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The ITRF2000

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Foreword

The ITRF2000 solution is intended to be a standard solution for a wide application community (geodesy, geophysics, navigation, etc.). It is achieved by combining simultaneously station positions and velocities using full variance-covariance information provided, in SINEX format, by the IERS analysis centers. The individual solutions incorporated in the combination are free from any external constraints, yielding actual space geodesy estimates in terms of station positions and velocities. The ITRF2000 origin is established by a weighted average of 5 over 7 submitted SLR solutions. Its scale is obtained by a weighted average of 5 SLR and 3 VLBI solutions. The ITRF2000 orientation is aligned to ITRF97 at epoch 1997.0 and its orientation time evolution is aligned to the geophysical model NNR-NUVEL-1A. The orientation and its time evolution were implemented using a consistent geodetic way, anchored over 50 sites of high geodetic quality. The ITRF2000 contains about 800 stations located on about 500 sites. Figure 1 shows the coverage of these sites, underlying the collocated space geodesy techniques.

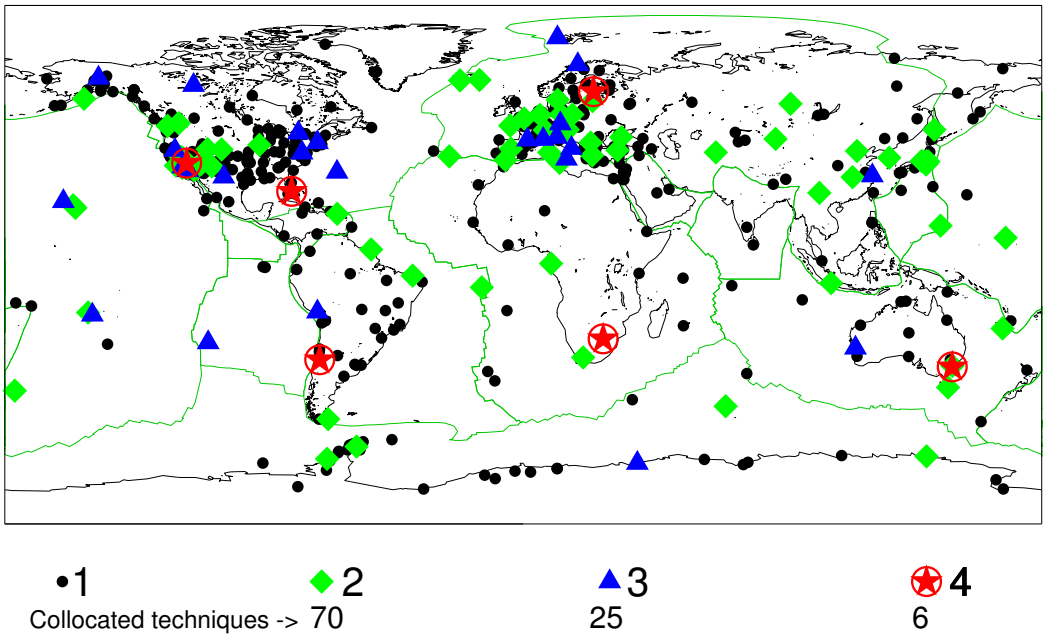

Fig. 1 ITRF2000 Primary Network and collocated techniques.

This Technical Note contains the main ITRF2000 products: station positions and velocities, transformation parameters between ITRF2000 and individual solutions used in the combination as well as the post fit residuals and statistics. The main technical procedure used to generate the ITRF2000, a thorough discussion of its quality as well as most important geodetic and geophysical results were published in Altamimi et al. (2002), appended to this Technical Note.

Prior to the ITRF2000 release, a dedicated Workshop was held on 2-3 November 2000 at the Ecole Nationale des Sciences Gographiques (ENSG), a part of the Institut Gographique National (IGN), in Champs-sur-Marne, France. The Workshop gathered members of the Working Group on ITRF Datum as well as representatives of most IERS Analysis Centers contributing to the ITRF2000. The full Workshop recommendations related to the ITRF2000 datum definition are appended to this Technical Note.

Note: The ITRF2000 is initially divided in two parts:

- Primary Combination of all (Global or Regional/Densification) solutions that contain both positions and velocities for all stations. This Technical Note is devoted to this primary combination.
- Densification solutions containing only station positions. This densification part will be computed and published on a later stage.

1 Current methodology for TRF combination

The current methodology is based on combining simultaneously station positions and velocities using full variance-covariance information provided, in SINEX format, by the IERS analysis centers.

1.1 Analysis strategy

The current analysis strategy adopted for the generation of ITRF solutions consists on the following steps:

- Removing constraints from the constrained solutions and applying minimum constraints equally to all individual solutions.
- Adding minimum constraints to loose solutions.
- Leaving as they are, solutions where analysis centers already applied minimum constraints.
- Propagating, for each individual solution, station positions at epochs of minimal position variance.
- Combining all solutions together with local ties, estimating variance components and iterating as necessary.

1.2 Model for simultaneous combination of station positions and velocities

Assuming that for each individual solution s, and each point i, we have position X_s^i at epoch t_s^i and velocity $\dot{X}_s^i$, expressed in a given TRF k.

The combination consists on estimating:

- Positions X_{itrf}^i at a given epoch t_0 and velocities $\dot{X}_{itrf}^i$ in ITRS
- Transformation parameters T_k at an epoch t_k and their rates $\dot{T}_k$, from the ITRF to each individual frame k

The general physical model used is given by the following equation (1):

$$\left\{ \begin{array}{rcl} X_s^i & = & X_{itrf}^i + (t_s^i - t_0)\dot{X}_{itrf}^i + T_k + D_k X_{itrf}^i + R_k X_{itrf}^i \\ & + & (t_s^i - t_k)\left[\dot{T}_k + \dot{D}_k X_{itrf}^i + \dot{R}_k X_{itrf}^i\right] \\ \\ \dot{X}_s^i & = & \dot{X}_{itrf}^i + \dot{T}_k + \dot{D}_k X_{itrf}^i + \dot{R}_k X_{itrf}^i \end{array} \right. \quad (1)$$

where for each individual frame k, D_k is the scale factor, the translation vector T_k and rotation matrix R_k are respectively defined (following IERS conventions) by:

$$T_k = \begin{pmatrix} T1_k \\ T2_k \\ T3_k \end{pmatrix} \quad \text{and} \quad R_k = \begin{pmatrix} 0 & -R3_k & R2_k \\ R3_k & 0 & -R1_k \\ -R2_k & R1_k & 0 \end{pmatrix}$$

The dotted parameters designate their derivatives with respect to time. $T1, T2, T3$ are the 3 origin components, $R1, R2, R3$ are the three small rotations according to the 3 axes, respectively X, Y, Z.

2 Selected data for ITRF2000

2.1 Solutions submitted by the IERS analysis centers

The selected solutions for the ITRF2000 combination are summarized in Table 1, underlying the constraint type applied by the individual analysis centers.

Table 1 Individual TRF solutions used in the ITRF2000 combination.

Technique **Analysis Center(AC)**	**AC** **SSC**	**Data** **Span**	**Station** **Number**	**Constraints**
VLBI				
Geodetic Institute of Bonn University	(GIUB) 00 R 01	84-99	51	Loose
Goddard Space Flight Center	(GSFC) 00 R 01	79-99	130	Loose
Shanghai Astronomical Observatory	(SHA) 00 R 01	79-99	127	Loose
LLR				
Forschungseinrichtung Satellitengeodaesie	(FSG) 00 M 01	77-00	3	Loose
SLR				
Australian Surveying and Land Information Group	(AUS) 00 L 01	92-00	55	Loose
Centro Geodesia Spaziale, Matera	(CGS) 00 L 01	84-99	94	Loose
Communications Research Laboratory	(CRL) 00 L 02	90-00	60	Loose
Center for Space Research	(CSR) 00 L 04	76-00	139	Loose
Delft Ins. Earth Oriented Space Research	(DEOS) 00 L 05	83-99	91	Loose
Deutsches Geodätisches Forschungsinstitut	(DGFI) 00 L 01	90-00	43	Removable
Joint Center for Earth System Technology, GSFC	(JCET) 00 L 05	93-00	48	Loose
GPS				
Center for Orbit Determination in Europe	(CODE) 00 P 03	93-00	160	Minimum
GeoForschungsZentrum Potsdam	(GFZ) 00 P 01	93-00	98	Minimum
International GPS Service by Natural Resources Canada	(IGS) 00 P 46	96-00	179	Minimum
Jet Propulsion Laboratory	(JPL) 00 P 01	91-99	112	Minimum
Univ of Newcastle upon Tyne	(NCL) 00 P 01	95-99	90	Minimum
NOAA, National Geodetic Survey	(NOAA) 00 P 01	94-00	165	Removable
DORIS				
Groupe de Recherche de Geodesie Spatiale	(GRGS) 00 D 01	93-00	66	Loose
Institut Gographique National	(IGN) 00 D 09	92-00	80	Minimum
Multi-technique (SLR + DORIS + PRARE)				
GRIM5 project (GRGS+GFZ)	(GRIM) 00 C 01	85-99	183	Loose
CSR: SLR + DORIS on TOPEX	(CSR) 00 C 01	-	147	Loose
GPS Densification				
CORS Network by NOAA	(CORS) 00 P 01	94-99	80	Removable
South America Network by Deutsches Geodätisches Forschungsinstitut	(DGFI) 00 P 01	96-00	31	Loose
IAG Subcommission for Europe (EUREF), by Bundesamt fuer Kartographie und Geodäsie	(EUR) 00 P 03	96-00	81	Minimum
Geophysical Institute, University of Alaska	(GIA) 00 P 01	96-99	20	Minimum
Institut Géographique National	(IGN) 00 P 01	98-00	28	Minimum
Jet Propulsion Laboratory	(JPL) 00 P 02	91-99	28	Minimum
Antartica network, by Institut Gographique National	(IGN) 00 P 02	95-00	17	Minimum
REGAL Network, France	(REGAL) 00 P 03	96-00	29	Minimum
Antartica SCAR network, by Institut fuer Planetare Geodaesie, TU Dresden	(SCAR) 00 P 02	95-99	66	Removable

2.1.1 Summary of the VLBI solutions

SSC(GIUB) 00 R 01

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Observing technique: VLBI, group delay observables
Data span: January 1984 - December 1999 (2282 sessions),
worldwide set of VLBI observations
Number of sites: 51
Number of radio sources: 681

Type of results: EOP, RSC, SSC

- station coordinates and velocities
- right ascension and declination of radio sources
- earth orientation parameters (X,Y,UT1-UTC,dpsi,deps) corrected for short periodic variations according to Gipson (1996)
- reference epochs for UT1-UTC and polar motion: midnight epochs
- reference epochs for nutation offsets: beginning of each session

Connection between systems:

- The orientation of CRF is defined by no-net-rotation constraints for 206 ICRF defining sources.
- Definition of initial translation and rotation of the TRF: Condition that the sum of adjustments of 12 sites with respect to ITRF97 is zero.
- The evolution of the TRF velocity field is defined by introducing the condition that the sum of adjustments of the velocities of five sites with respect to ITRF97 is zero.

SSC(GSFC) 00 R 01

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Mark III VLBI delay observations between August 1979 and October 2000 acquired by the NASA Crustal Dynamics Project, POLARIS/IRIS organized by NOAA, the Communications Research Laboratory (Japan), the Geographical Survey Institute (Japan), the University of Bonn Geodetic Institute, the National Astronomical Observatory (Japan), the Naval Research Laboratory Reference Frame Program, the USNO NAVEX/NAVNET, the NASA Space Geodesy Program-GSFC, and the National Earth Orientation Service (USA) have been analyzed for TRF. The origin and orientation of the TRF are connected to ITRF97 at 1997.0 by applying no-net-horizontal-translation and no-net-rotation constraints to the position adjustments of twelve stations with uniform station weighting for both constraints. The evolution of the TRF is connected to ITRF97 by applying no-net-horizontal-translation and no-net-rotation constraints to the velocity adjustments of five stations with uniform station weighting for both constraints. The right ascension origin and orientation of the CRF are connected to ICRF by applying a no-net-rotation constraint to the position adjustments of the 212 ICRF defining sources with weighting proportional to the precision of the source positions. Three-dimensional velocities are adjusted for all sites with constraints for those sites with insufficient data. The velocities of some groups of stations are constrained to be equal. Some stations are allowed a single discontinuous jump. Pressure loading is applied to remove the

temporal variations of the vertical positions without changing the mean vertical positions. Troposphere gradient parameters are generally estimated every six hours with a priori mean gradients derived from VLBI and weather data. Piece-wise linear, continuous troposphere zenith parameters are generally estimated every 20 minutes. Observations below 7 degrees elevation are excluded.

SSC(SHA) 00 R 01

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The VLBI analysis center at the Shanghai Observatory of Chinese Academy of Sciences analyze in this year the MKIII VLBI group delay observations between August 1979 and December 1999. The solutions produce the full set of RSC, SSC, SSV and EOP. Using almost all geodetic and astrometric experiments from the NASA Crustal Dynamics Project, POLARIS/IRIS organized by NOAA, the Communications Research Laboratory (Japan), the Geographical Survey Institute (Japan), the University of Bonn Geodetic Institute, the National Astronomical Observatory (Japan), the Naval Research Laboratory Reference Frame Program, the USNO NAVNET/NAVEX, the NASA Space Geodesy Program-GSFC, the National Earth Orientatio n Service (USA), CORE project, and APSG VLBI observations, the data include 2971 sessions and 2240434 group delay observations. There are 127 sites and 636 sources in the analysis. The TRF solution was loosely constrained.

2.1.2 Summary of the SLR solutions

SSC(AUS) 00 L 01

Lageos1 and Lageos2 global SLR solution from November 1992 to December 1999. Data processing undertaken in MICROCOSM, normal equation stacking in SOLVE. Solution epoch is 97:001:00000. ITRF97 used as apriori model, coordinates constrained to $\pm 1m$, velocities constrained to $\pm 1m/yr$.

SSC(CGS) 00 L 01

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The SLR solution CGS00L01 provides SSC/SSV at the reference epoch 970101 and 3-day EOP derived from Lageos I (Jan 84 - Oct 99) and Lageos II (Nov 92 - Oct 99) data. The normal points are analysed in 30-day arcs using EGM96 geopotential (up to degree 70) and its own tides model, taking into account the secular drift and the influence of the dynamical pole on C21 and S21 coefficients, all the major planets perturbations as well as the relativistic effects. Residual unmodelled effects in the along-track direction are minimized by the estimation of empirical accelerations. The normal equations are built up for all the parameters to be estimated, but at this stage, they are solved just for the arc parameters, namely those related to the orbit (state vector and along-track acceleration) and to the laser tracking systems (station range bias). This arc inversion is performed with a bayesian least square procedure by the NASA/GSFC GEODYNII software. All the normal equations with the updated arc parameters are then combined solving for the global parameters in a least squares sense using the NASA/GSFC SOLVE software. Site coordinates and velocities, C20 zonal coefficient and EOP (X, Y, UT1R-UTC) are estimated keeping UT1R-UTC fixed at the IERS values at the beginning of each arc and with loose constraints on SSC/SSV.

SSC(CRL) 00 L 02

Toshimichi Otsubo (NERC & CRL), Tadahiro Gotoh (CRL)

SSC(CRL)00L02 is a 10-year solution of station positions and velocities from Communications Research Laboratory, Tokyo, Japan. CRL analysis software CONCERTO 3.22 processed the global SLR data from 60 stations: Lageos-1 tracking data from 9 Jan 1990 (MJD 47900) to 6 Jan 2000 (51549), and Lageos-2 data from 24 Nov 1992 (48950) to 6 Jan 2000 (51549). Positions (epoch: 1 Jan 1997) were solved for per system, but velocities of systems in the same 'site', which is defined by first 5 digits of DOMES number, were constrained to be the same. Loose constraints to ITRF97 were also applied to the sites of 7090, 7105, 7110, 7210, 7403, 7839 and 7840, both for positions (10m) and velocities (1m/y). Earth orientation parameters were also solved for. The IERS Conventions 1996 were followed except the use of the EGM96 earth gravity field and the JPL DE/LE 405 planetary ephemeris. Range bias was estimated for all the stations every 50 days.

SSC(CSR) 00 L 04

The solution CSR00L04 used Lageos-1 data from May 1976 to February 2000 and Lageos-2 data from November 1992 to February 2000. A single station position at epoch 1997Jan01 00:00 and a single velocity were adjusted for each location from which SLR data to the Lageos satellites was obtained. Range biases were adjusted for every site every 12 days. Orbital elements were adjusted for each satellite every 30 days for the earliest data and each day for the most recent.

SSC(DEOS) 00 L 05

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The solution SSC(DEOS)00L05 consists of a coherent set of station positions and velocities. This solution has been determined from SLR observations of LAGEOS-1 (September 1983 - December 1999) and of LAGEOS-2 (October 1992-December 1999). In total, SSC(DEOS)00L05 includes 91 stations. The reference epoch is January 1, 1993. The kinematic component of SSC(DEOS)00L05 is not rigidly determined: a priori values for station velocities are taken from the NUVEL-1A NNR model, whereas a priori standard deviations of the velocities for all stations are set at 1 m/yr.

SSC(DGFI) 00 L 01

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The global solution SSC(DGFI)00L01 has been derived from LAGEOS-1 (January 1990 - December 1999) and LAGEOS-2 (October 1992 - December 1999) data. This solution consists of a coherent set of station positions and velocities of 43 stations. The reference epoch is January 1, 1997. SLR stations with a time series of less than one year are not included. Furthermore the final SLR solution does not include stations that show significant differences between our LAGEOS-1 and LAGEOS-2 results. In a first step weekly solutions were computed for LAGEOS-1 and LAGEOS-2. The results were used for data screening and outlier detection. Normal equations (including station positions, velocities and EOP's) were generated. In a second step these weekly normal equations were combined to derive the final set of station coordinates and velocities.

The datum is defined by fixing one UT1 correction for each weekly arc and by introducing constraints (a-priori ITRF97 station coordinates with a standard deviation of 1 mm and velocities with a standard deviation of 1 mm/yr) for the stations 7105 (Washington) and 7840 (Herstmonceux).

SSC(JCET) 00 L 05

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The solution is based on the analysis of laser ranging data to Lageos 1 and Lageos 2 from January 3, 1993 to January 3, 2000, in the form of ILRS Normal Points (NP). We have used all the data available from all the stations that tracked the two spacecraft during the analysis period.

2.1.3 Summary of the GPS solutions

SSC(CODE) 00 P 03

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The solution made available to the IERS by the CODE Analysis Center of the IGS for the 2000 submission was produced using as observations the GPS data of the global IGS network. The solution is based on observation over the time interval from GPS week 0782 (Jan. 1, 1995) to GPS week 1050 (Feb. 26, 2000).
A constraint of 1 m was put onto the coordinates in order to regularize the a priori significant constraints matrix (MATRIX_ESTIMATE). These constraints were week enough and did not change the solution.

SSC(GFZ) 00 P 01

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A global set of station coordinates (SSC(GFZ)00P01) and earth orientation parameters (EOP(GFZ)00P01) have been estimated from the analysis of the global GPS data spanning 7 years from January 1, 1993, to December 31, 1999 using the GFZ analysis software package EPOS.P.V2.

The number of sites included in the estimated global set is 104. Site velocities are adjusted for all sites which were analyzed for more than one year (∼90 sites). The velocity in height is loosely constrained. The orientation of the system was defined by applying no-net-rotation constraints both for the site coordinates and the site velocities, as a reference the ITRF99 (ITRF97_IGS_RS51.SNX) reference frame including velocities was used.

SSC(IGS) 98 P 46

Remi Ferland

This cumulative solution contains almost 5 years (1996-2001) of GPS data. Between GPS weeks 0837 and 1088, the weekly combined solutions from jpl, mit and ncl Global Associates Analysis Centers (GNAAC) were used in the cumulative solution. Since GPS week 0978, the Analysis Centers (AC) (code, emr, esa, gfz, jpl, ngs and sio) are used in the combination, while the GNAAC are used to quality control the weekly combination. The solutions are combined using the least-squares technique. All the available covariance information is used. All the solutions

were unconstrained and compared. AC/GNAAC station coordinates estimates were rejected if they exceed thresholds of 5 sigmas or 50 mm. The weekly combination also includes daily ERP (pole position and rate, LOD) since GPS week 1013 and weekly apparent geocenter estimates since GPS week 0978. The cumulative combination is updated every week with the current weekly combination. This cumulative solution includes station coordinates and velocity for 167 sites. The cumulative solution is aligned to ITRF97 by applying 14 parameters transformation estimated using a set of 51 so called reference frame stations. Inner constraints in origin, orientation and scale (and rates) are applied to the solution.

SSC(JPL) 00 P 01

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The most recent velocity and position solution from JPL is based on nearly nine years of data from 91JAN22 through 99OCT30. Position and velocity estimates were included for global sites with two year or more of data and official IGS log file information. Daily estimation was carried out with JPL's GIPSY software using strategies which generally adhered to IERS/IGS standards as described by Zumberge et al. (1997), Blewitt et al. (1992), and Heflin et al. (1992). Each daily coordinate and eop solution was aligned with ITRF97 by estimation and application of three rotations, three translations, and one scale. Antenna height corrections were applied based on information in the official IGS site logs. Unknown offsets due to equipment changes or co-seismic motion were estimated as necessary and outliers were removed. Positions, velocities, and time series of latitude, longitude, height, polar motion, length of day, geocenter, and scale estimates are all available via the web at <[1]>.

SSC(NCL) 00 P 01

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The solution presented is a kinematic combination of weekly P-sinex solutions from the Newcastle IGS Global Associate Analysis Centre. The data span four years gpsweeks 815-1022 (August 95 - August 99) and the minimum observation period for individual sites is 2 years.

Each weekly solution is a combination of the 7 IGS Analysis Centre (AC) solutions, stations having a minimum of 3 AC estimates form the core of the weekly solution (NCL G-sinex) any remaining AC stations being attached by back substitution, IGS RNAAC stations are also attached in this manner but are not included in the current kinematic solution.

The kinematic solution is iterated removing outliers at 3.0 standard deviations times the mean residual for each station. The resulting solution has loose constraints on orientation and orientation rate, the solution is aligned to the IGS ITRF97 constraining subset by estimating and applying a 14 parameter Helmert transformation. The estimate variance covariance is projected using minimum internal constraints to reflect the level of frame attachment.

[1] http://sideshow.jpl.nasa.gov/mbh/series.html

SSC(NOAA) 00 P 01

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This SINEX file was generated using NOAA's pages and gpscom software from the GPS ionosphere-free combination of phase observations. All available data from every third day between 94/001 - 99/365 were included. From this, station coordinates and velocities, GPS orbits, EOP X and Y pole and daily UT1 rates, and double-difference phase ambiguities were estimated. The adjustment included a number of sites which do not have Domes numbers and therefore are not wanted for the ITRF combination. These sites have been treated as nuisance parameters, like the orbits, EOP, etc., and were eliminated in the reduction of the matrix before the final set of sites included in this Sinex file.

2.1.4 Summary of the DORIS solutions

SSC(GRGS) 00 D 01

J.F. Cretaux, A. Cazenave (LEGOS-GRGS)
L. Soudarin, J-J Valette (CLS)

A solution of coordinates and velocities has been computed using the DORIS data of 6 years of SPOT2, SPOT3, SPOT4 and TOPEX/POSEIDON: January 1993 to December 1998. This solution concerns all the stations of the DORIS network which have observed enough in order to estimate their motions (66 stations).

Data analysis:

The DORIS data are analysed through a dynamical orbit computation in which the satellite orbit, station positions and velocities, and EOP are determined in a single inversion, together with selected parameters required to improve the force model and the measurement corrections. Orbits are computed on a daily basis for the both SPOT satellites, and on a 3-days basis for the TOPEX/POSEIDON satellite, from which normal equations for station coordinates, velocity vectors and EOP are derived. Individual normal equations of orbit computations for each satellite have been accumulated to form a 6-year combined matrix involving data of the four satellites. The inversion of this matrix yields the solution for the geodetic parameters.

The gravity field model used in the orbit computation is EGM96.

Estimated parameters:

- The EOP parameters are kept free with EOPC04 values as a-priori values.
- The stations parameters (positions and velocities) were all estimated, to make the frame entirely free.
- For DORIS stations located on the same site only the velocity of the site was estimated, and the coordinates of each stations were estimated separately.
- The solution SSC(GRGS) 00 D 01 gives positions and motions of 66 stations.

References

- Cazenave A., L. Soudarin, J-F. Cretaux, and C. Le-Provost, Sea level changes from Topex / Poseidon altimetry and tide gauges, and vertical crustal motions from DORIS, Geophysical Research letter, 26, 20777-2080, 1999.

- Cretaux J-F., L. Soudarin, A. Cazenave and F. Bouille, Present-day tectonic plate motions and crustal deformations from the DORIS space system, Journal of Geophysical Research, 103, 30167-30181, 1998.
- Soudarin L., J-F Cretaux, and A. Cazenave, Vertical crustal motions from the DORIS space geodesy system, Geophysical Research Letter, 26, 1207-1210, 1999.
- IERS Technical Note 27.

SSC(IGN) 00 D 09

Pascal Willis and Zuheir Altamimi (IGN)

Monthly station position solutions for DORIS Network were computed at IGN using Gipsy/Oasis II software including DORIS data of all available satellites (SPOT2+SPOT3+SPOT4+TOPEX). Data span: October 1993 - March 1999. These monthly solutions were combined together using CATREF software, estimating station positions at a reference epoch (mid data span) and station velocities.

2.1.5 Summary of the Multi-technique solutions

SSC(GRIM) 00 C 01

COMBINED SLR, DORIS and PRARE SITE COORDINATES AND VELOCITIES SOLUTION COMPUTED BY GRGS/GFZ in the framework of GRIM5-S2

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A solution of coordinates and velocities has been computed using:

- SLR data of 14.5 years of tracking on Lageos (Mai 1985 to September 1999)
- SLR data of 7 years of tracking on Lageos2 (November 1992 to September 1999)
- DORIS data of four 4-month periods for SPOT2, SPOT3, SPOT4 (between November 1993 and June 1999)
- SLR and DORIS data of four 4-month periods for TOPEX/Poseidon (between November 1993 and June 1999)
- PRARE data from 50 ERS2 6-day arcs (between July 1995 and October 1997)

This solution concerns 183 SLR and DORIS and 26 PRARE stations in position and in velocity.

Data analysis:

The tracking data are analysed through a dynamical orbit computation in which the satellite orbit, station positions and velocities are determined in a single inversion, together with selected parameters required to improve the force models and the measurement corrections. Orbits are computed by 10-day arcs for the Lageos satellites, by 2- to 4-day arcs for the SPOT satellites, by 3- to 5-day arcs for the TOPEX/Poseidon satellite and by 6-day arcs for ERS2. Normal equations are then formed for orbit parameters, force parameters, station coordinates and velocity vectors. Individual normal equations are accumulated to form a combined matrix. The inversion of this matrix yields the solution for the geodetic parameters. The connection between the SLR, DORIS and PRARE net-

works in that combined station solution is obtained through the simultaneous use of these techniques on satellites such as TOPEX/Poseidon and ERS2, and not through the use of ground survey ties between stations.

The gravity field model used in the orbit computation is GRIM5-S1.

Estimated parameters

- The position of 209 SLR, DORIS and PRARE stations was estimated, using as only constraint: final position = initial position $\pm 10m$.
- The velocity of 153 sites was estimated. The solution was stabilized by constraining it to an a-priori model (NNR-NUVEL1A and ICE4G-VM2) with a sigma of 1 m/y.

SSC(CSR) 00 C 01

The CSR00C01 solution is made using ninety-six sets of twenty-eight 1-day orbital arcs fit using all of the SLR and DORIS tracking of the Topex/Poseidon satellite.

2.1.6 Summary of the GPS Regional solutions

SSC(CORS) 00 P 01

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This SINEX file was generated using NOAA's pages and gpscom software from the GPS ionosphere-free combination of phase observations. All available CORS data from every third day between 94/001 - 99/365 were included. From this, station coordinates and velocities, GPS orbits, EOP X and Y pole and daily UT1 rates, and double-difference phase ambiguities were estimated. The adjustment included a number of sites which do not have Domes numbers and therefore are not wanted for the ITRF combination. These sites have been treated as nuisance parameters, like the orbits, EOP, etc., and were eliminated in the reduction of the matrix before the final set of sites included in this Sinex file.

SSC(DGFI) 00 P 01

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SC(DGFI)00P01 is a regional solution including the permanent GPS network of South America as available to DGFI and a number of additional sites in the Antarctica, the Atlantic Ocean, the Pacific Ocean and the Caribbean Sea. It covers the time period from July 1996 to February 2000, and provides position and linear velocity estimates of 31 sites being in operation since at least one year. The solution is based on weekly SINEX files generated by DGFI as the IGS RNAAC for South America. IGS combined orbits and Earth orientation parameters were held fixed. The solution is referred to ITRF97 by introducing positions at the reference epoch (1998, day 119) and velocities of CRO1, FORT and SANT as fictitious observations. The weight applied to these "observations" is set such as to still allow the positions and velocities of these fiducial stations to deviate from their ITRF97 values by some mm and mm/10 respectively.

SSC(EUR) 00 P 03

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D. Ineichen, L. Mervart (Astronomical Institute, University of Berne),
C. Bruyninx (Royal Observatory Belgium)

The EUREF ITRF2000 contribution solution SSC(EUREF)00.P03 was generated November 2000 and comprises data from 96:182:00000 to 00:001:86369, GPS weeks 0860 to 1042.

It is stored in SINEX VERSION 1.00 and was created by the program ADDNEQ2, V4.3 of the Bernese Software. The technique is GPS (P). Original solutions were computed with 180s sampling interval and estimated parameters were coordinates, phase ambiguities and 12 tropospheric zenith path delay values per day. By use of IGS products loosely constrained solutions in the ITRF97 reference frame are computed.

It is computed from the weekly EUREF combination solution obtained from the 12 EUREF analysis centers (ASI, BEK, BKG, COE, GOP, IGN, LPT, NKG, OLG, ROB, UPA, WUT) and generated at the Bundesamt für Kartographie und Geodäsie BKG, Frankfurt.

Contact is the EUREF analysis coordinator[2] on behalf of the IAG Commission X, Subcommission for Europe (EUREF).

The combination of 183 weekly solutions comprise 86 estimated coordinate sets of 81 stations. Stations ANKR 20805M002 (1999 08 15 00 00 00), HERS 13212M007(1999 04 25 00 00 00), PFAN 11005S002(1999 10 31 00 00 00), TRO1 10302M006(1998 12 27 00 00 00) and ZIMM 14001M004(1998 11 08 00 00 00) were assigned two sets of coordinates after discontinuities in the time series at the epochs given above.

Velocities for 81 sites were estimated. Coordinates and velocities of sites with time series of less than 6 months were not estimated.

Coordinates and velocities in the SINEX file are tied to the ITRF97 by a minimum constraint in translation applied to the IGS core sites: VILL, REYK, ONSA, WTZR, POTS, KOSG, MATE and ZWEN.

The a-priori covariance matrix is not included to the SINEX file. Constraints should be removed by estimation of three translation parameters for coordinates and for velocities in the combination. In this way the relative constraints used for some stations with jumps in the co ordinates are maintained. Detailed sites descriptions and logsheets can be accessed at <[3]>.

SSC(GIA) 00 P 01

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We contribute an IGS densification solution to the ITRF2000. This solution includes positions and velocities of well-determined permanent GPS sites in Alaska and NW Canada.

SSC(IGN) 00 P 01

Philippe Nicolon and Zuheir Altamimi (IGN)

Weekly station position solutions of the French RGP network were generated using Bernese Software as part of the IGN contribution to EUREF. Spanning approximately 2 years, these weekly solutions were combined together using CATREF software, estimating station positions at a reference epoch (mid data span) and station velocities.

[2] heinz.habrich@bkg.bund.de
[3] http://homepage.oma.be/euref/eurefhome.html

SSC(IGN) 00 P 02

Marie-Noëlle Bouin and Zuheir Altamimi (IGN)

Weekly station position solutions of the Antarctica network were generated using GAMIT Software. Spanning approximately 5 years (1995-2000), these weekly solutions were combined together using CATREF software, estimating station positions at a reference epoch (mid data span) and station velocities.

SSC(REGAL) 00 P 03

Eric Calais and Jean-Mathieu Nocquet

We process on a daily routine basis about 30 permanent GPS sites around the Alps in Italy, France, Germany, Austria, and Switzerland. We process pseudo-range and phase GPS data in single solutions using the GAMIT software. We solve for regional station coordinates, satellite state vector, 13 tropospheric zenith delay parameters per site and day, and phase ambiguities using doubly-differenced GPS phase-measurements, with IGS final orbits and IERS earth orientation parameters. The least-squares adjustment vector and its corresponding variance-covariance matrix for station positions and orbital elements estimated for each independent daily solution are then passed to a Kalman filter (GLOBK, Herring et al., 1990) in order to estimate position and velocities, using loose constrains on IGS sites coordinates.

2.2 Local surveys

As an improvement of the use of the local ties, all the eccentricities of colocated sites were converted into a complete set of positions for each site, provided in SINEX format. Each SINEX file reflects correlations between the cartesian components of the points within each site. This has been achieved by solving for the following system of observation equations (2):

$$\begin{pmatrix} \Delta x_s^{i,j} \\ \Delta y_s^{i,j} \\ \Delta z_s^{i,j} \end{pmatrix} = \begin{pmatrix} x^j - x^i \\ y^j - y^i \\ z^j - z^i \end{pmatrix} \tag{2}$$

Where ($\Delta x_s^{i,j}$, $\Delta y_s^{i,j}$, $\Delta z_s^{i,j}$) are the geocentric components of the tie vector linking two points i and j, of a given data set s. The standard deviations (SD) ($\sigma\Delta x_s^{i,j}$, $\sigma\Delta y_s^{i,j}$, $\sigma\Delta z_s^{i,j}$) for each local tie vector are used to compute a diagonal variance matrix. If these SD are not available, they are computed by:

$$\sigma_{computed} = \sqrt{\sigma_1^2 + \sigma_2^2} \tag{3}$$

where, $\sigma_1 = 3$ mm and $\sigma_2 = 10^{-6} \times \sqrt{(\Delta x_s^{i,j})^2 + (\Delta y_s^{i,j})^2 + (\Delta z_s^{i,j})^2}$

The equation system (2) needs of course initial coordinates for one point per tie vector set s, which are taken from ITRF solutions with 1 meter as standard deviation.

Table 5 of the appendix lists the local ties vectors used in the ITRF2000 combination.

3 ITRF2000 results

The ITRF2000 adjusted coordinates at epoch 1997.0 and velocities were split into 4 tables corresponding to the 4 techniques: VLBI, SLR, GPS and DORIS. These Tables are available in the Appendix. The ITRF2000 SINEX file as well as SINEX per technique are all available, (see section 5).

Table 10 of the Appendix contains the adjusted transformation parameters at epoch 1997.0 of each individual solution w.r.t. ITRF2000 as well as the corresponding rates. The transformation parameters are from each individual solution to the ITRF2000 and should be used with equation (4).The rates have to be considered as annual variations to the transformation parameters and should be used with equation (5). On the other hand, for a given transformation parameter T provided at an epoch t_k, its value at an epoch t in years could be obtained by equation (6).

$$\begin{pmatrix} X_s \\ Y_s \\ Z_s \end{pmatrix} = \begin{pmatrix} X \\ Y \\ Z \end{pmatrix} + \begin{pmatrix} T1 \\ T2 \\ T3 \end{pmatrix} + \begin{pmatrix} D & -R3 & R2 \\ R3 & D & -R1 \\ -R2 & R1 & D \end{pmatrix} \begin{pmatrix} X \\ Y \\ Z \end{pmatrix} \quad (4)$$

$$\begin{pmatrix} \dot{X}_s \\ \dot{Y}_s \\ \dot{Z}_s \end{pmatrix} = \begin{pmatrix} \dot{X} \\ \dot{Y} \\ \dot{Z} \end{pmatrix} + \begin{pmatrix} \dot{T}1 \\ \dot{T}2 \\ \dot{T}3 \end{pmatrix} + \begin{pmatrix} \dot{D} & -\dot{R}3 & \dot{R}2 \\ \dot{R}3 & \dot{D} & -\dot{R}1 \\ -\dot{R}2 & \dot{R}1 & \dot{D} \end{pmatrix} \begin{pmatrix} X \\ Y \\ Z \end{pmatrix} \quad (5)$$

Where X, Y, Z are the coordinates in the ITRF2000 and X_s, Y_s, Z_s are the coordinates in the individual system.

$$T(t) = T(t_k) + \dot{T} \times (t - t_k) \quad (6)$$

4 Analysis of the ITRF2000 results

The quality analysis of the ITRF2000 results is based more specifically on global residuals per solution (Table 2) as well as per site. All residuals on a site-by-site basis resulting from the combination are available in the Appendix (Table 11). In this Table, the following residuals are provided, per individual solution, for each station within each site, both for positions and velocities:

- (RX, RY, RZ) the 3 residual components in the geocentric frame;
- (RE, RN, RU) the 3 residual components in the local frame;
- (NE, NN, NU) the 3 normalized residual components in the local frame, such as, for example: $NE = \frac{RE}{\sigma_E}$, where σ_E is the uncertainty of the Easting component.

It should be noted that, since the individual solutions were mapped at their Epochs of Minimal Position Variance, this leads obviously to one epoch per station. Consequently, the post fit position residuals are naturally computed at the epoch of each station. Figure 2 shows ITRF2000 position and velocity formal errors as compared to those of ITRF97.

Table 2 Global ITRF2000 residuals per solution.

Solution	Station Nb.	Position WRMS mm	Velocity WRMS mm/y	MSF[1]
SSC(GIUB) 00 R 01	55	2.90	.90	3.71785
SSC(GSFC) 00 R 01	135	2.10	.50	2.55776
SSC(SHA) 00 R 01	134	3.20	1.20	2.37177
SSC(FSG) 00 M 01	3	53.00	4.50	2.97914
SSC(AUS) 00 L 01	52	9.40	4.00	.05641
SSC(CGS) 00 L 01	91	13.60	2.50	5.57565
SSC(CRL) 00 L 02	60	10.00	3.90	2.74816
SSC(CSR) 00 L 04	127	9.40	2.40	3.09817
SSC(DEOS) 00 L 05	87	10.90	4.60	7.02571
SSC(DGFI) 00 L 01	38	8.50	2.70	15.39293
SSC(JCET) 00 L 05	40	2.40	1.20	8.10320
SSC(CODE) 00 P 03	155	5.00	2.00	78.08821
SSC(GFZ) 00 P 01	94	3.10	1.90	.32788
SSC(IGS) 00 P 46	156	1.40	1.30	1.09528
SSC(JPL) 00 P 01	105	1.90	1.10	8.84726
SSC(NCL) 00 P 01	87	1.50	1.30	3.39173
SSC(NOAA) 00 P 01	157	3.20	1.60	58.90799
SSC(GRGS) 00 D 01	63	24.90	4.30	3.49859
SSC(IGN) 00 D 09	79	29.90	5.00	10.38382
SSC(GRIM) 00 C 01	162	9.40	2.10	1.41812
SSC(CSR) 00 C 01	135	5.60	1.60	4.40935
SSC(CORS) 00 P 01	18	2.20	1.40	57.23262
SSC(DGFI) 00 P 01	22	5.50	3.70	116.53909
SSC(EUR) 00 P 03	64	1.30	1.10	9.60853
SSC(GIA) 00 P 01	15	1.40	1.10	6.41125
SSC(IGN) 00 P 01	25	.90	1.40	4.67679
SSC(IGN) 00 P 02	17	2.10	1.60	4.26560
SSC(JPL) 00 P 02	24	2.90	1.80	14.92792
SSC(REGAL) 00 P 03	24	1.40	1.30	10.13074
SSC(SCAR) 00 P 02	29	8.00	2.80	89.68960

[1]Square Root of Matrix Scaling Factor.

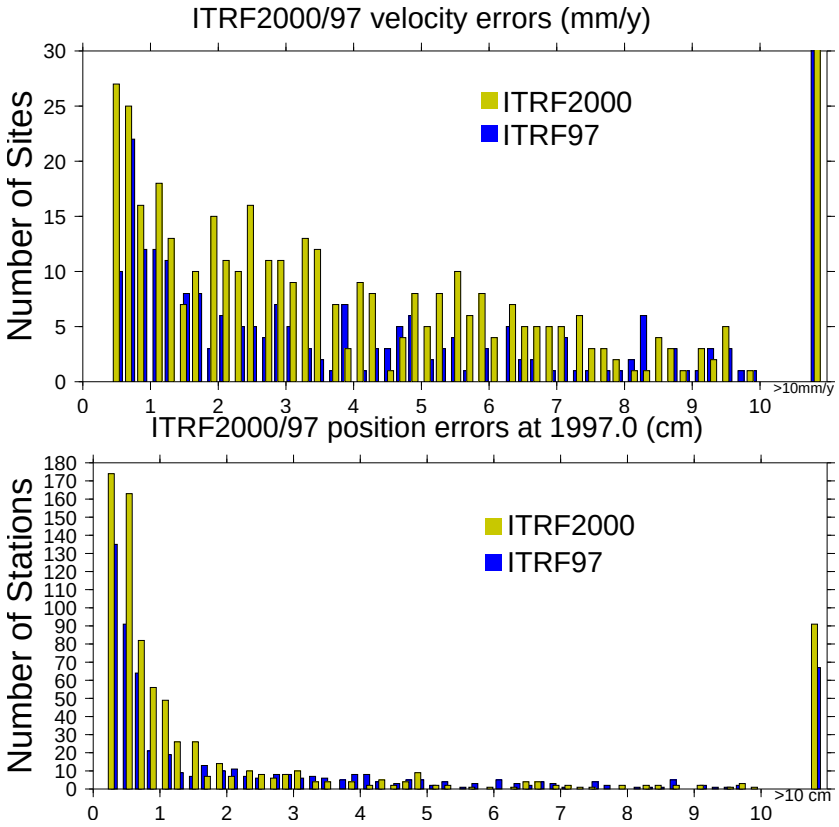
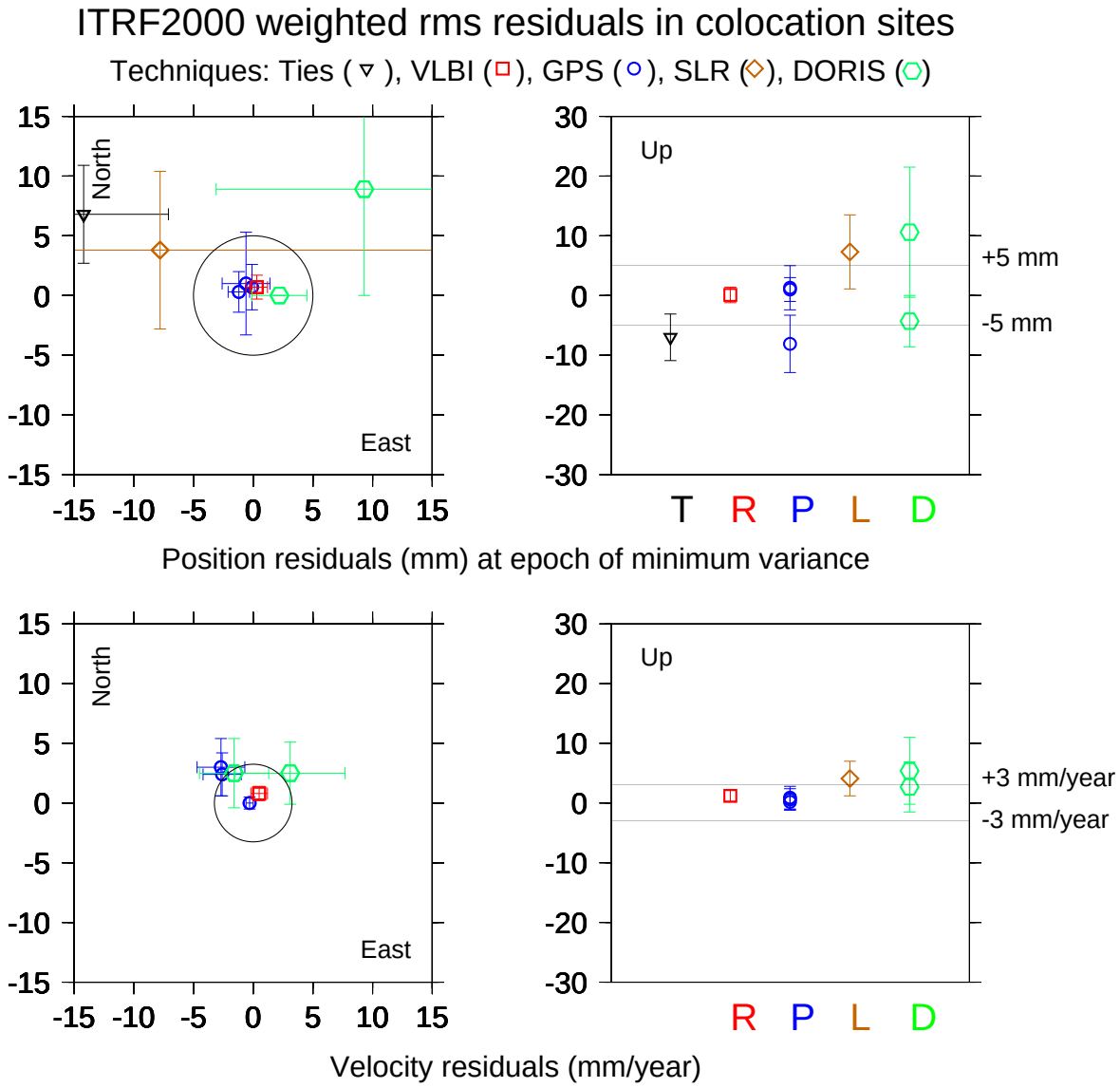


Fig. 2 Position and velocity formal errors.

Plots of post fit ITRF2000 Residuals in collocation sites are available at <[4]>.

As an example, figure 3 on page 21 illustrates position and velocity residuals in Hartebeesthoek (South Africa) collocated site. Figure 4 on page 22 portrays the Histogram of normalized residuals in ITRF2000 collocation sites.

[4] http://lareg.ensg.ign.fr/ITRF/ITRF2000-coloc/valsit.html



30302 HARTEBEESTHOEK

Point	Techn.	Nsol	Position (mm) East	North	Up	Velocity (mm/year) East	North	Up	
	Ties	T 5	-14.2	6.8	-7.0				
S001	VLBI	R 3	.3	.7	.1	.5	.8	1.2	1
M002	GPS	P 3	-.6	1.0	1.3	-2.7	3.0	.6	2
M004	GPS	P 4	-1.2	.3	1.0	-.3	.0	.9	3
M007	GPS	P 4	-.1	.7	-8.1	-2.6	2.4	.2	4
M003	SLR	L 3	-7.8	3.8	7.3	18.0*	20.8*	4.1	5
S005	DORIS	D 2	9.3	8.9	10.6	-1.6	2.5	2.7	6
S202	DORIS	D 2	2.2	.0	-4.3	3.1	2.5	5.4	7

[*: values falling outside above frames]

Fig. 3 Position and velocity residuals in Hartebeesthoek (South Africa) collocated site.

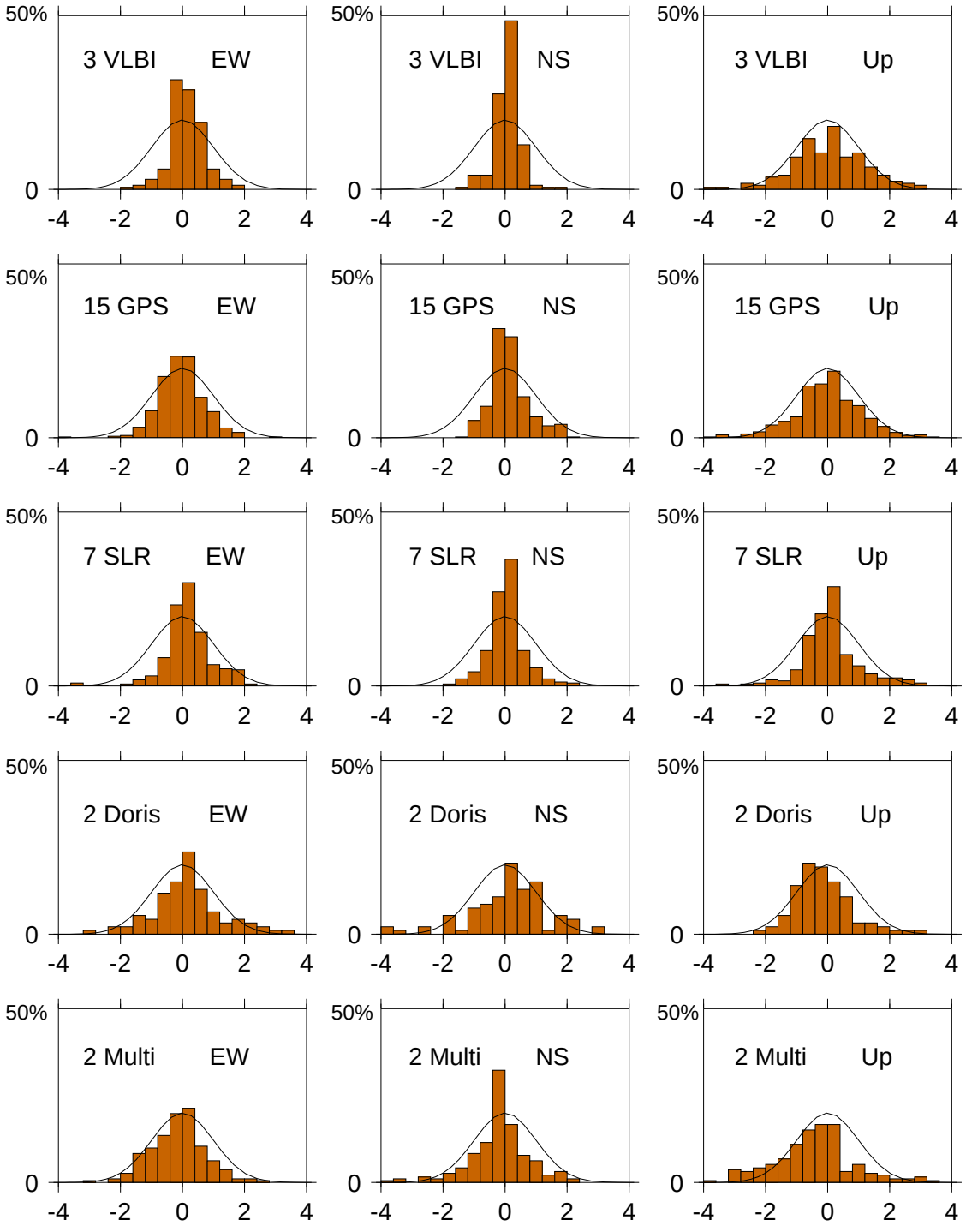


Fig. 4 Histogram of normalized residuals in ITRF2000 collocation sites.

5 Access to the ITRF2000 files

All the ITRF2000 related files are available via Internet:

http://lareg.ensg.ign.fr/ITRF/ITRF2000

The SINEX files are available by anonymous ftp:

ftp lareg.ensg.ign.fr (195.220.92.14)

username: anonymous
password: e-mail address
move to the itrf2000 directory: *cd pub/itrf/itrf2000*

- compressed ITRF2000 SINEX file (ITRF2000.SNX.gz; available on request)
- compressed ITRF2000_VLBI SINEX file (ITRF2000_VLBI.SNX.gz)
- compressed ITRF2000_SLR SINEX file (ITRF2000_SLR.SNX.gz)
- compressed ITRF2000_GPS SINEX file (ITRF2000_GPS.SNX.gz)
- compressed ITRF2000_DORIS SINEX file (ITRF2000_DORIS.SNX.gz)
- compressed ITRF2000_EUR_GPS_PERM SINEX file (ITRF2000_EUR_GPS_PERM.SNX.gz)
- compressed ITRF2000_EUROPE SINEX file (ITRF2000_EUROPE.SNX.gz)

References

Altamimi, Z., P. Sillard, and C. Boucher, ITRF2000: A new release of the International Terrestrial Reference Frame for earth science applications, J. Geophys. Res., 107(B10), 2214, doi:10.1029/2001JB000561, 2002.

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Table 3 Catalogue of IERS sites.

Release : 2002 8 29

DOMES Number	Site Name	Country	Long. d m	Lat. d m	Plate
10001	PARIS	FRANCE	2 25	48 51	EURA
10002	GRASSE	FRANCE	6 55	43 45	EURA
10003	TOULOUSE	FRANCE	1 29	43 34	EURA
10004	BREST	FRANCE	355 30	48 25	EURA
10011	SAINT-MICHEL DE PROVENCE	FRANCE	5 43	43 56	EURA
10020	CHIZE	FRANCE	359 36	46 08	EURA
10023	LA ROCHELLE	FRANCE	358 47	46 10	EURA
10073	MARSEILLE	FRANCE	5 21	43 17	EURA
10077	AJACCIO	FRANCE	8 44	41 56	EURA
10090	SAINT JEAN DES VIGNES	FRANCE	4 41	45 53	EURA
10091	LE MANS	FRANCE	0 09	48 01	EURA
10092	MARNE LA VALLEE	FRANCE	2 35	48 50	EURA
10093	VERON	FRANCE	1 30	49 06	EURA
10094	SEVRES	FRANCE	48 50	2 13	EURA
10095	CADARACHE-GINASSERVIS	FRANCE	5 47	43 41	EURA
10096	MODANE-AVRIEUX	FRANCE	6 43	45 13	EURA
10097	MONTPELLIER	FRANCE	3 52	43 38	EURA
10098	LA FECLAZ	FRANCE	5 59	45 39	EURA
10099	CHATEL	FRANCE	6 22	45 18	EURA
10101	COPENHAGUEN	DENMARK	12 30	55 44	EURA
10106	HIRTSHALS	DENMARK	9 58	57 36	EURA
10112	HOVVIG	DENMARK	8 07	56 10	EURA
10113	SULDRUP	DENMARK	9 45	56 51	EURA
10114	SMIDSTRUP	DENMARK	9 34	55 38	EURA
10115	ESBJERG	DENMARK	8 26	55 27	EURA
10116	GEDSER	DENMARK	11 55	54 34	EURA
10117	THORSHAVN	DENMARK	353 14	62 00	EURA
10202	REYKJAVIK	ICELAND	338 07	64 14	EURA
10204	HOFN	ICELAND	-15 12	64 16	EURA
10302	TROMSO	NORWAY	18 56	69 40	EURA
10307	OSLO	NORWAY	10 39	59 50	EURA
10317	NY-ALESUND	NORWAY	11 56	78 55	EURA
10322	DOMEN	NORWAY	31 02	70 20	EURA
10325	HONEFOSS	NORWAY	10 15	60 08	EURA
10329	TRYSIL	NORWAY	12 23	61 25	EURA
10330	STAVANGER	NORWAY	5 36	59 01	EURA
10331	TRONDHEIM	NORWAY	10 19	63 22	EURA
10332	GiH Gjovik	NORWAY	10 41	60 47	EURA
10402	ONSALA	SWEDEN	11 55	57 24	EURA
10403	KIRUNA	SWEDEN	20 25	67 50	EURA
10405	MARTSBO	SWEDEN	17 16	60 36	EURA
10422	KIRUNA/ESRANGE	SWEDEN	21 04	67 53	EURA
10423	VISBY	SWEDEN	18 22	57 39	EURA
10424	VILHELMINA	SWEDEN	16 34	64 42	EURA
10425	BORAS	SWEDEN	12 53	57 43	EURA
10503	METSAHOVI	FINLAND	24 23	60 13	EURA
10511	VAASA	FINLAND	21 46	62 58	EURA
10512	JOENSUU	FINLAND	30 06	62 23	EURA
10513	SODANKYLA/PITTIOVAARA	FINLAND	26 23	67 25	EURA
10801	VILNIUS	LITHUANIA	25 18	54 39	EURA
11001	GRAZ LUSTBUEHEL	AUSTRIA	15 30	47 04	EURA
11005	PFANDER	AUSTRIA	9 47	47 30	EURA
11006	INNSBRUCK/HAFELEKAR	AUSTRIA	11 22	47 15	EURA
11027	HUTBIEGL	AUSTRIA	15 36	48 39	EURA
11028	REISSECK	AUSTRIA	13 22	46 55	EURA
11029	PATSCHERKOFEL	AUSTRIA	11 29	47 13	EURA
11030	MATTERSBURG	AUSTRIA	16 24	47 44	EURA
11031	GAISBERG/SALZBURG	AUSTRIA	13 46	47 48	EURA
11032	THOERL-MA	AUSTRIA	13 41	46 33	EURA
11033	LINZ	AUSTRIA	14 17	48 19	EURA
11035	VIENNA	AUSTRIA	16 22	48 13	EURA
11036	VILLACH	AUSTRIA	13 51	46 36	EURA
11037	ROTTENMANN	AUSTRIA	14 21	47 31	EURA

11038	KITZBUEHEL	AUSTRIA	12 21	47 25	EURA
11039	HAUSER KAIBLING	AUSTRIA	13 46	47 22	EURA
11040	VOELKERMARKT	AUSTRIA	14 38	46 40	EURA
11041	ST. POELTEN	AUSTRIA	15 38	48 12	EURA
11042	ZETTERSFELD/LIENZ	AUSTRIA	12 48	46 52	EURA
11043	KRAHBERG	AUSTRIA	10 38	47 09	EURA
11101	SOFIA	BULGARIA	23 21	42 41	EURA
11104	VARNA	BULGARIA	27 55	43 12	EURA
11106	BURGAS	BULGARIA	27 28	42 29	EURA
11206	PENC	HUNGARY	19 17	47 48	EURA
11207	OROSHAZA	HUNGARY	20 40	46 33	EURA
11401	BUCAREST	RUMANIA	26 06	44 25	EURA
11502	PECNY/ONDREJOV	CZECH REPUBLIC	14 47	49 55	EURA
11503	BRNO	CZECH REPUBLIC	16 35	49 12	EURA
11507	MODRA-PIESOK	CZECH REPUBLIC	17 16	48 21	EURA
11508	PREDNIPRICKA	CZECH REPUBLIC	17 15	49 30	EURA
11510	CHRASTAVA	CZECH REPUBLIC	14 58	50 49	EURA
11511	KOTOUN	CZECH REPUBLIC	13 40	49 28	EURA
11512	VRBATUV KOSTELEC	CZECH REPUBLIC	15 56	49 52	EURA
11513	KLET	CZECH REPUBLIC	14 17	48 52	EURA
11801	SARAJEVO	BOSNIA & HERZEGOVINA	18 16	43 52	EURA
11901	DUBROVNIK	CROATIA	18 07	42 39	EURA
11902	OSIJEK	CROATIA	18 41	45 34	EURA
11903	PULA	CROATIA	13 51	44 53	EURA
12108	LJUBLJANA	SLOVENIA	14 30	46 05	EURA
12204	JOZEFOSLAW-WARSAW	POLAND	21 02	52 13	EURA
12205	BOROWIEC	POLAND	17 05	52 17	EURA
12207	BOROWA GORA	POLAND	21 02	52 29	EURA
12209	LAMKOWKO	POLAND	20 40	53 54	EURA
12217	WROCLAW	POLAND	17 04	51 07	EURA
12301	UZHGOROD	UKRAINE	22 18	48 38	EURA
12302	RIGA	LATVIA	24 04	56 57	EURA
12309	MENDELEEVO	RUSSIA	37 13	56 02	EURA
12312	YEREVAN	ARMENIA	44 30	40 14	EURA
12313	IRKOUTSK	RUSSIA	104 21	52 17	EURA
12319	NOVOSSIBIRSK	RUSSIA	83 14	54 50	EURA
12329	YUZHNO-SAKHALINSK	RUSSIA	142 43	47 02	EURA
12330	ZWENIGOROD	RUSSIA	36 47	55 42	EURA
12334	KITAB	UZBEKISTAN	66 53	39 08	EURA
12335	NIKOLAIEV	UKRAINE	31 59	46 58	EURA
12336	POLTAVA	MACEDONIA	34 30	49 36	EURA
12337	SIMEIS	UKRAINE	34 00	44 24	EURA
12338	BADARY	RUSSIA	102 15	51 45	EURA
12339	PARAMUSHIR (ILES KOURILES	RUSSIA	155 50	50 25	EURA
12340	MAIDANAK	UZBEKISTAN	66 57	38 41	EURA
12341	KOMSOMOLSK-NA-AMURE	RUSSIA	136 45	50 42	EURA
12342	USSURIISK	RUSSIA	131 45	44 01	EURA
12343	BALKHASH	RUSSIA	73 36	45 54	EURA
12344	EVPATORIA	UKRAINE	33 10	45 13	EURA
12347	DUNAOVCY	UKRAINE	26 43	48 51	EURA
12348	POLIGAN/BISHKEK	KYRGYZ REPUBLIC	74 42	42 41	EURA
12349	KRASNOYARSK	RUSSIA	92 50	56 00	EURA
12350	SVETLOE	RUSSIA	29 47	60 32	EURA
12351	ZELENCHUKSKAYA	RUSSIA	41 34	43 47	EURA
12352	SELEZASCHITA	KAZAKSTAN	77 01	43 11	EURA
12353	YAKUTSK	RUSSIA	129 40	62 02	EURA
12354	MAGADAN	RUSSIA	150 46	59 35	NOAM
12355	PETROPAVLOVSK-KAMCHATKA	RUSSIA	158 36	53 04	NOAM
12356	GOLOSIIV - KIEV	UKRAINE	30 30	50 22	EURA
12357	SARAPUL	RUSSIA	53 47	56 29	EURA
12358	BISHKEK	KYRGYZ REPUBLIC	74 36	42 53	EURA
12359	KOROLEV	RUSSIA	37 49	55 55	EURA
12360	TIXI	RUSSIA	128 52	71 38	EURA
12361	KHABAROVSK	RUSSIA	135 02	48 31	EURA
12362	ARTI	RUSSIA	58 34	56 26	EURA
12363	BILIBINO	RUSSIA	166 26	68 05	NOAM
12364	NORILSK	RUSSIA	88 22	69 22	EURA
12365	OBNINSK	RUSSIA	36 34	55 07	EURA
12366	LVIV	UKRAINE	24 52	49 50	EURA
12367	NOVOSIBIRSK, SNIIM	RUSSIA	82 55	55 02	EURA

12368	BRJUHOVYCHI	UKRAINE	23	57	49	55	EURA
12602	DIONYSOS	GREECE	23	56	38	05	EURA
12612	ASKITES	GREECE	25	34	40	56	EURA
12613	ROUMELLI	GREECE	24	42	35	24	EURA
12614	KARITSA	GREECE	20	40	39	44	EURA
12615	KATAVIA	GREECE	27	47	35	57	EURA
12616	XRISOKALARIA	GREECE	21	53	36	47	EURA
12617	CHANIA	GREECE	24	04	35	31	EURA
12706	LAMPEDUSA	ITALY	12	34	35	31	AFRC
12711	MEDICINA	ITALY	11	21	44	29	EURA
12712	GENOVA	ITALY	8	55	44	25	EURA
12717	NOTO	ITALY	12	48	36	42	AFRC
12718	TRIESTE	ITALY	13	53	45	39	EURA
12721	ELBA ISLAND	ITALY	10	13	42	45	EURA
12724	TORINO I	ITALY	7	38	45	01	EURA
12725	CAGLIARI	ITALY	9	00	39	08	EURA
12734	MATERA	ITALY	16	37	40	42	EURA
12741	VENEZIA	ITALY	12	20	45	26	EURA
12749	MONTE VENDA	ITALY	11	42	45	19	EURA
12750	PADOVA	ITALY	11	53	45	25	AFRC
12751	BOLZANO	ITALY	11	20	46	30	EURA
12752	PERUGIA	ITALY	12	22	43	07	EURA
12753	TRENTO	ITALY	11	07	46	04	EURA
12754	CAMERINO	ITALY	13	07	43	06	EURA
12755	REGGIO CALABRIA	ITALY	15	39	38	07	EURA
12756	FERRARA	ITALY	11	00	44	00	EURA
12757	L AQUILA	ITALY	13	21	42	22	EURA
12758	TRAPANI-MILO	ITALY	12	35	38	00	EURA
12759	NOVARA COMUNE	ITALY	8	37	45	27	EURA
12760	PRATO	ITALY	11	06	43	53	EURA
12761	MILANO-CAMPUS COMO	ITALY	9	06	45	48	EURA
13101	BRUSSELS	BELGIUM	4	22	50	48	EURA
13104	OSTENDE	BELGIUM	2	56	51	14	EURA
13112	DENTERGEM	BELGIUM	3	24	50	56	EURA
13113	DOURBES	BELGIUM	4	35	50	06	EURA
13114	WAREMME	BELGIUM	5	15	50	42	EURA
13201	BARTON STACEY/CHILBOLTON	UNITED KINGDOM	358	37	51	11	EURA
13205	CARLISLE	UNITED KINGDOM	357	04	54	54	EURA
13206	CARMARTHEN	UNITED KINGDOM	355	41	51	52	EURA
13207	COLCHESTER	UNITED KINGDOM	0	54	51	52	EURA
13208	DARESBURY	UNITED KINGDOM	357	21	53	21	EURA
13209	DROITWICH	UNITED KINGDOM	357	51	52	16	EURA
13212	HERSTMONCEUX	UNITED KINGDOM	0	21	50	52	EURA
13213	GREAT YARMOUTH	UNITED KINGDOM	1	44	52	35	EURA
13214	GUILDFORD	UNITED KINGDOM	0	37	51	12	EURA
13215	LEEDS	UNITED KINGDOM	358	27	53	49	EURA
13216	North Shields Tide Gauge	UNITED KINGDOM	358	34	55	00	EURA
13217	EDINBURGH	UNITED KINGDOM	356	42	55	56	EURA
13219	GLASGOW	UNITED KINGDOM	356	42	55	51	EURA
13220	NOTTINGHAM	UNITED KINGDOM	358	48	52	57	EURA
13221	INVERNESS	UNITED KINGDOM	355	47	57	29	EURA
13222	ISLE OF MAN NORTH	UNITED KINGDOM	355	37	54	20	EURA
13224	ISLE OF MAN SOUTH	UNITED KINGDOM	355	22	54	05	EURA
13225	KING LYNN	UNITED KINGDOM	0	24	52	45	EURA
13226	MALLAIG	UNITED KINGDOM	354	10	57	00	EURA
13227	NEWCASTLE	UNITED KINGDOM	358	23	54	59	EURA
13228	NORTHHAMPTON	UNITED KINGDOM	359	05	52	15	EURA
13229	PLYMOUTH	UNITED KINGDOM	355	53	50	26	EURA
13230	THURSO	UNITED KINGDOM	356	16	58	35	EURA
13234	TEDDINGTON	UNITED KINGDOM	359	39	51	25	EURA
13235	HERMITAGE	UNITED KINGDOM	358	43	51	27	EURA
13274	SOUTHAMPTON	UNITED KINGDOM	358	33	50	56	EURA
13296	BUDDON - CARNUSTY	UNITED KINGDOM	-2	47	56	29	EURA
13299	MORPETH	UNITED KINGDOM	-1	41	55	13	EURA
13402	SAN FERNANDO	SPAIN	353	48	36	28	EURA
13406	VILLAFRANCA	SPAIN	356	03	40	27	EURA
13407	MADRID-ROBLEDO	SPAIN	355	44	40	26	EURA
13410	ROQUETES - TORTOSA	SPAIN	0	30	40	49	EURA
13411	MADRID-FACULTAD	SPAIN	356	16	40	27	EURA
13420	YEBES	SPAIN	356	54	40	32	EURA

13431	BELLMUNT DE SEGARRA	SPAIN	1 24	41 36	EURA
13432	CAP DE CREUS	SPAIN	3 19	42 19	EURA
13433	ALICANTE	SPAIN	359 31	38 20	EURA
13434	A CORUNA	SPAIN	351 36	43 22	EURA
13435	ESCORNACRABES	SPAIN	0 59	42 42	EURA
13436	LLIVIA	SPAIN	1 59	42 29	EURA
13437	ALMERIA	SPAIN	357 32	36 51	EURA
13438	CANTABRIA	SPAIN	356 12	43 28	EURA
13439	VALENCIA	SPAIN	359 40	39 29	EURA
13440	LES AVELLANES	SPAIN	0 45	41 53	EURA
13441	MONTCADA	SPAIN	2 12	41 29	EURA
13442	LES PLANES	SPAIN	1 59	41 25	EURA
13443	MALAGA	SPAIN	355 36	36 44	EURA
13444	PALMA DE MALLORCA	SPAIN	2 37	39 33	EURA
13445	MADRID UPM-EUITT	SPAIN	356 22	3 38	EURA
13446	SONSECA	SPAIN	356 02	39 40	EURA
13447	CACERES	SPAIN	353 40	39 29	EURA
13448	LA RIOJA	SPAIN	357 30	42 27	EURA
13449	CEUTA	SPAIN	354 41	35 54	AFRC
13450	VIGO	SPAIN	351 15	42 28	EURA
13451	HUELVA	SPAIN	253 05	37 12	EURA
13452	ALBACETE	SPAIN	1 50	39 00	EURA
13502	DELFT	THE NEDERLANDS	4 23	52 00	EURA
13504	KOOTWIJK	THE NEDERLANDS	5 49	52 11	EURA
13506	WESTERBORK	THE NEDERLANDS	6 36	52 55	EURA
13510	APELDOORN	THE NEDERLANDS	5 57	52 14	EURA
13533	EIJSDEN	THE NEDERLANDS	5 44	50 47	EURA
13534	TERSCHELLING	THE NEDERLANDS	5 13	53 22	EURA
13902	PORTO	PORTUGAL	351 25	41 06	EURA
13903	LAGOS	PORTUGAL	351 21	37 09	EURA
13909	CASCAIS	PORTUGAL	-9 25	38 42	EURA
13910	LISBOA	PORTUGAL	350 49	38 43	EURA
14001	ZIMMERWALD	SWITZERLAND	7 28	46 53	EURA
14005	MONTE GENEROSO	SWITZERLAND	9 01	45 56	EURA
14006	CHRISCHONA	SWITZERLAND	7 41	47 34	EURA
14007	LA DOLE	SWITZERLAND	6 06	46 26	EURA
14009	BOURG_SAINT PIERRE	SWITZERLAND	7 12	45 57	EURA
14010	OBERALP	SWITZERLAND	8 40	46 39	EURA
14011	SIBLINGEN	SWITZERLAND	8 29	47 42	EURA
14012	STABIO	SWITZERLAND	8 56	45 51	EURA
14013	ZERNEZ	SWITZERLAND	10 06	46 41	EURA
14106	POTSDAM	GERMANY	13 04	52 23	EURA
14108	DRESDEN	GERMANY	13 45	51 03	EURA
14201	WETTZELL	GERMANY	12 53	49 09	EURA
14202	HOHENBUNSTORF	GERMANY	10 29	53 03	EURA
14208	OBERPFAFFENHOFEN	GERMANY	11 17	48 05	EURA
14209	EFFELSBERG	GERMANY	6 53	50 32	EURA
14213	HOHENPEISSENBERG	GERMANY	11 01	47 48	EURA
14214	KLOPPENHEIM	GERMANY	8 44	50 13	EURA
14216	KARLSRUHE	GERMANY	8 25	49 01	EURA
14234	BRAUNSCHWEIG	GERMANY	10 28	52 18	EURA
14258	EUSKIRCHEN	GERMANY	6 46	50 40	EURA
14260	KARLSBURG	GERMANY	13 37	53 59	EURA
14261	KIRSCHBERG	GERMANY	14 17	51 13	EURA
14262	NEUBIBERG	GERMANY	11 35	48 08	EURA
14263	NEUSTRELITZ	GERMANY	13 04	53 20	EURA
14264	HELGOLAND ISLAND	GERMANY	7 54	54 10	EURA
14265	DAUN	GERMANY	6 49	50 11	AURA
14266	ERLANGEN	GERMANY	11 00	49 35	AURA
14267	LEIPZIG	GERMANY	12 22	51 21	AURA
14268	BORKUM	GERMANY	6 45	53 34	EURA
14269	FLECHTING	GERMANY	11 13	52 20	EURA
14270	BRONNZELL	GERMANY	9 40	50 30	EURA
14271	CUXHAVEN	GERMANY	8 43	53 52	EURA
14272	HONAU	GERMANY	9 17	48 24	EURA
14273	NIEDERWEILER	GERMANY	7 17	49 54	EURA
14274	MEERANE	GERMANY	12 29	50 50	EURA
14275	SCHERNFELD	GERMANY	11 08	48 55	EURA
14276	WALLENHORST	GERMANY	8 00	52 21	EURA
14277	WARNEMUENDE	GERMANY	12 05	54 10	EURA

14278	TITZ-JACKERATH	GERMANY	6 26	51 02	EURA
14279	FRANKFURT	GERMANY	8 39	50 05	EURA
14280	HUEGELHEIM	GERMANY	7 35	47 50	EURA
14302	NICOSIA-ATHALASSA	CYPRUS	33 24	35 08	EURA
14303	LARNAKA	CYPRUS	33 38	34 55	EURA
14501	LJUBLJANA	SLOVENIA	14 33	46 03	EURA
15601	OHRID	MACEDONIA	20 48	41 08	EURA
20101	RIYADH	SAUDI ARABIA	46 24	24 55	ARAB
20403	MASHHAD	IRAN	59 28	36 18	EURA
20404	TEHERAN II	IRAN	51 23	35 44	EURA
20405	CHAH BAHAR	IRAN	60 42	25 18	EURA
20406	TORBAT-E-HEYDARIYEH	IRAN	58 28	35 18	EURA
20407	DREZFUL	IRAN	48 20	32 25	EURA
20408	BANDAR-E-BUSHEHR	IRAN	51 05	28 55	EURA
20409	YAZD	IRAN	53 49	32 19	EURA
20410	ZABOL	IRAN	61 31	31 03	EURA
20702	BAR GIYYORA	ISRAEL	35 05	31 43	ARAB
20703	MITZPE RAMON	ISRAEL	34 46	30 36	AFRC
20704	TEL AVIV	ISRAEL	34 47	32 04	AFRC
20705	HAIFA	ISRAEL	35 01	32 47	AFRC
20706	ELAT	ISRAEL	34 55	29 31	AFRC
20707	KATZRIN	ISRAEL	35 41	33 00	AFRC
20708	MAALE GILBOA	ISRAEL	35 25	32 29	AFRC
20709	KIBUTZ KABRI	ISRAEL	35 09	33 01	AFRC
20710	METZOKI DRAGOT	ISRAEL	35 24	31 35	AFRC
20711	KIBUTZ EL-ROM	ISRAEL	35 46	33 10	AFRC
20712	KIBUTZ LAHAV	ISRAEL	34 52	31 12	AFRC
20801	DIYARBAKIR	TURKEY	40 12	37 55	EURA
20802	YOZGAT	TURKEY	34 49	39 48	EURA
20803	MELENGICLICK	TURKEY	33 11	37 23	EURA
20804	YIGILCA	TURKEY	31 26	40 56	EURA
20805	ANKARA	TURKEY	32 45	39 53	EURA
20806	GEBZE	TURKEY	29 27	40 47	EURA
20807	ISTANBUL	TURKEY	29 01	41 06	EURA
20808	TRABZON	TURKEY	39 47	41 00	EURA
20809	MENTES	TURKEY	26 43	38 25	EURA
20810	BODRUM	TURKEY	27 25	37 01	EURA
20811	ERDEK	TURKEY	27 50	40 23	EURA
20812	ANTALYA	TURKEY	30 36	36 49	EURA
21501	EVEREST	NEPAL	86 49	27 57	EURA
21601	BEIJING	CHINA	115 54	39 36	EURA
21602	WUHAN	CHINA	114 20	30 32	EURA
21604	PURPLE MOUNTAIN	CHINA	118 49	32 04	EURA
21605	SHANGHAI	CHINA	121 26	31 01	EURA
21609	KUNMING	CHINA	102 47	25 01	EURA
21611	CHANGCHUN	CHINA	125 27	43 47	EURA
21612	URUMQI	CHINA	87 11	43 28	EURA
21613	LHASA	CHINA	91 06	29 39	EURA
21614	SHAANXI	CHINA	109 13	34 22	EURA
21615	PEIJIAKONG/XIAN	CHINA	108 59	34 11	EURA
21701	KASHIMA	JAPAN	140 40	35 57	NOAM
21702	MIZUSAWA	JAPAN	141 08	39 08	NOAM
21704	KOGANEI	JAPAN	139 32	35 40	NOAM
21705	DODAIRA	JAPAN	139 12	36 00	EURA
21709	OKINAWA	JAPAN	127 54	26 30	EURA
21715	KAINAN	JAPAN	135 14	34 09	EURA
21718	MIYAZAKI	JAPAN	131 25	31 55	EURA
21725	NOBEYAMA	JAPAN	138 29	35 56	NOAM
21726	SIMOSATO	JAPAN	135 56	33 34	EURA
21729	USUDA	JAPAN	138 29	36 12	EURA
21730	TSUKUBA	JAPAN	140 06	36 13	NOAM
21731	SHINTOTSUKAWA	JAPAN	141 51	43 32	NOAM
21732	CHICHIJIMA	JAPAN	142 13	27 05	PHIL
21733	MINAMI TORI SIMA (MARCUS)	JAPAN	154 00	24 30	PCFC
21735	TSUSHIMA	JAPAN	129 25	34 24	EURA
21736	ISHIGAKI SHIMA	JAPAN	124 10	24 21	PCFC
21737	SAGARA	JAPAN	138 11	34 41	NOAM
21738	DAITO	JAPAN	131 14	25 50	PHIL
21739	MIURA	JAPAN	139 39	35 12	NOAM
21740	TATEYAMA	JAPAN	139 51	34 56	NOAM

21741	MITAKA	JAPAN	139	34	35	41	NOAM
21742	AIRA	JAPAN	130	36	31	49	EURA
21743	TOUHAKU	JAPAN	133	42	35	29	EURA
21744	TAMAGUSUKU	JAPAN	127	46	26	08	EURA
21745	TONAMI	JAPAN	137	02	36	39	EURA
21746	KANOZAN	JAPAN	139	57	35	15	EURA
21747	GIFU	JAPAN	35	44	136	44	EURA
21903	CHON BURI	THAILAND	101	03	13	07	EURA
21904	BANGKOK	THAILAND	100	32	13	44	EURA
21905	PHUKET	THAILAND	98	18	7	46	EURA
22003	QUEZON	THE PHILIPPINES	121	04	14	39	EURA
22006	MANILA	THE PHILIPPINES	121	02	14	32	EURA
22201	AMMAN	JORDAN	35	53	32	02	ARAB
22306	BANGALORE	INDIA	77	34	13	01	INDI
22307	HYDERABAD	INDIA	78	33	17	25	INDI
22601	SINGAPORE I	SINGAPORE	103	41	1	21	EURA
22602	SINGAPORE II	SINGAPORE	103	58	1	21	EURA
22603	SINGAPORE III	SINGAPORE	103	50	1	26	EURA
22604	SINGAPORE IV	SINGAPORE	103	49	1	16	EURA
22701	ARAU	MALAYSIA	100	17	6	27	EURA
22702	BINTULU	MALAYSIA	113	04	3	16	EURA
22703	KOTA BHARU	MALAYSIA	102	06	6	14	EURA
22704	GUNONG RAPAT	MALAYSIA	101	08	4	35	EURA
22705	KOTA KINABALU	MALAYSIA	116	02	5	54	EURA
22706	KUALA LUMPUR	MALAYSIA	101	43	3	11	EURA
22707	KUALA TERENGGANU	MALAYSIA	103	08	5	19	EURA
22708	KUANTAN	MALAYSIA	103	21	3	50	EURA
22709	KUCHING	MALAYSIA	110	12	1	38	EURA
22710	LABUAN	MALAYSIA	115	15	5	17	EURA
22711	MIRI	MALAYSIA	114	00	4	22	EURA
22712	SANDAKAN	MALAYSIA	118	07	5	51	EURA
22713	TAWAU	MALAYSIA	117	53	4	16	EURA
22714	SKUDAI, JOHOR BAHRU	MALAYSIA	103	38	1	34	EURA
22901	JUMUHUREE PARK-MALE	MALDIVES	73	31	4	11	INDI
23001	HONG-KONG	HONG-KONG	114	11	22	18	EURA
23002	KAU YI CHAU	HONG-KONG	114	05	22	17	EURA
23003	FANLING	HONG-KONG	114	08	22	29	EURA
23101	CIBINONG	INDONESIA	106	50	-6	29	EURA
23104	MEDAN	INDONESIA	98	43	3	37	EURA
23105	BITUNG	INDONESIA	125	12	1	27	EURA
23106	PENDAK DAYUNG, JAKARTA	INDONESIA	106	53	-6	06	EURA
23107	SORONG, IRIAN JAYA	INDONESIA	131	15	0	53	EURA
23108	MANADO	INDONESIA	124	55	1	33	EURA
23401	PHNOM PENH	CAMBODIA	104	55	11	34	EURA
23403	SIHANOUKVILLE	CAMBODIA	103	31	10	37	EURA
23404	STUNG TRENG	CAMBODIA	105	58	13	32	EURA
23405	SVAY RIENG	CAMBODIA	105	47	11	06	EURA
23501	COLOMBO	SRI LANKA	79	52	6	54	INDI
23601	TAIPEI	TAIWAN	121	31	25	05	EURA
23603	TAOYUAN	TAIWAN	121	10	24	57	EURA
23604	HSINCHU	TAIWAN	120	59	24	48	EURA
23902	TAEJON	SOUTH KOREA	127	23	36	24	EURA
23903	SUWON-SHI	SOUTH KOREA	127	03	37	17	EURA
23904	OSAN AIR BASE	SOUTH KOREA	127	01	37	05	EURA
23905	CHEJU-SHI	SOUTH KOREA	126	32	33	31	EURA
24101	VIENTANE	LAO	102	31	18	02	EURA
24102	Champasack Province	LAO	105	51	14	07	EURA
24103	PHONGSALI	LAO	102	06	21	04	EURA
24104	HOUAXAY	LAO	100	26	20	16	EURA
24105	LAKXAO	LAO	104	59	18	11	EURA
24106	PHUTAKOY	LAO	106	30	16	37	EURA
24107	SAMNUA	LAO	104	03	20	25	EURA
24201	ULAN BATOR	MONGOLIA	107	03	47	52	EURA
24202	ARVAIKHEER	MONGOLIA	102	47	46	16	EURA
24203	CHOIBALSAN	MONGOLIA	114	35	48	05	EURA
24204	DALANZADGAD	MONGOLIA	104	26	43	35	EURA
24205	HOVD	MONGOLIA	91	37	47	58	EURA
24206	MURUN	MONGOLIA	100	06	49	40	EURA
24302	DIEN MIEN PHU	VIETNAM	103	02	21	24	EURA
24303	HAI PHONG	VIETNAM	106	47	20	42	EURA

24304	DA NANG	VIETNAM	108	13	16	04	EURA
24305	VUNG TAU	VIETNAM	107	05	10	21	EURA
24901	BAHREIN (JUFFAR)	BAHRAIN	50	36	26	13	ARAB
25601	CHUMYSH	KAZAKSTAN	43	00	74	45	EURA
30101	HELWAN	EGYPT	31	21	29	52	AFRC
30102	ALEXANDRIA	EGYPT	29	55	31	12	AFRC
30302	HARTEBEESTHOEK	SOUTH AFRICA	27	42	-25	53	AFRC
30304	OLIFANTSFONTEIN	SOUTH AFRICA	28	15	-25	58	AFRC
30307	SIMONSTOWN	SOUTH AFRICA	18	26	-34	11	AFRC
30310	PRETORIA	SOUTH AFRICA	28	18	-25	45	AFRC
30313	MARION ISLAND (PRINCE EDW	SOUTH AFRICA	37	51	-46	53	AFRC
30314	SUTHERLAND	SOUTH AFRICA	20	48	-32	23	AFRC
30315	RICHARDSBAY	SOUTH AFRICA	32	05	-28	48	AFRC
30602	ASCENSION	UNITED KINGDOM	345	36	-7	57	SOAM
30604	TRISTAN DA CUNHA	UNITED KINGDOM	347	41	-37	03	AFRC
30606	SAINTE-HELENE	UNITED KINGDOM	354	17	-15	57	AFRC
30607	SIGNY ISLAND	UNITED KINGDOM	-45	36	-60	42	PCFC
30608	GOUGH ISLAND	UNITED KINGDOM	-9	53	-40	21	AFRC
30802	DIEGO GARCIA	UNITED KINGDOM	72	22	-7	15	AFRC
31303	MASPALOMAS	SPANISH DEPENDENCIES	344	25	27	45	AFRC
31901	FLORES	PORTUGAL	328	52	39	27	AFRC
31903	SANTA MARIA	PORTUGAL	334	55	37	00	AFRC
31906	PONTA DELGADA (SAO MIGUEL	PORTUGAL	334	21	37	44	AFRC
32601	YAMOUSSOUKRO	COTE D'IVOIRE	354	46	6	52	AFRC
32809	LIBREVILLE	GABON	9	40	0	21	AFRC
32810	MASUKU	GABON	13	33	-1	38	AFRC
32901	KUMASI	GHANA	-1	34	6	40	AFRC
33201	MALINDI	KENYA	40	13	-2	56	AFRC
33710	ARLIT	NIGER	7	23	18	44	AFRC
33901	MBARARA	UGANDA	-	36	30	44	AFRC
34101	DAKAR	SENEGAL	-17	29	14	44	AFRC
34601	LUSAKA	ZAMBIA	28	21	-15	25	AFRC
35001	RABAT	MOROCCO	-6	52	33	59	AFRC
39601	PALMEIRA	CAPE VERDE	337	01	16	45	AFRC
39801	MAHE ISLAND	SEYCHELLES	55	29	-4	40	AFRC
39901	DJIBOUTI	DJIBOUTI	42	51	11	32	AFRC
40101	ST JOHN'S	CANADA	307	17	47	44	NOAM
40102	ONTARIO-OTTAWA	CANADA	284	05	45	24	NOAM
40103	PRINCE ALBERT	CANADA	254	04	53	13	NOAM
40104	ALGONQUIN	CANADA	281	56	45	57	NOAM
40105	PENTICTON	CANADA	240	23	49	19	NOAM
40114	OTTAWA	CANADA	284	17	45	24	NOAM
40118	WHITEHORSE	CANADA	224	55	60	44	NOAM
40120	HALIFAX	CANADA	296	29	44	38	NOAM
40124	CALGARY	CANADA	245	42	50	52	NOAM
40127	YELLOWKNIFE	CANADA	245	32	62	29	NOAM
40128	CHURCHILL	CANADA	-94	05	58	35	NOAM
40129	VICTORIA/SIDNEY	CANADA	236	31	48	23	NOAM
40130	HOLBERG	CANADA	237	52	50	38	NOAM
40132	LA GRANDE	CANADA	281	26	51	42	NOAM
40133	SCHEFFERVILLE	CANADA	293	00	55	00	NOAM
40134	WILLIAMS LAKE	CANADA	237	50	52	14	NOAM
40135	FLIN FLON	CANADA	-101	59	54	44	NOAM
40136	WHITEHORSE GPS SITE	CANADA	224	47	60	45	NOAM
40137	LAC DU BONNET	CANADA	264	08	50	16	NOAM
40138	NANOOSE	CANADA	235	55	49	18	NOAM
40139	CHEEKA PEAK	CANADA	235	23	48	18	NOAM
40140	UCLUELET	CANADA	234	28	48	56	NOAM
40141	WHISTLER	CANADA	237	05	50	07	NOAM
40142	CHILLIWACK	CANADA	238	00	49	10	NOAM
40143	NOOTKA ISLAND	CANADA	233	23	49	36	NOAM
40144	ELIZA DOME	CANADA	232	53	49	52	NOAM
40145	BEAVER COVE	CANADA	233	09	50	33	NOAM
40146	FREDERICTON	CANADA	293	22	66	38	NOAM
40147	GATINEAU	CANADA	284	15	45	35	NOAM
40148	HOLMAN	CANADA	242	14	70	44	NOAM
40149	RESOLUTE	CANADA	265	06	74	42	NOAM
40150	INUVIK	CANADA	226	28	68	19	NOAM
40151	BAIE COMEAU	CANADA	291	44	49	11	NOAM
40152	BAKER LAKE	CANADA	263	59	64	19	NOAM

40153	EUREKA	CANADA	274 04	79 59	NOAM
40154	KUUJJUARAPIK	CANADA	282 15	55 17	NOAM
40155	PICKLE LAKE	CANADA	269 50	51 28	NOAM
40156	VAL D OR	CANADA	282 24	48 06	NOAM
40157	PARRY SOUND	CANADA	279 58	45 21	NOAM
40158	ST. CATHERINE (PORT WELLE	CANADA	280 47	43 14	NOAM
40159	ROSSPORT	CANADA	272 29	48 50	NOAM
40160	HEARST	CANADA	276 29	49 40	NOAM
40161	KINGSTON	CANADA	283 29	44 13	NOAM
40162	ALERT (NUNAVUT)	CANADA	297 40	82 30	NOAM
40400	PASADENA	USA	241 50	34 12	PCFC
40403	PALOS VERDES	USA	241 36	33 45	PCFC
40404	PEARBLOSSOM	USA	242 05	34 31	PCFC
40405	GOLDSTONE	USA	243 06	35 20	NOAM
40406	SAN FRANCISCO (PRESIDIO)	USA	237 33	37 48	PCFC
40407	PINYON FLATS	USA	243 33	33 26	PCFC
40408	FAIRBANKS	USA	212 29	64 58	NOAM
40409	KAENA POINT (HAWAII)	USA	201 44	21 35	PCFC
40410	POINT REYES	USA	237 04	38 06	PCFC
40412	AUSTIN	USA	262 20	30 25	NOAM
40416	YAKATAGA	USA	-142 29	60 05	PCFC
40417	PATRICK AFB	USA	279 24	28 14	NOAM
40418	EDWARDS AFB	USA	242 19	34 58	NOAM
40419	KODIAK	USA	-152 30	57 44	NOAM
40420	VANDENBERG AFB	USA	239 26	34 35	PCFC
40421	NOME	USA	-165 22	64 34	NOAM
40423	SANDPOINT	USA	-160 29	55 21	NOAM
40424	KAUAI	USA	200 20	22 08	PCFC
40425	SOURDOUGH	USA	-145 29	62 40	NOAM
40426	CAP CANAVERAL I	USA	279 27	28 29	NOAM
40427	FORT ORD	USA	-121 46	36 29	PCFC
40428	SANTA PAULA I	USA	241 00	34 23	PCFC
40429	ALBUQUERQUE	USA	253 32	34 58	NOAM
40430	BLACK BUTTE	USA	244 17	33 40	NOAM
40431	DEADMAN LAKE	USA	243 43	34 15	NOAM
40432	ELY	USA	244 55	39 19	NOAM
40433	QUINCY	USA	239 04	39 58	NOAM
40434	MOUNT HOPKINS	USA	249 07	31 41	NOAM
40436	SAN DIEGO - OTAY MT.	USA	243 10	32 36	PCFC
40437	MAMMOTH LAKES	USA	241 04	37 38	NOAM
40438	BEAR LAKE	USA	248 35	41 56	NOAM
40439	OWENS VALLEY	USA	241 22	37 14	NOAM
40440	WESTFORD	USA	288 31	42 37	NOAM
40441	GREENBANK	USA	280 10	38 26	NOAM
40442	FORT DAVIS	USA	255 59	30 40	NOAM
40445	MAUI	USA	203 44	20 43	PCFC
40446	LEXINGTON	USA	288 44	42 27	NOAM
40449	OCOTILLO	USA	244 12	32 47	PCFC
40451	WASHINGTON	USA	282 56	38 55	NOAM
40452	BLOOMINGTON	USA	-86 30	39 10	NOAM
40453	CARROLLTON	USA	-85 07	33 34	NOAM
40454	LEONARD	USA	-95 48	35 55	NOAM
40455	MILES CITY	USA	-105 52	46 24	NOAM
40456	PIETOWN	USA	-108 07	34 18	NOAM
40457	SEATTLE	USA	-122 15	47 41	NOAM
40458	MALIBU/SADDLE PEAK	USA	241 21	34 04	NOAM
40460	LA JOLLA/SCRIPPS	USA	242 45	32 52	NOAM
40461	WHITTIER	USA	241 58	33 59	PCFC
40462	HOLLOMAN	USA	253 54	32 54	NOAM
40463	LOS ALAMOS, NM	USA	-106 15	35 47	NOAM
40464	PARKFIELD/CARR HILL	USA	239 34	35 53	NOAM
40465	NORTH LIBERTY	USA	268 26	41 46	NOAM
40466	KITT PEAK	USA	248 23	31 57	NOAM
40469	CHINA LAKE	USA	242 11	35 59	NOAM
40471	HANCOCK	USA	288 01	42 56	NOAM
40472	COLORADO SPRINGS	USA	255 07	39 00	NOAM
40473	BREWSTER	USA	240 19	48 08	NOAM
40474	LAKE MATHEWS	USA	242 34	33 51	NOAM
40475	WAIMEA (HAWAII)	USA	-155 40	20 01	PCFC
40476	HAWAIIAN VOLCANO OBSERVAT	USA	-155 17	19 25	PCFC

40477	MAUNA KEA	USA	204	33	19	48	PCFC
40478	CHATSWORTH	USA	241	22	34	15	PCFC
40479	BLYTHE	USA	251	17	33	37	NOAM
40480	BOMMER CANYON	USA	248	12	33	37	NOAM
40481	YUCAIPA	USA	248	54	34	02	NOAM
40482	LONG BEACH CITY	USA	241	48	33	47	NOAM
40483	WESTLAKE/ALLEN OSBORNE AN	USA	241	10	34	10	PCFC
40484	CHILAO FLATES/SAN GABRIEL	USA	247	59	34	20	PCFC
40485	LONGDON YARD/IRWINDALE	USA	242	00	34	07	PCFC
40486	PINEMEADOW	USA	243	23	33	37	PCFC
40487	LOS ANGELES	USA	241	43	34	01	PCFC
40488	CATALINA ISLAND	USA	241	31	33	26	PCFC
40489	HAT CREEK	USA	238	32	40	49	NOAM
40490	MARYLAND POINT	USA	282	46	38	22	NOAM
40491	FLAGSTAFF	USA	258	22	35	13	NOAM
40492	VERNAL	USA	250	26	40	20	NOAM
40493	YUMA	USA	245	48	32	56	NOAM
40496	PLATTEVILLE	USA	255	16	40	11	NOAM
40497	MONUMENT PEAK	USA	243	35	32	54	PCFC
40498	VLA	USA	252	24	39	05	NOAM
40499	RICHMOND	USA	279	37	25	37	NOAM
40503	SOCORRO ISLAND	MEXICO	249	03	18	44	PCFC
40504	MAZATLAN	MEXICO	253	33	23	14	NOAM
40505	CABO SAN LUCAS	MEXICO	250	08	22	55	PCFC
40506	ENSENADA	MEXICO	-116	09	31	15	PCFC
40507	AGUASCALIENTES (INEGI)	MEXICO	-102	17	21	51	PCFC
40508	CICESE	MEXICO	243	20	31	52	PCFC
40509	MEXICO CITY	MEXICO	260	50	19	20	NOAM
40510	POPOCATEPETL	MEXICO	261	22	19	04	NOAM
40511	SIERRA SAN PEDRO	MEXICO	-115	28	31	02	PCFC
40512	ISLA GUADALUPE	MEXICO	241	43	28	53	PCFC
40513	MANZANILLO	MEXICO	255	42	19	04	NOAM
40601	MOIN/COSTA-RICA	COSTA RICA	276	58	9	55	CARB
40701	SANTIAGO DE CUBA	CUBA	284	14	20	01	NOAM
40901	GUATEMALA CITY	GUATEMALA	-90	43	14	30	NOAM
41101	TEGUCIGALPA	HONDURAS	-87	12	14	05	CARB
41102	SAN LORENZO	HONDURAS	-87	26	13	25	CARB
41201	MANAGUA	NICARAGUA	-86	12	12	01	CARB
41202	ESTELI	NICARAGUA	-86	40	13	06	CARB
41401	SAN SALVADOR	EL SALVADOR	-89	07	13	42	CARB
41505	BUENOS-AIRES	ARGENTINA	301	29	-34	34	SOAM
41507	RIO GRANDE	ARGENTINA	292	15	-53	47	SOAM
41510	LA PLATA	ARGENTINA	302	04	-34	54	SOAM
41511	CORDOBA GPS SITE	ARGENTINA	295	32	-31	43	SOAM
41512	BAHIA BLANCA	ARGENTINA	297	44	-38	42	SOAM
41513	RAWSON	ARGENTINA	294	53	-43	18	SOAM
41514	SALTA	ARGENTINA	294	36	-24	44	SOAM
41515	USHUAIA I	ARGENTINA	291	42	-54	51	SOAM
41516	BASE ORCADAS	ARGENTINA	315	44	-60	44	SOAM
41517	CAUCETE	ARGENTINA	291	46	-31	36	SOAM
41518	LIHUE CALEL	ARGENTINA	294	24	-38	00	SOAM
41519	USHUAIA II	ARGENTINA	291	26	-54	51	SOAM
41520	TUCUMAN	ARGENTINA	294	46	-26	50	SOAM
41602	FORTALEZA	BRAZIL	321	34	-3	53	SOAM
41603	CUIBA	BRAZIL	303	56	-15	32	SOAM
41604	NATAL	BRAZIL	324	50	-5	55	SOAM
41606	BRASILIA	BRAZIL	-47	50	-15	45	SOAM
41608	RIO DE JANEIRO	BRAZIL	316	47	-22	54	SOAM
41609	CACHOEIRA PAULISTA	BRAZIL	315	00	-22	40	SOAM
41610	CURITIBA/PARANA	BRAZIL	-49	13	-25	26	SOAM
41611	PRESIDENTE PRUDENTE	BRAZIL	-51	24	-22	07	SOAM
41612	BOM JESUS DA LAPA	BRAZIL	-43	26	-13	16	SOAM
41613	VICOSA	BRAZIL	-42	52	-20	46	SOAM
41614	MANAUS	BRAZIL	-60	04	-3	07	SOAM
41615	IMPERATRIZ	BRAZIL	-47	30	-5	29	SOAM
41616	PORTO ALEGRE	BRAZIL	308	53	-30	04	SOAM
41617	RECIF	BRAZIL	325	03	-8	03	SOAM
41618	SALVADOR	BRAZIL	321	29	-13	01	SOAM
41619	CRATO	BRAZIL	320	35	-7	14	SOAM
41703	EASTER ISLAND	CHILE	250	34	-27	11	NAZC

41705	SANTIAGO	CHILE	289	20	-33	09	SOAM
41706	CERRO TOLOLO	CHILE	289	12	-30	10	SOAM
41708	IQUIQUE	CHILE	-69	54	-20	13	SOAM
41709	SEST	CHILE	-70	44	-29	16	SOAM
41710	CARIQUIMA	CHILE	-68	41	-19	29	SOAM
41712	VALPARAISO	CHILE	288	22	-33	02	SOAM
41713	ANTUCO	CHILE	-71	32	-37	20	SOAM
41714	COPIAPO	CHILE	-70	20	-27	23	SOAM
41715	COYHAIQUE	CHILE	-71	54	-45	31	SOAM
41716	PUNTA ARENAS I	CHILE	-70	53	-53	08	SOAM
41717	PUERTO WILLIAMS	CHILE	-67	35	-54	56	SOAM
41718	PUNTA ARENAS II	CHILE	-70	55	-53	38	SOAM
41719	CONCEPCION	CHILE	-73	02	-36	51	SOAM
41901	BOGOTA	COLUMBIA	285	56	4	49	SOAM
41902	CARTAGENE	COLUMBIA	-75	32	10	23	SOAM
42003	QUITO III	ECUADOR	281	31	0	12	SOAM
42004	SAN CRISTOBAL (GALAPAGOS)	ECUADOR	-89	37	-	54	NAZC
42005	SANTA CRUZ	ECUADOR	269	42	-	45	NAZC
42006	RIO BAMBA	ECUADOR	281	21	-1	39	SOAM
42202	AREQUIPA	PERU	288	30	-16	28	SOAM
42301	MONTEVIDEO	URUGUAY	-56	16	-34	53	SOAM
42402	MARACAIBO	VENEZUELA	-71	38	10	41	CARB
42501	BERMUDA	UNITED KINGDOM	295	21	32	21	NOAM
42601	KINGSTON	JAMAICA	283	11	18	05	NOAM
43001	THULE	GREENLAND	291	14	76	32	NOAM
43005	KELLYVILLE (KANGERLUSSUAQ	GREENLAND	309	09	66	59	NOAM
43006	SCORESBYSUND	GREENLAND	338	03	70	29	NOAM
43007	QAQORTOQ	GREENLAND	313	57	60	43	NOAM
43201	SAINTE CROIX	USA	-64	35	17	46	CARB
43401	BRIDGETOWN	BARBADOS	300	24	13	05	CARB
43602	GRAND TURK	THE BAHAMAS	288	51	21	26	NOAM
43605	FREEPORT	THE BAHAMAS	281	00	26	42	NOAM
49601	PARKFIELD	USA	239	31	35	52	PCFC
49602	SANTA ANA MOUNTAINS	USA	242	27	33	43	PCFC
49603	LAKE FOREST	USA	242	21	33	40	PCFC
49604	DARLINGTON	USA	280	11	34	15	NOAM
49605	PALISADES	USA	286	05	41	16	NOAM
49606	FAN MOUNTAIN	USA	281	18	37	53	NOAM
49607	ST. LOUIS	USA	269	48	38	35	NOAM
49608	NEENACH	USA	241	18	34	49	PCFC
49609	PARKFIELD/LOWES	USA	239	24	35	50	PCFC
49610	PARKFIELD/RANCHITA	USA	239	28	35	54	PCFC
49611	EL CARISO	USA	242	35	33	39	PCFC
49612	SAGINAW	USA	276	07	43	27	NOAM
49613	BRIGHTON	USA	276	15	42	31	NOAM
49614	CONOVER	USA	278	46	35	42	NOAM
49615	GRAND RAPIDS	USA	274	20	43	00	NOAM
49616	HAWK RUN	USA	281	49	40	53	NOAM
49617	AUBURN HILLS	USA	276	46	42	41	NOAM
49618	CADILLAC	USA	274	34	44	16	NOAM
49619	GAYLORD	USA	275	19	45	00	NOAM
49620	ALPENA	USA	276	26	45	04	NOAM
49621	KALAMAZOO	USA	274	28	42	14	NOAM
49622	L ANSE	USA	276	34	46	45	NOAM
49623	ASCANABA	USA	272	56	45	45	NOAM
49624	JACKSON	USA	275	37	42	17	NOAM
49625	LIBERTYVILLE	USA	272	02	42	18	NOAM
49626	PARKFIELD/CAMP ROBERTS	USA	239	15	35	47	PCFC
49627	PARKFIELD/TABLE	USA	239	38	35	55	PCFC
49628	NEEDLES	USA	245	23	34	46	PCFC
49629	NEWBERRY	USA	274	29	46	18	NOAM
49630	Pueblo, Colorado	USA	255	39	38	17	NOAM
49631	Lebanon, Ohio	USA	275	43	39	26	NOAM
49632	Gustavus, Ohio	USA	279	17	41	28	NOAM
49633	McConnelsville, Ohio	USA	278	10	39	40	NOAM
49634	Ellensburg, Washington (C	USA	239	17	46	57	NOAM
49635	Tumwater Hill, Washington	USA	237	05	47	01	NOAM
49636	Bismark, North Dakota	USA	259	11	46	05	NOAM
49637	Adrian, Michigan	USA	275	59	41	55	NOAM
49638	Twentynine Palms	USA	244	00	34	00	PCFC

49639	MT. PLEASANT	USA	275	14	43	37 NOAM
49640	PRUDHOE BAY	USA	211	57	70	02 NOAM
49641	Columbus, Ohio	USA	276	57	39	58 NOAM
49642	La Grande, Washington	USA	237	45	46	50 NOAM
49644	Freeport, Ohio	USA	273	45	40	12 NOAM
49645	Laredo, Texas	USA	260	33	27	31 NOAM
49646	Myton, Utah	USA	249	54	40	02 NOAM
49647	Houston, Texas	USA	264	58	29	05 NOAM
49648	Pharr, Texas	USA	261	49	26	13 NOAM
49649	Piketon, Ohio	USA	276	59	39	03 NOAM
49650	Pine River, Minnesota	USA	265	54	46	10 NOAM
49651	Sidney, ohio	USA	275	50	40	19 NOAM
49652	Tiffin, Ohio	USA	276	51	41	05 NOAM
49653	Wooster, Ohio	USA	278	02	40	48 NOAM
49700	ISLA VISTA	USA	240	07	34	25 PCFC
49701	Niland	USA	244	29	33	16 PCFC
49702	Coachella	USA	244	01	33	39 PCFC
49703	Corona	USA	242	24	33	51 PCFC
49704	Santa Monica	USA	241	04	34	06 PCFC
49705	Encino	USA	241	30	34	07 PCFC
49706	South El Monte	USA	241	57	34	02 PCFC
49707	Ojai	USA	240	49	34	26 PCFC
49708	Tajiguas	USA	239	53	34	29 PCFC
49709	Llano	USA	242	10	34	29 PCFC
49710	Santa Barbara	USA	240	17	34	30 PCFC
49711	Barstow	USA	243	12	34	40 PCFC
49712	Los Olivos	USA	239	60	34	43 PCFC
49713	Ludlow	USA	243	40	34	49 PCFC
49714	San Luis Obispo	USA	239	21	35	18 PCFC
49715	Unincoropated Kern County	USA	242	20	35	20 PCFC
49716	DYER/ESMERALDA	USA	241	58	37	45 NOAM
49717	ECHO CANYON STATE PARK	USA	245	44	37	55 NOAM
49718	FERNO MESA	USA	247	33	35	20 NOAM
49719	FREDONIA	USA	247	30	36	59 NOAM
49720	GABBS	USA	242	05	38	58 NOAM
49721	GARLIC/EMPIRE	USA	240	39	40	25 NOAM
49722	HUDSON FALLS	USA	286	28	43	16 NOAM
49723	NEW BERN	USA	282	57	35	10 NOAM
49724	RAILROAD VALLEY	USA	244	20	38	17 NOAM
49725	UPSAL HAGBACK	USA	241	12	39	38 NOAM
49726	OJAI/ROSE VALLEY	USA	240	49	34	32 PCFC
49727	KELSO	USA	244	21	34	47 PCFC
49728	AVALON	USA	241	40	33	18 PCFC
49729	SOLVANG	USA	240	02	34	34 PCFC
49730	GRAPEVINE/EDMONSTON PUMPI	USA	241	11	34	56 PCFC
49731	EAGLE ROCK	USA	241	48	34	07 PCFC
49732	SILVER LAKE	USA	241	45	34	06 PCFC
49733	SANTA PAULA/SOUTH MOUNTAI	USA	240	57	34	19 PCFC
49734	SANTA ROSA ISLAND	USA	239	57	34	00 PCFC
49735	NEWBERRY SPRINGS/TROY	USA	243	29	34	50 PCFC
49736	West SAN GABRIEL MOUNTAIN	USA	241	26	34	40 PCFC
49737	ARVIN	USA	241	06	35	12 PCFC
49738	FRAZIER PARK	USA	241	00	34	48 PCFC
49739	OZENA	USA	240	39	34	41 PCFC
49740	CASITAS SPRINGS	USA	240	38	34	24 PCFC
49741	SAN MIGUEL ISLAND	USA	239	39	34	02 PCFC
49742	VENTURA	USA	240	46	34	16 PCFC
49743	SUMMERFIELD	USA	257	29	34	49 NOAM
49744	POLSON	USA	245	53	46	40 EURA
49745	SPOKANE	USA	242	35	47	31 NOAM
49746	CORBIN	USA	282	38	38	12 NOAM
49747	BARTLETT	USA	288	50	44	06 NOAM
49748	EL PASO	USA	253	44	31	42 NOAM
49749	LAS VEGAS VALLEY	USA	244	49	36	10 NOAM
49750	PRICE/CARBON COUNTY	USA	249	11	39	36 NOAM
49751	MARICOPA	USA	240	36	34	55 PCFC
49752	S. SIERRA NEVADA	USA	241	56	35	52 PCFC
49753	BAKER	USA	243	56	35	17 PCFC
49754	TAFT	USA	240	40	35	09 PCFC
49755	RIDGECREST	USA	242	20	35	33 PCFC

49756	BORON	USA	242	26	35 04	PCFC
49757	CAMARILLO	USA	240	58	34 10	PCFC
49758	CALIFORNIA VALLEY	USA	240	09	35 11	PCFC
49759	BRISTOL MOUNTAIN	USA	244	06	34 43	PCFC
49760	BARSTOW/LANE MOUNT.	USA	243	04	35 05	PCFC
49761	TEHACHAPI	USA	241	36	35 09	PCFC
49762	VENTUCOPA	USA	240	31	34 51	PCFC
49763	CAPE BLANCO, OREGON	USA	235	26	42 50	NOAM
49764	TILLAMOOK, OREGON	USA	236	02	45 29	NOAM
49765	ROSEBURG, OREGON	USA	236	46	43 07	NOAM
49766	GOLDENDALE, WASHINGTON	USA	239	11	45 51	NOAM
49767	ELLENSBURG, WASHINGTON	USA	239	28	47 00	NOAM
49768	PACIFIC BEACH, WASHINGTON	USA	235	48	47 13	NOAM
49769	POINT ST. GEORGE, CA	USA	235	45	41 47	NOAM
49770	REDMOND, OREGON	USA	238	51	44 16	NOAM
49771	DENIO, NEVADA	USA	240	59	41 52	NOAM
49772	TRINIDAD HEAD, CA	USA	235	51	41 03	NOAM
49773	Paul Smith College	USA	285	45	44 26	NOAM
49774	WILMINGTON	USA	282	04	34 14	NOAM
49775	WASHINGTON (NC)	USA	282	57	35 34	NOAM
49776	RALEIGH	USA	281	22	35 47	NOAM
49779	MENTONE	USA	242	55	34 06	PCFC
49780	WILLMINGTON (CA)	USA	241	43	33 47	PCFC
49781	SILVERADO	USA	242	16	33 45	PCFC
49782	TIPTONVILLE	USA	270	39	36 28	NOAM
49783	PORTAGEVILLE	USA	270	18	36 25	NOAM
49784	NORTH LITTLE ROCK	USA	267	44	34 49	NOAM
49785	PARK HILLS	USA	269	31	37 51	NOAM
49786	CHARLESTON (MO)	USA	270	39	36 51	NOAM
49787	PIGGOTT (AR)	USA	269	50	36 22	NOAM
49788	CARUTHERSVILE (MO)	USA	270	18	35 07	NOAM
49789	STEELE (MO)	USA	270	09	36 05	NOAM
49790	COVINGTON	USA	270	21	35 32	NOAM
49791	TROY (TN)	USA	270	50	36 20	NOAM
49792	SAN GABRIEL MOUNTAINS	USA	242	02	34 15	PCFC
49793	CHINO HILLS	USA	242	16	33 58	PCFC
49794	BOISE	USA	243	43	43 39	NOAM
49795	NEWARK	USA	285	49	40 44	NOAM
49796	LEVEL ISLAND	USA	226	54	56 28	NOAM
49797	GREENVILLE	USA	277	38	34 50	NOAM
49798	HAGERSTOWN	USA	282	17	39 33	NOAM
49799	JOSHUA TREE NAT. PARK	USA	243	40	33 56	PCFC
49800	Glamis	USA	245	11	33 03	PCFC
49801	POTATO POINT/ALASKA	USA	-146	42	61 03	NOAM
49802	GUSTAVUS/ALASKA	USA	-135	42	58 25	NOAM
49803	CAPE HINCHINBROOK/ALASKA	USA	-146	39	60 14	NOAM
49804	COLD BAY/ALASKA	USA	-162	42	55 11	NOAM
49805	EIELSON AFB	USA	212	53	64 41	NOAM
49806	Johnson Valley	USA	243	35	34 35	PCFC
49807	Twentynine Palms/BEARMAT	USA	243	57	34 15	PCFC
49808	Lancaster/Challenger Midd	USA	242	11	34 38	PCFC
49809	New Cuyama	USA	240	20	34 56	PCFC
49810	Castaic/Foothill Feeder F	USA	241	24	34 30	PCFC
49811	Fillmore	USA	241	07	34 24	PCFC
49812	Newberry Springs/Hector M	USA	243	35	34 45	PCFC
49813	Ludlow	USA	243	48	34 41	PCFC
49814	Lancaster/Lancaster Injec	USA	241	52	34 39	PCFC
49815	Twentynine Palms/Noble Pa	USA	243	52	34 30	PCFC
49816	Norco	USA	242	26	33 55	PCFC
49817	Escondido	USA	242	58	33 07	PCFC
49818	Twentynine Palms/Obs. Poi	USA	244	06	34 21	PCFC
49819	Twentynine Palms/Obs. Poi	USA	243	42	34 25	PCFC
49820	Twentynine Palms/Crampton	USA	243	56	34 21	PCFC
49821	Twentynine Palms/Obs. Poi	USA	243	52	34 25	PCFC
49822	Twentynine Palms/Obs. Poi	USA	243	43	34 31	PCFC
49823	San Dimas	USA	242	12	34 05	PCFC
49824	Newberry Springs/Rodman M	USA	243	23	34 38	PCFC
49825	Mission Viejo	USA	242	21	33 33	PCFC
49826	Piru	USA	241	15	34 27	PCFC
49827	San Gabriel	USA	241	54	34 04	PCFC

49828	Ludlow	USA	243 60	34 37	PCFC
49829	Thermal	USA	243 51	33 38	PCFC
49830	Grapevine	USA	241 02	35 00	PCFC
49831	Castaic/Whitiker Peak	USA	241 16	34 34	PCFC
49832	LA CANADA	USA	241 49	34 17	PCFC
49833	SANTA CLARITA	USA	241 32	34 26	PCFC
49834	BIORKA ISLAND	USA	-135 32	56 51	NOAM
49835	SANTA CRUZ ISLAND	USA	240 13	34 02	NOAM
49836	PARKER	USA	245 49	34 19	NOAM
49837	WOODINVILLE	USA	237 55	47 46	NOAM
49838	TITUSVILLE	USA	280 20	41 38	NOAM
49839	ORONO	USA	291 20	44 54	NOAM
49840	BRUNSWICK	USA	290 04	43 53	NOAM
49841	CHATHAM	USA	290 03	41 40	NOAM
49842	NEW CASTLE	USA	289 18	43 04	NOAM
49843	MONTAUK POINT	USA	288 09	41 04	NOAM
49844	MONTPELIER	USA	287 26	44 15	NOAM
49845	CAPE HENLOPEN	USA	284 55	38 46	NOAM
49846	KITTY HAWK	USA	284 15	36 10	NOAM
49847	CAPE HENRY	USA	283 60	36 55	NOAM
49848	RICHMOND	USA	282 35	37 32	NOAM
49849	YOUNGSTOWN	USA	281 02	43 13	NOAM
49850	PITTSBURGH	USA	280 19	40 33	NOAM
49851	CHARLESTON	USA	280 10	32 45	NOAM
49852	KEY WEST NAVAL	USA	278 21	24 34	NOAM
49853	ASHEVILLE	USA	277 28	35 35	NOAM
49854	DETROIT	USA	276 55	42 17	NOAM
49855	NEEBISH ISLAND	USA	275 51	46 19	NOAM
49856	CHEBOYGAN	USA	275 33	45 39	NOAM
49857	CINCINNATI	USA	275 31	39 12	NOAM
49858	MARIETTA	USA	275 29	33 56	NOAM
49859	ERLANDER	USA	275 24	39 01	NOAM
49860	WHITEFISH POINT	USA	275 03	46 46	NOAM
49861	STURGEON BAY	USA	272 42	44 47	NOAM
49862	MILWAUKEE	USA	272 07	43 00	NOAM
49863	MOBILE	USA	271 59	30 13	NOAM
49864	UPPER KEWEENAW	USA	271 23	47 13	NOAM
49865	SUMMERFIELD	USA	270 15	38 36	NOAM
49866	ENGLISH TURN	USA	270 04	29 52	NOAM
49867	FRENCH BAYOU	USA	269 48	35 27	NOAM
49868	TEEDS GROVE	USA	269 47	42 00	NOAM
49869	VICKSBURG	USA	269 05	32 19	NOAM
49870	ALMA	USA	268 06	44 18	NOAM
49871	WISCONSIN POINT	USA	267 60	46 42	NOAM
49872	GALVESTON	USA	265 16	29 19	NOAM
49873	SALLISAW	USA	265 12	35 22	NOAM
49874	PERRY	USA	264 36	39 07	NOAM
49875	NEODESHA	USA	264 22	37 22	NOAM
49876	PALESTINE	USA	264 17	31 46	NOAM
49877	MORRIS	USA	264 09	35 40	NOAM
49878	ARANSAS PASS	USA	262 57	27 50	NOAM
49879	HAVILAND	USA	260 54	37 39	NOAM
49880	WACHAPREAGUE	USA	284 18	37 36	NOAM
49881	JAYTON	USA	259 02	33 01	NOAM
49882	GRANADA	USA	257 54	37 46	NOAM
49883	TUCUMCARI	USA	256 24	35 05	NOAM
49884	WHITE SANDS	USA	253 40	32 24	NOAM
49885	SALT LAKE CITY	USA	248 12	40 46	NOAM
49886	POINT LOMA	USA	242 46	32 39	PCFC
49887	POINT ARGUELLO	USA	239 22	34 34	PCFC
49888	APPLETON	USA	238 41	45 46	NOAM
49889	ROBINSON POINT	USA	237 38	47 23	NOAM
49890	PIGEON POINT	USA	237 37	37 11	PCFC
49891	POINT BLUNT	USA	237 35	37 51	PCFC
49892	WHIDBEY ISLAND	USA	237 19	48 18	NOAM
49893	FORT STEVENS	USA	236 03	46 12	NOAM
49894	MENDOCINO	USA	235 37	40 26	PCFC
49895	UPOLU POINT	USA	204 07	20 14	PCFC
49896	KOKOLE POINT	USA	200 15	21 59	NOAM
49897	Coronados Island	USA	242 46	32 24	PCFC

49898	Chula Vista	USA	243 02	32 34	PCFC
49899	Imperial	USA	244 30	32 49	PCFC
49900	LOS ALAMOS, CA	USA	239 43	34 44	PCFC
49901	WRIGHTWOOD	USA	242 19	34 23	NOAM
49902	MOUNT LEE	USA	241 41	34 08	PCFC
49903	HOLLYDALE	USA	241 50	33 55	PCFC
49904	DURMID HILL	USA	244 13	33 23	PCFC
49905	PACOIMA	USA	241 36	34 20	PCFC
49906	CLAREMONT/LA VERNE	USA	242 17	34 07	PCFC
49907	SOLOMONS ISLAND	USA	283 33	38 19	NOAM
49908	ANNAPOLIS	USA	283 31	38 59	NOAM
49909	SAN NICOLAS ISLAND	USA	240 29	33 15	NOAM
49910	NORTHRIDGE	USA	241 29	34 15	PCFC
49911	AZUSA	USA	242 06	34 08	PCFC
49912	TORRANCE AIRPORT	USA	241 40	33 48	PCFC
49913	HORN POINT	USA	283 52	38 35	NOAM
49914	KEYBISCAYNE/MIAMI	USA	279 50	25 44	NOAM
49915	SAN CLEMENTE ISLAND	USA	241 31	32 55	PCFC
49916	LAKE SKINNER	USA	242 56	32 34	NOAM
49917	WIDE CANYON	USA	243 36	33 56	NOAM
49918	IRVINE	USA	242 08	33 41	NOAM
49919	AVOCADO HEIGHTS	USA	242 00	34 02	PCFC
49920	CARSON	USA	241 45	33 52	PCFC
49921	COVINA	USA	242 06	34 05	PCFC
49922	DOWNEY	USA	241 52	33 56	PCFC
49923	LA PUENTE	USA	242 03	34 02	PCFC
49924	PARAMOUNT	USA	241 51	33 54	PCFC
49925	PICO RIVERA	USA	241 54	34 58	PCFC
49926	LEBEC	USA	241 06	34 48	PCFC
49927	BAR HARBOR	USA	291 47	44 24	NOAM
49928	EASTPORT	USA	293 01	44 55	NOAM
49929	COSTA MESA	USA	242 04	33 40	PCFC
49930	SOMIS	USA	240 41	34 16	PCFC
49931	SAN CLEMENTE	USA	242 22	33 27	PCFC
49932	DIAMOND BAR	USA	242 09	34 00	PCFC
49933	ATHENS/LOS ANGELES	USA	241 42	33 56	PCFC
49934	PALMER/ALASKA	USA	-149 08	61 36	NOAM
49935	COLLEGE/ALASKA	USA	-147 52	64 52	NOAM
49936	GARNER/ALASKA	USA	-148 59	63 50	NOAM
49937	BIG BEAR	USA	-116 53	34 16	NOAM
49938	PALOMAR MOUNTAIN	USA	243 08	33 21	PCFC
49939	LAKE ARROWHEAD	USA	242 47	34 14	PCFC
49940	BARSTOW	USA	242 59	34 55	PCFC
49941	RIALTO	USA	242 39	34 05	PCFC
49942	SANTA BARBARA	USA	240 09	34 25	PCFC
49943	WESTMORLAND	USA	244 16	33 04	PCFC
49944	IDYLLWILD	USA	243 17	33 44	PCFC
49945	RIVERSIDE	USA	242 41	33 55	PCFC
49946	PLACENTIA	USA	242 08	33 52	PCFC
49947	COMPTON	USA	241 47	33 53	PCFC
49948	YUCCA VALLEY	USA	243 38	34 07	PCFC
49949	CALABASAS	USA	241 22	34 08	PCFC
49950	LANDERS	USA	243 34	34 16	PCFC
49951	MOORPARK	USA	241 07	34 18	PCFC
49952	APPLE VALLEY	USA	242 51	34 28	PCFC
49953	WEST CAJON VALLEY	USA	242 31	34 19	PCFC
49954	PERRIS	USA	242 49	33 50	PCFC
49955	BEAUMONT	USA	243 01	33 58	PCFC
49956	SAN PEDRO	USA	241 42	33 43	PCFC
49957	GRANADA HILLS	USA	241 31	34 18	PCFC
49958	VICTORVILLE	USA	242 37	34 36	PCFC
49959	TWENTYNINE PALMS	USA	243 56	34 08	PCFC
49960	HEMET	USA	243 00	33 41	PCFC
49961	RANCHO CUCAMONGA	USA	242 28	34 06	PCFC
49962	RANCHITA	USA	243 28	33 13	PCFC
49963	TORRANCE	USA	241 40	33 53	PCFC
49964	LA HABRA	USA	242 04	33 56	PCFC
49965	BELL GARDENS	USA	241 50	33 58	PCFC
49966	HUNTINGTON PARK	USA	241 47	33 59	PCFC
49967	BEVERLY HILLS	USA	241 35	34 06	PCFC

49968	INGLEWOOD	USA	241	39	33	59	PCFC
49969	ANN ARBOR	USA	276	17	42	18	NOAM
49970	HONOLULU	USA	202	08	21	18	PCFC
49971	ANZA	USA	243	22	33	32	PCFC
49972	SALTON CITY	USA	244	01	33	18	PCFC
49973	WOODLAND HILLS	USA	241	26	34	11	PCFC
49974	THOUSAND OAKS	USA	241	10	34	15	PCFC
49975	PALMDALE	USA	242	10	34	35	PCFC
49976	SANTA ANA	USA	242	06	33	45	PCFC
49977	SANTA PAULA II	USA	240	51	34	20	PCFC
49978	PALM SPRINGS AIRPORT	USA	243	30	33	49	PCFC
49979	HILO AIRPORT	USA	204	57	19	43	PCFC
49980	LIHUE, KAUAI	USA	200	40	21	59	EURA
49981	HIGH VISTA	USA	242	12	34	46	PCFC
49982	QUARTZ HILL	USA	241	45	34	38	PCFC
49983	ROSAMOND	USA	241	48	34	53	PCFC
49984	OCOTILLO WELLS	USA	243	55	33	02	PCFC
49985	HOLTVILLE	USA	244	58	32	42	PCFC
49986	KERNVILLE	USA	241	32	35	40	PCFC
49987	VINCENT	USA	241	53	34	30	PCFC
49988	PALM DESERT	USA	243	37	33	44	PCFC
49989	LUCERNE VALLEY	USA	243	04	34	40	PCFC
49990	CHIRIACO SUMMIT	USA	244	22	33	42	PCFC
49991	RICE	USA	244	51	34	09	PCFC
49992	LOCKWOOD	USA	240	54	34	44	PCFC
49993	SAN BERNARDINO	USA	242	36	34	12	PCFC
49994	CABAZON	USA	243	18	33	55	PCFC
49995	KENAI/ALASKA	USA	-151	21	60	41	NOAM
49996	GLENNALLEN/ALASKA	USA	-145	58	62	07	NOAM
49997	CENTRAL/ALASKA	USA	-144	41	65	30	NOAM
49998	ANNETTE ISLAND/ALASKA	USA	-131	36	55	04	NOAM
49999	TALKEETNA/ALASKA	USA	-150	25	62	18	NOAM
50102	CARNARVON	AUSTRALIA	113	43	-24	54	AUST
50103	CANBERRA	AUSTRALIA	148	59	-35	35	AUST
50106	SMITHFIELD	AUSTRALIA	138	39	-34	41	AUST
50107	YARRAGADEE	AUSTRALIA	115	25	-29	05	AUST
50108	PARKES	AUSTRALIA	148	16	-33	00	AUST
50109	SALISBURY	AUSTRALIA	138	39	-34	44	AUST
50116	HOBART	AUSTRALIA	147	30	-42	51	AUST
50119	MOUNT STROMLO	AUSTRALIA	149	00	-35	19	AUST
50124	SYDNEY	AUSTRALIA	151	09	-33	47	AUST
50126	TOWNSVILLE	AUSTRALIA	146	46	-19	17	AUST
50127	COCO ISLANDS	AUSTRALIA	96	50	-12	12	AUST
50133	PERTH	AUSTRALIA	115	45	-31	58	AUST
50134	DARWIN I	AUSTRALIA	131	08	-12	51	AUST
50135	MACQUARIE ISLAND	AUSTRALIA	158	56	-54	30	AUST
50136	JABIRU	AUSTRALIA	132	54	-12	40	AUST
50137	ALICE SPRINGS/TELEGRAPH H	AUSTRALIA	133	53	-23	40	AUST
50138	CEDUNA	AUSTRALIA	133	49	-31	52	AUST
50139	KARRATHA	AUSTRALIA	117	06	-20	59	AUST
50140	TOWNSVILLE/CAPE FERGUSON	AUSTRALIA	147	03	-19	16	AUST
50141	HILLARYS/PERTH	AUSTRALIA	115	53	-31	48	AUST
50142	BELLEVUE/PERTH	AUSTRALIA	116	01	-31	53	AUST
50143	BRISBANE	AUSTRALIA	153	02	-27	29	AUST
50144	BURNIE	AUSTRALIA	145	55	-41	03	AUST
50145	PORT KEMBLA NSW	AUSTRALIA	150	51	-34	28	AUST
50146	COFFS HARBOUR NSW	AUSTRALIA	153	08	-30	19	AUST
50147	BATHURST	AUSTRALIA	149	34	-33	26	AUST
50148	ALBANY	AUSTRALIA	117	54	-35	02	AUST
50149	BUNBURY	AUSTRALIA	115	39	-33	19	AUST
50150	FREMANTLE	AUSTRALIA	115	44	-32	03	AUST
50151	GERALDTON	AUSTRALIA	114	36	-28	47	AUST
50152	PORT HEDLAND	AUSTRALIA	118	35	-20	19	AUST
50153	EUCLA	AUSTRALIA	128	53	-31	41	AUST
50154	WHYNDAM	AUSTRALIA	128	06	-15	27	AUST
50155	THEVENARD	AUSTRALIA	133	39	-32	09	AUST
50156	PORT LINCOLN	AUSTRALIA	135	52	-34	43	AUST
50157	LORN, VICTORIA	AUSTRALIA	143	59	-38	33	AUST
50158	PORTLAND, VICTORIA	AUSTRALIA	141	37	-38	21	AUST
50159	POINT LONSDALE, VICTORIA	AUSTRALIA	144	37	-38	17	AUST

50160	STONY POINT,VICTORIA	AUSTRALIA	145	13	-38	22	AUST
50161	PORT FAIRY, VICTORIA	AUSTRALIA	142	14	-38	23	AUST
50162	SPRING BAY - HOBART	AUSTRALIA	147	56	-42	33	AUST
50163	BARREN TIER	AUSTRALIA	146	45	-42	01	AUST
50164	PORT ARTHUR	AUSTRALIA	147	51	-43	09	AUST
50165	KARUMBA	AUSTRALIA	140	50	-17	29	AUST
50166	BAMAGA	AUSTRALIA	142	22	-10	51	AUST
50167	BUNDABERG	AUSTRALIA	152	23	-24	46	AUST
50168	CAIRNS	AUSTRALIA	145	47	-16	56	EURA
50169	COOKTOWN	AUSTRALIA	145	15	-15	29	AUST
50170	MACKAY	AUSTRALIA	149	13	-21	06	AUST
50171	WEIPA	AUSTRALIA	141	50	-12	40	AUST
50172	ROCKHAMPTON	AUSTRALIA	150	45	-23	10	AUST
50173	GROOTE EYLANDT	AUSTRALIA	136	25	-13	52	AUST
50174	CENTER ISLAND	AUSTRALIA	136	49	-15	45	AUST
50175	DARWIN II	AUSTRALIA	130	51	-12	26	AUST
50176	BROOME	AUSTRALIA	122	12	-17	57	AUST
50177	ESPERANCE	AUSTRALIA	121	54	-33	53	AUST
50178	PORT STANVAC	AUSTRALIA	138	29	-35	06	AUST
50179	PORT MACDONNELL	AUSTRALIA	140	42	-38	03	AUST
50180	VICTOR HARBOUR	AUSTRALIA	138	38	-35	34	AUST
50181	NEW NORCIA	AUSTRALIA	116	12	-31	03	AUST
50204	MOUNT JOHN	NEW ZEALAND	170	28	-43	58	AUST
50207	CHATHAM ISLAND	NEW ZEALAND	183	26	-43	57	PCFC
50208	WELLINGTON	NEW ZEALAND	174	47	-41	17	AUST
50209	AUCKLAND	NEW ZEALAND	174	50	-36	36	AUST
50210	NIUE ISLAND	NEW ZEALAND	190	04	-19	04	PCFC
50211	HOKITIKA	NEW ZEALAND	170	59	-42	43	AUST
50212	DUNEDIN	NEW ZEALAND	170	31	-45	52	AUST
50213	RAROTONGA	NEW ZEALAND	200	10	-21	13	PCFC
50214	CHRISTCHURCH	NEW ZEALAND	172	44	-43	37	AUST
50215	PAEKAKARIKI	NEW ZEALAND	174	57	-41	02	AUST
50216	Auckland tide gauge	NEW ZEALAND	174	46	-36	51	AUST
50217	Taupo Airport	NEW ZEALAND	176	05	-38	45	AUST
50218	WHANGAREI	NEW ZEALAND	174	17	-36	39	AUST
50219	TAURANGA	NEW ZEALAND	176	16	-37	25	AUST
50220	MASTERTON	NEW ZEALAND	175	35	-41	04	AUST
50221	HASTINGS	NEW ZEALAND	176	44	-39	37	AUST
50222	HAMILTON	NEW ZEALAND	175	07	-37	48	AUST
50223	GISBORNE	NEW ZEALAND	177	53	-38	38	AUST
50224	DANNEVIRKE	NEW ZEALAND	176	10	-40	18	AUST
50501	GUAM	USA	144	44	13	19	PCFC
50503	AMERICAN SAMOA	USA	189	17	-14	20	PCFC
50505	KWAJALEIN ATOLL I	USA	167	29	9	24	PCFC
50506	KWAJALEIN ATOLL II	USA	167	43	8	43	PCFC
50512	CAPITAL HILL/SAIPAN	USA	145	45	15	12	PCFC
50601	FALEOLO AIRPORT/SAMOA	WESTERN SAMOA	188	00	-13	50	PCFC
50602	APIA-UPOLU	WESTERN SAMOA	188	13	-13	49	PCFC
50801	SUVA	FIJI	178	27	-18	09	AUST
50803	VALEBASOGA-LAMBASA	FIJI	179	25	-16	26	AUST
50804	LAUTOKA	FIJI	177	24	-17	39	AUST
50805	ROTUMA ISLAND	FIJI	177	01	-12	30	AUST
50901	VAVA U AIRPORT	TONGA	186	02	-18	35	PCFC
51001	PORT MORESBY	PAPUA NEW GUINEA	147	10	-9	24	AUST
51002	LAE	PAPUA NEW GUINEA	146	59	-6	40	AUST
51003	LORENGAU	PAPUA NEW GUINEA	147	16	-2	01	AUST
51004	BUKA AIRSTRIP	PAPUA NEW GUINEA	154	40	-5	26	AUST
51005	VANIMO TOWN	PAPUA NEW GUINEA	141	18	-2	41	AUST
51201	NUSA TUPE ISLAND	SOLOMON ISLANDS	156	52	-8	06	PCFC
51401	ESPIEITO SANTO	VANUATU	167	12	-15	27	PCFC
51402	PORT VILA	VANUATU	168	19	-17	44	PCFC
66001	MC MURDO	ANTARTICA	166	40	-77	51	ANTA
66004	MAWSON STATION	ANTARTICA	62	52	-67	36	ANTA
66005	PALMER STATION	ANTARTICA	-64	03	-64	46	ANTA
66006	SYOWA	ANTARTICA	39	35	-69	00	ANTA
66007	ROTHERA	ANTARTICA	-68	07	-67	34	ANTA
66008	O'HIGGINS	ANTARTICA	-57	53	-63	19	ANTA
66009	SANAE	ANTARTICA	-2	50	-71	40	ANTA
66010	DAVIS	ANTARTICA	77	58	-68	35	ANTA
66011	CASEY	ANTARTICA	110	31	-66	17	ANTA

66012	BASE FREI / GREAT WALL	ANTARTICA	-58 59	-62 12	ANTA
66013	DOME C 1	ANTARTICA	123 06	-75 09	ANTA
66014	DOME C 2	ANTARTICA	123 35	-75 04	ANTA
66015	FERRAZ	ANTARTICA	-58 24	-62 05	ANTA
66016	ARCTOWSKI	ANTARTICA	-58 28	-62 10	ANTA
66017	BASE ARTIGAS	ANTARTICA	-58 54	-62 11	ANTA
66018	BELGRANO	ANTARTICA	-34 38	-77 52	ANTA
66019	DALLMANN	ANTARTICA	-58 41	-62 14	ANTA
66021	ELEPHANT ISLAND	ANTARTICA	-55 38	-61 29	ANTA
66022	ESPERANZA	ANTARTICA	-57 00	-63 24	ANTA
66023	FORSTER / Schirmacher Oas	ANTARTICA	11 50	-70 47	ANTA
66024	FOSSIL BLUFF	ANTARTICA	-68 19	-71 19	ANTA
66025	HAAG NUNATAK	ANTARTICA	-78 17	-77 02	ANTA
66026	KLIMENT OHRIDSKI	ANTARTICA	-60 22	-62 38	ANTA
66027	KOTTAS BERGE	ANTARTICA	-9 45	-74 18	ANTA
66028	MAITRI	ANTARTICA	11 44	-70 46	ANTA
66029	MARAMBIO	ANTARTICA	-56 39	-64 15	ANTA
66030	ZHONG SHANG	ANTARTICA	76 22	-69 22	ANTA
66031	NOTTER POINT/ ANTARCTIC P	ANTARTICA	-59 12	-63 40	ANTA
66032	PETER I ISLAND	ANTARTICA	-90 26	-68 52	ANTA
66033	ARTURO PRAT	ANTARTICA	-59 39	-62 29	ANTA
66034	SAN MARTIN	ANTARTICA	-67 06	-68 08	ANTA
66035	PUNTA SPRING - ANTARCTIC	ANTARTICA	-61 03	-64 18	ANTA
66036	TERRA NOVA BAY	ANTARTICA	164 06	-74 42	ANTA
66037	TROLL	ANTARTICA	2 32	-72 01	ANTA
66038	VERNADSKI	ANTARTICA	-64 15	-65 15	ANTA
66039	WASA	ANTARTICA	-13 25	-73 03	ANTA
66040	Amundsen-Scott Station, S	ANTARTICA	139 05	90 00	ANTA
66041	ALLAN HILLS NUNATAK	ANTARTICA	156 32	-76 43	ANTA
66042	ANT HILL	ANTARTICA	161 27	-78 47	ANTA
66043	BEAUFORT ISLAND	ANTARTICA	166 59	-76 57	ANTA
66044	CAPE BIRD	ANTARTICA	166 24	-77 17	ANTA
66045	BRATINA ISLAND	ANTARTICA	165 33	-78 00	ANTA
66046	BRIMSTONE PEAK	ANTARTICA	158 28	-75 48	ANTA
66047	BETTLE PEAK	ANTARTICA	163 32	-77 47	ANTA
66048	MOUNT CREAN	ANTARTICA	159 32	-77 52	ANTA
66049	CAPE CROZIER	ANTARTICA	169 20	-77 31	ANTA
66050	MOUNT DEWITT	ANTARTICA	159 51	-77 13	ANTA
66051	ESSER HILLS	ANTARTICA	164 05	-77 56	ANTA
66052	FRANKLIN ISLAND	ANTARTICA	168 23	-76 10	ANTA
66053	MASON SPUR	ANTARTICA	164 25	-78 33	ANTA
66054	MINNA BLUFF	ANTARTICA	167 09	-78 39	ANTA
66055	CAPE ROSS	ANTARTICA	163 01	-76 44	ANTA
66056	CAPE ROYDS	ANTARTICA	166 10	-77 33	ANTA
66057	CAPE REYNOLDS	ANTARTICA	162 34	-75 27	ANTA
66058	MARBLE POINT	ANTARTICA	163 49	-77 26	ANTA
66059	WARREN RANGE	ANTARTICA	158 18	-78 25	ANTA
66060	WHITE ISLAND	ANTARTICA	167 30	-78 11	ANTA
66061	MOUNT FLEMING	ANTARTICA	160 16	-77 32	ANTA
66062	FISHTAIL POINT	ANTARTICA	162 34	-78 56	ANTA
66063	CAPE ROBERTS	ANTARTICA	163 11	-77 02	ANTA
80601	PORT STANLEY/LOOKOUT HILL	FALKLAND ISLANDS	-57 51	-51 42	SOAM
81701	LA PALMA	CANARY ISLANDS	342 06	28 46	AFRC
82001	ISABELLA	PUERTO RICO	292 56	18 27	CARB
91201	KERGUELEN	KERGUELEN ISLANDS	70 14	-49 21	ANTA
91401	AMSTERDAM	AMSTERDAM ISLANDS	77 34	-37 48	ANTA
91501	ILE DES PETRELS	TERRE ADELIE	140 01	-66 40	ANTA
92201	PAPEETE (TAHITI)	SOCIETE ISLANDS	-149 34	-17 34	PCFC
92202	HUAHINE (MOTU HIUMOO)	SOCIETE ISLANDS	208 58	-16 44	PCFC
92301	RIKITEA (ILE MANGAREVA)	GAMBIER ISLANDS	-143 58	-23 07	PCFC
92401	TUBUAI	TUBAI ISLANDS	-149 27	-23 21	PCFC
92402	RURUTU	TUBAI ISLANDS	-151 20	-22 26	PCFC
92403	RAPA	TUBAI ISLANDS	-147 36	-23 21	PCFC
92502	HAO	TUAMOTU ISLANDS	-140 51	-18 10	PCFC
92504	ANAA	TUAMOTU ISLANDS	-145 30	-17 25	PCFC
92505	NAPUKA	TUAMOTU ISLANDS	-141 20	-14 05	PCFC
92506	NUKUTAVAKE	TUAMOTU ISLANDS	-138 42	-19 11	PCFC
92507	MORUROA	TUAMOTU ISLANDS	-138 48	-21 48	PCFC
92508	APATAKI	TUAMOTU ISLANDS	-146 24	-15 34	PCFC
92601	NUKU HIVA	MARQUISES ISLANDS	-140 00	-8 56	PCFC

92701	NOUMEA	NEW CALEDONIA	166	26	-22	18	AUST
92722	WANAHAM/ILE LIFOU	NEW CALEDONIA	167	14	-20	46	AUST
92727	KOUMAC	NEW CALEDONIA	164	17	-20	34	AUST
92732	WE-LIFOU	NEW CALEDONIA	167	16	-20	55	PCFC
92802	TANNA	NEW HEBRIDA	169	15	-19	32	AUST
92901	WALLIS	WALLIS AND FUTUNA IS	-176	10	-13	17	PCFC
92902	FUTUNA	WALLIS AND FUTUNA IS	-178	10	-14	18	PCFC
97101	LE MOULE	GUADELOUPE	-61	20	16	20	CARB
97301	KOUROU	FRENCH GUIANA	307	21	5	07	SOAM
97401	LA REUNION	REUNION	55	36	-21	12	AFRC

Table 4 Directory of IERS stations.

Release: 2002 8 29

DOMES Number	SITE	CDP	IGS	DORIS	DESIGNATION
10002	GRASSE				
M003		7605			Mobile VLBI mark 1989
M004					Concrete Slab/ 25 mm brass mark
M006			GRAS		GPS Pillar/brass mark
M008					SELF 2 mark
M010			GRAC		Concrete Pillar with Brass antenna base/GLONASS Marker
S001		7835			SLR IAR
S002		7845			LLR IAR
S014				GRAA	DORIS Ant. Ref. Pt.
S016				GR2B	DORIS antenna ref. pt. (Starec type)
10003	TOULOUSE				
M003		7608			VLBI mark
M004			TOUL		TOUL IGS mark
M005					DORIS 1 mark
M006					DORIS 2 mark
M008					Cit de l'espace / Mark under the DORIS antenna
M009			TLSE		Mark on a terrace roof
S001				TLSA	DORIS 1 antenna ref. pt (Alcatel type)
S003				TLHA	DORIS 2 antenna ref. pt (Alcatel type)
S004				TCEB	Cit de l'espace / DORIS antenna ref. pt. (Starec type)
10004	BREST				
M002		7604			Mobile VLBI mark 1989
M003			BRSG		Stainless steel mark in concrete block
M004			BRST		Building terrace / SO corner /hemisheric bronze bolt
S001					DORIS Ant. Ref. Pt.
10011	SAINT-MICHEL DE PROVENCE				
M001			MICH		Pillar/Top of forced centring device
10020	CHIZE				
M001			CHIZ		Geodetic ground marker (hemispheric bronze bolt)
10023	LA ROCHELLE				
M001			LROC		Triangular centering plate / aluminium mast / concrete bunker terrace
10073	MARSEILLE				
M008			MARS		Tide gauge building s terrace / S corner /hemisheric bronze bolt
10077	AJACCIO				
M002		7848			Concrete Monument / Brass mark
M005			AJAC		Renforced concrete pillar/Top of forced centring device
S001				AJAB	DORIS antenna ref. pt. (Starec type)
S002				AJAB	DORIS antenna ref. pt. (Starec type)
10090	SAINT JEAN DES VIGNES				
M001			SJDV		Top of forced centring device
10091	LE MANS				
M001			MANS		Steel tube on the roof of the ESGT building
10092	MARNE LA VALLEE				
M001			MLVL		ENSG building/ hemisheric bronze bolt

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10093  VERON
 M001                    LRBA      Steel mast in reinforced concrete building

10094  SEVRES
 M001                    BIPD      Steel guard rail: engraved cross

10095  CADARACHE-GINASSERVIS
 M001                    GINA      Pillar/Top of forced centring device

10096  MODANE-AVRIEUX
 M001                    MODA      Pillar/Top of forced centring device

10097  MONTPELLIER
 M001                    MTPL      Pillar/Top of forced centring device

10098  LA FECLAZ
 M001                    FCLZ      Pillar/Top of forced centring device

10099  CHATEL
 M001                    CHTL      Pillar/Top of forced centring device

10101  COPENHAGUEN
 M003                    BUDP      Pillar / center hole of antenna mount device
                                   (1-13-829)
 M004                    DK01      1-13-821, Pillar with iron plate and punch
                                   mark with fixed steel tripod
 M005                    DK0A      1-13-001, Concrete plate in soil with a brass
                                   bolt
 S001                    BUDD      GPS Ant. Ref. Point

10106  HIRTSHALS
 M001                    DK02      54-05-834, Brass bolt on concrete pier

10112  HOVVIG
 S001                    HVIG      GPS Ant. Ref. Point

10113  SULDRUP
 M001                    SULD      Pillar / center hole of antenna mount device
                                   (61-10-802)

10114  SMIDSTRUP
 M001                    SMID      Pillar / center hole of antenna mount device
                                   (117-05-810)

10115  ESBJERG
 M001                    DK03      K-75-956, Brass bolt on concrete pier

10116  GEDSER
 M001                    DK04      Brass bolt on concrete pier

10117  THORSHAVN
 M001                    DK05      K-87-9035, Concrete plate with bronze sheet
                                   and polished steel bolt

10202  REYKJAVIK
 M001                    REYK      Univ/bolt GPS marker
 M002                              DORIS mark
 M003                    REYZ      GPS+GLONASS Marker/Bolt
 S001                         REYA DORIS antenna ref. pt (Alcatel type)
 S002                         REYB DORIS 2 antenna ref. pt. (Starec type)

10204  HOFN
 M001              7635            VLBI monument 1992/brass marker in bedrock
 M002                    HOFN      IFAG GPS monument/chimney pillar /steel plate
 M003                              Statens kartverk GPS monument / chimney
                                   pillar/steel plate
 M004                              PRARE monument/observation tower/concrete
                                   pillar
 M005                              EUREF monument/concrete pillar/brass marker
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10302  TROMSO
 M001                                Trig. point (N 5481)
 M002              7602              Mobile VLBI and SLR mark
 M003                   TROM         GPS marker TSS GPSM
 M004                                Mark TSS III
 M005                                Mark WMC2
 M006                   TRO1         Hole top center/horizontal top plate/steel
                                     tower/bedrock
 S001                                TI4100/L1 20-DEC-87 - 26-OCT-88
 S002                                TI4100/L1 28-OCT-88 - 07-NOV-88
 S003                                TI4100/L1 07-NOV-88 - 21-SEP-89
 S004                                TI4100/L1 21-SEP-89 - 17-JUL-90
 S006                                TI4100/L1 17-JUL-90 - 22-AUG-90
 S007                                ROGUE SNR-8/DM B/L1 28-MAY-90 - 30-JUN-90
 S008                                ROGUE SNR-8/DM B/L1 01-JUL-90 - 18-JUL-90
 S009                                ROGUE SNR-8/DM B/L1 18-JUL-90 -
 S010                        TROA    DORIS antenna ref. pt (Alcatel type)

10307  OSLO
 M001                   OSLO         BOLT IN SOLID ROCK

10317  NY-ALESUND
 M001                   NYAL         GPS Mark
 M003                   NYA1         Hole top center/horizontal top plate/steel
                                     tower/bedrock
 M004                                DORIS 1 mark (12 mm brass mark)
 M005                   NYAG         Brass Bolt / Concrete block / Steel tower
 M006                                DORIS 2 mark (12 mm domed brass mark)
 S001                                ROGUE SNR-8/DM B/L1 17-JAN-91
 S002                        SPIA    DORIS antenna ref. pt (Alcatel type)
 S003              7331              20 m VLBI antenna reference point
 S004                        SPIB    DORIS 2 antenna ref. pt. (Starec type)

10322  DOMEN
 M002                   VADR         BOLT IN SOLID ROCK

10325  HONEFOSS
 M001                   HONE         SK Tower GPS mark
 S001

10329  TRYSIL
 M001              7607              VLBI mark

10330  STAVANGER
 M001                   STAV         BOLT IN SOLID ROCK

10331  TRONDHEIM
 M001                   TRON         BOLT IN SOLID ROCK

10332  GiH Gjovik
 M001                   GJOV         Gjovik University College / Building B / Bolt
                                     of antenna mounting device / 5300

10402  ONSALA
 M003                                NLS Mark 761331 (S7331)
 M004                   ONSA         Mark 301 GPSM
 M005                                Mark 401
 M006              7211              Mobile VLBI mark 1992
 S001              7212              VLBI ref. pt. ONSALA85
 S002              7213              VLBI ref. pt. ONSALA60
 S011                                TI4100/L1 18-DEC-87 -23-JAN-91
 S012                                ASHTECH/L1 27-JAN-91 -20-MAY-91
 S013                                ROGUE SNR-8/DM B/L1 31-MAY-91

10403  KIRUNA
 M002                   KIRU         GPS mark

10405  MARTSBO
 M002                   MAR6         STAINLESS PLATE/PILLAR/BEDROCK
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 S005                              ASHTECH/L1 22-JAN-91 - 13-FEB-91

10422  KIRUNA/ESRANGE
 M001                    KIR0      STAINLESS PLATE/PILLAR/BEDROCK

10423  VISBY
 M001                    VIS0      STAINLESS PLATE/PILLAR/BEDROCK

10424  VILHELMINA
 M001                    VIL0      STAINLESS PLATE/PILLAR/BEDROCK

10425  BORAS
 M001                    SPTF      Concrete monument on bedrock / metal plate

10503  METSAHOVI
 M001                              Mark (SF 348)
 M002               7601           Mobile VLBI mark 1989
 M003                              24 m high bilby tower
 M004                              Upper bench mark (FGI) under the DORIS antenna
 M005                    METZ      STEEL MAST/Antenna mounting device
 M006                              FGI mark on a concrete block (DORIS 2)
 S001               7805           SLR IAR
 S009                              ASHTECH L-XII/L1 ??-MAY-91
 S010                              ROGUE SNR-8/DM B/L1 01-JAN-92
 S011                    METS      ROGUE SNR-8/DM B/Bottom of the choke ring
 S013                         META DORIS antenna ref. pt (Alcatel type)
 S014               7806           METLAS/ Fixed laser 7806 /IAR
 S015                         METB DORIS antenna ref. pt. (Starec type)

10511  VAASA
 M001                    VAAS      BOLT/TOP OF STEEL GRID MAST

10512  JOENSUU
 M001                    JOEN      BOLT/TOP OF STEEL GRID MAST

10513  SODANKYLA/PITTIOVAARA
 M001                    SODA      BOLT/TOP OF STEEL GRID MAST

10801  VILNIUS
 M001                    VLNS      Concrete block/Concrete pier/Steel plate with
                                   a forced centering hole

11001  GRAZ LUSTBUEHEL
 M001                              Mark (A171)
 M002                    GRAZ      GPS Mark
 M003                    GRAA      Alu tripod ground marker fixed on the roof of
                                   the observatory (GRAA 306-164)
 M004                    GRAB      Alu ground marker rod fixed on the roof of the
                                   observatory (GRAB 306-164)
 S002               7839           Fixed Laser / intersection of axes

11005  PFANDER
 M001                              A 102 BREGENZ PILLAR
 M002                              CENTRAL MARKER/BED ROCK/BRASS BOLT
 S002                    PFAN      MINI-ROGUE / DM B /ARP

11006  INNSBRUCK/HAFELEKAR
 M001                              HAFELEKAR/CENTRAL MARKER/BED ROCK/BRASS BOLT
 M002                    IBK1      Innsbruck Univ./Institut Fur Geodasie/Pillar
                                   on the flat roof
 S003                    HFLK      HAFELEKAR/MINI-ROGUE / DM B /ARP

11027  HUTBIEGL
 M002                    AT01      KT T73-21B1, Granite pillar with bolt (KT) and
                                   forced centering device

11028  REISSECK
 M001                              CENTRAL MARKER/BED ROCK/BRASS BOLT
 S001                    GRMS      MINI-ROGUE / DM B /ARP
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11029  PATSCHERKOFEL
 M001                              CENTRAL MARKER/BED ROCK/BRASS BOLT
 S001                       PATK   MINI-ROGUE / DM B /ARP

11030  MATTERSBURG
 M001                              Steel mast/station reference marker
 M002                       MTBG   Steel mast/IGEX marker

11031  GAISBERG/SALZBURG
 M001                              Brass bolt in bedrock/Central markeR 8-64
 S001                       SBGZ   GPS Trimble 4000SSI Antenna/ARP

11032  THOERL-MA
 M001                       AT03   KT 397-200A1, Granite pillar with bolt (KT)
                                   and forced centering device, set in bedrock

11033  LINZ
 S001                       LINZ   LEICA AT504 (ChokeRing) / ARP

11035  VIENNA
 S001                       WIEN   Trimble 4000SSI, Dorne Margolin antenna / AR

11036  VILLACH
 S001                       VLCH   Trimble 4000 SSI, Choke ring antenna / ARP

11037  ROTTENMANN
 S001                       RTMN   ASHTECH Z-18 (091049) Choke ring antenna / ARP

11038  KITZBUEHEL
 S001                       KTZB   ASHTECH uZ-12, Choke ring antenna / ARP

11039  HAUSER KAIBLING
 S001                       HKBL   LEICA SR520, Ckoke ring antenna / ARP

11040  VOELKERMARKT
 S001                       VLKM   LEICA SR250, Dorne Margolin antenna / ARP

11041  ST. POELTEN
 S001                       STPO   LEICA SR250, Choke ring antenna / ARP

11042  ZETTERSFELD/LIENZ
 S001                       LIEN   ASHTECH UZ-12, Choke ring antenna / ARP

11043  KRAHBERG
 S001                       KRBG   LEICA SR250, Choke ring antenna / ARP

11101  SOFIA
 M001              7505             SLR MARKER 7505
 M002                       SOFI   PILLAR ON THE FLAT-ROOF

11104  VARNA
 M001                       BG04   Pillar on base with screw bolt in brass plate
                                   on pillar top, with forced centring device

11106  BURGAS
 M001                       BG01   Concrete pillar with brass plate and screw
                                   bolt inserted into a concrete slab, with
                                   forced centring device

11206  PENC
 M006                       PENC   CONCRETE PILLAR ON THE ROOF OF THE MAIN
                                   BUILDING

11207  OROSHAZA
 M001                       OROS   GPS marker on a roof

11401  BUCAREST
 M001                       BUBC   University Roof/Survey marker on pillar

11502  PECNY/ONDREJOV
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M001			Geodetic Monument/EUREF GPS 0209 / #2207010
M002		GOPE	GEODYNAMICAL PILLAR/ROOF MAIN BUILDING
11503	BRNO		
M001		TUBO	Marker on pillar
11507	MODRA-PIESOK		
M001		MOPI	CONCRETE PILLAR/BEDROCK
11508	PREDNIPRICKA		
M001		CZ03	Geodetic Monument /EUREF GPS 0210 / EUVN CZ03 / #3524005
11510	CHRASTAVA		
M001		CZ01	Levelling bench mark/EUVN CZ01/Steel bolt on iron tube filled with concrete / CZ4-13.1
11511	KOTOUN		
M001		CZ02	Levelling bench mark/EUVN CZ02 / HM-0.1, Steel bolt on iron tube filled with concrete
11512	VRBATUV KOSTELEC		
M001		CZ04	Eeg-25, Bronze bolt with forced centring in special pillar
11513	KLET		
M001			Geodetic Mark /EUREF 0218/#40130285
11801	SARAJEVO		
S001		SRJV	Old chimney of institute building/Trimble 4000SSI/GPS ARP
11901	DUBROVNIK		
M001		DUBR	Marker in a steel-plate on a permanent steel-tripod
11902	OSIJEK		
M001		OSJE	Bolt-Marker on a steel-mast
11903	PULA		
M001			Geodetic Ground Marker / 187 PULA-E / (EUREF No. 0729)
S001		PULA	TRIMBLE 4000SSI / TRM29659.00 / ARP / URS3580
12108	LJUBLJANA		
M001		LJUB	GPS Marker
12204	JOZEFOSLAW-WARSAW		
M001		JOZE	Geodynamical Pillar
12205	BOROWIEC		
M002		BOR1	Geodynamical pillar on roof/main building
M004		BORG	Stable gedynamical concrete pillar on the roof of the main building/GPS+GLONASS
S001	7811		SLR IAR
12207	BOROWA GORA		
M002		BOGO	PILLAR/ROOF OBSERVATORY MAIN BUILDING
M003		BOGI	Concrete pillar covered with wooden casing, on the top of the pillar brass plate with centring device
12209	LAMKOWKO		
M001		LAM0	Concret Pillar
12217	WROCLAW		
M001		WROC	PILLAR/ROOF MOUNT
12301	UZHGOROD		
M001		UZHL	Laboratory for Space Research/roof of the main

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                                  office/Top of steel pillar

12302  RIGA
 M001              7560           SLR mark
 M002                   RIGA      CONCRETE MONOLITH 10371
 S002              1884           SLR IAR
 S006              1885           FIXED LASER /ULISS CDP 1885

12309  MENDELEEVO
 M001                   MDVO      Roof/1 m square metallic plate
 M002                   MDVO      ROOF/2ND GPS MARKER
 M003                   MDVG      Pillar on the main building roof
 M004                   MDVZ      Roof/Pillar
 M005                   MDVJ      Stable geodynamical pillar on the roof  main
                                  building
 S001              1870           MENLAS / SAZHEN-2 / INTERSECTION OF AXES
 S003              1874           GRAN SLR system/intersection of axes

12312  YEREVAN
 M001                   NSSP      5/8-inch bolt set in a concrete pillar

12313  IRKOUTSK
 M001                   IRKT      2-3M PILLAR
 M002                   IRKG      West GPS/GLONASS Geodynamical Pillar
 M003                   IRKZ      Roof Briks Monument

12319  NOVOSSIBIRSK
 M001                   NVSK      GPS Marker

12329  YUZHNO-SAKHALINSK
 M002                             DORIS mark
 M003                   YSSK      Institute of Marine Geology and Geophysics/
                                  Roof/ Top of 5/8-11" diameter vertical rod
 S001                        SAKA DORIS antenna ref. pt (Alcatel type)

12330  ZWENIGOROD
 M001                   ZWEN      Roof main building/GPS pillar
 M002                   ZWEG      Roof main building/GLONASS pillar

12334  KITAB
 M001                   KIT3      Thread mark in rock
 M002                             DORIS mark
 M003                             DORIS concrete pillar (ex-PRARE) : top of bolt
 S004                        KITA DORIS 1 antenna ref. pt. (Alcatel type)
 S005                        KITB DORIS 2 antenna ref. pt. (Starec type)
 S006                        KIUB DORIS 3 antenna ref. pt. (Starec type)

12335  NIKOLAIEV
 M001                   MIKL      Top of mark of concrete pillar on the roof of
                                  main office

12336  POLTAVA
 M001                   POLV      Top of steel pillar located on the roof of the
                                  main office of the Poltava Gravimetrical
                                  Observatory

12337  SIMEIS
 M001              7561           Simeis SLR mark
 S003              1873           Simeis fixed SLR IAR
 S006              1893           Katzively Crimea fixed SLR IAR
 S008              7332           22 m AZ-EL Paraboloidal Radiotelescope Ref.
                                  pt.

12338  BADARY
 M001                             Hole in aluminium plate (DORIS mark)
 S001                        BADA DORIS antenna ref. pt (Alcatel type)

12339  PARAMUSHIR (ILES KOURILES)
 S001                        PASB DORIS Ant. Ref. Pt.
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12340  MAIDANAK
 S001              1863           MDN. FIXED LASER 1863
 S002              1864           MDN2. FIXED LASER 1864

12341  KOMSOMOLSK-NA-AMURE
 S001              1868           KOM. FIXED LASER 1868

12342  USSURIISK
 S001              7247           70 m VLBI antenna ref. pt.

12343  BALKHASH
 S001              1869           Balkhash fixed laser

12344  EVPATORIA
 S001              1867           EVP. FIXED LASER 1867

12347  DUNAOVCY
 S001              1866           Dun. Fixed SLR system

12348  POLIGAN/BISHKEK
 M001                    POL2      14 CM DIAMETER PIPE/PLATE

12349  KRASNOYARSK
 M001                              DORIS mark on a terrace
 M002                    KSTU      Concrete pillar / threaded mark
 S001                         KRAB DORIS antenna ref. pt. (Starec type)

12350  SVETLOE
 M001                    SVTL      ROOF/STAINLESS PLATE/CONCRETE PEDESTAL
 M002                              Ground pillar 102
 M003                    SVT3      Bronze mark 103 on the roof of the laboratory
                                   building
 S001              7380            Intersection of axes of a permanent VLBI
                                   antenna

12351  ZELENCHUKSKAYA
 M001                    ZECK      BOLT/PILLAR/OBSERVATION TOWER
 S001              7381            Intersection of axes of a permanent VLBI
                                   antenna

12352  SELEZASCHITA
 M001                    SELE      Top of metallic tube (4m height 0.12m
                                   diameter)

12353  YAKUTSK
 M001                    YAKA      Top of 5/8-11" diameter stainless steel rod
 M002                    YAKT      Top of 5/8-11" diameter stainless steel rod

12354  MAGADAN
 M001                    MAGO      Top of 5/8-11" diameter stainless steel rod

12355  PETROPAVLOVSK-KAMCHATKA
 M001                    PETR      Top of 5/8-11" diameter stainless steel rod
 M002                    PETP      Top of 15.5-mm diameter vertical brass rod

12356  GOLOSIIV - KIEV
 M001                    GLSV      Top of steel pillar on the roof of the main
                                   office
 S001              1824            Intersection of axes of a permanent SLR
                                   instrument

12357  SARAPUL
 S001              1871            SARLAS/fixed laser/IAR

12358  BISHKEK
 M001                    BISH      GFZ GPS MARK
 M002                    BISZ      Top of metal sheet on a concrete tube
                                   /GPS+GLONASS marker

12359  KOROLEV
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 M001                    CNS1      Steel mast

12360  TIXI
 M001                    TIXI      Punched center of top surface of 5/8-11"
                                   diameter, vertical stainless steel rod

12361  KHABAROVSK
 M001                    KHAB      East GPS/GLONASS Geodynamical Mark

12362  ARTI
 M001                    ARTU      Arti Geophysical Observatory/ Roof/ Top of
                                   5/8-11" diameter vertical rod

12363  BILIBINO
 M001                    BILI      Punched center on top of 5/8-11" diameter
                                   vertical rod

12364  NORILSK
 M001                    NRIL      Punched center on top of 5/8-11" diameter
                                   vertical rod

12365  OBNINSK
 M001                    MOBN      Roof / Punched center on top surface of
                                   5/8-11" diameter, vertical stainless steel rod

12366  LVIV
 M001                    SULP      Lviv Polytechnic / Fundamental astronomical
                                   monument / Pillar

12367  NOVOSIBIRSK, SNIIM
 M001                    NOVJ      Stable geodynamical pillar on the roof  main
                                   building

12368  BRJUHOVYCHI
 S001              1831            Intersection of axes of a permanent SLR
                                   instrument

12602  DIONYSOS
 M001                              Central Pillar
 M002              7515            Mark SLR Standard WEGENER disk
 M003                              DORIS mark
 M004                    DION      EUVN GPS Marker (unknown description)
 S001              7940            SLR IAR
 S011                         DIOA DORIS antenna ref. pt (Alcatel type)

12612  ASKITES
 M001              7510            Mark SLR 7510

12613  ROUMELLI
 M001              7517            Mark SLR 7517

12614  KARITSA
 M001              7520            Mark SLR 7520

12615  KATAVIA
 M001              7512            Mark SLR 7512

12616  XRISOKALARIA
 M001              7525            Mark SLR 7525

12617  CHANIA
 M001                    SBT1      Souda Bay Naval Base/Top of tide gauge shack
 S001                    TUC1      Leica CRS1000/ARP

12706  LAMPEDUSA
 M001              7544            Mark SLR 7544
 M002                    LAMP      GPS Marker

12711  MEDICINA
 M001                              Pillar
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 M002             7546          Mark SLR 7546
 M003                  MEDI     PILLAR MARKER R
 S001             7230          Radiotelescope ref. pt.

12712  GENOVA
 M002                  GENO     Stable pillar on the roof

12717  NOTO
 M001             7543          Mark SLR
 M002                           BOLT GPS EUREF 89 (G)
 M003                  NOTO     PILLAR MARKER R
 M004                  NOT1     Stable pillar on the ground
 S001             7547          Radiotelescope ref. pt.

12718  TRIESTE
 M001                           Mark (I 400130)
 M002             7550          Mark SLR 7550

12721  ELBA ISLAND
 M002                  ELBA     One meter stable pillar on the rock

12724  TORINO I
 M002                  TORI     GPS Marker "1"
 S001                  IENG     ASHTECH Z-XII3T / ARP

12725  CAGLIARI
 M001                           ILS Mark (I 234165)
 M002             7545          Mark SLR 7545
 M003                  CAGL     PILLAR MARKER G
 M004                  CAGZ     1.5 meter ground stable pillar
 S013             7548          Fixed SLR system

12734  MATERA
 M001                           Mark (I 201130)
 M004             7541          Mark SLR 7541 "C"
 M005             7540          Mark SLR 7540 "B"
 M007                           Roof GPS Mark
 M008                  MATE     Pole (CIGNET GPS mark)
 M009                  MAT1     0.4 meter stable pillar on the roof
 S001             7939          SLR IAR
 S005             7243          Fixed VLBI antenna
 S006                           ROGUE SNR-8/DM B/L1 22-JAN-91
 S007                           ROGUE SNR-8/DM B/L1 16-APR-91
 S008             7941          Intersection of alt-az axes of the 1.5 m
                                SLR/LLR telescope

12741  VENEZIA
 M001                  VENE     METALLIC PILAR ON THE ROOF

12749  MONTE VENDA
 M001             7542          SLR mark

12750  PADOVA
 M001                  UPAD     Concrete pillar
 M002                  UPAD     Screw under plastic mast
 S001                  PADO     TRIMBLE 4000SSI Antenna / Bottom of Chocke
                                Ring

12751  BOLZANO
 M001                  BZRG     Stable metallic pillar on the roof (local nb.
                                909)

12752  PERUGIA
 M001                  UNPG     Stable pillar "A" on the roof

12753  TRENTO
 M001                  TREN     Pilaster placed on the roof of a building made
                                of reinforced concrete (Palazzo Giulia)

12754  CAMERINO
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 M001                   CAME      One meter stable pillar

12755  REGGIO CALABRIA
 M001                   TRGC      One meter stable pillar on the roof

12756  FERRARA
 M001                   UNFE      0.4 meter stable metallic pillar on the roof

12757  L AQUILA
 M001                   AQUI      Roof / 0.5 meter stable metallic pillar

12758  TRAPANI-MILO
 M001                   MILO      1.5 meter stable pillar on the ground

12759  NOVARA COMUNE
 M001                   NOVA      2.5 meter steel pillar (pole) on the roof

12760  PRATO
 M001                   PRAT      1.5 m stable pillar on the roof of PIN

12761  MILANO-CAMPUS COMO
 M001                   COMO      0.9 meter stable pillar on the roof

13101  BRUSSELS
 M004                   BRUS      GPS ASTROLAB/OLD ASTROLAB OBSERVATION DOMEE
 M005                   BRUG      STEEL PLATE

13104  OSTENDE
 M002                   BE01      12B14R3, Metal support with plate over a small
                                  pillar with inserted bolt on building roof

13112  DENTERGEM
 M001                   DENT      PILLAR (EUREF # 0705)

13113  DOURBES
 M001                   DOUR      PILLAR (EUREF # 0708)

13114  WAREMME
 M001                   WARE      PILLAR (EUREF # 0706)

13201  BARTON STACEY/CHILBOLTON
 S002              7215           25m radiotelescope ref. pt.

13205  CARLISLE
 S001                   CARL      LEIAT504 / ARP

13206  CARMARTHEN
 S001                   CARM      LEIAT504 / ARP

13207  COLCHESTER
 S001                   COLC      LEIAT504 / ARP

13208  DARESBURY
 S001                   DARE      LEIAT504 / ARP

13209  DROITWICH
 S001                   DROI      ASH700936E / ARP

13212  HERSTMONCEUX
 M002                             Primary pillar (GB 481)
 M005                             Solar pillar
 M007                   HERS      GPS reference mark
 M009                   HERP      PRARE Steel Pillar
 S001              7840           SLR IAR
 S012                             ROGUE SNR-8A/DM B/L1 04-SEP-91-

13213  GREAT YARMOUTH
 S001                   GTY1      GPS Trimble 4000 SSE ARP
 S002                   GTY2      GLONASS Ashtech GG24 ARP
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13214  GUILDFORD
 M001                    SIGL      BRASS PLATE

13215  LEEDS
 M001                    LDS1      STAINLESS STEEL/BRASS PLATE
 M002                              Geodetic ground marker / IGLOS_01
 S001                    LEED      ASH700936E / ARP

13216  North Shields Tide Gauge
 S001                    NSTG      GPS Choke Ring Antenna ARP

13217  EDINBURGH
 S001                    EDIN      LEIAT504 / ARP

13219  GLASGOW
 S001                    GLAS      LEIAT504 / ARP

13220  NOTTINGHAM
 S001                    IESG      ASH700936D M / ARP
 S002                    NOTT      ASH700936E / ARP

13221  INVERNESS
 S001                    INVE      ASH700936E / ARP

13222  ISLE OF MAN NORTH
 S001                    IOMN      LEIAT504 / ARP

13224  ISLE OF MAN SOUTH
 S001                    IOMS      LEIAT504 / ARP

13225  KING LYNN
 S001                    KING      ASH700936E / ARP

13226  MALLAIG
 S001                    MALG      LEIAT504 / ARP

13227  NEWCASTLE
 S001                    NEWC      ASH700936E / ARP

13228  NORTHHAMPTON
 S001                    NORT      ASH700936E / ARP

13229  PLYMOUTH
 S001                    PLYM      LEIAT504 / ARP

13230  THURSO
 S001                    THUR      LEIAT504 / ARP

13234  TEDDINGTON
 M001                    NPLC      NPL Building 2/South East corner/Top of
                                   Aluminium pole
 M002                    NPLB      NPL Building 2/North East corner//Top of
                                   Aluminium pole
 M003                    NPLD      Building 2/NE corner of liftshaft roof /
                                   Centre of top of bolt through steel railing
 M004                    NPLE      NPL Building 2/centre of South side of
                                   liftshaft roof / Centre of top of bolt through
                                   steel railing
 M005                    NPLF      NW corner of liftshaft roof, Building 2/Steel
                                   railing/ Center of top bolt

13235  HERMITAGE
 S001                    ENGL      NIMA GPS antenna ASH700936B_M 1123 / ARP

13274  SOUTHAMPTON
 S002                    OSHQ      ASH700936E / ARP

13296  BUDDON - CARNUSTY
 M002              7603            Mobile VLBI mark 1989
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13299  MORPETH
 S001                    MORP      INTERSECTION OF THE VERTICAL AXIS FROM THE
                                   HORIZONTAL BENCHMARK (FORCED CENTRING PLATE)
                                   WITH THE HORIZONTAL PLANE TANGENT TO THE
                                   HEIGHT BENCHMARK (VERTICAL BOLT)

13402  SAN FERNANDO
 M004                    SFER      TOP OF TOWER/GPS MARKER
 S004               7824           Old SLR system (until April 1999)
 S006                    ROAH      AOAD/M_T GPS Antenna Reference Point
 S007               7824           SLR Fixed System / New position April 1999 /
                                   intersection of axes

13406  VILLAFRANCA
 M001                    VILL      ESA GPS marker

13407  MADRID-ROBLEDO
 S001               1563           64m antenna DSS63
 S003               1561           26(34) antenna DSS61
 S010               1565           34m antenna DSS65
 S011                              ROGUE SNR-8/DM R/L1 21-MAR-90
 S012                    MADR      ROGUE SNR-8/DM R/Bottom of the choke ring
                                   21-MAR-90
 S013                              ROGUE SNR-8/DM R/Top of the choke ring
                                   21-MAR-90

13410  ROQUETES - TORTOSA
 M001                    EBRE      Geodetic Pillar

13411  MADRID-FACULTAD
 S001                              TRIMBLE 4000SLD/L1 22-JAN-91 - 13-FEB-91

13420  YEBES
 M001                    YEBE      Reinforced concrete pillar/roof of the Centro
                                   Astronomico de Yebes (53602)
 S001               7333           14M RADIOTELESCOPE

13431  BELLMUNT DE SEGARRA
 M001                    BELL      4.5 m concrete pillar with forced centering

13432  CAP DE CREUS
 M001                    CREU      3m concrete pillar with forced centering

13433  ALICANTE
 M001                    ALAC      Metallic plate/Concrete pillar/Roof of the IGN
                                   tide gauge building (87201)

13434  A CORUNA
 M001                    ACOR      Metallic plate/Concrete pillar/Roof of the IGN
                                   tide gauge building (2101)

13435  ESCORNACRABES
 M001                    ESCO      3m concrete pillar with forced centering
                                   device

13436  LLIVIA
 M001                    LLIV      3.5m concrete pillar with forced centering
                                   device

13437  ALMERIA
 M001                    ALME      Reinforced concrete pillar on the top of the
                                   roof of the Observatorio Geofisico de Almeria
                                   (105901)

13438  CANTABRIA
 M001                    CANT      Reinforced concrete pillar on the top of the
                                   roof of the Universidad de Cantabria  (3502)

13439  VALENCIA
 M001                    VALE      Reinforced concrete pillar on the top of the
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			roof of the Universidad Politecnica de Valencia (72268)
13440	LES AVELLANES		
M001		AVEL	3m concrete pillar with forced centering device (255102001)
13441	MONTCADA		
M001		MNTC	concrete base with forced centering device (290121001)
13442	LES PLANES		
M001		PLAN	4m concrete pillar with forced centering device (285124002)
13443	MALAGA		
M001		MALA	Brass plate on reinforced concrete pillar on the top terrace of the Observatorio Geofisico de Malaga (E-105324)
13444	PALMA DE MALLORCA		
M001		MALL	Brass plate with bolt to fix the antenna on reinforced concrete pillar on the top of the roof of the Centro Oceanografico de Palma (E-069801)
13445	MADRID UPM-EUITT		
M001		MERC	Roof of EUITT/1m reinforced concrete pillar / Metallic plate with 3/8" centering bolt
13446	SONSECA		
M001		SONS	Reinforced concrete pillar on roof of the Sismological Center of Sonseca (65761)
13447	CACERES		
M001		CACE	Reinforced concrete pillar on the top of the roof of the Universidad Politecnica de Caceres (70459)
13448	LA RIOJA		
M001		RIOJ	Reinforced concrete block blasted tower on bedrock (20401)
13449	CEUTA		
M001		CEUT	CEUTA Port Authority building roof / Reinforced concrete pillar (1078B)
13450	VIGO		
M001		VIGO	Reinforced concrete pillar on roof of the building of Spanish Oceanographic Institute of Vigo
13451	HUELVA		
M001		HUEL	Huelvas Politechnical University / Roof / Reinforced concrete pillar
13452	ALBACETE		
M001		ALBA	Reinforced concrete block blasted tower on the roof of the Castilla-La Mancha University
13502	DELFT		
M002			GPS EUREF 89 (MARK # 18)
M003			GPS MARK # 15
M004		DELF	GPS MARK # 16
M005			GPS MARK # 19
M006		DLFT	GPS MARK # 20
M007			GPS MARK # 21
M008		VSLD	Van Swinden Laboratorium/Marker on steel mast on top of elevator housing of building entrance T

M009				GPS MARK # 02
M010				GPS MARK # 04
13504	KOOTWIJK			
M001				Perm. mark 1980
M002		8833		Monument MTLRS 1984
M003			KOSG	GPS mark 339334-25
S001		7833		SLR IAR (NL 233)
S013				ROGUE SNR-8/DM B/L1 20-JAN-91
13506	WESTERBORK			
M005			WSRT	TOP OF MAST (MARK #01)/RD 179811/NAP 0A-262
13510	APELDOORN			
M001			APEL	Top of 14 store building / survey marker (01) / RD 339347
13533	EIJSDEN			
M001			EIJS	TOP OF MAST (MARK #1)/RD 610326/NAP 61H002
13534	TERSCHELLING			
M001			TERS	TOP OF MAST (MARK #01)/RD 059306/NAP 0A-403
13902	PORTO			
M001			GAIA	Astronomical Observatory / concrete pillar / metalic structure
13903	LAGOS			
M001			LAGO	17th century fort/metal structure
13909	CASCAIS			
S001			CASC	LEICA SR9500/GPS ANTENNA: AT303/ARP
13910	LISBOA			
S001			OALN	GPS ARP / Ashtech Z-XII3 # 5555-1122A0 / DORNE MARGOLIN ASH
14001	ZIMMERWALD			
M001				Brass mark in a concrete monument (CH 99)
M002			ZIMA	DOPPLER Mark (DOP80) on top of an aluminium tube on the roof of the observatory. Removed Oct 1998. Replaced by GPS98.
M003				Steel tube on the roof of the observatory (GPS87)
M004			ZIMM	GPS Marker on top of a 9m mast (L+T88)
M005			ZIMZ	Steel tube on the roof of the obervatory (GPS97)
M006			ZIMJ	Eccentric mount on steel tube (GPS87) on the roof of the observatory (GPS87E)
M007				Steel tube on the roof of the observatory (GPS98). Installed Oct 1998. Replaces DOP80.
S001		7810		Fixed Laser / intersection of axes
S007		7810		New Laser Telescope (ZIMLAT) /intersection of axis
14005	MONTE GENEROSO			
M001				Mark (CH 65)
M002		7590		SLR Mark
14006	CHRISCHONA			
M002			CH01	1047.700, Concrete block with screw bolt
14007	LA DOLE			
M002			CH03	La Grivine / 1260.800
14009	BOURG_SAINT PIERRE			
M001			CH02	1345.700
14010	OBERALP			
M001			CH04	1232.200

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14011  SIBLINGEN
 M001                    CH05      1031.366

14012  STABIO
 M001                    CH06      1373.425, Bolt in rock

14013  ZERNEZ
 M001                    CH07      1218.400

14106  POTSDAM
 M001                              Pillar tour Helmert
 M003                    POTS      Geodetic pillar N-E / building A17
 S001              1181            SLR IAR
 S009              7836            POTLAS / intersection of axes

14108  DRESDEN
 M001                    DRES      GPS Geodetic Marker/roof-platform/Tech. Univ.
 M002                    DREJ      Survey Marker on Mast-Platform / Roof /
                                   Geodetic Institute / Tech. Univ.

14201  WETTZELL
 M001                              Astro. Pillar
 M002                              Trig. Point (D6843)
 M003              7595            SLR and GPS mark
 M004              7596            SLR mark
 M005              7597            SLR mark
 M006              7598            SLR and GPS (ROGUE) mark
 M007              7599            SLR mark
 M008                              Mark 1000 (bottom TI4100 12-NOV-90 -
                                   27-JUL-89)
 M009                    WETT      GPS mark 1200/top of tower
 M010                    WTZR      Pillar 1202
 M011                    WTZT      PILLAR 1201
 M012                    WTZG      PILLAR 1203
 M013                    WTZA      PILLAR 1204
 M014                              PILLAR 1205
 M200              7594            Marker at TIGO-platform for the
                                   TIGO-SLR-telescope.
 S002              7834            SLR IAR
 S004              7224            VLBI Ref. Point
 S013                              TI4100/L1 12-NOV-87 - 27-JUL-89
 S016                              MINI MAC/L1 23-MAY-89 -
 S017                              ROGUE SNR-800/DM B/L1 20-DEC-90
 S018              8834            SLR WLRS IAR
 S019                              ROGUE SNR-800/DM B/L1 22-JUL-91-
 S020                              ROGUE SNR-800/DM B/Bottom of the choke ring
                                   22-JUL-91-
 S100              7593            Intersection of the axis of the TIGO-VLBI
                                   radiotelescope.

14202  HOHENBUNSTORF
 M002              7600            Mobile VLBI mark 1989
 M003                    HOBU      Marker on GPS Pillar

14208  OBERPFAFFENHOFEN
 M001                    OBER      STEEL PILLAR/ROOF/DLR/D-PAF BUILDING
 M002                    DLRA      Universal antenna mount/centre of top plate
 M003                    OBE2      STEEL PILLAR/ROOF/DLR/D-PAF BUILDING
 M004                    OBET      Center of the nail G01 in the parapet on the
                                   roof of the building #102 of DLR-OP

14209  EFFELSBERG
 M001                              Control network mark
 M002                    EFBG      Bolt on the antenna mast, screw anchored to
                                   the roof and the wall of the building across
                                   the radiotelescope
 S001              7203            100m radiotelescope ref. pt.

14213  HOHENPEISSENBERG
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 M002             7630          Mobile VLBI mark 1992

14214  KLOPPENHEIM
 M002                  KLOP     Pillar with bolt

14216  KARLSRUHE
 M001                  KARL     PLATE & BOLT/SURVEY TOWER/TECHNICAL UNIVERSITY

14234  BRAUNSCHWEIG
 M001                  PTBB     Marker on roof-platform

14258  EUSKIRCHEN
 M002                  DE04     MARK EUREF D93 / Pillar with lightkeepers bolt
                                and forced centring device
 M003                  EUSK     GPS Geodetic Marker/roof-platform/Mainbuilding

14260  KARLSBURG
 M001             7632          Mobile VLBI mark 1992

14261  KIRSCHBERG
 M001             7631          Mobile VLBI mark 1992

14262  NEUBIBERG
 M001                  BLVA     Concrete pillar on roof top of BLVA
                                building/DREF No. 64

14263  NEUSTRELITZ
 M001                  NTZ1     Pillar North-East on building 202
 M002                  NTZ3     Pillar South-West on building 202

14264  HELGOLAND ISLAND
 M001                  HELG     Survey mast-platform with marker

14265  DAUN
 M001                  DAUN     Marker on roof-platform

14266  ERLANGEN
 M001                  ERLA     Marker on roof-platform

14267  LEIPZIG
 M001                  LEIP     Marker on roof-platform

14268  BORKUM
 M001                  BORK     Rivet thread on a circular tube of steel

14269  FLECHTING
 M001                  DE01     TP3633006100 = NivP 3633901510, bolt on top of
                                granite pillar

14270  BRONNZELL
 M001                  DE02     00426, Granite pillar

14271  CUXHAVEN
 M001                  DE03     2118-9-9000, Concrete pillar with centring
                                plate

14272  HONAU
 M001                  DE05     752105408, Granite pillar with bolt

14273  NIEDERWEILER
 M001                  DE06     6009001310, TP-pillar with brass bolt over
                                TP-plate

14274  MEERANE
 M001                  DE07     51401599, Granite Niv-pillar with lightkeepers
                                bolt on top

14275  SCHERNFELD
 M001                  DE08     TP-plate with centric ceramic marker, marked
                                0.7 m deep
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14276  WALLENHORST
 M001                    DE09      3614/551, Granite plate with brass bolt

14277  WARNEMUENDE
 M001                    DE10      Steel plate with screw bolt on jamb wall of
                                   the roof

14278  TITZ-JACKERATH
 M001                    TITZ      Marker on a Steel tripod fixed on a
                                   concrete-platform

14279  FRANKFURT
 M001                    FFMJ      Survey Marker on Mast-Platform / Roof / BKG

14280  HUEGELHEIM
 M001                    HUEG      Survey Marker on Mast-Platform / Roof / Gas
                                   compressor station

14302  NICOSIA-ATHALASSA
 M001                    NICO      BOLT ON PILLAR

14303  LARNAKA
 M001                    CY01      Metal pipe filled with concrete and bolted on
                                   concrete foundation

14501  LJUBLJANA
 M001                    GSR1      1.5 m high 6x6 cm stainless steel pillar /
                                   roof of a building at Litijska cesta 45

15601  OHRID
 M001                    ORID      Marker on pillar

20101  RIYADH
 S001              7832            FIXED LASER / SALRO

20403  MASHHAD
 M001                    MASH      Geodetic Ground Mark

20404  TEHERAN II
 M001                    TEHR      Geodetic Ground Mark

20405  CHAH BAHAR
 M001                    CHAB      Geodetic Ground Mark

20406  TORBAT-E-HEYDARIYEH
 M001                    KASH      Geodetic Ground Mark
 M002                    YAS1      Yas / Concrete pillar

20407  DREZFUL
 M001                    NILO      Nilofar / Concrete pillar

20408  BANDAR-E-BUSHEHR
 M001                    REIH      Reihaneh / Concrete pillar

20409  YAZD
 M001                    ROSE      Rose / Concrete pillar

20410  ZABOL
 M001                    ZABO      Geodetic Ground Mark

20702  BAR GIYYORA
 M001              7530            SLR mark 7530
 M002                    BARG      GPS Mark
 S001              7530            MOBLAS-2

20703  MITZPE RAMON
 S001                    RAMO      ASHTECH Choke Ring 700936/ARP

20704  TEL AVIV
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 M001                    TELA      5/8" hole in a metal device

20705  HAIFA
 M001                    BSHM      5/8" hole in a metal device

20706  ELAT
 M001                    ELAT      Screw in a metal device inside antenna, .011 m
                                   above antenna bottom

20707  KATZRIN
 M001                    KATZ      Screw in a metal device inside antenna, .011 m
                                   above antenna bottom

20708  MAALE GILBOA
 S001                    GILB      Antenna - ASH700936D_M   SNOW (SN CR15923) /
                                   BPA

20709  KIBUTZ KABRI
 S001                    KABR      Antenna - ASH700936D_M    SNOW (SN CR15924) /
                                   BPA

20710  METZOKI DRAGOT
 S001                    DRAG      GPS Antenna - ASH700936D_M CR14346 / BPA

20711  KIBUTZ EL-ROM
 S001                    ELRO      Bottom of pre-amplifier of GPS antenna
                                   ASH700936D_M /CR520000101

20712  KIBUTZ LAHAV
 S001                    LHAV      GPS Antenna - ASH701945C_M  SNOW/BAP

20801  DIYARBAKIR
 M001              7575            Mark SLR
 M002                    DYR2      UNAVCO leveling mount screwed onto threaded
                                   metal pin cemented into the roof

20802  YOZGAT
 M001              7585            Mark SLR

20803  MELENGICLICK
 M001              7580            Mark SLR

20804  YIGILCA
 M001              7587            Mark SLR

20805  ANKARA
 M001              7589            SLR mark 1993
 M002                    ANKR      GPS Pillar

20806  GEBZE
 M001                    TUBI      2m Pillar in bedrock

20807  ISTANBUL
 M001                    ISTA      Roof of the technical university/Survey Marker
                                   on a pillar

20808  TRABZON
 M001                    TRAB      Roof of the technical university/Survey Marker
                                   on a pillar

20809  MENTES
 M001                    MENT      Concrete Pillar

20810  BODRUM
 M001                    BODR      Geodetic Ground Marker Drilled on Concrete

20811  ERDEK
 M001                    ERDK      Geodetic Ground Marker Drilled on Concrete

20812  ANTALYA
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 M001                   ANTG      Geodetic Ground Marker Drilled on Concrete

21501  EVEREST
 M001                             DORIS mark
 S001                        EVEB DORIS antenna ref. pt. (Starec type)

21601  BEIJING
 M001                   BJFS      Concrete on the bedrock/Bench mark
 M002              7343           Concrete monument
 S004              7249           BEIJ fixed SLR system

21602  WUHAN
 M001                   WUHN      GPS mark
 S003              7236           Wuhan fixed laser
 S004              7231           Wuhan fixed laser (new location of 7236) /
                                  intersection of axes

21604  PURPLE MOUNTAIN
 M002                             DORIS mark
 S003                        PURA DORIS antenna ref. pt (Alcatel type)

21605  SHANGHAI
 M001                             Mark connect with bedrock
 M002                   SHAO      GPS marker JPL 4027-S
 S001              7837           SLR IAR
 S008              7226           VLBI 6m radiotelescope ref. pt.
 S009              7227           VLBI 25m antenna ref. pt.

21609  KUNMING
 M001                   KUNM      Brass pin cemented into concrete pillar
 S002              7820           YSLR01 / intersection of axes

21611  CHANGCHUN
 M001                   CC06      Geodetic Ground Mark
 S001              7237           CHALAS / intersection of axes

21612  URUMQI
 M001                   URUM      Geodetic pillar
 M002              7355           SLR PILLAR
 M003                   GUAO      Marker on the top of concrete pier
 S001              7330           25 m VLBI antenna reference point

21613  LHASA
 M001                   LHAS      GPS PILLAR / BOLT LS 12
 M002                   LHAZ      GPS/GLONASS pillar with bolt
 M003              7356           Pillar

21614  SHAANXI
 M001                   XIAN      GPS MARK JPL 3233-S

21615  PEIJIAKONG/XIAN
 M001                   PJKG      GPS/GLONASS PILLAR

21701  KASHIMA
 M001                             Metal station mark (Denken 1)
 M002              7335           SLR geodetic ground marker
 S001              1856           26m VLBI antenna
 S004              1857           34m VLBI antenna
 S006              7334           Steerable 11m Cassegrain VLBI
                                  antenna/intersection of axes
 S007                             Ashtech Z-XII with GEODETIC L1/L2 antenna/ARP

21702  MIZUSAWA
 M001              7314           Mobile VLBI marker
 M002                   MIZU      Concrete pilar / Building Roof
 S009              7314           Mobile VLBI
 S010              7324           10-m VLBI antenna/AZ-EL (MIZNAO10)
 S011                   MZSW      ASHTECH Z-XII3/Rev.D(70718)/ARP 23-MAR-1996
                                  (940029)
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21704  KOGANEI
 M001              7328           SLR geodetic ground marker
 M002                             10cm squared concrete base with nonprecise
                                  cross hair/M20-VLBI-S
 S002              7308           SLR CRLLAS IAR
 S004              7327           Steerable 11m Cassegrain VLBI
                                  antenna/intersection of axes
 S005                             Ashtech Z-XII with GEODETIC L1/L2 antenna/ARP
 S006                             Ashtech Choke Ring Antenna / SN 701933-02
                                  REV.A CRN21999080101 / ARP

21705  DODAIRA
 S001              7935           DDR Fixed SLR system

21709  OKINAWA
 S001              7301           SLR IAR HTLRS-1

21715  KAINAN
 M001              7350           Mobile VLBI marker / 8cm metal marker
 S001              7350           KAINAN  5m VLBI antenna Ref. Pt.

21718  MIYAZAKI
 S001              7312           5m mobile VLBI

21725  NOBEYAMA
 S001              7244           6m VLBI antenna ref. pt.

21726  SIMOSATO
 M001                             Stone marker
 M002              7838           SLR mark (center of the ring of the base pier)
 S001              7838           SLR IAR fixed

21729  USUDA
 M001                             GPS mark Control RM roof
 S001              7246           64M VLBI antenna IAR
 S002                             ROGUE SNR-8/DM R/L1 29-JAN-91/09-AUG-92
 S003                   USUD      ROGUE SNR-8/DM R/Bottom of the choke ring
                                  29-JAN-91/09-AUG-92
 S004                             ROGUE SNR-8/DM R/Top of the choke ring
                                  29-JAN-91/09-AUG-92
 S005                   USUD      ROGUE SNR-8/DM R/Bottom of the choke ring
                                  09-AUG-92/29-OCT-92
 S007                   USUD      ROGUE SNR-8/DM R/Bottom of the choke ring
                                  29-OCT-92/

21730  TSUKUBA
 M001              7311           Mobile VLBI marker
 M002                             GSI 5 MARKER
 M003                   TSKA      Stainless Steel Pillar/IGEX Marker
 M004                             TSUKUB32 VLBI  geodetic ground marker
 M005              7360           8cm metal marker / Mobile VLBI marker
 S001              7311           5m mobile VLBI
 S002                             MINI MAC2816AT/L1 10-JUL-88 - 17-DEC-91
 S003                             MINI MAC2816AT/L1 18-DEC-91
 S004                   TSUK      MINI MAC2816AT / Bottom of the antenna
 S005                   TSKB      TurboRogue/DM T/ARP 15-DEC-93
 S006                   TKBA      ASHTECH Z-XII3/Rev.D(70718)/ARP 06-APR-1996
                                  (942002)
 S007              7345           Fully steerable 32m Cassegrain antenna with
                                  AZ/EL mount (TSUKUB32)/Intersection of axes
 S008              7360           3.8m VLBI antenna Ref. Pt.

21731  SHINTOTSUKAWA
 M001              7315           Mobile VLBI marker
 S001              7315           Mobile VLBI
 S002                   STKW      ASHTECH Z-XII3/Rev.D(70718)/ARP 06-APR-1996
                                  (942001)
 S003              7346           Fully steerable 3.8m Cassegrain antenna with
                                  AZ/EL mount (SINTOTU3)/ Intersection of axes
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21732  CHICHIJIMA
 M001                              VLBI geodetic ground marker
 S001              7316            mobile VLBI
 S002              7844            SLR IAR HTLRS-1
 S003                   CCJM       ASHTECH Z-XII3/Rev.D(70718)/ARP 06-APR-1996
                                   (942003)
 S004              7347            Fully steerable 10m Cassegrain antenna with
                                   AZ/EL mount(CHICHI10)/ Intersection of axes

21733  MINAMI TORI SIMA (MARCUS)
 S001              7300            SLR IAR HTLRS-1
 S002              7310            mobile VLBI

21735  TSUSHIMA
 S001              7302            SLR IAR HTLRS-1

21736  ISHIGAKI SHIMA
 S001              7307            SLR IAR HTLRS-1

21737  SAGARA
 M001              7325            Mobile VLBI marker / 8cm metal marker
 S001              7325            VLBI antenna Ref. Pt.

21738  DAITO
 S001              7326            VLBI antenna Ref. Pt.

21739  MIURA
 M001              7337            SLR geodetic ground marker
 S001              7336            Steerable 11m Cassegrain VLBI
                                   antenna/intersection of axes
 S002                              Ashtech Z-XII with GEODETIC L1/L2 antenna/ARP

21740  TATEYAMA
 M001              7339            SLR geodetic ground marker
 S001              7338            Steerable 11m Cassegrain VLBI
                                   antenna/intersection of axes
 S002                              Ashtech Z-XII with GEODETIC L1/L2 antenna/ARP

21741  MITAKA
 S001                   MTKA       TSA-100 GPS ARP
 S002                   MTKA       ASHTECH 701073 ARP

21742  AIRA
 M001                              VLBI geodetic ground marker
 S001                   AIRA       TRIMBLE 4000SSI-RC II/Permanent L1/L2/ARP
                                   24-FEB-1998 (970837)
 S002              7348            Fully steerable 10m Cassegrain antenna with
                                   AZ/EL mount (AIRA)/ Intersection of axes

21743  TOUHAKU
 S001                   TOHK       ASHTECH Z-XII3/Rev.D(70718)/ARP 23-MAR-1996
                                   (940073)

21744  TAMAGUSUKU
 S001                   OKNW       ASHTECH Z-XII3/Rev.D(70718)/ARP 23-MAR-1996
                                   (940100)

21745  TONAMI
 M001              7351            Mobile VLBI marker / 8cm metal marker
 S001              7351            TONAMI  2.4m VLBI antenna Ref. Pt.

21746  KANOZAN
 S001              7352            KANOZAN  2.4m VLBI antenna Ref. Pt.

21747  GIFU
 S001              7354            Fully steerable 3m Cassegrain VLBI antenna
                                   with Az/El mount / Intersection of axes

21903  CHON BURI
 M001                   CHON       Geodetic Ground Mark
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21904  BANGKOK
 M001                    CHUL      Chulalongkorn Univ. / Geodetic survey mark on
                                   top of Survey Building
 M002                    RTSD      Mapping School / Pillar on top of building
                                   /RTSD2

21905  PHUKET
 M001                    PHUK      Geodetic Ground Mark

22003  QUEZON
 M001                    PIMO      Geodetic ground marker under mobile geodetic
                                   system (GPS)

22006  MANILA
 M002                              DORIS mark
 M003                    MMA8      Geodetic Ground Mark
 S001                         MANA DORIS antenna ref. pt (Alcatel type)

22201  AMMAN
 M001                    AMMN      Top of center support screw on SCIGN D3
                                   antenna adaptor

22306  BANGALORE
 M001                    IISC      Granite Monument 250 m2
 M002                    IISC      CIRCLE AND DOT
 M003                    BAN2      Pillar

22307  HYDERABAD
 M001                              Stainless steel platform/Pillar/main building
                                   of NGRI

22601  SINGAPORE I
 M001                    NTUS      MARKER NTUS-01 / STEEL POLE /ROOF OF THE
                                   SCHOOL CIVIL ENGINEERING
 M002                    NTBS      Pillar

22602  SINGAPORE II
 M001                    CCBS      Changkat Changi Base Station / Pole secured to
                                   building
 M002                    SMU1      200 Airport Road / Stainless steel bolt on top
                                   of pillar

22603  SINGAPORE III
 M001                    PPBS      Peixin Primary School, Yishun Ring Road / Pole
                                   secured to building

22604  SINGAPORE IV
 M001                    RMBS      Radin Mas Base Station / Pole secured to
                                   building

22701  ARAU
 M001                    ARAU      Concrete Piller Piled to Bedrock

22702  BINTULU
 M001                    BINT      Galvanised Iron Pipe Mounted on Concrete Jetty

22703  KOTA BHARU
 M001                    GETI      Brass Thread piled on the concrete roof of
                                   Tide House

22704  GUNONG RAPAT
 M001                    IPOH      Stainless Steel Pillar mounted on concrete
                                   slab (piled to bedrock)

22705  KOTA KINABALU
 M001                    KINA      Concrete Pillar Piled to bedrock

22706  KUALA LUMPUR
 M001                    KTPK      Galvanised Iron Piped Mounted on top of
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                                  Concrete roof

22707  KUALA TERENGGANU
 M001                    KUAL     Brass Tread piled to bedrock (Geodyssea
                                  Station)

22708  KUANTAN
 M001                    KUAN     Concrete Pillar Piled to Bedrock

22709  KUCHING
 M001                    KUCH     Concrete Pillar Piled to Bedrock

22710  LABUAN
 M001                    LABU     Concrete Pillar Piled to Bedrock

22711  MIRI
 M001                    MIRI     Stainless Steel Pipe Mounted on Concrete Roof

22712  SANDAKAN
 M001                    SAND     Concrete Pillar Piled to Bedrock

22713  TAWAU
 M001                    MTAW     Concrete Pillar Piled to Bedrock

22714  SKUDAI, JOHOR BAHRU
 M001                    UTMJ     Brass Thread piled to concrete roof

22901  JUMUHUREE PARK-MALE
 M001                    MALE     Brass rod with stainless steel cap
 S001                    MALD     LEIAT504 chokering ant./ LEIS spherical radome
                                  /ARP

23001  HONG-KONG
 M001                    HKPU     Concrete Pillar / GLONASS MARKER

23002  KAU YI CHAU
 M001                    P075     Geodetic monument / concrete pillar with
                                  forced centering device

23003  FANLING
 M001                    P430     Geodetic mark

23101  PAREPARE
 M001                    PARE     Concrete pillar on top of building
 M001                             DORIS mark 1 (destroyed)
 M002                    BAKO     Concrete monument TTG1
 M003                             Domed brass mark on concrete pillar (DORIS 2
                                  mark)
 M004                    LABG     Concrete pillar / Bakosurtanal
 S001                         CIBB DORIS antenna ref. pt. (Starec type)
 S002                         CICB DORIS antenna ref. pt. (Starec type)

23104  MEDAN
 M001                    SAMP     Concrete pillar on top of building / Sampali

23105  BITUNG
 M001                    PBIT     Concrete pillar

23106  PENDAK DAYUNG, JAKARTA
 M001                    PDAY     Concrete pillar

23107  SORONG, IRIAN JAYA
 M001                    PSOR     Concrete pillar

23108  MANADO
 M001                    MAND     Manado Airpor / Concrete pillar / Manado
                                  N.4001
 M002                    WINA     Winangun / Concrete pillar

23401  PHNOM PENH
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 M001                  PENH      Geodetic Ground Mark
 M002                  LAND      Geodetic Ground Mark

23402  SIEM REAP
 M001                  SIEM      Geodetic Ground Mark

23403  SIHANOUKVILLE
 M001                  SIHA      Geodetic Ground Mark

23404  STUNG TRENG
 M001                  STUE      Geodetic Ground Mark

23405  SVAY RIENG
 M001                  SVAY      Geodetic Ground Mark

23501  COLOMBO
 M001                            Mark on roof (Epoch 92)
 M002                            DORIS mark
 S001                       COLA DORIS antenna ref. pt (Alcatel type)

23601  TAIPEI
 M001                  TAIW      GPS mark

23603  TAOYUAN
 M001                  NFTL      Building roof/Geodetic marker/stainless steel
                                 pillar
 S001                  TWTL      GPS/GLONASS Antenna/3S NAV TSA-100 CR/ ARP
 S002                  TWTF      ASH701945C_M    SCIS / CR620012101 / ARP

23604  HSINCHU
 S001                  TNML      AOAD/M_T GPS Antenna/ARP
 S002                  TCMS      LEIAT504 (SN:720) GPS antenna/ARP

23902  TAEJON
 M001                  TAEJ      KAO GPS STATION/Stainless Steel Rod In Poured
                                 Concrete Post
 M002                  DAEJ      Stainless Steel Rod/Top of Ferro-concrete
                                 Pillar
 S001                            TRIMBLE 4000SDT/L1

23903  SUWON-SHI
 M001                  SUWN      Concrete base marker
 M002            7353            Mobile VLBI Marker
 S001                  7353      SUWON  3.8m VLBI antenna Ref. Pt.

23904  OSAN AIR BASE
 S001                  SKOR      NIMA GPS antenna ASH700936B_M 12121 /ARP

23905  CHEJU-SHI
 M001                  CHJU      Pillar

24101  VIENTANE
 M001                  VIEN      Concrete Monument

24102  Champasack Province
 M001                  KHON      Concrete Monument

24103  PHONGSALI
 M001                  PHON      Concrete Monument

24104  HOUAXAY
 M001                  HOUA      Concrete Monument

24105  LAKXAO
 M001                  LAKX      Concrete Monument

24106  PHUTAKOY
 M001                  PHUT      Concrete Monument

24107  SAMNUA
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 M001                    SAMN      Concrete Monument

24201  ULAN BATOR
 M001                    ULAB      Geodetic Pillar

24202  ARVAIKHEER
 M001                    ARVA      Point of Gravimetric Network

24203  CHOIBALSAN
 M001                    CHOI      Point of Gravimetric network

24204  DALANZADGAD
 M001                    DALA      Point of Gravimetric Network

24205  HOVD
 M001                    HOVD      Point of Gravimetric Network

24206  MURUN
 M001                    MURN      Point of Gravimetric Network

24302  DIEN MIEN PHU
 M001                    QT01      Geodetic Ground Mark

24303  HAI PHONG
 M001                    QT02      Geodetic Ground Mark

24304  DA NANG
 M001                    QT03      Geodetic Ground Mark

24305  VUNG TAU
 M001                    QT04      Geodetic Ground Mark

24901  BAHREIN (JUFFAR)
 M001                              RM1-31314 DMA 35012 (OLD DOPPLER 31482)
 M002                    BAHR      WM1 DMA 32021
 S001                              GPS DMA TI4100 / L1

25601  CHUMYSH
 M001                    CHUM      Divot in a 5/8" S/S screw in the DOSE leveling
                                   mount.

30101  HELWAN
 M001                    PHLW      Dimple in the center of a long, steel threaded
                                   pin
 S001             7831             SLR IAR fixed

30102  ALEXANDRIA
 M001                    ALEX      CEA/eighth floor terrace/Center of lower steel
                                   plate of the centring device fixed on the top
                                   of a concrete pillar

30302  HARTEBEESTHOEK
 M002                    HART      Engraved plate below ROGUE antenna
 M003             7501             SLR mark 1993
 M004                    HRAO      KRUGERSDORP/SS6TRI MONUMENT
 M005                              DORIS 1 mark
 M006                              DORIS 2 mark
 M007                    HARK      Survey and Mapping Rogue bench mark
 M008                              Brass mark on top of a steel pole
 M009                    HARB      Brass mark on a concrete pad
 S001             7232             26m VLBI antenna ref. pt.
 S005                         HBLA DORIS 2 antenna ref. pt. (Alcatel type)
 S006                         HBKB DORIS antenna ref. pt. (Starec type)
 S202                         HBKA DORIS 1 antenna ref. pt. (Alcatel type)

30304  OLIFANTSFONTEIN
 S001             7902             Fixed SLR / Laser Mount Rotation Axes

30307  SIMONSTOWN
 M001                    SIMO      Pier / Center of bottom plate of SSI
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                                  self-centring mount

30310  PRETORIA
 M001                    CSIR     Steel Table on top of building lift tower
 S001                    SAFR     NIMA GPS antenna ASH700936B_M CR16465 / ARP

30313  MARION ISLAND (PRINCE EDWARD ISLANDS)
 M001                             DORIS mark
 S001                        MARA DORIS antenna ref. pt (Alcatel type)
 S002                        MARB DORIS 2 antenna ref. pt. (Starec type)

30314  SUTHERLAND
 M001               7502          SLR mark 1993
 M002                    SUTH     Ref. Pt. on Stainless steel platform / pier
                                  tied to bedrock
 M003                    SUTG     PIER/Top of fixed antenna mount
 M004                    SUTM     Pillar in Bedrock

30315  RICHARDSBAY
 M001                    RBAY     Top of small v drilled into stainless steel
                                  with self centring platform

30602  ASCENSION
 M001                    ASC1     PLATE/I-BEAM MAST/ROOF MOUNT
 M002                             Ariane station / DORIS mark
 S003                             GPS OCS monitor station
 S004                        ASDB DORIS 2 antenna ref. pt. (Starec type)

30604  TRISTAN DA CUNHA
 M001                             Concrete pillar / DORIS mark
 S001                        TRIA DORIS antenna ref. pt (Alcatel type)
 S002                        TRIB DORIS antenna ref. pt. (Starec type)

30606  SAINTE-HELENE
 M002                             DORIS 2 mark
 S002                        HELA DORIS 1 antenna ref. pt. (Alcatel type)
 S003                        HELB DORIS 2 antenna ref. pt. (Starec type)

30607  SIGNY ISLAND
 M001                    SIG1     GAP GPS MARKER
 S001                        SIGA DORIS antenna ref. pt (Alcatel type)

30608  GOUGH ISLAND
 M001                    GOUG     steel pipe, drilled into the rock, 5/8"screw

30802  DIEGO GARCIA
 M001                    DGAR     GPS MARKER/ROOF MOUNT
 S002                             GPS OCS monitor station

31303  MASPALOMAS
 M001                    MASP     PILLAR MPA1
 M002                    MAS1     GPS mark

31901  FLORES
 S001                        FLOA DORIS antenna ref. pt (Alcatel type)

31903  SANTA MARIA
 S001                        SAMB DORIS antenna ref. pt. (Starec type)

31906  PONTA DELGADA (SAO MIGUEL)
 M001               7609          Ponta Delgada / Mobile VLBI mark 1992
 M002                             DORIS mark on the university roof
 M003                             Tide gauge benchmark MN B 11/92
 M004                    PDEL     Metalic pillar on the top of a building in the
                                  Azores University
 S001                        PDLB DORIS antenna ref. pt. (Starec type)
 S002                        PDMB DORIS antenna ref. pt. (Starec type)

32601  YAMOUSSOUKRO
 M001                    YKRO     Raised tip (3mm) above monument plate
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32809  LIBREVILLE
 M001                          N'Koltang / Borne 1988
 M002                   NKLG   Domed brass mark in concrete block
 M003                          DORIS mark in the concrete base of the
                               building
 S001                          TRIMBLE SLD/L1 22-JAN-91 - 13-FEB-91
 S002                     LIBA DORIS antenna ref. pt (Alcatel type)
 S003                     LIBB DORIS 2 antenna ref. pt. (Starec type)

32810  MASUKU
 M001                   MSKU 28-0 Top of the SCIGN mount center bolt

32901  KUMASI
 M001                   KUMA   PILLAR UST 1/68/SS1

33201  MALINDI
 M001                   MALI   METAL PLATE / CONCRETE MONUMENT

33710  ARLIT
 M002                          DORIS 2 mark
 S001                     ARLA DORIS 1 antenna ref. pt (Alcatel type)
 S002                     ARMA DORIS 2 antenna ref. pt (Alcatel type)

33901  MBARARA
 M001                   MBAR   Top of the center support bolt of the SCIGN
                               adapter

34101  DAKAR
 M003                          DORIS mark
 S004                     DAKA DORIS antenna ref. pt (Alcatel type)

34601  LUSAKA
 M001                   ZAMB   Anodized aluminium self-centring plate with
                               v-shaped hole

35001  RABAT
 M001                   IAVH   Institut Agronomique et Veterinaire Hassan
                               II/5/8-inch threaded stainless steel pin
                               cemented into roof of building
 M002                   RABT   Conquest pin that is epoxied into the cement
                               wall on the roof

39601  PALMEIRA
 S001                   TGCV   LEIAT504  antenna / LEIS spherical radome /ARP

39801  MAHE ISLAND
 M001                   SEY1   MONUMENT CONNECTED TO A CONCRETE WELL-HEAD JPL
                               4016-S
 M002                          Pointe Larue / Concrete block / 12 mm
                               stainless steel mark (DORIS)
 M003                          Pointe Larue / Tide gauge jetty / concrete pad
                               / mark UH2
 S005                     MAHB Pointe Larue / DORIS antenna ref. pt. (Starec
                               type)

39901  DJIBOUTI
 M001                          AR00 mark
 M002                          Pasted target on top of a wall (DORIS 1)
 M003                          Top of a building wall / 12 mm domed mark
                               (DORIS 2)
 M004                          Concrete pillar / threaded hole in metal part
 S002                     DJIA DORIS antenna ref. pt (Alcatel type)
 S003                     DJIB DORIS antenna ref. pt. (Starec type)

40101  ST JOHN'S
 M001                   STJO   920000 Concrete pillar on bedrock/plate
 M002                          Concrete pillar / DORIS mark
 M003                          Mark in the center of the mobile VLBI antenna
                               support
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 S002                        STJB DORIS antenna ref. pt. (Starec type)

40102  ONTARIO-OTTAWA
 M001                             DORIS mark on the roof of Geomatics Canada
                                  building
 S005                        OTTA DORIS antenna ref. pt (Alcatel type) (original
                                  location)
 S006                        OTTA DORIS antenna ref. pt (Alcatel type) : dubious
                                  position (1st fall)
 S007                        OTTA DORIS antenna ref. pt (Alcatel type) : between
                                  1st and 2nd fall
 S008                        OTTA DORIS antenna ref. pt (Alcatel type) : dubious
                                  position (2nd fall)
 S009                        OTTA DORIS antenna ref. pt (Alcatel type) : between
                                  2nd and 3rd fall
 S010                        OTTA DORIS antenna ref. pt (Alcatel type) : dubious
                                  position (3rd fall)
 S011                        OTTB DORIS antenna ref. pt (Starec type)

40103  PRINCE ALBERT
 M001                   PRAL      GPS Mark

40104  ALGONQUIN
 M002                   ALGO      883160 GPS ARO N. pier
 M003              7410           SLR Mark (933000)
 M004                   ALGR      CONCRETE PILLAR with BRASS PLATE and STAINLESS
                                  STEEL FORCE CENTERING PIN (No. 983002)
 S001              7282           46m VLBI antenna ref. pt.
 S003                             ROGUE SNR-8/DORNE-MARGOLIN B/L1 16-JAN-91 -

40105  PENTICTON
 M001              7283           Mobile VLBI mark 7283
 M002                   DRAO      GPS MARK 887006
 S002                             TI4100/L1
 S003                             ROGUE SNR-8/DM B/L1 27-FEB-91

40114  OTTAWA
 M001                   NRC1      GPS MARKER

40118  WHITEHORSE
 M001              7284           Mobile VLBI mark 7284
 M002              7284           Mobile VLBI mark 7284 PEQ

40120  HALIFAX
 M001                   HLFX      Forced centering plate on concrete pillar
                                  (961000)

40124  CALGARY
 M001                   PRDS      PRIDDIS/GPS Mark

40127  YELLOWKNIFE
 M001              7285           Mobile VLBI mark (LBI 829098)
 M002                             Mark 869211
 M003                   YELL      Mark 889201
 M004              7296           Mobile VLBI MARK (LBI 909012)
 S003                             TI4100/L1 01-JAN-87 - 02-JUL-89
 S004                             TI4100/L1 07-JUL-89 - 21-JAN-91
 S005                             ROGUE SNR-8/DORNE-MARGOLIN B/L1 21-JAN-91 -
                                  19-MAR-91
 S006                             Mini ROGUE SNR-8C/DORNE-MARGOLIN B/L1
                                  20-MAR-91-
 S007                        YELA DORIS antenna ref. pt (Alcatel type)
 S008                        YELB DORIS antenna ref. pt. (Starec type)

40128  CHURCHILL
 M002                   CHUR      PLATE/CONCRETE PILLAR

40129  VICTORIA/SIDNEY
 M001              7289           Mobile VLBI mark
 M002                   PGC1      Marker 867001/Centre-punch on brass
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			control-point marker set into concrete flush with ground level
	M003	ALBH	Albert Head GPS Mark 927000
	M004	PGC2	Brass marker in concrete base (967007)
	M005	PGC3	Brass plate on top of concrete pillar (987001)
	M006	PGC4	Stainless Steel plate on top of concrete pillar (987002)
	M007	PGC5	Brass plate on top of concrete pillar (987003)
	S001		VICTORIA/ROGUE/L1 16-JAN-91 -
40130	HOLBERG		
	M001	HOLB	GPS mark
40132	LA GRANDE		
	M001 7411		Mobile SLR MARKER 7411
40133	SCHEFFERVILLE		
	M001	SCHE	GPS MARKER (SCHE)
	M002	SCH2	Brass plate/bolt/concrete pier
40134	WILLIAMS LAKE		
	M001	WILL	GPS MARKER
40135	FLIN FLON		
	M001	FLIN	GPS MARKER 965000
40136	WHITEHORSE GPS SITE		
	M001	WHIT	MONUMENT 7787017
40137	LAC DU BONNET		
	M001	DUBO	TOP OF CONCRETE PIER 924000
40138	NANOOSE		
	M001	NANO	Brass plate on top of concrete pillar anchored into bedrock
40139	CHEEKA PEAK		
	M001	NEAH	Brass plate on top of concrete pillar anchored into bedrock
40140	UCLUELET		
	M001	UCLU	Brass plate on top of concrete pillar anchored into bedrock
40141	WHISTLER		
	M001	WSLR	Brass plate on top of concrete pillar anchored into bedrock
40142	CHILLIWACK		
	M001	CHWK	Stainless Steel forced centre pier (987020)
40143	NOOTKA ISLAND		
	M001	NTKA	WCDA Stainless Steel forced center pier (M007000)
40144	ELIZA DOME		
	M001	ELIZ	WCDA Stainless Steel forced center pier (M007001)
40145	BEAVER COVE		
	M001	BCOV	WCDA Stainless Steel forced center pier (M007003)
40146	FREDERICTON		
	S001	UNB1	Chokering antenna [RegAnt II] RA0193 / ARP
40147	GATINEAU		
	M001	CAGS	Bedrock / Concrete pillar / brass plate with a forced centering stainless steel bolt (962000)

40148 HOLMAN
M001 HOLM Bedrock / Concrete pillar / brass plate with a forced centering stainless steel bolt (M019000)

40149 RESOLUTE
M001 RESO Bedrock / Concrete pillar / brass plate with a forced centering stainless steel bolt (M009002)

40150 INUVIK
M001 INVK Bedrock / Concrete pillar / brass plate with a forced centering stainless steel bolt (M009004)

40151 BAIE COMEAU
M001 BAIE Concrete pillar attached to bedrock (M012001)

40152 BAKER LAKE
M001 BAKE Stainless steel plate with a forced centering stainless steel bolt weldeded on top of a 1.5 metre high stainless steel pillar, 14 cm in diameter (M019002)

40153 EUREKA
M001 EURK Steel platform welded to a steel pole (M019001)

40154 KUUJJUARAPIK
M001 KUUJ Brass centering plate 20.3 cm in diameter set in concrete cylinder 35.5 cm in diameter (942005)

40155 PICKLE LAKE
M001 PICL Concrete pillar attached to bedrock (M013001)

40156 VAL D OR
M001 VALD Concrete pillar (932051)

40157 PARRY SOUND
M001 PARY Aluminum plate with a forced centering stainless steel bolt embedded on top of a 3.3 m high, 15 cm diameter aluminum pillar (M023006)

40158 ST. CATHERINE (PORT WELLER)
M001 PWEL Aluminum plate with a forced centering stainless steel bolt embedded on top of a 3.3 m high, 15 cm diameter aluminum pillar (M023002)

40159 ROSSPORT
M001 ROSS Aluminum plate with a forced centering stainless steel bolt embedded on top of a 3.3 m high, 15 cm diameter aluminum pillar (M023004)

40160 HEARST
M001 HRST Brass plate with a forced centering stainless steel bolt embedded on top of a 1.5 m high, 40 cm diameter concrete pillar (963012)

40161 KINGSTON
M001 KNGS Stainless plate with a forced centering stainless steel bolt embedded on top of a 8 m high, 25 cm wide concrete abutment (M023003)

40162 ALERT (NUNAVUT)
M001 ALRT Brass plate with a stainless steel centering

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                                    bolt on the top of 5 inch

40400  PASADENA
 M001              7896              Mark SLR (JPL aries 2 1975)
 M003              7263              Mobile VLBI Mark
 M005              7264              Mobile VLBI MARK
 M006              7272 JPLM         Mobile VLBI mark (JPL MV3 1983)
 M007              7272 JPLM         Mobile VLBI mark (JPL MV3 1983) PEQ
 M101                   WLSN         Mt. Wilson/bedrock/concrete bloch JPL 4028-s
 M301                   BRAN         Burbank/pipe with fitting adaptor
 M401                   VDCY         Glendale/ Top of center support screw, SCIGN
                                     D3 antenna
 S004                                ROGUE SNR-8/DM R/L1 6-NOV-90 -
 S201                   CIT1         CALTECH/NORTH MUDD BUILDING/ROGUE SNR-8000/DM
                                     T/ARP

40403  PALOS VERDES
 M001              7268              Mobile VLBI mark
 M002                   PVEP         PGGA Mark
 M003                   PVRS         Rolling Hills/Raised nipple on the lower part
                                     of the antenna adaptor
 M004                   PVHS         Rolling Hills/Raised nipple on the lower part
                                     of the antenna adaptor
 M005                   PVE3         Top of center support screw on SCIGN  D3
                                     antenna adaptor

40404  PEARBLOSSOM
 M001              7254              Mobile VLBI mark (NCMN 1983)
 M002              7253              Mobile VLBI mark
 M003                   DVPB         Raised nipple on the lower part of the antenna
                                     adaptor
 M004                   PBPP         Drilled hole in top of center support bolt of
                                     SCIGN D3 antenna adaptor
 M101                   HOLC         HOLCOMB RIDGE/ 3/4" Vert. Stainless steel rod
 M103                   HOL3         HOLCOMB RIDGE/Top of center support screw on
                                     SCIGN D3  antenna adaptor

40405  GOLDSTONE
 M001              7085              MOBLAS 7085 Goldstone val
 M002              7115              MOBLAS 7115-1979 standard NASA disk
 M006              7265              Mojave NCMN 1983 NGS station disk
 M010              7287              Mojave TLRS 1984 standard NASA disk
 M011                                Mojave NCMN 1 1983
 M013              7288              Mojave mobile VLBI and TLRS mark(Punchmark on
                                     sheared surface of 7287 mark)
 M014                                DORIS mark
 S001              1514              Mars 64m fixed VLBI ref. point (DSS14)
 S003              1512              (26) 34m fixed VLBI ref. point (DSS12)
 S005                        GOMA    DORIS 2 antenna ref. pt (Alcatel type)
 S009              7222              Mojave fixed 12m VLBI ref. point
 S014              1513              Venus 26m fixed VLBI ref. point (DSS13)
 S019              1515              Mars 34m fixed VLBI ref. point (DSS15)
 S020                                TI4100/L1 11-NOV-86 - 18-JUL-88
 S024                                TI4100 FRPA-2/L1/L2 19-JUL-88
 S025                                MINI MAC 2816AT/L1 05-FEB-89
 S026                                ROGUE SNR-8/DM R/L1 14-DEC-89
 S028                   GOLD         Goldstone/ ROGUE SNR-8/DM R/Bottom of the
                                     choke ring 14-DEC-
 S029                   MOJ1         Mojave/MINI MAC 2816AT/Bottom of the antenna
                                     05-FEB-89
 S030                                Goldstone/ ROGUE SNR-8/DM R/Top of the choke
                                     ring 14-DEC-89
 S031                   GOLD         Goldstone/ ROGUE SNR-8/DM R/Bottom choke ring
                                     PEQ 28-JUN-92-
 S032                                Goldstone/ ROGUE SNR-8/DM R/Top choke ring PEQ
 S033              7222              Mojave fixed 12m VLBI ref. point PEQ
                                     28-JUN-92-
 S034              1515              Mars 34m fixed VLBI ref. point (DSS15) PEQ
 S035                        GOLA    DORIS 1 antenna ref. pt (Alcatel type)
 S037                        GOMB    DORIS 3 antenna ref. pt. (Starec type)
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40406  SAN FRANCISCO (PRESIDIO)
 M001              7252           Mobile VLBI mark
 M002              7252           Mobile VLBI mark PEQ

40407  PINYON FLATS
 M001              7256           Mobile VLBI mark (NCMN 1981)
 M002                   PIN1      Pinyon 1
 M003                   PIN1      Pinyon 1 PEQ
 M004                   PIN2      Pinyon 2
 S001                             ROGUE SNR-8/DM B/L1 6-NOV-90 -

40408  FAIRBANKS
 M001                   FAIR      GPS pillar
 M002                             Range building roof / engraved cross on
                                  aluminum coating (DORIS 1 mark)
 M004                             Engraved cross on the upper surface of a
                                  6-meter pedestal
 S001                             26m antenna ref. pt.
 S002              7225           26m VLBI ref. point (GILMORE CREEK)
 S003                             ROGUE SNR-8/DM R/L1 17-JAN-91
 S004                        FAIA DORIS antenna ref. pt (Alcatel type)
 S005                        FAIB DORIS 2 antenna ref. pt. (Starec type)

40409  KAENA POINT (HAWAII)
 S001                             GPS OCS monitor station

40410  POINT REYES
 M001              7251           Mobile VLBI mark

40412  AUSTIN
 M001              7890           Mark SLR 7890
 M002                             Austin monument
 M003              7271           Mobile VLBI mark
 M004                   ARLT      Brass disks cemented in concrete/GPS Station
                                  85408

40416  YAKATAGA
 M001              7277           Mobile VLBI mark
 M002              7277           Mobile VLBI mark PEQ

40417  PATRICK AFB
 M001              7081           Mark SLR
 M002              7069           Mark SLR
 M003                   PATR      Brass disks cemented in concrete/GPS Station
                                  85145

40418  EDWARDS AFB
 M001                   PHLB      Top of center support screw on SCIGN D3
                                  antenna adaptor
 M002                   EDWD      Brass disks cemented in concrete/GPS Station
                                  85146

40419  KODIAK
 M001              7278           Mobile VLBI marker / MARK 7278 MODIFIED CLASS
                                  A BENCH ROD
 S001                   KOD1      GPS ARP /  ASHTECH Z-XII3 (05401), ASH700829.3
                                  (12080)
 S002                   KOD2      GPS ARP /  ASHTECH Z-XII3 (04946), ASH700829.3
                                  (11264)
 S003                   KODK      GPS Antenna - ASH701933B_M CRN1999160190 /
                                  Bottom of  pre-amplifier

40420  VANDENBERG AFB
 M001              7111           DMA disk MOBLAS 7111 (1981)
 M002              7223           DMA disk VLBI 7223 (1983)
 M003              7880           DMA disk TLRS 7880 (1983)
 M004              7887           DMA disk TLRS 7887 (1983)
 M006                   VNDP      PGGA 1991
 M007                   VNDP      PGGA 1991 PEQ
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 M101                   HARV      HARVEST PLATFORM/GPS pier

40421  NOME
 M001              7279           Mobile VLBI mark

40423  SANDPOINT
 M001              7280           Mobile VLBI mark

40424  KAUAI
 M004                   KOKB      VERLOT radar building JPL GPS mark 3028-S
 M005                             CIGNET-GPS survey marker
 M006                             JPL GPS temporary mark
 S001              1311           9m VLBI ref. point
 S002                             TI4100/L1 - -86 -
 S003                             TI4100 FRPA-2/L1 -APR-88 - 02-JUL-90
 S004                             TRIMBLE 4000SST/L1 02-JUL-90 - 17-MAR-92
 S006                             ROGUE SNR-8/DM R/L1 21-NOV-90 -
 S007              7298           20-m VLBI antenna/AZ-EL
 S008                        KOKA DORIS antenna ref. pt (Alcatel type)

40425  SOURDOUGH
 M001              7281           Mobile VLBI mark
 M002              7281           Mobile VLBI mark PEQ

40426  CAP CANAVERAL I
 M001                   CAPE      Brass disks cemented in concrete/GPS Station
                                  85414
 S001                   CCV1      GPS ARP / ASHTECH z-XII3, ASH700829.3 SNOW

40427  FORT ORD
 M001              7266           Mobile VLBI mark (NCMN 1981)
 M002              7241           Mobile VLBI mark
 M003              7241           Mobile VLBI mark PEQ

40428  SANTA PAULA I
 M001              7255           Mobile VLBI mark
 M002                   KBRC      Top of center support screw on SCIGN  D3
                                  antenna adaptor

40429  ALBUQUERQUE
 S001              7884           Albuquerque STARFIRE (STRLAS) /fixed laser/IAR

40430  BLACK BUTTE
 M001              7269           Mobile VLBI mark (NCMN 1982)

40431  DEADMAN LAKE
 M001              7267           Mobile VLBI mark
 M002                   SDHL      Landers / Drilled hole in top of center
                                  support bolt of antenna  adaptor

40432  ELY
 M001              7286           Mobile VLBI mark/ELY AIRPORT R.M. NO. 2 1954
 M002              7257           Mobile VLBI mark/ELY AIRPORT 1954

40433  QUINCY
 M001              7051           Steel plate MOBLAS 7051
 M002              7109           MOBLAS 7109 (1981) Standard NASA disk
 M004              7221 QUIN      QUINCY NCMN Standard NASA disk (7221-1982)
 M005              7886           TLRS 7886 (1982) standard NASA disk
 M006              7260           Quincy ARIES 1979

40434  MOUNT HOPKINS
 M002              7888           Mark SLR
 S001              7921           SLR IAR (SAO)

40436  SAN DIEGO - OTAY MT.
 M002              7062           Mark SLR Circular 5" steel plate
 M003              7035           Mark SLR 7035 1988

40437  MAMMOTH LAKES
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 M001              7259           Mobile VLBI mark
 M002                   CASA      GPS Mark JPL 4087-S

40438  BEAR LAKE
 M001              7082           Mark SLR (4" x 4" Steel plate)
 M002              7046           SLR mark

40439  OWENS VALLEY
 M001              7114           MOBLAS 7114 (1979) standard NASA disk
 M003              7084           MOBLAS, TLRS 7084 standard NASA disk
 M004              7853           Mobile VLBI Jul 87 standard NASA disk
 S002              7207           40m VLBI ref. point
 S006              7616           VLBA antenna reference point

40440  WESTFORD
 M001              7091           MOBLAS Haystack Inter Comp 1977
 M004                             Monument MICRO
 S002              7205           Haystack / 37m VLBI ref. point
 S003              7209           Westford / 18m VLBI ref. point
 S014                             TI4100/L1 -OCT-86 - 04-AUG-88
 S016                             TI4100 FRPA-2/L1/L2 05-AUG-88 - 14-FEB-89
 S017                             MINI MAC 2816AT/L1 29-JAN-89 -
 S019                   WES1      MINI MAC 2816AT / Bottom of the antenna
 S020                   WES2      Rogue SNR-8000/DM T/BPA 08-FEB-93

40441  GREENBANK
 S001              7204           43m radiotelescope ref. pt.
 S004              7214           85-foot antenna ref. pt. NRAO85-3
 S005              7248           85-foot antenna ref. pt. NRAO85-1
 S006              7214           85-foot antenna ref. pt. NRAO85-3 PEQ
 S007              7208           20-m antenna ref. pt.

40442  FORT DAVIS
 M001              7086           MLRS, MOBLAS, TLRS-1 standard NASA disk
 M004                             McDonald RM4 1977
 M005              7885           MLRS, MOBLAS, TLRS-1 standard NASA disk
 M006              7080           MLRS mark 7080 1988
 M008              7850           Mobile VLBI and SLR mark 7850 1988
 M009              7900           Mobile VLBI mark (Havard RM 5 1977)
 M010              7897           SLR Mark 7850
 M011              7851           SLR MARK 7851
 M012                   MDO1      GPS Mark 4011-S
 S001              7086           LLR MLRS
 S002              7206           LLR McDonald 2
 S003              7216           85-foot VLBI ref. point (HRAS 085)
 S017              7613           VLBA antenna reference point

40445  MAUI
 M001              7210           HOLLAS fixed carriage bolt
 M002              7120           MOBLAS 7120 (1980)
 S005              7210           LLR Haleakala transmitter
 S008                   MAUI      Ashtech Dorne-Margolin chokering antenna S/N:
                                  12610 / ARP center of base of pre-amplifier

40446  LEXINGTON
 S001                   SL1X      Ashtech Z18/701073 ASHTECH CHOKE RING/ARP

40449  OCOTILLO
 M001              7270           Mobile VLBI mark (NCMN 1982)

40451  WASHINGTON
 M101              7101           MOBLAS 7101-1977 standard NASA disk
 M102              7102           Mobile SLR 7102-1978 standard NASA disk
 M103              7103           Mobile SLR 7103-1978 standard NASA disk
 M104              7104           Mobile SLR 7104-1978 standard NASA disk
 M105              7105           MOBLAS -7 7105-1981 standard NASA disk
 M106              7100           Mobile SLR 7100-1977 standard NASA disk
 M107              7064           Mobile SLR 7064 standard NASA disk
 M108              7065           Mobile SLR 7065 standard NASA disk
 M110                             Greenbelt north GEOS(GSFC) GORF
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 M111             7899           TLRS 7899-1980 standars NASA disk
 M112             7063           STALAS fixed Laser standard NASA disk
 M113             7106           SLR mark
 M114             7125           SLR mark 7125 1985 standard NASA disk
 M115             8213           SLR mark
 M116             7130           SLR mark 7130 1985 standard NASA disk
 M117             7920           SLR mark 7125-B standard NASA disk
 M118             7889           SLR mark 7889 1981 standard NASA disk
 M119             7917           SLR mark 7917 Steel plate SAO-3
 M120             7918           SLR mark standard NASA disk
 M121             7919           SLR mark standard NASA disk
 M122             7083           SLR mark standard NASA disk
 M123                  GODE      GPS Mark East (JPL 4006)
 M124                  GODW      GPS Mark West (JPL 4005)
 M125             7108           Mark SGP 7108-1993
 S003                  USNO      Roof of USNO Bldg 52/AOAD/M_T(SN#309)/ARP
                                 24-APR-1997 - present
 S004                  USNX      Roof of USNO Bldg 78/3S-02-TSADM(SN#12)/ARP
                                 15-OCT-1998 - 26-AUG-1999
 S005                  WASH      NIMA GPS antenna ASH700936B_M 1122 /ARP
 S006                  USN1      Roof of USNO Bldg 78/3S-02-TSADM(SN#12)/ARP
                                 21-DEC-2000 - present
 S176                       GREB DORIS antenna ref. pt (Starec type)

40452  BLOOMINGTON
 M001             7291           Mobile VLBI mark

40453  CARROLLTON
 M001             7228           Mobile VLBI mark

40454  LEONARD
 M001             7292           Mobile VLBI mark

40455  MILES CITY
 M001             7038           Mobile VLBI mark

40456  PIETOWN
 M001                  PIE1      Concrete GPS pier JPL 4009 S
 S001             7234           VLBA antenna reference point

40457  SEATTLE
 M001             7229           Mobile VLBI mark

40458  MALIBU/SADDLE PEAK
 M001                  SPK1      STEEL MONUMENT/ROOF CONCRETE BUNKER JPL 4504-S

40460  LA JOLLA/SCRIPPS
 M001                  SIO1      SCRIPPS 1 1989 UCSD IGPP
 M002                  SIO2      SCRIPPS 2
 M003                  SIO2      Peak of center support screw of lower part of
                                 the antenna adaptor
 M004                  SIO3      SCRIPPS 3
 M005                  SIO4      Peak of center support screw of lower part of
                                 the antenna adaptor
 M006                  SIO5      Top of center support screw on SCIGN D3
                                 antenna adaptor
 S003                            ARP/DM B/(ASHTECH 700936 Rev D) SN 14723

40461  WHITTIER
 M001                  WHC1      WHITTIER COLLEGE/STEEL MON./SIDE BULIDING
                                 4505-S
 M002                  WHI1      WHITTIER LIBRARY/STEEL MON./SIDE BULIDING
                                 4502-S
 M003                  RHCL      Raised nipple on the lower part of the antenna
                                 adaptor

40462  HOLLOMAN
 M001                  HOLL      Brass disks cemented in concrete/GPS Station
                                 85144
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40463  LOS ALAMOS, NM
 S001              7611          VLBA antenna reference point

40464  PARKFIELD/CARR HILL
 M001                   CARR      LEXI 1989-USGS
 M002                   LAND      Lang Parkfield/Punch mark on side of braced
                                  monument
 M003                   POMM      Pomm Parkfield/Punch mark on side of braced
                                  monument
 M004                   MIDA      Mida Parkfield/Punch mark on side of braced
                                  monument
 M005                   CAND      Cann Parkfield/Punch mark on side of braced
                                  monument
 M006                   CARH      Carrhill /  Drilled hole in top of center
                                  support bolt of antenna adaptor
 M007                   HUNT      Hunt / Parkfield / Drilled hole in top of
                                  center support bolt of antenna adaptor
 M008                   MNMC      Mine Mountaine / Parkfield / Drilled hole in
                                  top of center support bolt of antenna adaptor

40465  NORTH LIBERTY
 M001                   NLIB      Concrete GPS pier JPL 4007 S
 S001              7612          VLBA reference point (intersection of axes)

40466  KITT PEAK
 S001              7610          25-m VLBA antenna reference point

40469  CHINA LAKE
 M001                   COSO      1" DIAMETER RING/ 0.75" ROD /GRANITIC BASEMENT

40471  HANCOCK
 S001              7618          25-M VLBA antenna reference point

40472  COLORADO SPRINGS
 S001                             GPS OCS monitor station
 S003                   AMCT      TurboRogue SNR12 Ser T247; DM T ANTENNA Ser
                                  308/ARP; 24-MAR-1998 to 14-OCT-1998
 S004                   AMC2      TURBOROGUE SNR12 Ser T245; DM T ANTENNA Ser
                                  308/ARP; 15-OCT-1998 to present

40473  BREWSTER
 M001                   BREW      Divot on a SCIGN mount
 S001              7614          25-M VLBA antenna reference point

40474  LAKE MATHEWS
 M001                   MATH      PGGA Mark
 M002                   MAT2      Top of center support screw on SCIGN D3
                                  antenna adaptor

40475  WAIMEA (HAWAII)
 S001                        WAIA DORIS antenna ref. pt (Alcatel type)

40476  HAWAIIAN VOLCANO OBSERVATORY
 S001                        HVOA DORIS antenna ref. pt (Alcatel type)

40477  MAUNA KEA
 M001                   MKEA      GPS MARKER
 S001              7617          25-M VLBA antenna reference point

40478  CHATSWORTH
 M001                   CHTP      PGGA Mark (stainless steel pin in rock)
 M002                   ROCK      ROCKETDYNE/PIPE IN SANDSTONE
 M101                   OATT      Oatt Mountain/concrete bunker/ss-pin JPL
                                  4029-s
 S101                   OAT2      OATT MOUNTAIN / DM T ANTENNA / ARP

40479  BLYTHE
 M001                   BLYT      PGGA Mark Nov. 1993

40480  BOMMER CANYON
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 M001                    TRAK      PGGA Mark sandstone rock/stainless steel rod

40481  YUCAIPA
 M001                    CRFP      PGGA Mark

40482  LONG BEACH CITY
 M001                    LBCH      JPL 4500-s
 M002                    LBC1      Raised nipple on the lower part of the antenna
                                   adaptor
 M003                    LBC2      Raised nipple on the lower part of the antenna
                                   adaptor

40483  WESTLAKE/ALLEN OSBORNE AND ASSOCIATES
 S001                    AOA1      ROGUE SNR-8000/DM T/ARP 07-SEP-94 -

40484  CHILAO FLATES/SAN GABRIEL MOUNTAINS
 M001                    CHIL      3/4" Vert. Stainless steel rod with brass
                                   adaptor

40485  LONGDON YARD/IRWINDALE
 M001                    LONG      3/4" Vert. Stainless steel rod with brass
                                   adaptor

40486  PINEMEADOW
 M001                    ROCH      PGGA Marker

40487  LOS ANGELES
 M001                    USC1      Univ. of South Calif./Steel Pillar on Vault
 M002                    UCLP      Univ. of Calif./ GPS marker
 M003                    DSHS      Dorsey High School/Raised nipple on the lower
                                   part of the antenna adaptor
 M004                    FXHS      Fairfax High School/Raised nipple on the lower
                                   part of the antenna adaptor
 M005                    ELSC      East L.A. Science Center/Raised nipple on the
                                   lower part of the antenna adaptor
 M006                    WRHS      Westchester High School/Raised nipple on the
                                   lower part of the antenna adaptor
 M007                    MHMS      Markham Middle School / Top of center support
                                   screw on SCIGN D3 antenna adaptor
 M008                    PKRD      Elysian Park/Top of center support screw on
                                   scign d3 antenna
 M009                    MTA1      Civic Center MTA / Drilled hole in top of
                                   center support bolt of antenna adaptor

40488  CATALINA ISLAND
 M001                    CAT1      STAINLESS STEAL PIN JPL 4506-S

40489  HAT CREEK
 M001                              Mark NCMN B
 S001              7218            26m VLBI ref. point of radio telescope

40490  MARYLAND POINT
 S001              7217            (26m) 85-foot radiotelescope

40491  FLAGSTAFF
 M002              7891            Mark SLR (RMT N 4 1981)
 M003              7261            Mobile VLBI mark

40492  VERNAL
 M001              7892            Mobile SLR and VLBI mark (NCMN 1981)
 M002              7290            Mobile SLR and VLBI mark (NCMN 1985)

40493  YUMA
 M001              7894            Mobile SLR and VLBI mark

40496  PLATTEVILLE
 M001              7112            Moblas 7112-1980 standard NASA disk
 M002              7258            NCMN 1981 mobile VLBI NGS station disk

40497  MONUMENT PEAK
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 M001             7110           ORT station 7110-1981 standard NASA disk
 M002             7220           ARIES ORION STA 7220-1981
 M003             7274           NCMN 1983 mobile VLBI NGS disk
 M004                  MONP      PGGA MARK

40498  VLA
 S001             7619           VLA INTERFEROMETER Ref. Pt.

40499  RICHMOND
 M001                            Timer 1962
 M002             7295 RCM2      Mark SLR
 M005                  RCM4      Stainless steel plate (Richmond 1993)
 S001             7219           65 foot VLBI antenna
 S009                            TI4100 FRPA-2/L1/L2 09-FEB-88 - 24-FEB-89
 S011                            MINI MAC 2816AT/L1 05-FEB-89 -
 S013                            MINI MAC 2816AT/Bottom of the antenna
 S015                       RICA DORIS 1 antenna ref. pt (Alcatel type)
 S016                       RIDA DORIS 2 antenna ref. pt (Alcatel type)
 S017                  RCM3      Turbo Rogue SNR-8000/DM T/BPA 26-OCT-93
 S018                  RCM5      Turbo Rogue SNR-8000/DM T/BPA 11-OCT-93
 S019             7201           VLBI ANTENNA REF. POINT
 S020                  RCM6      Turbo Rogue SNR-8000/DM T/BPA 1-NOV-96

40503  SOCORRO ISLAND
 M002                            DORIS 2 mark
 M003                            Mark NGS/NOAA BM-3
 M004                            Mark CIFSA III "Mojonera"
 M005                            Mark NGS/NOAA BM-5
 S002                       SOCA DORIS 1 antenna ref. pt (Alcatel type)
 S003                       SODA DORIS 2 antenna ref. pt (Alcatel type)
 S004                       SODB DORIS 3 antenna ref. pt. (Starec type)

40504  MAZATLAN
 M001             7122           MOBLAS 7122-1983 standard NASA disk

40505  CABO SAN LUCAS
 M001             7882           Mark SLR 7882 1983

40506  ENSENADA
 M001             7883           SLR mark 7883

40507  AGUASCALIENTES (INEGI)
 M001                  INEG      Concrete pillar/GPS EPOCH 92 marker

40508  CICESE
 M001                  CICE      HIGH CONCRETE PILLAR JPL 3235
 M002                  CIC1      Geodetic ground marker under mobile geodetic
                                 system (GPS)

40509  MEXICO CITY
 M001                  UIGF      Stainless steel spike/Concrete column

40510  POPOCATEPETL
 M001                  POPN      Stainless steel spike
 M002                  POPW      Stainless steel spike

40511  SIERRA SAN PEDRO
 M001                  SPMX      Raised nipple on the lower part of the GPS
                                 antenna adaptor

40512  ISLA GUADALUPE
 M001                  GUAX      Drilled hole in top of center support bolt of
                                 antenna adaptor

40513  MANZANILLO
 S001                  MANZ      ASH701933B_M  SNOW antenna / ARP

40601  MOIN/COSTA-RICA
 M001                  MOIN      UNAVCO antenna mount/Pillar/Roof RECOPE
                                 building
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40701  SANTIAGO DE CUBA
 M001                  SCUB      GPS pillar on the roof of the Geodynamical
                                 Observatory
 S001             1953           SLR IAR

40901  GUATEMALA CITY
 S001                  GUAT      Trimble SSI / ARP

41101  TEGUCIGALPA
 S001                  TEGU      Trimble SSI / GPS ARP

41102  SAN LORENZO
 S001                  SLOR      Trimble SSI / GPS ARP

41201  MANAGUA
 S001                  MANA      Trimble SSi GPS antenna/ARP

41202  ESTELI
 S001                  ESTI      Trimble SSi GPS antenna/ARP

41401  SAN SALVADOR
 S001                  SSIA      Trimble 4000SSi/GPS ARP

41505  BUENOS-AIRES
 M002                  IGMO      Terrace IGM building / Concrete pillar / Brass
                                 Mark
 S006                            GPS DMA TI4100 / L1
 S007                  ARGN      NIMA GPS antenna ASH700936B_M 11941 / ARP

41507  RIO GRANDE
 M002                            DORIS 2 mark
 M003                  RIOZ      Small concrete block/threaded brass mark on a
                                 triangular plate
 M004                  RIOG      Concrete pillar / threaded brass mark on a
                                 triangular plate
 M005                            Mark on concrete pillar (DORIS 3)
 S003                       RIOA DORIS 1 antenna ref. pt (Alcatel type)
 S004                       RIOB DORIS antenna ref. pt. (Starec type)
 S005                       RIPB DORIS antenna ref. pt. (Starec type)

41510  LA PLATA
 M001                  LPGS      CONCRETE PILLAR

41511  CORDOBA GPS SITE
 M001                  CORD      Center point of a buried s/s conquest pin

41512  BAHIA BLANCA
 M001                  VBCA      Top building Universidad Nacional del Sur /
                                 brass plate with a central hole

41513  RAWSON
 M001                  RWSN      Screw fixed on top of metal tower

41514  SALTA
 M001                  UNSA      Stable pillar on the roof of a small building
                                 at the university Salta

41515  USHUAIA I
 S001                  AUTF      GPS ASH700936D_M   SNOW/ARP

41516  BASE ORCADAS
 S001                  BIOR      GPS ASH700936D_M  SNOW / ARP

41517  CAUCETE
 S001                  CFAG      GPS ASH700936D_M  SNOW / ARP

41518  LIHUE CALEL
 S001                  LHCL      GPS ASH700936D_M  SNOW / ARP
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41519  USHUAIA II
 S001                    PNTF      GPS ASH700936D_M  SNOW / ARP

41520  TUCUMAN
 S001                    TUCU      GPS ASH700936D_M  SNOW / ARP

41602  FORTALEZA
 M001                    FORT      Bronze plate SAT92009
 S001              7297            45-foot VLBI antenna

41603  CUIBA
 M001                    CUIB      Concrete pillar with forced centering device
                                   in the top of a water reservoir (92583)

41604  NATAL
 S001              7929            SLR IAR

41606  BRASILIA
 M001                    BRAZ      CONCRETE PILLAR JPL 4024-S

41608  RIO DE JANEIRO
 M001                    RIOD      Concrete pillar (height 0.96m) with forced
                                   centering device / 91720

41609  CACHOEIRA PAULISTA
 M002                              DORIS mark
 M003                    CHPI      Concrete Pillar / Dimple on a steel pin
 S001                         CACB DORIS antenna ref. pt. (Starec type)

41610  CURITIBA/PARANA
 M001                    PARA      Concrete pillar with forced centering device
                                   near the Space Geodesy Lab of UFPR (91105)

41611  PRESIDENTE PRUDENTE
 M001                    UEPP      Concrete pillar with forced centering device
                                   (91559)

41612  BOM JESUS DA LAPA
 M001                    BOMJ      Concrete pillar with forced centering device
                                   in the top of a one-floor building (93030)

41613  VICOSA
 M001                    VICO      Concrete pillar with forced centering device
                                   in the top of a two-floor building (91696)

41614  MANAUS
 M001                    MANU      Concrete pillar with forced centering device
                                   in the top of a two-floor building (91300)

41615  IMPERATRIZ
 M001                    IMPZ      Concrete pillar with forced centering device
                                   in the top of a two-floor building (92165)

41616  PORTO ALEGRE
 M001                    POAL      Universidade Federal do Rio Grande do Sul /
                                   two-floor building / concrete pillar / forced
                                   centering device

41617  RECIF
 M001                    RECF      Concrete pillar with forced centering device

41618  SALVADOR
 M001                    SALV      Concrete pillar with forced centering device

41619  CRATO
 M001                    CRAT      Concrete pillar with forced centering device /
                                   92300

41703  EASTER ISLAND
 M001              7061            TLRS-2 7061-1983 NASA-GSFC station disk
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 M002             7097           TLRS-2 7097-1986 NASA brass disk
 M003                  EIS1      GPS mark JPL 4008-S
 M004                            DORIS mark
 M005                            Concrete block / 12 mm domed brass mark (DORIS
                                 2)
 M006                            Tide gauge / mark Instituto Hidrografico
                                 CF-18a
 S008                       EASA DORIS antenna ref. pt (Alcatel type)
 S009                       EASB DORIS antenna ref. pt. (Starec type)

41705  SANTIAGO
 M001             7400           Mark SLR
 M002                            GPS Mark (GIG'91)
 M003                  SANT      GPS Mark JPL 4001-S
 M004             7404           SLR MARKER 7404
 M005                  SANG      Brass disk / .3m x .3m x 1.m concrete block
                                 (Marker 12M-A 92)
 S004                            ROGUE SNR-8/DM R/L1 15-JAN-91 -
 S006             1404           12m VLBI antenna IAR
 S007                       SANA DORIS 1 antenna ref. pt. (Alcatel type)
 S008                       SAOB DORIS 2 antenna ref. pt. (Starec type)
 S009                       SANB DORIS 3 antenna ref. pt. (Starec type)

41706  CERRO TOLOLO
 M001             7401           Mark SLR

41708  IQUIQUE
 S001                       IQUB DORIS Ant. Ref. Pt.
 S002                  IQQE      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12470 / BPA

41709  SEST
 S001             7239           VLBI antenna

41710  CARIQUIMA
 S001                       CARB DORIS Ant. Ref. Pt.

41712  VALPARAISO
 S001                  VALP      Ashtech Dorne-Margolin chokering antenna
                                 S/N:CR14321/ARP

41713  ANTUCO
 S001                  ANTC      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12462 / BPA

41714  COPIAPO
 S001                  COPO      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12473 / BPA

41715  COYHAIQUE
 S001                  COYQ      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12479 / BPA

41716  PUNTA ARENAS I
 S001                  PARC      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12472 / BPA

41717  PUERTO WILLIAMS
 S001                  PWMS      Ashtech Dorne-Margolin chokering antenna
                                 serial # 12481 / BPA

41718  PUNTA ARENAS II
 M001                  PUN1      GPS MARKER PARE

41719  CONCEPCION
 M001             7405           Geodetic ground marker / SLR TIGO
 M002                  CONZ      Concrete pilar with stainless steal
                                 construction with 5/8" thread
 M003             7761           Steal plate on the top of Steal tube
                                 vertically mounted at wall of house for
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                                        gravimeter
 S001             7640                  Intersection of axes of TIGO-radiotelescope

41901  BOGOTA
 M001                        BOGT       GPS MARKER JPL 4022-S/INGEOMINAS COMPLEX
 M002                        BOGA       Brass plate on a flat roof under a pillar

41902  CARTAGENE
 M001                        CART       Aluminium plate/Top of Pillar

42003  QUITO III
 S003                        ECUA       NIMA GPS antenna ASH700936B_M 11935 / ARP

42004  SAN CRISTOBAL (GALAPAGOS)
 M002                                   DORIS mark
 S001                             GALA  DORIS antenna ref. pt (Alcatel type)

42005  SANTA CRUZ
 M001                        GALA       DARWIN STATION / GPS MARKER

42006  RIO BAMBA
 M001                        RIOP       5/8-inch threaded stainless steel pin cemented
                                        into concrete pillar

42202  AREQUIPA
 M002                                   Satellite mark 1961
 M003             7403                  Mark SLR
 M004                                   East Satellite mark Ref. 1
 M005                        AREQ       GPS marker JPL 4021-s
 M006                                   DORIS 1 mark
 M007                                   Concrete pillar / mark (DORIS 2)
 S001             7907                  SAO-2 fixed laser
 S005                             AREA  DORIS antenna ref. pt (Alcatel type)
 S006                             AREB  DORIS antenna ref. pt. (Starec type)

42301  MONTEVIDEO
 M001                        MON1       GPS MARKER PILLAR ON THE ROOF OF A BUILDING

42402  MARACAIBO
 M001                        MARA       Concrete pillar with forced centering on the
                                        top of the building "Facultad de Ingenieria"

42501  BERMUDA
 M001             7067                  Mark SLR
 M002             7294                  Mobile VLBI mark
 S004                        BRMU       Turbo Rogue SNR-8000/DM T/BPA 12-MAR-93

42601  KINGSTON
 S001                        JAMA       GPS ARP / AOAD/M_TA_NGS S/N: 114

43001  THULE
 M001                        THU1       BUILDING ROOF/RECTANGULAR PLATE
 M002                        THU2       Bolt in 1.5 meter concrete pillar

43005  KELLYVILLE (KANGERLUSSUAQ)
 M001                        KELY       KELLYVILLE/1M CONCRETE PILLAR/STEEL PLATE

43006  SCORESBYSUND
 M001                        SCOB       Top of 4 meter steel mast

43007  QAQORTOQ
 M001                        QAQ1       BRASS BOLT IN 2 M CONCRETE PILLAR

43201  SAINTE CROIX
 M001                        CRO1       VLBA RM 1 JPL 4023
 S001             7615                  25-M VLBA antenna reference point

43401  BRIDGETOWN
 S001                        BARB       BPA/Ashtech Chokering with Dome  CR1537
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43602  GRAND TURK
 M001                            Mark SKI 1952
 M002              7068          Mark SLR

43605  FREEPORT
 S001                    FREE    ASH701933B_M  SNOW antenna / ARP

49601  PARKFIELD
 M001                    HOGS    Hogs / Drilled hole in top of center support
                                 bolt of SCIGN D3 antenna adaptor
 M002                    MASW    Mason West / Drilled hole in top of center
                                 support bolt of antenna adaptor

49602  SANTA ANA MOUNTAINS
 M001                    MJPK    Drilled hole in top of center support bolt of
                                 antenna adaptor

49603  LAKE FOREST
 M001                    WHYT    Drilled hole in top of center support bolt  of
                                 SCIGN D3 antenna adaptor

49604  DARLINGTON
 S001                    FDTC    TRIMBLE 4000SSI / TRM29659.00 / ARP

49605  PALISADES
 S001                    LAMT    TRIMBLE 4000SSI / TRM29659.00 / DOME / ARP

49606  FAN MOUNTAIN
 S001                    UVFM    TRIMBLE 4000SSI / TRM29659.00 / DOME / ARP

49607  ST. LOUIS
 M001                    NIMA    Brass disks cemented in concrete/GPS Station
                                 85401

49608  NEENACH
 M001                    ALPP    Drilled hole in top of center support bolt of
                                 antenna adaptor

49609  PARKFIELD/LOWES
 M001                    LOWS    Lowes/Drilled hole in top of center support
                                 bolt of antenna adaptor

49610  PARKFIELD/RANCHITA
 M001                    RNCH    Drilled hole in top of center support bolt of
                                 antenna adaptor

49611  EL CARISO
 M001                    ECFS    Drilled hole in top of center support bolt of
                                 antenna adaptor

49612  SAGINAW
 S001                    BAYR    LEICA RS500  / LEIAT504 / ARP

49613  BRIGHTON
 S001                    BRIG    LEICA RS500 / LEIAT504 / ARP

49614  CONOVER
 S001                    CONO    TRIMBLE 4700 / TRM33429.20+GP / ARP

49615  GRAND RAPIDS
 S001                    GRAR    LEICA RS500 / LEIAT504 / ARP

49616  HAWK RUN
 S001                    HRN1    ASHTECH Z-XII3 / ASH700829.3 SNOW / ARP
 S002                    HRN2    ASHTECH Z-XII3 / ASH700829.3  SNOW / ARP

49617  AUBURN HILLS
 S001                    METR    LEICA RS500 / LEIAT504 / ARP

49618  CADILLAC
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 S001                    NOR1      LEICA RS500 / LEIAT504 / ARP

49619  GAYLORD
 S001                    NOR2      LEICA RS500 / LEIAT504 / ARP

49620  ALPENA
 S001                    NOR3      LEICA RS500 / LEIAT504 / ARP

49621  KALAMAZOO
 S001                    SOWR      LEICA RS500 / LEIAT504 / ARP

49622  L ANSE
 S001                    SUP1      LEICA RS500 / LEIAT504 / ARP

49623  ASCANABA
 S001                    SUP2      LEICA RS500 / LEIAT504 / ARP

49624  JACKSON
 S001                    UNIV      LEICA RS500 / LEIAT504 / ARP

49625  LIBERTYVILLE
 S001                    LCDT      TRIMBLE 5700 / TRM41249.00 / ARP

49626  PARKFIELD/CAMP ROBERTS
 M001                    CRBT      Drilled hole in top of center support bolt of
                                   SCIGN D3 antenna adapotor.

49627  PARKFIELD/TABLE
 M001                    TBLP      Drilled hole in top of center support bolt of
                                   SCIGN D3 antenna adaptor

49628  NEEDLES
 M001                    NDAP      Drilled hole in top of center support bolt of
                                   antenna adaptor

49629  NEWBERRY
 S001                    SUP3      LEICA RS500 / LEIAT504 / ARP

49630  Pueblo, Colorado
 S001                    PUB1      ASH700829.3  SNOW / ARP
 S002                    PUB2      ASH700829.3  SNOW / ARP

49631  Lebanon, Ohio
 S001                    LEBA      TRM29659.00 / ARP

49632  Gustavus, Ohio
 S001                    GUST      TRM29659.00 / ARP

49633  McConnelsville, Ohio
 S001                    MCON      TRM29659.00 / ARP

49634  Ellensburg, Washington (CORS)
 S001                    SC00      TRM29659.00 / ARP

49635  Tumwater Hill, Washington
 S001                    TWHL      ASH701945B_M / ARP

49636  Bismark, North Dakota
 S001                    BSMK      TRM41249.00 / ARP

49637  Adrian, Michigan
 S001                    ADRI      LEIAT504 / ARP

49638  Twentynine Palms
 M001                    BEMT      Drilled hole in top of center support bolt of
                                   antenna  adaptor

49639  MT. PLEASANT
 S001                    MPLE      LEICA RS500 / LEIAT504 / ARP
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49640  PRUDHOE BAY
 S001                  CCPT      TRIMBLE 5700 / TRM4124900 / ARP
 S002                  PBOC      TRIMBLE 5700 / TRM4124900 / ARP

49641  Columbus, Ohio
 S001                  COLB      TRIMBLE 5700 / TRM29659.00 / ARP

49642  La Grande, Washington
 S001                  CPXF      ASHTECH Z-XII3 / ASH701945_M / ARP

49643  Defiance, Ohio
 S001                  DEFI      TRIMBLE 5700 / TRM29659.00 /ARP

49644  Freeport, Ohio
 S001                  FREO      TRIMBLE 5700 / TRM29659.00 / ARP

49645  Laredo, Texas
 S001                  LARD      TRIMBLE 4000SSE / TRM22020.00+GP / ARP

49646  Myton, Utah
 S001                  MYT1      ASHTECH Z-X113 / ASH700829.3 / ARP
 S002                  MYT2      ASHTECH Z-X113 / ASH700829.3 / ARP

49647  Houston, Texas
 S001                  NETP      TRIMBLE 4000SSI / TRM29659.00 / ARP

49648  Pharr, Texas
 S001                  PHAR      TRIMBLE 4000SSE / TRM22020.00+GP / ARP

49649  Piketon, Ohio
 S001                  PKTN      TRIMBLE 5700 / TRM29659.00 / ARP

49650  Pine River, Minnesota
 S001                  PNR1      ASHTECH Z-XII3 / ASH700829.3 / ARP
 S002                  PNR2      ASHTECH Z-XII3 / ASH700829.3 / ARP

49651  Sidney, ohio
 S001                  SIDN      TRIMBLE 5700 / TRM39659.00 / ARP

49652  Tiffin, Ohio
 S001                  TIFF      TRIMBLE 5700 / TRM29569.00 / ARP

49653  Wooster, Ohio
 S001                  WOOS      TRIMBLE 5700 / TRM29659.00 / ARP

49700  ISLA VISTA
 M001                  COPR      Drilled hole in top of center support bolt of
                                 antenna adaptor

49701  Niland
 M001                  GLRS      Top of center support screw on SCIGN D3
                                 antenna adaptor

49702  Coachella
 M001                  CACT      Top of center support screw on SCIGN D3
                                 antenna adaptor

49703  Corona
 M001                  CNPP      Top of center support screw on SCIGN  D3
                                 antenna adaptor

49704  Santa Monica
 M001                  CIRX      Top of center support screw on SCIGN  D3
                                 antenna adaptor

49705  Encino
 M001                  VIMT      Top of center support screw on SCIGN  D3
                                 antenna adaptor

49706  South El Monte
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 M001                    WNRA      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49707  Ojai
 M001                    HVYS      Top of center support screw on SCIGN  D3
                                   antenna adaptor
 M002                    NHRG      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49708  Tajiguas
 M001                    TJRN      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49709  Llano
 M001                    LL01      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49710  Santa Barbara
 M001                    RCA2      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49711  Barstow
 M001                    ORMT      Shallow rod/braced antenna mount

49712  Los Olivos
 M001                    FGST      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49713  Ludlow
 M001                    CDMT      Shallow rod/braced antenna mount

49714  San Luis Obispo
 M001                    USLO      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49715  Unincoropated Kern County
 M001                    RAMT      Top of center support screw on SCIGN  D3
                                   antenna adaptor

49716  DYER/ESMERALDA
 S001                    DYER      GPS/ARP TRIMBLE 4000SSI, TRM29659.00

49717  ECHO CANYON STATE PARK
 S001                    ECHO      GPS ARP/ TRIMBLE 4000SSI, TRM29659.00

49718  FERNO MESA
 S001                    FERN      GPS ARP/ TRIMBLE 4000SSI, TRM29659.00

49719  FREDONIA
 S001                    FRED      GPS ARP/ TRIMBLE 4000SSI, TRM29659.00

49720  GABBS
 S001                    GABB      GPS ARP/ TRIMBLE 4000SSI, TRM29659.00

49721  GARLIC/EMPIRE
 S001                    GARL      GPS ARP / TRIMBLE 4000SSI, TRM29650.00

49722  HUDSON FALLS
 S001                    HDF1      GPS ARP / ASHTECH Z-XII3    ASH700829.3   SNOW
 S002                    HDF2      GPS ARP / ASHTECH Z-XII3    ASH700829.3   SNOW

49723  NEW BERN
 S001                    NBR1      GPS ARP / ASHTECH Z-XII3    ASH700829.3   SNOW
 S002                    NBR2      GPS ARP / ASHTECH Z-XII3    ASH700829.3   SNOW

49724  RAILROAD VALLEY
 S001                    RAIL      GPS ARP / TRIMBLE 4000SSI, TRM29659.00

49725  UPSAL HAGBACK
 S001                    UPSA      GPS ARP / TRIMBLE 4000SSE, TRM29659.00
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49726  OJAI/ROSE VALLEY
 M001                   RSVY      Top of center support screw on SCIGN D3
                                  antenna adaptor

49727  KELSO
 M001                   GMRC      Top of center support screw on SCIGN D3
                                  antenna adaptor

49728  AVALON
 M001                   CAT2      Top of center support screw on SCIGN  D3
                                  antenna adaptor

49729  SOLVANG
 M001                   BBDM      Top of center support screw on SCIGN  D3
                                  antenna adaptor

49730  GRAPEVINE/EDMONSTON PUMPING PLANT
 M001                   EDPP      Top of center support screw on SCIGN  D3
                                  antenna adaptor

49731  EAGLE ROCK
 M001                   OXYC      Top of center support screw on SCIGN D3
                                  antenna adaptor

49732  SILVER LAKE
 M001                   SILK      Top of center support screw on SCIGN  D3
                                  antenna adaptor

49733  SANTA PAULA/SOUTH MOUNTAIN
 M001                   SOMT      Top of center support screw on SCIGN D3
                                  antenna adaptor

49734  SANTA ROSA ISLAND
 M001                   SRS1      Top of center support screw on SCIGN D3
                                  antenna adaptor

49735  NEWBERRY SPRINGS/TROY
 M001                   TROY      JPL 0.0614 m fixed-height spike mount over
                                  survey mark reference point

49736  West SAN GABRIEL MOUNTAINS
 M001                   BRPK      Drilled hole in top of center support bolt of
                                  antenna adaptor

49737  ARVIN
 M001                   ARM1      Drilled hole in top of center support bolt of
                                  antenna adaptor
 M002                   ARM2      Drilled hole in top of center support bolt of
                                  antenna adaptor

49738  FRAZIER PARK
 M001                   CCST      Drilled hole in top of center support bolt of
                                  antenna adaptor

49739  OZENA
 M001                   OZST      Drilled hole in top of center support bolt of
                                  antenna adaptor

49740  CASITAS SPRINGS
 M001                   CSST      Top of center support screw on SCIGN  D3
                                  antenna adaptor

49741  SAN MIGUEL ISLAND
 M001                   MIG1      Drilled hole in top of center support of
                                  antenna adaptor

49742  VENTURA
 M001                   VNCO      Drilled hole in top of center support of
                                  antenna adaptor
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49743  SUMMERFIELD
 S001                  SUM1      ASHTECH Z-XII3 / ASH700829.3 / SNOW
 S002                  SUM2      ASHTECH Z-XII3 / ASH700829.3 / SNOW

49744  POLSON
 S001                  PLS1      ASHTECH Z-XII3 / ASH700829.3 / SNOW
 S002                  PLS2      ASHTECH Z-XII3 / ASH700829.3 / SNOW

49745  SPOKANE
 S001                  SPN1      ASHTECH Z-XII3 / ASH700829.3 / SNOW
 S002                  SPN2      ASHTECH Z-XII3 / ASH700829.3 / SNOW

49746  CORBIN
 S001                  CORB      GPS ARP / TRIMBLE 4000SSI  /  AOAD/M_T

49747  BARTLETT
 S001                  BARN      GPS ARP / TRIMBLE 4000SSI  /  TRM33429.00+GP

49748  EL PASO
 S003                  ELP3      GPS ARP / TRIMBLE 4000SSE  /  TRM22020.00+GP

49749  LAS VEGAS VALLEY
 S001                  LVWD      GPA ARP / TRIMBLE 4000SSI  /  TRM23903.00

49750  PRICE/CARBON COUNTY
 S001                  PUC1      GPS ARP / TRIMBLE 4700  /  TRM33429.20+GP

49751  MARICOPA
 M001                  BCWR      Drilled hole in top of center support bolt of
                                 antenna adaptor

49752  S. SIERRA NEVADA
 M001                  BEPK      Drilled hole in top of center support bolt of
                                 antenna adaptor

49753  BAKER
 M001                  BKAP      Top of center support screw on SCIGN D3
                                 antenna adaptor

49754  TAFT
 M001                  BVPP      Drilled hole in top of center support bolt of
                                 antenna adaptor

49755  RIDGECREST
 M001                  CCCC      Drilled hole in top of center support bolt of
                                 antenna adaptor

49756  BORON
 M001                  CPBN      Drilled hole in top of center support bolt of
                                 antenna adaptor

49757  CAMARILLO
 M001                  CSCI      Top of center support screw on SCIGN  D3
                                 antenna adaptor

49758  CALIFORNIA VALLEY
 M001                  GDEC      Drilled hole in top of center support bolt of
                                 antenna adaptor

49759  BRISTOL MOUNTAIN
 M001                  I40A      Drilled hole in top of center support bolt of
                                 antenna adaptor

49760  BARSTOW/LANE MOUNT.
 M001                  LNMT      Drilled hole in top of center support / bolt
                                 of antenna adaptor

49761  TEHACHAPI
 M001                  THCP      Drilled hole in top of center support bolt of
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                                    antenna adaptor

49762  VENTUCOPA
 M001                   VCST        Drilled hole in top of center support bolt of
                                    antenna adaptor

49763  CAPE BLANCO, OREGON
 M001                   CABL        punch mark on top of drilled braced monument

49764  TILLAMOOK, OREGON
 M001                   CHZZ        punch mark on top of drilled braced monument

49765  ROSEBURG, OREGON
 M001                   DDSN        Center punch on top of invar rod

49766  GOLDENDALE, WASHINGTON
 M001                   GOBS        center punch on top of drilled braced monument

49767  ELLENSBURG, WASHINGTON
 M001                   LIND        center punch on top of rod mounted on top of
                                    building

49768  PACIFIC BEACH, WASHINGTON
 M001                   PABH        center punch on top of drilled braced monument
 M001                   PABH        center punch on top of drilled braced monument

49769  POINT ST. GEORGE, CA
 M001                   PTSG        center punch on top of drilled braced monument

49770  REDMOND, OREGON
 M001                   REDM        center punch on top of invar rod set in
                                    bedrock

49771  DENIO, NEVADA
 M001                   SHLD        center punch on top of drilled braced monument

49772  TRINIDAD HEAD, CA
 M001                   TRND        center punch on top of invar rod set in
                                    bedrock

49773  Paul Smith College
 S001                   PSC1        GPS ARP / ASH701933B_M    SNOW

49774  WILMINGTON
 S001                   WILR        GPS ARP / TRM22020.00+GP

49775  WASHINGTON (NC)
 S001                   WASR        GPS ARP / TRM33429.00+GP

49776  RALEIGH
 S001                   RALR        GPS ARP / TRM22020.00+GP

49779  MENTONE
 M001                   7ODM        Drilled hole in top of center support bolt of
                                    antenna adaptor

49780  WILLMINGTON (CA)
 M001                   HBCO        Drilled hole in top of center support bolt of
                                    antenna adaptor

49781  SILVERADO
 M001                   OEOC        Drilled hole in top of center support bolt of
                                    antenna adaptor

49782  TIPTONVILLE
 S001                   RLAP        Reelfoot Lake Airpark / ASH700936D_M  SNOW
                                    antenna serial #11762 / ARP / (901) 253-3179
 S002                   NWCC        Northwest Correctional Center / ASH700936D_M
                                    SNOW antenna serial #503 / ARP (901)253-5244
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49783  PORTAGEVILLE
 S001                  PTGV      Delta Research Center / ASH700936D_M  SNOW
                                 antenna serial #11405 /ARP / (573) 3792314

49784  NORTH LITTLE ROCK
 S001                  CRAR      Camp JT Robinson Army Nat. Guard /
                                 ASH700936D_M SNOW antenna serial #11943 / ARP
                                 (501) 212-5849

49785  PARK HILLS
 S001                  MACC      Minearal Area Community College / ASH700936D_M
                                 SNOW antenna serial #11755 /ARP / (573)
                                 5182321

49786  CHARLESTON (MO)
 S001                  MAIR      Mississippi County Airport / ASH700936D_M SNOW
                                 antenna serial #11408 / ARP / (573) 6838683

49787  PIGGOTT (AR)
 S001                  PIGT      Water Treatment Plant / ASH700936D_M SNOW
                                 antenna serial #401 /ARP / (870) 5982946

49788  CARUTHERSVILE (MO)
 S001                  MCTY      Pemiscot County R-III School / ASH700936D_M
                                 SNOW antenna serial #782 / ARP / (573) 3330060

49789  STEELE (MO)
 S001                  STLE      U.S. Supply Handling Equipment / ASH700936D_M
                                 SNOW antenna serial #402 / ARP / (573) 6953730

49790  COVINGTON
 S001                  CVMS      Crestview Middle School / ASH700936D_M SNOW
                                 antenna serial #405 /ARP / (901) 4752534

49791  TROY (TN)
 S001                  HCES      Hillcrest Elementary School / ASH700936D_M
                                 SNOW antenna serial #502 / ARP / (901) 5364609

49792  SAN GABRIEL MOUNTAINS
 M001                  CGDM      drilled hole in top of center support bolt  of
                                 SCIGN D3 antenna adaptor

49793  CHINO HILLS
 M001                  TWMS      Top of center support screw on SCIGN D3
                                 antenna adaptor

49794  BOISE
 S001                  IDTD      ASHTECH UZ-12  /  ASH700936E / ARP

49795  NEWARK
 S002                  NJI2      LEICA SR9500  /  LEIAT303 / ARP

49796  LEVEL ISLAND
 S001                  LEV1      ASHTECH Z-XII3 / ASH700829.3  SNOW / ARP
 S002                  LEV2      ASHTECH Z-XII3 / ASH700829.3  SNOW / ARP

49797  GREENVILLE
 S001                  GVLT      TRIMBLE 4600 / TRM29659.00 / ARP

49798  HAGERSTOWN
 S001                  HAG1      ASHTECH Z-XII3 / ASH700829.3  SNOW /ARP
 S002                  HAG2      ASHTECH Z-XII3 / ASH700829.3 SNOW/ ARP

49799  JOSHUA TREE NAT. PARK
 M001                  KYVW      Drilled hole in top of center  support bolt on
                                 SCIGN D3 antenna adaptor

49800  Glamis
 M001                  GMPK      Top of center support screw on SCIGN D3
                                 antenna adaptor
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49801  POTATO POINT/ALASKA
 S001                   POT1      GPA ARP
 S003                   POT3      GPS ARP /  ASHTECH Z-XII3 (05508), ASH700829.3
                                  (12079)
 S004                   POT4      GPS ARP / ASHTECH Z-XII3 (05507), ASH700829.3
                                  (11943)

49802  GUSTAVUS/ALASKA
 S001                   GUS1      GPS ARP / ASHTECH Z-XII3 (05072), ASH700829.3
                                  (11038)
 S002                   GUS2      GPS ARP / ASHTECH Z-XII3 (05058), ASH700829.3
                                  (11272)

49803  CAPE HINCHINBROOK/ALASKA
 S001                   CHI1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW
 S003                   CHI3      GPS ARP / ASHTECH Z-XII3 (05501), ASH700829.3
                                  (11948)
 S004                   CHI4      GPS ARP / ASHTECH Z-XII3 (05502), ASH700829.3
                                  (11947)

49804  COLD BAY/ALASKA
 S001                   BAY1      GPS ARP / ASHTECH Z-XII3 (04955), ASH700829.3
                                  (11265)
 S002                   BAY2      GPS ARP / ASHTECH Z-XII3 (05277), ASH700829.3
                                  (11269)

49805  EIELSON AFB
 S001                   ALAS      NIMA GPS antenna ASH700936B_M CR 16559 / ARP

49806  Johnson Valley
 M001                   AGMT      Top of center support screw on SCIGN D3
                                  antenna adaptor

49807  Twentynine Palms/BEARMAT Hill
 M001                   BMHL      Top of center support screw on SCIGN D3
                                  antenna adaptor

49808  Lancaster/Challenger Middle School
 M001                   CHMS      Top of center support screw on SCIGN D3
                                  antenna adaptor

49809  New Cuyama
 M001                   CUHS      Top of center support screw on SCIGN  D3
                                  adaptor

49810  Castaic/Foothill Feeder Facility
 M001                   FHFF      Top of center support screw on SCIGN D3
                                  antenna adaptor
 M002                   CTDM      Drilled hole in top of center support bolt of
                                  antenna adaptor

49811  Fillmore
 M001                   FMTP      Top of center support screw on SCIGN D3
                                  antenna adaptor
 M002                   FMVT      Drilled hole in top of center support bolt of
                                  antenna adaptor

49812  Newberry Springs/Hector Mine
 M001                   HCMN      Top of center support screw on SCIGN D3
                                  antenna adaptor

49813  Ludlow
 M001                   LDSW      Top of drilled divot on N side of monument

49814  Lancaster/Lancaster Injection Well
 M001                   LINJ      Top of a drilled divot in the vertical leg
                                  of the monument

49815  Twentynine Palms/Noble Pass Firing
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 M001                   NBPS      Top of center support screw on SCIGN D3
                                  antenna adaptor

49816  Norco
 M001                   NOCO      Top of center support screw on SCIGN D3
                                  antenna adaptor

49817  Escondido
 M001                   OGHS      Top of center support screw on SCIGN D3
                                  antenna adaptor

49818  Twentynine Palms/Obs. Point Bullion
 M001                   OPBL      Top of center support screw on SCIGN D3
                                  antenna adaptor

49819  Twentynine Palms/Obs. Point Creole
 M001                   OPCL      Top of center support screw on SCIGN D3
                                  antenna adaptor

49820  Twentynine Palms/Crampton
 M001                   OPCP      Top of center support screw on SCIGN D3
                                  antenna adaptor

49821  Twentynine Palms/Obs. Point Cross
 M001                   OPCX      Top of drilled divot on N side of monument

49822  Twentynine Palms/Obs. Point Round
 M001                   OPRD      Top of drilled divot on N side of monument

49823  San Dimas
 M001                   PSDM      Top of center support screw on SCIGN D3
                                  antenna adaptor

49824  Newberry Springs/Rodman Mountain
 M001                   RDMT      Top of center support screw on SCIGN D3
                                  antenna adaptor

49825  Mission Viejo
 M001                   SBCC      Top of center support screw on SCIGN D3
                                  antenna adaptor

49826  Piru
 M001                   SFDM      Top of center support screw on SCIGN D3
                                  antenna adaptor

49827  San Gabriel
 M001                   SGHS      Top of center support screw on SCIGN  D3
                                  adaptor
 M002                   GVRS      Monterey Park / Top of center support screw on
                                  SCIGN  D3 antenna adaptor

49828  Ludlow
 M001                   SIBE      JPL 0.0614 m fixed-height spike mount over
                                  survey mark reference point

49829  Thermal
 M001                   TMAP      Top of center support screw on SCIGN D3
                                  antenna adaptor

49830  Grapevine
 M001                   WGPP      Top of center support screw on SCIGN D3
                                  antenna adaptor

49831  Castaic/Whitiker Peak
 M001                   WKPK      Top of center support screw on SCIGN D3
                                  antenna adaptor

49832  LA CANADA
 M001                   BTDM      Top of center support screw on SCIGN D3
                                  antenna adaptor
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49833  SANTA CLARITA
 M001                  SKYB      Top of center support screw on SCIGN D3
                                 antenna adaptor

49834  BIORKA ISLAND
 S001                  BIS1      GPS ARP / ASHTECH Z-XII3, ASH7000829.3  SNOW
 S002                  BIS2      GPS ARP / ASHTECH Z-XII3, ASH7000829.3  SNOW

49835  SANTA CRUZ ISLAND
 M001                  CRU1      Top of center support screw on SCIGN D3
                                 antenna adaptor

49836  PARKER
 M001                  GNPS      Top of center support screw on SCIGN D3
                                 antenna adaptor

49837  WOODINVILLE
 S001                  DWH1      JPS LEGACY MT312431807 & JPSREGANT_DD_ERA0083

49838  TITUSVILLE
 S001                  UPTC      GPS ARP / TRIMBLE 4000SSI / TRM2390.00
                                 (SN#0220109634)

49839  ORONO
 S001                  ORO_      GPS ARP / ASHTECH Z-XII3, ASH700936E_C

49840  BRUNSWICK
 S001                  BRU1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49841  CHATHAM
 S001                  CHT1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49842  NEW CASTLE
 S002                  POR2      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49843  MONTAUK POINT
 S001                  MNP1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49844  MONTPELIER
 S001                  VCAP      GPS ARP / TRIMBLE 4000SSE, TRM22020.00+GP

49845  CAPE HENLOPEN
 S001                  CHL1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49846  KITTY HAWK
 S001                  DUCK      GPS ARP / TRIMBLE 4000SSE, TRM22020.00+GP

49847  CAPE HENRY
 S001                  CHR1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49848  RICHMOND
 S001                  RIC1      GPS ARP / ASHTECH Z-XII3, ASH700936E_C

49849  YOUNGSTOWN
 S001                  YOU1      GPS ARP / ASHTECH Z-XII3, ASH700829.3

49850  PITTSBURGH
 S001                  PIT1      GPS ARP / TRIMBLE 4000SSI, TRM22020.00+GP

49851  CHARLESTON
 S001                  CHA1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49852  KEY WEST NAVAL
 S001                  KYW1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49853  ASHEVILLE
 S001                  ASHV      GPS ARP / TRIMBLE 4000SSI, TRM29659.00

49854  DETROIT
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 S001                    DET1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49855  NEEBISH ISLAND
 S003                    NEB3      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49856  CHEBOYGAN
 S001                    CHB1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49857  CINCINNATI
 S001                    GALB      GPS ARP / LEICA SR9500, LEIAT303 LEIC

49858  MARIETTA
 S001                    ATL1      GPS ARP / LEICA SR9500, LEIAT303

49859  ERLANDER
 S001                    ERLA      GPS ARP / ASHTECH Z-XII3, ASH700936C_M

49860  WHITEFISH POINT
 S001                    WHP1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49861  STURGEON BAY
 S001                    STB1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49862  MILWAUKEE
 S001                    MIL1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49863  MOBILE
 S001                    MOB1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49864  UPPER KEWEENAW
 S001                    KEW1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49865  SUMMERFIELD
 S003                    STL3      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49866  ENGLISH TURN
 S001                    ENG1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49867  FRENCH BAYOU
 S002                    MEM2      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49868  TEEDS GROVE
 S001                    RIS1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49869  VICKSBURG
 S001                    VIC1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49870  ALMA
 S001                    STP1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49871  WISCONSIN POINT
 S001                    WIS1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49872  GALVESTON
 S001                    GAL1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49873  SALLISAW
 S001                    SAL1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49874  PERRY
 S001                    KAN1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49875  NEODESHA
 S001                    NDSK      GPS ARP / TRIMBLE 4000SSI, TRM22020.00+GP
 S101                    NDS1      GPS ARP / TRIMBLE 4000SSI  /  TRM22020.00+GP

49876  PALESTINE
 S001                    PATT      GPS ARP / TRIMBLE 4000SSI, TRM22020.00+GP

49877  MORRIS
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 S001                  PATT      GPS ARP / TRIMBLE 4000SSE, TRM23903.00

49878  ARANSAS PASS
 S003                  ARP3      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49879  HAVILAND
 S001                  HVLK      GPS ARP / TRIMBLE 4000SSE, TRM22020.00+GP

49880  WACHAPREAGUE
 S001                  VIMS      GPS ARP / ROGUE SNR-8000, AOAD/M_T

49881  JAYTON
 S001                  JTNT      GPS ARP / TRIMBLE 4000SSI, TRM22020.00+GP

49882  GRANADA
 S001                  GDAC      GPS ARP / TRIMBLE 4000SSE, TRM22020.00+GP

49883  TUCUMCARI
 S001                  TCUN      GPS ARP / TRIMBLE 4000SSE, TRM22020.00+GP

49884  WHITE SANDS
 S001                  WSMN      GPS ARP / TRIMBLE 4000SSI, TRM23903.00

49885  SALT LAKE CITY
 S001                  RBUT      GPS ARP / TRIMBLE 4000SSI, TRM29659.00

49886  POINT LOMA
 S003                  PLO3      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49887  POINT ARGUELLO
 S001                  PAR1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49888  APPLETON
 S001                  GWEN      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49889  ROBINSON POINT
 S001                  RPT1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49890  PIGEON POINT
 S001                  PPT1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49891  POINT BLUNT
 S001                  PBL1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49892  WHIDBEY ISLAND
 S001                  WHD1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49893  FORT STEVENS
 S001                  FTS1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49894  MENDOCINO
 S001                  CME1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49895  UPOLU POINT
 S001                  UPO1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49896  KOKOLE POINT
 S001                  KOK1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49897  Coronados Island
 M001                  CORX      Top of center support screw on SCIGN D3
                                 antenna adaptor

49898  Chula Vista
 M001                  NSSS      Top of center support screw on SCIGN D3
                                 antenna adaptor

49899  Imperial
 M001                  IVCO      Top of center support screw on SCIGN  D3
                                 antenna adaptor
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49900  LOS ALAMOS, CA
 M001                    ORES      Top of center support screw on SCIGN D3
                                   antenna adaptor

49901  WRIGHTWOOD
 M001                    TABL      TABLE MOUNTAIN/SCRIPPS TETRAPOD MONUMENT

49902  MOUNT LEE
 M001                    LEEP      SCIGN GPS MARKER

49903  HOLLYDALE
 M001                    HOLP      SCIGN GPS MARKER

49904  DURMID HILL
 M001                    DHLG      PGGA GPS MARKER /HOLE IN STAINLESS STEEL ROD

49905  PACOIMA
 M001                    DAM1      SCIGN GPS MARKER/THREADED ROCK PIN
 M002                    DAM2      SCIGN GPS MARKER/BUILT PIER
 M003                    CMP9      FIRE CAMP 9/ SCIGN GPS MARKER /THREADED ROCK
                                   PIN
 M004                    WMAP      Raised nipple on the lower part of the antenna
                                   adaptor

49906  CLAREMONT/LA VERNE
 M001                    CLAR      CLAREMONT/SCIGN GPS MARKER/DRIVEN-ROD
 M002                    LORS      LA VERNE/Raised nipple on the lower part of
                                   the antenna adaptor

49907  SOLOMONS ISLAND
 S001                    SOL1      DM T ANTENNA /BPA

49908  ANNAPOLIS
 S001                    USNA      DM T ANTENNA /BPA
 S101                    ANP1      ASHTECH Z-XII3  / ASH700829.3  SNOW / ARP
 S102                    ANP2      ASHTECH Z-XII3 / ASH700829.3  SNOW / ARP

49909  SAN NICOLAS ISLAND
 S001                    SNI1      DM T ANTENNA / ARP /JPL 4507-S

49910  NORTHRIDGE
 S001                    CSN1      DM T ANTENNA / ARP

49911  AZUSA
 M001                    AZU1      GPS MARKER
 M002                    MRDM      Drilled hole in top of center support bolt  of
                                   SCIGN D3 antenna adaptor
 M003                    SGDM      drilled hole in top of center support bolt on
                                   scign d3 antenna adaptor

49912  TORRANCE AIRPORT
 M001                    TORP      SCIGN GPS Marker/Drilled hole in the vertical
                                   pipe

49913  HORN POINT
 S001                    HNPT      Rogue SNR-12/DM T/ARP/Bottom of Flange
                                   13-DEC-1995

49914  KEYBISCAYNE/MIAMI
 S001                    AOML      BPA/Dorne Margolin T  148
 S002                    MIA1      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

49915  SAN CLEMENTE ISLAND
 M001                    SCIP      Divot on north-facing antenna tripod leg

49916  LAKE SKINNER
 M001                    BILL      Peak of center support screw of lower part of
                                   the antenna adaptor
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49917  WIDE CANYON
 M001                    WIDE      Peak of center support screw of lower part of
                                   the antenna adaptor

49918  IRVINE
 S001                    3SNA      3S Navigation R100/40T / TSA-100 / ARP

49919  AVOCADO HEIGHTS
 M001                    VYAS      Raised nipple on the lower part of the antenna
                                   adaptor

49920  CARSON
 M001                    CSDH      Raised nipple on the lower part of the antenna
                                   adaptor
 M002                    CRHS      Raised nipple on the lower part of the antenna
                                   adaptor

49921  COVINA
 M001                    CVHS      Raised nipple on the lower part of the antenna
                                   adaptor
 M002                    WCHS      Raised nipple on the lower part of the antenna
                                   adaptor

49922  DOWNEY
 M001                    DYHS      Raised nipple on the lower part of the antenna
                                   adaptor

49923  LA PUENTE
 M001                    LPHS      Raised nipple on the lower part of the antenna
                                   adaptor

49924  PARAMOUNT
 M001                    PMHS      Raised nipple on the lower part of the antenna
                                   adaptor

49925  PICO RIVERA
 M001                    BKMS      Raised nipple on the lower part of the antenna
                                   adaptor

49926  LEBEC
 M001                    FZHS      Raised nipple on the lower part of the antenna
                                   adaptor
 M002                    LJRN      Frazier Park/ Top of center support screw on
                                   SCIGN  D3 antenna adaptor

49927  BAR HARBOR
 S001                    BARH      TRIMBLE 4000SSI  3748A21042/TRIMBLE CHOKERING
                                   0220088091/ARP

49928  EASTPORT
 S001                    EPRT      TRIMBLE 4000SSI  3748A20591/TRIMBLE CHOKERING
                                   02200108548/ARP

49929  COSTA MESA
 M001                    FVPK      Raised nipple on the lower part of the antenna
                                   adaptor

49930  SOMIS
 M001                    MUSD      Raised nipple on the lower part of the antenna
                                   adaptor

49931  SAN CLEMENTE
 M001                    SCMS      Raised nipple on the lower part of the antenna
                                   adaptor

49932  DIAMOND BAR
 M001                    SPMS      Raised nipple on the lower part of the antenna
                                   adaptor

49933  ATHENS/LOS ANGELES
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M001		LASC	Raised nipple on the lower part of the antenna adaptor
49934	PALMER/ALASKA		
M001		ATWC	0.7 m concrete pad/Reference point on SCIGN antenna adaptor
49935	COLLEGE/ALASKA		
M001		CLGO	Concrete pillar/top of brass rod
49936	GARNER/ALASKA		
M001		GRNR	Bedrock/concrete pillar/bottom of threads of an invar rod
49937	BIG BEAR		
M001		BBRY	Raised nipple on the lower part of the antenna adaptor
49938	PALOMAR MOUNTAIN		
M001		PMOB	Raised nipple on the lower part of the antenna adaptor
49939	LAKE ARROWHEAD		
M001		MSOB	Raised nipple on the lower part of the antenna adaptor
49940	BARSTOW		
M001		BSRY	Raised nipple on the lower part of the antenna adaptor
49941	RIALTO		
M001		RTHS	Raised nipple on the lower part of the antenna adaptor
49942	SANTA BARBARA		
M001		UCSB	Raised nipple on the lower part of the antenna adaptor
49943	WESTMORLAND		
M001		CRRS	Raised nipple on the lower part of the antenna adaptor
49944	IDYLLWILD		
M001		DSSC	Raised nipple on the lower part of the antenna adaptor
49945	RIVERSIDE		
M001		MLFP	Raised nipple on the lower part of the antenna adaptor
49946	PLACENTIA		
M001		CCCS	Raised nipple on the lower part of the antenna adaptor
49947	COMPTON		
M001		CCCO	Raised nipple on the lower part of the antenna adaptor
49948	YUCCA VALLEY		
M001		CTMS	Raised nipple on the lower part of the antenna adaptor
49949	CALABASAS		
M001		CBHS	Raised nipple on the lower part of the antenna adaptor
49950	LANDERS		
M001		LDES	Raised nipple on the lower part of the antenna adaptor

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49951  MOORPARK
 M001                    MPWD      Raised nipple on the lower part of the antenna
                                   adaptor

49952  APPLE VALLEY
 M001                    AVRY      Raised nipple on the lower part of the antenna
                                   adaptor

49953  WEST CAJON VALLEY
 M001                    CJMS      Raised nipple on the lower part of the antenna
                                   adaptor

49954  PERRIS
 M001                    PPBF      Raised nipple on the lower part of the antenna
                                   adaptor

49955  BEAUMONT
 M001                    BMRY      Raised nipple on the lower part of the antenna
                                   adaptor

49956  SAN PEDRO
 M001                    VTIS      Raised nipple on the lower part of the antenna
                                   adaptor

49957  GRANADA HILLS
 M001                    VNCX      Raised nipple on the lower part of the antenna
                                   adaptor

49958  VICTORVILLE
 M001                    SCIA      Raised nipple on the lower part of the antenna
                                   adaptor

49959  TWENTYNINE PALMS
 M001                    OAES      Raised nipple on the lower part of the antenna
                                   adaptor

49960  HEMET
 M001                    ESRE      Raised nipple on the lower part of the antenna
                                   adaptor
 M002                    ESRW      Raised nipple on the lower part of the antenna
                                   adaptor

49961  RANCHO CUCAMONGA
 M001                    EWPP      Raised nipple on the lower part of the antenna
                                   adaptor

49962  RANCHITA
 M001                    MVFD      Raised nipple on the lower part of the antenna
                                   adaptor

49963  TORRANCE
 M001                    ECCO      Raised nipple on the lower part of the antenna
                                   adaptor

49964  LA HABRA
 M001                    SNHS      Raised nipple on the lower part of the antenna
                                   adaptor

49965  BELL GARDENS
 M001                    BGIS      Raised nipple on the lower part of the antenna
                                   adaptor

49966  HUNTINGTON PARK
 M001                    HPHS      Raised nipple on the lower part of the antenna
                                   adaptor

49967  BEVERLY HILLS
 M001                    LFRS      Raised nipple on the lower part of the antenna
                                   adaptor
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49968  INGLEWOOD
 M001                    NOPK      Raised nipple on the lower part of the antenna
                                   adaptor

49969  ANN ARBOR
 S001                    UOFM      Novatel GPS Antenna/ARP

49970  HONOLULU
 S001                    HNLC      Ashtech Dorne-Margolin chokering antenna/ARP

49971  ANZA
 M001                    AZRY      Raised nipple on the lower part of the antenna
                                   adaptor

49972  SALTON CITY
 M001                    SLMS      Raised nipple on the lower part of the antenna
                                   adaptor

49973  WOODLAND HILLS
 M001                    LAPC      Raised nipple on the lower part of the antenna
                                   adaptor

49974  THOUSAND OAKS
 M001                    TOST      Raised nipple on the lower part of the antenna
                                   adaptor

49975  PALMDALE
 M001                    LLAS      Raised nipple on the lower part of the antenna
                                   adaptor

49976  SANTA ANA
 M001                    SACY      Raised nipple on the lower part of the antenna
                                   adaptor

49977  SANTA PAULA II
 M001                    OVLS      Raised nipple on the lower part of the antenna
                                   adaptor

49978  PALM SPRINGS AIRPORT
 M001                    PSAP      Raised nipple on the lower part of the antenna
                                   adaptor

49979  HILO AIRPORT
 S001                    HILO      Ashtech Dorne-Margolin chokering antenna S/N:
                                   11943

49980  LIHUE, KAUAI
 S001                    LHUE      Ashtech Dorne-Margolin chokering antenna S/N:
                                   CR16132

49981  HIGH VISTA
 M001                    HIVI      Raised nipple on the lower part of the antenna
                                   adaptor

49982  QUARTZ HILL
 M001                    QHTP      Raised nipple on the lower part of the antenna
                                   adaptor

49983  ROSAMOND
 M001                    RSTP      Raised nipple on the lower part of the antenna
                                   adaptor

49984  OCOTILLO WELLS
 M001                    USGC      Raised nipple on the lower part of the antenna
                                   adaptor

49985  HOLTVILLE
 M001                    IID2      Raised nipple on the lower part of the antenna
                                   adaptor
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49986  KERNVILLE
 M001                    ISLK      Raised nipple on the lower part of the antenna
                                   adaptor

49987  VINCENT
 M001                    VNPS      Raised nipple on the lower part of the antenna
                                   adaptor

49988  PALM DESERT
 M001                    COTD      Raised nipple on the lower part of the antenna
                                   adaptor

49989  LUCERNE VALLEY
 M001                    WOMT      Raised nipple on the lower part of the antenna
                                   adaptor

49990  CHIRIACO SUMMIT
 M001                    HNPS      Raised nipple on the lower part of the antenna
                                   adaptor

49991  RICE
 M001                    IMPS      Raised nipple on the lower part of the antenna
                                   adaptor

49992  LOCKWOOD
 M001                    LVMS      Raised nipple on the lower part of the antenna
                                   adaptor

49993  SAN BERNARDINO
 M001                    GHRP      Raised nipple on the lower part of the antenna
                                   adaptor

49994  CABAZON
 M001                    SGPS      Raised nipple on the lower part of the antenna
                                   adaptor
 M002                    WWMT      WhitewaterMountain / Drilled hole in top of
                                   center support bolt of SCIGN D3 antenna
                                   adapotor

49995  KENAI/ALASKA
 S001                    KEN1      GPS ARP /  ASHTECH Z-XII3 (05275), ASH700829.3
                                   (11034)
 S002                    KEN2      GPS ARP / ASHTECH Z-XII3 (04946), ASH700829.3
                                   (11264)

49996  GLENNALLEN/ALASKA
 S001                    GNAA      GPS ARP /  TRIMBLE 4000SSI (3626A16314),
                                   TRM22020.00+GP (0220049324)

49997  CENTRAL/ALASKA
 S001                    CENA      GPS ARP /  TRIMBLE 4000SSI (3638A15780),
                                   TRM22020.00+GP (0220050480)

49998  ANNETTE ISLAND/ALASKA
 S001                    AIS1      GPS ARP /  ASHTECH Z-XII3 (04952), ASH700829.3
                                   (11276)
 S002                    AIS2      GPS ARP / ASHTECH Z-XII3 (05064), ASH700829.3
                                   (11274)

49999  TALKEETNA/ALASKA
 S001                    TLKA      GPS ARP /  TRIMBLE 4000SSI (3626A16312),
                                   TRM22020.00+GP (0220054209)

50102  CARNARVON
 M001                    CARN      Standard survey mark in concrete / QUOBBA 115

50103  CANBERRA
 M106              7843            Orroral/center ground mark 7843
 M107                    ORRO      Orroral/Mark AU005/PLATE ON COLLIMATION TOWER
 M108                    TIDB      Tidbinbilla/SPC40 (AU017) (JPL 4002 - S 1992)
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 M109                                  Tidbinbilla/NM/C/194
 M110                                  Tidbinbilla/NM/C/196
 M111                                  DORIS mark
 S001             1543                 DSS43 Antenna
 S003             7943                 SAO-3 fixed laser
 S005             1542                 DSS42 Antenna
 S006             1544                 DSS44 Antenna
 S007             7843                 NLRS (coude mirror 7)
 S010             1545                 DSS45 Antenna
 S012                                  Tidbinbilla/ROGUE SNR-8/DM R/L1
                                       20-MAR-90-03-FEB-92
 S013                                  Orroral/TRIMBLE SST /L1
 S014                                  Tidbinbilla/ROGUE SNR-8/DM R/L1
                                       03-FEB-92-10-MAY-92
 S015                                  Tidbinbilla/ROGUE SNR-8/DM R/L1 11-MAY-92-
 S016                                  Orroral/ASHTECH/L1 15-MAY-92-
 S017                                  Tidbinbilla/ROGUE SNR-8/DM R/Bottom of the
                                       choke ring 11-MAY
 S018                                  Orroral/ASHTECH/Bottom antenna 15-MAY-92-
 S019                                  Tidbinbilla/ROGUE SNR-8/DM R/Top of the choke
                                       ring 20-MAR-90
 S020                  DS40            Tidbinbilla/ROGUE SNR-8/DM R/Bottom of the
                                       choke ring 20-MAR
 S021                  DS41            Tidbinbilla/ROGUE SNR-8/DM R/Bottom of the
                                       choke ring 03-FEB
 S201                       ORRA       DORIS 1 antenna ref. pt. (Alcatel type)
 S202                       ORRB       DORIS 2 antenna ref. pt.

50106  SMITHFIELD
 S005                                  GPS DMA TI4100 / L1

50107  YARRAGADEE
 M001             7090                 MOBLAS 7090 brass disk
 M004                  YAR1            Mark RM-4
 M005                                  DORIS ground mark / Centre punch mark in a
                                       brass pin set in concrete
 M006                  YARR            Plate on secondary GPS mark/centre of base of
                                       5/8" spigot of GPS antenna / AU053
 S005                                  ROGUE SNR-8/DM R/L1 15-DEC-90 -
 S006                       YARA       DORIS antenna ref. pt (Alcatel type)
 S009             7847                 PSLR
 S010                       YARB       DORIS antenna ref. pt. (Starec type)

50108  PARKES
 S001             7202                 64-m Radiotelescope Ref. point

50109  SALISBURY
 S001                  AUST            NIMA GPS antenna ASH700936B_M 1121/ ARP

50116  HOBART
 M001                  UF05            West pillar
 M002                  UF03            North pillar
 M003                  HOB1            U-Chanel plate
 M004                  HOB2            Pillar/stainless steel plate (AU16)
 M005                  HOBT            Brass plaque in concrete wharf / SPM 9927
 S002             7242                 VLBI antenna ref. pt.
 S003                                  MINIMAC 2816AT/L1 21-JAN-90 -
 S004                                  MINIMAC 2816AT/Bottom of the antenna

50119  MOUNT STROMLO
 M001                  STR0            Fundamental pillar/plate/centre of base of
                                       5/8" spigot of GPS antenna/AU045
 M002                  STR1            North pillard/plate/centre of base of 5/8"
                                       spigot of GPS antenna /AU046
 M003                                  DORIS mark: 3-metre cylindrical steel pole /
                                       top centre of a 5/8" steel bolt
 S001             7849                 Stromlo SLR / intersection of the elevation
                                       and azimuth axes of the telescope
 S002                       MSOB       DORIS antenna ref. pt. (Starec type)
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50124  SYDNEY
 M001                   LINR      LINDFIELD/National Measurement  Laboratory
                                  building/steel mounting plate (NML2)
 M002                   COVE      Brass plaque in rock / SSM 118849

50126  TOWNSVILLE
 M001                             Pillar on the office building roof
 M002                   TWVL      Steel bolt in concrete / 114711
 S002                             TRIMBLE 4000SST/L1 25-JUL-90 -
 S004                   TOWN      TRIMBLE 4000SST/Bottom of the antenna

50127  COCO ISLANDS
 M001                   COCO      MOMUMENT AU018

50133  PERTH
 M001                   PERT      GPS Mark
 M002                   PERR      Concrete block/Brass Plaque (gnan 73)

50134  DARWIN I
 M001                   DARW      GPS Mark

50135  MACQUARIE ISLAND
 M001                   MAC1      pillar/atainless steel plate

50136  JABIRU
 M001                   JAB1      ERISS/MONUMENT AU043

50137  ALICE SPRINGS/TELEGRAPH HILL
 M001                   ALIC      MONUMENT AU012

50138  CEDUNA
 M001                   CEDU      UTAS / MONUMENT AU019

50139  KARRATHA
 M001                   KARR      HARDING DAM TELSTRA TOWER/MONUMENT AU013

50140  TOWNSVILLE/CAPE FERGUSON
 M001                   TOW2      AIMS/MONUMENT AU028
 M002                   AIM4      Bolt in rock / PSM12150
 M003                   FERG      Deep-driven stainless steel rod / SSM 83469

50141  HILLARYS/PERTH
 M001                   HILS      Deep-driven stainless steel rod / Hammersly
                                  164
 S001                   HIL1      Ashtech Geodetic III (ground plane) antenna
                                  (Model 7007/ARP (Hamersly 130)

50142  BELLEVUE/PERTH
 M001                   BELR      Bellevue 157/DOLA building/Stainless steel
                                  pole surrounded by concrete

50143  BRISBANE
 M001                   SUNM      STEEL PILLAR ON ROOF OF LANDCENTRE BUILDING
                                  (SUNMAP PILLAR 703022)
 M002                   BRIS      Brass plaque in concrete / PM 53010

50144  BURNIE
 M001                   BUR1      Centre of base of 5/8" spigot on GPS antenna
                                  mounting plate/ST1139
 M002                   SPM9      Brass plaque in rock / SPM 9089

50145  PORT KEMBLA NSW
 M001                   FLAG      Brass rod in concrete / TS 7374
 M002                   PKEM      Brass Plaque inscribed "RAN HYDROGRAPHIC
                                  SERVICE H1/98" /  TS 7409
 M003                   KEMB      Metal rod in rock / PM 70948

50146  COFFS HARBOUR NSW
 M001                   COFF      Stainless Steel pin in concrete / PM 109723
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50147  BATHURST
 M001                    MYL0      Pillar Plate on Concrete pillar / TS 5517
 M002                    MYL1      Pillar Plate on Concrete pillar / 5517-1

50148  ALBANY
 M001                    ALBA      Standard survey mark in concrete / ALB 133

50149  BUNBURY
 M001                    BUNB      Brass plaque in Concrete / Bunbury North 45

50150  FREMANTLE
 M001                    FREM      Deck Spike in bitumen / NMVF6AT

50151  GERALDTON
 M001                    GERA      Brass plaque in concrete / GN284

50152  PORT HEDLAND
 M001                    PHED      Brass plaque in concrete / KH226

50153  EUCLA
 M001                    EUCL      Aluminium plaque on concrete observing pillar
                                   / 4634/1045

50154  WHYNDAM
 M001                    WYND      Brass plaque in concrete / EC71

50155  THEVENARD
 M001                    MURP      Aluminium plaque on concrete observing pillar
                                   / 5633/1680
 M002                    THVP      Concrete observing pillar / 5633/1679

50156  PORT LINCOLN
 M001                    PLIN      Deck Spike in wharf decking / 6028/3764

50157  LORN, VICTORIA
 M001                    LORN      Aluminium rivet in concrete / Lorne 69
 M002                    LAAC      Deep driven, copper-coated steel rod / PM 86
 M003                    BENW      Deep driven, copper-coated steel rod / PM 76

50158  PORTLAND, VICTORIA
 M001                    HENT      Aluminium rivet in concrete / PM 393
 M002                    PORT      Deep-driven stainless steel rod / PM80

50159  POINT LONSDALE, VICTORIA
 M001                    PLON      Deep driven, copper-coated steel rod

50160  STONY POINT,VICTORIA
 M001                    STPT      Aluminium rivet in concrete / Bittern 293

50161  PORT FAIRY, VICTORIA
 M001                    PFAI      Brass plaque in concrete / 1571-10

50162  SPRING BAY - HOBART
 M001                    SBAY      Brass disc in concrete / SPM 9404
 M002                    SBCP      Concrete observing pillar / SPM9529 RM4
 M003                    TRIP      Concrete observing pillar / SPM9261 RM4

50163  BARREN TIER
 M001                    TIER      Brass plaque in concrete / ST336 RM5

50164  PORT ARTHUR
 M001                    PTAR      Brass nut on top of galvanised pole / ST 1140

50165  KARUMBA
 M001                    KARU      Brass plaque in concrete / 10178

50166  BAMAGA
 M001                    BAMA      Deep driven galvanised iron star picket with a
                                   concrete collar  / 128716
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50167 BUNDABERG
M001 BUND Brass plaque in concrete / 3853

50168 CAIRNS
M001 CAIR Brass plaque in concrete / 128688

50169 COOKTOWN
M001 COOK Brass plaque in concrete / 92489

50170 MACKAY
M001 MACK Brass plaque in concrete / 9131

50171 WEIPA
M001 WEIP Steel Pillar / 9047

50172 ROCKHAMPTON
M001 MULA Brass plaque in concrete / 95189
M002 YEPP Deep driven stainless steel rod / 82477

50173 GROOTE EYLANDT
M001 GRTG Stainless steel mast with GPS antenna mounting plate / NTS904
M002 GROO Stainless steel bolt in rock / NTS653
M003 ALYA Deep driven steel rod in concrete / NTS652

50174 CENTER ISLAND
M001 CENI Triangle cut in rock with imscription "BM1 AHS 1966"

50175 DARWIN II
M001 PILL Concrete observing pillar / NTS302
M002 WINN Deep-driven stainless steel rod / BM4563
M003 RAAF Brass plaque in concrete / NTS664

50176 BROOME
M001 BRME Deep driven stainless steel rod / Broome 184
M002 BROO Deep driven stainless steel rod / Broome 173

50177 ESPERANCE
M001 ESPE Stainless steel pin in granite / Esperance 171

50178 PORT STANVAC
M001 RFNP Concrete observing pillar / 6527/8432
M002 STNP Concrete observing pillar / 6627/22981

50179 PORT MACDONNELL
M001 PMAC Aluminium plaque on concrete observing pillar 7021/1562

50180 VICTOR HARBOUR
M001 VICH Aluminium plaque on concrete observing pillar 6626/3810

50181 NEW NORCIA
M001 NNOR Mark at the center of a horizontal metal plate embedded on a concrete monument

50204 MOUNT JOHN
M001 MTJO Lake Tekapo / Centre of stainless plate with 5/8 inch threaded stud in top of concrete pillar; height reference is the stainless plate

50207 CHATHAM ISLAND
M001 CHAT PILLAR/15CM DIAMETER PLATE
M002 Concrete block / DORIS mark
M003 Concrete block / Stainless steel pin (mark 5503)
M004 Concrete wharf / Brass mark near the tide gauge

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 S001                        CHAB DORIS antenna ref. pt. (Starec type)

50208  WELLINGTON
 M001                              Pillar on the DOSLI building roof
 M002                    WEL2      AIRPORT/MONUMENT AUS360
 M003                    WGTN      Geodetic Ground Mark
 S001                              TRIMBLE 4000SST/L1 15-FEB-90 -
 S002                    WELL      TRIMBLE 4000SST/Bottom of the antenna
 S003                    NEWZ      NIMA GPS antenna ASH700936B_M CR16562 /ARP
 S004                    WGTT      Wellington tide gauge / Leica CRS1000 / DM /
                                   ARP

50209  AUCKLAND
 M001                    AUCK      PILLAR/15CM DIAMETER PLATE

50210  NIUE ISLAND
 S001                    NIUC      Ashtech Dorne-Margolin chokering antenna S/N:
                                   12477/ARP

50211  HOKITIKA
 M001                    HOKI      Airport/Permanent survey pillar 2m high (1421)

50212  DUNEDIN
 M001                    OUSD      Otago University Surveying Department/Pillar
 M002                    OUS2      200mm diameter steel pillar / Roof
 S001                    DUNT      Port Chalmers Tide Gauge / Leica CRS1000 /DM
                                   Antenna /ARP

50213  RAROTONGA
 M001                    RART      Arorang, Ministry of Works / Steel Rod, approx
                                   1m long
 M002                    RABM      Rarotonga International Airport / Stainless
                                   Steel Pin (BM 29)

50214  CHRISTCHURCH
 M001                    MQZG      McQueens Valley / Centre of stainless plate
                                   with 5/8 inch threaded stud in top of concrete
                                   pillar; height reference is the stainless
                                   plate
 S001                    LYTT      Lyttelton Tide Gauge / Leica CRS1000 / DM
                                   Antenna / ARP

50215  PAEKAKARIKI
 M001                    PAEK      Centre of stainless plate with 5/8 inch
                                   threaded stud in top of concrete pillar;
                                   height reference is the stainless plate

50216  Auckland tide gauge
 S001                    TAKL      Leica CRS1000 / DM / ARP

50217  Taupo Airport
 M001                    TAUP      Centre of stainless plate with 5/8 inch
                                   threaded stud in top of concrete pillar;
                                   height reference is the stainless plate

50218  WHANGAREI
 M001                    WHNG      Centre of stainless plate with 5/8 inch
                                   threaded stud in top of concrete pillar;
                                   height reference is the stainless plate

50219  TAURANGA
 M001                    TRNG      Centre of stainless plate with 5/8 inch
                                   threaded stud in top of concrete pillar;
                                   height reference is the stainless plate

50220  MASTERTON
 M001                    MAST      Centre of stainless plate with 5/8 inch
                                   threaded stud in top of concrete pillar;
                                   height reference is the stainless plate
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50221  HASTINGS
 M001                   HAST      Centre of stainless plate with 5/8 inch
                                  threaded stud in top of concrete pillar;
                                  height reference is the stainless plate

50222  HAMILTON
 M001                   HAMT      Centre of stainless plate with 5/8 inch
                                  threaded stud in top of concrete pillar;
                                  height reference is the stainless plate

50223  GISBORNE
 M001                   GISB      Centre of stainless plate with 5/8 inch
                                  threaded stud in top of concrete pillar;
                                  height reference is the stainless plate

50224  DANNEVIRKE
 M001                   DNVK      Centre of stainless plate with 5/8 inch
                                  threaded stud in top of concrete pillar;
                                  height reference is the stainless plate

50501  GUAM
 M002                   GUAM      GUAM OBS./ROOF/GUMO 1992-LAMONT-DOHERTY EARTH
                                  OBSERVATORY
 S001                        GUAB DORIS antenna ref. pt. (Starec type)

50503  AMERICAN SAMOA
 M001              7096           Mark SLR
 S006                   ASPA      TRIMBLE 4700  /  TRM33429.20+GP / ARP

50505  KWAJALEIN ATOLL I
 M001              7092           Mark SLR
 S003              4968           Tardex 26m antenna ref. pt.
 S004                             GPS OCS monitor station

50506  KWAJALEIN ATOLL II
 M001                   KWJ1      GPS MARKER/ROOF MOUNT

50512  CAPITAL HILL/SAIPAN
 S001                   CNMI      TRIMBLE 4700  /  TRM33429.20+GP / ARP

50601  FALEOLO AIRPORT/SAMOA
 S001                   FALE      Ashtech Dorne-Margolin chokering antenna S/N:
                                  12627/ARP

50602  APIA-UPOLU
 M001                   AOBS      Apia Observatory / Brass Plaque set in
                                  concrete (RASC 11236)

50801  SUVA
 M001                   FIJI      UNIVERSITY OF SOUTH PACIFIC/MONUMENT AU361
 S001                   SUVA      Ashtech Dorne-Margolin chokering antenna S/N:
                                  12478/ARP

50803  VALEBASOGA-LAMBASA
 M001                   VANU      10mm stainless steel pin in solid rock

50804  LAUTOKA
 M001                   VITI      Saweni Beach flats / 10mm stainless steel pin
                                  in solid rock

50805  ROTUMA ISLAND
 M001                   ROTU      West end of Rotuma Island / 9cm Bronze Plaque
                                  set in concrete /SOLMEA

50901  VAVA U AIRPORT
 S001                   VAVC      Ashtech Dorne-Margolin chokering antenna
                                  S/N:12468/ARP

51001  PORT MORESBY
 M002                   MORE      Permanent Survey Mark PSM15832
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 S001                        MORA DORIS antenna ref. pt (Alcatel type)

51002  LAE
 M001                  LAE1      Roof / Plate on the top of a metallic pole

51003  LORENGAU
 M001                  MAS2      Nabu Wharf / 6mm copper rod in concrete /
                                 TG-Manus

51004  BUKA AIRSTRIP
 M001                  BUKA      Brass Plaque PSM4871

51005  VANIMO TOWN
 M001                  VANI      Nail set in concrete PSM 63/1

51201  NUSA TUPE ISLAND
 S001                  NUSA      Ashtech Dorne-Margolin chokering antenna S/N:
                                 CR14322/ARP

51401  ESPIEITO SANTO
 S001                  SANC      Ashtech Dorne-Margolin chokering antenna S/N:
                                 12466/ARP

51402  PORT VILA
 S001                  VILA      Ashtech Dorne-Margolin chokering antenna/ARP

66001  MC MURDO
 M001                  MCMU      GPS mark (MCMGPS) (11-FEB-92 - 31-OCT-93)
 M003                  MCM4      GPS MARK new location
 M004                  CRAR      STEEL PLATE ON MAST/GPS+GLONASS MARKER
 S001                            ROGUE SNR-8/DM R/L1 11-FEB-92/31-OCT-93
 S006                  MCM2      ROGUE SNR-8/DM R/ARP 31-OCT-93 - ?

66004  MAWSON STATION
 M001                  MAW1      MONUMENT AUS64

66005  PALMER STATION
 M001                  PAL1      GAP GPS MARKER
 M002                  PALM      PALMER PERMANENT GPS ANTENNA

66006  SYOWA
 M001                            DORIS mark
 M002                            SCAR mark
 M003                            DORIS 2 mark in concrete pillar
 S001                       SYOB DORIS antenna ref. pt. (Starec type)
 S002                  SYOG      TurboRogue/DM T/ARP 15-MAR-1995
 S003                       SYPB DORIS 2 antenna ref. pt. (Starec type)
 S004            7342            Fully steerable 11m Cassegrain antenna with
                                 AZ/EL mount / IAR

66007  ROTHERA
 M001                  ROT1      GAP 1995 mark
 S001                       ROTA DORIS 1 antenna ref. pt. (Alcatel type)

66008  O'HIGGINS
 M001                  OHIG      METAL PLATE/PILLAR K5
 M002                            BOLT/PILLAR K5
 M003                  OHG1      GAP GPS MARKER on PILLAR K1
 M004                  OHIZ      Marker on Steel Plate
 M005                  OHI2      Marker on Pillar K 6
 S001            7245            9-m VLBI antenna

66009  SANAE
 M001                  VESL      steel pipe, drilled into the rock, 5/8" screw

66010  DAVIS
 M001                  DAV1      pillar/atainless steel plate (AUS99)

66011  CASEY
 M001                  CAS1      pillar/atainless steel plate (AUS100)
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66012  BASE FREI / GREAT WALL
 M001                   GRW1      GREAT WALL/GPS MONUMENT PILLAR
 S001                   FREI      Ashtech Dorne-Margolin chokering antenna
                                  serial # CR13219 / BPA

66013  DOME C 1
 M001                             Top of a metallic rod in the ice
 S001                        DOMB DORIS antenna ref. pt. (Starec type)
 S002                        DO2B DORIS antenna ref. pt. (Starec type)

66014  DOME C 2
 M001                             Top of a metallic rod in the ice
 S001                        DO1B DORIS antenna ref. pt. (Starec type)

66015  FERRAZ
 M001                   FERR      Steel Pillar/91900

66016  ARCTOWSKI
 M001                   ARCT      GPS MARKER, STEEL NAIL IN CONCRETE PILLAR

66017  BASE ARTIGAS
 M001                   ART1      GPS MARKER

66018  BELGRANO
 M001                   BEL1      Referenzpunkt 222/ Estacion 222
 M002                   BELG      GAP MARKER

66019  DALLMANN
 M001                   DAL1      GAP GPS MARKER
 M002                   DALL      PILLAR PERMANENT GPS ANTENNA

66021  ELEPHANT ISLAND
 M001                   ELE1      GAP MARKER

66022  ESPERANZA
 M001                   ESP1      GAP MARKER

66023  FORSTER / Schirmacher Oase
 M001                   FOR1      FOR1 GPS MARKER NEAR THE RUSSIAN BASE
                                  NOVOLASEREVSKAJA
 M002                   FOR2      FOR2 GPS MARKER

66024  FOSSIL BLUFF
 M001                   FOS1      GAP GPS MARKER

66025  HAAG NUNATAK
 M001                   HAAG      GAP GPS MARKER

66026  KLIMENT OHRIDSKI
 M001                   KOH1      GAP GPS MARKER

66027  KOTTAS BERGE
 M001                   KOTA      GAP MARKER

66028  MAITRI
 M001                   MAIT      GPS MONUMENT, PILLAR

66029  MARAMBIO
 M001                   MAR1      GAP MARKER

66030  ZHONG SHANG
 M001                   ZHON      GPS OBSERVING SITE

66031  NOTTER POINT/ ANTARCTIC PENINSULA
 M001                   NOT1      GAP GPS MARKER

66032  PETER I ISLAND
 M001                   PET1      GAP GPS MARKER
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66033  ARTURO PRAT
 M001                    PRA1      GAP GPS MARKER

66034  SAN MARTIN
 M001                    SMR1      GAP GPS MARKER

66035  PUNTA SPRING - ANTARCTIC PENINSULA
 M001                    SPR1      GAP GPS MARKER

66036  TERRA NOVA BAY
 M001                    TNB1      GPS TNB1

66037  TROLL
 M001                    TROL      NP GPS MARKER

66038  VERNADSKI
 M001                    VER1      GAP GPS MARKER

66039  WASA
 M001                    WASA      MARKER 9201

66040  Amundsen-Scott Station, South Pole
 M001                    AMUN      Stainless Steel Rod, 5/8th-inch, top and
                                   center, projecting from wood block attached to
                                   top of roof of building called the Skylab

66041  ALLAN HILLS NUNATAK
 M001                    ALN0      DIMPLE ON GEODETIC GROUND MARKER

66042  ANT HILL
 M001                    ANT0      DIMPLE ON GEODETIC GROUND MARKER

66043  BEAUFORT ISLAND
 M001                    BFT0      DIMPLE ON GEODETIC GROUND MARKER

66044  CAPE BIRD
 M001                    BIR0      DIMPLE ON GEODETIC GROUND MARKER

66045  BRATINA ISLAND
 M001                    BRA0      DIMPLE ON GEODETIC GROUND MARKER

66046  BRIMSTONE PEAK
 M001                    BRM0      DIMPLE ON GEODETIC GROUND MARKER

66047  BETTLE PEAK
 M001                    BTL0      DIMPLE ON GEODETIC GROUND MARKER

66048  MOUNT CREAN
 M001                    CRN0      DIMPLE ON GEODETIC GROUND MARKER

66049  CAPE CROZIER
 M001                    CRZ0      DIMPLE ON GEODETIC GROUND MARKER

66050  MOUNT DEWITT
 M001                    DWT0      DIMPLE ON GEODETIC GROUND MARKER

66051  ESSER HILLS
 M001                    ESH0      DIMPLE ON GEODETIC GROUND MARKER

66052  FRANKLIN ISLAND
 M001                    FRK0      DIMPLE ON GEODETIC GROUND MARKER

66053  MASON SPUR
 M001                    MAS0      DIMPLE ON GEODETIC GROUND MARKER

66054  MINNA BLUFF
 M001                    MBF0      DIMPLE ON GEODETIC GROUND MARKER

66055  CAPE ROSS
 M001                    ROS0      DIMPLE ON GEODETIC GROUND MARKER
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66056  CAPE ROYDS
 M001                   ROY0      DIMPLE ON GEODETIC GROUND MARKER

66057  CAPE REYNOLDS
 M001                   RYN0      DIMPLE ON GEODETIC GROUND MARKER

66058  MARBLE POINT
 M001                   WAL0      DIMPLE ON GEODETIC GROUND MARKER

66059  WARREN RANGE
 M001                   WRN0      DIMPLE ON GEODETIC GROUND MARKER

66060  WHITE ISLAND
 M001                   WTE0      DIMPLE ON GEODETIC GROUND MARKER

66061  MOUNT FLEMING
 M001                   FLM2      DIMPLE ON GEODETIC GROUND MARKER

66062  FISHTAIL POINT
 M001                   FTP1      DIMPLE ON GEODETIC GROUND MARKER

66063  CAPE ROBERTS
 M001                   ROB1      DIMPLE ON GEODETIC GROUND MARKER

80601  PORT STANLEY/LOOKOUT HILL
 S001                   LKTH      Ashtech Dorne-Margolin chokering antenna
                                  serial # CR16377 / BPA

81701  LA PALMA
 M001                   LPAL      Reinforced concrete pillar on roof of the
                                  Roque de los Muchachos Observatory (108330)

82001  ISABELLA
 S003                   PUR3      GPS ARP / ASHTECH Z-XII3, ASH700829.3 SNOW

91201  KERGUELEN
 M002                   KERG      IGNF BRASS MARK RBGM
 M003                             EX-PRARE PILLAR / TOP OF STAINLESS STEEL PLATE
 M005                             Upper face of the base plate of the DORIS
                                  tower / axis of the tube
 M006                             Ex-PRARE pillar / top of the threaded bolt
                                  (DORIS 2 mark)
 S002                        KERA DORIS antenna ref. pt (Alcatel type)
 S003                        KERB DORIS antenna ref. pt. (Starec type)
 S004                        KESB DORIS antenna ref. pt. (Starec type)

91401  AMSTERDAM
 M001                             DORIS 1 mark
 M002                             DORIS concrete pillar / lower triangular plate
                                  / stainless steel mark
 M003                             NIVMER pillar
 S001                        AMSA DORIS 1 antenna ref. pt. (Alcatel type)
 S002                        AMSB DORIS 2 antenna ref. pt. (Starec type)
 S003                        AMTB DORIS antenna ref. pt. (Starec type)

91501  ILE DES PETRELS
 M001                   DUM1      Plate/GPS pillar (SCAR 95)
 S001                        ADEA DORIS antenna ref. pt (Alcatel type)

92201  PAPEETE (TAHITI)
 M003                   PAMA      IGN brass mark
 M006                   TAHI      12 MM DOMED MARK UGP1
 M007             7124            MOBLAS-8 7124-1997 Standard NASA disk
 M008                             DORIS 2 mark
 M009                   THTI      IGS mark THTI on a terrace roof
 M010                             Brass disks cemented in concrete/GPS Station
                                  85414
 S003                             ASHTECH/L1 22-JAN-91 - 13-FEB-91-
 S004                             ROGUE SNR-8/DM R/L1 01-JAN-92
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 S007                       PAPB DORIS antenna ref. pt. (Starec type)
 S008                       PAQB DORIS 2 antenna ref. pt. (Starec type)
 S009                       PAMB DORIS antenna ref. pt (Starec type) 19-08-1993
                                 - 28-09-1993

92202  HUAHINE ( MOTU HIUMOO )
 M001                            Tube Huahine no. 5
 M002             7121           MOBLAS-1 7121-1982 standard NASA disk
 M003             7123           TLRS-2 7123 CSR reference
 M004             7123           TLRS-2 7123 standard NASA disk
 M005                            Mark RM-1
 S008                            ASHTECH/L1 22-JAN-91 - 13-FEB-91
 S009                       HUAA DORIS antenna ref. pt (Alcatel type)

92301  RIKITEA (ILE MANGAREVA)
 S001                       MGRB DORIS antenna ref. pt (Starec type) 16-06-1995
                                 - 27-06-1995

92401  TUBUAI
 S001                       TUBB DORIS antenna ref. pt (Starec type) 07-10-1993
                                 - 27-10-1993

92402  RURUTU
 S001                       RURB DORIS antenna ref. pt (Starec type) 08-05-1995
                                 - 29-05-1995

92403  RAPA
 M001                            DORIS mark
 S001                       RAQB DORIS 2 antenna ref. pt. (Starec type)
 S002                       RAPB DORIS 1 antenna ref. pt. (Starec type)
                                 11-03-1995 - 30-03-1995

92502  HAO
 S001                       HAOB DORIS antenna ref. pt (Starec type) 15-02-1994
                                 - 09-03-1994

92504  ANAA
 S001                       ANAB DORIS antenna ref. pt (Starec type) 09-11-1993
                                 - 26-11-1993

92505  NAPUKA
 S001                       NAPB DORIS antenna ref. pt (Starec type) 26-01-1995
                                 - 06-02-1995

92506  NUKUTAVAKE
 S001                       NKTB DORIS antenna ref. pt (Starec type) 15-02-1995
                                 - 28-02-1995

92507  MORUROA
 S001                       MURB DORIS antenna ref. pt (Starec type) 19-01-1994
                                 - 14-02-1994

92508  APATAKI
 S001                       APAB DORIS antenna ref. pt (Starec type) 17-12-1993
                                 - 28-12-1993

92601  NUKU HIVA
 S001                       NUKB DORIS antenna ref. pt (Starec type) 04-12-1993
                                 - 04-12-1993

92701  NOUMEA
 M002                            DORIS mark
 M003                  NOUM      Center of stainless steel plate fixed to the
                                 top of 4" steel pillar
 M004                            Tide gauge auxiliary benchmark L-1
 S001                       NOUA DORIS antenna ref. pt (Alcatel type)

92722  WANAHAM/ILE LIFOU
 S001                       LIFB DORIS Ant. Ref. Pt.
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92727  KOUMAC
 S001                    KOUC      Ashtech Dorne-Margolin chokering antenna S/N:
                                   12463/ARP

92732  WE-LIFOU
 S001                    LPIL      Ashtech Dorne-Margolin chokering antenna/ARP

92802  TANNA
 S001                         TANB DORIS Ant. Ref. Pt.

92901  WALLIS
 M001                              DORIS mark
 S001                         WALA DORIS antenna ref. pt (Alcatel type)

92902  FUTUNA
 M001                              Metal pipe / DORIS supporting plate / mark
 S001                         FUTB DORIS antenna ref. pt. (Starec type)
 S002                    FTNA      Ashtech Dorne-Margolin chokering antenna/ARP

97101  LE MOULE
 M001                              RBGM / Borne
 S001                              ASHTECH/L1 22-JAN-91 - 13-FEB-91

97301  KOUROU
 M201                              Pillar Diane I (84)
 M210                    KOUR      Mark at the center of a horizontal metal plate
                                   embedded on a concrete monument
 M211                    KOU1      Mark at the center of a horizontal metal plate
                                   embedded on a concrete monument
 M401                              DORIS 2 mark
 S001                              ASHTECH/L1 22-JAN-91 - 13-FEB-91
 S004                         KRUB DORIS antenna ref. pt. (Starec type)
 S005                         KRUA DORIS 1 antenna ref. pt (Alcatel type)

97401  LA REUNION
 M002                              DORIS mark
 M003                    REUN      Pillar/Brass mark 12mm diameter
 M004                              DORIS mark set in the central tube of the
                                   metal base
 S001                         REUA DORIS antenna ref. pt (Alcatel type)
 S002                         REUB DORIS 2 antenna ref. pt. (Starec type)
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Table 5 Local Ties of ITRF2000 collocation sites.

DOMES # Name		DX/sigX m	DY/sigY m	DZ/sigZ m
10002 GRASSE				
From	To			
10002S001	10002S002	.542	36.489	-4.421
10002S001	10002M003	6.007	-33.777	-8.036
10002S001	10002M006	-0.632	-44.858	1.199
10003 TOULOUSE				
10003M003	10003S001	97.452	-173.328	-75.241
		.003	.003	.003
10003M003	10003M004	-103.8755	-214.4924	136.6852
		.003	.003	.003
10003S001	10003S003	646.213	314.389	-683.489
		.003	.003	.003
10004 BREST				
10004M004	10004M002	-2285.5897	-357.3528	2050.1591
10202 REYKJAVIK				
10202M001	10202S002	-1856.220	-1334.644	595.235
		.003	.003	.003
10202S002	10202S001	-0.034	0.040	-0.211
		.003	.003	.003
10302 TROMSOE				
10302M002	10302M003	36.289	-33.115	-9.215
10302M002	10302S010	11.225	-1.567	-0.514
10317 NY-ALESUND				
10317S002	10317S004	0.045	0.010	0.237
		.002	.002	.002
10317M001	10317S002	363.330	1536.449	-158.180
10317M003	10317S004	360.060	1530.851	-162.949
		.02	.02	.02
10402 ONSALA				
10402S002	10402M006	35.927	-51.366	-34.575
10402S002	10402M004	52.631	-40.464	-43.865
10503 METSAHOVI				
10503M002	10503S011	1918.178	1548.001	-1324.664
10503M002	10503S001	1942.700	1512.472	-1347.868
		0.004	0.004	0.004
10503M002	10503S013	-11.611	15.215	6.230
		.001	.001	.001
11001 GRAZ				
11001S002	11001M002	-2.558	8.516	-1.321
11101 SOFIA				
11101M002	11101M001	25.2836	10.3253	-39.0333
12205 BOROWIEC				
12205S001	12205M002	25.767	-72.908	-0.324
12302 RIGA				
12302M002	12302S002	-3.401	18.661	-6.963
12302M002	12302M001	14.834	-4.832	-13.919
12349 KRASNOYARSK				
12349M002	12349S001	19.774	6.545	4.478
		.002	.002	.002
12334 KITAB				
12334S005	12334S004	.230	.545	.493
		.001	.001	.001
12334M001	12334S005	79.039	56.144	-90.607
		.002	.002	.002

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12302 DIONYSOS
 12602M002  12602S011      -1.226       40.030      -14.416
                             .010         .010         .010
12706 LAMPEDUSA
 12706M002  12706M001    -333.026    -3626.021     1656.109

12711 MEDICINA
 12711M002  12711S001     -29.531       29.904       48.556
                            0.001        0.001        0.005
 12711M002  12711M003       1.386       26.495       -5.965
                             .0015        .0015        .0015
12717 NOTO
 12717M001  12717S001      34.242       67.907      -38.223
 12717M001  12717M003      -0.220      128.861      -43.217
                             .0015        .0015        .0015
12725 CAGLIARI
 12725M002  12725M003     -19.036      -23.844       40.947
                             .0015        .0015        .0015
12734 MATERA
 12734S001  12734S005     -26.118      -67.072       63.162
                            0.007        0.007        0.007
 12734S001  12734M008     -15.172      -24.826       24.959
 12734S001  12734M005      19.533      -12.202      -28.771
 12734S001  12734M004      25.263      -27.625      -30.369

13212 HERSTMONCEUX
 13212S001  13212M007       6.505       10.278       -3.945

13402 SAN FERNANDO
 13402M004  13402S004     -45.3210      35.3025      89.3855A

13407 MADRID
 13407S010  13407S012    -134.246      159.664      164.275

13504 KOOTWIJK
 13504M002  13504M003     -12.458      -37.501       23.025
 13504M002  13504S001     -13.621      -26.287       18.705

14001 ZIMMERWALD
 14001S001  14001M004      13.680        6.012       -6.242
 14001S007  14001M004      13.506        5.986       -6.420

14106 POTSDAM
 14106S009  14106M003      50.091       95.219      -40.438

14201 WETTZELL
 14201S002  14201S004      10.003      -46.149       11.072
 14201S002  14201M004      52.559       55.916      -58.337
 14201S002  14201M005      72.017       45.135      -70.501
 14201S002  14201M009      48.700       71.268      -48.250
 14201S002  14201S018      46.976        4.049      -34.728
 14201S002  14201M010      50.805       72.249      -50.245

20805 ANKARA
 20805M001  20805M002      14.2608      -2.0499     -11.4556
                            0.0075       0.0079       0.0048
21601 BEIJING
 21601M001  21601S004     -16.501      118.295     -146.316
                             0.03         0.03         0.03
21605 SHANGHAI
 21605S009  21605S001     598.7945     469.6798     -154.8482
                              .02          .02          .02
21730 TSUKUBA
 21730S001  21730S005     -26.306      -38.284        2.761

21732 CHICHIJIMA
 21732S001  21732S002   -1716.283    -1462.147     -539.508
                             0.500        0.500        0.500
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23101 CIBINONG
 23101M002  23101S001       5.376       9.504      40.507
                             .002        .002        .002
30302 HARTEBEESTHOEK
 30302S001  30302M002    -817.332    2103.129     203.079
                            0.010       0.010       0.010
 30302S001  30302S202    -801.257    2086.234     199.848
                            0.010       0.010       0.010
 30302M002  30302M007      -0.145      -0.374      -0.623
 30302S202  30302S005      -0.040       0.222      -0.696
 30302S202  30302M007     -16.233      16.509       2.618
 30302M007  30302M004     727.192   -1970.552    -237.139

30313 MARIN ISLAND
 30313S002  30313S001      -0.135      -0.105       0.182
                              .05         .05         .05
30314 SUTHERLAND
 30314M002  30314M001     268.583    -700.891     133.755

30602 ASCENSION
 30602M001  30602S004    2635.473    8401.489    3838.071
                             .003        .003        .003
31906 PONTA DELGADA
 31906M001  31906S001    -580.825    -234.188     629.626
                             .002        .002        .002
32809 LIBREVILLE
 32809S003  32809S002      -0.248      -0.047       0.000
                             .002        .002        .002
 32809S003  32809M002      -2.993       0.110     -14.392
                             .002        .002        .002
33710 ARLIT
 33710S001  33710S002   -1362.690   -2163.732    4825.937
                             .010        .010       0.010
40101 ST. JOHN'S
 40101M001  40101S002     -23.276      -9.051       6.485
                             .001        .001        .001
40104 ALGONQUIN
 40104S001  40104M002      94.756      61.021       6.665
 40104S001  40104M003     178.266      65.690     -13.477

40105 PENTICTON
 40105M001  40105M002    -324.180     178.052      11.636

40127 YELLOWKNIFE
 40127M001  40127M003    -327.855     314.587      82.910
 40127M003  40127M004      52.933     -57.155     -17.996
 40127M001  40127S007    -299.419     303.252      89.890
                             .005        .005        .005
40129 VICTORIA
 40129M001  40129M003     -22.740      34.377      23.036

40400 PASADENA
 40400M003  40400M007       1.987     -18.063     -22.052
 40400M003  40400M001      94.064     -31.945      55.121

40405 GOLDSTONE
 40405S009  40405M013    -323.113     148.213     -43.993
                            0.007       0.013       0.010
 40405S009  40405M006    -304.746     137.590     -45.871
                            0.003       0.003       0.003
 40405M001  40405S001    -227.005     188.001     153.150
 40405M001  40405S019    -144.572    -119.976    -229.148
 40405M001  40405M013   -3099.925   -5078.130   -8472.555
 40405M001  40405M002    2532.581  -14016.673  -15901.337
 40405M013  40405S028    2880.020    5222.261    8549.860
 40405M013  40405S035      -9.691      23.663      26.579
 40405M002  40405S014    -267.503      69.179     -40.943
                            0.002       0.003       0.002
 40405M002  40405S037       3.047       0.448       6.936
                            0.002       0.002       0.002
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40405S037	40405S005	0.028	0.055	-0.044
		.001	0.001	0.001
40407 PINYON FLATS				
40407M001	40407M003	125.588	117.655	279.910
40407M001	40407M004	169.626	93.187	280.348
40408 FAIRBANKS				
40408S002	40408M001	-74.141	49.2757	-31.2367
		.01	.01	.01
40408S002	40408S004	-955.7811	228.0477	-298.6194
		.0061	.0054	.0041
40408S005	40408S004	75.663	-238.119	-17.718
		.005	.005	.005
40420 VANDENBERG				
40420M002	40420M007	5.037	12.908	21.229
40424 KAUAI				
40424S001	40424M004	7.9388	-23.6178	-4.4062
40424S007	40424S008	-137.0348	-22.0583	-363.7762
		.0035	.0068	.0022
40424S007	40424M004	-0.4960	-19.4002	-42.2362
		0.0016	0.0018	0.0017
40433 QUINCY				
40433M002	40433M001	341.581	-288.817	-158.149
40433M002	40433M004	3.890	-38.987	-38.409
		0.002	0.001	0.001
40433M002	40433M005	-7.611	5.310	0.619
40436 SAN DIEGO				
40436M002	40436M003	-0.756	-3.831	-5.638
40438 BEAR LAKE				
40438M002	40438M001	5.825	1.270	3.391
40439 OWENS VALLEY				
40439M004	40439M001	-1.223	-2.261	-3.617
40439M004	40439S002	820.489	-549.119	-87.117
		0.005	0.009	0.009
40439M004	40439M003	-169.108	55.235	-41.459
40440 WESTFORD				
40440M001	40440S002	-48.865	12.264	65.806
		0.001	0.002	0.002
40440M001	40440S003	-247.002	-851.720	-800.428
		0.003	0.004	0.004
40440S003	40440S020	26.796	41.022	30.476
		.004	.006	.006
40442 FORT DAVIS				
40442M001	40442S001	4.356	-5.631	-3.556
40442M001	40442S002	-655.977	-228.944	-452.568
40442M001	40442M005	.000	.000	.000
40442M001	40442S003	5914.397	-3496.510	-4031.862
40442M001	40442M008	117.201	135.047	352.485
40442M001	40442M006	104.3287	124.7845	330.5613
40442S003	40442M009	-16.973	-39.906	-95.340
40442S003	40442S017	201.877	-158.812	-155.894
40442M008	40442M012	9.5212	-1.7953	1.4841
40445 MAUI				
40445M001	40445S005	-.483	-.212	1.003
40445M001	40445M002	8.044	19.381	40.992
40451 WASHINGTON				
40451M105	40451M112	-4.947	-17.162	-19.125
40451M105	40451M106	635.813	182.229	25.164
40451M105	40451M101	520.577	170.825	41.961
40451M105	40451M102	-33.112	-2.452	4.398
40451M105	40451M103	-34.066	1.868	9.839
40451M105	40451M104	376.110	153.626	64.228

40451M105	40451M111	645.036	181.778	22.412
40451M105	40451M125	75.125	116.762	110.510
40451M105	40451M114	26.038	-17.460	-29.389
40451M105	40451M117	22.182	-19.215	-30.410
40451M105	40451M120	-14.419	5.137	9.456
40451M105	40451M123	54.230	97.009	93.863
		.005	.005	.005
40451M105	40451M108	-28.408	-0.491	5.446
40451M105	40451M116	15.577	25.904	25.854
40451M105	40451M113	-73.298	46.101	76.255
40456 PIETOWN				
40456S001	40456M001	36.916	34.827	35.255
40465 NORTH LIBERTY				
40465S001	40465M001	-62.228	25.387	3.626
40477 MAUNA KEA				
40477S001	40477M001	-30.1321	82.2265	-5.9084
		0.0024	0.0016	0.0016
40496 PLATTEVILLE				
40496M001	40496M002	-29.894	9.036	1.025
		0.001	0.001	0.001
40491 FLAGSTAFF				
40491M002	40491M003	-16.022	16.985	14.536
40497 MONUMENT PEAK				
40497M001	40497M002	-14.269	6.872	-0.596
40497M001	40497M003	-11.395	7.802	2.523
40497M001	40497M004	31.3649	-5.4557	20.5255
40499 RICHMOND				
40499M002	40499S001	-60.877	0.931	44.212
40499M002	40499M005	-76.090	69.330	168.048
		.005	0.005	.005
40499M002	40499S018	15.832	16.844	45.521
		.005	.005	.005
40499M002	40499S016	-562.109	405.864	1039.938
		.005	.005	.005
40499S016	40499S015	322.947	108.948	109.759
		.01	.01	.01
40503 SOCORRO ISLAND				
40503S004	40503S002	-202.883	30.460	-148.559
		.03	.03	.03
40503S004	40503S003	0.089	0.233	-0.084
		.001	.001	.001
41507 RIO GRANDE				
41507S004	41507S003	-4.283	-4.105	2.101
		.002	.002	.002
41507M004	41507S004	-53.551	12.390	-26.527
41507S004	41507M003	28.859	-20.968	26.426
		.002	.002	.002
41602 FORTALEZA				
41602M001	41602S001	-16.598	-21.732	-45.805
41703 EASTER ISLAND				
41703M002	41703M003	32.016	12.485	-37.088
41703M002	41703S008	-9.958	3.341	-5.267
		.010	.010	.010
41705 SANTIAGO				
41705M003	41705M001	6.309	-38.829	61.146
41705M003	41705S006	-0.230	69.610	-113.927
41705M003	41705M004	21.1422	-35.3245	60.4834
41705S007	41705S006	-6653.652	-17960.221	22748.664
41705S008	41705M001	-0.674	1.921	1.330
42202 AREQUIPA				
42202M003	42202M005	18.615	-0.548	21.499
42202M003	42202S001	-16.021	-7.914	-3.651
42202M003	42202S005	-11.368	-8.020	-3.627

		.002	.002	.002
43201 SAINT CROIX				
43201M001	43201S001	77.3621	7.0895	-28.1538
50207 CHATHAM ISLAND				
50207M001	50207S001	24.691	46.309	-32.062
50501 GUAM				
50501M002	50501S001	-3965.701	-3252.703	-5313.389
		.005	.005	.005
50505 KWAJALEIN ATOLL				
50505M001	50505S003	-89.234	-702.977	544.240
66007 ROTHERA				
66007S001	66007M001	-123.076	213.190	-106.182
		.100	.100	.100
66006 SYOWA				
66006S003	66006S002	-298.055	23.376	-89.987
		.002	.002	.002
66006S003	66006S001	-6.973	7.447	-4.098
		.05	.05	.05
66006S002	66006S004	-13.684	120.599	24.259
		.02	.02	.05
66008 O'HIGGINS				
66008S001	66008M001	39.451	-17.640	28.435
91201 KERGUELEN				
91201S003	91201S002	-0.065	-0.149	0.154
		.001	.001	.001
91201M002	91201S003	-510.926	120.724	-36.935
		.002	.002	.002
91501 TERRE ADELIE				
91501M001	91501S001	-175.860	175.957	104.489
		.03	.03	.03
92201 PAPEETE/TAHITI				
92201M006	92201S007	-11.033	16.403	0.416
92201M007	92201M006	-162.0445	295.4850	36.6482
92201M006	92201M009	153.589	-270.934	-64.947
92201M009	92201S008	1.129	-6.358	2.366
		.002	.002	.002
92202 HUAHINE				
92202M004	92202S009	-6.282	7.965	-0.173
92202M004	92202M002	1.458	0.807	0.501
92701 NOUMEA				
92701M003	92701S001	-22.223	-15.286	38.253
		.003	.003	.003
97301 KOUROU				
97301M210	97301S004	15669.795	9832.776	-16899.100
		.050	.050	.050
97301S004	97301S005	-546.150	-243.018	1689.742
		.002	.002	.002
97401 REUNION				
97401S002	97401S001	.447	.645	-0.273
		.001	.001	.001
50103 ORRORAL				
50103S202	50103S201	.167	-0.101	0.140
		.01	.01	.01

Table 6 VLBI ITRF2000 station positions at epoch 1997.0 and velocities.

DOMES NB.	SITE NAME	TECH. ID.	X/Vx	Y/Vy	Z/Vz	Sigmas			SOLN
			----------	----------	m/m/y ----------				
10002M003	GRASSE	VLBI 7605	4581697.646	556125.760	4389351.457	.003	.002	.003	
10002M003			-.0131	.0189	.0101	.0003	.0001	.0004	
10003M003	TOULOUSE	VLBI 7608	4627950.007	119843.672	4372863.043	.003	.002	.003	
10003M003			-.0134	.0187	.0088	.0009	.0003	.0008	
10004M002	BREST	VLBI 7604	4228877.078	-333104.179	4747181.000	.005	.001	.006	
10004M002			-.0133	.0184	.0085	.0021	.0004	.0022	
10204M001	HOFN	VLBI 7635	2679650.259	-727916.442	5722807.259	.013	.005	.029	
10204M001			-.0066	.0146	.0127	.0013	.0006	.0024	
10302M002	TROMSO	VLBI 7602	2102904.048	721602.517	5958201.325	.002	.001	.003	
10302M002			-.0165	.0090	.0075	.0004	.0003	.0008	
10317S003	NY-ALESUND	VLBI 7331	1202462.754	252734.395	6237766.038	.001	.001	.003	
10317S003			-.0144	.0076	.0090	.0002	.0001	.0006	
10329M001	TRYSIL	VLBI 7607	2988029.173	655957.070	5578669.164	.042	.014	.076	
10329M001			-.0074	.0092	.0191	.0087	.0029	.0158	
10402M006	ONSALA	VLBI 7211	3370641.958	711866.118	5349796.172	.003	.003	.004	
10402M006			-.0134	.0148	.0095	.0002	.0001	.0004	
10402S002	ONSALA	VLBI 7213	3370606.031	711917.485	5349830.746	.002	.001	.002	
10402S002			-.0134	.0148	.0095	.0002	.0001	.0004	
10503M002	METSAHOVI	VLBI 7601	2890652.740	1310295.334	5513958.720	.003	.003	.004	
10503M002			-.0160	.0149	.0088	.0003	.0002	.0006	
12337S008	SIMEIS	VLBI 7332	3785231.067	2551207.415	4439796.384	.002	.002	.003	
12337S008			-.0198	.0164	.0084	.0010	.0007	.0012	
12711S001	BOLOGNA	VLBI 7230	4461369.979	919596.826	4449559.199	.002	.001	.002	
12711S001			-.0187	.0200	.0086	.0004	.0002	.0004	
12711S001	BOLOGNA	VLBI 7230	4461369.985	919596.819	4449559.208	.002	.001	.002	2 96:341
12711S001			-.0187	.0200	.0086	.0004	.0002	.0004	
12717S001	NOTO	VLBI 7547	4934563.122	1321201.261	3806484.497	.002	.001	.002	
12717S001			-.0173	.0174	.0134	.0004	.0002	.0004	
12734S005	MATERA	VLBI 7243	4641938.770	1393003.017	4133325.546	.002	.001	.002	
12734S005			-.0188	.0191	.0131	.0003	.0001	.0004	
13201S002	BARTON STACEY/CH	VLBI 7215	4008310.895	-100649.844	4943794.424	3.593	3.461	3.649	
13201S002			.0400	.0740	-.0131	.2218	.2137	.2253	
13296M002	BUDDON - CARNUST	VLBI 7603	3526416.335	-171421.192	5294098.886	1.729	1.723	1.730	
13296M002			-.0164	.0044	.0111	.2347	.2340	.2348	
13407S003	MADRID-ROBLEDO	VLBI 1561	4849245.229	-360278.154	4114884.594	.125	.026	.105	
13407S003			-.0076	.0196	.0129	.0005	.0002	.0005	
13407S010	MADRID-ROBLEDO	VLBI 1565	4849336.690	-360488.790	4114748.836	.003	.001	.002	
13407S010			-.0076	.0196	.0129	.0005	.0002	.0005	
13407S010	MADRID-ROBLEDO	VLBI 1565	4849336.694	-360488.791	4114748.832	.003	.001	.003	2 97:304
13407S010			-.0076	.0196	.0129	.0005	.0002	.0005	
13420S001	YEBES	VLBI 7333	4848780.298	-261702.078	4123035.752	.006	.002	.005	
13420S001			-.0102	.0192	.0107	.0028	.0008	.0025	
14201S004	WETTZELL	VLBI 7224	4075539.883	931735.261	4801629.371	.002	.001	.002	
14201S004			-.0157	.0172	.0087	.0002	.0001	.0004	
14201S100	WETTZELL	VLBI 7593	4075572.679	931755.120	4801584.364	.004	.002	.005	
14201S100			-.0157	.0172	.0087	.0002	.0001	.0004	
14202M002	HOHENBUNSTORF	VLBI 7600	3778214.705	698644.627	5074053.689	1.715	1.685	1.733	
14202M002			-.0334	-.0030	.0192	.2281	.2241	.2304	
14209S001	EFFELSBERG	VLBI 7203	4033947.453	486990.512	4900430.790	.003	.001	.004	
14209S001			-.0149	.0178	.0077	.0006	.0002	.0007	
14209S001	EFFELSBERG	VLBI 7203	4033947.472	486990.514	4900430.813	.003	.001	.004	2 96:309
14209S001			-.0149	.0178	.0077	.0006	.0002	.0007	
14213M002	HOHENPEISSENBERG	VLBI 7630	4213687.235	820422.959	4702784.244	1.064	1.066	1.068	
14213M002			-.0099	.0193	.0057	.2341	.2346	.2348	
14260M001	KARLSBURG	VLBI 7632	3653204.343	884427.615	5135732.078	1.055	1.054	1.057	
14260M001			.0063	.0237	-.0103	.2351	.2350	.2355	
14261M001	KIRSCHBERG	VLBI 7631	3879830.863	987963.309	4948713.275	1.036	1.025	1.047	
14261M001			.0174	.0123	-.0181	.2295	.2271	.2319	
21605S009	SHANGHAI	VLBI 7227	-2831686.913	4675733.666	3275327.690	.002	.003	.003	
21605S009			-.0307	-.0112	-.0134	.0004	.0005	.0005	
21612S001	URUMQI	VLBI 7330	228310.720	4631922.795	4367063.988	.002	.005	.005	
21612S001			-.0306	-.0055	-.0003	.0009	.0022	.0020	
21701S001	KASHIMA	VLBI 1856	-3997892.269	3276581.278	3724118.233	.002	.002	.003	
21701S001			-.0003	.0052	-.0118	.0004	.0003	.0005	

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21701S004 KASHIMA           VLBI 1857 -3997649.227  3276690.754  3724278.825  .003  .002  .003
21701S004                             -.0003        .0052        -.0118 .0004 .0003 .0005
21701S006 KASHIMA           VLBI 7334 -3997505.669  3276878.399  3724240.707  .005  .005  .005
21701S006                             -.0003        .0052        -.0118 .0004 .0003 .0005
21702S009 MIZUSAWA          VLBI 7314 -3862411.906  3105015.030  4001944.890  .031  .027  .031
21702S009                              .0010        .0038        -.0027 .0053 .0046 .0054
21702S010 MIZUSAWA          VLBI 7324 -3857236.108  3108803.212  4003883.084  .016  .014  .016
21702S010                              .0010        .0038        -.0027 .0053 .0046 .0054
21704S004 KOGANEI           VLBI 7327 -3941937.446  3368150.894  3702235.314  .009  .010  .009
21704S004                             -.0001        .0061        -.0111 .0015 .0026 .0019
21718S001 MIYAZAKI          VLBI 7312 -3582767.649  4052033.587  3369020.207  .415  .385  .355
21718S001                              .0217       -.0475        -.0484 .0452 .0414 .0378
21725S001 NOBEYAMA          VLBI 7244 -3871168.560  3428274.280  3723697.866  .244  .216  .222
21725S001                             -.0470        .0515         .0305 .0382 .0339 .0351
21729S001 USUDA             VLBI 7246 -3855355.412  3427427.607  3740971.291  .049  .043  .051
21729S001                             -.0043        .0048        -.0051 .0005 .0005 .0006
21730S001 TSUKUBA           VLBI 7311 -3957172.928  3310237.958  3737708.948  .003  .003  .003
21730S001                             -.0012        .0073        -.0087 .0005 .0005 .0006
21730S007 TSUKUBA           VLBI 7345 -3957408.752  3310229.367  3737494.789  .004  .004  .005
21730S007                             -.0012        .0073        -.0087 .0005 .0005 .0006
21731S001 SHINTOTSUKAWA     VLBI 7315 -3642141.822  2861496.647  4370361.932  .648  .550  .692
21731S001                              .0082        .0134         .0314 .1007 .0855 .1076
21731S003 SHINTOTSUKAWA     VLBI 7346 -3642142.114  2861496.632  4370361.722  .259  .219  .276
21731S003                              .0082        .0134         .0314 .1007 .0855 .1076
21732S001 CHICHIJIMA        VLBI 7316 -4489356.454  3482989.810  2887931.314  .267  .236  .217
21732S001                              .0306        .0390         .0126 .0332 .0296 .0269
21732S004 CHICHIJIMA        VLBI 7347 -4490618.496  3483908.137  2884899.122  .081  .074  .066
21732S004                              .0306        .0390         .0126 .0332 .0296 .0269
21733S002 MINAMI TORI SIMA  VLBI 7310 -5227446.489  2551379.698  2607604.995  .036  .022  .022
21733S002                              .0412        .0612         .0228 .0077 .0050 .0051
21737S001 SAGARA            VLBI 7325 -3913437.574  3501122.887  3608593.441  .708  .490  .641
21737S001                              .0497        .0228        -.0348 .1786 .1232 .1611
21739S001 MIURA             VLBI 7336 -3976129.983  3377927.923  3656753.862  .011  .018  .012
21739S001                              .0175       -.0095        -.0039 .0026 .0051 .0033
21740S001 TATEYAMA          VLBI 7338 -4000983.406  3375276.019  3632213.230  .009  .014  .009
21740S001                              .0106       -.0182        -.0056 .0020 .0041 .0023
21742S002 AIRA              VLBI 7348 -3530219.389  4118797.596  3344015.918  .137  .134  .119
21742S002                             -.0011       -.0161        -.0417 .0545 .0536 .0475
23903S001 SUWON-SHI         VLBI 7353 -3062024.021  4055453.834  3841809.998  .030  .031  .026
23903S001                             -.0290       -.0076        -.0102 .0023 .0028 .0026
30302S001 HARTEBEESTHOEK    VLBI 7232  5085442.780  2668263.490 -2768697.014  .003  .002  .002
30302S001                             -.0012        .0198         .0159 .0005 .0003 .0004
31906M001 PONTA DELGADA (S  VLBI 7609  4552174.621 -2186664.691  3882779.795  .015  .016  .012
31906M001                              .0006        .0165         .0111 .0035 .0035 .0030
40104S001 ALGONQUIN         VLBI 7282   918034.742 -4346132.271  4561971.166  .001  .002  .002
40104S001                             -.0161       -.0041         .0026 .0001 .0003 .0004
40105M001 PENTICTON         VLBI 7283 -2058840.505 -3621286.446  4814420.743  .003  .003  .003
40105M001                             -.0164       -.0018        -.0067 .0003 .0004 .0006
40118M001 WHITEHORSE        VLBI 7284 -2215213.306 -2209261.190  5540291.709  .159  .146  .349
40118M001                              .0195        .0395        -.0795 .0149 .0139 .0331
40118M001 WHITEHORSE        VLBI 7284 -2215213.422 -2209261.301  5540291.894  .118  .110  .262 2 88:217
40118M001                              .0195        .0395        -.0795 .0149 .0139 .0331
40127M001 YELLOWKNIFE       VLBI 7285 -1224124.649 -2689530.698  5633555.371  .002  .003  .004
40127M001                             -.0208       -.0044        -.0009 .0002 .0003 .0006
40127M004 YELLOWKNIFE       VLBI 7296 -1224399.573 -2689273.264  5633620.274  .001  .002  .003
40127M004                             -.0208       -.0044        -.0009 .0002 .0003 .0006
40129M001 VICTORIA/SIDNEY   VLBI 7289 -2341310.146 -3539083.892  4745768.334  .003  .003  .004
40129M001                             -.0104       -.0014        -.0064 .0004 .0005 .0007
40400M003 PASADENA          VLBI 7263 -2493306.177 -4655197.390  3565519.439  .003  .003  .003
40400M003                             -.0291        .0242         .0084 .0004 .0006 .0006
40403M001 PALOS VERDES      VLBI 7268 -2525453.001 -4670035.452  3522886.930  .022  .036  .027
40403M001                             -.0307        .0265         .0163 .0025 .0041 .0030
40404M001 PEARBLOSSOM       VLBI 7254 -2464071.077 -4649425.496  3593905.782  .014  .023  .018
40404M001                             -.0244        .0181         .0046 .0010 .0015 .0011
40405M013 GOLDSTONE         VLBI 7288 -2356494.181 -4646607.652  3668426.613  .003  .005  .004
40405M013                             -.0161        .0059        -.0051 .0002 .0003 .0004
40405S009 GOLDSTONE         VLBI 7222 -2356171.064 -4646755.855  3668470.595  .001  .002  .002
40405S009                             -.0161        .0059        -.0051 .0002 .0003 .0004
40405S009 GOLDSTONE         VLBI 7222 -2356171.082 -4646755.859  3668470.588  .002  .004  .004 2 92:181
40405S009                             -.0161        .0059        -.0051 .0002 .0003 .0004
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40405S014 GOLDSTONE         VLBI 1513 -2351129.208 -4655477.052  3660956.903  .002  .004  .004
40405S014                                    -.0161        .0059       -.0051 .0002 .0003 .0004
40405S019 GOLDSTONE         VLBI 1515 -2353538.835 -4641649.500  3676670.006  .004  .006  .006
40405S019                                    -.0161        .0059       -.0051 .0002 .0003 .0004
40405S019 GOLDSTONE         VLBI 1515 -2353538.846 -4641649.487  3676669.982  .001  .002  .002 2 92:181
40405S019                                    -.0161        .0059       -.0051 .0002 .0003 .0004
40406M001 SAN FRANCISCO (P  VLBI 7252 -2707704.987 -4257609.377  3888374.232  .044  .068  .060
40406M001                                    -.0207        .0270        .0032 .0046 .0072 .0063
40406M001 SAN FRANCISCO (P  VLBI 7252 -2707704.979 -4257609.373  3888374.218  .031  .048  .043 2 89:294
40406M001                                    -.0207        .0270        .0032 .0046 .0072 .0063
40407M001 PINYON FLATS      VLBI 7256 -2369636.075 -4761324.763  3511116.233  .015  .025  .018
40407M001                                    -.0230        .0178        .0072 .0015 .0027 .0020
40408S002 FAIRBANKS         VLBI 7225 -2281547.309 -1453645.086  5756993.162  .001  .001  .002
40408S002                                    -.0222       -.0036       -.0092 .0002 .0002 .0004
40410M001 POINT REYES       VLBI 7251 -2732333.297 -4217634.732  3914491.285  .031  .046  .043
40410M001                                    -.0292        .0204        .0234 .0037 .0055 .0052
40412M003 AUSTIN            VLBI 7271  -737793.842 -5459892.286  3202990.433 2.218 2.220 2.219
40412M003                                    -.0115       -.0001       -.0092 .2341 .2342 .2342
40416M001 YAKATAGA          VLBI 7277 -2529744.374 -1942091.132  5505028.242  .077  .063  .159
40416M001                                    -.0235        .0213        .0273 .0076 .0062 .0157
40416M001 YAKATAGA          VLBI 7277 -2529744.403 -1942091.092  5505028.127  .058  .047  .120 2 88:203
40416M001                                    -.0235        .0213        .0273 .0076 .0062 .0157
40419M001 KODIAK            VLBI 7278 -3026940.288 -1575911.768  5370362.535  .012  .009  .019
40419M001                                    -.0195        .0040        .0033 .0011 .0009 .0017
40420M002 VANDENBERG AFB    VLBI 7223 -2678094.952 -4525450.572  3597410.339  .005  .007  .006
40420M002                                    -.0312        .0300        .0195 .0006 .0009 .0008
40421M001 NOME              VLBI 7279 -2658150.621  -693821.988  5737236.607  .048  .020  .094
40421M001                                    -.0276       -.0083       -.0032 .0050 .0021 .0095
40423M001 SANDPOINT         VLBI 7280 -3425462.024 -1214669.110  5223858.161  .058  .034  .087
40423M001                                    -.0204        .0039       -.0128 .0072 .0044 .0109
40424S001 KAUAI             VLBI 1311 -5543846.063 -2054563.643  2387814.111  .002  .001  .002
40424S001                                    -.0095        .0630        .0298 .0003 .0002 .0004
40424S007 KAUAI             VLBI 7298 -5543837.628 -2054567.859  2387851.939  .002  .001  .002
40424S007                                    -.0095        .0630        .0298 .0003 .0002 .0004
40425M001 SOURDOUGH         VLBI 7281 -2419993.676 -1664228.726  5643538.095  .070  .054  .160
40425M001                                    -.0275        .0025       -.0193 .0063 .0049 .0145
40425M001 SOURDOUGH         VLBI 7281 -2419993.662 -1664228.748  5643538.141  .050  .039  .115 2 88:210
40425M001                                    -.0275        .0025       -.0193 .0063 .0049 .0145
40427M001 FORT ORD          VLBI 7266 -2697026.976 -4354393.076  3788077.835  .046  .075  .064
40427M001                                    -.0313        .0276        .0233 .0046 .0074 .0064
40427M002 FORT ORD          VLBI 7241 -2699840.476 -4359126.864  3781051.194  .038  .061  .053
40427M002                                    -.0313        .0276        .0233 .0046 .0074 .0064
40427M002 FORT ORD          VLBI 7241 -2699840.450 -4359126.838  3781051.233  .032  .051  .044 2 89:297
40427M002                                    -.0313        .0276        .0233 .0046 .0074 .0064
40428M001 SANTA PAULA I     VLBI 7255 -2554476.925 -4608627.241  3582138.462  .051  .090  .069
40428M001                                    -.0364        .0173        .0155 .0061 .0108 .0083
40430M001 BLACK BUTTE       VLBI 7269 -2306307.033 -4787914.379  3515736.350  .065  .130  .093
40430M001                                    -.0161        .0085       -.0121 .0066 .0132 .0094
40431M001 DEADMAN LAKE      VLBI 7267 -2336819.996 -4732587.443  3570330.306  .228  .432  .312
40431M001                                    -.0447       -.0494        .0312 .0243 .0462 .0332
40432M001 ELY               VLBI 7286 -2077236.402 -4486712.685  4018753.664  .035  .075  .062
40432M001                                    -.0176        .0054       -.0132 .0039 .0084 .0070
40433M004 QUINCY            VLBI 7221 -2517231.003 -4198595.164  4076531.251  .001  .002  .002
40433M004                                    -.0198        .0080       -.0054 .0002 .0003 .0004
40437M001 MAMMOTH LAKES     VLBI 7259 -2448246.890 -4426738.294  3875435.843  .063  .109  .091
40437M001                                    -.0211        .0066       -.0089 .0054 .0091 .0076
40439M004 OWENS VALLEY      VLBI 7853 -2410421.311 -4477800.351  3838690.289  .004  .006  .005
40439M004                                    -.0170        .0084       -.0070 .0002 .0003 .0004
40439S002 OWENS VALLEY      VLBI 7207 -2409600.832 -4478349.490  3838603.180  .003  .005  .005
40439S002                                    -.0170        .0084       -.0070 .0002 .0003 .0004
40439S006 OWENS VALLEY      VLBI 7616 -2409150.114 -4478573.232  3838617.397  .001  .002  .002
40439S006                                    -.0170        .0084       -.0070 .0002 .0003 .0004
40440S002 WESTFORD          VLBI 7205  1492404.731 -4457266.525  4296881.773  .001  .002  .003
40440S002                                    -.0156       -.0013        .0026 .0001 .0002 .0003
40440S003 WESTFORD          VLBI 7209  1492206.588 -4458130.518  4296015.541  .001  .002  .002
40440S003                                    -.0156       -.0013        .0026 .0001 .0002 .0003
40441S001 GREENBANK         VLBI 7204   882879.886 -4924482.316  3944130.693  .001  .003  .003
40441S001                                    -.0146       -.0008        .0006 .0002 .0004 .0004
40441S004 GREENBANK         VLBI 7214   882325.569 -4925137.994  3943397.679  .001  .003  .003
40441S004                                    -.0146       -.0008        .0006 .0002 .0004 .0004
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40441S004 GREENBANK        VLBI 7214   882325.560 -4925137.999  3943397.685  .001  .002  .002 2 90:340
40441S004                                 -.0146       -.0008        .0006 .0002 .0004 .0004
40441S005 GREENBANK        VLBI 7248   883555.549 -4924490.897  3943961.967  .002  .007  .006
40441S005                                 -.0146       -.0008        .0006 .0002 .0004 .0004
40441S007 GREENBANK        VLBI 7208   883772.747 -4924385.596  3944042.494  .001  .002  .002
40441S007                                 -.0146       -.0008        .0006 .0002 .0004 .0004
40442M008 FORT DAVIS       VLBI 7850 -1330008.196 -5328391.591  3236502.712  .002  .003  .002
40442M008                                 -.0125       -.0001       -.0065 .0001 .0003 .0003
40442M009 FORT DAVIS       VLBI 7900 -1324227.977 -5332063.058  3232023.021  .003  .004  .003
40442M009                                 -.0125       -.0001       -.0065 .0001 .0003 .0003
40442S003 FORT DAVIS       VLBI 7216 -1324210.999 -5332023.153  3232118.362  .001  .003  .002
40442S003                                 -.0125       -.0001       -.0065 .0001 .0003 .0003
40442S017 FORT DAVIS       VLBI 7613 -1324009.129 -5332181.970  3231962.472  .001  .002  .002
40442S017                                 -.0125       -.0001       -.0065 .0001 .0003 .0003
40445M002 MAUI             VLBI 7120 -5465998.562 -2404408.039  2242228.751  .004  .003  .003
40445M002                                 -.0138        .0607        .0311 .0004 .0003 .0004
40449M001 OCOTILLO         VLBI 7270 -2335601.604 -4832245.392  3434392.431  .904 1.772 1.443
40449M001                                 -.0506       -.0974       -.0120 .0756 .1485 .1212
40451M102 WASHINGTON       VLBI 7102  1130686.513 -4831353.031  3994110.937  .002  .003  .003
40451M102                                 -.0148       -.0001        .0010 .0002 .0003 .0003
40451M125 WASHINGTON       VLBI 7108  1130794.761 -4831233.812  3994217.047  .001  .002  .002
40451M125                                 -.0148       -.0001        .0010 .0002 .0003 .0003
40452M001 BLOOMINGTON      VLBI 7291   302384.405 -4941699.065  4007908.512 2.195 2.196 2.195
40452M001                                 -.0129        .0011       -.0015 .2343 .2343 .2343
40453M001 CARROLLTON       VLBI 7228   453520.717 -5300506.348  3507207.45917.56317.56717.560
40453M001                                  .0021        .0451        .00051.85731.85791.8569
40454M001 LEONARD          VLBI 7292  -522231.629 -5145676.885  3720152.352 2.191 2.192 2.192
40454M001                                 -.0124        .0017       -.0044 .2342 .2343 .2343
40455M001 MILES CITY       VLBI 7038 -1204439.067 -4239211.107  4596266.022 2.043 2.044 2.044
40455M001                                 -.0140       -.0005       -.0074 .2345 .2345 .2345
40456S001 PIETOWN          VLBI 7234 -1640953.713 -5014816.027  3575411.878  .001  .002  .002
40456S001                                 -.0147       -.0006       -.0084 .0002 .0003 .0004
40457M001 SEATTLE          VLBI 7229 -2295348.001 -3638029.381  4693408.517  .063  .110  .131
40457M001                                 -.0087        .0117       -.0232 .0084 .0150 .0173
40463S001 LOS ALAMOS, NM   VLBI 7611 -1449752.361 -4975298.593  3709123.926  .001  .002  .002
40463S001                                 -.0137        .0013       -.0072 .0002 .0003 .0004
40465S001 NORTH LIBERTY    VLBI 7612  -130872.256 -4762317.122  4226851.039  .001  .002  .002
40465S001                                 -.0151        .0010       -.0037 .0001 .0003 .0004
40466S001 KITT PEAK        VLBI 7610 -1995678.630 -5037317.718  3357328.129  .001  .002  .002
40466S001                                 -.0131        .0007       -.0083 .0002 .0004 .0004
40471S001 HANCOCK          VLBI 7618  1446375.114 -4447939.660  4322306.122  .001  .002  .002
40471S001                                 -.0149       -.0018        .0034 .0002 .0005 .0005
40473S001 BREWSTER         VLBI 7614 -2112064.978 -3705356.520  4726813.798  .001  .002  .002
40473S001                                 -.0135        .0023       -.0110 .0002 .0003 .0004
40477S001 MAUNA KEA        VLBI 7617 -5464074.965 -2495249.118  2148296.845  .002  .001  .002
40477S001                                 -.0135        .0631        .0296 .0005 .0004 .0005
40489S001 HAT CREEK        VLBI 7218 -2523970.044 -4123506.314  4147752.547  .005  .008  .008
40489S001                                 -.0195        .0069       -.0079 .0006 .0009 .0009
40490S001 MARYLAND POINT   VLBI 7217  1106629.297 -4882907.158  3938086.959  .008  .024  .020
40490S001                                 -.0156        .0034       -.0020 .0009 .0027 .0022
40491M003 FLAGSTAFF        VLBI 7261 -1923992.776 -4850854.630  3658589.324  .029  .069  .054
40491M003                                 -.0182       -.0083       -.0024 .0032 .0076 .0059
40492M002 VERNAL           VLBI 7290 -1631473.381 -4589129.004  4106759.896  .035  .089  .076
40492M002                                 -.0169       -.0093       -.0005 .0042 .0107 .0092
40493M001 YUMA             VLBI 7894 -2196778.025 -4887337.194  3448425.281  .040  .087  .062
40493M001                                 -.0185       -.0119        .0002 .0041 .0089 .0063
40496M002 PLATTEVILLE      VLBI 7258 -1240708.205 -4720454.351  4094481.613  .007  .015  .013
40496M002                                 -.0153        .0017       -.0077 .0008 .0019 .0017
40497M003 MONUMENT PEAK    VLBI 7274 -2386289.600 -4802346.345  3444884.126  .002  .003  .003
40497M003                                 -.0307        .0255        .0145 .0002 .0003 .0003
40498S001 VLA              VLBI 7619 -1601185.290 -5041977.492  3554875.924 3.122 3.126 3.124
40498S001                                 -.0099        .0032       -.0093 .2323 .2323 .2323
40499S001 RICHMOND         VLBI 7219   961258.052 -5674090.060  2740533.809  .001  .003  .002
40499S001                                 -.0097       -.0013        .0013 .0002 .0005 .0004
40499S019 RICHMOND         VLBI 7201   961255.330 -5674092.597  2740533.795  .002  .005  .003
40499S019                                 -.0097       -.0013        .0013 .0002 .0005 .0004
41602S001 FORTALEZA        VLBI 7297  4985370.037 -3955020.320  -428472.286  .002  .002  .001
41602S001                                 -.0013       -.0044        .0121 .0004 .0004 .0003
41705S006 SANTIAGO         VLBI 1404  1769693.112 -5044504.532 -3468434.968  .002  .003  .002
41705S006                                  .0221       -.0059        .0111 .0004 .0006 .0005
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41709S001 SEST             VLBI 7239  1838237.628 -5258698.869 -3100589.417 1.341 1.475 1.299
41709S001                                  -.0391        .0539       -.0906 .2023 .2225 .1949
42501M002 BERMUDA          VLBI 7294  2307209.436 -4874215.858  3394317.976  .009  .023  .016
42501M002                                  -.0128       -.0012        .0067 .0003 .0005 .0004
43201S001 SAINTE CROIX     VLBI 7615  2607848.521 -5488069.690  1932739.537  .001  .003  .002
43201S001                                   .0085        .0073        .0121 .0003 .0006 .0004
50103S001 CANBERRA         VLBI 1543 -4460894.390  2682361.295 -3674747.873  .894  .715 1.306
50103S001                                  -.0376        .0011        .0440 .0004 .0003 .0005
50103S010 CANBERRA         VLBI 1545 -4460935.401  2682765.711 -3674381.193  .003  .002  .003
50103S010                                  -.0376        .0011        .0440 .0004 .0003 .0005
50108S001 PARKES           VLBI 7202 -4554232.016  2816758.966 -3454035.854  .049  .033  .039
50108S001                                  -.0412       -.0012        .0418 .0151 .0103 .0124
50116S002 HOBART           VLBI 7242 -3950236.737  2522347.560 -4311562.539  .002  .002  .002
50116S002                                  -.0399        .0090        .0399 .0004 .0003 .0005
50505S003 KWAJALEIN ATOLL  VLBI 4968 -6143536.343  1363997.796  1034707.688  .093  .027  .035
50505S003                                   .0184        .0692        .0262 .0087 .0025 .0034
66006S004 SYOWA            VLBI 7342  1766194.139  1460410.951 -5932273.371  .011  .011  .022
66006S004                                   .0038       -.0015       -.0015 .0008 .0008 .0018
66008S001 O'HIGGINS        VLBI 7245  1525833.025 -2432463.665 -5676174.511  .002  .002  .004
66008S001                                   .0193       -.0037       -.0039 .0005 .0006 .0010
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SOLN: Solution Number Estimate using observations occurred after the indicated epoch.
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Table 7 SLR ITRF2000 station positions at epoch 1997.0 and velocities.

DOMES NB.	SITE NAME	TECH.	ID.	X/Vx	Y/Vy	Z/Vz	Sigmas			SOLN
						m/m/y				
10002S001	GRASSE	SLR	7835	4581691.641	556159.539	4389359.491	.002	.001	.002	
10002S001				-.0131	.0189	.0101	.0003	.0001	.0004	
10002S002	GRASSE	SLR	7845	4581692.181	556196.024	4389355.072	.003	.002	.003	
10002S002				-.0131	.0189	.0101	.0003	.0001	.0004	
10302M002	TROMSO	SLR	7602	2102904.048	721602.517	5958201.325	.002	.001	.003	
10302M002				-.0165	.0090	.0075	.0004	.0003	.0008	
10503S001	METSAHOVI	SLR	7805	2892595.439	1311807.806	5512610.851	.005	.004	.005	
10503S001				-.0160	.0149	.0088	.0003	.0002	.0006	
10503S014	METSAHOVI	SLR	7806	2892607.127	1311813.065	5512598.640	.005	.004	.006	
10503S014				-.0160	.0149	.0088	.0003	.0002	.0006	
11001S002	GRAZ LUSTBUEHEL	SLR	7839	4194426.517	1162694.033	4647246.650	.002	.001	.002	
11001S002				-.0176	.0181	.0082	.0003	.0001	.0004	
11101M001	SOFIA	SLR	7505	4319397.511	1868697.956	4292024.832	.005	.004	.005	
11101M001				-.0165	.0187	.0073	.0026	.0013	.0025	
12205S001	BOROWIEC	SLR	7811	3738332.834	1148246.491	5021816.035	.002	.002	.003	
12205S001				-.0170	.0161	.0075	.0005	.0002	.0006	
12302M001	RIGA	SLR	7560	3183914.178	1421473.547	5322796.817	.004	.003	.005	
12302M001				-.0221	.0131	-.0001	.0009	.0007	.0011	
12302S002	RIGA	SLR	1884	3183895.938	1421497.041	5322803.772	.003	.002	.003	
12302S002				-.0221	.0131	-.0001	.0009	.0007	.0011	
12302S006	RIGA	SLR	1885	3183892.292	1421465.633	5322813.836	.056	.056	.056	
12302S006				-.0221	.0131	-.0001	.0009	.0007	.0011	
12337M001	SIMEIS	SLR	7561	3783746.464	2551362.667	4441445.131	.021	.016	.026	
12337M001				-.0198	.0164	.0084	.0010	.0007	.0012	
12337S003	SIMEIS	SLR	1873	3783902.527	2551405.010	4441257.623	.017	.015	.020	
12337S003				-.0198	.0164	.0084	.0010	.0007	.0012	
12337S006	SIMEIS	SLR	1893	3785944.593	2550780.551	4439461.330	.009	.008	.007	
12337S006				-.0198	.0164	.0084	.0010	.0007	.0012	
12340S002	MAIDANAK	SLR	1864	1953285.794	4588973.835	3966767.683	.006	.009	.009	
12340S002				-.0294	.0073	.0020	.0032	.0055	.0051	
12341S001	KOMSOMOLSK-NA-AM	SLR	1868	-2948544.691	2774312.522	4912302.970	.011	.012	.013	
12341S001				-.0071	.0474	-.0098	.0050	.0055	.0052	
12602M002	DIONYSOS	SLR	7515	4595216.467	2039435.374	3912629.477	.012	.012	.011	
12602M002				.0059	.0065	-.0085	.0016	.0015	.0016	
12602S001	DIONYSOS	SLR	7940	4595217.058	2039465.131	3912614.723	3.714	2.435	4.874	
12602S001				.0059	.0065	-.0085	.0016	.0015	.0016	
12612M001	ASKITES	SLR	7510	4353444.694	2082666.589	4156506.658	.041	.029	.042	
12612M001				-.0204	.0359	-.0047	.0049	.0035	.0051	
12613M001	ROUMELLI	SLR	7517	4728694.669	2174373.537	3674572.813	.045	.026	.035	
12613M001				.0019	.0200	-.0201	.0050	.0031	.0040	
12614M001	KARITSA	SLR	7520	4596042.490	1733476.870	4055720.971	.020	.014	.020	
12614M001				-.0155	.0166	.0083	.0028	.0019	.0029	
12615M001	KATAVIA	SLR	7512	4573400.038	2409322.415	3723881.665	.030	.023	.029	
12615M001				.0022	.0245	-.0153	.0038	.0030	.0038	
12616M001	XRISOKALARIA	SLR	7525	4745949.570	1905705.979	3799168.994	.022	.014	.019	
12616M001				.0049	.0059	-.0112	.0031	.0021	.0028	
12706M001	LAMPEDUSA	SLR	7544	5072831.863	1130886.403	3684837.140	.008	.004	.007	
12706M001				-.0142	.0185	.0137	.0016	.0009	.0014	
12711M002	MEDICINA	SLR	7546	4461399.510	919566.924	4449510.647	.002	.001	.002	
12711M002				-.0187	.0200	.0086	.0004	.0002	.0004	
12717M001	NOTO	SLR	7543	4934528.876	1321133.360	3806522.733	.002	.001	.002	
12717M001				-.0173	.0174	.0134	.0004	.0002	.0004	
12718M002	TRIESTE	SLR	7550	4336738.495	1071270.831	4537911.450	.198	.161	.193	
12718M002				-.0133	-.0634	.0329	.0198	.0161	.0197	
12725M002	CAGLIARI	SLR	7545	4893397.969	772673.469	4004141.115	.003	.002	.002	
12725M002				-.0122	.0195	.0116	.0007	.0003	.0007	
12725S013	CAGLIARI	SLR	7548	4893347.256	772582.965	4004255.167	.006	.006	.006	
12725S013				-.0122	.0195	.0116	.0007	.0003	.0007	
12734M004	MATERA	SLR	7541	4641990.143	1393042.472	4133232.015	.004	.003	.004	
12734M004				-.0188	.0191	.0131	.0003	.0001	.0004	
12734M005	MATERA	SLR	7540	4641984.413	1393057.895	4133233.614	.004	.003	.004	
12734M005				-.0188	.0191	.0131	.0003	.0001	.0004	
12734S001	MATERA	SLR	7939	4641964.880	1393070.095	4133262.385	.002	.001	.002	
12734S001				-.0188	.0191	.0131	.0003	.0001	.0004	

12749M001	MONTE VENDA	SLR	7542	4399363.472	910506.674	4512940.981	.044	.026	.045
12749M001				-.0140	.0308	.0010	.0155	.0070	.0158
13212S001	HERSTMONCEUX	SLR	7840	4033463.712	23662.478	4924305.171	.001	.001	.002
13212S001				-.0128	.0180	.0095	.0002	.0001	.0003
13402S004	SAN FERNANDO	SLR	7824	5105473.731	-555110.702	3769892.629	.007	.003	.006
13402S004				-.0025	.0179	.0163	.0025	.0006	.0019
13402S007	SAN FERNANDO	SLR	7824	5105473.975	-555110.726	3769892.801	.011	.006	.009
13402S007				-.0025	.0179	.0163	.0025	.0006	.0019
13504M002	KOOTWIJK	SLR	8833	3899237.704	396769.312	5015055.327	.003	.003	.003
13504M002				-.0134	.0165	.0099	.0004	.0001	.0005
13504S001	KOOTWIJK	SLR	7833	3899224.083	396743.026	5015074.032	.004	.004	.005
13504S001				-.0134	.0165	.0099	.0004	.0001	.0005
14001S001	ZIMMERWALD	SLR	7810	4331283.500	567549.720	4633140.083	.002	.001	.002
14001S001				-.0138	.0185	.0100	.0004	.0002	.0005
14001S007	ZIMMERWALD	SLR	7810	4331283.676	567549.743	4633140.267	.002	.001	.002
14001S007				-.0138	.0185	.0100	.0004	.0002	.0005
14106S001	POTSDAM	SLR	1181	3800621.145	882005.461	5028859.593	.016	.009	.019
14106S001				-.0161	.0161	.0077	.0003	.0002	.0005
14106S009	POTSDAM	SLR	7836	3800639.676	881982.040	5028831.684	.002	.001	.002
14106S009				-.0161	.0161	.0077	.0003	.0002	.0005
14201M004	WETTZELL	SLR	7596	4075582.438	931837.324	4801559.959	.004	.003	.004
14201M004				-.0157	.0172	.0087	.0002	.0001	.0004
14201M005	WETTZELL	SLR	7597	4075601.895	931826.541	4801547.795	.003	.003	.004
14201M005				-.0157	.0172	.0087	.0002	.0001	.0004
14201M007	WETTZELL	SLR	7599	4075515.148	931753.662	4801631.440	1.365	.332	1.646
14201M007				-.0157	.0172	.0087	.0002	.0001	.0004
14201M200	WETTZELL	SLR	7594	4075596.021	931733.123	4801568.560	.034	.026	.029
14201M200				-.0157	.0172	.0087	.0002	.0001	.0004
14201S002	WETTZELL	SLR	7834	4075529.879	931781.409	4801618.296	.002	.001	.002
14201S002				-.0157	.0172	.0087	.0002	.0001	.0004
14201S018	WETTZELL	SLR	8834	4075576.850	931785.456	4801583.559	.002	.001	.002
14201S018				-.0157	.0172	.0087	.0002	.0001	.0004
20101S001	RIYADH	SLR	7832	3992101.030	4192172.507	2670410.716	.006	.006	.005
20101S001				-.0292	.0020	-.0014	.0091	.0059	.0064
20702M001	BAR GIYYORA	SLR	7530	4443965.836	3121945.377	3334693.814	.013	.010	.011
20702M001				-.0101	.0283	.0165	.0032	.0031	.0029
20801M001	DIYARBAKIR	SLR	7575	3848635.686	3251760.977	3898909.391	.030	.025	.034
20801M001				-.0271	.0080	.0125	.0042	.0038	.0047
20802M001	YOZGAT	SLR	7585	4029730.500	2802093.407	4062067.945	.046	.039	.049
20802M001				-.0117	.0238	-.0169	.0068	.0058	.0073
20803M001	MELENGICLICK	SLR	7580	4247620.351	2778638.967	3851607.628	.043	.038	.042
20803M001				-.0135	-.0012	.0084	.0059	.0053	.0058
20804M001	YIGILCA	SLR	7587	4117361.822	2517076.925	4157679.179	.047	.032	.046
20804M001				-.0177	.0106	.0095	.0059	.0042	.0060
20805M001	ANKARA	SLR	7589	4121934.339	2652189.980	4069035.135	.007	.007	.005
20805M001				-.0088	-.0023	.0064	.0008	.0006	.0008
21601S004	BEIJING	SLR	7249	-2148760.301	4426759.556	4044509.699	.011	.015	.014
21601S004				-.0444	.0141	-.0013	.0040	.0055	.0049
21602S003	WUHAN	SLR	7236	-2266555.799	5009079.399	3222266.119	.014	.019	.016
21602S003				-.0325	-.0077	-.0119	.0007	.0012	.0009
21605S001	SHANGHAI	SLR	7837	-2831088.079	4676203.326	3275172.811	.003	.003	.003
21605S001				-.0307	-.0112	-.0134	.0004	.0005	.0005
21609S002	KUNMING	SLR	7820	-1281275.692	5640727.251	2682925.899	.017	.060	.030
21609S002				-.0318	-.0024	-.0203	.0037	.0083	.0043
21611S001	CHANGCHUN	SLR	7237	-2674386.739	3757189.307	4391508.401	.003	.003	.004
21611S001				-.0218	-.0083	-.0092	.0011	.0015	.0014
21701M002	KASHIMA	SLR	7335	-3997484.332	3276846.862	3724296.623	.005	.005	.005
21701M002				-.0003	.0052	-.0118	.0004	.0003	.0005
21704M001	KOGANEI	SLR	7328	-3941941.252	3368169.513	3702195.704	.005	.007	.006
21704M001				-.0001	.0061	-.0111	.0015	.0026	.0019
21704S002	KOGANEI	SLR	7308	-3942020.122	3368097.568	3702191.046	.006	.006	.006
21704S002				-.0001	.0061	-.0111	.0015	.0026	.0019
21726S001	SIMOSATO	SLR	7838	-3822388.363	3699363.567	3507573.139	.004	.004	.004
21726S001				.0027	.0051	-.0053	.0008	.0008	.0009
21739M001	MIURA	SLR	7337	-3976161.712	3377950.404	3656687.305	.008	.014	.009
21739M001				.0175	-.0095	-.0039	.0026	.0051	.0033
21740M001	TATEYAMA	SLR	7339	-4000955.193	3375310.477	3632200.882	.006	.011	.007
21740M001				.0106	-.0182	-.0056	.0020	.0041	.0023
30101S001	HELWAN	SLR	7831	4728283.371	2879670.411	3156894.715	.007	.006	.006
30101S001				-.0213	.0120	.0173	.0017	.0014	.0014

30302M003	HARTEBEESTHOEK	SLR 7501	5085401.108	2668330.096	-2768688.879	.014	.010	.010
30302M003			-.0012	.0198	.0159	.0005	.0003	.0004
30314M001	SUTHERLAND	SLR 7502	5041543.391	1915353.102	-3396942.319	.006	.004	.005
30314M001			.0057	.0197	.0146	.0022	.0012	.0015
40104M003	ALGONQUIN	SLR 7410	918213.010	-4346066.580	4561957.685	.002	.003	.003
40104M003			-.0161	-.0041	.0026	.0001	.0003	.0004
40132M001	LA GRANDE	SLR 7411	749864.716	-3709310.703	5116946.033	.023	.030	.035
40132M001			-.0778	.0434	.0162	.0113	.0154	.0180
40400M001	PASADENA	SLR 7896	-2493212.113	-4655229.335	3565574.560	.004	.004	.004
40400M001			-.0291	.0242	.0084	.0004	.0006	.0006
40405M001	GOLDSTONE	SLR 7085	-2353394.263	-4641529.525	3676899.156	.004	.006	.006
40405M001			-.0161	.0059	-.0051	.0002	.0003	.0004
40405M002	GOLDSTONE	SLR 7115	-2350861.709	-4655546.238	3660997.843	.003	.004	.004
40405M002			-.0161	.0059	-.0051	.0002	.0003	.0004
40405M006	GOLDSTONE	SLR 7265	-2356475.810	-4646618.265	3668424.724	.003	.004	.004
40405M006			-.0161	.0059	-.0051	.0002	.0003	.0004
40405M013	GOLDSTONE	SLR 7288	-2356494.181	-4646607.652	3668426.613	.003	.005	.004
40405M013			-.0161	.0059	-.0051	.0002	.0003	.0004
40429S001	ALBUQUERQUE	SLR 7884	-1483442.830	-5019625.636	3635692.019	.007	.011	.010
40429S001			.0145	.0210	.0018	.0063	.0079	.0074
40433M001	QUINCY	SLR 7051	-2516893.312	-4198844.994	4076411.510	.003	.003	.004
40433M001			-.0198	.0080	-.0054	.0002	.0003	.0004
40433M002	QUINCY	SLR 7109	-2517234.893	-4198556.177	4076569.660	.001	.002	.002
40433M002			-.0198	.0080	-.0054	.0002	.0003	.0004
40433M005	QUINCY	SLR 7886	-2517242.503	-4198550.867	4076570.279	.003	.003	.004
40433M005			-.0198	.0080	-.0054	.0002	.0003	.0004
40434M002	MOUNT HOPKINS	SLR 7888	-1936744.074	-5077636.766	3331993.126	.701	1.427	1.003
40434M002			.0060	.1514	-.0525	.0460	.0922	.0651
40434S001	MOUNT HOPKINS	SLR 7921	-1936759.891	-5077704.213	3331921.625	.874	1.764	1.239
40434S001			.0060	.1514	-.0525	.0460	.0922	.0651
40436M002	SAN DIEGO - OTAY	SLR 7062	-2428826.032	-4799750.272	3417272.919	.024	.034	.031
40436M002			-.0212	.0266	.0227	.0033	.0054	.0044
40436M003	SAN DIEGO - OTAY	SLR 7035	-2428826.788	-4799754.103	3417267.280	.023	.034	.031
40436M003			-.0212	.0266	.0227	.0033	.0054	.0044
40438M001	BEAR LAKE	SLR 7082	-1735997.409	-4425048.162	4241430.650	.020	.028	.023
40438M001			-.0323	.0392	.0225	.0034	.0049	.0038
40438M002	BEAR LAKE	SLR 7046	-1736003.234	-4425049.434	4241427.258	.020	.028	.023
40438M002			-.0323	.0392	.0225	.0034	.0049	.0038
40439M001	OWENS VALLEY	SLR 7114	-2410422.534	-4477802.613	3838686.672	.005	.007	.006
40439M001			-.0170	.0084	-.0070	.0002	.0003	.0004
40439M003	OWENS VALLEY	SLR 7084	-2410590.419	-4477745.116	3838648.830	.005	.007	.006
40439M003			-.0170	.0084	-.0070	.0002	.0003	.0004
40439M004	OWENS VALLEY	SLR 7853	-2410421.311	-4477800.351	3838690.289	.004	.006	.005
40439M004			-.0170	.0084	-.0070	.0002	.0003	.0004
40440M001	WESTFORD	SLR 7091	1492453.596	-4457278.791	4296815.967	.001	.003	.003
40440M001			-.0156	-.0013	.0026	.0001	.0002	.0003
40442M001	FORT DAVIS	SLR 7086	-1330125.399	-5328526.641	3236150.226	.002	.003	.002
40442M001			-.0125	-.0001	-.0065	.0001	.0003	.0003
40442M005	FORT DAVIS	SLR 7885	-1330125.399	-5328526.641	3236150.226	.004	.004	.004
40442M005			-.0125	-.0001	-.0065	.0001	.0003	.0003
40442M006	FORT DAVIS	SLR 7080	-1330021.067	-5328401.856	3236480.782	.001	.002	.002
40442M006			-.0125	-.0001	-.0065	.0001	.0003	.0003
40442M008	FORT DAVIS	SLR 7850	-1330008.196	-5328391.591	3236502.712	.002	.003	.002
40442M008			-.0125	-.0001	-.0065	.0001	.0003	.0003
40445M001	MAUI	SLR 7210	-5466006.606	-2404427.420	2242187.757	.002	.001	.002
40445M001			-.0138	.0607	.0311	.0004	.0003	.0004
40445M002	MAUI	SLR 7120	-5465998.562	-2404408.039	2242228.751	.004	.003	.003
40445M002			-.0138	.0607	.0311	.0004	.0003	.0004
40451M101	WASHINGTON	SLR 7101	1131240.209	-4831179.752	3994148.500	.003	.003	.003
40451M101			-.0148	-.0001	.0010	.0002	.0003	.0003
40451M102	WASHINGTON	SLR 7102	1130686.513	-4831353.031	3994110.937	.002	.003	.003
40451M102			-.0148	-.0001	.0010	.0002	.0003	.0003
40451M103	WASHINGTON	SLR 7103	1130685.566	-4831348.709	3994116.378	.003	.003	.003
40451M103			-.0148	-.0001	.0010	.0002	.0003	.0003
40451M104	WASHINGTON	SLR 7104	1131095.742	-4831196.951	3994170.767	.003	.003	.003
40451M104			-.0148	-.0001	.0010	.0002	.0003	.0003
40451M105	WASHINGTON	SLR 7105	1130719.632	-4831350.577	3994106.539	.001	.002	.002
40451M105			-.0148	-.0001	.0010	.0001	.0003	.0003
40451M106	WASHINGTON	SLR 7100	1131355.445	-4831168.348	3994131.703	.003	.003	.003
40451M106			-.0148	-.0001	.0010	.0001	.0003	.0003

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40451M108 WASHINGTON        SLR 7065  1130691.224 -4831351.068  3994111.985  .003  .003  .003
40451M108                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M111 WASHINGTON        SLR 7899  1131364.668 -4831168.799  3994128.951  .003  .003  .003
40451M111                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M112 WASHINGTON        SLR 7063  1130714.686 -4831367.740  3994087.413  .003  .003  .003
40451M112                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M113 WASHINGTON        SLR 7106  1130646.334 -4831304.476  3994182.794  .003  .003  .003
40451M113                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M114 WASHINGTON        SLR 7125  1130745.670 -4831368.038  3994077.149  .003  .003  .003
40451M114                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M116 WASHINGTON        SLR 7130  1130735.209 -4831324.673  3994132.393  .003  .003  .003
40451M116                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M117 WASHINGTON        SLR 7920  1130741.815 -4831369.793  3994076.129  .003  .003  .003
40451M117                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M120 WASHINGTON        SLR 7918  1130705.215 -4831345.445  3994115.998  .002  .003  .003
40451M120                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451M121 WASHINGTON        SLR 7919  1130705.701 -4831347.679  3994117.782  .143  .597  .503
40451M121                             -.0148       -.0001        .0010 .0001 .0003 .0003
40491M002 FLAGSTAFF         SLR 7891 -1923976.754 -4850871.615  3658574.788  .029  .069  .054
40491M002                             -.0182       -.0083       -.0024 .0032 .0076 .0059
40492M001 VERNAL            SLR 7892 -1631484.903 -4589134.291  4106749.814  .115  .301  .278
40492M001                             -.0169       -.0093       -.0005 .0042 .0107 .0092
40493M001 YUMA              SLR 7894 -2196778.025 -4887337.194  3448425.281  .040  .087  .062
40493M001                             -.0185       -.0119        .0002 .0041 .0089 .0063
40496M001 PLATTEVILLE       SLR 7112 -1240678.311 -4720463.387  4094480.588  .007  .015  .013
40496M001                             -.0153        .0017       -.0077 .0008 .0019 .0017
40497M001 MONUMENT PEAK     SLR 7110 -2386278.211 -4802354.145  3444881.598  .001  .002  .002
40497M001                             -.0306        .0255        .0145 .0002 .0003 .0003
40497M002 MONUMENT PEAK     SLR 7220 -2386292.480 -4802347.272  3444881.002  .003  .003  .003
40497M002                             -.0306        .0255        .0145 .0002 .0003 .0003
40497M003 MONUMENT PEAK     SLR 7274 -2386289.600 -4802346.345  3444884.126  .002  .003  .003
40497M003                             -.0307        .0255        .0145 .0002 .0003 .0003
40499M002 RICHMOND          SLR 7295   961318.924 -5674090.994  2740489.611  .002  .004  .002
40499M002                             -.0097       -.0013        .0013 .0002 .0005 .0004
40504M001 MAZATLAN          SLR 7122 -1660089.399 -5619100.446  2511637.863  .005  .007  .005
40504M001                             -.0105        .0000       -.0049 .0006 .0010 .0007
40505M001 CABO SAN LUCAS    SLR 7882 -1997242.138 -5528041.065  2468355.422  .010  .016  .011
40505M001                             -.0416        .0262        .0133 .0022 .0042 .0025
40506M001 ENSENADA          SLR 7883 -2406127.056 -4898368.170  3290336.763  .014  .017  .015
40506M001                             -.0309        .0273        .0163 .0035 .0043 .0037
40701S001 SANTIAGO DE CUBA  SLR 1953  1474548.254 -5811242.429  2168945.006  .018  .033  .021
40701S001                             -.0148       -.0365        .0123 .0048 .0091 .0054
41604S001 NATAL             SLR 7929  5186465.799 -3653855.455  -654321.181 1.255  .883  .596
41604S001                             -.1377        .0530        .0570 .0725 .0509 .0346
41703M002 EASTER ISLAND     SLR 7097 -1884983.777 -5357608.358 -2892853.411  .003  .003  .003
41703M002                              .0638       -.0190       -.0068 .0004 .0005 .0004
41705M001 SANTIAGO          SLR 7400  1769699.649 -5044612.979 -3468259.900  .002  .003  .003
41705M001                              .0221       -.0059        .0111 .0004 .0006 .0005
41705M004 SANTIAGO          SLR 7404  1769714.489 -5044609.495 -3468260.576  .026  .028  .022
41705M004                              .0221       -.0059        .0111 .0004 .0006 .0005
41706M001 CERRO TOLOLO      SLR 7401  1815517.377 -5213464.642 -3187998.954  .014  .020  .021
41706M001                              .0131        .0330        .0487 .0020 .0033 .0033
42202M003 AREQUIPA          SLR 7403  1942808.113 -5804069.704 -1796915.463  .001  .002  .001
42202M003                              .0118       -.0010        .0137 .0003 .0004 .0003
42202S001 AREQUIPA          SLR 7907  1942792.093 -5804077.622 -1796919.105  .003  .003  .003
42202S001                              .0118       -.0010        .0137 .0003 .0004 .0003
42501M001 BERMUDA           SLR 7067  2308538.451 -4874080.025  3393628.630  .435  .957  .618
42501M001                             -.0128       -.0012        .0067 .0003 .0005 .0004
43602M002 GRAND TURK        SLR 7068  1920481.636 -5619479.109  2318914.54155.82556.02755.770
43602M002                             -.0719       -.0149        .00533.04903.05113.0432
50103S003 CANBERRA          SLR 7943 -4447549.003  2677133.985 -3694996.046  .074  .047  .064
50103S003                             -.0376        .0011        .0440 .0004 .0003 .0005
50103S007 CANBERRA          SLR 7843 -4446477.084  2678127.010 -3696251.251  .002  .002  .002
50103S007                             -.0376        .0011        .0440 .0004 .0003 .0005
50107M001 YARRAGADEE        SLR 7090 -2389006.924  5043329.339 -3078524.890  .001  .002  .002
50107M001                             -.0470        .0079        .0488 .0002 .0003 .0004
50107S009 YARRAGADEE        SLR 7847 -2389018.005  5043337.019 -3078506.041  .375  .482  .435
50107S009                             -.0470        .0079        .0488 .0002 .0003 .0004
50119S001 MOUNT STROMLO     SLR 7849 -4467063.648  2683034.480 -3667007.371  .002  .002  .002
50119S001                             -.0351       -.0013        .0461 .0007 .0007 .0008
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Appendix Table 7: SLR ITRF2000 station positions at epoch 1997.0 and velocities.

50503M001	AMERICAN SAMOA	SLR	7096	-6100048.101	-996202.339	-1568975.975	3.731	2.304	2.121
50503M001				-.1441	.0784	.0306	.2237	.1386	.1275
50505M001	KWAJALEIN ATOLL	SLR	7092	-6143447.109	1364700.773	1034163.447	.093	.027	.035
50505M001				.0184	.0692	.0262	.0087	.0025	.0034
92201M007	PAPEETE (TAHITI)	SLR	7124	-5246406.747	-3077284.972	-1913814.173	.004	.003	.003
92201M007				-.0425	.0468	.0291	.0007	.0008	.0007
92202M002	HUAHINE (MOTU H	SLR	7121	-5345865.650	-2958246.183	-1824623.530	.010	.011	.009
92202M002				-.0388	.0542	.0309	.0017	.0015	.0012
92202M004	HUAHINE (MOTU H	SLR	7123	-5345867.110	-2958246.991	-1824624.031	.009	.010	.008
92202M004				-.0388	.0542	.0309	.0017	.0015	.0012

Table 8 GPS ITRF2000 station positions at epoch 1997.0 and velocities GPS stations.

DOMES NB.	SITE NAME	TECH.	ID.	X/Vx	Y/Vy	Z/Vz	Sigmas			SOLN
				m/m/y						
10002M006	GRASSE	GPS	GRAS	4581691.012	556114.680	4389360.696	.002	.001	.002	
10002M006				-.0131	.0189	.0101	.0003	.0001	.0004	
10003M004	TOULOUSE	GPS	TOUL	4627846.128	119629.178	4372999.723	.002	.001	.002	
10003M004				-.0134	.0187	.0088	.0009	.0003	.0008	
10004M002	BREST	GPS	7604	4228877.078	-333104.179	4747181.000	.005	.001	.006	
10004M002				-.0133	.0184	.0085	.0021	.0004	.0022	
10004M004	BREST	GPS	BRST	4231162.677	-332746.825	4745130.837	.006	.001	.006	
10004M004				-.0133	.0184	.0085	.0021	.0004	.0022	
10011M001	SAINT-MICHEL DE	GPS	MICH	4578886.977	458434.255	4402461.434	.008	.002	.007	
10011M001				-.0074	.0197	.0158	.0031	.0007	.0029	
10073M008	MARSEILLE	GPS	MARS	4630532.881	433946.163	4350142.640	.008	.002	.007	
10073M008				-.0158	.0182	.0083	.0031	.0007	.0029	
10077M005	AJACCIO	GPS	AJAC	4696989.550	723994.369	4239678.490	.833	.189	.740	
10077M005				-.0146	.0037	-.0053	.2686	.0609	.2387	
10090M001	SAINT JEAN DES V	GPS	SJDV	4433469.953	362672.672	4556211.610	.004	.001	.004	
10090M001				-.0090	.0186	.0145	.0017	.0004	.0017	
10091M001	LE MANS	GPS	MANS	4274276.048	11584.191	4718385.958	.008	.002	.008	
10091M001				-.0129	.0159	.0075	.0031	.0006	.0033	
10092M001	MARNE LA VALLEE	GPS	MLVL	4201577.090	189859.958	4779064.724	.007	.001	.008	
10092M001				-.0166	.0159	.0061	.0029	.0006	.0032	
10095M001	CADARACHE-GINASS	GPS	GINA	4597159.085	465906.853	4382366.700	.005	.001	.004	
10095M001				-.0070	.0193	.0166	.0020	.0004	.0019	
10096M001	MODANE-AVRIEUX	GPS	MODA	4470757.663	525990.993	4504955.382	.011	.002	.011	
10096M001				-.0112	.0203	.0105	.0041	.0009	.0040	
10097M001	MONTPELLIER	GPS	MTPL	4612940.626	311634.817	4379108.465	.024	.005	.022	
10097M001				-.0141	.0188	.0090	.0083	.0019	.0077	
10098M001	LA FECLAZ	GPS	FCLZ	4443368.669	465894.217	4538566.036	.011	.003	.010	
10098M001				-.0139	.0187	.0083	.0043	.0011	.0043	
10099M001	CHATEL	GPS	CHTL	4466578.165	497735.693	4511789.531	.035	.009	.035	
10099M001				-.0110	.0206	.0105	.0117	.0030	.0117	
10202M001	REYKJAVIK	GPS	REYK	2587384.489	-1043033.504	5716563.979	.001	.001	.002	
10202M001				-.0199	-.0019	.0073	.0004	.0003	.0008	
10204M002	HOFN	GPS	HOFN	2679690.006	-727951.336	5722789.146	.003	.001	.005	
10204M002				-.0066	.0146	.0127	.0013	.0006	.0024	
10302M003	TROMSO	GPS	TROM	2102940.337	721569.379	5958192.113	.001	.001	.003	
10302M003				-.0165	.0090	.0075	.0004	.0003	.0008	
10302M006	TROMSO	GPS	TRO1	2102928.617	721619.379	5958196.191	.002	.001	.004	
10302M006				-.0165	.0090	.0075	.0004	.0003	.0008	
10302M006	TROMSO	GPS	TRO1	2102928.615	721619.378	5958196.182	.003	.002	.009	2 98:361
10302M006				-.0165	.0090	.0075	.0004	.0003	.0008	
10317M001	NY-ALESUND	GPS	NYAL	1202430.643	252626.646	6237767.533	.001	.001	.003	
10317M001				-.0144	.0076	.0090	.0002	.0001	.0006	
10317M003	NY-ALESUND	GPS	NYA1	1202433.960	252632.229	6237772.513	.001	.001	.004	
10317M003				-.0144	.0076	.0090	.0002	.0001	.0006	
10402M004	ONSALA	GPS	ONSA	3370658.663	711877.023	5349786.877	.001	.001	.002	
10402M004				-.0134	.0148	.0095	.0002	.0001	.0004	
10403M002	KIRUNA	GPS	KIRU	2251420.923	862817.135	5885476.614	.001	.001	.003	
10403M002				-.0147	.0122	.0116	.0004	.0003	.0010	
10405M002	MARTSBO	GPS	MAR6	2998189.527	931451.662	5533398.581	.006	.002	.010	
10405M002				-.0142	.0149	.0108	.0028	.0011	.0049	
10422M001	KIRUNA/ESRANGE	GPS	KIRO	2248123.320	865686.592	5886425.686	.005	.002	.013	
10422M001				-.0176	.0117	.0081	.0025	.0012	.0065	
10423M001	VISBY	GPS	VISO	3246470.378	1077900.392	5365278.018	.006	.002	.010	
10423M001				-.0160	.0152	.0083	.0030	.0012	.0048	
10424M001	VILHELMINA	GPS	VILO	2620258.707	779138.048	5743799.372	.005	.002	.010	
10424M001				-.0146	.0131	.0121	.0024	.0009	.0051	
10503S011	METSAHOVI	GPS	METS	2892570.923	1311843.330	5512634.057	.001	.001	.002	
10503S011				-.0160	.0149	.0088	.0003	.0002	.0006	
10511M001	VAASA	GPS	VAAS	2699864.444	1078263.891	5658064.766	.006	.003	.011	
10511M001				-.0141	.0154	.0149	.0028	.0013	.0055	
10512M001	JOENSUU	GPS	JOEN	2564139.226	1486149.658	5628951.362	.005	.003	.011	
10512M001				-.0185	.0142	.0071	.0027	.0016	.0055	
10513M001	SODANKYLA/PITTIO	GPS	SODA	2200146.809	1091638.257	5866870.700	.009	.005	.023	
10513M001				-.0168	.0117	.0117	.0040	.0023	.0101	

11001M002	GRAZ LUSTBUEHEL	GPS	GRAZ	4194423.959	1162702.549	4647245.328	.002	.001	.002
11001M002				-.0176	.0181	.0082	.0003	.0001	.0004
11005S002	PFANDER	GPS	PFAN	4253560.183	733544.830	4681452.914	.008	.002	.009
11005S002				-.0137	.0187	.0112	.0045	.0011	.0049
11005S002	PFANDER	GPS	PFAN	4253560.144	733544.827	4681452.883	.017	.004	.018 2 99:304
11005S002				-.0137	.0187	.0112	.0045	.0011	.0049
11006S003	INNSBRUCK/HAFELE	GPS	HFLK	4248505.175	855575.595	4667172.195	.003	.001	.003
11006S003				-.0134	.0187	.0111	.0013	.0004	.0014
11031S001	GAISBERG/SALZBUR	GPS	SBGZ	4180931.104	973735.295	4703203.448	.047	.014	.053
11031S001				.0097	.0258	.0415	.0185	.0055	.0205
11101M002	SOFIA	GPS	SOFI	4319372.228	1868687.631	4292063.865	.005	.002	.004
11101M002				-.0165	.0187	.0073	.0026	.0013	.0025
11206M006	PENC	GPS	PENC	4052449.626	1417680.986	4701407.038	.003	.001	.003
11206M006				-.0166	.0181	.0082	.0012	.0005	.0014
11401M001	BUCAREST	GPS	BUCU	4093760.981	2007793.635	4445129.877	.014	.010	.014
11401M001				-.0108	.0272	.0113	.0048	.0034	.0047
11502M002	PECNY/ONDREJOV	GPS	GOPE	3979316.259	1050312.340	4857067.020	.002	.001	.002
11502M002				-.0165	.0170	.0083	.0007	.0003	.0009
11507M001	MODRA-PIESOK	GPS	MOPI	4053738.000	1260571.463	4744940.750	.006	.002	.007
11507M001				-.0056	.0197	.0225	.0033	.0012	.0038
12204M001	JOZEFOSLAW-WARSA	GPS	JOZE	3664940.315	1409153.741	5009571.323	.002	.001	.002
12204M001				-.0181	.0162	.0074	.0006	.0003	.0008
12205M002	BOROWIEC	GPS	BOR1	3738358.598	1148173.582	5021815.705	.002	.001	.002
12205M002				-.0170	.0161	.0075	.0005	.0002	.0006
12207M002	BOROWA GORA	GPS	BOGO	3633739.116	1397434.005	5035353.392	.003	.002	.005
12207M002				-.0165	.0162	.0094	.0016	.0007	.0021
12209M001	LAMKOWKO	GPS	LAMA	3524523.073	1329693.519	5129846.289	.001	.001	.002
12209M001				-.0184	.0143	.0066	.0005	.0002	.0007
12217M001	WROCLAW	GPS	WROC	3835751.428	1177249.830	4941605.159	.006	.002	.008
12217M001				-.0159	.0163	.0090	.0037	.0013	.0047
12302M002	RIGA	GPS	RIGA	3183899.344	1421478.378	5322810.736	.002	.002	.003
12302M002				-.0221	.0131	-.0001	.0009	.0007	.0011
12309M001	MENDELEEVO	GPS	MDVO	2844672.112	2161066.397	5266365.554	.015	.011	.026
12309M001				-.0171	.0165	.0148	.0008	.0007	.0015
12309M002	MENDELEEVO	GPS	MDVO	2844672.267	2161070.079	5266363.806	.002	.001	.003
12309M002				-.0171	.0165	.0148	.0008	.0007	.0015
12312M001	YEREVAN	GPS	NSSP	3478646.842	3418805.729	4097987.116	.011	.011	.011
12312M001				-.0248	.0158	.0169	.0055	.0055	.0058
12313M001	IRKOUTSK	GPS	IRKT	-968332.190	3794425.411	5018167.758	.001	.002	.002
12313M001				-.0256	.0005	-.0054	.0004	.0006	.0008
12329M003	YUZHNO-SAKHALINS	GPS	YSSK	-3465320.798	2638269.400	4644085.493	.008	.007	.009
12329M003				-.0213	-.0033	-.0125	.0023	.0022	.0025
12330M001	ZWENIGOROD	GPS	ZWEN	2886325.543	2155998.399	5245816.145	.001	.001	.002
12330M001				-.0221	.0121	.0036	.0005	.0004	.0008
12334M001	KITAB	GPS	KIT3	1944945.356	4556652.193	4004325.976	.001	.002	.002
12334M001				-.0272	.0075	.0022	.0004	.0007	.0006
12348M001	POLIGAN/BISHKEK	GPS	POL2	1239971.586	4530790.055	4302578.777	.001	.002	.002
12348M001				-.0273	.0055	.0021	.0005	.0009	.0009
12349M002	KRASNOYARSK	GPS	KSTU	-174281.721	3571333.012	5264196.061	.002	.003	.005
12349M002				-.0245	.0029	-.0065	.0007	.0015	.0021
12350M001	SVETLOE	GPS	SVTL	2730155.511	1562364.624	5529989.211	.007	.004	.013
12350M001				-.0197	.0141	.0041	.0035	.0023	.0065
12351M001	ZELENCHUKSKAYA	GPS	ZECK	3451174.880	3060335.313	4391955.568	.003	.003	.004
12351M001				-.0205	.0167	.0087	.0013	.0012	.0015
12352M001	SELEZASCHITA	GPS	SELE	1046790.836	4540257.051	4342920.758	.002	.004	.004
12352M001				-.0295	.0032	.0012	.0009	.0019	.0017
12353M001	YAKUTSK	GPS	YAKZ	-1915023.239	2308213.235	5610225.002	.003	.003	.006
12353M001				-.0228	-.0075	-.0087	.0011	.0013	.0023
12354M001	MAGADAN	GPS	MAGO	-2825810.143	1581232.927	5477005.540	.004	.003	.006
12354M001				-.0239	-.0019	-.0146	.0014	.0011	.0023
12355M001	PETROPAVLOVSK-KA	GPS	PETR	-3576235.940	1401010.619	5075178.909	.007	.004	.009
12355M001				-.0097	.0059	-.0042	.0026	.0015	.0033
12355M002	PETROPAVLOVSK-KA	GPS	PETP	-3576239.756	1401003.444	5075177.505	.007	.004	.009
12355M002				-.0097	.0059	-.0042	.0026	.0015	.0033
12356M001	GOLOSIIV - KIEV	GPS	GLSV	3512889.114	2068979.763	4888903.141	.005	.003	.006
12356M001				-.0175	.0151	.0076	.0019	.0012	.0025
12360M001	TIXI	GPS	TIXI	-1264873.036	1569455.795	6031003.458	.004	.004	.011
12360M001				-.0197	-.0001	-.0048	.0013	.0014	.0039
12362M001	ARTI	GPS	ARTU	1843956.907	3016203.039	5291261.706	.003	.004	.005
12362M001				-.0225	.0115	.0014	.0010	.0010	.0012

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12363M001 BILIBINO          GPS BILI -2321892.971   560096.878  5894691.764  .044  .038  .110
12363M001                                 -.0021       -.0023       .0248 .0153 .0131 .0380
12706M002 LAMPEDUSA         GPS LAMP  5073164.888  1134512.425  3683181.032  .007  .003  .006
12706M002                                 -.0142       .0185       .0137 .0016 .0009 .0014
12711M003 BOLOGNA           GPS MEDI  4461400.895   919593.423  4449504.682  .002  .001  .002
12711M003                                 -.0187       .0200       .0086 .0004 .0002 .0004
12712M002 GENOVA            GPS GENO  4507892.447   707621.329  4441603.426  .009  .003  .009
12712M002                                 -.0165       .0194       .0092 .0037 .0011 .0036
12717M003 NOTO              GPS NOTO  4934528.655  1321262.222  3806479.519  .002  .001  .002
12717M003                                 -.0173       .0174       .0134 .0004 .0002 .0004
12724M002 TORINO I          GPS TORI  4472544.459   601634.192  4492545.112  .004  .001  .004
12724M002                                 -.0113       .0193       .0094 .0017 .0005 .0016
12725M003 CAGLIARI          GPS CAGL  4893378.933   772649.625  4004182.063  .002  .001  .002
12725M003                                 -.0122       .0195       .0116 .0007 .0003 .0007
12734M008 MATERA            GPS MATE  4641949.707  1393045.271  4133287.343  .002  .001  .002
12734M008                                 -.0188       .0191       .0131 .0003 .0001 .0004
12741M001 VENEZIA           GPS VENE  4379724.871   957495.734  4521605.129  .004  .001  .004
12741M001                                 -.0102       .0191       .0150 .0018 .0005 .0018
12750M002 PADOVA            GPS UPAD  4389531.283   923253.642  4519256.346  .002  .001  .002
12750M002                                 -.0174       .0188       .0104 .0007 .0002 .0008
12751M001 BOLZANO           GPS BZRG  4312657.614   864634.517  4603844.341  .009  .005  .009
12751M001                                 -.0124       .0189       .0139 .0040 .0021 .0042
12752M001 PERUGIA           GPS UNPG  4555145.782   997822.263  4337432.551  .053  .017  .050
12752M001                                  .0163       .0248       .0399 .0209 .0066 .0195
13101M004 BRUSSELS          GPS BRUS  4027893.852   307045.689  4919475.037  .002  .001  .002
13101M004                                 -.0121       .0172       .0095 .0005 .0002 .0006
13112M001 DENTERGEM         GPS DENT  4020711.593   238850.977  4928949.572  .004  .001  .005
13112M001                                 -.0166       .0165       .0062 .0018 .0004 .0022
13113M001 DOURBES           GPS DOUR  4086778.262   328451.848  4869782.550  .005  .001  .006
13113M001                                 -.0140       .0162       .0084 .0027 .0006 .0032
13114M001 WAREMME           GPS WARE  4031947.308   370150.898  4911905.907  .005  .001  .006
13114M001                                 -.0149       .0171       .0065 .0020 .0005 .0024
13212M007 HERSTMONCEUX      GPS HERS  4033470.220    23672.752  4924301.231  .001  .001  .002
13212M007                                 -.0128       .0180       .0095 .0002 .0001 .0003
13212M007 HERSTMONCEUX      GPS HERS  4033470.217    23672.770  4924301.233  .003  .001  .004 2 99:115
13212M007                                 -.0128       .0180       .0095 .0002 .0001 .0003
13402M004 SAN FERNANDO      GPS SFER  5105519.055  -555146.005  3769803.246  .007  .002  .005
13402M004                                 -.0025       .0179       .0163 .0025 .0006 .0019
13406M001 VILLAFRANCA       GPS VILL  4849833.786  -335049.186  4116014.840  .002  .001  .002
13406M001                                 -.0099       .0200       .0111 .0005 .0002 .0005
13407S012 MADRID-ROBLEDO    GPS MADR  4849202.453  -360329.122  4114913.104  .002  .001  .002
13407S012                                 -.0076       .0196       .0129 .0005 .0002 .0005
13407S012 MADRID-ROBLEDO    GPS MADR  4849202.462  -360329.081  4114913.083  .007  .003  .006 2 97:319
13407S012                                 -.0076       .0196       .0129 .0005 .0002 .0005
13410M001 ROQUETES - TORTO  GPS EBRE  4833520.246    41536.947  4147461.448  .003  .001  .003
13410M001                                 -.0108       .0189       .0106 .0013 .0003 .0011
13431M001 BELLMUNT DE SEGA  GPS BELL  4775849.488   116814.213  4213018.873  .040  .008  .035
13431M001                                 -.0133       .0190       .0069 .0139 .0029 .0120
13432M001 CAP DE CREUS      GPS CREU  4715420.398   273177.629  4271946.535  .020  .004  .018
13432M001                                 -.0116       .0165       .0237 .0075 .0014 .0067
13433M001 ALICANTE          GPS ALAC  5009051.241   -42072.353  3935057.596  .076  .012  .059
13433M001                                 -.0001       .0189       .0223 .0259 .0042 .0201
13434M001 A CORUNA          GPS ACOR  4594489.789  -678367.966  4357065.996  .079  .018  .074
13434M001                                 -.0115       .0253       .0248 .0268 .0060 .0252
13435M001 ESCORNACRABES     GPS ESCO  4696265.048    79978.318  4304244.882  .085  .014  .075
13435M001                                 -.0161       .0261       .0098 .0290 .0048 .0258
13502M004 DELFT             GPS DELF  3924687.552   301132.856  5001910.904  .004  .001  .005
13502M004                                 -.0150       .0164       .0070 .0023 .0006 .0028
13504M003 KOOTWIJK          GPS KOSG  3899225.245   396731.809  5015078.351  .001  .001  .002
13504M003                                 -.0134       .0165       .0099 .0004 .0001 .0005
13506M005 WESTERBORK        GPS WSRT  3828735.985   443304.827  5064884.632  .002  .001  .003
13506M005                                 -.0136       .0164       .0094 .0009 .0004 .0012
13533M001 EIJSDEN           GPS EIJS  4023086.357   400394.968  4916655.443  .094  .023  .111
13533M001                                 -.0090       .0146       .0114 .0342 .0083 .0403
13534M001 TERSCHELLING      GPS TERS  3798580.750   346993.937  5094780.959  .075  .020  .097
13534M001                                 -.0290       .0092       .0028 .0274 .0073 .0355
13909S001 CASCAIS           GPS CASC  4917537.025  -815726.366  3965857.305  .015  .004  .012
13909S001                                 -.0114       .0189       .0033 .0060 .0015 .0048
14001M004 ZIMMERWALD        GPS ZIMM  4331297.182   567555.730  4633133.845  .002  .001  .002
14001M004                                 -.0138       .0185       .0100 .0004 .0002 .0005
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14001M004 ZIMMERWALD         GPS ZIMM  4331297.177   567555.732  4633133.840  .002  .001  .003 2 98:312
14001M004                                  -.0138        .0185        .0100 .0004 .0002 .0005
14106M003 POTSDAM            GPS POTS  3800689.768   882077.259  5028791.246  .001  .001  .002
14106M003                                  -.0161        .0161        .0077 .0003 .0002 .0005
14201M009 WETTZELL           GPS WETT  4075578.577   931852.679  4801570.046  .002  .001  .003
14201M009                                  -.0157        .0172        .0087 .0002 .0001 .0004
14201M010 WETTZELL           GPS WTZR  4075580.685   931853.660  4801568.054  .001  .001  .002
14201M010                                  -.0157        .0172        .0087 .0002 .0001 .0004
14208M001 OBERPFAFFENHOFEN   GPS OBER  4186558.532   835027.048  4723759.260  .002  .001  .003
14208M001                                  -.0160        .0173        .0083 .0008 .0003 .0009
14216M001 KARLSRUHE          GPS KARL  4146524.468   613137.913  4791517.068  .037  .009  .041
14216M001                                  -.0118        .0184        .0103 .0148 .0035 .0166
14258M003 EUSKIRCHEN         GPS EUSK  4022106.355   477010.949  4910840.654  .026  .006  .031
14258M003                                  -.0174        .0173        .0070 .0107 .0024 .0127
14302M001 NICOSIA-ATHALASS   GPS NICO  4359415.849  2874116.974  3650777.712  .004  .003  .003
14302M001                                  -.0135        .0139        .0138 .0017 .0012 .0014
20703S001 MITZPE RAMON       GPS RAMO  4514722.017  3133507.725  3228024.574  .008  .006  .006
20703S001                                  -.0179        .0161        .0148 .0032 .0024 .0023
20704M001 TEL AVIV           GPS TELA  4443535.558  3086140.785  3366854.097  .012  .010  .009
20704M001                                  -.0191        .0167        .0177 .0057 .0046 .0043
20705M001 HAIFA              GPS BSHM  4395951.664  3080706.983  3433497.912  .034  .027  .025
20705M001                                  -.0208        .0098        .0112 .0120 .0097 .0092
20706M001 ELAT               GPS ELAT  4555028.848  3180067.211  3123164.302  .011  .009  .007
20706M001                                  -.0180        .0201        .0201 .0055 .0044 .0038
20710S001 METZOKI DRAGOT     GPS DRAG  4432980.874  3149431.992  3322110.339  .128  .110  .099
20710S001                                  -.0369        .0104        .0074 .0354 .0305 .0275
20711S001 KIBUTZ EL-ROM      GPS ELRO  4336218.566  3124003.721  3471463.087  .156  .134  .126
20711S001                                  -.0400        .0029        .0129 .0423 .0366 .0342
20805M002 ANKARA             GPS ANKR  4121948.591  2652187.949  4069023.681  .002  .001  .002
20805M002                                  -.0088       -.0023        .0064 .0008 .0006 .0008
20805M002 ANKARA             GPS ANKR  4121948.594  2652187.938  4069023.685  .008  .005  .008 2 99:227
20805M002                                  -.0088       -.0023        .0064 .0008 .0006 .0008
20808M001 TRABZON            GPS TRAB  3705250.492  3084421.557  4162044.636  .147  .134  .152
20808M001                                  -.0047        .0219        .0240 .0419 .0380 .0433
21601M001 BEIJING            GPS BJFS -2148743.784  4426641.236  4044655.935  .014  .019  .017
21601M001                                  -.0444        .0141       -.0013 .0040 .0055 .0049
21602M001 WUHAN              GPS WUHN -2267749.162  5009154.325  3221290.762  .002  .003  .002
21602M001                                  -.0325       -.0077       -.0119 .0007 .0012 .0009
21605M002 SHANGHAI           GPS SHAO -2831733.268  4675666.039  3275369.521  .001  .002  .002
21605M002                                  -.0307       -.0112       -.0134 .0004 .0005 .0005
21609M001 KUNMING            GPS KUNM -1281255.473  5640746.079  2682880.117  .010  .022  .012
21609M001                                  -.0318       -.0024       -.0203 .0037 .0083 .0043
21612M001 URUMQI             GPS URUM   193030.873  4606851.324  4393311.421  .003  .006  .006
21612M001                                  -.0306       -.0055       -.0003 .0009 .0022 .0020
21613M001 LHASA              GPS LHAS  -106937.669  5549269.591  3139215.762  .001  .003  .002
21613M001                                  -.0462       -.0076        .0121 .0005 .0011 .0007
21614M001 SHAANXI            GPS XIAN -1735212.505  4976840.109  3580538.372  .001  .003  .002
21614M001                                  -.0336       -.0042       -.0119 .0008 .0017 .0013
21729S007 USUDA              GPS USUD -3855262.998  3427432.519  3741020.362  .002  .002  .002
21729S007                                  -.0043        .0048       -.0051 .0005 .0005 .0006
21730S005 TSUKUBA            GPS TSKB -3957199.240  3310199.668  3737711.708  .002  .002  .002
21730S005                                  -.0012        .0073       -.0087 .0005 .0005 .0006
22003M001 QUEZON             GPS PIMO -3186294.170  5286624.093  1601158.176  .006  .008  .004
22003M001                                   .0445        .0176        .0296 .0011 .0012 .0012
22306M001 BANGALORE          GPS IISC  1337937.267  6070315.399  1427876.262  .067  .133  .044
22306M001                                  -.0410        .0030        .0334 .0009 .0007 .0005
22306M002 BANGALORE          GPS IISC  1337936.813  6070317.106  1427876.516  .002  .003  .002
22306M002                                  -.0410        .0030        .0334 .0009 .0007 .0005
22601M001 SINGAPOUR          GPS NTUS -1508022.690  6195576.699   148799.482  .004  .008  .002
22601M001                                  -.0300       -.0057       -.0044 .0014 .0031 .0007
23101M002 CIBINONG           GPS BAKO -1836968.965  6065617.193  -716257.776  .006  .006  .003
23101M002                                  -.0203       -.0155       -.0048 .0024 .0027 .0012
23601M001 TAIPEI             GPS TAIW -3024781.986  4928936.819  2681234.458  .002  .003  .002
23601M001                                  -.0317       -.0154       -.0137 .0013 .0019 .0011
23902M001 TAEJON             GPS TAEJ -3120422.930  4086355.456  3761769.629  .002  .002  .002
23902M001                                  -.0246       -.0146       -.0176 .0012 .0015 .0014
23902M002 TAEJON             GPS DAEJ -3120041.778  4084614.970  3764027.006  .004  .005  .005
23902M002                                  -.0246       -.0146       -.0176 .0012 .0015 .0014
23903M001 SUWON-SHI          GPS SUWN -3062022.653  4055448.089  3841818.340  .005  .006  .006
23903M001                                  -.0290       -.0076       -.0102 .0023 .0028 .0026
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24901M002 BAHREIN (JUFFAR)   GPS BAHR  3633909.050  4425275.467  2799861.271  .002  .002  .002
24901M002                                    -.0297        .0091        .0253 .0008 .0009 .0006
30302M002 HARTEBEESTHOEK     GPS HART  5084625.444  2670366.597 -2768493.928  .003  .002  .002
30302M002                                    -.0012        .0198        .0159 .0005 .0003 .0004
30302M004 HARTEBEESTHOEK     GPS HRAO  5085352.489  2668395.670 -2768731.676  .003  .002  .002
30302M004                                    -.0012        .0198        .0159 .0005 .0003 .0004
30302M007 HARTEBEESTHOEK     GPS HARK  5084625.303  2670366.228 -2768494.542  .003  .002  .002
30302M007                                    -.0012        .0198        .0159 .0005 .0003 .0004
30314M002 SUTHERLAND         GPS SUTH  5041274.808  1916053.992 -3397076.074  .006  .003  .004
30314M002                                     .0057        .0197        .0146 .0022 .0012 .0015
30602M001 ASCENSION          GPS ASC1  6118526.077 -1572344.698  -876451.166  .004  .002  .001
30602M001                                    -.0025       -.0048        .0102 .0015 .0007 .0004
30608M001 GOUGH ISLAND       GPS GOUG  4795578.541  -835299.537 -4107634.065  .009  .004  .008
30608M001                                     .0140        .0181        .0152 .0039 .0018 .0034
30802M001 DIEGO GARCIA       GPS DGAR  1916269.771  6029977.317  -801720.175  .002  .004  .002
30802M001                                    -.0422        .0203        .0307 .0009 .0018 .0005
31303M001 MASPALOMAS         GPS MASP  5439189.132 -1522054.788  2953464.285  .002  .001  .002
31303M001                                    -.0018        .0178        .0154 .0007 .0003 .0005
31303M002 MASPALOMAS         GPS MASP  5439192.252 -1522055.633  2953454.722  .002  .001  .001
31303M002                                    -.0018        .0178        .0154 .0007 .0003 .0005
32601M001 YAMOUSSOUKRO       GPS YKRO  6306439.987  -578381.058   757956.265  .020  .006  .005
32601M001                                    -.0008        .0250        .0202 .0012 .0011 .0011
32809M002 LIBREVILLE         GPS NKLG  6287385.842  1071574.385    39132.745  .007  .008  .004
32809M002                                    -.0076        .0138        .0177 .0022 .0024 .0013
33201M001 MALINDI            GPS MALI  4865366.487  4110737.445  -331121.710  .003  .003  .001
33201M001                                    -.0171        .0131        .0174 .0014 .0013 .0004
33201M001 MALINDI            GPS MALI  4865366.477  4110737.432  -331121.706  .009  .009  .002 2 97:291
33201M001                                    -.0171        .0131        .0174 .0014 .0013 .0004
35001M001 RABAT              GPS IAVH  5256828.146  -633054.224  3544324.540  .068  .038  .045
35001M001                                    -.0156        .0421       -.0138 .0407 .0225 .0270
39801M001 MAHE ISLAND        GPS SEY1  3602870.766  5238174.329  -516275.514  .008  .010  .002
39801M001                                    -.0206        .0248        .0118 .0035 .0044 .0009
40101M001 ST JOHN'S          GPS STJO  2612631.229 -3426807.026  4686757.805  .001  .001  .002
40101M001                                    -.0172       -.0030        .0078 .0003 .0004 .0005
40104M002 ALGONQUIN          GPS ALGO   918129.499 -4346071.239  4561977.824  .001  .002  .002
40104M002                                    -.0161       -.0041        .0026 .0001 .0003 .0004
40105M002 PENTICTON          GPS DRAO -2059164.684 -3621108.394  4814432.379  .001  .001  .002
40105M002                                    -.0164       -.0018       -.0067 .0003 .0004 .0006
40114M001 OTTAWA             GPS NRC1  1112777.321 -4341475.826  4522955.775  .001  .002  .003
40114M001                                    -.0155       -.0045        .0045 .0005 .0009 .0010
40124M001 CALGARY            GPS PRDS -1659602.844 -3676725.756  4925493.611  .004  .005  .005
40124M001                                    -.0176       -.0011       -.0090 .0017 .0020 .0023
40127M003 YELLOWKNIFE        GPS YELL -1224452.501 -2689216.107  5633638.279  .001  .001  .002
40127M003                                    -.0208       -.0044       -.0009 .0002 .0003 .0006
40128M002 CHURCHILL          GPS CHUR  -236438.708 -3307616.791  5430049.174  .001  .002  .003
40128M002                                    -.0192       -.0090        .0078 .0003 .0007 .0010
40129M003 VICTORIA/SIDNEY    GPS ALBH -2341332.886 -3539049.513  4745791.371  .001  .001  .002
40129M003                                    -.0104       -.0014       -.0064 .0004 .0005 .0007
40130M001 HOLBERG            GPS HOLB -2503040.416 -3188233.336  4908701.563  .011  .012  .015
40130M001                                    -.0140        .0006       -.0082 .0047 .0054 .0070
40133M002 SCHEFFERVILLE      GPS SCH2  1448636.903 -3385243.649  5191046.936  .002  .003  .004
40133M002                                    -.0161       -.0080        .0131 .0008 .0013 .0018
40134M001 WILLIAMS LAKE      GPS WILL -2084258.009 -3313872.988  5019853.098  .002  .002  .003
40134M001                                    -.0178       -.0019       -.0066 .0007 .0009 .0013
40135M001 FLIN FLON          GPS FLIN  -766174.416 -3611375.303  5184056.250  .001  .002  .002
40135M001                                    -.0186       -.0053       -.0026 .0003 .0007 .0010
40136M001 WHITEHORSE GPS S   GPS WHIT -2218337.816 -2201205.112  5543057.583  .001  .001  .003
40136M001                                    -.0175        .0001       -.0079 .0005 .0005 .0010
40137M001 LAC DU BONNET      GPS DUBO  -417603.554 -4064529.811  4881432.198  .001  .003  .003
40137M001                                    -.0169        .0020       -.0067 .0005 .0012 .0014
40138M001 NANOOSE            GPS NANO -2335726.738 -3451608.345  4812009.996  .014  .018  .021
40138M001                                    -.0094        .0040       -.0113 .0067 .0083 .0100
40140M001 UCLUELET           GPS UCLU -2440669.053 -3416437.076  4785136.866  .014  .016  .019
40140M001                                    -.0025        .0026       -.0077 .0064 .0076 .0092
40141M001 WHISTLER           GPS WSLR -2227013.617 -3439649.113  4872522.251  .013  .016  .019
40141M001                                    -.0119        .0021       -.0116 .0064 .0079 .0095
40142M001 CHILLIWACK         GPS CHWK -2215259.730 -3543996.846  4802098.800  .051  .061  .074
40142M001                                    -.0127        .0032       -.0150 .0192 .0231 .0278
40400M007 PASADENA           GPS JPLM -2493304.198 -4655215.451  3565497.383  .001  .002  .002
40400M007                                    -.0291        .0242        .0084 .0004 .0006 .0006
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40400M101 PASADENA           GPS wlsn -2483640.617 -4660073.111  3568172.089  .005  .007  .005
40400M101                             -.0291        .0242        .0084 .0004 .0006 .0006
40400M301 PASADENA           GPS BRAN -2502254.466 -4651654.382  3563569.196  .002  .003  .002
40400M301                             -.0291        .0242        .0084 .0004 .0006 .0006
40400S201 PASADENA           GPS CIT1 -2491489.941 -4660803.503  3559128.869  .003  .005  .004
40400S201                             -.0291        .0242        .0084 .0004 .0006 .0006
40403M002 PALOS VERDES       GPS pvep -2525523.162 -4670030.707  3522843.104  .007  .010  .008
40403M002                             -.0307        .0265        .0163 .0025 .0041 .0030
40404M101 PEARBLOSSOM        GPS HOLC -2459517.947 -4655992.282  3589168.804  .011  .014  .011
40404M101                             -.0244        .0181        .0046 .0010 .0015 .0011
40405S031 GOLDSTONE          GPS GOLD -2353614.180 -4641385.388  3676976.454  .001  .002  .002
40405S031                             -.0161        .0059       -.0051 .0002 .0003 .0004
40407M004 PINYON FLATS       GPS PIN2 -2369466.447 -4761231.575  3511396.583  .015  .025  .018
40407M004                             -.0230        .0178        .0072 .0015 .0027 .0020
40408M001 FAIRBANKS          GPS FAIR -2281621.431 -1453595.793  5756961.909  .001  .001  .002
40408M001                             -.0222       -.0036       -.0092 .0002 .0002 .0004
40419S001 KODIAK             GPS KOD1 -3028720.728 -1597307.366  5363076.625  .002  .002  .003
40419S001                             -.0195        .0040        .0033 .0011 .0009 .0017
40420M007 VANDENBERG AFB     GPS VNDP -2678089.919 -4525437.661  3597431.568  .005  .007  .006
40420M007                             -.0312        .0300        .0195 .0006 .0009 .0008
40420M101 VANDENBERG AFB     GPS harv -2686069.302 -4527084.330  3589502.308  .006  .010  .008
40420M101                             -.0261        .0373        .0133 .0032 .0044 .0034
40424M004 KAUAI              GPS KOKB -5543838.118 -2054587.260  2387809.705  .002  .001  .002
40424M004                             -.0095        .0630        .0298 .0003 .0002 .0004
40426S001 CAP CANAVERAL I    GPS CCV1   921997.870 -5535327.766  3021401.158  .002  .005  .003
40426S001                             -.0127       -.0048        .0016 .0025 .0049 .0028
40433M004 QUINCY             GPS 7221 -2517231.003 -4198595.164  4076531.251  .001  .002  .002
40433M004                             -.0198        .0080       -.0054 .0002 .0003 .0004
40437M002 MAMMOTH LAKES      GPS casa -2444430.296 -4428687.799  3875747.438  .014  .022  .018
40437M002                             -.0211        .0066       -.0089 .0054 .0091 .0076
40440S020 WESTFORD           GPS WES2  1492233.378 -4458089.484  4296046.006  .001  .002  .002
40440S020                             -.0156       -.0013        .0026 .0001 .0002 .0003
40440S020 WESTFORD           GPS WES2  1492233.369 -4458089.483  4296046.010  .002  .004  .004 97:144-98:158
40440S020                             -.0156       -.0013        .0026 .0001 .0002 .0003
40442M012 FORT DAVIS         GPS MDO1 -1329998.678 -5328393.387  3236504.199  .001  .002  .002
40442M012                             -.0125       -.0001       -.0065 .0001 .0003 .0003
40451M123 WASHINGTON         GPS GODE  1130773.867 -4831253.583  3994200.409  .001  .002  .002
40451M123                             -.0148       -.0001        .0010 .0001 .0003 .0003
40451S003 WASHINGTON         GPS USNO  1112189.893 -4842955.037  3985352.249  .001  .002  .002
40451S003                             -.0148       -.0001        .0010 .0002 .0003 .0003
40456M001 PIETOWN            GPS PIE1 -1640916.793 -5014781.204  3575447.142  .001  .002  .002
40456M001                             -.0147       -.0006       -.0084 .0002 .0003 .0004
40458M001 MALIBU/SADDLE PE   GPS spk1 -2535991.605 -4642435.287  3552148.093  .005  .007  .005
40458M001                             -.0298        .0277        .0142 .0028 .0039 .0028
40460M004 LA JOLLA/SCRIPPS   GPS SIO3 -2455456.521 -4767480.705  3441383.654  .005  .008  .006
40460M004                             -.0318        .0219        .0141 .0026 .0040 .0028
40461M001 WHITTIER           GPS whc1 -2488199.015 -4673487.488  3544649.152  .004  .006  .005
40461M001                             -.0278        .0283        .0082 .0025 .0035 .0026
40461M002 WHITTIER           GPS whi1 -2488634.189 -4673655.800  3544074.082  .005  .007  .006
40461M002                             -.0278        .0283        .0082 .0025 .0035 .0026
40465M001 NORTH LIBERTY      GPS NLIB  -130934.482 -4762291.737  4226854.669  .001  .002  .002
40465M001                             -.0151        .0010       -.0037 .0001 .0003 .0004
40469M001 CHINA LAKE         GPS coso -2411148.241 -4571430.495  3727461.547  .006  .009  .007
40469M001                             -.0118        .0113       -.0005 .0036 .0052 .0040
40472S003 COLORADO SPRINGS   GPS AMCT -1248596.587 -4819428.827  3976505.136  .003  .009  .007
40472S003                             -.0179        .0010       -.0110 .0017 .0042 .0034
40472S004 COLORADO SPRINGS   GPS AMC2 -1248596.070 -4819428.229  3976506.042  .005  .012  .010
40472S004                             -.0179        .0010       -.0110 .0017 .0042 .0034
40474M001 LAKE MATHEWS       GPS MATH -2443215.352 -4706037.477  3533477.600  .002  .003  .002
40474M001                             -.0266        .0236        .0105 .0008 .0012 .0009
40477M001 MAUNA KEA          GPS MKEA -5464105.097 -2495166.895  2148290.939  .002  .001  .002
40477M001                             -.0135        .0631        .0296 .0005 .0004 .0005
40478M002 CHATSWORTH         GPS ROCK -2533219.884 -4631543.705  3568400.368  .002  .003  .002
40478M002                             -.0306        .0230        .0162 .0010 .0014 .0011
40478S101 CHATSWORTH         GPS oat2 -2524553.534 -4630094.340  3577352.088  .004  .005  .004
40478S101                             -.0306        .0230        .0162 .0010 .0014 .0011
40479M001 BLYTHE             GPS blyt -2223206.565 -4830299.786  3510587.672  .022  .032  .023
40479M001                             -.0161        .0002       -.0084 .0027 .0045 .0032
40480M001 BOMMER CANYON      GPS TRAK -2480029.028 -4703111.049  3511298.477  .002  .003  .003
40480M001                             -.0293        .0271        .0124 .0011 .0015 .0012
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40481M001 YUCAIPA           GPS CRFP -2410446.534 -4710490.586  3550422.388  .002  .003  .003
40481M001                                  -.0231        .0169        .0062 .0010 .0014 .0011
40482M001 LONG BEACH CITY   GPS lbch -2507798.449 -4676370.054  3526890.666  .007  .011  .008
40482M001                                  -.0268        .0477        .0073 .0053 .0075 .0055
40483S001 WESTLAKE/ALLEN O  GPS AOA1 -2547879.914 -4628773.880  3561049.917  .004  .006  .004
40483S001                                  -.0289        .0290        .0143 .0022 .0031 .0023
40484M001 CHILAO FLATES/SA  GPS CHIL -2478003.030 -4655349.280  3577932.197  .002  .003  .002
40484M001                                  -.0282        .0216        .0070 .0010 .0014 .0011
40485M001 LONGDON YARD/IRW  GPS LONG -2482077.362 -4667439.251  3556771.594  .002  .003  .003
40485M001                                  -.0327        .0215        .0112 .0011 .0016 .0012
40486M001 PINEMEADOW        GPS ROCH -2382183.274 -4755085.074  3511367.707  .003  .005  .004
40486M001                                  -.0244        .0168        .0074 .0017 .0024 .0018
40487M001 LOS ANGELES       GPS usc1 -2507564.595 -4659953.553  3548660.889  .004  .005  .004
40487M001                                  -.0273        .0282        .0114 .0018 .0025 .0019
40487M002 LOS ANGELES       GPS uclp -2519006.908 -4650672.626  3552862.645  .004  .005  .004
40487M002                                  -.0273        .0282        .0114 .0018 .0025 .0019
40488M001 CATALINA ISLAND   GPS CAT1 -2540621.963 -4682555.618  3495319.216  .004  .006  .005
40488M001                                  -.0297        .0312        .0158 .0026 .0036 .0026
40497M004 MONUMENT PEAK     GPS MONP -2386246.845 -4802359.598  3444902.121  .001  .002  .002
40497M004                                  -.0306        .0255        .0145 .0002 .0003 .0003
40499M002 RICHMOND          GPS 7295    961318.924 -5674090.994  2740489.611  .002  .004  .002
40499M002                                  -.0097       -.0013        .0013 .0002 .0005 .0004
40499M005 RICHMOND          GPS RCM4    961242.833 -5674021.663  2740657.662  .005  .006  .005
40499M005                                  -.0097       -.0013        .0013 .0002 .0005 .0004
40499S018 RICHMOND          GPS RCM5    961334.750 -5674074.162  2740535.148  .001  .004  .002
40499S018                                  -.0097       -.0013        .0013 .0002 .0005 .0004
40499S020 RICHMOND          GPS RCM6    961334.750 -5674074.121  2740535.134  .001  .003  .002
40499S020                                  -.0097       -.0013        .0013 .0002 .0005 .0004
40507M001 AGUASCALIENTES (  GPS INEG -1260435.744 -5788547.698  2360340.250  .039  .133  .059
40507M001                                   .0099        .0082        .0057 .0133 .0443 .0195
40508M001 CICESE            GPS cice -2433307.471 -4844963.236  3348363.266  .007  .012  .009
40508M001                                  -.0301        .0302        .0128 .0031 .0049 .0034
40508M002 CICESE            GPS CIC1 -2433176.853 -4845045.125  3348295.738  .009  .014  .010
40508M002                                  -.0301        .0302        .0128 .0031 .0049 .0034
40601M001 MOIN/COSTA-RICA   GPS MOIN    755369.101 -6236567.769  1098850.971  .002  .008  .002
40601M001                                   .0103        .0047        .0013 .0032 .0100 .0024
41505M002 BUENOS-AIRES      GPS IGM0   2751801.003 -4479882.617 -3598917.297  .063  .100  .081
41505M002                                   .0150       -.0172        .0056 .0168 .0266 .0216
41507M004 RIO GRANDE        GPS RIOG   1429907.727 -3495354.740 -5122698.672  .002  .003  .004
41507M004                                   .0079       -.0102        .0028 .0007 .0009 .0011
41510M001 LA PLATA          GPS LPGS   2780102.969 -4437418.863 -3629404.583  .002  .002  .002
41510M001                                   .0025       -.0072        .0087 .0006 .0009 .0008
41511M001 CORDOBA GPS SITE  GPS CORD   2345503.864 -4910842.804 -3316365.439  .005  .007  .006
41511M001                                  -.0003       -.0042        .0100 .0011 .0011 .0011
41512M001 BAHIA BLANCA      GPS VBCA   2319240.725 -4411743.768 -3966484.152  .055  .097  .089
41512M001                                   .0224       -.0385       -.0044 .0153 .0271 .0250
41602M001 FORTALEZA         GPS FORT   4985386.627 -3954998.587  -428426.482  .002  .002  .001
41602M001                                  -.0013       -.0044        .0121 .0004 .0004 .0003
41603M001 CUIBA             GPS CUIB   3430711.408 -5099641.548 -1699432.977  .021  .030  .011
41603M001                                   .0009       -.0066        .0113 .0088 .0128 .0049
41606M001 BRASILIA          GPS BRAZ   4115014.087 -4550641.532 -1741444.061  .003  .003  .002
41606M001                                   .0005       -.0063        .0115 .0016 .0017 .0008
41610M001 CURITIBA/PARANA   GPS PARA   3763751.637 -4365113.774 -2724404.732  .006  .007  .005
41610M001                                   .0049       -.0085        .0090 .0033 .0038 .0026
41611M001 PRESIDENTE PRUDE  GPS UEPP   3687624.311 -4620818.580 -2386880.388  .015  .019  .010
41611M001                                   .0014       -.0080        .0116 .0073 .0091 .0050
41612M001 BOM JESUS DA LAP  GPS BOMJ   4510195.854 -4268322.307 -1453035.352  .021  .020  .008
41612M001                                  -.0033       -.0063        .0140 .0098 .0094 .0038
41613M001 VICOSA            GPS VICO   4373283.316 -4059639.021 -2246959.775  .024  .022  .013
41613M001                                  -.0009       -.0075        .0123 .0107 .0100 .0060
41614M001 MANAUS            GPS MANU   3179009.383 -5518662.137  -344401.868  .023  .038  .006
41614M001                                  -.0039        .0055        .0143 .0131 .0216 .0034
41615M001 IMPERATRIZ        GPS IMPZ   4289656.535 -4680885.000  -606347.402  .048  .052  .012
41615M001                                  -.0252        .0180        .0194 .0179 .0194 .0045
41703M003 EASTER ISLAND     GPS EISL -1884951.760 -5357595.877 -2892890.504  .001  .002  .002
41703M003                                   .0638       -.0190       -.0068 .0004 .0005 .0004
41705M003 SANTIAGO          GPS SANT   1769693.337 -5044574.148 -3468321.048  .001  .002  .002
41705M003                                   .0221       -.0059        .0111 .0004 .0006 .0005
41901M001 BOGOTA            GPS BOGT   1744399.096 -6116037.813   512731.625  .003  .005  .001
41901M001                                  -.0057        .0277        .0112 .0015 .0027 .0006
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42005M001	SANTA CRUZ	GPS	GALA	-33796.116	-6377522.655	-82120.899	.002	.006	.001
42005M001				.0516	-.0011	.0123	.0009	.0022	.0005
42006M001	RIO BAMBA	GPS	RIOP	1255144.990	-6253609.537	-182569.867	.025	.044	.011
42006M001				-.0067	.0338	.0005	.0082	.0158	.0038
42202M005	AREQUIPA	GPS	AREQ	1942826.728	-5804070.256	-1796893.968	.001	.002	.001
42202M005				.0118	-.0010	.0137	.0003	.0004	.0003
42402M001	MARACAIBO	GPS	MARA	1976117.057	-5948895.194	1173592.127	.029	.073	.019
42402M001				.0141	.0023	.0080	.0102	.0255	.0065
42501S004	BERMUDA	GPS	BRMU	2304703.582	-4874817.178	3395186.895	.001	.002	.002
42501S004				-.0128	-.0012	.0067	.0003	.0005	.0004
42601S001	KINGSTON	GPS	JAMA	1388059.738	-5909149.083	1951963.837	.122	.391	.154
42601S001				.0265	.0034	-.0039	.0406	.1295	.0512
43001M001	THULE	GPS	THU1	538981.422	-1388714.794	6181005.139	.001	.001	.003
43001M001				-.0217	-.0041	.0033	.0002	.0003	.0010
43005M001	KELLYVILLE (KANG	GPS	KELY	1575559.280	-1941827.932	5848076.502	.001	.001	.003
43005M001				-.0199	-.0029	.0034	.0005	.0005	.0013
43201M001	SAINTE CROIX	GPS	CRO1	2607771.157	-5488076.781	1932767.685	.001	.002	.001
43201M001				.0085	.0073	.0121	.0003	.0006	.0004
43401S001	BRIDGETOWN	GPS	BARB	3143384.507	-5359714.632	1434871.503	.005	.007	.003
43401S001				.0098	.0061	.0145	.0019	.0029	.0011
49802S001	GUSTAVUS/ALASKA	GPS	GUS1	-2396424.208	-2338789.555	5410251.925	.003	.003	.005
49802S001				-.0268	-.0112	.0092	.0012	.0012	.0019
49802S002	GUSTAVUS/ALASKA	GPS	GUS2	-2396393.972	-2338783.886	5410267.879	.002	.002	.004
49802S002				-.0268	-.0112	.0092	.0012	.0012	.0019
49803S001	CAPE HINCHINBROO	GPS	CHI1	-2651411.347	-1745165.859	5513732.135	.003	.004	.005
49803S001				-.0107	.0159	.0013	.0031	.0034	.0045
49804S001	COLD BAY/ALASKA	GPS	BAY1	-3484297.092	-1084760.204	5213545.761	.002	.002	.003
49804S001				-.0234	-.0007	-.0122	.0014	.0010	.0019
49839S001	ORONO	GPS	ORO_	1646125.347	-4215281.748	4479660.701	.006	.009	.009
49839S001				-.0154	-.0042	.0061	.0032	.0046	.0046
49840S001	BRUNSWICK	GPS	BRU1	1578685.158	-4324849.945	4399278.141	.002	.003	.003
49840S001				-.0140	-.0026	.0043	.0014	.0020	.0019
49841S001	CHATHAM	GPS	CHT1	1635806.118	-4482177.303	4218387.494	.002	.003	.003
49841S001				-.0176	-.0034	.0036	.0012	.0018	.0016
49842S002	NEW CASTLE	GPS	POR2	1541609.017	-4404571.897	4333253.896	.002	.003	.003
49842S002				-.0144	-.0031	.0048	.0016	.0025	.0023
49843S001	MONTAUK POINT	GPS	MNP1	1499281.182	-4576355.417	4168038.098	.002	.003	.003
49843S001				-.0146	-.0016	.0043	.0016	.0025	.0022
49844S001	MONTPELIER	GPS	VCAP	1369550.378	-4365534.838	4429096.685	.005	.008	.008
49844S001				-.0153	-.0050	.0056	.0029	.0044	.0042
49845S001	CAPE HENLOPEN	GPS	CHL1	1281265.719	-4811189.022	3973020.895	.002	.003	.003
49845S001				-.0143	-.0028	.0023	.0012	.0019	.0015
49846S001	KITTY HAWK	GPS	DUCK	1268587.191	-4995511.561	3744508.588	.006	.011	.008
49846S001				-.0151	.0011	.0002	.0032	.0057	.0041
49847S001	CAPE HENRY	GPS	CHR1	1234421.496	-4953339.471	3810911.127	.002	.004	.003
49847S001				-.0133	-.0049	-.0007	.0015	.0026	.0019
49848S001	RICHMOND	GPS	RIC1	1102094.039	-4942503.109	3864934.677	.004	.008	.006
49848S001				-.0144	-.0002	.0006	.0023	.0042	.0032
49849S001	YOUNGSTOWN	GPS	YOU1	890487.477	-4568460.461	4346297.718	.002	.004	.004
49849S001				-.0159	-.0045	.0050	.0015	.0024	.0022
49850S001	PITTSBURGH	GPS	PIT1	868032.959	-4775165.539	4124897.949	.005	.009	.008
49850S001				-.0137	.0036	-.0056	.0026	.0045	.0038
49851S001	CHARLESTON	GPS	CHA1	946821.776	-5284901.538	3431363.116	.002	.004	.003
49851S001				-.0107	-.0037	.0019	.0012	.0022	.0015
49852S001	KEY WEST NAVAL	GPS	KYW1	842464.505	-5741929.019	2637061.491	.004	.008	.004
49852S001				-.0101	-.0018	.0027	.0022	.0045	.0022
49853S001	ASHEVILLE	GPS	ASHV	673609.713	-5148653.640	3692529.519	.005	.009	.007
49853S001				-.0137	-.0024	.0015	.0027	.0048	.0034
49854S001	DETROIT	GPS	DET1	568024.746	-4690674.649	4270188.829	.002	.003	.003
49854S001				-.0143	-.0036	-.0011	.0011	.0019	.0016
49855S003	NEEBISH ISLAND	GPS	NEB3	449726.549	-4389684.455	4590090.742	.002	.004	.004
49855S003				-.0152	-.0008	.0045	.0015	.0025	.0025
49856S001	CHEBOYGAN	GPS	CHB1	430716.933	-4445226.450	4538513.964	.002	.003	.003
49856S001				-.0144	-.0004	.0004	.0012	.0019	.0018
49857S001	CINCINNATI	GPS	GALB	475545.708	-4925638.937	4010732.975	.009	.017	.014
49857S001				-.0129	-.0012	-.0004	.0031	.0058	.0047
49858S001	MARIETTA	GPS	ATL1	505865.080	-5273284.628	3540689.627	.011	.021	.014
49858S001				-.0156	-.0074	.0023	.0038	.0073	.0049
49859S001	ERLANDER	GPS	ERLA	466447.011	-4939929.966	3994478.614	.004	.008	.007
49859S001				-.0143	.0000	-.0011	.0023	.0043	.0034

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49860S001 WHITEFISH POINT    GPS WHP1   384617.477 -4359416.819  4624497.813  .002  .003  .003
49860S001                                   -.0172       -.0047        .0028 .0013 .0020 .0020
49861S001 STURGEON BAY       GPS STB1   212435.712 -4528758.917  4471353.774  .002  .004  .004
49861S001                                   -.0179       -.0031       -.0002 .0014 .0022 .0021
49862S001 MILWAUKEE          GPS MIL1   172136.025 -4668696.651  4327808.352  .002  .004  .003
49862S001                                   -.0160        .0007       -.0029 .0013 .0021 .0018
49863S001 MOBILE             GPS MOB1   190172.312 -5512307.113  3192181.690  .002  .004  .003
49863S001                                   -.0143       -.0002       -.0027 .0014 .0027 .0016
49864S001 UPPER KEWEENAW     GPS KEW1   104177.006 -4338052.026  4659064.360  .002  .004  .004
49864S001                                   -.0143       -.0058       -.0005 .0015 .0023 .0023
49865S003 SUMMERFIELD        GPS STL3    21018.415 -4990461.929  3958770.827  .003  .005  .004
49865S003                                   -.0141        .0012       -.0038 .0016 .0027 .0021
49866S001 ENGLISH TURN       GPS ENG1     5629.329 -5534933.978  3158737.803  .002  .004  .003
49866S001                                   -.0147       -.0027       -.0025 .0013 .0024 .0014
49867S002 FRENCH BAYOU       GPS MEM2   -18702.577 -5200624.021  3680096.858  .002  .004  .003
49867S002                                   -.0172        .0010       -.0024 .0013 .0022 .0016
49868S001 TEEDS GROVE        GPS RIS1   -18689.673 -4746210.057  4246762.164  .005  .009  .007
49868S001                                   -.0154       -.0027       -.0012 .0025 .0044 .0039
49869S001 VICKSBURG          GPS VIC1   -86596.184 -5393806.190  3391546.690  .002  .004  .003
49869S001                                   -.0132       -.0005       -.0056 .0012 .0021 .0014
49870S001 ALMA               GPS STP1  -151855.860 -4569681.774  4432570.902  .003  .005  .005
49870S001                                   -.0157        .0021       -.0050 .0017 .0029 .0027
49871S001 WISCONSIN POINT    GPS WIS1  -154082.386 -4379009.124  4619457.497  .002  .004  .004
49871S001                                   -.0176       -.0006       -.0039 .0016 .0025 .0025
49872S001 GALVESTON          GPS GAL1  -459551.173 -5545997.594  3105820.563  .002  .004  .003
49872S001                                   -.0133        .0040       -.0073 .0013 .0024 .0015
49873S001 SALLISAW           GPS SAL1  -437218.820 -5188678.449  3671226.917  .003  .005  .003
49873S001                                   -.0134       -.0047       -.0042 .0016 .0029 .0020
49874S001 PERRY              GPS KAN1  -466463.922 -4932743.133  4003353.666  .003  .005  .004
49874S001                                   -.0142        .0012       -.0025 .0017 .0028 .0022
49875S001 NEODESHA           GPS NDSK  -498567.202 -5050077.598  3851195.271  .003  .005  .004
49875S001                                   -.0149        .0002       -.0036 .0017 .0030 .0022
49876S001 PALESTINE          GPS PATT  -540765.448 -5400118.716  3339605.980  .005  .010  .006
49876S001                                   -.0142       -.0001       -.0048 .0031 .0055 .0034
49877S001 MORRIS             GPS HKLO  -529863.476 -5159629.723  3699768.383  .002  .004  .003
49877S001                                   -.0145       -.0001       -.0032 .0012 .0021 .0015
49878S003 ARANSAS PASS       GPS ARP3  -693605.970 -5601311.839  2960668.966  .002  .005  .003
49878S003                                   -.0173        .0022       -.0063 .0015 .0028 .0016
49879S001 HAVILAND           GPS HVLK  -800338.209 -4992906.781  3875267.322  .003  .004  .004
49879S001                                   -.0153        .0004       -.0053 .0016 .0027 .0020
49880S001 WACHAPREAGUE       GPS VIMS  1250692.726 -4902017.182  3871080.257  .002  .004  .003
49880S001                                   -.0147       -.0011        .0017 .0013 .0023 .0018
49881S001 JAYTON             GPS JTNT -1019496.658 -5256048.434  3455931.344  .004  .008  .005
49881S001                                   -.0147        .0015       -.0051 .0025 .0044 .0029
49882S001 GRANADA            GPS GDAC -1065179.590 -4934984.901  3886468.794  .003  .005  .004
49882S001                                   -.0154        .0011       -.0042 .0018 .0029 .0022
49883S001 TUCUMCARI          GPS TCUN -1229663.002 -5079280.255  3646289.597  .007  .012  .008
49883S001                                   -.0140        .0015       -.0075 .0033 .0057 .0040
49884S001 WHITE SANDS        GPS WSMN -1517577.740 -5173006.258  3399278.722  .002  .004  .003
49884S001                                   -.0141       -.0015       -.0064 .0015 .0024 .0016
49885S001 SALT LAKE CITY     GPS RBUT -1797278.720 -4491525.898  4145132.638  .007  .011  .010
49885S001                                   -.0179        .0007       -.0092 .0041 .0061 .0053
49886S003 POINT LOMA         GPS PLO3 -2460295.446 -4778387.840  3422768.235  .003  .005  .004
49886S003                                   -.0341        .0287        .0152 .0021 .0031 .0021
49887S001 POINT ARGUELLO     GPS PAR1 -2679517.055 -4522967.697  3599483.697  .004  .006  .004
49887S001                                   -.0362        .0325        .0187 .0034 .0047 .0035
49888S001 APPLETON           GPS GWEN -2316901.091 -3806506.794  4548956.478  .005  .007  .007
49888S001                                   -.0130       -.0027       -.0092 .0029 .0036 .0038
49889S001 ROBINSON POINT     GPS RPT1 -2316417.687 -3653646.078  4671031.896  .003  .003  .004
49889S001                                   -.0119        .0010       -.0079 .0016 .0019 .0021
49890S001 PIGEON POINT       GPS PPT1 -2725252.948 -4295977.238  3833959.054  .003  .004  .003
49890S001                                   -.0277        .0339        .0170 .0018 .0023 .0019
49891S001 POINT BLUNT        GPS PBL1 -2703286.326 -4256586.192  3892573.437  .003  .003  .003
49891S001                                   -.0276        .0238        .0061 .0016 .0021 .0018
49892S001 WHIDBEY ISLAND     GPS WHD1 -2295684.946 -3576426.466  4740083.078  .003  .003  .004
49892S001                                   -.0097        .0020       -.0117 .0016 .0019 .0022
49893S001 FORT STEVENS       GPS FTS1 -2469885.162 -3667814.969  4581028.274  .003  .003  .004
49893S001                                   -.0058        .0001       -.0053 .0017 .0020 .0022
49894S001 MENDOCINO          GPS CME1 -2746197.164 -4011270.648  4115639.284  .003  .004  .004
49894S001                                   -.0126        .0233        .0115 .0020 .0024 .0022
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49895S001	UPOLU POINT	GPS	UPO1	-5464031.767	-2446032.649	2193283.030	.007	.005	.003
49895S001				-.0124	.0632	.0293	.0042	.0028	.0019
49896S001	KOKOLE POINT	GPS	KOK1	-5551749.829	-2047250.258	2372726.612	.007	.004	.003
49896S001				-.0085	.0642	.0290	.0039	.0024	.0019
49901M001	WRIGHTWOOD	GPS	TABL	-2448549.823	-4668099.290	3582740.937	.002	.004	.003
49901M001				-.0260	.0177	.0053	.0012	.0018	.0014
49902M001	MOUNT LEE	GPS	LEEP	-2507463.082	-4652632.264	3559086.685	.002	.003	.002
49902M001				-.0295	.0252	.0098	.0010	.0014	.0011
49903M001	HOLLYDALE	GPS	HOLP	-2500945.815	-4670473.245	3539500.425	.002	.003	.003
49903M001				-.0298	.0260	.0100	.0011	.0015	.0011
49904M001	DURMID HILL	GPS	dhlg	-2319099.063	-4799846.543	3490090.466	.025	.037	.026
49904M001				-.0222	.0101	-.0038	.0036	.0057	.0040
49905M001	PACOIMA	GPS	DAM1	-2507721.090	-4638444.532	3577430.023	.002	.004	.003
49905M001				-.0290	.0247	.0081	.0009	.0014	.0010
49905M002	PACOIMA	GPS	dam2	-2507655.598	-4638419.596	3577506.559	.004	.006	.005
49905M002				-.0290	.0247	.0081	.0009	.0014	.0010
49905M003	PACOIMA	GPS	CMP9	-2508505.849	-4637175.117	3579499.854	.002	.003	.003
49905M003				-.0290	.0247	.0081	.0009	.0014	.0010
49906M001	CLAREMONT/LA VER	GPS	CLAR	-2458218.162	-4680467.713	3556758.387	.002	.003	.002
49906M001				-.0294	.0188	.0090	.0010	.0014	.0011
49907S001	SOLOMONS ISLAND	GPS	SOL1	1173608.863	-4871160.862	3933263.105	.001	.003	.002
49907S001				-.0144	.0000	.0009	.0007	.0012	.0010
49908S001	ANNAPOLIS	GPS	USNA	1160668.929	-4826883.325	3990863.060	.002	.004	.003
49908S001				-.0125	-.0053	.0001	.0012	.0021	.0017
49909S001	SAN NICOLAS ISLA	GPS	sni1	-2631346.566	-4646278.982	3477113.259	.007	.010	.008
49909S001				-.0300	.0311	.0189	.0037	.0052	.0038
49910S001	NORTHRIDGE	GPS	csn1	-2520225.756	-4637082.562	3569875.398	.023	.031	.023
49910S001				-.0320	.0243	.0110	.0037	.0053	.0039
49911M001	AZUSA	GPS	azu1	-2472979.158	-4671338.256	3558107.694	.008	.011	.008
49911M001				-.0311	.0256	.0094	.0043	.0065	.0046
49912M001	TORRANCE AIRPORT	GPS	torp	-2517894.221	-4670260.212	3527827.455	.009	.012	.009
49912M001				-.0309	.0281	.0145	.0049	.0070	.0050
49913S001	HORN POINT	GPS	hnpt	1196626.466	-4846358.507	3956723.098	.003	.005	.004
49913S001				-.0172	-.0004	.0027	.0015	.0026	.0020
49914S001	KEYBISCAYNE/MIAM	GPS	AOML	982296.803	-5664607.228	2752614.479	.002	.006	.003
49914S001				-.0102	-.0015	.0015	.0009	.0021	.0011
49914S002	KEYBISCAYNE/MIAM	GPS	MIA1	982509.422	-5664641.775	2752416.958	.002	.005	.003
49914S002				-.0102	-.0015	.0015	.0009	.0021	.0011
49915M001	SAN CLEMENTE ISL	GPS	SCIP	-2556587.402	-4711014.066	3446241.381	.007	.011	.008
49915M001				-.0311	.0309	.0158	.0034	.0050	.0035
49917M001	WIDE CANYON	GPS	WIDC	-2354850.049	-4745524.099	3540692.991	.005	.008	.006
49917M001				-.0130	.0136	.0142	.0024	.0037	.0027
49935M001	COLLEGE/ALASKA	GPS	CLGO	-2299609.292	-1444753.122	5751925.893	.002	.001	.003
49935M001				-.0236	-.0043	-.0083	.0010	.0009	.0019
49995S001	KENAI/ALASKA	GPS	KEN1	-2748338.701	-1501544.399	5537749.436	.002	.001	.003
49995S001				-.0302	-.0157	-.0095	.0010	.0008	.0016
49998S001	ANNETTE ISLAND/A	GPS	AIS1	-2430153.785	-2737192.911	5205816.621	.002	.002	.003
49998S001				-.0181	-.0004	-.0050	.0009	.0010	.0014
50103M108	CANBERRA	GPS	TIDB	-4460996.129	2682557.076	-3674443.694	.002	.001	.002
50103M108				-.0376	.0011	.0440	.0004	.0003	.0005
50107M004	YARRAGADEE	GPS	YAR1	-2389025.536	5043316.872	-3078530.731	.001	.002	.002
50107M004				-.0470	.0079	.0488	.0002	.0003	.0004
50116M003	HOBART	GPS	HOB1	-3950184.081	2522364.454	-4311588.172	.002	.001	.002
50116M003				-.0399	.0090	.0399	.0004	.0003	.0005
50116M004	HOBART	GPS	HOB2	-3950071.361	2522415.185	-4311638.362	.002	.001	.002
50116M004				-.0399	.0090	.0399	.0004	.0003	.0005
50127M001	COCO ISLANDS	GPS	COCO	-741950.006	6190961.630	-1337768.586	.001	.004	.002
50127M001				-.0436	.0070	.0479	.0006	.0016	.0006
50133M001	PERTH	GPS	PERT	-2368686.968	4881316.517	-3341796.161	.001	.002	.002
50133M001				-.0483	.0101	.0490	.0004	.0007	.0006
50134M001	DARWIN I	GPS	DARW	-4091358.781	4684606.724	-1408580.460	.023	.026	.011
50134M001				-.0423	-.0041	.0544	.0075	.0083	.0036
50135M001	MACQUARIE ISLAND	GPS	MAC1	-3464038.501	1334172.763	-5169224.323	.002	.001	.003
50135M001				-.0192	.0190	.0175	.0006	.0004	.0008
50136M001	JABIRU	GPS	JAB1	-4236442.824	4559929.623	-1388624.653	.030	.032	.011
50136M001				-.0296	-.0181	.0592	.0127	.0137	.0048
50137M001	ALICE SPRINGS/TE	GPS	ALIC	-4052051.830	4212836.100	-2545105.836	.008	.008	.005
50137M001				-.0437	.0009	.0497	.0029	.0030	.0019
50138M001	CEDUNA	GPS	CEDU	-3753472.231	3912740.984	-3347960.860	.009	.009	.008
50138M001				-.0455	.0066	.0461	.0033	.0034	.0029

50139M001	KARRATHA	GPS	KARR	-2713832.258	5303935.087	-2269515.012	.006	.010	.005
50139M001				-.0458	.0058	.0512	.0022	.0037	.0018
50140M001	TOWNSVILLE/CAPE	GPS	TOW2	-5054582.693	3275504.449	-2091539.703	.009	.006	.005
50140M001				-.0353	-.0120	.0496	.0033	.0024	.0017
50207M001	CHATHAM ISLAND	GPS	CHAT	-4590670.912	-275482.993	-4404596.777	.002	.001	.002
50207M001				-.0263	.0399	.0212	.0007	.0004	.0007
50209M001	AUCKLAND	GPS	AUCK	-5105681.003	461564.048	-3782181.752	.002	.001	.002
50209M001				-.0253	-.0012	.0288	.0008	.0004	.0007
50501M002	GUAM	GPS	GUAM	-5071312.800	3568363.492	1488904.316	.002	.002	.002
50501M002				.0042	.0105	.0030	.0009	.0007	.0005
50506M001	KWAJALEIN ATOLL	GPS	KWJ1	-6160881.013	1339882.959	960810.459	.003	.002	.002
50506M001				.0207	.0673	.0270	.0016	.0008	.0006
66001M003	MC MURDO	GPS	MCMU	-1311703.250	310815.104	-6213255.125	.001	.001	.003
66001M003				.0088	-.0120	-.0033	.0004	.0004	.0013
66001S006	MC MURDO	GPS	MCMU	-1310621.746	310414.119	-6213400.393	.035	.025	.097
66001S006				.0088	-.0120	-.0033	.0004	.0004	.0013
66004M001	MAWSON STATION	GPS	MAW1	1111287.166	2168911.279	-5874493.595	.002	.003	.008
66004M001				.0014	-.0023	-.0036	.0008	.0012	.0028
66005M002	PALMER STATION	GPS	PALM	1192671.773	-2450887.581	-5747096.045	.002	.003	.006
66005M002				.0165	-.0052	.0029	.0008	.0012	.0024
66006S002	SYOWA	GPS	SYOG	1766207.841	1460290.350	-5932297.680	.003	.002	.007
66006S002				.0038	-.0015	-.0015	.0008	.0008	.0018
66008M001	O'HIGGINS	GPS	OHIG	1525872.480	-2432481.304	-5676146.082	.001	.002	.003
66008M001				.0193	-.0037	-.0039	.0005	.0006	.0010
66009M001	SANAE	GPS	VESL	2009329.713	-99741.474	-6033158.472	.003	.002	.005
66009M001				.0102	.0018	.0048	.0009	.0009	.0011
66010M001	DAVIS	GPS	DAV1	486854.548	2285099.302	-5914955.683	.001	.001	.003
66010M001				.0008	-.0032	-.0057	.0004	.0004	.0006
66011M001	CASEY	GPS	CAS1	-901776.162	2409383.419	-5816748.420	.001	.002	.003
66011M001				.0001	-.0077	-.0073	.0004	.0005	.0010
82001S003	ISABELLA	GPS	PUR3	2358177.858	-5573619.714	2007083.844	.009	.015	.006
82001S003				.0110	.0030	.0124	.0047	.0074	.0030
91201M002	KERGUELEN	GPS	KERG	1406337.336	3918161.100	-4816167.355	.001	.002	.002
91201M002				-.0053	.0028	-.0058	.0005	.0007	.0008
91501M001	ILE DES PETRELS	GPS	DUM1	-1940883.779	1628483.353	-5833718.017	.003	.003	.006
91501M001				-.0015	-.0139	-.0024	.0009	.0009	.0014
92201M003	PAPEETE (TAHITI)	GPS	PAMA	-5245195.332	-3080472.188	-1912825.381	.005	.004	.002
92201M003				-.0425	.0468	.0291	.0007	.0008	.0007
92201M006	PAPEETE (TAHITI)	GPS	TAHI	-5246568.791	-3076989.491	-1913777.527	.003	.003	.002
92201M006				-.0425	.0468	.0291	.0007	.0008	.0007
92201M009	PAPEETE (TAHITI)	GPS	THTI	-5246415.202	-3077260.424	-1913842.475	.003	.003	.003
92201M009				-.0425	.0468	.0291	.0007	.0008	.0007
92701M003	NOUMEA	GPS	NOUM	-5739971.535	1387563.663	-2402123.551	.005	.003	.003
92701M003				-.0210	-.0141	.0415	.0018	.0011	.0011
97301M210	KOUROU	GPS	KOUR	3839591.421	-5059567.553	579956.935	.002	.002	.001
97301M210				-.0027	-.0039	.0122	.0007	.0008	.0003

SOLN: Solution Number Estimate using observations occurred after the indicated epoch.

Table 9 DORIS ITRF2000 station positions at epoch 1997.0 and velocities.

DOMES NB.	SITE NAME	TECH.	ID.	X/Vx	Y/Vy	Z/Vz	Sigmas			SOLN
				m/m/y						
10003S001	TOULOUSE	DORIS	TLSA	4628047.462	119670.346	4372787.806	.003	.003	.003	
10003S001				-.0134	.0187	.0088	.0009	.0003	.0008	
10003S003	TOULOUSE	DORIS	TLHA	4628693.678	119984.735	4372104.317	.004	.004	.004	
10003S003				-.0134	.0187	.0088	.0009	.0003	.0008	
10202S001	REYKJAVIK	DORIS	REYA	2585528.239	-1044368.114	5717159.006	.004	.004	.004	
10202S001				-.0199	-.0019	.0073	.0004	.0003	.0008	
10202S002	REYKJAVIK	DORIS	REYB	2585528.272	-1044368.151	5717159.215	.003	.003	.004	
10202S002				-.0199	-.0019	.0073	.0004	.0003	.0008	
10317S002	NY-ALESUND	DORIS	SPIA	1202793.980	254163.084	6237609.354	.003	.003	.003	
10317S002				-.0144	.0076	.0090	.0002	.0001	.0006	
10503S013	METSAHOVI	DORIS	META	2890641.129	1310310.549	5513964.949	.003	.003	.004	
10503S013				-.0160	.0149	.0088	.0003	.0002	.0006	
12329S001	YUZHNO-SAKHALINS	DORIS	SAKA	-3465326.122	2638266.734	4644082.362	.006	.006	.006	
12329S001				-.0213	-.0033	-.0125	.0023	.0022	.0025	
12334S004	KITAB	DORIS	KITA	1945024.624	4556708.879	4004235.866	.002	.003	.003	
12334S004				-.0272	.0075	.0022	.0004	.0007	.0006	
12334S005	KITAB	DORIS	KITB	1945024.394	4556708.335	4004235.373	.002	.003	.003	
12334S005				-.0272	.0075	.0022	.0004	.0007	.0006	
12338S001	BADARY	DORIS	BADA	-838277.706	3865777.028	4987626.676	.004	.004	.004	
12338S001				-.0261	.0024	-.0035	.0021	.0021	.0021	
12339S001	PARAMUSHIR (ILES	DORIS	PASB	-3703647.535	1640011.661	4910412.903	.034	.051	.033	
12339S001				.0709	.0800	.0126	.0917	.1298	.0871	
12349S001	KRASNOYARSK	DORIS	KRAB	-174261.947	3571339.557	5264200.539	.003	.004	.005	
12349S001				-.0245	.0029	-.0065	.0007	.0015	.0021	
12602S011	DIONYSOS	DORIS	DIOA	4595215.240	2039475.402	3912615.068	.008	.009	.007	
12602S011				.0059	.0065	-.0085	.0016	.0015	.0016	
21501S001	EVEREST	DORIS	EVEB	313666.474	5633552.703	2974736.718	.011	.008	.006	
21501S001				-.0328	-.0061	.0217	.0053	.0041	.0029	
21604S003	PURPLE MOUNTAIN	DORIS	PURA	-2608502.045	4739980.356	3366883.078	.009	.008	.006	
21604S003				-.0305	-.0012	-.0075	.0047	.0040	.0031	
22006S001	MANILLE	DORIS	MANA	-3184357.591	5291042.203	1590419.468	.010	.009	.005	
22006S001				.0287	.0130	.0011	.0049	.0042	.0025	
23101S001	CIBINONG	DORIS	CIBB	-1836963.589	6065626.697	-716217.271	.006	.006	.003	
23101S001				-.0203	-.0155	-.0048	.0024	.0027	.0012	
23501S001	COLOMBO	DORIS	COLA	1113278.620	6233646.287	760276.736	.011	.008	.005	
23501S001				-.0481	.0063	.0302	.0058	.0042	.0027	
30302S005	HARTEBEESTHOEK	DORIS	HBLA	5084641.495	2670349.940	-2768497.856	.004	.004	.004	
30302S005				-.0012	.0198	.0159	.0005	.0003	.0004	
30302S202	HARTEBEESTHOEK	DORIS	HBKA	5084641.535	2670349.719	-2768497.161	.003	.003	.003	
30302S202				-.0012	.0198	.0159	.0005	.0003	.0004	
30313S001	MARION ISLAND (P	DORIS	MARA	3448405.619	2680356.296	-4632640.416	.007	.008	.007	
30313S001				-.0053	.0027	.0020	.0032	.0034	.0029	
30313S002	MARION ISLAND (P	DORIS	MARB	3448405.755	2680356.388	-4632640.596	.031	.032	.029	
30313S002				-.0053	.0027	.0020	.0032	.0034	.0029	
30602S004	ASCENSION III	DORIS	ASDB	6121161.551	-1563943.209	-872613.095	.005	.003	.003	
30602S004				-.0025	-.0048	.0102	.0015	.0007	.0004	
30604S001	TRISTAN DA CUNHA	DORIS	TRIA	4978463.192	-1086620.670	-3823205.613	.005	.006	.004	
30604S001				.0193	.0162	.0165	.0023	.0029	.0020	
30606S002	SAINTE-HELENE	DORIS	HELA	6104828.425	-605837.482	-1740706.481	.016	.025	.012	
30606S002				.0088	.0161	.0202	.0068	.0102	.0050	
30606S003	SAINTE-HELENE	DORIS	HELB	6104823.158	-605830.941	-1740720.161	.023	.035	.017	
30606S003				.0088	.0161	.0202	.0068	.0102	.0050	
31901S001	FLORES	DORIS	FLOA	4221385.077	-2549305.644	4031509.324	.444	.503	.363	
31901S001				-.0619	.0262	.0089	.1153	.1307	.0943	
31903S001	SANTA MARIA	DORIS	SAMB	4617391.260	-2169543.792	3815405.092	.013	.015	.011	
31903S001				-.0067	.0146	.0272	.0096	.0116	.0079	
31906S001	PONTA DELGADA (S	DORIS	PDLB	4551593.796	-2186898.879	3883409.421	.015	.016	.012	
31906S001				.0006	.0165	.0111	.0035	.0035	.0030	
32809S002	N KOLTANG (STATI	DORIS	LIBA	6287388.588	1071574.228	39147.138	.007	.008	.004	
32809S002				-.0076	.0138	.0177	.0022	.0024	.0013	
32809S003	N KOLTANG (STATI	DORIS	LIBB	6287388.836	1071574.275	39147.138	.007	.008	.004	
32809S003				-.0076	.0138	.0177	.0022	.0024	.0013	
33710S002	ARLIT	DORIS	ARMA	5991269.363	773728.558	2040688.517	.017	.025	.013	
33710S002				-.0137	.0230	.0176	.0086	.0125	.0067	

34101S004	DAKAR	DORIS	DAKA	5886437.429	-1848461.501	1611441.716	.007	.010	.005
34101S004				.0007	.0195	.0151	.0037	.0053	.0025
39901S002	DJIBOUTI	DORIS	DJIA	4583119.395	4250952.183	1266247.730	.007	.007	.004
39901S002				-.0195	.0188	.0194	.0034	.0035	.0019
40102S009	ONTARIO-OTTAWA	DORIS	OTTA	1107623.474	-4347253.868	4518738.045	.014	.010	.010
40102S009				-.0190	.0020	.0094	.0092	.0066	.0066
40102S011	ONTARIO-OTTAWA	DORIS	OTTB	1107623.639	-4347254.010	4518738.214	.030	.021	.021
40102S011				-.0190	.0020	.0094	.0092	.0066	.0066
40127S007	YELLOWKNIFE	DORIS	YELA	-1224424.065	-2689227.457	5633645.268	.004	.004	.004
40127S007				-.0208	-.0044	-.0009	.0002	.0003	.0006
40405S005	GOLDSTONE	DORIS	GOMA	-2350858.638	-4655545.739	3661004.732	.003	.004	.004
40405S005				-.0161	.0059	-.0051	.0002	.0003	.0004
40405S035	GOLDSTONE	DORIS	GOLA	-2356503.874	-4646583.989	3668453.194	.004	.005	.005
40405S035				-.0161	.0059	-.0051	.0002	.0003	.0004
40405S037	GOLDSTONE	DORIS	GOMB	-2350858.666	-4655545.794	3661004.776	.003	.004	.004
40405S037				-.0161	.0059	-.0051	.0002	.0003	.0004
40408S004	FAIRBANKS	DORIS	FAIA	-2282503.083	-1453417.029	5756694.545	.003	.003	.003
40408S004				-.0222	-.0036	-.0092	.0002	.0002	.0004
40424S008	KAUAI	DORIS	KOKA	-5543974.667	-2054589.924	2387488.165	.004	.006	.003
40424S008				-.0095	.0630	.0298	.0003	.0002	.0004
40499S016	RICHMOND	DORIS	RIDA	960756.810	-5673685.134	2741529.554	.005	.005	.004
40499S016				-.0097	-.0013	.0013	.0002	.0005	.0004
40503S003	SOCORRO ISLAND	DORIS	SODA	-2160725.393	-5643017.328	2034836.883	.023	.019	.011
40503S003				-.0398	.0309	.0107	.0139	.0110	.0070
40503S004	SOCORRO ISLAND	DORIS	SODB	-2160725.482	-5643017.561	2034836.967	.023	.019	.011
40503S004				-.0398	.0309	.0107	.0139	.0110	.0070
41507S003	RIO GRANDE	DORIS	RIOA	1429849.894	-3495346.452	-5122723.095	.003	.003	.004
41507S003				.0079	-.0102	.0028	.0007	.0009	.0011
41507S004	RIO GRANDE	DORIS	RIOB	1429854.177	-3495342.346	-5122725.196	.002	.003	.004
41507S004				.0079	-.0102	.0028	.0007	.0009	.0011
41609S001	CACHOEIRA PAULIS	DORIS	CACB	4163494.036	-4163782.191	-2444561.601	.009	.011	.006
41609S001				.0069	-.0081	.0080	.0043	.0054	.0032
41703S008	EASTER ISLAND	DORIS	EASA	-1884993.740	-5357605.042	-2892858.673	.005	.004	.003
41703S008				.0638	-.0190	-.0068	.0004	.0005	.0004
41705S007	SANTIAGO	DORIS	SANA	1776346.796	-5026544.334	-3491183.620	.011	.008	.007
41705S007				.0221	-.0059	.0111	.0004	.0006	.0005
41705S008	SANTIAGO	DORIS	SAOB	1769700.324	-5044614.902	-3468261.229	.003	.004	.004
41705S008				.0221	-.0059	.0111	.0004	.0006	.0005
41708S001	IQUIQUE	DORIS	IQUB	2057516.265	-5623891.567	-2191168.819	.067	.047	.031
41708S001				.0215	.0031	.0118	.0379	.0266	.0175
41710S001	CARIQUIMA	DORIS	CARB	2187706.663	-5607222.345	-2114900.544	.103	.074	.049
41710S001				-.0355	.0096	.0170	.0580	.0411	.0276
42004S001	SAN CRISTOBAL (G	DORIS	GALA	42716.691	-6377216.468	-99590.655	.012	.008	.005
42004S001				.0492	.0016	.0088	.0064	.0043	.0029
42202S005	AREQUIPA	DORIS	AREA	1942796.745	-5804077.725	-1796919.090	.002	.003	.002
42202S005				.0118	-.0010	.0137	.0003	.0004	.0003
50103S201	CANBERRA	DORIS	ORRA	-4446470.646	2678101.947	-3696274.156	.007	.007	.006
50103S201				-.0376	.0011	.0440	.0004	.0003	.0005
50103S202	CANBERRA	DORIS	ORRB	-4446470.825	2678102.059	-3696274.272	.002	.002	.002
50103S202				-.0376	.0011	.0440	.0004	.0003	.0005
50107S006	YARRAGADEE	DORIS	YARA	-2389003.897	5043340.608	-3078513.098	.003	.004	.003
50107S006				-.0470	.0079	.0488	.0002	.0003	.0004
50107S010	YARRAGADEE	DORIS	YARB	-2389004.028	5043340.810	-3078513.191	.001	.002	.002
50107S010				-.0470	.0079	.0488	.0002	.0003	.0004
50119S002		DORIS	MSOB	-4467068.113	2683030.093	-3667003.998	.002	.002	.002
50119S002				-.0351	-.0013	.0461	.0007	.0007	.0008
50207S001	CHATHAM ISLAND	DORIS	CHAB	-4590646.223	-275436.686	-4404628.840	.004	.003	.004
50207S001				-.0263	.0399	.0212	.0007	.0004	.0007
50501S001	GUAM	DORIS	GUAB	-5075278.513	3565110.796	1483590.931	.004	.005	.004
50501S001				.0042	.0105	.0030	.0009	.0007	.0005
51001S001	PORT MORESBY	DORIS	MORA	-5288462.970	3410034.465	-1038802.547	.014	.015	.008
51001S001				-.0264	-.0215	.0533	.0048	.0053	.0028
66006S001	SYOWA	DORIS	SYOB	1766498.910	1460274.404	-5932211.778	.004	.004	.005
66006S001				.0038	-.0015	-.0015	.0008	.0008	.0018
66006S003	SYOWA	DORIS	SYPB	1766505.896	1460266.974	-5932207.693	.003	.003	.007
66006S003				.0038	-.0015	-.0015	.0008	.0008	.0018
66007S001	ROTHERA	DORIS	ROTA	909378.192	-2264934.545	-5872956.909	.004	.004	.005
66007S001				.0154	-.0025	.0020	.0009	.0012	.0019
91201S002	KERGUELEN	DORIS	KERA	1405826.345	3918281.675	-4816204.137	.002	.003	.003
91201S002				-.0053	.0028	-.0058	.0005	.0007	.0008

91201S003	KERGUELEN	DORIS	KERB	1405826.410	3918281.824	-4816204.291	.002	.003	.003
91201S003				-.0053	.0028	-.0058	.0005	.0007	.0008
91401S001	AMSTERDAM	DORIS	AMSA	1086061.644	4927962.970	-3887828.328	.014	.011	.009
91401S001				.0100	-.0129	-.0103	.0066	.0050	.0043
91401S002	AMSTERDAM	DORIS	AMSB	1086063.006	4927948.552	-3887839.975	.023	.018	.015
91401S002				.0100	-.0129	-.0103	.0066	.0050	.0043
91501S001	ILE DES PETRELS	DORIS	ADEA	-1941059.672	1628659.298	-5833613.537	.003	.003	.004
91501S001				-.0015	-.0139	-.0024	.0009	.0009	.0014
92201S007	PAPEETE (TAHITI)	DORIS	PAPB	-5246579.825	-3076973.090	-1913777.113	.004	.004	.003
92201S007				-.0425	.0468	.0291	.0007	.0008	.0007
92201S008	PAPEETE (TAHITI)	DORIS	PAQB	-5246414.074	-3077266.783	-1913840.110	.004	.004	.003
92201S008				-.0425	.0468	.0291	.0007	.0008	.0007
92202S009	HUAHINE (MOTU H	DORIS	HUAA	-5345873.394	-2958239.028	-1824624.205	.010	.010	.008
92202S009				-.0388	.0542	.0309	.0017	.0015	.0012
92403S001	RAPA	DORIS	RAQB	-4594704.626	-3297397.505	-2939098.788	.012	.013	.008
92403S001				-.0477	.0535	.0295	.0111	.0121	.0077
92701S001	NOUMEA	DORIS	NOUA	-5739993.760	1387548.376	-2402085.294	.005	.004	.004
92701S001				-.0210	-.0141	.0415	.0018	.0011	.0011
92722S001	WANAHAM/ILE LIFO	DORIS	LIFB	-5818620.100	1317666.276	-2248371.784	.028	.042	.018
92722S001				-.0226	.0008	.0413	.0188	.0285	.0120
92802S001	TANNA	DORIS	TANB	-5908269.263	1118485.175	-2119839.735	.029	.044	.019
92802S001				.0155	.1140	.0064	.0217	.0334	.0139
92901S001	WALLIS	DORIS	WALA	-6195393.766	-413727.968	-1454075.313	.013	.018	.009
92901S001				-.0090	.0607	.0328	.0063	.0091	.0042
97301S004	KOUROU	DORIS	KRUB	3855261.278	-5049734.807	563057.788	.007	.007	.004
97301S004				-.0027	-.0039	.0122	.0007	.0008	.0003
97401S001	LA REUNION	DORIS	REUA	3364093.844	4907945.457	-2293482.325	.007	.007	.004
97401S001				-.0066	.0107	.0120	.0034	.0030	.0019
97401S002	LA REUNION	DORIS	REUB	3364093.397	4907944.812	-2293482.052	.007	.007	.004
97401S002				-.0066	.0107	.0120	.0034	.0030	.0019

Table 10 Transformation parameters from ITRF2000 to individual solutions

Solution	T1 cm	T2 cm	T3 cm	D 10-8	R1 .001"	R2 .001"	R3 .001"	Epoch y
(GIUB) 00 R 01	19.20	243.81	10.97	-.017	.290	-.035	-.001	97: 1
	.12	.12	.15	.035	.034	.031	.026	
Rates	.14	-.12	-.14	-.001	.038	.012	-.054	
	.06	.06	.06	.005	.019	.018	.018	
(GSFC) 00 R 01	-21.43	-43.82	-1.80	-.050	-1.829	.210	-.877	97: 1
	.10	.10	.14	.034	.029	.025	.020	
Rates	-1.41	-3.82	-.14	-.003	-.403	-.037	-.244	
	.02	.02	.03	.005	.004	.004	.003	
(SHA) 00 R 01	31.70	36.24	-11.64	-.022	.020	-.226	.068	97: 1
	.13	.13	.16	.035	.040	.038	.033	
Rates	-.01	-.21	.12	-.001	-.013	-.035	-.059	
	.08	.08	.09	.005	.028	.027	.026	
(FSG) 00 M 01	13.84	-16.73	-4.79	-.858	-9.568	-2.709	10.871	97: 1
	13.26	10.86	12.50	.199	6.400	6.364	2.297	
Rates	1.90	-1.15	.42	-.009	-.617	-.894	-.072	
	1.32	1.11	1.27	.030	.647	.634	.134	
(AUS) 00 L 01	-.31	-.13	.08	.022	.285	.067	.190	97: 1
	.13	.13	.25	.034	.045	.052	.041	
Rates	.25	.03	-.15	.007	.206	-.061	-.016	
	.05	.05	.09	.007	.015	.017	.011	
(CGS) 00 L 01	.11	.14	.01	-.026	.335	.074	-1.264	97: 1
	.09	.09	.24	.039	.064	.086	.073	
Rates	.01	.01	.01	-.011	.100	-.149	-.448	
	.02	.02	.06	.006	.012	.014	.013	
(CRL) 00 L 02	.00	.02	.11	.028	.768	-.049	.472	97: 1
	.11	.11	.15	.035	.049	.038	.046	
Rates	-.03	.03	-.03	.004	.122	-.033	.064	
	.03	.04	.05	.007	.010	.008	.007	
(CSR) 00 L 04	-.03	.07	.28	.090	4.205	-10.233	12.818	97: 1
	.00	.00	.00	.000	.043	.039	.049	
Rates	.02	.03	.09	.002	1.723	-2.372	3.838	
	.00	.00	.00	.000	.007	.006	.008	
(DEOS) 00 L 01	-1.07	-.41	-1.09	.203	.938	9.660	-3.630	97: 1
	.16	.20	.24	.041	.068	.062	.059	
Rates	-.01	-.05	-.07	.041	.170	2.228	-1.049	
	.03	.04	.05	.007	.011	.009	.010	
(DGFI) 00 L 01	-.21	-.19	.17	.003	.937	.442	.764	97: 1
	.12	.12	.30	.033	.081	.062	.074	
Rates	.00	.02	.01	-.005	.053	.010	.025	
	.04	.04	.10	.006	.019	.016	.018	

(JCET)	00 L 05	.02	-.01	-.15	.094	20.077	-9.826	55.270	97: 1
		.06	.07	.15	.032	.024	.027	.026	
Rates		.01	-.03	.05	.019	6.574	-3.268	-.386	
		.02	.02	.06	.006	.008	.008	.006	
(CODE)	00 P 01	.14	1.24	-1.22	-.036	-.612	-.752	-.525	97: 1
		.26	.26	.39	.034	.047	.049	.038	
Rates		.04	-.55	-.21	-.021	.085	-.149	-.075	
		.15	.15	.22	.008	.021	.022	.010	
(GFZ)	00 P 01	1.66	2.33	-1.45	.008	.355	-.133	-.123	97: 1
		.17	.17	.25	.033	.027	.031	.019	
Rates		-.04	-.10	-.06	.016	-.007	-.002	.039	
		.03	.04	.05	.006	.006	.006	.006	
(IGS)	00 P 01	.65	.59	-1.83	.138	.045	-.010	.021	97: 1
		.08	.08	.13	.032	.017	.019	.019	
Rates		-.05	-.05	-.15	-.002	-.004	.005	.022	
		.02	.02	.03	.006	.005	.006	.006	
(JPL)	00 P 01	.55	.77	-1.68	.131	.051	.025	.008	97: 1
		.07	.07	.12	.033	.013	.015	.013	
Rates		-.10	-.07	-.23	.017	-.009	.003	.027	
		.02	.02	.03	.006	.004	.005	.005	
(NCL)	00 P 01	.73	.69	-1.68	-.006	.050	-.009	.001	97: 1
		.21	.21	.29	.033	.035	.041	.016	
Rates		-.03	-.18	-.13	-.001	-.015	-.009	.032	
		.14	.13	.13	.007	.023	.027	.012	
(NOAA)	00 P 01	1.56	.96	-12.68	-.015	962.178	606.516	-2004.490	97: 1
		.07	.08	.12	.033	.014	.016	.014	
Rates		-.06	-.59	2.89	.008	.244	.079	1.183	
		.04	.03	.04	.007	.006	.008	.009	
(GRGS)	00 D 01	1.30	.34	-8.81	.641	.014	-.691	.269	97: 1
		.21	.19	.17	.040	.054	.055	.114	
Rates		.01	-.23	-.05	-.046	.146	.034	-.108	
		.11	.11	.08	.015	.028	.029	.065	
(IGN)	00 D 09	-1.00	-1.03	-3.72	-.377	-3.015	6.195	-2850.742	97: 1
		.26	.26	.26	.050	.047	.050	.078	
Rates		-.30	.04	-.65	-.095	-.091	.159	13.211	
		.18	.18	.18	.028	.017	.017	.032	
(GRIM)	00 C 01	.03	.11	.96	-.029	-.026	.050	-19.599	97: 1
		.07	.07	.17	.031	.028	.032	.115	
Rates		-.05	.01	.16	-.010	-.034	-.007	-4.912	
		.02	.02	.04	.005	.006	.007	.020	
(CSR)	00 C 01	.01	.02	.36	-.080	-8.120	-.821	.327	97: 1
		.06	.06	.15	.032	.023	.027	.027	
Rates		.02	-.02	.06	.004	-2.617	1.737	.055	
		.02	.02	.05	.006	.007	.008	.006	

(CORS)	00 P 01	2.34	1.49	-10.96	-.025	-1.007	-.403	-.456	97: 1
		.34	.29	.31	.039	.124	.089	.077	
Rates		.22	-.56	.20	-.024	-.076	.042	-.108	
		.19	.16	.17	.014	.073	.051	.044	
(DGFI)	00 P 01	.43	.76	-2.42	-.066	-.128	-.154	.165	97: 1
		.47	.32	.72	.077	.191	.127	.157	
Rates		.10	-.05	.22	.013	.107	.141	-.039	
		.21	.15	.27	.030	.074	.053	.071	
(EUR)	00 P 03	.41	.67	-1.31	.062	-.127	.303	.418	97: 1
		.28	.32	.26	.040	.086	.103	.066	
Rates		-.08	.02	-.38	.017	.116	-.020	-.173	
		.13	.15	.11	.012	.041	.050	.031	
(GIA)	00 P 01	.70	-.21	-2.13	.090	-.176	-.022	-.089	97: 1
		.27	.34	.25	.039	.118	.072	.051	
Rates		.62	-.39	-.17	-.048	-.094	-.132	-.099	
		.18	.22	.15	.015	.081	.049	.036	
(IGN)	00 P 01	-6.52	1.26	13.61	.060	-.045	2.673	.652	97: 1
		1.21	2.36	1.41	.067	.576	.584	.524	
Rates		-14.95	1.60	-24.46	.881	.088	-1.585	-.197	
		.59	1.24	.70	.028	.303	.287	.272	
(IGN)	00 P 02	6.97	2.91	24.91	.696	-.189	.246	.389	97: 1
		.29	.30	.20	.047	.096	.089	.031	
Rates		-1.63	-.62	-2.49	-.109	-.186	-.008	-.016	
		.24	.54	.15	.042	.170	.065	.038	
(JPL)	00 P 02	43.16	-20.53	-7.40	.723	-5.448	-7.391	-12.455	97: 1
		20.18	20.17	21.16	.692	8.274	4.386	6.673	
Rates		2.48	-1.26	-1.98	.167	-.745	-.498	-.543	
		6.58	5.35	6.56	.237	2.347	1.604	1.975	
(REGAL)	00 P 03	-5.07	-10.02	-40.18	.743	-3.072	-4.485	2.090	97: 1
		3.43	6.37	3.97	.180	1.518	1.661	1.436	
Rates		7.82	4.23	1.71	-.018	-.488	-2.616	-2.683	
		1.29	2.32	1.48	.064	.554	.622	.524	
(SCAR)	00 P 01	-.08	.32	.47	.176	.452	.171	-.006	97: 1
		.10	.12	.16	.036	.036	.049	.022	
Rates		-.39	1.23	-.58	-.051	-.395	-.052	.100	
		.04	.05	.05	.009	.017	.024	.010	

Table 11 ITRF2000 Residuals

10002 GRASSE

DOMES NUM.	S	CDP NUM.	*	RX m	RY m	RZ m	RE m	RN m	RU m	NE	NN	NU	EPOCH y
Positions													
M003	1	7605	TIE10002	-.0019	-.0017	.0022	-.0014	.0030	.0000	-.5	1.0	.0	97: 1
M003	1	7605	R GSFC	.0151	.0065	.0094	.0047	-.0041	.0179	.5	-.1	.5	89:257
M003	1	7605	R SHA	.0084	.0058	.0036	.0047	-.0037	.0090	.4	-.1	.3	89:257
M006	1	GRAS	TIE10002	.0023	-.0008	.0059	-.0011	.0027	.0056	-.4	.9	1.8	97: 1
M006	1	GRAS	P CODE	-.0018	-.0019	.0037	-.0017	.0040	.0011	-.7	1.1	.3	97:340
M006	1	GRAS	P IGS	-.0022	-.0002	-.0025	.0000	-.0003	-.0033	.0	-.1	-1.5	98:177
M006	1	GRAS	P1 JPL	.0000	.0002	-.0010	.0002	-.0008	-.0007	.1	-.3	-.3	97:257
M006	1	GRAS	P NCL	-.0039	-.0018	-.0071	-.0013	-.0023	-.0078	-.5	-.2	-.7	96:252
M006	1	GRAS	P NOAA	-.0010	-.0006	-.0004	-.0004	.0005	-.0011	-.2	.2	-.4	97:296
M006	1	GRAS	P EUR	-.0016	.0002	-.0013	.0004	.0002	-.0020	.5	.1	-.7	98: 97
M006	1	GRAS	P1 IGN	-.0004	-.0001	.0000	.0000	.0002	-.0003	-.1	.2	-.3	98:317
M006	1	GRAS	P REGAL	-.0005	.0006	.0002	.0006	.0004	-.0002	.7	.2	-.1	98:338
S001	1	7835	TIE10002	.0000	.0000	.0000	.0000	.0000	.0000	.0	.0	.0	97: 1
S001	1	7835	L AUS	-.0040	-.0030	.0007	-.0025	.0035	-.0026	-.5	.7	-.5	98:294
S001	1	7835	L CGS	-.0064	.0103	-.0120	.0110	-.0051	-.0120	1.9	-1.0	-2.4	93: 97
S001	1	7835	L CRL	-.0324	-.0030	-.0173	.0009	.0100	-.0354	.2	1.0	-3.5	91: 76
S001	1	7835	L4 CSR	-.0102	.0028	-.0107	.0041	-.0009	-.0144	1.5	-.2	-2.9	92:104
S001	1	7835	L DEOS	.0043	.0003	.0148	-.0003	.0077	.0133	.0	1.4	2.4	92:216
S001	1	7835	L DGFI	.0005	-.0001	.0143	-.0002	.0100	.0103	.0	2.0	2.1	93:196
S001	1	7835	L JCET	.0009	-.0006	.0017	-.0007	.0006	.0018	-.6	.3	.8	97:101
S001	1	7835	C GRIM	-.0028	-.0053	-.0076	-.0050	-.0031	-.0077	-1.0	-1.1	-2.8	93: 1
S001	1	7835	C1 CSR	-.0001	-.0009	-.0040	-.0008	-.0028	-.0029	-.6	-1.0	-1.1	96:355
S002	1	7845	TIE10002	-.0028	-.0036	.0027	-.0032	.0042	-.0004	-1.0	1.3	-.1	97: 1
S002	1	7845	M FSG	-.0008	.0054	.0018	.0055	.0015	.0012	.1	.1	.1	93: 1
S002	1	7845	L AUS	.0048	-.0017	.0014	-.0023	-.0022	.0042	-.2	-.3	.5	99:251
S002	1	7845	L CGS	.0024	.0119	-.0008	.0116	-.0032	.0022	1.2	-.2	.2	97: 1
S002	1	7845	L CRL	-.0113	.0006	.0044	.0019	.0108	-.0050	.1	.3	-.1	99:125
S002	1	7845	L4 CSR	.0097	.0029	.0045	.0017	-.0037	.0103	.2	-.2	.6	98:347
S002	1	7845	L DEOS	-.0019	-.0018	-.0011	-.0015	.0007	-.0023	-.1	.1	-.2	93: 1
S002	1	7845	L DGFI	-.0053	-.0025	.0056	-.0018	.0079	-.0002	-.2	.9	.0	94:322
S002	1	7845	C GRIM	-.0047	.0004	-.0209	.0010	-.0119	-.0178	.2	-1.1	-1.7	92: 69
S002	1	7845	C1 CSR	.0003	.0000	-.0039	-.0001	-.0030	-.0025	.0	-.3	-.3	98:331

				RVX m/y	RVY m/y	RVZ m/y	RVE m/y	RVN m/y	RVU m/y	NVE	NVN	NVU
Velocities												
M003	1	7605	R GSFC	-.1647	-.7036	.1736	-.6786	.2971	-.0593	-.5	.2	.0
M003	1	7605	R SHA	-.0041	-.0229	.0076	-.0222	.0102	.0003	-.1	.0	.0
M006	1	GRAS	P CODE	-.0004	.0003	-.0020	.0004	-.0012	-.0016	.3	-.4	-.6
M006	1	GRAS	P IGS	.0003	.0006	.0004	.0005	.0000	.0006	.8	.0	.3
M006	1	GRAS	P1 JPL	-.0011	-.0004	-.0013	-.0003	-.0001	-.0017	-.3	-.1	-.9
M006	1	GRAS	P NCL	.0002	-.0006	.0008	-.0006	.0004	.0006	-.6	.2	.3
M006	1	GRAS	P NOAA	-.0022	-.0002	-.0005	.0001	.0012	-.0019	.1	.6	-1.1
M006	1	GRAS	P EUR	-.0002	.0000	.0003	.0000	.0003	.0000	.0	.1	.0
M006	1	GRAS	P1 IGN	-.0003	-.0003	.0001	-.0003	.0003	-.0002	-.6	.2	-.1
M006	1	GRAS	P REGAL	.0002	.0005	.0006	.0005	.0002	.0006	.7	.1	.3
S001	1	7835	L AUS	.0009	-.0011	-.0006	-.0012	-.0009	.0001	-.4	-.4	.0
S001	1	7835	L CGS	-.0012	-.0008	.0005	-.0007	.0012	-.0005	-.4	1.1	-.5
S001	1	7835	L CRL	.0037	.0000	.0029	-.0004	-.0004	.0047	-.1	-.1	1.0
S001	1	7835	L4 CSR	-.0007	-.0006	-.0010	-.0005	-.0002	-.0012	-.6	-.2	-1.0
S001	1	7835	L DEOS	.0037	-.0011	-.0015	-.0016	-.0036	.0015	-.8	-1.1	.5
S001	1	7835	L DGFI	.0008	-.0012	.0001	-.0013	-.0004	.0005	-.8	-.3	.3
S001	1	7835	L JCET	.0016	.0001	-.0003	-.0001	-.0013	.0010	-.2	-1.2	.9
S001	1	7835	C GRIM	-.0010	-.0895	.0114	-.0887	.0163	-.0006	-.1	.0	.0
S001	1	7835	C1 CSR	.0004	.0002	.0001	.0002	-.0003	.0004	.2	-.2	.3
S002	1	7845	M FSG	.0000	.0002	.0004	.0002	.0003	.0003	.1	.1	.1
S002	1	7845	L AUS	-.0142	.0253	.0129	.0268	.0169	.0010	1.6	1.1	.1
S002	1	7845	L CGS	-.0155	.0068	.0132	.0086	.0197	-.0014	.0	.0	.0
S002	1	7845	L CRL	.0085	.0004	.0080	-.0006	-.0001	.0117	.0	.0	.4
S002	1	7845	L4 CSR	-.0001	.0001	.0013	.0001	.0010	.0008	.0	.1	.1
S002	1	7845	L DEOS	.0389	-.0083	-.0379	-.0129	-.0534	.0010	.0	.0	.0

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S002 1 7845 L DGFI       .0008 -.0012  .0001 -.0013 -.0004  .0005  -.8  -.3   .3
S002 1 7845 C GRIM       .0009 -.0042  .0020 -.0043  .0012  .0016 -1.4  1.7  2.2
S002 1 7845 C1 CSR      -.0008 -.0011 -.0017 -.0010 -.0006 -.0019  -.1   .0  -.1

10003 TOULOUSE

Positions
M003 1 7608 TIE10003     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 7608 R GSFC       .0250 -.0006  .0228 -.0012 -.0007  .0338  -.2   .0   .9 92:133
M003 1 7608 R SHA        .0233  .0000  .0208 -.0006 -.0010  .0312  -.1   .0   .9 92:133
M004 1 TOUL TIE10003    -.0030 -.0019 -.0049 -.0019 -.0015 -.0056  -.6  -.5 -1.8 97:  1
M004 1 TOUL P CODE      -.0007 -.0016  .0032 -.0015  .0028  .0017  -.5   .5   .3 99: 15
M004 1 TOUL P IGS       -.0011 -.0006 -.0014 -.0006 -.0002 -.0017  -.4  -.1  -.5 99:139
M004 1 TOUL P1 JPL       .0031  .0001  .0028  .0000 -.0001  .0042   .0   .0  1.1 98:282
M004 1 TOUL P NOAA       .0024  .0007  .0033  .0006  .0007  .0040   .3   .2  1.4 98:148
M004 1 TOUL P EUR       -.0020  .0005 -.0015  .0005  .0003 -.0025   .7   .1  -.7 98:244
M004 1 TOUL P1 IGN       .0001 -.0002 -.0001 -.0002 -.0002  .0000  -.7  -.2   .0 98:282
M004 1 TOUL P REGAL      .0016 -.0010 -.0004 -.0011 -.0014  .0009 -1.0  -.5   .3 99: 71
S001 1 TLSA TIE10003     .0033  .0015  .0049  .0014  .0012  .0058   .5   .4  1.8 97:  1
S001 1 TLSA D GRGS      -.0077 -.0029 -.0297 -.0027 -.0161 -.0261  -.1 -1.1 -1.7 95: 61
S001 1 TLSA D9 IGN      -.0134 -.0116 -.0249 -.0112 -.0087 -.0271  -.5  -.4 -1.3 95: 32
S001 1 TLSA C GRIM      -.0114  .0092 -.0205  .0095 -.0071 -.0222   .2  -.3  -.9 93:  1
S001 1 TLSA C1 CSR      -.0030 -.0094 -.0053 -.0093 -.0016 -.0060 -1.3  -.3 -1.0 95: 52
S003 1 TLHA TIE10003     .0059  .0014  .0047  .0013 -.0007  .0075   .3  -.2  1.7 97:  1
S003 1 TLHA D GRGS      -.0075  .0021 -.0294  .0023 -.0162 -.0256   .1  -.5  -.9 98:116
S003 1 TLHA D9 IGN      -.0118 -.0090 -.0211 -.0087 -.0070 -.0232  -.2  -.2  -.8 98:347
S003 1 TLHA C GRIM      -.0423  .0045 -.0054  .0056  .0251 -.0342   .1  1.2 -1.6 98:134
S003 1 TLHA C1 CSR      -.0106 -.0007 -.0029 -.0004  .0053 -.0097   .0   .6 -1.1 98:339

Velocities
M003 1 7608 R GSFC       .1373 -.5320 -.3362 -.5354 -.3288 -.1422  -.3  -.2  -.1
M003 1 7608 R SHA        .0001 -.0108 -.0056 -.0108 -.0040 -.0040   .0   .0   .0
M004 1 TOUL P CODE      -.0023  .0009 -.0044  .0010 -.0017 -.0047   .5  -.2  -.6
M004 1 TOUL P IGS       -.0028 -.0002 -.0029 -.0002 -.0002 -.0040  -.1   .0 -1.1
M004 1 TOUL P1 JPL      -.0042  .0003 -.0041  .0004 -.0001 -.0059   .2   .0 -1.2
M004 1 TOUL P NOAA      -.0046  .0002 -.0025  .0003  .0014 -.0051   .2   .4 -1.6
M004 1 TOUL P EUR       -.0035 -.0005 -.0032 -.0004  .0000 -.0047  -.5   .0  -.9
M004 1 TOUL P1 IGN      -.0012 -.0004 -.0012 -.0003  .0000 -.0017 -1.0   .0 -1.5
M004 1 TOUL P REGAL     -.0025  .0000 -.0018  .0000  .0004 -.0031   .0   .1 -1.0
S001 1 TLSA D GRGS      -.0032  .0004 -.0013  .0005  .0013 -.0032   .0   .1  -.3
S001 1 TLSA D9 IGN       .0005  .0050 -.0042  .0050 -.0034 -.0024   .2  -.2  -.1
S001 1 TLSA C GRIM      -.0116 -.0907  .0101 -.0904  .0170 -.0031  -.1   .0   .0
S001 1 TLSA C1 CSR      -.0017  .0087 -.0013  .0087  .0001 -.0019  1.5   .0  -.4
S003 1 TLHA D GRGS      -.0032  .0004 -.0013  .0005  .0013 -.0032   .0   .1  -.3
S003 1 TLHA D9 IGN      -.0051 -.0139  .0121 -.0138  .0125  .0043  -.3   .4   .1
S003 1 TLHA C GRIM      -.0052 -.0009 -.0013 -.0008  .0027 -.0046  -.1   .3  -.5
S003 1 TLHA C1 CSR      -.0084 -.0011  .0105 -.0009  .0134  .0011  -.1  1.2   .1

10004 BREST

Positions
M002 1 7604 TIE10004     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7604 R GSFC      -.0218  .0000 -.0223 -.0017  .0014 -.0311  -.3   .0  -.9 89:245
M002 1 7604 R SHA       -.0220 -.0003 -.0208 -.0020  .0026 -.0301  -.2   .1  -.9 89:245
M002 1 7604 P1 IGN       .0065 -.0009  .0056 -.0004 -.0012  .0086  -.3  -.2  1.6 98:215
M004 1 BRST TIE10004     .0092  .0006 -.0043  .0013 -.0097  .0029   .3 -2.2   .6 97:  1
M004 1 BRST P EUR       -.0037  .0007 -.0037  .0004  .0003 -.0053   .3   .1 -1.0 99:187
M004 1 BRST P1 IGN      -.0010 -.0006 -.0016 -.0006 -.0004 -.0018  -.7  -.1  -.4 99:169

Velocities
M002 1 7604 R GSFC       .3395  .5385 -.5514  .5635 -.5875 -.2158   .5  -.4  -.1
M002 1 7604 R SHA        .0131  .0249 -.0174  .0259 -.0198 -.0056   .1  -.1   .0
M002 1 7604 P1 IGN      -.0027 -.0002 -.0031 -.0004  .0000 -.0041  -.3   .0  -.6
M004 1 BRST P EUR        .0003 -.0011  .0038 -.0011  .0023  .0031  -.3   .1   .2
M004 1 BRST P1 IGN      -.0027 -.0002 -.0031 -.0004 -.0001 -.0041  -.3   .0  -.6

10011 SAINT-MICHEL DE

Positions
M001 1 MICH P1 IGN       .0005 -.0003  .0004 -.0004  .0000  .0006  -.7   .0   .3 99:160
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M001 1 MICH P REGAL      .0002  .0008  .0008  .0007  .0004  .0007  1.0   .2   .3 99:175

Velocities
M001 1 MICH P1 IGN       .0003 -.0001  .0008 -.0001  .0004  .0008  -.2   .1   .2
M001 1 MICH P REGAL      .0001 -.0004  .0007 -.0004  .0004  .0006  -.3   .1   .1

10073 MARSEILLE

Positions
M008 1 MARS P EUR       -.0036 -.0002 -.0030  .0001  .0003 -.0047   .1   .1 -1.0 99:145
M008 1 MARS P1 IGN       .0013 -.0003  .0013 -.0004  .0001  .0018  -.8   .0   .8 99:161
M008 1 MARS P REGAL     -.0002  .0010  .0004  .0010  .0004  .0001  1.1   .1   .1 99:147

Velocities
M008 1 MARS P EUR       -.0035  .0001 -.0020  .0004  .0010 -.0039   .2   .1  -.3
M008 1 MARS P1 IGN       .0021  .0000  .0023 -.0002  .0003  .0031  -.2   .1   .8
M008 1 MARS P REGAL     -.0023 -.0007 -.0013 -.0005  .0006 -.0026  -.3   .1  -.5

10077 AJACCIO

Positions
M005 1 AJAC P1 IGN       .0016 -.0001  .0020 -.0003  .0005  .0025  -.2   .1   .3  0: 38

Velocities
M005 1 AJAC P1 IGN      -.0077 -.0033 -.0117 -.0021 -.0033 -.0138   .0   .0  -.1

10090 SAINT JEAN DES V

Positions
M001 1 SJDV P CODE       .0007 -.0013  .0039 -.0013  .0023  .0032  -.4   .4   .6 99: 62
M001 1 SJDV P IGS       -.0012 -.0005 -.0007 -.0004  .0004 -.0013  -.3   .1  -.2 99:172
M001 1 SJDV P EUR       -.0007  .0002 -.0007  .0003  .0000 -.0010   .3   .0  -.2 99: 94
M001 1 SJDV P1 IGN       .0014 -.0002  .0013 -.0003 -.0001  .0019  -.8  -.1  1.1 98:318
M001 1 SJDV P REGAL     -.0008 -.0002 -.0024 -.0001 -.0011 -.0023  -.1  -.5 -1.1 99: 94

Velocities
M001 1 SJDV P CODE      -.0001  .0010 -.0029  .0010 -.0019 -.0021   .4  -.2  -.2
M001 1 SJDV P IGS        .0003 -.0001  .0002 -.0001  .0000  .0004   .0   .0   .0
M001 1 SJDV P EUR       -.0051 -.0015 -.0054 -.0011 -.0001 -.0075  -.5   .0  -.7
M001 1 SJDV P1 IGN       .0003 -.0003  .0006 -.0003  .0002  .0006  -.5   .1   .2
M001 1 SJDV P REGAL      .0011  .0000  .0012  .0000  .0001  .0016   .0   .0   .5

10091 LE MANS

Positions
M001 1 MANS P1 IGN      -.0001 -.0004 -.0012 -.0004 -.0007 -.0010  -.7  -.3  -.3 99: 54
M001 1 MANS P REGAL      .0030 -.0016  .0041 -.0016  .0005  .0051  -.8   .1  1.3 99:287

Velocities
M001 1 MANS P1 IGN      -.0012 -.0001 -.0024 -.0001 -.0007 -.0026  -.2  -.2  -.6
M001 1 MANS P REGAL     -.0176 -.0050 -.0189 -.0050  .0005 -.0259  -.8   .0 -1.8

10092 MARNE LA VALLEE

Positions
M001 1 MLVL P1 IGN       .0003 -.0004  .0001 -.0004 -.0002  .0002  -.8  -.1   .1 99: 24

Velocities
M001 1 MLVL P1 IGN      -.0007 -.0003 -.0009 -.0003  .0000 -.0012  -.4   .0  -.3

10095 CADARACHE-GINASS

Positions
M001 1 GINA P1 IGN       .0008 -.0002  .0005 -.0003 -.0002  .0009  -.6  -.1   .5 99: 17
M001 1 GINA P REGAL     -.0004  .0007  .0002  .0008  .0004 -.0001  1.1   .2   .0 99:106

Velocities
M001 1 GINA P1 IGN       .0002 -.0002  .0008 -.0002  .0005  .0007  -.4   .2   .3
M001 1 GINA P REGAL      .0007 -.0002  .0008 -.0003  .0001  .0010  -.3   .0   .3
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10096 MODANE-AVRIEUX

Positions
M001 1 MODA P1 IGN       .0004 -.0004  .0004 -.0004  .0000  .0005  -.7   .0   .2 99:213
M001 1 MODA P REGAL       .0007  .0007  .0006  .0006 -.0001  .0009   .8   .0   .4 99:221

Velocities
M001 1 MODA P1 IGN        .0014  .0000  .0015 -.0002  .0001  .0021  -.2   .0   .4
M001 1 MODA P REGAL      -.0006 -.0001 -.0003  .0000  .0002 -.0006   .0   .0  -.1

10097 MONTPELLIER

Positions
M001 1 MTPL P1 IGN        .0012 -.0003  .0014 -.0004  .0002  .0019  -.5   .1   .6 99:305
M001 1 MTPL P REGAL      -.0004 -.0001 -.0003 -.0001  .0001 -.0005  -.1   .0  -.2 99:297

Velocities
M001 1 MTPL P1 IGN       -.0014 -.0005 -.0009 -.0004  .0003 -.0017  -.2   .0  -.1
M001 1 MTPL P REGAL       .0007  .0006  .0010  .0005  .0002  .0012   .1   .0   .1

10098 LA FECLAZ

Positions
M001 1 FCLZ P REGAL       .0001  .0003 -.0007  .0003 -.0006 -.0004   .4  -.3  -.2 99:145

Velocities
M001 1 FCLZ P REGAL       .0005  .0002  .0006  .0001  .0001  .0008   .1   .0   .2

10099 CHATEL

Positions
M001 1 CHTL P REGAL       .0001  .0004 -.0003  .0004 -.0003 -.0002   .5  -.1  -.1 99:342

Velocities
M001 1 CHTL P REGAL       .0000  .0000 -.0001  .0000 -.0001 -.0001   .0   .0   .0

10202 REYKJAVIK

Positions
M001 1 REYK TIE10202      .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 REYK P CODE        .0019 -.0008  .0058  .0000  .0007  .0061   .0   .2  1.4 98: 17
M001 1 REYK P GFZ         .0013 -.0011  .0016 -.0006 -.0008  .0022  -.3  -.3   .5 98:360
M001 1 REYK P IGS         .0004 -.0008 -.0005 -.0006 -.0008 -.0001  -.7  -.7  -.1 98: 83
M001 1 REYK P1 JPL       -.0017 -.0003 -.0009 -.0009  .0009 -.0015  -.6   .4  -.5 97:352
M001 1 REYK P NCL        -.0002 -.0010  .0001 -.0010 -.0001  .0002  -.7  -.1   .1 98: 25
M001 1 REYK P NOAA       -.0039 -.0006 -.0016 -.0020  .0024 -.0029  -.4   .4  -.3 99:156
M001 1 REYK P EUR         .0003  .0006  .0013  .0006  .0005  .0012   .7   .3   .5 98:194
S001 1 REYA TIE10202      .0034 -.0055  .0024 -.0038 -.0037  .0045  -.9  -.8  1.0 97:  1
S001 1 REYA D GRGS       -.0014  .0231 -.0080  .0209  .0055 -.0116  1.4   .4  -.8 95:341
S001 1 REYA D9 IGN       -.0416 -.0012  .0020 -.0167  .0352 -.0148  -.9  1.9  -.7 95:273
S001 1 REYA C GRIM        .0088  .0229 -.0286  .0245 -.0121 -.0259   .9  -.4  -.9 93:  1
S002 1 REYB TIE10202      .0032 -.0027  .0011 -.0013 -.0031  .0027  -.4 -1.0   .9 97:  1
S002 1 REYB D GRGS       -.0285  .0078 -.0262 -.0034  .0150 -.0364  -.1   .3  -.7 98:205
S002 1 REYB D9 IGN       -.0543 -.0278 -.0121 -.0461  .0307 -.0283 -1.4   .9  -.8 99:170
S002 1 REYB C GRIM       -.0514  .0075  .0117 -.0123  .0506 -.0114  -.4  2.1  -.5 99: 28
S002 1 REYB C1 CSR       -.0177 -.0053 -.0002 -.0115  .0129 -.0065  -.9   .8  -.4 99:152

Velocities
M001 1 REYK P CODE       -.0009  .0005 -.0045  .0001 -.0011 -.0045   .1  -.5 -1.3
M001 1 REYK P GFZ         .0029 -.0005  .0023  .0007 -.0016  .0033   .3  -.5   .7
M001 1 REYK P IGS         .0016  .0001  .0013  .0007 -.0007  .0018  1.1  -.8  1.3
M001 1 REYK P1 JPL        .0004  .0008  .0015  .0008  .0006  .0013   .5   .3   .4
M001 1 REYK P NCL        -.0008 -.0010  .0005 -.0012  .0005  .0003 -1.1   .3   .1
M001 1 REYK P NOAA       -.0014  .0033 -.0015  .0025  .0016 -.0024  1.0   .5  -.5
M001 1 REYK P EUR        -.0006 -.0009 -.0003 -.0011  .0001 -.0004 -1.3   .0  -.2
S001 1 REYA D GRGS        .0006  .0005  .0011  .0007  .0002  .0012   .1   .0   .1
S001 1 REYA D9 IGN        .0091  .0032 -.0036  .0064 -.0081 -.0001   .6  -.7   .0
S001 1 REYA C GRIM       -.0457 -.0623  .0087 -.0749  .0209 -.0005  -.1   .0   .0
S002 1 REYB D GRGS        .0006  .0005  .0011  .0007  .0002  .0012   .1   .0   .1
S002 1 REYB D9 IGN        .0299  .0078 -.0045  .0184 -.0243  .0068   .2  -.3   .1
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S002 1 REYB C GRIM       .0023 -.0005  .0040  .0004 -.0003  .0046   .0   .0   .6
S002 1 REYB C1 CSR      -.0135  .0257  .0008  .0188  .0203 -.0089   .5   .4  -.2

10204 HOFN

Positions
M001 1 7635 R GSFC       .0007  .0004  .0025  .0006  .0005  .0025   .1   .0   .1 92:208
M001 1 7635 R SHA        .0010  .0000  .0003  .0003 -.0008  .0007   .0   .0   .0 92:208
M002 1 HOFN P CODE      -.0001 -.0011  .0026 -.0011  .0010  .0024  -.4   .3   .5 98:269
M002 1 HOFN P IGS       -.0023  .0004 -.0042 -.0003  .0003 -.0048  -.2   .1 -1.6 98:338
M002 1 HOFN P NOAA       .0066  .0023  .0043  .0039 -.0033  .0064  1.8 -1.2  1.7 98:287
M002 1 HOFN P EUR        .0019 -.0009  .0081 -.0004  .0017  .0082  -.4   .6  2.0 98:348

Velocities
M001 1 7635 R GSFC      -.2703 -.1754 -.3593 -.2402  .0376 -.4170  -.3   .0  -.2
M001 1 7635 R SHA       -.0144 -.0164  .0076 -.0196  .0119  .0027  -.1   .1   .0
M002 1 HOFN P CODE      -.0002  .0003 -.0042  .0003 -.0016 -.0039   .2  -.5  -.8
M002 1 HOFN P IGS        .0003  .0001 -.0002  .0002 -.0003 -.0001   .2  -.1   .0
M002 1 HOFN P NOAA       .0001 -.0001  .0025 -.0001  .0010  .0023   .0   .3   .4
M002 1 HOFN P EUR        .0011 -.0010  .0017 -.0007 -.0004  .0021  -.4  -.1   .3

10302 TROMSO

Positions
M002 1 7602 TIE10302    -.0001  .0023 -.0002  .0022 -.0007  .0001  2.3  -.7   .1 97:  1
M002 1 7602 R GSFC      -.0060 -.0085 -.0186 -.0061  .0015 -.0204 -1.0   .1 -1.0 91:174
M002 1 7602 R SHA       -.0041 -.0087 -.0165 -.0069  .0005 -.0178  -.8   .0  -.9 91:196
M002 1 7602 L CGS       -.0099 -.0039  .0211 -.0005  .0173  .0161   .0   .5   .3 97:  1
M002 1 7602 L4 CSR      -.0041  .0319  .0005  .0315 -.0059  .0027  1.0  -.1   .0 90:244
M002 1 7602 C GRIM      -.0211  .0231 -.0463  .0287 -.0044 -.0478   .9  -.1  -.5 90:256
M003 1 TROM TIE10302     .0001 -.0023  .0002 -.0022  .0007 -.0001 -2.3   .7  -.1 97:  1
M003 1 TROM P CODE       .0002 -.0020  .0034 -.0019  .0016  .0030  -.6   .3   .3 96: 49
M003 1 TROM P GFZ       -.0086 -.0020 -.0105  .0009  .0046 -.0129   .3  1.2 -1.9 94:337
M003 1 TROM P IGS        .0005 -.0017  .0007 -.0018  .0003  .0007 -1.5   .2   .2 97:288
M003 1 TROM P1 JPL       .0003  .0024  .0020  .0022 -.0003  .0022  1.9  -.2   .8 95:188
M003 1 TROM P NCL        .0001 -.0011 -.0005 -.0010  .0001 -.0005  -.6   .0  -.1 97:215
M003 1 TROM P NOAA      -.0029 -.0016 -.0068 -.0006  .0007 -.0075  -.2   .2 -1.3 99: 24
M003 1 TROM P EUR       -.0002  .0036 -.0030  .0034 -.0019 -.0024   .8  -.2  -.1 96:348
M006 1 TRO1 P CODE       .0008 -.0022 -.0037 -.0023 -.0014 -.0034  -.8  -.3  -.5 99:131
M006 1 TRO1 P GFZ        .0011  .0011  .0033  .0007 -.0002  .0036   .4  -.1   .8 99:111
M006 1 TRO1 P IGS        .0004 -.0001  .0008 -.0002  .0000  .0008  -.2   .0   .3 99:349
M006 1 TRO1 P EUR        .0012 -.0037 -.0086 -.0038 -.0029 -.0081 -1.5  -.5  -.6 98:253
M006 2 TRO1 P EUR       -.0016 -.0008 -.0042 -.0003  .0002 -.0046  -.2   .0  -.6 99:228
S010 1 TROA TIE10302    -.0001  .0023 -.0002  .0022 -.0007  .0001   .7  -.2   .0 97:  1

Velocities
M002 1 7602 R GSFC       .0011 -.0125 -.0043 -.0121  .0014 -.0050 -2.6   .2  -.4
M002 1 7602 R SHA        .0021 -.0122 -.0028 -.0123  .0009 -.0033 -2.8   .1  -.3
M002 1 7602 L CGS       -.0193  .0015  .0087  .0077  .0197  .0020   .0   .0   .0
M002 1 7602 L4 CSR       .0342  .0465 -.0456  .0329 -.0604 -.0262   .1  -.1   .0
M002 1 7602 C GRIM      -.0982 -.1220  .0903 -.0835  .1556  .0386  -.1   .1   .0
M003 1 TROM P CODE      -.0013  .0011 -.0059  .0014 -.0012 -.0058   .7  -.3  -.7
M003 1 TROM P GFZ        .0025  .0013  .0019  .0004 -.0020  .0027   .3  -.9   .7
M003 1 TROM P IGS        .0004 -.0014 -.0008 -.0014 -.0002 -.0007 -1.8  -.2  -.4
M003 1 TROM P1 JPL      -.0001 -.0007 -.0002 -.0006  .0003 -.0003 -1.1   .3  -.2
M003 1 TROM P NCL       -.0008 -.0014 -.0007 -.0010  .0008 -.0011  -.8   .5  -.4
M003 1 TROM P NOAA       .0005 -.0005  .0001 -.0007 -.0003  .0002  -.4  -.1   .1
M003 1 TROM P EUR       -.0008 -.0001 -.0102  .0001 -.0028 -.0098   .0  -.4  -.6
M006 1 TRO1 P CODE      -.0013  .0011 -.0059  .0014 -.0012 -.0058   .7  -.3  -.7
M006 1 TRO1 P GFZ        .0020  .0014  .0020  .0007 -.0015  .0027   .5  -.7   .7
M006 1 TRO1 P IGS        .0008  .0001  .0020 -.0001  .0000  .0022  -.1   .0   .5
M006 1 TRO1 P EUR       -.0008 -.0001 -.0102  .0001 -.0028 -.0098   .0  -.4  -.6
M006 2 TRO1 P EUR       -.0008 -.0001 -.0102  .0001 -.0028 -.0098   .0  -.4  -.6

10317 NY-ALESUND

Positions
M001 1 NYAL TIE10317     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 NYAL P CODE       .0030 -.0002  .0093 -.0008 -.0011  .0097  -.3  -.3   .9 96:212
M001 1 NYAL P GFZ        .0000 -.0025  .0036 -.0024  .0012  .0034 -1.0   .4   .4 96:297
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M001 1 NYAL P IGS        .0008 -.0011  .0003 -.0012 -.0005  .0004 -1.3  -.4   .1 98:175
M001 1 NYAL P1 JPL       .0005  .0006  .0007  .0005 -.0005  .0008   .4  -.3   .2 96:101
M001 1 NYAL P NCL       -.0003 -.0008  .0001 -.0007  .0005  .0000  -.4   .3   .0 97:351
M001 1 NYAL P NOAA       .0009 -.0004 -.0063 -.0006 -.0020 -.0060  -.3  -.9 -1.4 97:147
M001 1 NYAL P EUR        .0009  .0013  .0059  .0011  .0000  .0060   .6   .0   .3 97:139
M003 1 NYA1 TIE10317     .0020 -.0250 -.0260 -.0249 -.0019 -.0261 -1.2  -.1 -1.3 97:  1
M003 1 NYA1 P CODE       .0023 -.0020 -.0036 -.0024 -.0025 -.0032  -.9  -.7  -.4 99: 91
M003 1 NYA1 P GFZ        .0012  .0010  .0037  .0007 -.0007  .0039   .5  -.3   .7 99: 80
M003 1 NYA1 P IGS        .0002  .0001  .0002  .0001 -.0002  .0002   .1  -.2   .1 99:238
M003 1 NYA1 P EUR       -.0001 -.0009 -.0012 -.0009  .0001 -.0013 -1.0   .0  -.1 99: 83
S002 1 SPIA TIE10317     .0069 -.0113  .0006 -.0124 -.0042  .0014 -3.5 -1.2   .4 97:  1
S002 1 SPIA D GRGS      -.0206 -.0089  .0240 -.0044  .0262  .0193  -.6  3.1  2.4 95:359
S002 1 SPIA D9 IGN       .0354  .0322 -.0244  .0242 -.0452 -.0160  2.1 -3.7 -1.1 95:350
S002 1 SPIA C GRIM      -.0094  .0130 -.0038  .0146  .0056 -.0049  2.2   .9 -1.0 95:275
S002 1 SPIA C1 CSR      -.0277 -.0182 -.0373 -.0121  .0232 -.0426  -.4   .5  -.5 95:325
S003 1 7331 R GSFC       .0010  .0002  .0004  .0000 -.0009  .0005   .0 -1.1   .2 97:  1
S003 1 7331 R SHA        .0010 -.0002  .0013 -.0004 -.0007  .0015  -.3  -.5   .6 96:352
S004 1 SPIB TIE10317     .0068 -.0114  .0003 -.0126 -.0042  .0011 -3.1 -1.0   .3 97:  1
S004 1 SPIB C1 CSR       .1678  .0384 -.2814  .0029 -.2230 -.2431   .0 -1.1  -.7 99:281

Velocities
M001 1 NYAL P CODE      -.0008  .0017 -.0047  .0019 -.0005 -.0047  1.2  -.2  -.5
M001 1 NYAL P GFZ        .0017  .0009  .0021  .0005 -.0014  .0024   .4  -.7   .4
M001 1 NYAL P IGS        .0008 -.0003 -.0023 -.0005 -.0012 -.0021  -.8 -1.4  -.9
M001 1 NYAL P1 JPL       .0001 -.0001  .0003 -.0001  .0000  .0004  -.2   .0   .2
M001 1 NYAL P NCL       -.0007 -.0008 -.0035 -.0006  .0002 -.0036  -.5   .1  -.9
M001 1 NYAL P NOAA      -.0002 -.0001  .0006 -.0001  .0003  .0006  -.1   .2   .2
M001 1 NYAL P EUR        .0006  .0024  .0042  .0022 -.0003  .0044  1.4  -.1   .3
M003 1 NYA1 P CODE      -.0008  .0017 -.0047  .0019 -.0005 -.0047  1.2  -.2  -.5
M003 1 NYA1 P GFZ        .0018  .0012  .0020  .0008 -.0016  .0024   .6  -.8   .4
M003 1 NYA1 P IGS        .0006  .0016  .0011  .0014 -.0007  .0013  1.4  -.5   .3
M003 1 NYA1 P EUR        .0006  .0024  .0042  .0022 -.0003  .0044  1.4  -.1   .3
S002 1 SPIA D GRGS       .0005  .0032  .0026  .0030 -.0006  .0028   .6  -.1   .6
S002 1 SPIA D9 IGN       .0003  .0005 -.0185  .0004 -.0040 -.0181   .1  -.6 -2.2
S002 1 SPIA C GRIM       .0067  .0065  .0037  .0049 -.0071  .0052  1.3 -1.8  1.5
S002 1 SPIA C1 CSR      -.0082  .0041  .0159  .0057  .0101  .0142   .3   .4   .3
S003 1 7331 R GSFC      -.0001 -.0001 -.0006 -.0001  .0000 -.0006  -.6   .0 -1.2
S003 1 7331 R SHA        .0003 -.0001  .0011 -.0002  .0000  .0011  -.2   .0  1.0
S004 1 SPIB C1 CSR      -.0766  .0032  .2526  .0190  .1214  .2337   .0   .1   .1

10329 TRYSIL

Positions
M001 1 7607 R GSFC       .0005  .0002  .0017  .0001  .0004  .0017   .0   .0   .2 92: 88
M001 1 7607 R SHA        .0001  .0003 -.0004  .0002 -.0004 -.0002   .0   .0   .0 92: 97

Velocities
M001 1 7607 R GSFC       .0001 -.0001 -.0003 -.0001 -.0003 -.0003   .0   .0   .0
M001 1 7607 R SHA        .0002  .0000  .0001  .0000 -.0001  .0002   .0   .0   .0

10402 ONSALA

Positions
M004 1 ONSA TIE10402     .0009  .0022 -.0049  .0020 -.0038 -.0034   .5  -.9  -.8 97:  1
M004 1 ONSA P CODE       .0013 -.0020  .0055 -.0022  .0023  .0051 -1.0   .7  1.3 97:331
M004 1 ONSA P GFZ        .0009 -.0012  .0003 -.0014 -.0004  .0006  -.9  -.2   .2 97:329
M004 1 ONSA P IGS        .0006 -.0002  .0002 -.0003 -.0003  .0005  -.4  -.3   .4 98:182
M004 1 ONSA P1 JPL      -.0009  .0002 -.0008  .0004  .0003 -.0011   .4   .2  -.6 96:105
M004 1 ONSA P NCL        .0000 -.0008  .0002 -.0008  .0002  .0001  -.6   .2   .0 98:109
M004 1 ONSA P NOAA      -.0014  .0013 -.0022  .0016 -.0003 -.0025   .9  -.1 -1.1 97:235
M004 1 ONSA P EUR        .0005  .0002  .0004  .0001 -.0003  .0006   .1  -.1   .2 98:176
M006 1 7211 TIE10402     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M006 1 7211 R GSFC       .0022  .0022 -.0008  .0017 -.0026  .0008   .2  -.1   .0 92:121
S002 1 7213 TIE10402     .0003  .0004 -.0002  .0003 -.0004  .0000   .1  -.1   .0 97:  1
S002 1 7213 R GIUB       .0002  .0000 -.0030 -.0001 -.0018 -.0024   .0  -.8 -1.1 95:264
S002 1 7213 R GSFC       .0030  .0008  .0052  .0001  .0002  .0061   .2   .1  3.0 94:344
S002 1 7213 R SHA        .0037  .0002  .0028 -.0005 -.0016  .0043  -.4  -.7  1.8 96:307

Velocities
M004 1 ONSA P CODE       .0016  .0006 -.0005  .0002 -.0017  .0005   .2  -.8   .2
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M004 1 ONSA P GFZ        .0031  .0014  .0029  .0007 -.0012  .0042  1.0 -1.1  3.3
M004 1 ONSA P IGS        .0025  .0006  .0027  .0001 -.0007  .0037   .1  -.8  4.1
M004 1 ONSA P1 JPL       .0000  .0008  .0003  .0008  .0000  .0003  1.7   .1   .3
M004 1 ONSA P NCL        .0022  .0003  .0035 -.0001  .0001  .0041  -.1   .0  2.5
M004 1 ONSA P NOAA      -.0001  .0008  .0018  .0008  .0009  .0015   .7   .7  1.1
M004 1 ONSA P EUR        .0027  .0002  .0035 -.0004 -.0004  .0044  -.5  -.2  1.5
M006 1 7211 R GSFC       .1168 -.0004 -.1229 -.0245 -.1624 -.0419   .0  -.1   .0
S002 1 7213 R GIUB       .0006  .0000 -.0002 -.0001 -.0006  .0002  -.1  -.7   .2
S002 1 7213 R GSFC      -.0005 -.0001 -.0004  .0000  .0002 -.0006   .1   .9 -2.3
S002 1 7213 R SHA        .0002 -.0001 -.0003 -.0002 -.0003 -.0001  -.1  -.3  -.1

10403 KIRUNA

Positions
M002 1 KIRU P CODE       .0000 -.0027 -.0016 -.0025  .0003 -.0018 -1.0   .1  -.3 98:257
M002 1 KIRU P IGS       -.0004 -.0003 -.0005 -.0002  .0003 -.0006  -.2   .2  -.2 98: 36
M002 1 KIRU P1 JPL       .0012  .0006  .0018  .0001 -.0006  .0022   .1  -.3   .7 96:238
M002 1 KIRU P NCL        .0004 -.0009  .0008 -.0009  .0003  .0008  -.7   .1   .2 97:293
M002 1 KIRU P NOAA      -.0004 -.0014 -.0041 -.0012 -.0008 -.0042  -.6  -.3 -1.3 97:163
M002 1 KIRU P EUR        .0011  .0006  .0021  .0002 -.0004  .0024   .1  -.1   .4 98:222

Velocities
M002 1 KIRU P CODE      -.0001 -.0001 -.0060  .0000 -.0022 -.0056   .0  -.6  -.9
M002 1 KIRU P IGS        .0004  .0006 -.0004  .0004 -.0006 -.0001   .5  -.5  -.1
M002 1 KIRU P1 JPL       .0001  .0005  .0011  .0005  .0001  .0012   .6   .1   .7
M002 1 KIRU P NCL       -.0004 -.0017 -.0009 -.0014  .0006 -.0012 -1.2   .3  -.4
M002 1 KIRU P NOAA      -.0006  .0003  .0011  .0005  .0008  .0009   .4   .5   .4
M002 1 KIRU P EUR        .0008 -.0001  .0009 -.0004 -.0003  .0011  -.3  -.1   .2

10405 MARTSBO

Positions
M002 1 MAR6 P EUR       -.0006 -.0002 -.0007 -.0001  .0002 -.0009  -.1   .1  -.3 98:293

Velocities
M002 1 MAR6 P EUR       -.0003 -.0002 -.0002 -.0001  .0002 -.0003  -.1   .1  -.1

10422 KIRUNA/ESRANGE

Positions
M001 1 KIR0 P EUR       -.0005 -.0004 -.0014 -.0002  .0001 -.0015  -.1   .0  -.3 98:294

Velocities
M001 1 KIR0 P EUR       -.0006 -.0003 -.0006 -.0001  .0004 -.0009  -.1   .1  -.1

10423 VISBY

Positions
M001 1 VIS0 P EUR       -.0008 -.0003 -.0007  .0000  .0003 -.0011   .0   .1  -.3 98:297

Velocities
M001 1 VIS0 P EUR       -.0002 -.0002 -.0002 -.0001  .0001 -.0003  -.1   .0  -.1

10424 VILHELMINA

Positions
M001 1 VIL0 P EUR       -.0002 -.0001 -.0002 -.0001  .0001 -.0003  -.1   .1  -.1 98:307

Velocities
M001 1 VIL0 P EUR       -.0003 -.0002 -.0002 -.0001  .0003 -.0003  -.1   .1  -.1

10503 METSAHOVI

Positions
M002 1 7601 TIE10503     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7601 R GSFC      -.0138 -.0057 -.0267  .0005 -.0003 -.0306   .0   .0  -.5 89:189
M002 1 7601 R SHA       -.0084 -.0044 -.0167 -.0006 -.0001 -.0192   .0   .0  -.4 89:190
S001 1 7805 TIE10503    -.0007  .0001 -.0007  .0003  .0001 -.0009   .1   .0  -.2 97:  1
S001 1 7805 L AUS       -.0172 -.0142  .0075 -.0058  .0224 -.0042  -.1   .4  -.1 96:304
S001 1 7805 L CGS        .0302  .0055 -.0363 -.0074 -.0439 -.0168  -.3 -1.1  -.3 94:318
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S001 1 7805 L CRL        .0477 -.0146 -.0186 -.0330 -.0418  .0024  -.5  -.4   .0 95:  5
S001 1 7805 L4 CSR      -.0069 -.5047 -.0069 -.4568  .1829 -.1126 -1.4   .3  -.1 87:201
S001 1 7805 L DEOS       .0632  .0683 -.0293  .0361 -.0889  .0172   .2  -.6   .1 95: 10
S001 1 7805 C GRIM       .0387 -.0171  .1421 -.0315  .0461  .1373  -.5   .6  1.7 93:  1
S001 1 7805 C1 CSR       .0359  .0273  .0537  .0100 -.0115  .0685   .6  -.4  2.1 96:302
S011 1 METS TIE10503     .0044 -.0048  .0017 -.0062 -.0009  .0025 -1.5  -.2   .6 97:  1
S011 1 METS P CODE       .0000 -.0033  .0025 -.0030  .0024  .0015 -1.3   .8   .4 97:308
S011 1 METS P GFZ       -.0001 -.0004 -.0018 -.0004 -.0007 -.0016  -.2  -.3  -.5 97:330
S011 1 METS P IGS       -.0004 -.0004 -.0010 -.0002  .0000 -.0011  -.3   .0  -.7 98:146
S011 1 METS P1 JPL       .0010  .0024  .0031  .0018 -.0001  .0036  1.5  -.1  1.7 96: 89
S011 1 METS P NCL        .0000 -.0010  .0000 -.0009  .0003 -.0002  -.7   .2  -.1 98:  5
S011 1 METS P NOAA      -.0014  .0013 -.0028  .0018 -.0008 -.0028   .9  -.4 -1.1 97:190
S011 1 METS P EUR        .0012  .0005  .0017  .0000 -.0003  .0021   .0  -.1   .6 98:116
S013 1 META TIE10503    -.0001  .0003 -.0001  .0003 -.0001 -.0001   .2  -.1  -.1 97:  1
S013 1 META D GRGS      -.0288 -.0216  .0109 -.0078  .0359 -.0080  -.5  2.2  -.5 96: 56
S013 1 META D9 IGN       .0269  .0087 -.0473 -.0032 -.0478 -.0271  -.2 -2.6 -1.4 96:257
S013 1 META C GRIM       .0044 -.0243 -.0181 -.0239 -.0038 -.0187  -.8  -.1  -.7 93:  1
S013 1 META C1 CSR       .0072 -.0043  .0064 -.0069 -.0009  .0079 -1.1  -.1  1.2 96:268
S014 1 7806 L AUS       -.0056  .0075  .0022  .0091  .0028  .0009   .8   .2   .1 99:251
S014 1 7806 L CGS       -.0425 -.0120 -.0703  .0067  .0030 -.0827   .2   .0  -.9 97:  1
S014 1 7806 L CRL       -.0114 -.0217 -.0159 -.0150  .0089 -.0234  -.4   .2  -.7 99:253
S014 1 7806 L4 CSR       .0006 -.0133  .0105 -.0124  .0095  .0066  -.3   .1   .1 99:320
S014 1 7806 L DEOS      -.0573  .0495  .0203  .0688  .0377  .0018   .2   .1   .0 93:  1
S014 1 7806 L JCET      -.0029  .0061 -.0294  .0068 -.0145 -.0255   .6  -.8 -1.0 99:315
S014 1 7806 C1 CSR      -.0085  .0028 -.0156  .0061 -.0021 -.0168   .6  -.1  -.9 99: 51

Velocities
M002 1 7601 R GSFC      -.1488 -.4144 -.0282 -.3160  .2522 -.1767  -.3   .2  -.1
M002 1 7601 R SHA        .0017 -.0077  .0031 -.0077  .0030  .0019   .0   .0   .0
S001 1 7805 L AUS        .0051 -.0017  .0122 -.0037  .0027  .0126  -.1   .1   .3
S001 1 7805 L CGS        .0194  .0057  .0250 -.0029 -.0050  .0316  -.2  -.2  1.0
S001 1 7805 L CRL        .1161  .0018  .3503 -.0463  .0816  .3569  -.4   .4  1.6
S001 1 7805 L4 CSR       .0082  .0635  .0038  .0545 -.0274  .0201   .9  -.2   .1
S001 1 7805 L DEOS       .0133 -.0124 -.0024 -.0168 -.0073  .0014  -.3  -.1   .0
S001 1 7805 C GRIM       .0143 -.0531  .0098 -.0543  .0126  .0040   .0   .0   .0
S001 1 7805 C1 CSR      -.0054  .0061  .0087  .0078  .0064  .0063   .3   .2   .2
S011 1 METS P CODE       .0004  .0006 -.0014  .0004 -.0012 -.0009   .3  -.6  -.3
S011 1 METS P GFZ        .0028  .0008  .0028 -.0004 -.0011  .0039  -.5 -1.0  2.8
S011 1 METS P IGS        .0008  .0003  .0008 -.0001 -.0003  .0012  -.1  -.3  1.0
S011 1 METS P1 JPL      -.0007  .0005 -.0009  .0007  .0000 -.0010  1.3  -.1 -1.0
S011 1 METS P NCL        .0006 -.0002  .0008 -.0004  .0001  .0009  -.4   .0   .4
S011 1 METS P NOAA      -.0010 -.0001  .0001  .0004  .0009 -.0004   .3   .6  -.2
S011 1 METS P EUR        .0009 -.0001  .0007 -.0005 -.0003  .0009  -.3  -.1   .3
S013 1 META D GRGS       .0009  .0001  .0028 -.0003  .0007  .0028   .0   .1   .3
S013 1 META D9 IGN      -.0023  .0004 -.0056  .0013 -.0011 -.0059   .2  -.1  -.7
S013 1 META C GRIM       .0143 -.0531  .0098 -.0542  .0126  .0040   .0   .0   .0
S013 1 META C1 CSR      -.0008 -.0006 -.0031 -.0002 -.0007 -.0031  -.1  -.2  -.9
S014 1 7806 L AUS       -.0185  .0317  .0123  .0365  .0094  .0088  1.9   .5   .5
S014 1 7806 L CGS       -.0173  .0059  .0110  .0125  .0170  .0029   .0   .0   .0
S014 1 7806 L CRL       -.0236 -.0375  .0275 -.0244  .0457  .0055  -.5   .6   .1
S014 1 7806 L4 CSR      -.0068 -.0021 -.0164  .0008 -.0020 -.0177   .0   .0  -.3
S014 1 7806 L DEOS       .0513 -.0043 -.0198 -.0251 -.0489  .0051   .0   .0   .0
S014 1 7806 L JCET      -.0112 -.0165 -.0169 -.0104  .0064 -.0231  -.1   .0  -.1
S014 1 7806 C1 CSR      -.0056 -.0024  .0025  .0002  .0065 -.0008   .0   .3   .0

10511 VAASA

Positions
M001 1 VAAS P EUR       -.0006 -.0003 -.0008 -.0001  .0002 -.0010  -.1   .1  -.3 98:304

Velocities
M001 1 VAAS P EUR       -.0004 -.0002 -.0002 -.0001  .0003 -.0004   .0   .1  -.1

10512 JOENSUU

Positions
M001 1 JOEN P EUR       -.0006 -.0005 -.0010 -.0001  .0002 -.0013  -.1   .1  -.3 98:284

Velocities
M001 1 JOEN P EUR       -.0002 -.0001  .0004  .0001  .0004  .0002   .0   .1   .0
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10513 SODANKYLA/PITTIO

Positions
M001 1 SODA P EUR       -.0009 -.0007 -.0020 -.0002  .0002 -.0023  -.2   .1  -.4 99: 63

Velocities
M001 1 SODA P EUR        .0000  .0003  .0019  .0003  .0006  .0018   .1   .1   .2

11001 GRAZ LUSTBUEHEL

Positions
M002 1 GRAZ TIE11001     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 GRAZ P CODE      -.0035 -.0021  .0004 -.0011  .0032 -.0024  -.3   .5  -.4 96:266
M002 1 GRAZ P IGS       -.0010 -.0002 -.0010  .0001  .0001 -.0014   .1   .0  -.9 98:206
M002 1 GRAZ P1 JPL       .0018  .0011  .0019  .0006 -.0001  .0028   .4  -.1  1.4 96:324
M002 1 GRAZ P NCL       -.0019  .0005 -.0056  .0010 -.0026 -.0052   .3  -.3  -.7 97: 90
M002 1 GRAZ P NOAA      -.0004 -.0007  .0001 -.0006  .0005 -.0003  -.3   .2  -.1 98: 39
M002 1 GRAZ P EUR       -.0009 -.0003 -.0002 -.0001  .0006 -.0008  -.1   .2  -.3 98: 82
M002 1 GRAZ P REGAL     -.0022  .0015 -.0008  .0020  .0007 -.0017  1.5   .3  -.7 99: 25
M002 2 GRAZ P CODE       .0016 -.0021  .0064 -.0025  .0036  .0053 -1.0  1.0  1.4 98: 61
S002 1 7839 TIE11001    -.0003 -.0004  .0011 -.0003  .0010  .0005  -.1   .3   .2 97:  1
S002 1 7839 L AUS       -.0019  .0027  .0047  .0031  .0040  .0027   .6   .9   .6 98:131
S002 1 7839 L CGS        .0054  .0104  .0041  .0086 -.0031  .0084  1.5  -.6  1.7 94:209
S002 1 7839 L CRL        .0106  .0021  .0194 -.0008  .0053  .0216  -.1   .6  2.4 91: 59
S002 1 7839 L4 CSR       .0074  .0041  .0100  .0019  .0008  .0129   .7   .2  3.0 92:238
S002 1 7839 L DEOS      -.0013 -.0019 -.0001 -.0015  .0013 -.0013  -.3   .2  -.2 92:266
S002 1 7839 L DGFI      -.0041 -.0047  .0014 -.0034  .0048 -.0025  -.6   .9  -.5 94: 69
S002 1 7839 L JCET       .0002  .0000 -.0011  .0000 -.0009 -.0007   .0  -.6  -.4 96:320
S002 1 7839 C GRIM      -.0056 -.0012 -.0070  .0003 -.0005 -.0090   .1  -.2 -3.1 92: 38
S002 1 7839 C1 CSR       .0034  .0005  .0026 -.0004 -.0007  .0043  -.4  -.4  2.6 97:  3

Velocities
M002 1 GRAZ P CODE      -.0007  .0004 -.0031  .0006 -.0017 -.0027   .4  -.6  -.9
M002 1 GRAZ P IGS       -.0007  .0000 -.0006  .0002  .0001 -.0009   .2   .1  -.7
M002 1 GRAZ P1 JPL      -.0015 -.0001 -.0011  .0003  .0003 -.0018   .4   .3 -1.9
M002 1 GRAZ P NCL        .0001 -.0002  .0002 -.0002  .0001  .0002  -.2   .1   .1
M002 1 GRAZ P NOAA      -.0022 -.0003 -.0011  .0003  .0008 -.0023   .2   .4 -1.2
M002 1 GRAZ P EUR       -.0004  .0003 -.0005  .0004 -.0001 -.0006   .4   .0  -.2
M002 1 GRAZ P REGAL      .0004  .0015 -.0006  .0014 -.0010  .0001  1.1  -.4   .0
M002 2 GRAZ P CODE      -.0007  .0005 -.0031  .0006 -.0018 -.0027   .4  -.6  -.9
S002 1 7839 L AUS       -.0010 -.0011  .0027 -.0008  .0027  .0011  -.4  1.3   .5
S002 1 7839 L CGS       -.0017 -.0009 -.0008 -.0004  .0009 -.0019  -.3   .7 -1.5
S002 1 7839 L CRL       -.0023 -.0009 -.0012 -.0003  .0010 -.0026  -.1   .2  -.6
S002 1 7839 L4 CSR      -.0010 -.0008 -.0012 -.0005  .0000 -.0017  -.6   .0 -1.9
S002 1 7839 L DEOS       .0029 -.0014 -.0007 -.0021 -.0023  .0011 -1.0  -.7   .3
S002 1 7839 L DGFI       .0006 -.0009  .0018 -.0010  .0010  .0015  -.6   .6   .9
S002 1 7839 L JCET      -.0016 -.0005 -.0022 -.0001 -.0002 -.0028  -.2  -.3 -3.7
S002 1 7839 C GRIM       .0016 -.0037  .0011 -.0040  .0004  .0012 -1.4   .4  1.3
S002 1 7839 C1 CSR      -.0015 -.0007 -.0020 -.0002 -.0002 -.0026  -.5  -.2 -3.2

11005 PFANDER

Positions
S002 1 PFAN P EUR       -.0008  .0000 -.0005  .0001  .0002 -.0009   .1   .1  -.3 98:253
S002 2 PFAN P EUR        .0010  .0002  .0015  .0000  .0003  .0018   .0   .0   .2 99:340

Velocities
S002 1 PFAN P EUR        .0021  .0001  .0021 -.0003 -.0001  .0030  -.2   .0   .6
S002 2 PFAN P EUR        .0021  .0001  .0021 -.0003 -.0001  .0030  -.2   .0   .6

11006 INNSBRUCK/HAFELE

Positions
S003 1 HFLK P CODE       .0009 -.0020  .0032 -.0022  .0018  .0027  -.7   .4   .5 99: 42
S003 1 HFLK P IGS        .0017 -.0003  .0008 -.0006 -.0006  .0017  -.4  -.2   .5 99:168
S003 1 HFLK P1 JPL      -.0041  .0000 -.0032  .0008  .0008 -.0051   .4   .3 -1.7 98:170
S003 1 HFLK P NOAA       .0110  .0015  .0142 -.0007  .0015  .0179  -.1   .2  2.2 99:259
S003 1 HFLK P EUR        .0002  .0002  .0010  .0001  .0005  .0009   .1   .2   .3 98: 86
S003 1 HFLK P REGAL     -.0011  .0006 -.0004  .0008  .0004 -.0010   .6   .1  -.3 99: 28
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Velocities
S003 1 HFLK P CODE       .0021  .0009 -.0016  .0005 -.0027  .0003   .2  -.5   .1
S003 1 HFLK P IGS        .0004  .0002  .0005  .0002  .0000  .0007   .1   .0   .1
S003 1 HFLK P1 JPL      -.0053 -.0010 -.0042  .0000  .0011 -.0067   .0   .3 -2.1
S003 1 HFLK P NOAA      -.0015  .0000 -.0010  .0003  .0004 -.0017   .1   .1  -.4
S003 1 HFLK P EUR        .0014  .0000  .0011 -.0003 -.0003  .0017  -.3  -.1   .6
S003 1 HFLK P REGAL      .0028  .0017  .0044  .0011  .0007  .0053   .6   .1   .8

11031 GAISBERG/SALZBUR

Positions
S001 1 SBGZ P EUR        .0002  .0000  .0005 -.0001  .0002  .0005   .0   .0   .1 99:205

Velocities
S001 1 SBGZ P EUR        .0139  .0036  .0148  .0003 -.0007  .0206   .0   .0  1.0

11101 SOFIA

Positions
M001 1 7505 TIE11101     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7505 L4 CSR       .0078  .0116  .0220  .0075  .0082  .0235   .1   .1   .2 95:286
M001 1 7505 C GRIM       .0149 -.0177  .0223 -.0221  .0120  .0200  -.1   .0   .0 95:286
M001 1 7505 C1 CSR      -.0057  .0086  .0038  .0102  .0040  .0013   .3   .1   .0 95:281
M002 1 SOFI TIE11101    -.0003  .0003  .0002  .0004  .0002  .0000   .1   .1   .0 97:  1
M002 1 SOFI P IGS       -.0007 -.0021 -.0038 -.0017 -.0018 -.0037  -.1  -.1  -.2 98: 91
M002 1 SOFI P1 JPL      -.0032 -.0006 -.0012  .0008  .0012 -.0032   .2   .3  -.8 98:101
M002 1 SOFI P NOAA      -.0010 -.0007 -.0016 -.0002 -.0004 -.0020  -.1  -.1  -.6 98:164
M002 1 SOFI P EUR        .0014  .0007  .0020  .0001  .0004  .0025   .0   .1   .8 98:270

Velocities
M001 1 7505 L4 CSR      -.1492 -.0791  .0508 -.0133  .1513 -.0897   .0   .2  -.1
M001 1 7505 C GRIM       .0952 -.0450  .0569 -.0791 -.0051  .0897  -.1   .0   .1
M001 1 7505 C1 CSR       .0394  .3429  .1050  .2990 -.0392  .1980   .1   .0   .1
M002 1 SOFI P IGS        .0007 -.0007 -.0020 -.0009 -.0017 -.0011   .0   .0   .0
M002 1 SOFI P1 JPL       .0002  .0006 -.0006  .0005 -.0007 -.0001   .1  -.1   .0
M002 1 SOFI P NOAA      -.0009 -.0008  .0002 -.0003  .0009 -.0007  -.1   .2  -.2
M002 1 SOFI P EUR       -.0008  .0001 -.0006  .0004  .0000 -.0009   .2   .0  -.2

11206 PENC

Positions
M006 1 PENC P CODE      -.0005 -.0032  .0034 -.0029  .0034  .0015  -.9   .7   .3 99: 40
M006 1 PENC P IGS       -.0002 -.0014  .0005 -.0013  .0008  .0000  -.5   .2   .0 99:165
M006 1 PENC P NOAA      -.0008  .0084 -.0019  .0082 -.0028  .0000  3.9 -1.1   .0 98: 39
M006 1 PENC P EUR       -.0018 -.0014  .0013 -.0007  .0025 -.0005  -.6   .9  -.2 98:123

Velocities
M006 1 PENC P CODE       .0027  .0012 -.0002  .0003 -.0023  .0019   .1  -.4   .3
M006 1 PENC P IGS        .0024  .0005  .0006 -.0003 -.0014  .0021  -.1  -.2   .3
M006 1 PENC P NOAA      -.0009  .0006  .0000  .0008  .0005 -.0005   .5   .2  -.2
M006 1 PENC P EUR       -.0002  .0005 -.0007  .0005 -.0005 -.0005   .4  -.2  -.2

11401 BUCAREST

Positions
M001 1 BUBC P IGS        .0020  .0040 -.0003  .0027 -.0027  .0023   .6  -.5   .4  0:225
M001 1 BUBC P NOAA      -.0042 -.0023 -.0039 -.0002  .0006 -.0062   .0   .1 -1.4 99:207
M001 1 BUBC P EUR        .0005  .0006  .0003  .0003 -.0003  .0008   .1  -.1   .1 99:222

Velocities
M001 1 BUBC P IGS        .0047  .0031 -.0021  .0007 -.0054  .0025   .0  -.2   .1
M001 1 BUBC P NOAA       .0070 -.0025  .0086 -.0053  .0025  .0097  -.5   .2   .7
M001 1 BUBC P EUR       -.0048 -.0031 -.0021 -.0007  .0025 -.0055   .0   .1  -.3

11502 PECNY/ONDREJOV

Positions
M002 1 GOPE P CODE       .0001 -.0028  .0067 -.0027  .0048  .0047 -1.2  1.3  1.2 97:364
M002 1 GOPE P IGS       -.0007 -.0007  .0008 -.0005  .0011  .0001  -.4   .5   .0 98:145
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M002 1 GOPE P NCL       -.0031  .0053 -.0074  .0059 -.0035 -.0067  1.5  -.4  -.6 96:325
M002 1 GOPE P NOAA       .0020  .0031 -.0016  .0025 -.0032  .0005  1.3 -1.4   .2 97:326
M002 1 GOPE P EUR       -.0023 -.0009  .0002 -.0003  .0020 -.0014  -.3   .8  -.5 98: 93

Velocities
M002 1 GOPE P CODE       .0001  .0001 -.0022  .0001 -.0015 -.0016   .0  -.6  -.6
M002 1 GOPE P IGS        .0006 -.0010  .0014 -.0011  .0006  .0013 -1.3   .3   .7
M002 1 GOPE P NCL       -.0017  .0000 -.0025  .0005 -.0003 -.0030   .4  -.2 -1.5
M002 1 GOPE P NOAA      -.0005  .0005  .0006  .0006  .0006  .0003   .4   .4   .1
M002 1 GOPE P EUR        .0002  .0003  .0002  .0002 -.0001  .0003   .2   .0   .1

11507 MODRA-PIESOK

Positions
M001 1 MOPI P EUR       -.0011 -.0004 -.0002  .0000  .0007 -.0009   .0   .2  -.3 98:172

Velocities
M001 1 MOPI P EUR        .0006  .0002  .0005  .0001 -.0001  .0008   .0   .0   .2

12204 JOZEFOSLAW-WARSA

Positions
M001 1 JOZE P CODE       .0017 -.0027  .0092 -.0031  .0052  .0076 -1.3  1.5  2.0 97:328
M001 1 JOZE P NOAA       .0000  .0043 -.0035  .0040 -.0034 -.0018  2.1 -1.6  -.8 97:256
M001 1 JOZE P EUR       -.0021 -.0007  .0002  .0001  .0019 -.0012   .1   .8  -.4 98: 95

Velocities
M001 1 JOZE P CODE       .0009  .0005 -.0016  .0001 -.0017 -.0007   .1  -.8  -.3
M001 1 JOZE P NOAA      -.0014  .0007 -.0007  .0011  .0004 -.0012   .9   .3  -.9
M001 1 JOZE P EUR       -.0008 -.0003 -.0016  .0000 -.0003 -.0017   .0  -.1  -.7

12205 BOROWIEC

Positions
M002 1 BOR1 TIE12205     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 BOR1 P CODE       .0022 -.0019  .0072 -.0024  .0031  .0066 -1.0   .9  1.7 97:332
M002 1 BOR1 P IGS        .0010 -.0001  .0012 -.0003  .0000  .0015  -.4   .0   .9 98: 79
M002 1 BOR1 P1 JPL       .0006  .0002  .0011  .0000  .0001  .0013   .0   .0   .6 97:121
M002 1 BOR1 P NCL       -.0009 -.0007 -.0005 -.0004  .0006 -.0011  -.3   .2  -.4 97:244
M002 1 BOR1 P NOAA       .0005 -.0026 -.0016 -.0027 -.0008 -.0015  -.7  -.1  -.3 98:352
M002 1 BOR1 P EUR       -.0005 -.0003 -.0011 -.0002 -.0002 -.0013  -.1  -.1  -.4 98: 88
S001 1 7811 TIE12205     .0022  .0012  .0062  .0005  .0018  .0064   .2   .6  2.0 97:  1
S001 1 7811 L AUS       -.0211  .0037  .0053  .0098  .0183 -.0074  1.1  2.4 -1.0 99:170
S001 1 7811 L CGS        .0132  .0078  .0153  .0036 -.0024  .0213   .4  -.2  1.5 96:145
S001 1 7811 L CRL        .0223  .0027  .0433 -.0040  .0089  .0478  -.2   .3  1.6 95:331
S001 1 7811 L4 CSR       .0286  .0073  .0374 -.0015 -.0005  .0476   .0   .0   .4 97: 43
S001 1 7811 L DEOS       .0042 -.0126 -.0129 -.0133 -.0081 -.0100  -.8  -.5  -.6 96: 61
S001 1 7811 L DGFI      -.0073 -.0073 -.0099 -.0048  .0011 -.0134  -.4   .1 -1.2 96:133
S001 1 7811 L JCET       .0117  .0055  .0160  .0018 -.0004  .0205   .2   .0  1.5 97:266
S001 1 7811 C GRIM       .0351 -.0119  .0356 -.0217 -.0020  .0466 -1.4  -.1  2.7 97:  5
S001 1 7811 C1 CSR       .0353  .0000  .0304 -.0103 -.0080  .0447 -1.3  -.6  3.0 97: 48

Velocities
M002 1 BOR1 P CODE       .0009  .0004 -.0012  .0001 -.0015 -.0004   .1  -.7  -.2
M002 1 BOR1 P IGS        .0006 -.0002  .0002 -.0004 -.0003  .0005  -.6  -.3   .4
M002 1 BOR1 P1 JPL      -.0007 -.0004 -.0001 -.0002  .0005 -.0006  -.2   .3  -.4
M002 1 BOR1 P NCL       -.0006 -.0002 -.0005  .0000  .0002 -.0008   .0   .1  -.4
M002 1 BOR1 P NOAA      -.0015  .0004 -.0005  .0008  .0008 -.0012   .6   .4  -.6
M002 1 BOR1 P EUR        .0003  .0001  .0000  .0000 -.0003  .0002   .0  -.1   .1
S001 1 7811 L AUS       -.0029  .0049 -.0048  .0056 -.0019 -.0046   .6  -.2  -.5
S001 1 7811 L CGS        .0004  .0019  .0081  .0017  .0042  .0069   .6   .9  1.5
S001 1 7811 L CRL       -.0039 -.0021 -.0040 -.0009  .0010 -.0058  -.2   .1  -.6
S001 1 7811 L4 CSR      -.0059 -.0009 -.0049  .0008  .0017 -.0075   .1   .1  -.6
S001 1 7811 L DEOS       .0000 -.0005  .0014 -.0005  .0009  .0010  -.1   .1   .2
S001 1 7811 L DGFI      -.0026  .0005  .0049  .0012  .0049  .0025   .3  1.2   .6
S001 1 7811 L JCET       .0029  .0012  .0045  .0003  .0003  .0055   .1   .1   .9
S001 1 7811 C GRIM      -.0041 -.0039 -.0047 -.0025  .0011 -.0068  -.5   .2  -.8
S001 1 7811 C1 CSR      -.0021 -.0014  .0009 -.0007  .0025 -.0008  -.2   .4  -.1

12207 BOROWA GORA
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Positions
M002 1 BOGO P CODE       .0010 -.0021  .0026 -.0023  .0014  .0022  -.8   .3   .4 99: 45
M002 1 BOGO P IGS        .0000 -.0006  .0001 -.0005  .0003  .0000  -.2   .1   .0 99:118
M002 1 BOGO P EUR       -.0002 -.0001  .0005 -.0001  .0005  .0003  -.1   .2   .1 98:108

Velocities
M002 1 BOGO P CODE       .0011  .0007 -.0002  .0003 -.0012  .0006   .1  -.2   .1
M002 1 BOGO P IGS        .0019  .0003  .0030 -.0004  .0004  .0035  -.1   .0   .5
M002 1 BOGO P EUR        .0002  .0001  .0000  .0000 -.0002  .0001   .0  -.1   .0

12209 LAMKOWKO

Positions
M001 1 LAMO P CODE      -.0013 -.0029  .0013 -.0023  .0025 -.0003 -1.0   .8  -.1 98:  3
M001 1 LAMO P IGS       -.0012 -.0009 -.0014 -.0004  .0003 -.0019  -.4   .2  -.9 98:275
M001 1 LAMO P1 JPL       .0010 -.0009  .0013 -.0012  .0003  .0015  -.7   .1   .5 97:318
M001 1 LAMO P NCL        .0005 -.0003  .0007 -.0005  .0001  .0008  -.4   .1   .4 97:202
M001 1 LAMO P NOAA       .0003 -.0009 -.0016 -.0010 -.0009 -.0013  -.5  -.4  -.6 97:297
M001 1 LAMO P EUR        .0008  .0004  .0005  .0000 -.0004  .0009   .0  -.2   .3 98:156

Velocities
M001 1 LAMO P CODE       .0014  .0007 -.0004  .0002 -.0015  .0006   .1  -.7   .2
M001 1 LAMO P IGS        .0022  .0000  .0039 -.0008  .0006  .0044  -.8   .3  2.3
M001 1 LAMO P1 JPL      -.0005 -.0010 -.0003 -.0008  .0005 -.0007  -.6   .3  -.3
M001 1 LAMO P NCL       -.0001 -.0002  .0001 -.0001  .0002 -.0001  -.1   .1   .0
M001 1 LAMO P NOAA      -.0014 -.0003 -.0006  .0002  .0008 -.0013   .2   .5  -.8
M001 1 LAMO P EUR       -.0004 -.0001 -.0006  .0000  .0000 -.0007   .0   .0  -.3

12217 WROCLAW

Positions
M001 1 WROC P EUR       -.0006 -.0002  .0000 -.0001  .0005 -.0004   .0   .2  -.1 98:146

Velocities
M001 1 WROC P EUR        .0004  .0002  .0006  .0000  .0000  .0007   .0   .0   .2

12302 RIGA

Positions
M001 1 7560 TIE12302     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7560 L CGS        .0026 -.0439  .0476 -.0411  .0390  .0314 -1.1   .5   .4 97:  1
M001 1 7560 L4 CSR       .0121  .0159  .0249  .0096 -.0011  .0304   .0   .0   .1 91:270
M001 1 7560 L DEOS       .0053  .0122  .0258  .0090  .0059  .0269   .1   .0   .2 93:  1
M001 1 7560 C GRIM      -.0062  .0355  .0079  .0349 -.0031  .0115   .2   .0   .0 93:  1
M002 1 RIGA TIE12302    -.0001 -.0006  .0002 -.0005  .0004  .0000  -.2   .1   .0 97:  1
M002 1 RIGA P EUR       -.0049 -.0022 -.0072  .0000  .0006 -.0089   .0   .2 -2.4 98:278
S002 1 1884 TIE12302    -.0054  .0012 -.0005  .0033  .0035 -.0028   .8   .8  -.7 97:  1
S002 1 1884 L AUS        .0050  .0019  .0087 -.0003  .0002  .0102   .0   .0  1.2 99: 65
S002 1 1884 L CGS       -.0064  .0012 -.0171  .0037 -.0048 -.0172   .5  -.5 -1.7 95:275
S002 1 1884 L CRL       -.0170 -.0152 -.0218 -.0070  .0063 -.0302  -.4   .2 -1.1 94:236
S002 1 1884 L4 CSR       .0082 -.0056  .0167 -.0084  .0048  .0168  -.1   .0   .1 97:173
S002 1 1884 L DEOS       .0313 -.0032  .0102 -.0156 -.0173  .0235  -.8  -.9  1.3 95:308
S002 1 1884 L DGFI       .0045 -.0172  .0073 -.0175  .0064  .0045 -1.6   .6   .5 95:327
S002 1 1884 L JCET      -.0081 -.0080 -.0185 -.0040 -.0012 -.0213  -.2   .0  -.7 96:295
S002 1 1884 C GRIM       .0171  .0048  .0210 -.0026 -.0033  .0272  -.1  -.1   .4 93:  1
S002 1 1884 C1 CSR      -.0085 -.0040 -.0221 -.0001 -.0042 -.0236   .0  -.1  -.6 97:115
S006 1 1885 L AUS       -.0001  .0001 -.0001  .0001  .0000 -.0001   .0   .0   .0 97:  0
S006 1 1885 C GRIM       .1247 -.1728 -.0150 -.2086 -.0446  .0111  -.1   .0   .0 96:254

Velocities
M001 1 7560 L CGS       -.0231  .0035  .0024  .0126  .0178 -.0087   .0   .0   .0
M001 1 7560 L4 CSR      -.1426  .3072  .2640  .3386  .1482  .2186   .1   .1   .1
M001 1 7560 L DEOS       .0438 -.0074 -.0318 -.0247 -.0483 -.0065   .0   .0   .0
M001 1 7560 C GRIM       .0108 -.0620  .0009 -.0610  .0135 -.0076   .0   .0   .0
M002 1 RIGA P EUR       -.0045 -.0024 -.0079 -.0003  .0000 -.0094  -.2   .0 -1.8
S002 1 1884 L AUS        .0169  .0051  .0014 -.0023 -.0139  .0107  -.3 -1.9  1.6
S002 1 1884 L CGS       -.0013 -.0001  .0005  .0005  .0013 -.0002   .2   .4  -.1
S002 1 1884 L CRL       -.0003 -.0014  .0007 -.0012  .0011  .0001  -.2   .1   .0
S002 1 1884 L4 CSR       .0028 -.0020  .0028 -.0029  .0001  .0033  -.3   .0   .1
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S002 1 1884 L DEOS      -.0064 -.0048 -.0042 -.0018  .0043 -.0077  -.2   .6 -1.1
S002 1 1884 L DGFI      -.0084 -.0046 -.0046 -.0008  .0055 -.0091  -.2  1.3 -2.4
S002 1 1884 L JCET       .0019  .0007  .0014 -.0002 -.0010  .0022   .0  -.1   .1
S002 1 1884 C GRIM       .0108 -.0620  .0009 -.0610  .0135 -.0076   .0   .0   .0
S002 1 1884 C1 CSR       .0012  .0035  .0101  .0027  .0034  .0099   .2   .2   .5
S006 1 1885 L AUS       -.0028 -.0057 -.0016 -.0041  .0032 -.0040  -.1   .1  -.1
S006 1 1885 C GRIM      -.0006 -.0051 -.0062 -.0044 -.0012 -.0066  -.6  -.1  -.5

12309 MENDELEEVO

Positions
M001 1 MDVO P CODE      -.0002 -.0044  .0065 -.0034  .0059  .0038  -.3   .3   .2 96:219
M002 1 MDVO P CODE       .0031 -.0024  .0061 -.0038  .0025  .0057 -1.5   .8  1.4 98: 36
M002 1 MDVO P NCL        .0002  .0015  .0072  .0011  .0031  .0066   .4   .8  1.3 96:339
M002 1 MDVO P EUR       -.0029 -.0019 -.0060  .0002 -.0005 -.0069   .1  -.2 -2.1 98:236
S001 1 1870 C GRIM       .0232 -.0358  .0087 -.0425  .0076  .0054  -.2   .0   .0 97: 15

Velocities
M001 1 MDVO P CODE      -.0006  .0002 -.0020  .0005 -.0008 -.0019   .3  -.3  -.7
M002 1 MDVO P CODE      -.0006  .0002 -.0020  .0005 -.0008 -.0019   .3  -.3  -.7
M002 1 MDVO P NCL       -.0001  .0002  .0029  .0002  .0016  .0025   .1   .7   .9
M002 1 MDVO P EUR        .0035  .0039  .0091  .0010  .0008  .0104   .4   .2  2.4
S001 1 1870 C GRIM       .1204 -.0606  .2298 -.1211  .0793  .2236  -.3   .2   .7

12312 YEREVAN

Positions
M001 1 NSSP P CODE       .0043 -.0004  .0051 -.0033  .0021  .0054  -.5   .3   .7 99:107
M001 1 NSSP P IGS        .0005  .0002  .0002 -.0002 -.0002  .0005   .0   .0   .1 99:  3
M001 1 NSSP P NOAA      -.0011 -.0023 -.0033 -.0008 -.0010 -.0039  -.2  -.3 -1.0 98:272

Velocities
M001 1 NSSP P CODE       .0058  .0025  .0042 -.0023 -.0006  .0072  -.1   .0   .2
M001 1 NSSP P IGS        .0052  .0035  .0032 -.0011 -.0015  .0068  -.1  -.1   .4
M001 1 NSSP P NOAA      -.0012 -.0022 -.0010 -.0008  .0008 -.0024  -.1   .1  -.3

12313 IRKOUTSK

Positions
M001 1 IRKT P CODE       .0026 -.0001  .0078 -.0025  .0054  .0057  -.9  1.4  1.4 98: 60
M001 1 IRKT P GFZ        .0004  .0059  .0051 -.0018 -.0013  .0075  -.9  -.4  2.4 98:203
M001 1 IRKT P IGS       -.0002 -.0005 -.0011  .0003 -.0003 -.0011   .4  -.3  -.8 98:200
M001 1 IRKT P1 JPL      -.0007 -.0028 -.0023  .0013  .0006 -.0034   .9   .3 -1.4 97:337
M001 1 IRKT P NCL       -.0002 -.0006  .0003  .0004  .0005 -.0001   .2   .3   .0 98:130
M001 1 IRKT P NOAA       .0015 -.0018 -.0048 -.0010 -.0013 -.0051  -.4  -.5 -1.9 98: 37

Velocities
M001 1 IRKT P CODE       .0021 -.0044 -.0093 -.0010 -.0020 -.0103  -.6  -.7 -3.5
M001 1 IRKT P GFZ        .0003 -.0011 -.0019  .0000 -.0002 -.0022   .0  -.1 -1.1
M001 1 IRKT P IGS        .0000 -.0002 -.0003  .0001 -.0001 -.0004   .1  -.1  -.4
M001 1 IRKT P1 JPL       .0005  .0005  .0023 -.0006  .0011  .0020  -.5   .6  1.0
M001 1 IRKT P NCL       -.0005  .0001  .0003  .0005  .0000  .0004   .4   .0   .2
M001 1 IRKT P NOAA       .0002  .0010  .0000 -.0004 -.0007  .0006  -.2  -.3   .3

12329 YUZHNO-SAKHALINS

Positions
M003 1 YSSK P CODE       .0036 -.0007  .0005 -.0017  .0028 -.0019  -.3   .4  -.3 99:336
M003 1 YSSK P GFZ       -.0002  .0061  .0055 -.0047  .0009  .0066  -.9   .1  1.0  0: 24
M003 1 YSSK P IGS       -.0015 -.0013 -.0025  .0020 -.0020 -.0016   .7  -.6  -.5  0:142
S001 1 SAKA D9 IGN      -.0159  .0197  .0080 -.0060 -.0125  .0226  -.3  -.6  1.2 95:232
S001 1 SAKA C1 CSR       .0027 -.0007 -.0021 -.0011  .0004 -.0033  -.2   .1  -.6 95:233

Velocities
M003 1 YSSK P CODE      -.0221  .0182  .0397 -.0011  .0061  .0486   .0   .2  1.3
M003 1 YSSK P GFZ       -.0017  .0037 -.0004 -.0019 -.0029  .0021  -.2  -.3   .2
M003 1 YSSK P IGS        .0001 -.0055 -.0083  .0043 -.0032 -.0084   .6  -.4  -.9
S001 1 SAKA D9 IGN       .0071  .0026 -.0001 -.0064  .0029 -.0028  -.5   .3  -.3
S001 1 SAKA C1 CSR       .0044  .0047  .0015 -.0064  .0015  .0007 -2.0   .5   .2
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12330 ZWENIGOROD

Positions

M001 1 ZWEN P CODE	.0012	-.0026	.0027	-.0028	.0020	.0019	-1.0	.5	.4	98:221
M001 1 ZWEN P GFZ	.0033	.0008	.0020	-.0013	-.0014	.0034	-.7	-.6	1.1	98:177
M001 1 ZWEN P IGS	.0010	.0003	.0013	-.0004	-.0001	.0016	-.4	.0	1.1	98:165
M001 1 ZWEN P1 JPL	.0010	.0015	.0033	.0006	.0005	.0037	.3	.2	1.5	97:330
M001 1 ZWEN P NCL	.0000	-.0003	.0014	-.0003	.0009	.0011	-.2	.5	.5	98:143
M001 1 ZWEN P NOAA	.0012	-.0015	-.0008	-.0019	-.0005	-.0007	-.8	-.2	-.3	97:281
M001 1 ZWEN P EUR	.0002	.0000	.0000	-.0001	-.0002	.0001	-.1	-.1	.0	98:241

Velocities

M001 1 ZWEN P CODE	.0009	.0014	-.0023	.0006	-.0026	-.0010	.3	-.8	-.3
M001 1 ZWEN P GFZ	.0015	.0012	.0012	.0001	-.0009	.0020	.0	-.6	1.2
M001 1 ZWEN P IGS	.0007	.0000	.0006	-.0004	-.0002	.0008	-.4	-.1	.6
M001 1 ZWEN P1 JPL	-.0008	-.0014	-.0003	-.0006	.0011	-.0011	-.4	.6	-.5
M001 1 ZWEN P NCL	.0013	-.0002	.0029	-.0009	.0009	.0029	-.6	.4	1.3
M001 1 ZWEN P NOAA	-.0012	.0000	-.0010	.0007	.0002	-.0014	.4	.1	-.7
M001 1 ZWEN P EUR	.0000	-.0003	-.0003	-.0002	-.0001	-.0004	-.1	.0	-.1

12334 KITAB

Positions

M001 1 KIT3 TIE12334	.0000	.0000	.0000	.0000	.0000	.0000	.0	.0	.0	97: 1
M001 1 KIT3 P CODE	.0016	-.0048	.0050	-.0034	.0063	.0002	-1.1	1.4	.1	97:249
M001 1 KIT3 P GFZ	.0022	.0019	.0010	-.0013	-.0008	.0027	-.5	-.2	.8	97:285
M001 1 KIT3 P IGS	-.0003	.0005	.0002	.0004	.0000	.0004	.4	.0	.3	98: 19
M001 1 KIT3 P1 JPL	.0003	-.0003	-.0002	-.0004	-.0001	-.0002	-.2	.0	-.1	96:354
M001 1 KIT3 P NCL	-.0006	-.0012	-.0006	.0000	.0004	-.0014	.0	.2	-.7	97:360
M001 1 KIT3 P NOAA	.0021	.0012	-.0002	-.0014	-.0014	.0014	-.5	-.5	.5	97:239
S004 1 KITA TIE12334	-.0010	-.0021	.0037	.0001	.0043	.0005	.0	1.8	.2	97: 1
S004 1 KITA D GRGS	.0192	-.0349	.0179	-.0314	.0294	-.0078	-1.4	1.8	-.4	94:333
S004 1 KITA D9 IGN	.0066	.0137	-.0050	-.0007	-.0134	.0086	.0	-.7	.4	94:321
S004 1 KITA C GRIM	-.0090	.0042	-.0439	.0099	-.0342	-.0274	.2	-1.0	-.8	93: 1
S004 1 KITA C1 CSR	-.0017	.0298	-.0129	.0133	-.0269	.0126	1.5	-3.6	1.6	94:257
S005 1 KITB TIE12334	-.0009	-.0016	.0033	.0002	.0037	.0007	.1	1.7	.3	97: 1
S005 1 KITB D GRGS	.0291	-.1031	-.0400	-.0672	.0216	-.0899	-1.2	.5	-2.1	97: 16
S005 1 KITB D9 IGN	.0042	.0011	-.0373	-.0034	-.0306	-.0215	-.1	-1.1	-.7	98:273
S005 1 KITB C GRIM	-.0035	-.0543	-.0652	-.0181	-.0182	-.0809	-.5	-.9	-3.6	97:306
S005 1 KITB C1 CSR	.0178	-.0079	-.0189	-.0195	-.0145	-.0122	-1.6	-1.4	-1.2	98:210

Velocities

M001 1 KIT3 P CODE	.0008	.0005	-.0023	-.0005	-.0023	-.0008	-.2	-.7	-.3
M001 1 KIT3 P GFZ	.0004	-.0001	-.0005	-.0004	-.0005	-.0003	-.3	-.3	-.2
M001 1 KIT3 P IGS	.0004	.0012	.0007	.0001	-.0002	.0014	.1	-.2	1.2
M001 1 KIT3 P1 JPL	.0004	-.0001	.0014	-.0004	.0011	.0009	-.3	.6	.5
M001 1 KIT3 P NCL	.0004	.0003	.0000	-.0002	-.0003	.0003	-.1	-.2	.2
M001 1 KIT3 P NOAA	-.0009	.0000	-.0016	.0008	-.0010	-.0013	.4	-.5	-.6
S004 1 KITA D GRGS	.0004	-.0079	-.0030	-.0034	.0021	-.0074	-.1	.1	-.4
S004 1 KITA D9 IGN	.0054	-.0039	-.0025	-.0065	-.0011	-.0027	-.2	-.1	-.1
S004 1 KITA C GRIM	.0805	-.0385	.0028	-.0892	.0045	-.0012	-.1	.0	.0
S004 1 KITA C1 CSR	-.0162	.0022	-.0022	.0157	.0010	-.0048	1.7	.1	-.6
S005 1 KITB D GRGS	.0004	-.0079	-.0030	-.0034	.0021	-.0074	-.1	.1	-.4
S005 1 KITB D9 IGN	-.0096	.0043	-.0040	.0106	-.0032	-.0024	.3	-.1	-.1
S005 1 KITB C GRIM	.0003	.0058	.0197	.0020	.0119	.0166	.1	.8	1.0
S005 1 KITB C1 CSR	.0014	-.0019	.0009	-.0020	.0015	-.0003	-.2	.2	.0

12337 SIMEIS

Positions

M001 1 7561 L CGS	.0141	-.0262	-.0074	-.0296	-.0032	-.0073	-.8	-.1	-.1	97: 1
M001 1 7561 L4 CSR	-.0408	-.0026	-.0439	.0207	-.0067	-.0559	.2	-.1	-.4	91:308
M001 1 7561 L DEOS	-.0239	.0085	.0098	.0204	.0175	-.0039	.4	.3	-.1	93: 1
M001 1 7561 C GRIM	.0098	.0006	.0065	-.0049	-.0013	.0106	-.1	.0	.2	93: 1
S003 1 1873 L AUS	-.0270	-.0521	-.0189	-.0281	.0225	-.0500	-.5	.4	-.9	96:349
S003 1 1873 L CGS	.0353	.0195	.0352	-.0035	-.0030	.0533	-.2	-.1	1.9	93:186
S003 1 1873 L CRL	.0692	.0619	.1259	.0127	.0255	.1538	.2	.3	2.1	93:105
S003 1 1873 L4 CSR	.0413	-.0071	-.0295	-.0290	-.0423	.0010	-.1	-.1	.0	92:192
S003 1 1873 L DEOS	-.0670	-.0906	-.0536	-.0376	.0360	-.1134	-.5	.5	-1.5	92:310
S003 1 1873 L JCET	.0425	-.0149	-.0186	-.0361	-.0321	.0062	-.1	-.1	.0	96:220

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S003 1 1873 C GRIM       .0452  .0453  .0837  .0123  .0159  .1035   .1   .1   .5 93:  1
S003 1 1873 C1 CSR       .0645  .0139  .0621 -.0245  .0015  .0873  -.2   .0   .5 94:349
S006 1 1893 L AUS       -.0155 -.0102  .0055  .0002  .0169 -.0094   .0  1.2  -.7 99: 84
S006 1 1893 L CGS       -.0058 -.0014 -.0192  .0021 -.0098 -.0174   .1  -.4  -.7 95:108
S006 1 1893 L CRL        .0128  .0052  .0119 -.0028 -.0009  .0180  -.1   .0   .6 94:219
S006 1 1893 L4 CSR      -.0404 -.0400 -.0647 -.0106 -.0071 -.0852   .0   .0  -.2 97: 83
S006 1 1893 L DEOS       .1315 -.0043 -.0524 -.0771 -.1121  .0395  -.4  -.7   .3 93:  1
S006 1 1893 L JCET       .0108  .0179 -.0078  .0089 -.0189  .0081   .2  -.4   .2 96:150
S006 1 1893 C GRIM       .0089 -.0224 -.0156 -.0235 -.0075 -.0146  -.3  -.1  -.1 95: 68
S006 1 1893 C1 CSR       .0256 -.0215  .0138 -.0321  .0034  .0162  -.3   .0   .1 96:234
S008 1 7332 R GIUB       .0039  .0038  .0042  .0010 -.0007  .0068   .2  -.1  1.3 96:263
S008 1 7332 R GSFC       .0008 -.0003  .0008 -.0007  .0002  .0010  -.3   .1   .3 97: 57
S008 1 7332 R SHA        .0010  .0002  .0020 -.0004  .0007  .0020  -.2   .2   .6 96:337

Velocities
M001 1 7561 L CGS       -.0178  .0058  .0120  .0147  .0166  .0001   .0   .0   .0
M001 1 7561 L4 CSR       .1625  .0174  .1654 -.0764  .0171  .2189  -.1   .0   .3
M001 1 7561 L DEOS       .0426 -.0060 -.0292 -.0288 -.0433  .0024   .0   .0   .0
M001 1 7561 C GRIM       .0400 -.0732  .0093 -.0830  .0121  .0010  -.1   .0   .0
S003 1 1873 L AUS       -.0003 -.0054  .0049 -.0044  .0058  .0011  -.1   .1   .0
S003 1 1873 L CGS       -.0025  .0022  .0146  .0032  .0110  .0096   .4  1.1  1.0
S003 1 1873 L CRL        .0044  .0153  .0192  .0102  .0052  .0221   .5   .2   .8
S003 1 1873 L4 CSR      -.0048 -.0021  .0008  .0009  .0042 -.0031   .0   .0   .0
S003 1 1873 L DEOS      -.0191 -.0024  .0064  .0087  .0166 -.0078   .3   .7  -.3
S003 1 1873 L JCET       .0283 -.0051  .0417 -.0200  .0154  .0439  -.1   .0   .1
S003 1 1873 C GRIM       .0400 -.0732  .0093 -.0830  .0121  .0010  -.1   .0   .0
S003 1 1873 C1 CSR       .0139  .0035  .0223 -.0049  .0065  .0252  -.1   .1   .3
S006 1 1893 L AUS       -.0014  .0024  .0134  .0028  .0095  .0095   .2   .6   .6
S006 1 1893 L CGS       -.0003  .0010  .0037  .0009  .0024  .0028   .1   .3   .3
S006 1 1893 L CRL       -.0001 -.0013 -.0019 -.0010 -.0008 -.0019  -.1  -.1  -.2
S006 1 1893 L4 CSR      -.0020  .0010  .0042  .0019  .0038  .0022   .0   .0   .0
S006 1 1893 L DEOS       .0426 -.0060 -.0293 -.0288 -.0433  .0024   .0   .0   .0
S006 1 1893 L JCET       .0006 -.0095  .0002 -.0082  .0035 -.0033  -.3   .1  -.1
S006 1 1893 C GRIM       .0024 -.0039  .0012 -.0046  .0010  .0007  -.2   .0   .0
S006 1 1893 C1 CSR      -.0003  .0017 -.0043  .0016 -.0035 -.0025   .0  -.1   .0
S008 1 7332 R GIUB       .0000 -.0015 -.0014 -.0012 -.0004 -.0016  -.5  -.1  -.6
S008 1 7332 R GSFC      -.0001 -.0004 -.0013 -.0003 -.0007 -.0012  -.2  -.4  -.7
S008 1 7332 R SHA        .0000  .0007  .0001  .0006 -.0002  .0003   .3  -.1   .2

12338 BADARY

Positions
S001 1 BADA D GRGS       .0369  .0306 -.0043 -.0425 -.0200  .0103 -2.4 -1.5   .8 96:126
S001 1 BADA D9 IGN      -.0006 -.0295  .0120  .0068  .0300 -.0084   .4  1.8  -.5 96:325
S001 1 BADA C GRIM       .0008 -.0086 -.0075  .0011  .0021 -.0112   .1   .2 -1.2 96:135
S001 1 BADA C1 CSR       .0001  .0053 -.0011 -.0012 -.0047  .0023  -.3  -.9   .4 96:298

Velocities
S001 1 BADA D GRGS      -.0004  .0007 -.0049  .0003 -.0036 -.0033   .0  -.4  -.4
S001 1 BADA D9 IGN      -.0056 -.0034 -.0044  .0062 -.0010 -.0048   .7  -.1  -.6
S001 1 BADA C GRIM       .0053 -.0024 -.0013 -.0047  .0019 -.0031  -.6   .4  -.6
S001 1 BADA C1 CSR       .0011  .0023  .0001 -.0015 -.0015  .0013  -.7  -.6   .5

12339 PARAMUSHIR (ILES

Positions
S001 1 PASB C GRIM       .0011 -.0076  .0017  .0065  .0042 -.0013   .1   .1   .0 96:356

Velocities
S001 1 PASB C GRIM       .0045  .0139 -.0024 -.0145 -.0027 -.0009  -.1   .0   .0

12340 MAIDANAK

Positions
S002 1 1864 L CGS       -.0058  .0064  .0075  .0078  .0036  .0076   .6   .2   .5 97: 17
S002 1 1864 L CRL       -.0153 -.0111  .0144  .0097  .0214 -.0037   .4   .9  -.2 96:126
S002 1 1864 L4 CSR      -.0032  .0233  .0444  .0121  .0220  .0435   .1   .1   .1 99:183
S002 1 1864 C GRIM       .0279 -.0048  .0040 -.0275 -.0009  .0075 -1.1   .0   .3 97:137
S002 1 1864 C1 CSR       .0019 -.0207 -.0078 -.0098  .0053 -.0192  -.3   .1  -.4 97:270
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Velocities
S002 1 1864 L CGS       -.0026 -.0009 -.0008  .0020  .0005 -.0020   .3   .1  -.2
S002 1 1864 L CRL       -.0010 -.0001  .0009  .0009  .0010  .0002   .1   .1   .0
S002 1 1864 L4 CSR      -.0044 -.0036 -.0058  .0026 -.0013 -.0076   .1   .0  -.1
S002 1 1864 C GRIM       .0042  .0015 -.0031 -.0033 -.0043  .0004  -.3  -.2   .0
S002 1 1864 C1 CSR      -.0071  .0076  .0021  .0095 -.0010  .0046   .4   .0   .1

12341 KOMSOMOLSK-NA-AM

Positions
S001 1 1868 L AUS       -.0185 -.0190  .0081  .0265  .0048  .0066  1.0   .2   .3 99: 65
S001 1 1868 L CRL       -.0458 -.0284  .0393  .0520  .0141  .0392  1.3   .3   .8 96:263
S001 1 1868 L4 CSR       .0243  .1085  .0668 -.0957 -.0015  .0876  -.4   .0   .2 99:287
S001 1 1868 L DEOS      -.0410 -.1901  .0169  .1665  .0884 -.0505   .2   .1   .0 96:120
S001 1 1868 L DGFI      -.0142 -.0444 -.0096  .0421  .0095 -.0202  1.0   .2  -.5 97:191
S001 1 1868 L JCET       .0070  .0093 -.0014 -.0115 -.0019 -.0003  -.6  -.1   .0 95: 83
S001 1 1868 C GRIM      -.0017  .0704  .0397 -.0501 -.0132  .0621  -.1   .0   .1 98:281
S001 1 1868 C1 CSR       .0411  .0231  .0462 -.0449  .0402  .0268  -.5   .4   .2 97:320

Velocities
S001 1 1868 L AUS        .0028  .0035 -.0082 -.0045 -.0055 -.0061  -.2  -.3  -.4
S001 1 1868 L CRL        .0077  .0465  .0008 -.0391 -.0198  .0172 -1.9  -.8   .6
S001 1 1868 L4 CSR      -.0005  .0633  .0164 -.0457 -.0235  .0404  -.5  -.2   .4
S001 1 1868 L DEOS       .0279  .0694 -.0144 -.0697 -.0302  .0061  -.4  -.2   .0
S001 1 1868 L DGFI       .0292  .0402 -.0100 -.0493 -.0112 -.0038 -1.8  -.4  -.2
S001 1 1868 L JCET      -.0272  .0034  .0278  .0162  .0005  .0355   .3   .0   .5
S001 1 1868 C GRIM       .0342  .0259 -.0037 -.0423  .0032 -.0074  -.1   .0   .0
S001 1 1868 C1 CSR       .0054  .0596 -.0104 -.0471 -.0351  .0153 -1.0  -.6   .2

12342 USSURIISK

Positions
S001 1 7247 R SHA        .0013 -.0003 -.0012 -.0007 -.0001 -.0016   .0   .0   .0 92: 72

Velocities
S001 1 7247 R SHA        .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

12343 BALKHASH

Positions
S001 1 1869 C GRIM       .0066 -.0013 -.0028 -.0067 -.0024 -.0015   .0   .0   .0 93:245

Velocities
S001 1 1869 C GRIM       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

12344 EVPATORIA

Positions
S001 1 1867 C GRIM       .0099 -.0055 -.0001 -.0101 -.0038  .0036   .0   .0   .0 94:  2

Velocities
S001 1 1867 C GRIM       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

12348 POLIGAN/BISHKEK

Positions
M001 1 POL2 P CODE       .0031 -.0030  .0052 -.0038  .0052  .0020 -1.3  1.2   .5 98:113
M001 1 POL2 P IGS       -.0002  .0014  .0006  .0005 -.0005  .0013   .5  -.3   .8 98:192
M001 1 POL2 P1 JPL      -.0004 -.0019 -.0012 -.0001  .0004 -.0022   .0   .2  -.9 97:356
M001 1 POL2 P NCL       -.0004 -.0006 -.0002  .0002  .0003 -.0007   .1   .1  -.3 98: 86
M001 1 POL2 P NOAA       .0009 -.0010 -.0039 -.0011 -.0024 -.0032  -.4  -.7  -.9 98:188

Velocities
M001 1 POL2 P CODE       .0005  .0000 -.0025 -.0005 -.0019 -.0016  -.3  -.6  -.5
M001 1 POL2 P IGS        .0001  .0004 -.0002  .0000 -.0004  .0001   .0  -.3   .1
M001 1 POL2 P1 JPL      -.0003 -.0016  .0000 -.0001  .0011 -.0012  -.1   .5  -.5
M001 1 POL2 P NCL        .0002  .0000 -.0007 -.0002 -.0006 -.0004  -.1  -.2  -.2
M001 1 POL2 P NOAA      -.0012 -.0004 -.0010  .0011 -.0002 -.0012   .3  -.1  -.3

12349 KRASNOYARSK
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Positions
M002 1 KSTU TIE12349     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 KSTU P CODE       .0034 -.0026  .0041 -.0033  .0045  .0018 -1.2  1.0   .3 98:259
M002 1 KSTU P GFZ        .0024  .0041  .0032 -.0026 -.0015  .0048 -1.2  -.4  1.1 99: 27
M002 1 KSTU P IGS       -.0009  .0008 -.0003  .0009 -.0008  .0002   .8  -.4   .1 98:339
M002 1 KSTU P1 JPL       .0003 -.0018 -.0003 -.0002  .0014 -.0013  -.1   .3  -.3 98:277
M002 1 KSTU P NOAA       .0004 -.0030 -.0068 -.0003 -.0013 -.0073  -.1  -.3 -1.8 98:245
S001 1 KRAB TIE12349    -.0001  .0002  .0002  .0001  .0000  .0003   .0   .0   .1 97:  1
S001 1 KRAB D9 IGN      -.0041 -.0304 -.0346  .0056  .0057 -.0456   .1   .1 -1.0 98:347
S001 1 KRAB C GRIM       .0481 -.0531 -.0199 -.0454  .0348 -.0475  -.4   .4  -.5 99:150
S001 1 KRAB C1 CSR       .0033  .0015 -.0292 -.0033 -.0175 -.0234  -.2  -.7 -1.1 99:233

Velocities
M002 1 KSTU P CODE       .0012  .0015  .0001 -.0013 -.0012  .0009  -.7  -.2   .1
M002 1 KSTU P GFZ       -.0011  .0027  .0055  .0010  .0008  .0061   .5   .2  1.3
M002 1 KSTU P IGS       -.0002 -.0007 -.0018  .0002 -.0005 -.0019   .2  -.2  -.7
M002 1 KSTU P1 JPL       .0030 -.0007 -.0011 -.0030  .0001 -.0014  -.7   .0  -.2
M002 1 KSTU P NOAA       .0037 -.0024 -.0031 -.0036  .0004 -.0040  -.9   .1  -.6
S001 1 KRAB D9 IGN      -.0057  .0019  .0016  .0056 -.0010  .0026   .1   .0   .1
S001 1 KRAB C GRIM       .0924 -.0623  .0824 -.0893  .1015  .0310  -.1   .1   .0
S001 1 KRAB C1 CSR      -.0134  .0106 -.0311  .0128 -.0267 -.0195   .1  -.2  -.1

12350 SVETLOE

Positions
M001 1 SVTL P EUR       -.0012 -.0009 -.0018 -.0002  .0004 -.0023  -.1   .1  -.5 98:277

Velocities
M001 1 SVTL P EUR       -.0001  .0000  .0005  .0000  .0003  .0004   .0   .1   .1

12351 ZELENCHUKSKAYA

Positions
M001 1 ZECK P CODE       .0007 -.0039  .0030 -.0034  .0036  .0007 -1.0   .8   .1 98:255
M001 1 ZECK P GFZ        .0027  .0009  .0006 -.0012 -.0014  .0023  -.4  -.4   .7 99: 21
M001 1 ZECK P IGS       -.0002 -.0005 -.0007 -.0002 -.0002 -.0009  -.1  -.1  -.5 99: 12
M001 1 ZECK P NOAA       .0001 -.0015 -.0023 -.0012 -.0011 -.0022  -.4  -.3  -.7 98:269
M001 1 ZECK P EUR        .0011  .0016  .0028  .0004  .0007  .0033   .1   .2  1.0 98:336

Velocities
M001 1 ZECK P CODE      -.0011 -.0014 -.0039 -.0003 -.0016 -.0040  -.1  -.4  -.9
M001 1 ZECK P GFZ        .0018  .0022  .0020  .0005 -.0005  .0034   .2  -.2  1.1
M001 1 ZECK P IGS        .0010  .0007  .0009 -.0001 -.0002  .0015  -.1  -.1   .7
M001 1 ZECK P NOAA      -.0016 -.0022 -.0022 -.0006  .0002 -.0034  -.2   .1  -.8
M001 1 ZECK P EUR       -.0016 -.0007 -.0016  .0006  .0000 -.0023   .1   .0  -.4

12352 SELEZASCHITA

Positions
M001 1 SELE P CODE       .0031 -.0025  .0039 -.0036  .0040  .0014 -1.1   .7   .3 98:365
M001 1 SELE P IGS       -.0002  .0006 -.0006  .0003 -.0008  .0000   .2  -.3   .0 99: 48
M001 1 SELE P1 JPL      -.0001 -.0047 -.0001 -.0009  .0031 -.0035  -.4  1.0 -1.1 98:249
M001 1 SELE P NOAA       .0014  .0009 -.0031 -.0012 -.0031 -.0013  -.4  -.9  -.4 98:245

Velocities
M001 1 SELE P CODE       .0005 -.0020 -.0048 -.0010 -.0022 -.0046  -.3  -.3  -.7
M001 1 SELE P IGS        .0005  .0008  .0011 -.0003  .0001  .0014  -.2   .1   .6
M001 1 SELE P1 JPL      -.0010  .0006 -.0001  .0012 -.0004  .0002   .4  -.1   .0
M001 1 SELE P NOAA      -.0012 -.0018 -.0033  .0007 -.0010 -.0038   .2  -.2  -.8

12353 YAKUTSK

Positions
M001 1 YAKA P CODE       .0038 -.0021  .0006 -.0016  .0038 -.0014  -.5  1.0  -.3 99:  8
M001 1 YAKA P IGS       -.0018  .0004 -.0004  .0012 -.0015  .0003   .8  -.8   .1 99:149
M001 1 YAKA P NOAA       .0017 -.0030 -.0052  .0006  .0006 -.0062   .2   .2 -1.6 98:337

Velocities
M001 1 YAKA P CODE       .0005  .0011 -.0022 -.0010 -.0015 -.0017  -.4  -.4  -.3
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M001 1 YAKA P IGS        .0001 -.0007  .0000  .0004  .0005 -.0003   .2   .3  -.1
M001 1 YAKA P NOAA       .0001 -.0011 -.0027  .0006 -.0005 -.0028   .2  -.1  -.5

12354 MAGADAN

Positions
M001 1 MAGO P CODE       .0040 -.0015  .0014 -.0007  .0044 -.0010  -.2  1.0  -.2 99: 22
M001 1 MAGO P IGS       -.0019  .0003  .0005  .0007 -.0013  .0014   .5  -.7   .6 99:200
M001 1 MAGO P NOAA       .0010 -.0043 -.0076  .0033 -.0013 -.0081   .9  -.3 -1.8 98:344

Velocities
M001 1 MAGO P CODE       .0019 -.0014 -.0034  .0003  .0003 -.0041   .1   .1  -.7
M001 1 MAGO P IGS       -.0006  .0002 -.0003  .0001 -.0007  .0000   .1  -.3   .0
M001 1 MAGO P NOAA       .0024  .0007 -.0035 -.0017 -.0003 -.0039  -.4  -.1  -.6

12355 PETROPAVLOVSK-KA

Positions
M001 1 PETR P CODE       .0031 -.0011  .0036 -.0001  .0048  .0009   .0   .7   .1 98:152
M002 1 PETP P CODE       .0052 -.0025 -.0017  .0005  .0036 -.0048   .1   .6  -.7 99:197
M002 1 PETP P GFZ        .0022  .0031  .0008 -.0037  .0012  .0001 -1.4   .3   .0 99:199
M002 1 PETP P IGS       -.0013 -.0002  .0005  .0006 -.0006  .0011   .4  -.2   .4 99:333
M002 1 PETP P NOAA      -.0013 -.0048 -.0069  .0050 -.0037 -.0059  1.1  -.6 -1.0 99:125

Velocities
M001 1 PETR P CODE       .0013  .0010 -.0060 -.0014 -.0029 -.0053  -.3  -.3  -.5
M002 1 PETP P CODE       .0013  .0010 -.0060 -.0014 -.0029 -.0053  -.3  -.3  -.5
M002 1 PETP P GFZ       -.0002  .0021  .0034 -.0019  .0012  .0033  -.6   .3   .6
M002 1 PETP P IGS       -.0011 -.0013 -.0013  .0016 -.0012 -.0007   .5  -.2  -.1
M002 1 PETP P NOAA       .0066  .0005 -.0034 -.0029  .0027 -.0062  -.3   .2  -.5

12356 GOLOSIIV - KIEV

Positions
M001 1 GLSV P CODE       .0024 -.0016  .0044 -.0026  .0019  .0042  -.8   .4   .9 99:  6
M001 1 GLSV P IGS        .0013 -.0001  .0005 -.0008 -.0005  .0010  -.4  -.2   .4 99:204
M001 1 GLSV P NOAA      -.0020 -.0034 -.0047 -.0019 -.0004 -.0058  -.7  -.1 -1.8 99: 42
M001 1 GLSV P EUR        .0010  .0010  .0019  .0003  .0002  .0023   .1   .0   .7 99: 76

Velocities
M001 1 GLSV P CODE      -.0004  .0002 -.0023  .0004 -.0013 -.0019   .1  -.3  -.4
M001 1 GLSV P IGS        .0007 -.0001  .0006 -.0005 -.0001  .0008  -.2   .0   .2
M001 1 GLSV P NOAA      -.0002  .0009  .0011  .0008  .0005  .0011   .2   .1   .2
M001 1 GLSV P EUR       -.0004  .0002 -.0003  .0004  .0000 -.0004   .1   .0  -.1

12360 TIXI

Positions
M001 1 TIXI P CODE       .0038 -.0030 -.0014 -.0011  .0041 -.0028  -.3  1.0  -.4 99:182
M001 1 TIXI P GFZ        .0013  .0026  .0053 -.0027  .0005  .0054 -1.2   .2  1.0 99:202
M001 1 TIXI P IGS       -.0001  .0003  .0002 -.0001 -.0002  .0003   .0  -.1   .1 99:350
M001 1 TIXI P NOAA       .0014 -.0026 -.0113  .0005 -.0008 -.0116   .2  -.2 -1.8 99:184

Velocities
M001 1 TIXI P CODE       .0012 -.0012 -.0067 -.0002 -.0005 -.0069   .0  -.1  -.5
M001 1 TIXI P GFZ        .0001 -.0035  .0017  .0021  .0031  .0008   .8   .8   .1
M001 1 TIXI P IGS       -.0001  .0012  .0011 -.0007 -.0006  .0013  -.3  -.2   .2
M001 1 TIXI P NOAA      -.0016  .0029 -.0039 -.0006 -.0043 -.0027  -.1  -.5  -.2

12362 ARTI

Positions
M001 1 ARTU P CODE       .0029 -.0020  .0010 -.0035  .0007  .0007  -.8   .1   .1 99:343
M001 1 ARTU P GFZ        .0067  .0073  .0111 -.0019 -.0019  .0146  -.5  -.3  2.2  0: 27
M001 1 ARTU P IGS       -.0009 -.0015 -.0030 -.0001 -.0002 -.0035   .0  -.1 -1.1  0:111

Velocities
M001 1 ARTU P CODE       .0376  .0404  .0719 -.0110 -.0053  .0898  -.5  -.2  2.1
M001 1 ARTU P GFZ        .0000  .0000  .0001  .0000  .0001  .0000   .0   .1   .0
M001 1 ARTU P IGS        .0002  .0005 -.0016  .0000 -.0013 -.0011   .0  -.2  -.1
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12363 BILIBINO

Positions
M001 1 BILI P CODE       .0049 -.0032 -.0044  .0019  .0035 -.0061   .4   .4  -.4 99:306
M001 1 BILI P GFZ       -.0004  .0046  .0120 -.0043  .0031  .0116  -.7   .3   .6 99:361

Velocities
M001 1 BILI P CODE      -.0295  .0093  .1079 -.0021  .0117  .1116   .0   .1   .4
M001 1 BILI P GFZ        .0194 -.0010  .0338 -.0035  .0303  .0243  -.2  1.3   .6

12602 DIONYSOS

Positions
M002 1 7515 TIE12602     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7515 L CGS        .0073  .0193 -.0138  .0147 -.0198  .0029   .9  -.9   .1 88: 16
M002 1 7515 L4 CSR       .0058 -.0011  .0058 -.0034  .0016  .0074  -.1   .0   .1 88: 51
M002 1 7515 L DEOS      -.0025  .0059  .0080  .0064  .0062  .0050   .2   .2   .2 88:236
M002 1 7515 C GRIM       .0001 -.0259  .0356 -.0237  .0345  .0138  -.6   .8   .3 93:  1
S001 1 7940 L4 CSR       .0040 -.0035 -.0123 -.0048 -.0110 -.0058   .0   .0   .0 84:168
S011 1 DIOA TIE12602    -.0015 -.0015  .0070 -.0008  .0067  .0028  -.1   .7   .3 97:  1
S011 1 DIOA D GRGS      -.0503 -.0140 -.0030  .0076  .0295 -.0426   .2  1.2 -1.6 96: 83
S011 1 DIOA D9 IGN       .0167  .0261 -.0349  .0171 -.0434 -.0011   .6 -1.7   .0 97:  6
S011 1 DIOA C GRIM      -.0067 -.0097 -.0185 -.0062 -.0084 -.0193  -.2  -.5 -1.0 95:329
S011 1 DIOA C1 CSR       .0070  .0039  .0031  .0007 -.0025  .0082   .1  -.3   .8 97:174

Velocities
M002 1 7515 L CGS        .0071 -.0048  .0041 -.0072  .0004  .0061  -.7   .0   .4
M002 1 7515 L4 CSR       .0053 -.0011  .0056 -.0032  .0017  .0069  -.4   .1   .5
M002 1 7515 L DEOS       .0047 -.0008 -.0017 -.0027 -.0038  .0021  -.2  -.3   .2
M002 1 7515 C GRIM       .0534 -.1024 -.0074 -.1152 -.0103  .0011  -.1   .0   .0
S001 1 7940 L4 CSR      -.0787  .0481  .0758  .0758  .0920  .0055   .0   .0   .0
S011 1 DIOA D GRGS       .0055  .0027  .0031  .0002 -.0014  .0067   .0  -.1   .4
S011 1 DIOA D9 IGN       .0021 -.0064  .0018 -.0067  .0019  .0006  -.4   .1   .0
S011 1 DIOA C GRIM       .0016 -.0079  .0103 -.0078  .0091  .0050  -.9  1.2   .6
S011 1 DIOA C1 CSR       .0011 -.0040 -.0012 -.0041 -.0006 -.0012  -.6  -.1  -.2

12612 ASKITES

Positions
M001 1 7510 L CGS       -.0024  .0026 -.0217  .0034 -.0157 -.0150   .2  -.7  -.7 88:163
M001 1 7510 L4 CSR       .0115 -.0030  .0035 -.0077 -.0033  .0091  -.2  -.1   .2 88: 99
M001 1 7510 L DEOS      -.0079  .0065 -.0065  .0093 -.0021 -.0075   .3  -.1  -.2 88:338
M001 1 7510 C GRIM      -.0117  .0108 -.0213  .0148 -.0122 -.0184   .9  -.5  -.8 89: 97

Velocities
M001 1 7510 L CGS        .0057  .0114  .0034  .0078 -.0040  .0098   .9  -.3   .8
M001 1 7510 L4 CSR       .0014  .0144 -.0063  .0124 -.0097  .0015  1.4  -.7   .1
M001 1 7510 L DEOS      -.0011  .0114 -.0170  .0108 -.0154 -.0082   .8 -1.1  -.6
M001 1 7510 C GRIM      -.0006  .0090 -.0069  .0083 -.0074 -.0020   .8  -.5  -.1

12613 ROUMELLI

Positions
M001 1 7517 L CGS       -.0020  .0094 -.0192  .0094 -.0169 -.0094   .6  -.9  -.5 88:213
M001 1 7517 L4 CSR       .0034  .0012 -.0009 -.0003 -.0028  .0025   .0  -.1   .1 88:224
M001 1 7517 L DEOS      -.0130 -.0049 -.0034  .0010  .0053 -.0133   .0   .1  -.4 88:160
M001 1 7517 C GRIM      -.0116  .0044 -.0208  .0088 -.0119 -.0191   .4  -.4  -.6 88: 80

Velocities
M001 1 7517 L CGS       -.0002  .0070 -.0046  .0065 -.0053 -.0004  1.0  -.6   .0
M001 1 7517 L4 CSR      -.0001  .0084 -.0052  .0076 -.0062 -.0002  1.2  -.7   .0
M001 1 7517 L DEOS      -.0073  .0053 -.0095  .0079 -.0052 -.0091   .5  -.3  -.6
M001 1 7517 C GRIM       .0017 -.0047 -.0007 -.0050 -.0004 -.0008  -.2   .0   .0

12614 KARITSA

Positions
M001 1 7520 L CGS       -.0024  .0147 -.0210  .0146 -.0181 -.0111   .6  -.5  -.3 87:176
M001 1 7520 L4 CSR      -.0030 -.0010 -.0066  .0001 -.0030 -.0067   .0   .0  -.1 91: 99
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M001 1 7520 L DEOS       .0011  .0047  .0059  .0040  .0028  .0059   .1   .1   .2 91:184
M001 1 7520 C GRIM      -.0099 -.0056 -.0170 -.0017 -.0059 -.0195  -.1  -.3  -.9 91:345

Velocities
M001 1 7520 L CGS        .0061  .0088  .0134  .0061  .0047  .0153   .5   .2   .7
M001 1 7520 L4 CSR       .0024  .0013  .0057  .0004  .0026  .0057   .0   .2   .3
M001 1 7520 L DEOS       .0034 -.0028 -.0023 -.0038 -.0032  .0002  -.5  -.4   .0
M001 1 7520 C GRIM       .0029 -.0050  .0023 -.0057  .0012  .0022 -1.2   .2   .4

12615 KATAVIA

Positions
M001 1 7512 L CGS        .0119  .0045 -.0042 -.0015 -.0109  .0078  -.1  -.5   .4 89:194
M001 1 7512 L4 CSR       .0039  .0012 -.0067 -.0007 -.0078 -.0007   .0  -.2   .0 89:147
M001 1 7512 L DEOS      -.0115 -.0041 -.0135  .0017 -.0039 -.0177   .1  -.1  -.6 89:277
M001 1 7512 C GRIM      -.0017  .0132 -.0028  .0124 -.0050  .0022   .8  -.3   .1 90:114

Velocities
M001 1 7512 L CGS       -.0020  .0053 -.0039  .0056 -.0036 -.0017   .8  -.4  -.2
M001 1 7512 L4 CSR      -.0006  .0071 -.0045  .0065 -.0053 -.0004   .9  -.6   .0
M001 1 7512 L DEOS      -.0019  .0059 -.0099  .0061 -.0086 -.0049   .6  -.7  -.5
M001 1 7512 C GRIM       .0086  .0046  .0006  .0000 -.0053  .0082   .0  -.6  1.0

12616 XRISOKALARIA

Positions
M001 1 7525 L CGS       -.0019  .0094 -.0160  .0095 -.0139 -.0081   .6  -.7  -.4 90: 47
M001 1 7525 L CRL       -.0088  .0242 -.0066  .0258 -.0058 -.0033   .9  -.1  -.1 92:102
M001 1 7525 L4 CSR      -.0063 -.0051 -.0085 -.0024 -.0022 -.0113  -.1   .0  -.2 91: 84
M001 1 7525 L DEOS      -.0033  .0054  .0017  .0063  .0020  .0002   .3   .1   .0 90:284
M001 1 7525 C GRIM      -.0096  .0053 -.0117  .0085 -.0052 -.0125   .4  -.2  -.4 89:257
M001 1 7525 C1 CSR      -.0052 -.0052 -.0129 -.0029 -.0063 -.0132  -.1  -.2  -.3 94:248

Velocities
M001 1 7525 L CGS       -.0010 -.0035 -.0004 -.0029  .0010 -.0020  -.5   .1  -.3
M001 1 7525 L CRL        .0017  .0025 -.0009  .0017 -.0022  .0015   .1  -.1   .1
M001 1 7525 L4 CSR      -.0021 -.0010 -.0039 -.0001 -.0017 -.0042   .0  -.2  -.5
M001 1 7525 L DEOS       .0028  .0012 -.0008  .0000 -.0025  .0019   .0  -.3   .3
M001 1 7525 C GRIM       .0012 -.0060  .0016 -.0060  .0019  .0000  -.6   .2   .0
M001 1 7525 C1 CSR       .0717  .0112  .0498 -.0163 -.0025  .0865   .0   .0   .2

12706 LAMPEDUSA

Positions
M001 1 7544 TIE12706     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7544 L AUS       -.0607  .0559  .0594  .0678  .0757 -.0038  1.3  1.5  -.1 96: 92
M001 1 7544 L CGS       -.0033  .0125 -.0221  .0129 -.0177 -.0132   .7  -.6  -.4 88:331
M001 1 7544 L4 CSR      -.0044 -.0004 -.0020  .0006  .0009 -.0048   .0   .0  -.1 90:127
M001 1 7544 L DEOS      -.0087  .0108  .0053  .0124  .0079 -.0019   .4   .3  -.1 90:163
M001 1 7544 C GRIM      -.0015  .0064 -.0087  .0066 -.0070 -.0051   .3  -.2  -.2 89:101
M001 1 7544 C1 CSR      -.0009  .0151 -.0078  .0149 -.0078 -.0025   .5  -.2  -.1 92:322
M002 1 LAMP TIE12706    -.0009  .0011  .0003  .0013  .0006 -.0004   .2   .1  -.1 97:  1
M002 1 LAMP P EUR        .0039  .0009  .0031  .0001  .0003  .0051   .0   .0   .6 99:264

Velocities
M001 1 7544 L AUS       -.0181  .0290  .0153  .0323  .0191 -.0004  1.0   .7   .0
M001 1 7544 L CGS       -.0013 -.0083  .0000 -.0078  .0018 -.0025  -.7   .1  -.1
M001 1 7544 L4 CSR      -.0034  .0007  .0000  .0015  .0018 -.0026   .2   .1  -.2
M001 1 7544 L DEOS      -.0006 -.0021 -.0035 -.0019 -.0022 -.0028  -.1  -.2  -.2
M001 1 7544 C GRIM       .0491 -.0294  .0420 -.0394  .0101  .0582 -2.0   .3  1.5
M001 1 7544 C1 CSR      -.1619  .0395 -.0828  .0738  .0194 -.1698   .1   .0  -.1
M002 1 LAMP P EUR       -.0093  .0024 -.0014  .0044  .0039 -.0078   .3   .1  -.2

12711 MEDICINA

Positions
M002 1 7546 TIE12711     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7546 L4 CSR       .1974 -.0635  .1870 -.1020  .0068  .2598  -.3   .0   .2 88:150
M003 1 MEDI TIE12711    -.0012  .0046  .0003  .0048  .0004  .0000  2.6   .2   .0 97:  1
M003 1 MEDI P CODE      -.0010 -.0038  .0017 -.0035  .0024 -.0001 -1.1   .5   .0 99: 58
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M003 1 MEDI P IGS        .0003 -.0008 -.0006 -.0008 -.0006 -.0003  -.6  -.2  -.1 99:240
M003 1 MEDI P1 JPL      -.0003  .0011  .0004  .0011  .0004  .0002   .7   .2   .1 98: 86
M003 1 MEDI P NOAA       .0009  .0013  .0017  .0011  .0004  .0020   .5   .1   .8 98: 18
M003 1 MEDI P EUR       -.0017  .0000 -.0009  .0003  .0006 -.0018   .3   .2  -.7 98: 63
M003 1 MEDI P REGAL     -.0014  .0003  .0003  .0006  .0011 -.0007   .6   .6  -.4 98:332
S001 1 7230 TIE12711     .0005 -.0021 -.0031 -.0021 -.0023 -.0021 -1.5  -.6  -.6 97:  1
S001 1 7230 R GIUB      -.0004  .0017 -.0006  .0018 -.0004 -.0004   .8  -.1  -.1 94:354
S001 1 7230 R GSFC       .0020  .0013  .0022  .0009  .0000  .0031   .9   .0  1.4 94: 65
S001 1 7230 R SHA        .0025  .0029  .0016  .0023 -.0010  .0033  1.4  -.3  1.1 96:145
S001 2 7230 R GIUB      -.0010 -.0011 -.0021 -.0008 -.0007 -.0024  -.3  -.2  -.7 97:  1
S001 2 7230 R GSFC       .0019 -.0006  .0013 -.0010 -.0003  .0022  -.9  -.1   .9 97:  1
S001 2 7230 R SHA        .0046  .0000  .0054 -.0009  .0006  .0070  -.6   .2  2.6 97:  1

Velocities
M002 1 7546 L4 CSR       .1506  .1186  .0547  .0857 -.0812  .1606   .0   .0   .1
M003 1 MEDI P CODE       .0000  .0014 -.0008  .0013 -.0008 -.0003   .5  -.1   .0
M003 1 MEDI P IGS       -.0034  .0005 -.0055  .0012 -.0017 -.0062   .7  -.5 -1.7
M003 1 MEDI P1 JPL      -.0018 -.0016 -.0021 -.0012  .0000 -.0030  -.6   .0 -1.0
M003 1 MEDI P NOAA      -.0033 -.0022 -.0017 -.0015  .0014 -.0038  -.9   .7 -1.8
M003 1 MEDI P EUR       -.0006 -.0019 -.0005 -.0017  .0004 -.0010 -1.9   .1  -.4
M003 1 MEDI P REGAL     -.0003 -.0008 -.0001 -.0007  .0002 -.0004  -.9   .1  -.3
S001 1 7230 R GIUB       .0001  .0007 -.0004  .0006 -.0004 -.0001   .7  -.4  -.1
S001 1 7230 R GSFC       .0000  .0006  .0000  .0006 -.0001  .0001  2.2  -.2   .2
S001 1 7230 R SHA       -.0002  .0006 -.0006  .0006 -.0003 -.0005   .6  -.3  -.4
S001 2 7230 R GIUB      -.0169  .0169  .0070  .0199  .0142 -.0045   .0   .0   .0
S001 2 7230 R GSFC      -.0327 -.0147  .0061 -.0078  .0289 -.0207   .0   .0   .0
S001 2 7230 R SHA       -.0193  .0169  .0105  .0205  .0184 -.0037   .0   .0   .0

12712 GENOVA

Positions
M002 1 GENO P NOAA      -.0026  .0000 -.0005  .0004  .0015 -.0022   .1   .4  -.6 99: 87
M002 1 GENO P EUR        .0017  .0000  .0017 -.0003  .0000  .0024  -.2   .0   .4 99:178
M002 1 GENO P REGAL      .0001  .0007  .0011  .0007  .0006  .0009   .7   .2   .4 99:137

Velocities
M002 1 GENO P NOAA      -.0026  .0009 -.0001  .0013  .0016 -.0017   .3   .2  -.2
M002 1 GENO P EUR        .0003  .0021  .0004  .0021 -.0002  .0007   .3   .0   .0
M002 1 GENO P REGAL      .0005  .0001  .0003  .0000 -.0001  .0006   .0   .0   .1

12717 NOTO

Positions
M001 1 7543 TIE12717     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7543 L CGS        .0249  .0167 -.0223  .0097 -.0349  .0093   .5 -1.1   .3 92: 72
M001 1 7543 L4 CSR      -.0065  .0065  .0057  .0079  .0073 -.0003   .2   .1   .0 92:116
M001 1 7543 L DEOS      -.0021  .0025 -.0155  .0030 -.0116 -.0104   .1  -.4  -.3 92:146
M001 1 7543 C GRIM      -.0005  .0064 -.0033  .0063 -.0034 -.0010   .4  -.1   .0 91:216
M001 1 7543 C1 CSR      -.0148  .0043 -.0046  .0080  .0042 -.0133   .3   .1  -.3 93:249
M003 1 NOTO TIE12717    -.0010  .0016  .0032  .0018  .0029  .0015  1.0  1.6   .8 97:  1
M003 1 NOTO P CODE       .0030  .0005  .0078 -.0003  .0044  .0071  -.1   .7  1.2 99:137
M003 1 NOTO P IGS       -.0060 -.0020 -.0038 -.0004  .0007 -.0073  -.3   .3 -2.8 98:159
M003 1 NOTO P1 JPL      -.0015 -.0006 -.0013 -.0002 -.0001 -.0020  -.1   .0  -.8 97:286
M003 1 NOTO P NCL       -.0014 -.0002 -.0010  .0002  .0000 -.0017   .1   .0  -.7 97:157
M003 1 NOTO P NOAA      -.0043 -.0009  .0012  .0003  .0036 -.0028   .1   .8  -.6 99: 42
M003 1 NOTO P EUR       -.0016  .0005  .0005  .0009  .0012 -.0008   .6   .4  -.2 98:136
S001 1 7547 TIE12717     .0041 -.0059 -.0132 -.0068 -.0120 -.0059 -2.2 -3.8 -1.9 97:  1
S001 1 7547 R GIUB       .0051  .0029  .0035  .0015 -.0006  .0067   .6  -.2  1.9 96: 22
S001 1 7547 R GSFC       .0036  .0014  .0033  .0004  .0004  .0051   .3   .1  1.5 96:245
S001 1 7547 R SHA       -.0002  .0007  .0004  .0007  .0003  .0002   .4   .1   .1 96:290

Velocities
M001 1 7543 L CGS        .0085  .0011 -.0018 -.0012 -.0065  .0057  -.1  -.3   .3
M001 1 7543 L4 CSR       .0014 -.0050  .0048 -.0052  .0038  .0030  -.2   .1   .1
M001 1 7543 L DEOS       .0007 -.0091  .0012 -.0089  .0020 -.0007  -.4   .1   .0
M001 1 7543 C GRIM       .0073 -.0053 -.0036 -.0070 -.0063  .0024  -.5  -.3   .1
M001 1 7543 C1 CSR       .0897 -.0002  .2087 -.0234  .1150  .1945   .0   .1   .2
M003 1 NOTO P CODE       .0011  .0013  .0008  .0010 -.0003  .0016   .2   .0   .2
M003 1 NOTO P IGS        .0033  .0018  .0037  .0009  .0008  .0051   .9   .5  3.0
M003 1 NOTO P1 JPL       .0001  .0004  .0010  .0004  .0007  .0008   .3   .3   .4
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M003 1 NOTO P NCL       -.0026  .0002 -.0009  .0008  .0007 -.0025   .6   .3 -1.1
M003 1 NOTO P NOAA      -.0022  .0000 -.0009  .0005  .0005 -.0022   .2   .2  -.6
M003 1 NOTO P EUR       -.0005  .0013  .0013  .0014  .0012  .0006   .9   .4   .2
S001 1 7547 R GIUB       .0012 -.0003  .0002 -.0006 -.0005  .0010  -.5  -.4   .8
S001 1 7547 R GSFC       .0000 -.0006 -.0006 -.0006 -.0004 -.0005 -1.8  -.8  -.8
S001 1 7547 R SHA        .0001 -.0004 -.0006 -.0004 -.0004 -.0004  -.4  -.4  -.3

12718 TRIESTE

Positions
M002 1 7550 L CGS        .0271  .0410  .0110  .0333 -.0182  .0332   .9  -.3   .5 86:262
M002 1 7550 L4 CSR       .1018  .0538  .0844  .0278 -.0209  .1385   .2  -.1   .4 86:268
M002 1 7550 L DEOS       .0119  .0390  .0628  .0350  .0290  .0595   .4   .4   .8 87:  5
M002 1 7550 C GRIM      -.0111  .0878  .0076  .0879 -.0021  .0126   .3   .0   .0 86:158

Velocities
M002 1 7550 L CGS       -.0054 -.0695  .0295 -.0662  .0363  .0057 -2.3   .6   .1
M002 1 7550 L4 CSR      -.0039 -.0825  .0222 -.0792  .0324 -.0006  -.8   .1   .0
M002 1 7550 L DEOS       .0047 -.0845  .0155 -.0831  .0221  .0001 -1.5   .5   .0
M002 1 7550 C GRIM      -.1003 -.2051 -.0204 -.1751  .0905 -.1170  -.3   .1  -.2

12724 TORINO I

Positions
M002 1 TORI P NOAA      -.0040  .0011 -.0008  .0016  .0021 -.0033   .6   .5  -.8 99: 70
M002 1 TORI P EUR        .0030  .0002  .0029 -.0002  .0000  .0042  -.1   .0   .6 99:202
M002 1 TORI P REGAL      .0004  .0003  .0002  .0003 -.0001  .0005   .4  -.1   .2 98:292

Velocities
M002 1 TORI P NOAA       .0023  .0004  .0016  .0001 -.0005  .0027   .0  -.1   .5
M002 1 TORI P EUR        .0004  .0008 -.0019  .0007 -.0017 -.0010   .1  -.1   .0
M002 1 TORI P REGAL      .0005  .0004  .0004  .0003 -.0001  .0007   .4   .0   .3

12725 CAGLIARI

Positions
M002 1 7545 TIE12725     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7545 L CGS        .0266 -.0187  .0003 -.0227 -.0145  .0183  -.6  -.2   .3 97:  1
M002 1 7545 L CRL        .0019  .0005  .0119  .0002  .0080  .0090   .0   .7   .8 91:169
M002 1 7545 L4 CSR       .0097 -.0004  .0030 -.0019 -.0037  .0093  -.1   .0   .1 88:361
M002 1 7545 L DEOS       .0019  .0085  .0074  .0081  .0037  .0071   .2   .1   .2 93:  1
M002 1 7545 C GRIM       .0053 -.0109  .0024 -.0116 -.0003  .0042  -.5   .0   .1 93:  1
M002 1 7545 C1 CSR      -.0250  .0020 -.0278  .0058 -.0062 -.0364   .1  -.1  -.5 94: 21
M003 1 CAGL TIE12725     .0000  .0000  .0005  .0000  .0004  .0003   .0   .2   .2 97:  1
M003 1 CAGL P CODE       .0032 -.0017  .0063 -.0022  .0030  .0062  -.7   .6  1.2 99: 26
M003 1 CAGL P1 JPL      -.0002  .0001 -.0004  .0001 -.0002 -.0004   .1  -.1  -.2 98: 65
M003 1 CAGL P NOAA       .0007 -.0005  .0006 -.0006  .0001  .0009  -.2   .0   .3 98:  6
M003 1 CAGL P EUR       -.0009  .0004 -.0003  .0005  .0003 -.0008   .5   .1  -.3 98:201
M003 1 CAGL P REGAL     -.0024  .0000  .0027  .0003  .0036 -.0001   .2  1.4   .0 99: 77
S013 1 7548 L AUS       -.0070  .0028  .0106  .0038  .0123  .0017   .1   .3   .0 97:108
S013 1 7548 L CGS       -.0262  .0143 -.0353  .0182 -.0124 -.0406  1.1  -.4 -1.3 97:  6
S013 1 7548 L CRL       -.0292  .0218 -.0023  .0261  .0142 -.0212   .7   .2  -.3 96:284
S013 1 7548 L4 CSR      -.0787  .0167 -.0889  .0288 -.0216 -.1144   .1   .0  -.1 98:134
S013 1 7548 L DEOS       .1213  .0243  .0185  .0051 -.0637  .1076   .1 -1.3  2.1 98:182
S013 1 7548 L JCET      -.0023 -.0062 -.0029 -.0058 -.0002 -.0043  -.7   .0  -.6 95:208
S013 1 7548 C GRIM      -.0297 -.0067 -.0285 -.0020 -.0029 -.0415  -.1   .0  -.6 96:242
S013 1 7548 C1 CSR      -.0175  .0124 -.0374  .0150 -.0193 -.0356   .1  -.1  -.2 97:111

Velocities
M002 1 7545 L CGS       -.0139  .0069  .0151  .0090  .0197 -.0002   .0   .0   .0
M002 1 7545 L CRL        .0004 -.0026  .0055 -.0026  .0043  .0035  -.6   .7   .5
M002 1 7545 L4 CSR      -.0091  .0030 -.0040  .0043  .0023 -.0091   .6   .1  -.4
M002 1 7545 L DEOS       .0369 -.0089 -.0397 -.0145 -.0529  .0021   .0   .0   .0
M002 1 7545 C GRIM       .0051 -.0964  .0129 -.0960  .0163  .0004  -.1   .0   .0
M002 1 7545 C1 CSR       .2575  .0334  .3005 -.0071  .0693  .3910   .0   .1   .6
M003 1 CAGL P CODE      -.0015  .0011 -.0024  .0014 -.0010 -.0025   .6  -.2  -.4
M003 1 CAGL P1 JPL       .0006 -.0008  .0004 -.0009  .0000  .0006  -.5   .0   .2
M003 1 CAGL P NOAA      -.0007 -.0005  .0004 -.0004  .0008 -.0004  -.2   .3  -.2
M003 1 CAGL P EUR        .0006 -.0002  .0007 -.0003  .0001  .0009  -.3   .1   .3
M003 1 CAGL P REGAL     -.0023 -.0004 -.0006  .0000  .0011 -.0022   .0   .4  -.8
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S013 1 7548 L AUS        .0008  .0123 -.0079  .0120 -.0078 -.0029   .4  -.3  -.1
S013 1 7548 L CGS        .0060 -.0053  .0013 -.0062 -.0023  .0048  -.9  -.2   .4
S013 1 7548 L CRL       -.0136  .0003 -.0286  .0025 -.0137 -.0284   .1  -.3  -.7
S013 1 7548 L4 CSR      -.0211  .0195 -.0271  .0225 -.0098 -.0309   .2  -.1  -.2
S013 1 7548 L DEOS       .0024 -.0016 -.0011 -.0019 -.0022  .0010  -.2  -.2   .1
S013 1 7548 L JCET       .0058  .0044  .0195  .0035  .0110  .0173   .3  1.2  1.8
S013 1 7548 C GRIM       .0016 -.0072  .0021 -.0074  .0014  .0017 -1.0   .1   .2
S013 1 7548 C1 CSR      -.0200  .0045 -.0132  .0076  .0018 -.0231   .1   .0  -.1

12734 MATERA

Positions
M004 1 7541 TIE12734     .0003  .0000 -.0003  .0000 -.0004  .0000   .0  -.1   .0 97:  1
M004 1 7541 L CGS       -.0067 -.0704  .0158 -.0655  .0293 -.0099 -3.2  1.0  -.3 97:  1
M004 1 7541 L4 CSR       .0077  .0145 -.0042  .0117 -.0107  .0061   .3  -.1   .1 88:327
M004 1 7541 L DEOS       .0053  .0122  .0128  .0102  .0041  .0148   .3   .1   .4 93:  1
M004 1 7541 C GRIM       .0060  .0069 -.0017  .0049 -.0063  .0048   .2  -.2   .1 93:  1
M004 1 7541 C1 CSR      -.0027  .0071 -.0052  .0075 -.0036 -.0038   .2  -.1  -.1 94:146
M005 1 7540 TIE12734     .0001 -.0002  .0002 -.0002  .0001  .0002  -.1   .0   .0 97:  1
M005 1 7540 L CGS        .0165 -.1122  .0290 -.1122  .0328  .0064 -3.4   .6   .1 97:  1
M005 1 7540 L4 CSR       .0753  .0149  .0386 -.0074 -.0205  .0831  -.1  -.1   .3 86: 61
M005 1 7540 L DEOS       .0092  .0079 -.0061  .0049 -.0118  .0044   .1  -.2   .1 93:  1
M005 1 7540 C GRIM       .0093 -.0027 -.0030 -.0052 -.0076  .0042  -.1  -.1   .1 93:  1
M008 1 MATE TIE12734     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M008 1 MATE P CODE       .0010 -.0022  .0061 -.0023  .0045  .0042  -.9  1.2  1.1 97:329
M008 1 MATE P GFZ       -.0005 -.0014 -.0020 -.0012 -.0010 -.0020  -.7  -.3  -.7 97:287
M008 1 MATE P IGS        .0002 -.0002  .0003 -.0003  .0002  .0003  -.3   .2   .2 98:142
M008 1 MATE P1 JPL       .0015  .0009  .0003  .0004 -.0009  .0015   .2  -.4   .6 98: 91
M008 1 MATE P NCL       -.0015 -.0009 -.0011 -.0004  .0003 -.0020  -.3   .1 -1.0 98: 46
M008 1 MATE P NOAA      -.0046 -.0063 -.0011 -.0047  .0032 -.0054 -1.0   .5  -.8 99: 33
M008 1 MATE P EUR        .0008  .0003  .0007  .0001  .0000  .0011   .1   .0   .5 98:161
M008 1 MATE P REGAL     -.0003  .0012  .0056  .0012  .0042  .0036   .5  1.4  1.2 99:109
S001 1 7939 TIE12734     .0001 -.0020  .0007 -.0020  .0008  .0001  -.6   .3   .0 97:  1
S001 1 7939 L AUS       -.0096 -.0023 -.0082  .0006  .0002 -.0129   .1   .0 -1.3 98:139
S001 1 7939 L CGS        .0202  .0192  .0165  .0126 -.0037  .0296   .2  -.1   .5 93: 71
S001 1 7939 L CRL        .0238  .0124  .0254  .0051  .0021  .0365   .7   .2  3.0 91:224
S001 1 7939 L4 CSR       .0206  .0133  .0174  .0068 -.0022  .0292  1.3  -.2  2.7 89:242
S001 1 7939 L DEOS      -.0028  .0001 -.0007  .0009  .0012 -.0025   .1   .2  -.3 92:186
S001 1 7939 L DGFI      -.0076 -.0019  .0008  .0004  .0057 -.0054   .0   .6  -.5 94:198
S001 1 7939 L JCET       .0065 -.0019  .0048 -.0036  .0000  .0075 -1.2   .0  1.7 96: 98
S005 1 7243 TIE12734     .0091 -.0079 -.0007 -.0102 -.0047  .0044 -1.3  -.6   .6 97:  1
S005 1 7243 R GIUB       .0000  .0003 -.0002  .0003 -.0003  .0000   .1  -.1   .0 95:359
S005 1 7243 R GSFC       .0028  .0012  .0026  .0003  .0000  .0040   .3   .0  1.8 96:214
S005 1 7243 R SHA        .0025  .0008  .0025  .0001  .0002  .0036   .1   .1  1.4 96:320

Velocities
M004 1 7541 L CGS       -.0191  .0069  .0168  .0121  .0234 -.0015   .0   .0   .0
M004 1 7541 L4 CSR      -.0052 -.0016 -.0014  .0000  .0025 -.0050   .0   .1  -.2
M004 1 7541 L DEOS       .0348 -.0079 -.0349 -.0176 -.0467  .0008   .0   .0   .0
M004 1 7541 C GRIM       .0133 -.0909  .0143 -.0909  .0195 -.0008  -.1   .0   .0
M004 1 7541 C1 CSR       .1826 -.1175  .2102 -.1651  .0676  .2440  -.1   .0   .1
M005 1 7540 L CGS       -.0191  .0069  .0168  .0121  .0234 -.0015   .0   .0   .0
M005 1 7540 L4 CSR      -.0564 -.1452 -.1273 -.1228 -.0342 -.1555  -.1   .0  -.1
M005 1 7540 L DEOS       .0348 -.0079 -.0349 -.0176 -.0467  .0008   .0   .0   .0
M005 1 7540 C GRIM       .0133 -.0909  .0143 -.0909  .0195 -.0008  -.1   .0   .0
M008 1 MATE P CODE       .0004  .0002 -.0016  .0001 -.0016 -.0007   .0  -.6  -.3
M008 1 MATE P GFZ        .0020  .0014  .0005  .0008 -.0011  .0021   .9  -.9  1.7
M008 1 MATE P IGS       -.0013 -.0009 -.0012 -.0005  .0001 -.0019  -.7   .1 -1.8
M008 1 MATE P1 JPL       .0003  .0003 -.0003  .0002 -.0005  .0001   .1  -.2   .1
M008 1 MATE P NCL        .0013  .0007  .0014  .0003  .0001  .0020   .3   .1  1.1
M008 1 MATE P NOAA      -.0009  .0002  .0002  .0004  .0007 -.0005   .2   .3  -.2
M008 1 MATE P EUR        .0006  .0000  .0014 -.0002  .0007  .0014  -.2   .4   .7
M008 1 MATE P REGAL      .0000  .0008  .0007  .0008  .0004  .0006   .4   .1   .2
S001 1 7939 L AUS       -.0005 -.0006  .0000 -.0004  .0004 -.0005  -.1   .1  -.1
S001 1 7939 L CGS       -.0014 -.0018  .0000 -.0013  .0012 -.0015  -.1   .1  -.1
S001 1 7939 L CRL       -.0024 -.0020  .0005 -.0012  .0023 -.0018  -.3   .5  -.4
S001 1 7939 L4 CSR       .0007 -.0004  .0004 -.0005  .0000  .0007  -.5   .0   .4
S001 1 7939 L DEOS       .0021 -.0015 -.0013 -.0020 -.0020  .0004  -.9  -.6   .1
S001 1 7939 L DGFI      -.0009 -.0022  .0019 -.0018  .0024  .0001  -.5   .8   .0
S001 1 7939 L JCET       .0010  .0003  .0022  .0000  .0010  .0022   .0   .4  1.0
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S005 1 7243 R GIUB       .0003  .0000  .0001 -.0001 -.0001  .0003  -.1  -.1   .3
S005 1 7243 R GSFC       .0000  .0000 -.0001  .0000  .0000 -.0001   .2  -.1  -.2
S005 1 7243 R SHA        .0000 -.0001  .0000 -.0001  .0000  .0000  -.1   .0   .0

12741 VENEZIA

Positions
M001 1 VENE P NOAA      -.0050 -.0021 -.0047 -.0010  .0005 -.0071  -.4   .1 -2.0 98:209
M001 1 VENE P EUR        .0028  .0011  .0029  .0005 -.0001  .0041   .4   .0  1.1 98:187
M001 1 VENE P REGAL     -.0006  .0009  .0010  .0010  .0010  .0004   .9   .4   .2 98:258

Velocities
M001 1 VENE P NOAA       .0045  .0003  .0061 -.0006  .0011  .0075  -.3   .3  2.1
M001 1 VENE P EUR        .0033 -.0003  .0038 -.0010  .0004  .0049  -.7   .1  1.2
M001 1 VENE P REGAL     -.0025 -.0001 -.0031  .0004 -.0005 -.0039   .4  -.2 -1.6

12749 MONTE VENDA

Positions
M001 1 7542 L CGS        .0069  .0118 -.0060  .0102 -.0107  .0021   .4  -.2   .0 97:  1
M001 1 7542 L4 CSR      -.0165 -.0040 -.0208 -.0006 -.0026 -.0268   .0   .0  -.2 91:188
M001 1 7542 C GRIM      -.0106  .0093 -.0013  .0113  .0051 -.0069   .2   .1  -.1 91:241

Velocities
M001 1 7542 L CGS       -.0157  .0191  .0042  .0219  .0111 -.0051   .0   .0   .0
M001 1 7542 L4 CSR      -.1314  .0095 -.1160  .0359  .0085 -.1716   .1   .0  -.4
M001 1 7542 C GRIM       .0866 -.1820  .0937 -.1958  .0318  .1004  -.2   .0   .1

12750 PADOVA

Positions
M002 1 UPAD P CODE      -.0004 -.0026  .0050 -.0025  .0042  .0029 -1.0  1.1   .8 98:  8
M002 1 UPAD P IGS       -.0022 -.0003 -.0023  .0002 -.0001 -.0032   .2   .0 -1.1 98: 56
M002 1 UPAD P1 JPL       .0014 -.0017 -.0007 -.0020 -.0012  .0002  -.7  -.3   .1 99: 22
M002 1 UPAD P NCL       -.0067  .0038 -.0124  .0051 -.0046 -.0129  1.2  -.4 -1.0 96:344
M002 1 UPAD P NOAA      -.0016 -.0012 -.0004 -.0008  .0011 -.0015  -.3   .3  -.4 98:284
M002 1 UPAD P EUR       -.0024 -.0004 -.0016  .0001  .0006 -.0028   .1   .2 -1.0 98:112
M002 1 UPAD P1 IGN       .0003 -.0005  .0002 -.0006  .0000  .0003 -1.6   .0   .3 98:320
M002 1 UPAD P REGAL     -.0005  .0010  .0010  .0011  .0009  .0005  1.1   .4   .2 99: 42

Velocities
M002 1 UPAD P CODE       .0009  .0007 -.0015  .0005 -.0018 -.0004   .3  -.7  -.1
M002 1 UPAD P IGS        .0010 -.0009  .0014 -.0011  .0004  .0015 -1.2   .2   .6
M002 1 UPAD P1 JPL       .0015  .0008  .0020  .0005  .0002  .0026   .2   .1   .6
M002 1 UPAD P NCL        .0007  .0002  .0009  .0000  .0001  .0011   .0   .1   .5
M002 1 UPAD P NOAA      -.0033  .0017 -.0015  .0024  .0010 -.0031  1.2   .4 -1.1
M002 1 UPAD P EUR        .0012 -.0002  .0006 -.0004 -.0004  .0012  -.5  -.1   .4
M002 1 UPAD P1 IGN      -.0004  .0007  .0006  .0007  .0006  .0003  1.4   .6   .3
M002 1 UPAD P REGAL      .0008  .0000  .0002 -.0001 -.0004  .0006  -.1  -.1   .2

12751 BOLZANO

Positions
M001 1 BZRG P NOAA      -.0016  .0012  .0004  .0015  .0013 -.0007   .6   .4  -.2 99:  1
M001 1 BZRG P EUR        .0023 -.0005 -.0049 -.0009 -.0049 -.0021  -.4  -.8  -.3 99:177

Velocities
M001 1 BZRG P NOAA      -.0008  .0000  .0021  .0002  .0021  .0010   .1   .5   .2
M001 1 BZRG P EUR       -.0060  .0014 -.0046  .0026  .0009 -.0072   .4   .0  -.4

12752 PERUGIA

Positions
M001 1 UNPG P EUR        .0009  .0002  .0011  .0000  .0002  .0015   .0   .0   .2 99:197

Velocities
M001 1 UNPG P EUR        .0294  .0070  .0246  .0006 -.0027  .0389   .1  -.1  1.6

13101 BRUSSELS
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Positions
M004 1 BRUS P CODE       .0002 -.0019  .0049 -.0019  .0031  .0039  -.9   .9  1.1 97:315
M004 1 BRUS P IGS       -.0005 -.0003 -.0004 -.0002  .0001 -.0006  -.3   .1  -.4 98: 53
M004 1 BRUS P1 JPL       .0016  .0015  .0028  .0014  .0004  .0033  1.2   .2  1.6 97:123
M004 1 BRUS P NCL       -.0007 -.0006 -.0009 -.0006  .0000 -.0011  -.5   .0  -.5 97:200
M004 1 BRUS P NOAA       .0015  .0019  .0018  .0018 -.0002  .0024   .9  -.1  1.1 97:239
M004 1 BRUS P EUR       -.0006 -.0004 -.0012 -.0004 -.0002 -.0013  -.6  -.1  -.5 98: 88

Velocities
M004 1 BRUS P CODE       .0015  .0003 -.0006  .0002 -.0015  .0005   .2  -.7   .2
M004 1 BRUS P IGS       -.0003  .0001 -.0002  .0002  .0001 -.0004   .3   .1  -.3
M004 1 BRUS P1 JPL      -.0004 -.0001 -.0010  .0000 -.0003 -.0010   .0  -.2  -.7
M004 1 BRUS P NCL        .0000 -.0008  .0010 -.0008  .0007  .0007  -.8   .4   .4
M004 1 BRUS P NOAA      -.0010  .0002 -.0001  .0003  .0007 -.0007   .2   .5  -.5
M004 1 BRUS P EUR        .0016  .0003  .0014  .0001 -.0003  .0022   .2  -.1   .8

13112 DENTERGEM

Positions
M001 1 DENT P EUR       -.0008  .0000 -.0004  .0000  .0003 -.0008   .1   .1  -.2 98:168
M001 1 DENT P1 IGN       .0000 -.0004 -.0002 -.0004 -.0001 -.0002  -.7   .0  -.1 99: 54

Velocities
M001 1 DENT P EUR       -.0007  .0000  .0000  .0000  .0005 -.0004   .0   .2  -.1
M001 1 DENT P1 IGN       .0005 -.0004  .0000 -.0004 -.0004  .0003  -.5  -.1   .1

13113 DOURBES

Positions
M001 1 DOUR P EUR       -.0006  .0001 -.0005  .0001  .0001 -.0007   .2   .0  -.2 98:154

Velocities
M001 1 DOUR P EUR        .0008  .0000  .0011 -.0001  .0001  .0013  -.1   .0   .4

13114 WAREMME

Positions
M001 1 WARE P EUR       -.0011 -.0002 -.0009 -.0001  .0003 -.0014  -.1   .1  -.4 98:167
M001 1 WARE P1 IGN       .0000 -.0005 -.0004 -.0005 -.0002 -.0004  -.6  -.1  -.1 99:348

Velocities
M001 1 WARE P EUR        .0000 -.0004  .0006 -.0004  .0004  .0004  -.5   .1   .1
M001 1 WARE P1 IGN       .0039  .0003  .0120  .0000  .0046  .0118   .0   .2   .5

13201 BARTON STACEY/CH

Positions
S002 1 7215 R GSFC       .0023  .0009  .0018  .0009 -.0007  .0028   .1   .0   .1 80:294
S002 1 7215 R SHA        .0037  .0032  .0103  .0033  .0037  .0102   .2   .2   .4 80:294

Velocities
S002 1 7215 R GSFC      -.3328 -.2343 -.0197 -.2426  .2422 -.2204  -.3   .2  -.2
S002 1 7215 R SHA        .0218  .0273 -.0054  .0279 -.0198  .0090   .1  -.1   .0

13212 HERSTMONCEUX

Positions
M007 1 HERS TIE13212     .0032 -.0046  .0045 -.0046  .0003  .0055 -1.4   .1  1.7 97:  1
M007 1 HERS P CODE       .0008 -.0032  .0052 -.0032  .0027  .0045 -1.4   .7  1.2 97:340
M007 1 HERS P IGS       -.0027 -.0035 -.0035 -.0035 -.0001 -.0044 -3.6   .0 -1.7 98:253
M007 1 HERS P1 JPL       .0018  .0001  .0027  .0001  .0003  .0032   .1   .1  1.5 96:265
M007 1 HERS P NCL        .0018  .0002  .0001  .0002 -.0013  .0012   .2  -.6   .5 97: 48
M007 1 HERS P NOAA      -.0068  .0026 -.0058  .0027  .0016 -.0087  1.1   .4 -2.4 98:269
M007 1 HERS P EUR        .0004  .0003  .0007  .0003  .0001  .0008   .4   .0   .2 97:302
M007 1 HERS P1 IGN       .0057 -.0006  .0063 -.0006 -.0004  .0085  -.8  -.1  2.0 98:300
M007 2 HERS P EUR       -.0034  .0011 -.0025  .0011  .0010 -.0041  1.0   .2  -.7 99:245
M007 2 HERS P1 IGN      -.0005 -.0005 -.0013 -.0005 -.0004 -.0014  -.6  -.1  -.3 99:253
S001 1 7840 TIE13212     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7840 L AUS       -.0063  .0078  .0008  .0079  .0053 -.0033  1.5  1.2  -.8 98: 91
S001 1 7840 L CGS        .0043  .0085 -.0037  .0084 -.0057 -.0002  1.6 -1.2   .0 93:255
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S001 1 7840 L CRL        .0010 -.0054 -.0011 -.0054 -.0014 -.0003 -1.3  -.2   .0 91: 41
S001 1 7840 L4 CSR      -.0002  .0006 -.0033  .0006 -.0019 -.0027   .3  -.3  -.4 92:106
S001 1 7840 L DEOS       .0076 -.0032  .0067 -.0032 -.0017  .0100  -.6  -.3  1.9 92:171
S001 1 7840 L DGFI      -.0023 -.0048 -.0013 -.0048  .0010 -.0025  -.9   .2  -.5 93:280
S001 1 7840 L JCET       .0033  .0011  .0031  .0011 -.0006  .0045  1.4  -.4  2.8 96:208
S001 1 7840 C GRIM       .0012 -.0026 -.0052 -.0026 -.0041 -.0033 -1.0 -2.6 -1.9 91:306
S001 1 7840 C1 CSR       .0040 -.0009  .0041 -.0009 -.0005  .0057 -1.1  -.3  2.9 96:208

Velocities
M007 1 HERS P CODE       .0013 -.0019 -.0016 -.0019 -.0020 -.0005 -1.4  -.8  -.2
M007 1 HERS P IGS       -.0013 -.0025 -.0020 -.0025 -.0003 -.0023 -4.0  -.2 -1.4
M007 1 HERS P1 JPL      -.0016  .0000 -.0021  .0001 -.0001 -.0027   .1  -.1 -2.7
M007 1 HERS P NCL        .0058  .0009  .0018  .0009 -.0034  .0051   .8 -1.1  1.7
M007 1 HERS P NOAA       .0002  .0003 -.0012  .0003 -.0009 -.0008   .2  -.4  -.4
M007 1 HERS P EUR        .0015  .0004  .0019  .0004  .0001  .0024   .5   .0   .6
M007 1 HERS P1 IGN       .0009 -.0052  .0037 -.0052  .0017  .0034 -3.0   .2   .4
M007 2 HERS P EUR        .0015  .0004  .0019  .0004  .0001  .0024   .5   .0   .6
M007 2 HERS P1 IGN       .0009 -.0052  .0037 -.0052  .0017  .0034 -3.0   .2   .4
S001 1 7840 L AUS       -.0018  .0013  .0022  .0013  .0028  .0006   .6  1.4   .3
S001 1 7840 L CGS       -.0005 -.0004  .0006 -.0004  .0007  .0002  -.2   .7   .1
S001 1 7840 L CRL       -.0011 -.0001  .0011 -.0001  .0015  .0002   .0   .3   .0
S001 1 7840 L4 CSR       .0000 -.0003 -.0002 -.0003 -.0001 -.0002  -.4  -.1  -.2
S001 1 7840 L DEOS       .0021 -.0017 -.0023 -.0017 -.0031 -.0005  -.8 -1.0  -.1
S001 1 7840 L DGFI       .0000 -.0013  .0005 -.0013  .0003  .0004  -.8   .2   .3
S001 1 7840 L JCET      -.0007  .0004  .0008  .0004  .0010  .0001  1.0  1.4   .2
S001 1 7840 C GRIM      -.0002 -.0032  .0017 -.0032  .0012  .0012 -1.1  3.4  3.0
S001 1 7840 C1 CSR       .0004  .0004  .0013  .0004  .0005  .0013  1.0   .6  1.4

13296 BUDDON - CARNUST

Positions
M002 1 7603 R GSFC      -.0008  .0002 -.0008  .0001  .0003 -.0011   .0   .0   .0 89:233
M002 1 7603 R SHA        .0001  .0006  .0001  .0006  .0000  .0001   .1   .0   .0 89:233

Velocities
M002 1 7603 R GSFC       .0912  .3402 -.0898  .3442 -.1118 -.0337   .2  -.1   .0
M002 1 7603 R SHA       -.0019 -.0060  .0018 -.0061  .0024  .0006   .0   .0   .0

13402 SAN FERNANDO

Positions
M004 1 SFER TIE13402     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 SFER P IGS        .0000 -.0008 -.0021 -.0008 -.0017 -.0011  -.3  -.5  -.3  0: 66
M004 1 SFER P NOAA      -.0045 -.0005 -.0013 -.0010  .0016 -.0043  -.3   .3  -.8 99:140
M004 1 SFER P EUR       -.0089  .0013 -.0060  .0003  .0005 -.0108   .3   .1 -2.2 99:  8
M004 1 SFER P1 IGN      -.0011  .0005 -.0024  .0004 -.0012 -.0023   .4  -.4  -.7 99:149
M004 1 SFER P REGAL     -.0019 -.0056  .0032 -.0058  .0033  .0009 -2.1  1.0   .3 99:237
S004 1 7824 TIE13402    -.0027  .0005 -.0025  .0002 -.0004 -.0037   .1  -.1 -1.2 97:  1
S004 1 7824 L CGS        .0145  .0016 -.0028  .0032 -.0107  .0098   .2  -.4   .4 98: 38
S004 1 7824 L CRL        .0316 -.0007  .0230  .0028 -.0002  .0390   .1   .0   .7 98: 29
S004 1 7824 L DEOS       .0836 -.0213  .0228 -.0121 -.0324  .0823  -.4 -1.0  2.6 98: 30
S004 1 7824 L DGFI       .0448 -.0226  .0309 -.0176 -.0031  .0561  -.4  -.1  1.6 98: 35
S004 1 7824 L JCET       .0129 -.0044  .0216 -.0030  .0095  .0235   .0   .2   .4 98: 65
S004 1 7824 C GRIM       .3072 -.1457  .2643 -.1117  .0217  .4153  -.4   .1  1.1 94:  1
S007 1 7824 L CGS        .0629  .0246  .0297  .0313 -.0116  .0658   .4  -.1   .5 97:  1
S007 1 7824 L CRL       -.0006 -.0031  .0040 -.0031  .0034  .0022  -.1   .1   .1 99:249
S007 1 7824 L DEOS       .1009  .0079  .2497  .0187  .1417  .2284   .1   .5   .8 93:  1
S007 1 7824 L DGFI       .0121 -.0094 -.0021 -.0080 -.0094  .0092  -.3  -.4   .3 99:273
S007 1 7824 C GRIM      -.0231 -.0428 -.0040 -.0451  .0077 -.0171 -1.4   .2  -.5 99:196

Velocities
M004 1 SFER P IGS        .0066 -.0004  .0037  .0004 -.0009  .0075   .1  -.1  1.0
M004 1 SFER P NOAA       .0038 -.0009  .0022 -.0005 -.0005  .0044  -.1  -.1   .5
M004 1 SFER P EUR        .0078 -.0011  .0037 -.0003 -.0017  .0085  -.2  -.3  1.5
M004 1 SFER P1 IGN       .0091  .0000  .0087  .0010  .0016  .0124   .7   .3  2.3
M004 1 SFER P REGAL      .0063  .0026  .0051  .0032  .0006  .0078   .7   .1  1.0
S004 1 7824 L CGS       -.0266 -.0044 -.0164 -.0073  .0023 -.0306  -.3   .0  -.6
S004 1 7824 L CRL       -.0461  .0186  .0048  .0135  .0323 -.0356   .3   .4  -.4
S004 1 7824 L DEOS      -.0082 -.0040 -.0405 -.0048 -.0280 -.0302  -.1  -.7  -.7
S004 1 7824 L DGFI      -.0311 -.0298 -.0420 -.0330 -.0173 -.0473  -.4  -.3  -.7
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S004 1 7824 L JCET       .0036 -.0115 -.0140 -.0110 -.0141 -.0044  -.1  -.2  -.1
S004 1 7824 C GRIM      -.0169 -.1029  .0179 -.1041  .0177  .0061  -.1   .0   .0
S007 1 7824 L CGS       -.0069  .0051  .0194  .0044  .0200  .0055   .0   .0   .0
S007 1 7824 L CRL        .0241 -.0239 -.0475 -.0212 -.0540 -.0069  -.6  -.7  -.1
S007 1 7824 L DEOS       .0374 -.0119 -.0385 -.0078 -.0538  .0081   .0   .0   .0
S007 1 7824 L DGFI      -.0311 -.0298 -.0420 -.0330 -.0173 -.0473  -.4  -.3  -.7
S007 1 7824 C GRIM      -.0643  .0216 -.0535  .0145 -.0037 -.0851   .2   .0 -1.0

13406 VILLAFRANCA

Positions
M001 1 VILL P CODE       .0046 -.0014  .0086 -.0011  .0035  .0092  -.4   .7  2.0 98:217
M001 1 VILL P GFZ       -.0008 -.0005 -.0024 -.0005 -.0014 -.0022  -.3  -.4  -.6 99: 40
M001 1 VILL P IGS        .0005 -.0007  .0003 -.0006 -.0001  .0006  -.7  -.1   .4 98:281
M001 1 VILL P1 JPL      -.0013  .0004 -.0020  .0004 -.0006 -.0023   .3  -.3 -1.0 97:164
M001 1 VILL P NCL       -.0019 -.0002 -.0014 -.0003  .0002 -.0024  -.3   .1 -1.3 97:350
M001 1 VILL P NOAA      -.0016  .0000 -.0009 -.0001  .0003 -.0018   .0   .1  -.6 97:187
M001 1 VILL P EUR        .0026 -.0001  .0023  .0001  .0000  .0035   .1   .0  1.2 98:232
M001 1 VILL P REGAL     -.0011 -.0024 -.0030 -.0025 -.0017 -.0027 -1.4  -.6  -.9 99:177

Velocities
M001 1 VILL P CODE      -.0025  .0005 -.0038  .0003 -.0012 -.0044   .2  -.3 -1.0
M001 1 VILL P GFZ       -.0013 -.0010 -.0022 -.0011 -.0009 -.0023  -.6  -.3  -.7
M001 1 VILL P IGS       -.0011 -.0003 -.0007 -.0004  .0001 -.0012  -.5   .1 -1.1
M001 1 VILL P1 JPL      -.0005  .0003 -.0002  .0002  .0002 -.0005   .2   .1  -.3
M001 1 VILL P NCL       -.0021 -.0003 -.0009 -.0004  .0007 -.0021  -.4   .4 -1.4
M001 1 VILL P NOAA      -.0006 -.0001  .0008 -.0001  .0010  .0001  -.1   .5   .0
M001 1 VILL P EUR        .0004 -.0005  .0004 -.0005  .0000  .0006  -.6   .0   .2
M001 1 VILL P REGAL     -.0014 -.0014  .0006 -.0015  .0013 -.0006  -.9   .3  -.2

13407 MADRID-ROBLEDO

Positions
S003 1 1561 R GSFC       .0056  .0004  .0051  .0008  .0003  .0075   .0   .0   .1 83:126
S010 1 1565 TIE13407     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S010 1 1565 R GIUB      -.0016  .0017 -.0025  .0016 -.0007 -.0029   .6  -.2  -.6 94:242
S010 1 1565 R GSFC       .0018  .0012 -.0003  .0014 -.0013  .0011  1.4  -.4   .3 94:170
S010 1 1565 R SHA        .0030  .0017  .0001  .0019 -.0018  .0022  1.1  -.4   .5 95:348
S010 2 1565 R GIUB       .0048  .0017  .0032  .0020 -.0006  .0056   .7  -.1  1.0 97:  1
S010 2 1565 R GSFC       .0026 -.0006  .0031 -.0005  .0007  .0040  -.4   .2  1.0 97:  1
S010 2 1565 R SHA        .0049 -.0008  .0044 -.0004  .0001  .0066  -.3   .0  1.6 97:  1
S012 1 MADR TIE13407     .0087  .0036 -.0068  .0043 -.0106  .0020  1.3 -3.4   .6 97:  1
S012 1 MADR P CODE      -.0184  .0012 -.0041 -.0002  .0088 -.0167  -.1  1.3 -2.4 95:349
S012 1 MADR P IGS        .0007 -.0015  .0005 -.0014 -.0001  .0010 -1.4  -.1   .5 97:363
S012 2 MADR P GFZ        .0026  .0490 -.0452  .0490 -.0337 -.0301   .8  -.2  -.1 98:169
S012 2 MADR P1 JPL       .0000 -.0001  .0003 -.0001  .0002  .0002   .0   .0   .0 99:194

Velocities
S003 1 1561 R GSFC       .0217  .0135 -.0426  .0151 -.0458 -.0119   .0   .0   .0
S010 1 1565 R GIUB       .0005  .0001  .0000  .0001 -.0003  .0004   .1  -.2   .2
S010 1 1565 R GSFC      -.0004  .0003 -.0007  .0002 -.0002 -.0008   .8  -.2  -.8
S010 1 1565 R SHA       -.0004  .0004 -.0009  .0003 -.0005 -.0009   .3  -.4  -.7
S010 2 1565 R GIUB      -.0061  .0164  .0111  .0159  .0132  .0017   .0   .0   .0
S010 2 1565 R GSFC      -.0230 -.0163  .0130 -.0179  .0240 -.0081   .0   .0   .0
S010 2 1565 R SHA       -.0085  .0163  .0150  .0157  .0177  .0024   .0   .0   .0
S012 1 MADR P CODE       .0027 -.0018  .0001 -.0016 -.0017  .0022  -.6  -.2   .2
S012 1 MADR P IGS        .0042 -.0006  .0031 -.0002 -.0004  .0052  -.4  -.3  3.9
S012 2 MADR P GFZ        .0010  .0024 -.0003  .0024 -.0007  .0004  1.1  -.3   .1
S012 2 MADR P1 JPL       .0117  .0005  .0262  .0014  .0124  .0259   .1   .6  1.1

13410 ROQUETES - TORTO

Positions
M001 1 EBRE P IGS        .0007 -.0017  .0000 -.0017 -.0004  .0005  -.9  -.1   .1 98:153
M001 1 EBRE P1 JPL      -.0004 -.0030 -.0003 -.0030  .0000 -.0005 -1.9   .0  -.2 98:203
M001 1 EBRE P NOAA      -.0020 -.0027 -.0007 -.0027  .0008 -.0020 -1.1   .3  -.6 98:189
M001 1 EBRE P EUR       -.0014  .0001 -.0011  .0001  .0001 -.0018   .2   .0  -.6 98:232
M001 1 EBRE P1 IGN       .0008  .0003  .0004  .0003 -.0002  .0008   .6  -.1   .4 98:361
M001 1 EBRE P REGAL      .0007 -.0015  .0002 -.0016 -.0003  .0007 -1.2  -.1   .3 99:112
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Velocities
M001 1 EBRE P IGS        .0081 -.0117  .0027 -.0118 -.0031  .0078  -.9  -.1   .2
M001 1 EBRE P1 JPL      -.0006 -.0006 -.0006 -.0006 -.0001 -.0009  -.3   .0  -.2
M001 1 EBRE P NOAA      -.0014 -.0004  .0003 -.0004  .0012 -.0008  -.2   .3  -.2
M001 1 EBRE P EUR       -.0009 -.0016 -.0003 -.0016  .0004 -.0009 -2.2   .1  -.2
M001 1 EBRE P1 IGN       .0034  .0002  .0047  .0002  .0013  .0056   .3   .5  2.0
M001 1 EBRE P REGAL     -.0027 -.0006 -.0018 -.0006  .0004 -.0032  -.5   .1 -1.0

13420 YEBES

Positions
S001 1 7333 R GIUB       .0109  .0013  .0060  .0019 -.0025  .0121   .5  -.2  1.1 97:351
S001 1 7333 R GSFC      -.0013  .0000 -.0019 -.0001 -.0006 -.0022   .0  -.1  -.4 98:325
S001 1 7333 R SHA        .0010  .0003  .0011  .0004  .0002  .0015   .2   .0   .2 98:  3

Velocities
S001 1 7333 R GIUB       .0052 -.0003  .0056  .0000  .0008  .0076   .0   .1   .9
S001 1 7333 R GSFC       .0000 -.0001 -.0003 -.0001 -.0002 -.0002  -.1   .0  -.1
S001 1 7333 R SHA        .0014 -.0001  .0018  .0000  .0005  .0022   .0   .1   .5

13431 BELLMUNT DE SEGA

Positions
M001 1 BELL P EUR       -.0030  .0005 -.0019  .0006  .0005 -.0035   .4   .1  -.5 99:228
M001 1 BELL P1 IGN       .0019  .0000  .0017 -.0001  .0000  .0026  -.1   .0   .7 99:340

Velocities
M001 1 BELL P EUR       -.0047 -.0011 -.0082 -.0009 -.0030 -.0090  -.2  -.1  -.3
M001 1 BELL P1 IGN      -.0110 -.0006 -.0074 -.0003  .0018 -.0131  -.1   .1  -.5

13432 CAP DE CREUS

Positions
M001 1 CREU P EUR       -.0039 -.0001 -.0039  .0001 -.0002 -.0055   .1   .0  -.9 99:197
M001 1 CREU P1 IGN       .0017 -.0001  .0016 -.0002  .0001  .0023  -.2   .0   .8 99:232

Velocities
M001 1 CREU P EUR       -.0040  .0010 -.0084  .0012 -.0036 -.0086   .3  -.2  -.4
M001 1 CREU P1 IGN       .0010 -.0002  .0017 -.0003  .0006  .0019  -.2   .1   .2

13433 ALICANTE

Positions
M001 1 ALAC P1 IGN       .0017  .0004  .0014  .0004  .0000  .0022   .4   .0   .6 99:341

Velocities
M001 1 ALAC P1 IGN       .0009 -.0001  .0015 -.0001  .0006  .0017   .0   .0   .1

13434 A CORUNA

Positions
M001 1 ACOR P1 IGN      -.0013 -.0001 -.0022 -.0003 -.0008 -.0024  -.2  -.1  -.4 99:339

Velocities
M001 1 ACOR P1 IGN       .0040  .0002  .0040  .0007  .0001  .0056   .1   .0   .2

13435 ESCORNACRABES

Positions
M001 1 ESCO P1 IGN       .0007 -.0002  .0006 -.0002  .0000  .0009  -.2   .0   .2 99:338

Velocities
M001 1 ESCO P1 IGN       .0000 -.0001  .0005 -.0001  .0003  .0004   .0   .0   .0

13502 DELFT

Positions
M004 1 DELF P EUR       -.0004  .0001 -.0004  .0001  .0001 -.0006   .1   .0  -.2 98:178

Velocities
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M004 1 DELF P EUR       .0008  .0000  .0011 -.0001  .0000  .0013  -.2   .0   .5

13504 KOOTWIJK

Positions
M002 1 8833 TIE13504     .0011  .0020  .0006  .0019 -.0006  .0013   .6  -.2   .4 97:  1
M002 1 8833 L AUS       -.0296  .0106  .0280  .0135  .0396  .0047   .2   .7   .1 96:326
M002 1 8833 L CGS       -.0466 -.0647 -.0170 -.0597  .0314 -.0459 -1.8   .5  -.6 97:  1
M002 1 8833 L4 CSR      -.0213 -.0041 -.0237 -.0019  .0025 -.0320  -.1   .0  -.3 89:102
M002 1 8833 L DEOS      -.0258  .0024 -.0113  .0050  .0132 -.0245   .1   .4  -.7 88:239
M002 1 8833 L DGFI      -.0168 -.0112 -.0098 -.0095  .0081 -.0187  -.2   .2  -.5 92: 16
M002 1 8833 C GRIM      -.0162  .0017 -.0300  .0034 -.0057 -.0335   .1  -.1  -.7 90: 74
M003 1 KOSG TIE13504     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 KOSG P CODE      -.0007 -.0017  .0038 -.0016  .0030  .0025  -.7   .9   .7 97:316
M003 1 KOSG P GFZ        .0012 -.0017  .0014 -.0018  .0001  .0018 -1.2   .0   .6 97:336
M003 1 KOSG P IGS       -.0012 -.0002 -.0015 -.0001  .0000 -.0019  -.2   .0 -1.7 98:112
M003 1 KOSG P1 JPL       .0016  .0001  .0027 -.0001  .0003  .0031  -.1   .2  1.9 96: 36
M003 1 KOSG P NCL       -.0007 -.0008 -.0008 -.0007  .0002 -.0011  -.6   .1  -.6 98: 45
M003 1 KOSG P NOAA       .0021 -.0005  .0018 -.0007 -.0005  .0027  -.4  -.2  1.2 97:245
M003 1 KOSG P EUR        .0001 -.0001 -.0005 -.0001 -.0004 -.0003  -.2  -.1  -.1 98: 66
M003 1 KOSG P REGAL      .0023 -.0012 -.0036 -.0014 -.0039 -.0016  -.7 -1.2  -.4 99:133
S001 1 7833 TIE13504     .0013  .0030  .0009  .0028 -.0007  .0017   .6  -.2   .4 97:  1
S001 1 7833 L CGS       -.0574 -.0567 -.1302 -.0506 -.0302 -.1414 -1.8  -.5 -2.2 97:  1
S001 1 7833 L4 CSR      -.2434  .1158 -.2612  .1398  .0219 -.3477  1.8   .1  -.8 81:123
S001 1 7833 L DEOS       .0144  .0257  .0444  .0241  .0138  .0455   .1   .1   .2 93:  1

Velocities
M002 1 8833 L AUS       -.0127  .0160  .0129  .0172  .0166  .0034   .3   .3   .1
M002 1 8833 L CGS       -.0165  .0057  .0124  .0073  .0201  .0001   .0   .0   .0
M002 1 8833 L4 CSR       .0041 -.0025  .0099 -.0029  .0030  .0101  -.4   .1   .3
M002 1 8833 L DEOS       .0039 -.0005  .0062 -.0009  .0007  .0072   .0   .0   .4
M002 1 8833 L DGFI       .0065 -.0064  .0050 -.0070 -.0015  .0075  -.4  -.1   .5
M002 1 8833 C GRIM      -.0017 -.0075 -.0047 -.0073 -.0009 -.0052  -.6   .0  -.2
M003 1 KOSG P CODE       .0000  .0001 -.0024  .0001 -.0015 -.0019   .1  -.7  -.8
M003 1 KOSG P GFZ        .0024  .0014  .0019  .0011 -.0008  .0030  1.7  -.8  2.7
M003 1 KOSG P IGS        .0009  .0001  .0006  .0000 -.0003  .0010   .0  -.4  1.1
M003 1 KOSG P1 JPL      -.0003  .0000 -.0002  .0000  .0001 -.0003   .0   .2  -.4
M003 1 KOSG P NCL       -.0005 -.0008 -.0002 -.0007  .0004 -.0005  -.8   .2  -.3
M003 1 KOSG P NOAA      -.0002 -.0001  .0011 -.0001  .0008  .0007  -.1   .6   .5
M003 1 KOSG P EUR        .0025 -.0001  .0026 -.0003 -.0004  .0036  -.6  -.2  1.5
M003 1 KOSG P REGAL      .0031  .0005  .0012  .0002 -.0017  .0029   .1  -.5   .8
S001 1 7833 L CGS       -.0165  .0057  .0124  .0073  .0201  .0001   .0   .0   .0
S001 1 7833 L4 CSR       .0392 -.0379  .0086 -.0417 -.0225  .0284 -1.7  -.2   .3
S001 1 7833 L DEOS       .0443 -.0078 -.0306 -.0122 -.0530  .0024   .0   .0   .0

13506 WESTERBORK

Positions
M005 1 WSRT P CODE       .0029 -.0014  .0065 -.0018  .0018  .0068  -.7   .5  1.6 98:179
M005 1 WSRT P GFZ        .0036 -.0006  .0035 -.0010 -.0007  .0049  -.6  -.3  1.6 99:  4
M005 1 WSRT P IGS       -.0011 -.0005 -.0020 -.0004 -.0003 -.0023  -.5  -.2 -1.5 98:324
M005 1 WSRT P1 JPL      -.0049 -.0013 -.0040 -.0007  .0016 -.0062  -.4   .5 -2.1 98:301
M005 1 WSRT P NOAA       .0002  .0000  .0021  .0000  .0011  .0017   .0   .3   .5 99: 14
M005 1 WSRT P EUR        .0024  .0001  .0024 -.0001 -.0005  .0034  -.2  -.1   .9 98:326

Velocities
M005 1 WSRT P CODE      -.0001  .0004 -.0027  .0004 -.0015 -.0022   .3  -.5  -.6
M005 1 WSRT P GFZ       -.0002  .0008 -.0013  .0008 -.0007 -.0011   .6  -.3  -.4
M005 1 WSRT P IGS        .0006 -.0001  .0005 -.0002 -.0002  .0008  -.2  -.1   .5
M005 1 WSRT P1 JPL      -.0015 -.0003 -.0022 -.0001 -.0001 -.0027  -.1   .0  -.5
M005 1 WSRT P NOAA       .0011  .0006  .0029  .0005  .0008  .0030   .2   .2   .6
M005 1 WSRT P EUR        .0013 -.0003  .0015 -.0004 -.0001  .0020  -.4   .0   .4

13533 EIJSDEN

Positions
M001 1 EIJS P EUR        .0007  .0000  .0010 -.0001  .0001  .0012   .0   .0   .2 99:271

Velocities
M001 1 EIJS P EUR       -.0075 -.0024 -.0075 -.0016  .0012 -.0107  -.2   .0  -.3
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13534 TERSCHELLING

Positions
M001 1 TERS P EUR        .0006 -.0001  .0009 -.0001  .0000  .0011  -.1   .0   .2 99:269

Velocities
M001 1 TERS P EUR       -.0120 -.0022 -.0116 -.0011  .0028 -.0165  -.1   .1  -.4

13909 CASCAIS

Positions
S001 1 CASC P CODE       .0004 -.0003  .0041 -.0002  .0029  .0029  -.1   .4   .3 99: 70
S001 1 CASC P IGS       -.0016  .0001 -.0009 -.0001  .0003 -.0018   .0   .0  -.1 99: 82
S001 1 CASC P EUR        .0016  .0007  .0008  .0010 -.0003  .0017   .5   .0   .3 99:151
S001 1 CASC P1 IGN      -.0001 -.0003 -.0013 -.0004 -.0010 -.0009  -.3  -.2  -.2 99:187

Velocities
S001 1 CASC P CODE       .0046 -.0001 -.0054  .0006 -.0071  .0002   .1  -.2   .0
S001 1 CASC P IGS        .0049 -.0004 -.0037  .0004 -.0059  .0015   .0  -.1   .0
S001 1 CASC P EUR       -.0064 -.0012 -.0041 -.0022  .0007 -.0073  -.4   .0  -.5
S001 1 CASC P1 IGN      -.0014  .0017 -.0009  .0015  .0003 -.0018   .6   .0  -.2

14001 ZIMMERWALD

Positions
M004 1 ZIMM TIE14001     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 ZIMM P CODE       .0011 -.0026  .0066 -.0027  .0039  .0053 -1.2  1.1  1.5 97:318
M004 1 ZIMM P1 JPL       .0067 -.0030  .0080 -.0039  .0009  .0101 -1.5   .2  2.3 99:124
M004 1 ZIMM P NOAA       .0040 -.0016  .0062 -.0021  .0015  .0071  -.8   .4  1.8 98:207
M004 1 ZIMM P EUR       -.0058  .0005 -.0064  .0013 -.0002 -.0086  1.5  -.1 -2.9 97:212
M004 1 ZIMM P1 IGN       .0002  .0008 -.0001  .0008 -.0003  .0001  1.6  -.2   .1 98:263
M004 2 ZIMM P EUR       -.0005  .0002 -.0002  .0003  .0002 -.0005   .2   .0  -.1 99:162
M004 2 ZIMM P1 IGN       .0014 -.0003  .0018 -.0005  .0002  .0022  -.8   .1  1.1 99:186
S001 1 7810 TIE14001    -.0022  .0012 -.0035  .0014 -.0009 -.0039   .5  -.3 -1.2 97:  1
S001 1 7810 L AUS       -.0053  .0114 -.0009  .0120  .0021 -.0033  1.5   .3  -.5 99:234
S001 1 7810 L CGS       -.0032  .0078 -.0114  .0081 -.0063 -.0098  1.2  -.7 -1.1 92:  4
S001 1 7810 L CRL       -.0058 -.0053 -.0093 -.0045 -.0017 -.0112  -.6  -.1  -.8 92: 30
S001 1 7810 L4 CSR      -.0081 -.0004 -.0093  .0006 -.0005 -.0124   .2   .0  -.8 93: 50
S001 1 7810 L DEOS       .0084 -.0007  .0093 -.0018  .0003  .0124  -.2   .0  1.3 92: 70
S001 1 7810 L DGFI       .0108 -.0001  .0082 -.0015 -.0022  .0133  -.2  -.3  2.1 92:298
S001 1 7810 L JCET      -.0018  .0011 -.0001  .0013  .0011 -.0012   .6   .2  -.2 95: 90
S001 1 7810 C GRIM      -.0015 -.0042 -.0082 -.0040 -.0042 -.0074  -.6  -.4  -.7 93:  1
S001 1 7810 C1 CSR      -.0012 -.0009 -.0015 -.0007 -.0001 -.0019  -.3   .0  -.4 97:208
S007 1 7810 TIE14001    -.0002 -.0016  .0022 -.0016  .0018  .0013  -.5   .6   .4 97:  1
S007 1 7810 L CGS        .0138  .0091  .0063  .0073 -.0066  .0148   .8  -.5  1.2 97:  1
S007 1 7810 L CRL       -.0052 -.0039  .0062 -.0032  .0084  .0007  -.1   .2   .0 97:241
S007 1 7810 L DEOS      -.0134 -.0043 -.0109 -.0026  .0027 -.0174  -.1   .1  -.6 93:  1
S007 1 7810 L DGFI      -.0092 -.0093 -.0017 -.0081  .0063 -.0083  -.7   .6  -.8 98:143
S007 1 7810 L JCET       .0008  .0001 -.0002  .0000 -.0007  .0004   .0  -.3   .1 98:223
S007 1 7810 C GRIM      -.0088 -.0077 -.0178 -.0065 -.0051 -.0196  -.2  -.2  -.8 95:196

Velocities
M004 1 ZIMM P CODE       .0024  .0001  .0002 -.0002 -.0016  .0018  -.1  -.7   .8
M004 1 ZIMM P1 JPL      -.0001 -.0012  .0002 -.0012  .0003 -.0001  -.8   .1   .0
M004 1 ZIMM P NOAA      -.0015  .0002 -.0007  .0004  .0006 -.0015   .3   .3  -.9
M004 1 ZIMM P EUR        .0010  .0005  .0011  .0003  .0000  .0015   .3   .0   .4
M004 1 ZIMM P1 IGN       .0032  .0004  .0025  .0000 -.0007  .0040   .0  -.3  1.9
M004 2 ZIMM P EUR        .0010  .0005  .0011  .0003  .0000  .0015   .3   .0   .4
M004 2 ZIMM P1 IGN       .0032  .0004  .0025  .0000 -.0006  .0040   .0  -.3  1.9
S001 1 7810 L AUS       -.0130  .0041 -.0102  .0058  .0021 -.0159   .5   .2 -1.5
S001 1 7810 L CGS       -.0024 -.0008 -.0011 -.0005  .0011 -.0026  -.2   .3  -.7
S001 1 7810 L CRL       -.0042  .0006  .0001  .0011  .0030 -.0027   .2   .4  -.3
S001 1 7810 L4 CSR       .0018 -.0002  .0021 -.0004  .0002  .0027  -.4   .1  1.4
S001 1 7810 L DEOS       .0053 -.0011  .0003 -.0018 -.0035  .0037  -.4  -.8   .8
S001 1 7810 L DGFI       .0011  .0008  .0043  .0007  .0021  .0040   .2   .6  1.2
S001 1 7810 L JCET       .0005  .0003  .0013  .0002  .0005  .0013   .2   .2   .7
S001 1 7810 C GRIM      -.0014 -.0839  .0112 -.0830  .0166 -.0002  -.1   .0   .0
S001 1 7810 C1 CSR       .0023  .0004  .0031  .0001  .0004  .0039   .1   .2  1.7
S007 1 7810 L CGS       -.0163  .0069  .0130  .0089  .0200 -.0010   .0   .0   .0
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S007 1 7810 L CRL        .0046  .0005  .0059 -.0001  .0007  .0075   .0   .1   .7
S007 1 7810 L DEOS       .0408 -.0076 -.0351 -.0128 -.0528  .0013   .0   .0   .0
S007 1 7810 L DGFI       .0011  .0008  .0043  .0007  .0021  .0040   .2   .6  1.2
S007 1 7810 L JCET       .0026 -.0002  .0014 -.0006 -.0009  .0028  -.2  -.2   .7
S007 1 7810 C GRIM       .0009 -.0039  .0011 -.0039  .0005  .0011 -1.3   .2   .5

14005 MONTE GENEROSO

Positions
M002 1 7590 C GRIM      -.0052  .0252 -.0178  .0257 -.0115 -.0136   .4  -.1  -.1 85:280

Velocities
M002 1 7590 C GRIM       .0059 -.0149 -.0061 -.0157 -.0067 -.0020   .0   .0   .0

14106 POTSDAM

Positions
M003 1 POTS TIE14106     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 POTS P CODE      -.0014 -.0023  .0026 -.0019  .0031  .0009  -.8   .9   .2 97:304
M003 1 POTS P GFZ        .0008 -.0006 -.0006 -.0008 -.0009 -.0001  -.5  -.3   .0 98: 78
M003 1 POTS P IGS       -.0007 -.0003 -.0012 -.0002 -.0001 -.0014  -.2  -.1 -1.1 98:211
M003 1 POTS P1 JPL       .0009  .0029  .0021  .0026  .0001  .0026  1.9   .0  1.1 97:205
M003 1 POTS P NCL        .0005 -.0008  .0006 -.0009  .0002  .0007  -.7   .1   .3 98:  2
M003 1 POTS P NOAA       .0004  .0012 -.0001  .0011 -.0006  .0003   .6  -.3   .1 97:248
M003 1 POTS P EUR       -.0007 -.0003 -.0009 -.0002  .0000 -.0012  -.2   .0  -.4 98: 34
S001 1 1181 L CGS        .0094  .0071 -.0004  .0047 -.0088  .0063   .3  -.4   .3 88:204
S001 1 1181 L CRL       -.0047  .0111 -.0395  .0119 -.0225 -.0326   .2  -.1  -.2 90:209
S001 1 1181 L4 CSR       .1296  .0400 -.0034  .0097 -.1093  .0799   .1  -.2   .2 86:104
S001 1 1181 L DEOS       .0093 -.0117 -.0041 -.0135 -.0076  .0007  -.2  -.1   .0 93:  1
S001 1 1181 C GRIM      -.0775 -.0192 -.0967 -.0012  .0042 -.1253   .0   .0  -.6 93:  1
S009 1 7836 TIE14106    -.0014  .0006 -.0003  .0009  .0008 -.0010   .3   .3  -.3 97:  1
S009 1 7836 L AUS       -.0159  .0102  .0053  .0135  .0137 -.0039  1.9  2.2  -.6 98:303
S009 1 7836 L CGS       -.0021  .0044 -.0009  .0048  .0003 -.0013   .6   .0  -.1 97:  1
S009 1 7836 L CRL       -.0040 -.0009  .0062  .0000  .0070  .0024   .0   .5   .2 92: 30
S009 1 7836 L4 CSR       .0003 -.0023 -.0002 -.0023  .0000 -.0003  -.4   .0   .0 95:336
S009 1 7836 L DEOS       .0117 -.0094 -.0008 -.0118 -.0079  .0051 -1.0  -.7   .4 94:332
S009 1 7836 L DGFI      -.0012 -.0086  .0021 -.0081  .0037 -.0003 -1.0   .5   .0 95:275
S009 1 7836 L JCET       .0034  .0009  .0034  .0001 -.0007  .0049   .1  -.3  1.8 96:142
S009 1 7836 C GRIM       .0104 -.0158  .0078 -.0177 -.0005  .0102 -1.3  -.1  1.1 96:277
S009 1 7836 C1 CSR      -.0003  .0018 -.0024  .0018 -.0016 -.0018   .9  -.4  -.5 96:267

Velocities
M003 1 POTS P CODE       .0000 -.0001 -.0026 -.0001 -.0016 -.0021  -.1  -.7  -.9
M003 1 POTS P GFZ        .0018  .0008  .0010  .0004 -.0009  .0020   .5  -.7  1.6
M003 1 POTS P IGS        .0004  .0003  .0002  .0002 -.0002  .0005   .3  -.2   .5
M003 1 POTS P1 JPL      -.0012 -.0008 -.0016 -.0005  .0001 -.0021  -.5   .1 -1.2
M003 1 POTS P NCL       -.0017 -.0004 -.0017  .0000  .0004 -.0025   .0   .2 -1.5
M003 1 POTS P NOAA      -.0020 -.0003 -.0011  .0001  .0009 -.0021   .1   .6 -1.3
M003 1 POTS P EUR       -.0006  .0002 -.0011  .0003 -.0002 -.0012   .4  -.1  -.5
S001 1 1181 L CGS       -.0032 -.0025 -.0010 -.0017  .0023 -.0031  -.7   .6  -.7
S001 1 1181 L CRL       -.1372  .0862 -.1279  .1150  .0124 -.1710   .9   .0  -.5
S001 1 1181 L4 CSR      -.0322 -.0080 -.0258 -.0005  .0106 -.0407   .0   .1  -.4
S001 1 1181 L DEOS       .0442 -.0075 -.0313 -.0173 -.0519  .0005   .0   .0   .0
S001 1 1181 C GRIM       .0039 -.0736  .0088 -.0726  .0156 -.0008  -.1   .0   .0
S009 1 7836 L AUS       -.0009  .0023  .0033  .0025  .0023  .0024   .7   .7   .8
S009 1 7836 L CGS       -.0181  .0054  .0104  .0093  .0194 -.0018   .0   .0   .0
S009 1 7836 L CRL       -.0001 -.0015 -.0001 -.0014  .0003 -.0003  -.4   .1  -.1
S009 1 7836 L4 CSR       .0008 -.0013  .0009 -.0015  .0001  .0010 -1.0   .1   .4
S009 1 7836 L DEOS       .0020 -.0016  .0007 -.0021 -.0008  .0015  -.6  -.2   .3
S009 1 7836 L DGFI       .0006 -.0021  .0027 -.0022  .0016  .0022  -.7   .6   .8
S009 1 7836 L JCET       .0007 -.0008  .0007 -.0009  .0000  .0009 -1.2   .0   .6
S009 1 7836 C GRIM      -.0015 -.0043 -.0010 -.0039  .0013 -.0023 -1.0   .2  -.3
S009 1 7836 C1 CSR       .0018  .0002  .0022 -.0002 -.0001  .0029  -.2   .0  1.3

14201 WETTZELL

Positions
M004 1 7596 TIE14201     .0004 -.0005 -.0002 -.0005 -.0003  .0000  -.2  -.1   .0 97:  1
M004 1 7596 L4 CSR      -.0624  .0545 -.0274  .0670  .0189 -.0525   .3   .0  -.1 85:310
M004 1 7596 C GRIM      -.1630 -.0305 -.0681  .0066  .0808 -.1599   .1   .5 -1.0 93:  1
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M005 1 7597 TIE14201    -.0005 -.0024 -.0002 -.0022  .0006 -.0008  -.7   .2  -.3 97:  1
M005 1 7597 L CGS        .0108 -.0053 -.0014 -.0076 -.0079  .0051  -.4  -.2   .1 97:  1
M005 1 7597 L CRL        .0195  .0138 -.0197  .0091 -.0296 -.0005   .5 -1.1   .0 95:275
M005 1 7597 L4 CSR       .0055 -.0036  .0099 -.0048  .0031  .0105  -.1   .0   .1 95:160
M005 1 7597 L DEOS       .0267 -.0077 -.0103 -.0135 -.0251  .0081  -.2  -.4   .1 93:  1
M005 1 7597 L JCET      -.0306 -.0057 -.0246  .0013  .0075 -.0390   .1   .3 -1.7 95:305
M005 1 7597 C GRIM       .0204  .0122 -.0201  .0074 -.0303 -.0004   .2  -.4   .0 93:  1
M005 1 7597 C1 CSR      -.0275 -.0139 -.0050 -.0074  .0193 -.0233  -.4   .5  -.6 95:284
M007 1 7599 L4 CSR       .0219  .0158  .0300  .0105  .0008  .0389   .0   .0   .0 84:327
M009 1 WETT TIE14201    -.0019  .0025  .0000  .0029  .0010 -.0009   .9   .3  -.3 97:  1
M009 1 WETT P CODE      -.0002 -.0019  .0059 -.0018  .0044  .0040  -.6   .7   .7 97:111
M009 1 WETT P GFZ       -.0065 -.0037 -.0032 -.0021  .0033 -.0071  -.6   .6 -1.2 94:240
M009 1 WETT P EUR        .0067 -.0054 -.0052 -.0068 -.0074 -.0004 -1.1  -.4   .0 97: 49
M010 1 WTZR TIE14201     .0013  .0019  .0028  .0016  .0006  .0032   .5   .2  1.0 97:  1
M010 1 WTZR P CODE       .0006 -.0021  .0054 -.0022  .0034  .0041  -.9  1.0  1.1 97:303
M010 1 WTZR P GFZ        .0016 -.0013  .0006 -.0016 -.0006  .0013 -1.0  -.2   .5 98:203
M010 1 WTZR P IGS        .0002 -.0003  .0003 -.0003  .0001  .0003  -.5   .1   .3 98:145
M010 1 WTZR P1 JPL       .0008  .0006  .0013  .0004  .0002  .0016   .3   .1   .7 98: 17
M010 1 WTZR P NCL        .0004 -.0006  .0005 -.0007  .0002  .0005  -.5   .1   .3 98: 58
M010 1 WTZR P NOAA       .0008  .0001  .0005  .0000 -.0003  .0009   .0  -.1   .4 97:349
M010 1 WTZR P EUR        .0003 -.0001  .0001 -.0002 -.0002  .0002  -.2  -.1   .1 98: 45
M010 1 WTZR P1 IGN      -.0005  .0000  .0000  .0001  .0004 -.0003   .3   .4  -.3 98:290
M010 1 WTZR P REGAL     -.0014  .0005 -.0031  .0008 -.0010 -.0032   .6  -.4 -1.3 99: 24
M200 1 7594 L4 CSR      -.0383 -.0108 -.0397 -.0020  .0041 -.0561   .0   .0  -.2 98:206
M200 1 7594 L DEOS       .0036 -.0035 -.0024 -.0042 -.0036  .0000  -.1  -.1   .0 93:  1
M200 1 7594 C GRIM      -.1138 -.0161 -.0697  .0097  .0410 -.1276   .1   .1  -.4 99:  1
M200 1 7594 C1 CSR      -.0386 -.0097 -.0516 -.0008 -.0036 -.0651   .0   .0  -.4 98:157
S002 1 7834 TIE14201     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 7834 L CGS       -.0023  .0181 -.0153  .0182 -.0114 -.0104  1.7  -.7  -.7 88:267
S002 1 7834 L CRL       -.0122 -.0007 -.0142  .0021 -.0001 -.0186   .2   .0  -.9 90:163
S002 1 7834 L4 CSR       .0635  .0218  .0714  .0072 -.0038  .0976   .3   .0  1.2 86:262
S002 1 7834 L DEOS      -.0280 -.0047 -.0210  .0016  .0077 -.0345   .1   .6 -2.5 90:300
S004 1 7224 TIE14201     .0011  .0015  .0024  .0013  .0005  .0027   .4   .2   .9 97:  1
S004 1 7224 R GIUB       .0021  .0007  .0013  .0002 -.0008  .0024   .1  -.4  1.2 95:324
S004 1 7224 R GSFC      -.0007  .0000 -.0012  .0001 -.0003 -.0013   .2  -.2 -1.2 95:145
S004 1 7224 R SHA        .0002 -.0002 -.0002 -.0003 -.0002 -.0001  -.2  -.1   .0 96:333
S018 1 8834 TIE14201    -.0045 -.0021 -.0097 -.0011 -.0026 -.0105  -.3  -.8 -3.3 97:  1
S018 1 8834 L AUS       -.0029  .0006  .0051  .0012  .0054  .0021   .2  1.0   .4 97:245
S018 1 8834 L CGS       -.0025  .0040 -.0024  .0045 -.0004 -.0028   .6  -.1  -.4 97:  1
S018 1 8834 L CRL        .0021 -.0008  .0092 -.0012  .0047  .0082  -.2   .3   .6 92: 16
S018 1 8834 L4 CSR       .0005  .0022  .0025  .0020  .0009  .0026   .4   .1   .3 94:286
S018 1 8834 L DEOS      -.0019 -.0011 -.0019 -.0007  .0003 -.0028  -.1   .0  -.3 93:  1
S018 1 8834 L JCET       .0020  .0011  .0023  .0006 -.0001  .0032   .6  -.1  1.6 95:120
S018 1 8834 C1 CSR      -.0005 -.0015 -.0049 -.0014 -.0026 -.0043  -.9  -.9 -1.5 96:252
S100 1 7593 R GSFC       .0004  .0002  .0007  .0002  .0002  .0008   .1   .0   .2 99: 61
S100 1 7593 R SHA        .0009  .0000 -.0011 -.0002 -.0014 -.0003  -.1  -.2   .0 99: 29

Velocities
M004 1 7596 L4 CSR      -.0841 -.1090  .1036 -.0875  .1482  .0089  -.1   .2   .0
M004 1 7596 C GRIM       .0055 -.0791  .0099 -.0784  .0158 -.0005  -.1   .0   .0
M005 1 7597 L CGS       -.0175  .0059  .0117  .0097  .0195 -.0014   .0   .0   .0
M005 1 7597 L CRL       -.0312 -.0220  .0171 -.0145  .0379 -.0101  -.8  1.1  -.3
M005 1 7597 L4 CSR       .0133  .0012  .0111 -.0018 -.0028  .0171  -.1  -.1   .3
M005 1 7597 L DEOS       .0425 -.0076 -.0333 -.0169 -.0518  .0009   .0   .0   .0
M005 1 7597 L JCET      -.0179  .0633  .1301  .0657  .0877  .0962  1.5  1.8  2.1
M005 1 7597 C GRIM       .0055 -.0791  .0099 -.0784  .0158 -.0005  -.1   .0   .0
M005 1 7597 C1 CSR       .0229 -.0004  .0038 -.0055 -.0143  .0175  -.2  -.2   .3
M007 1 7599 L4 CSR      -.1524  .2415 -.2091  .2694 -.0651 -.2202   .1   .0  -.1
M009 1 WETT P CODE      -.0003  .0001 -.0025  .0001 -.0014 -.0020   .1  -.6  -.9
M009 1 WETT P GFZ        .0015  .0009  .0009  .0005 -.0007  .0018   .4  -.4  1.0
M009 1 WETT P EUR        .0003  .0001  .0011  .0000  .0005  .0011   .0   .2   .5
M010 1 WTZR P CODE      -.0003  .0001 -.0025  .0002 -.0014 -.0021   .1  -.6  -.9
M010 1 WTZR P GFZ        .0014  .0010  .0010  .0006 -.0005  .0018   .7  -.3  1.1
M010 1 WTZR P IGS       -.0006 -.0002 -.0010 -.0001 -.0001 -.0012  -.2  -.2 -1.4
M010 1 WTZR P1 JPL      -.0016 -.0003 -.0008  .0001  .0007 -.0016   .1   .3  -.7
M010 1 WTZR P NCL       -.0009 -.0005 -.0004 -.0003  .0004 -.0010  -.3   .3  -.6
M010 1 WTZR P NOAA      -.0019 -.0004 -.0011  .0001  .0008 -.0021   .0   .4 -1.0
M010 1 WTZR P EUR        .0010  .0002  .0009  .0000 -.0002  .0014   .0  -.1   .7
M010 1 WTZR P1 IGN      -.0013 -.0004 -.0020 -.0001 -.0003 -.0024  -.2  -.3 -2.0
M010 1 WTZR P REGAL      .0019  .0013  .0002  .0009 -.0015  .0015   .8  -.7   .7
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M200 1 7594 L4 CSR       .0132  .0335  .0768  .0297  .0349  .0715   .1   .1   .1
M200 1 7594 L DEOS       .0425 -.0076 -.0333 -.0169 -.0518  .0009   .0   .0   .0
M200 1 7594 C GRIM       .0055 -.0791  .0099 -.0784  .0158 -.0006  -.1   .0   .0
M200 1 7594 C1 CSR       .0613  .0353  .0262  .0207 -.0340  .0640   .0   .0   .1
S002 1 7834 L CGS       -.0022 -.0021 -.0022 -.0016  .0006 -.0034  -.9   .3 -1.6
S002 1 7834 L CRL       -.0285 -.0166 -.0695 -.0098 -.0217 -.0731  -.3  -.3 -1.0
S002 1 7834 L4 CSR       .0001 -.0022  .0011 -.0021  .0010  .0006  -.6   .1   .1
S002 1 7834 L DEOS       .0033 -.0022  .0003 -.0028 -.0019  .0020 -1.2  -.5   .5
S004 1 7224 R GIUB       .0006  .0001  .0001 -.0001 -.0004  .0005  -.1  -.4   .6
S004 1 7224 R GSFC       .0000  .0000  .0000  .0000  .0000  .0000   .0  -.1  -.2
S004 1 7224 R SHA        .0003 -.0001  .0002 -.0001 -.0001  .0003  -.1  -.1   .3
S018 1 8834 L AUS       -.0027 -.0006 -.0019  .0000  .0008 -.0032   .0   .4 -1.7
S018 1 8834 L CGS       -.0175  .0059  .0117  .0097  .0195 -.0014   .0   .0   .0
S018 1 8834 L CRL       -.0018 -.0011 -.0006 -.0006  .0011 -.0017  -.2   .2  -.3
S018 1 8834 L4 CSR      -.0005 -.0014 -.0011 -.0013 -.0001 -.0014 -1.3  -.1  -.9
S018 1 8834 L DEOS       .0425 -.0076 -.0333 -.0169 -.0518  .0009   .0   .0   .0
S018 1 8834 L JCET      -.0015  .0001 -.0019  .0005 -.0001 -.0024   .7  -.1 -2.0
S018 1 8834 C1 CSR      -.0010 -.0004 -.0013 -.0002  .0000 -.0017  -.2   .0 -1.3
S100 1 7593 R GSFC      -.0006  .0020  .0003  .0020  .0003  .0001   .7   .0   .0
S100 1 7593 R SHA       -.0045  .0021 -.0052  .0030 -.0005 -.0065   .6   .0  -.6

14202 HOHENBUNSTORF

Positions
M002 1 7600 R GSFC      -.0013  .0002 -.0007  .0004  .0006 -.0013   .1   .0  -.1 89:176
M002 1 7600 R SHA       -.0037  .0007 -.0026  .0014  .0012 -.0042   .1   .1  -.2 89:177

Velocities
M002 1 7600 R GSFC       .2024  .0640 -.0067  .0261 -.1724  .1213   .0  -.1   .1
M002 1 7600 R SHA       -.0117 -.0087  .0084 -.0064  .0155 -.0012   .0   .1   .0

14208 OBERPFAFFENHOFEN

Positions
M001 1 OBER P GFZ        .0020 -.0009  .0009 -.0013 -.0008  .0019  -.8  -.3   .6 98:280
M001 1 OBER P IGS       -.0001 -.0007 -.0006 -.0006 -.0003 -.0006  -.5  -.1  -.3 99:135
M001 1 OBER P1 JPL       .0007  .0008  .0015  .0006  .0004  .0017   .4   .2   .6 98:131
M001 1 OBER P NCL       -.0024 -.0043 -.0031 -.0037  .0003 -.0045  -.4   .0  -.2 97: 30
M001 1 OBER P NOAA       .0000 -.0002  .0002 -.0002  .0001  .0001  -.1   .0   .0 98:141
M001 1 OBER P EUR       -.0020 -.0001 -.0019  .0003  .0002 -.0027   .2   .1  -.8 98:228
M001 1 OBER P REGAL     -.0009  .0006 -.0017  .0008 -.0006 -.0018   .8  -.3  -.9 98:360

Velocities
M001 1 OBER P GFZ        .0006  .0006 -.0003  .0004 -.0007  .0002   .4  -.3   .1
M001 1 OBER P IGS       -.0008 -.0006 -.0012 -.0004 -.0001 -.0015  -.3   .0  -.7
M001 1 OBER P1 JPL      -.0008  .0001 -.0004  .0003  .0003 -.0008   .2   .1  -.3
M001 1 OBER P NCL        .0010  .0001  .0017 -.0001  .0004  .0020  -.1   .2   .8
M001 1 OBER P NOAA      -.0015  .0001 -.0002  .0004  .0010 -.0012   .2   .4  -.5
M001 1 OBER P EUR        .0011  .0003  .0012  .0001  .0000  .0017   .0   .0   .4
M001 1 OBER P REGAL      .0021  .0012  .0014  .0007 -.0008  .0026   .7  -.3  1.2

14209 EFFELSBERG

Positions
S001 1 7203 R GIUB       .0065  .0017  .0063  .0010 -.0011  .0091   .3  -.2  1.7 94:159
S001 1 7203 R GSFC      -.0057 -.0003 -.0073  .0004 -.0002 -.0093   .3  -.1 -1.9 93:220
S001 1 7203 R SHA       -.0100 -.0011 -.0137  .0001 -.0010 -.0170   .0  -.2 -2.8 95:251
S001 2 7203 R GIUB      -.0043 -.0033 -.0026 -.0027  .0020 -.0050  -.5   .2  -.4 97:  1
S001 2 7203 R GSFC      -.0065 -.0012 -.0078 -.0004  .0001 -.0102  -.3   .0 -2.0 97:  1
S001 2 7203 R SHA       -.0003  .0009 -.0053  .0009 -.0032 -.0042   .4  -.5  -.6 97:  1

Velocities
S001 1 7203 R GIUB       .0024  .0013  .0026  .0010 -.0003  .0036   .6  -.1   .9
S001 1 7203 R GSFC      -.0009  .0000 -.0009  .0001  .0001 -.0013   .2   .2 -1.5
S001 1 7203 R SHA       -.0004 -.0001 -.0014 -.0001 -.0006 -.0013  -.1  -.4 -1.0
S001 2 7203 R GIUB      -.0131  .0147  .0061  .0162  .0126 -.0025   .0   .0   .0
S001 2 7203 R GSFC      -.0294 -.0155  .0059 -.0119  .0278 -.0152   .0   .0   .0
S001 2 7203 R SHA       -.0157  .0148  .0095  .0166  .0167 -.0014   .0   .0   .0

14213 HOHENPEISSENBERG
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Positions
M002 1 7630 R GSFC       .0019  .0005  .0014  .0001 -.0005  .0023   .0   .0   .0 92:168
M002 1 7630 R SHA       -.0009  .0002 -.0004  .0004  .0004 -.0008   .0   .0   .0 92:168

Velocities
M002 1 7630 R GSFC      -.0941 -.0031  .0663  .0149  .1134 -.0133   .0   .1   .0
M002 1 7630 R SHA        .0019 -.0007 -.0013 -.0010 -.0022  .0002   .0   .0   .0

14216 KARLSRUHE

Positions
M001 1 KARL P EUR        .0004  .0001  .0006  .0001  .0001  .0007   .1   .0   .1 99:170

Velocities
M001 1 KARL P EUR        .0033  .0004  .0033 -.0001 -.0003  .0047   .0   .0   .3

14258 EUSKIRCHEN

Positions
M003 1 EUSK P EUR        .0004  .0001  .0006  .0000  .0000  .0008   .0   .0   .2 99:140

Velocities
M003 1 EUSK P EUR        .0007 -.0001  .0010 -.0002  .0001  .0012  -.1   .0   .1

14260 KARLSBURG

Positions
M001 1 7632 R GSFC       .0012  .0001  .0024 -.0002  .0004  .0026   .0   .0   .1 92:189
M001 1 7632 R SHA        .0002  .0003 -.0006  .0003 -.0006 -.0003   .0   .0   .0 92:189

Velocities
M001 1 7632 R GSFC      -.7155 -.2571  .5824 -.0815  .9539  .0266   .0   .4   .0
M001 1 7632 R SHA        .0099  .0020 -.0077 -.0004 -.0127 -.0003   .0  -.1   .0

14261 KIRSCHBERG

Positions
M001 1 7631 R GSFC       .0012  .0005  .0017  .0002  .0001  .0021   .0   .0   .1 92:179
M001 1 7631 R SHA       -.0012  .0001 -.0014  .0004  .0000 -.0018   .0   .0  -.1 92:179

Velocities
M001 1 7631 R GSFC      -.2698 -.0895  .3201 -.0202  .4215  .0719   .0   .2   .0
M001 1 7631 R SHA        .0141  .0030 -.0130 -.0006 -.0194 -.0011   .0  -.1   .0

14302 NICOSIA-ATHALASS

Positions
M001 1 NICO P CODE       .0008 -.0033  .0046 -.0032  .0044  .0018  -.9   .9   .4 98:195
M001 1 NICO P IGS       -.0001  .0002 -.0010  .0003 -.0008 -.0006   .1  -.4  -.3 98:334
M001 1 NICO P1 JPL      -.0017 -.0017 -.0019 -.0005 -.0003 -.0030  -.1  -.1  -.8 98:181
M001 1 NICO P NOAA       .0003 -.0017 -.0010 -.0016 -.0004 -.0011  -.4  -.1  -.3 98:207
M001 1 NICO P EUR        .0024  .0020  .0040  .0003  .0015  .0048   .1   .4  1.1 98:228

Velocities
M001 1 NICO P CODE      -.0002 -.0011 -.0025 -.0008 -.0016 -.0021  -.2  -.4  -.5
M001 1 NICO P IGS        .0012  .0010  .0006  .0002 -.0004  .0016   .1  -.2   .7
M001 1 NICO P1 JPL      -.0012  .0004 -.0014  .0010 -.0007 -.0014   .2  -.1  -.2
M001 1 NICO P NOAA       .0007 -.0004  .0010 -.0007  .0007  .0009  -.2   .2   .2
M001 1 NICO P EUR       -.0028  .0006 -.0020  .0021 -.0005 -.0028   .4  -.1  -.5

20101 RIYADH

Positions
S001 1 7832 L AUS       -.0304  .0040  .0169  .0248  .0229 -.0092   .8   .6  -.3 96:320
S001 1 7832 L CGS        .0029  .0120  .0013  .0061 -.0034  .0102   .4  -.2   .6 96:305
S001 1 7832 L CRL       -.0124 -.0009  .0195  .0083  .0216 -.0001   .4   .7   .0 96:305
S001 1 7832 L4 CSR      -.0175 -.0005  .0085  .0123  .0129 -.0077   .3   .4  -.2 96:325
S001 1 7832 L DEOS       .0074 -.0001  .0266 -.0054  .0220  .0158   .0   .2   .1 95:333
S001 1 7832 C GRIM       .0198 -.0267 -.0153 -.0327 -.0115 -.0116  -.7  -.3  -.3 96:365
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S001 1 7832 C1 CSR       .0046  .0042  .0013 -.0005 -.0015  .0062   .0  -.1   .4 96:327

Velocities
S001 1 7832 L AUS       -.0181 -.0076  .0029  .0078  .0103 -.0151   .2   .2  -.3
S001 1 7832 L CGS       -.0139 -.0058 -.0252  .0061 -.0171 -.0231   .1  -.5  -.6
S001 1 7832 L CRL        .0053 -.0208 -.0670 -.0182 -.0559 -.0385  -.4 -1.3  -.8
S001 1 7832 L4 CSR       .0002  .0008 -.0240  .0004 -.0220 -.0094   .0  -.6  -.2
S001 1 7832 L DEOS       .0112  .0163 -.0098  .0031 -.0171  .0135   .1  -.3   .3
S001 1 7832 C GRIM       .0344 -.0263 -.0796 -.0430 -.0742 -.0292  -.3  -.7  -.2
S001 1 7832 C1 CSR      -.0002  .0167 -.0326  .0116 -.0346 -.0029   .2  -.8  -.1

20702 BAR GIYYORA

Positions
M001 1 7530 L CGS       -.0237 -.0118 -.0283  .0040 -.0103 -.0371   .2  -.6 -2.1 97:  1
M001 1 7530 L CRL       -.0074  .0021  .0079  .0059  .0092  .0000   .4   .5   .0 94:  1
M001 1 7530 L4 CSR      -.0220 -.0127 -.0162  .0022 -.0005 -.0300   .0   .0  -.4 92:223
M001 1 7530 L DEOS       .0176 -.0037  .0128 -.0131  .0044  .0172  -.5   .2   .8 92: 99
M001 1 7530 C GRIM      -.0010 -.0076 -.0177 -.0057 -.0123 -.0137  -.1  -.1  -.1 93:322
M001 1 7530 C1 CSR       .0039  .0018 -.0019 -.0008 -.0038  .0026   .0  -.2   .1 93:342

Velocities
M001 1 7530 L CGS       -.0061  .0167  .0209  .0172  .0154  .0149   .0   .0   .0
M001 1 7530 L CRL        .0205  .0139 -.0092 -.0004 -.0209  .0162   .0  -.6   .4
M001 1 7530 L4 CSR       .0118  .0165  .0055  .0067 -.0054  .0191   .3  -.3   .9
M001 1 7530 L DEOS       .0064  .0102 -.0007  .0046 -.0064  .0091   .6  -.8  1.2
M001 1 7530 C GRIM       .0935  .0158  .0418 -.0409 -.0095  .0948  -.5  -.1   .9
M001 1 7530 C1 CSR       .0115  .0303 -.0218  .0182 -.0327  .0114   .3  -.5   .2

20703 MITZPE RAMON

Positions
S001 1 RAMO P CODE       .0046 -.0010  .0051 -.0035  .0028  .0053  -.8   .5  1.0 99:128
S001 1 RAMO P IGS        .0016  .0026  .0013  .0012 -.0003  .0030   .4  -.1  1.0 99:293
S001 1 RAMO P NOAA      -.0070 -.0064 -.0060 -.0012 -.0004 -.0111  -.3  -.1 -2.8 99: 46
S001 1 RAMO P EUR        .0060  .0070  .0069  .0023  .0014  .0112   .5   .3  2.1 99:161

Velocities
S001 1 RAMO P CODE       .0037 -.0064 -.0017 -.0074 -.0012 -.0014  -.9  -.1  -.2
S001 1 RAMO P IGS       -.0036  .0038  .0005  .0052  .0008 -.0005  1.2   .2  -.1
S001 1 RAMO P NOAA       .0018 -.0007 -.0004 -.0015 -.0009  .0007  -.2  -.2   .1
S001 1 RAMO P EUR       -.0060 -.0052 -.0054 -.0008 -.0006 -.0095  -.1  -.1  -.7

20704 TEL AVIV

Positions
M001 1 TELA P IGS       -.0001 -.0001 -.0003  .0000 -.0002 -.0003   .0   .0  -.1 98:331

Velocities
M001 1 TELA P IGS        .0000  .0002  .0000  .0002 -.0001  .0001   .0   .0   .0

20705 HAIFA

Positions
M001 1 BSHM P IGS       -.0001  .0002 -.0003  .0002 -.0003 -.0001   .0  -.1   .0 99:269

Velocities
M001 1 BSHM P IGS       -.0010  .0002 -.0006  .0007 -.0001 -.0009   .1   .0  -.1

20706 ELAT

Positions
M001 1 ELAT P IGS        .0000 -.0001 -.0003 -.0001 -.0002 -.0002   .0  -.1  -.1 98:280

Velocities
M001 1 ELAT P IGS        .0000  .0002  .0000  .0002 -.0001  .0001   .0   .0   .0

20710 METZOKI DRAGOT

Positions
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S001 1 DRAG P IGS       -.0005  .0010 -.0005  .0011 -.0005 -.0001   .1  -.1   .0  0:225

Velocities
S001 1 DRAG P IGS       -.0058 -.0044 -.0046 -.0002 -.0001 -.0086   .0   .0  -.3

20711 KIBUTZ EL-ROM

Positions
S001 1 ELRO P IGS       -.0004  .0009 -.0006  .0010 -.0006 -.0001   .1  -.1   .0  0:246

Velocities
S001 1 ELRO P IGS       -.0086 -.0080 -.0066 -.0015  .0009 -.0134   .0   .0  -.3

20801 DIYARBAKIR

Positions
M001 1 7575 L CGS        .0046  .0056 -.0221  .0013 -.0218 -.0080   .0  -.6  -.2 97:  1
M001 1 7575 L4 CSR      -.0053  .0009 -.0201  .0041 -.0137 -.0151   .1  -.2  -.2 88:192
M001 1 7575 L DEOS      -.0033  .0165 -.0038  .0148 -.0080  .0041   .2  -.1   .1 89:211
M001 1 7575 C GRIM      -.0157 -.0105 -.0170  .0021 -.0019 -.0252   .1  -.1 -1.0 89:242

Velocities
M001 1 7575 L CGS       -.0232 -.0026  .0165  .0130  .0249 -.0051   .0   .0   .0
M001 1 7575 L4 CSR      -.0031  .0066  .0059  .0071  .0035  .0051   .3   .1   .2
M001 1 7575 L DEOS       .0053  .0116  .0019  .0055 -.0056  .0102   .2  -.2   .3
M001 1 7575 C GRIM       .0062 -.0043  .0117 -.0073  .0081  .0087  -.1   .1   .1

20802 YOZGAT

Positions
M001 1 7585 L CGS       -.0291 -.0009 -.0427  .0158 -.0172 -.0460   .7  -.6 -1.6 90:147
M001 1 7585 L4 CSR       .0035  .0265 -.0484  .0198 -.0487 -.0172   .3  -.6  -.2 91:159
M001 1 7585 L DEOS      -.0250  .0085 -.0157  .0213 -.0020 -.0220   .6  -.1  -.6 90:215
M001 1 7585 C GRIM      -.0318 -.0494  .0097 -.0224  .0422 -.0355  -.4   .7  -.6 89:182

Velocities
M001 1 7585 L CGS       -.0140  .0250 -.0332  .0285 -.0273 -.0191  2.4 -1.7 -1.2
M001 1 7585 L4 CSR      -.0049  .0239 -.0376  .0224 -.0351 -.0167  1.8 -2.2 -1.1
M001 1 7585 L DEOS       .0001  .0349 -.0282  .0286 -.0345 -.0027  1.5 -1.9  -.2
M001 1 7585 C GRIM       .0073  .0254 -.0043  .0167 -.0164  .0130   .2  -.2   .1

20803 MELENGICLICK

Positions
M001 1 7580 L CGS       -.0012  .0073 -.0001  .0068 -.0018  .0023   .3  -.1   .1 90:361
M001 1 7580 L4 CSR      -.0008 -.0001 -.0062  .0004 -.0045 -.0043   .0  -.1  -.1 90: 14
M001 1 7580 L DEOS       .0030  .0078  .0071  .0049  .0016  .0097   .2   .0   .3 89:321
M001 1 7580 C GRIM      -.0121  .0080 -.0175  .0133 -.0104 -.0152   .4  -.3  -.5 89:175

Velocities
M001 1 7580 L CGS        .0009 -.0042  .0048 -.0040  .0048  .0017  -.3   .3   .1
M001 1 7580 L4 CSR      -.0053 -.0087 -.0006 -.0044  .0051 -.0077  -.3   .3  -.5
M001 1 7580 L DEOS       .0025 -.0058  .0020 -.0062  .0022  .0004  -.4   .1   .0
M001 1 7580 C GRIM      -.0039 -.0149 -.0012 -.0103  .0060 -.0098  -.3   .2  -.3

20804 YIGILCA

Positions
M001 1 7587 L CGS        .0089  .0191 -.0113  .0117 -.0200  .0058   .6  -.8   .2 90:  2
M001 1 7587 L4 CSR      -.0038 -.0073  .0004 -.0042  .0049 -.0050  -.1   .1  -.1 90:170
M001 1 7587 L DEOS       .0042 -.0001  .0048 -.0022  .0013  .0058  -.1   .0   .1 89:123
M001 1 7587 C GRIM       .0040  .0065  .0050  .0035 -.0006  .0084   .1   .0   .2 89:141

Velocities
M001 1 7587 L CGS       -.0039 -.0032 -.0003 -.0008  .0030 -.0040  -.1   .3  -.3
M001 1 7587 L4 CSR       .0010 -.0009  .0036 -.0013  .0025  .0026  -.2   .2   .2
M001 1 7587 L DEOS       .0036 -.0066 -.0033 -.0075 -.0022 -.0024  -.4  -.1  -.1
M001 1 7587 C GRIM       .0013 -.0054  .0084 -.0052  .0075  .0042  -.2   .2   .1

20805 ANKARA
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Positions
M001 1 7589 TIE20805     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7589 L CGS        .0691  .0955  .1103  .0429  .0143  .1550  1.2   .3  3.7 97:  1
M001 1 7589 L4 CSR       .1620  .1992  .1978  .0799 -.0047  .3141   .8   .0  2.4 93: 78
M002 1 ANKR TIE20805    -.0093  .0187  .0010  .0208 -.0007  .0025  2.6  -.1   .4 97:  1
M002 1 ANKR P CODE      -.0005 -.0037  .0036 -.0028  .0043  .0005  -.9  1.0   .1 98: 65
M002 1 ANKR P IGS        .0001  .0002  .0001  .0001 -.0001  .0002   .1  -.1   .1 97:350
M002 1 ANKR P1 JPL       .0006 -.0004 -.0009 -.0007 -.0008 -.0004  -.3  -.3  -.2 97:287
M002 1 ANKR P NCL        .0004 -.0011  .0011 -.0011  .0010  .0005  -.6   .4   .2 97:352
M002 1 ANKR P NOAA      -.0011 -.0014 -.0023 -.0006 -.0007 -.0027  -.2  -.3 -1.0 97:333
M002 1 ANKR P EUR        .0052  .0019  .0060 -.0012  .0011  .0080  -.4   .3  2.1 98:111
M002 2 ANKR P EUR       -.0059 -.0029 -.0039  .0007  .0012 -.0076   .1   .2 -1.0 99:331

Velocities
M001 1 7589 L CGS       -.0064 -.0134  .0103 -.0078  .0160 -.0031   .0   .0   .0
M001 1 7589 L4 CSR      -.0547 -.0080  .1149  .0229  .1204  .0351   .1   .3   .1
M002 1 ANKR P CODE       .0001  .0017 -.0024  .0014 -.0024 -.0008   .5  -.7  -.3
M002 1 ANKR P IGS       -.0004  .0007 -.0001  .0008 -.0001 -.0001   .6  -.1   .0
M002 1 ANKR P1 JPL      -.0006 -.0007  .0004 -.0003  .0009 -.0004  -.1   .5  -.2
M002 1 ANKR P NCL        .0016 -.0009  .0018 -.0016  .0008  .0018 -1.0   .4   .9
M002 1 ANKR P NOAA      -.0021  .0009 -.0013  .0019 -.0002 -.0018  1.0  -.1  -.9
M002 1 ANKR P EUR        .0010  .0005  .0018 -.0002  .0006  .0020   .0   .1   .5
M002 2 ANKR P EUR        .0010  .0005  .0018 -.0002  .0006  .0020   .0   .1   .5

20808 TRABZON

Positions
M001 1 TRAB P IGS        .0001 -.0004 -.0008 -.0004 -.0005 -.0006   .0   .0  -.1  0:189

Velocities
M001 1 TRAB P IGS        .0077  .0029  .0060 -.0027 -.0006  .0098  -.1   .0   .2

21501 EVEREST

Positions
S001 1 EVEB D GRGS       .0721  .0156 -.0093 -.0712 -.0174  .0129 -2.0 -1.0   .6 96: 26
S001 1 EVEB D9 IGN      -.0243 -.0394  .0078  .0221  .0260 -.0322   .7  1.3 -1.3 96:256
S001 1 EVEB C GRIM      -.0086 -.0176 -.0164  .0076 -.0060 -.0236   .2  -.3 -1.0 97:136
S001 1 EVEB C1 CSR      -.0024  .0080  .0013  .0028 -.0026  .0075   .2  -.3   .8 96:299

Velocities
S001 1 EVEB D GRGS      -.0021 -.0024 -.0018  .0020 -.0004 -.0031   .1   .0  -.2
S001 1 EVEB D9 IGN      -.0049 -.0014 -.0036  .0048 -.0024 -.0032   .3  -.2  -.3
S001 1 EVEB C GRIM       .0091 -.0034  .0002 -.0093  .0015 -.0024  -.4   .1  -.2
S001 1 EVEB C1 CSR       .0040  .0003  .0017 -.0040  .0012  .0013  -.6   .3   .3

21601 BEIJING

Positions
M001 1 BJFS TIE21601     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 BJFS P GFZ        .0054  .0010  .0028 -.0053  .0032  .0007  -.6   .3   .1 99:358
M001 1 BJFS P IGS       -.0023  .0015 -.0001  .0014 -.0016  .0017   .4  -.4   .4  0:195
S004 1 7249 TIE21601    -.0158  .0253  .0795  .0032  .0423  .0736   .1  1.4  2.5 97:  1
S004 1 7249 L AUS       -.0044 -.0031 -.0042  .0053 -.0027 -.0034   .5  -.3  -.3 99:264
S004 1 7249 L CGS       -.0071  .0021 -.0045  .0055 -.0066  .0010   .3  -.3   .0 98: 22
S004 1 7249 L CRL       -.0323 -.0296  .0155  .0420  .0199  .0002   .6   .2   .0 98:207
S004 1 7249 L4 CSR      -.0508  .0152  .0689  .0390  .0303  .0715   .2   .1   .3 98:311
S004 1 7249 L DGFI      -.0134 -.0152  .0337  .0187  .0310  .0154   .3   .6   .3 98:223
S004 1 7249 C GRIM       .0138 -.0158 -.0343 -.0055 -.0135 -.0374  -.1  -.1  -.4 98:206
S004 1 7249 C1 CSR       .0011 -.0011  .0032 -.0005  .0033  .0009   .0   .1   .0 98: 55

Velocities
M001 1 BJFS P GFZ       -.0191  .0186  .0090  .0091 -.0090  .0250   .6  -.5  1.5
M001 1 BJFS P IGS       -.0149  .0178  .0074  .0056 -.0087  .0221   .4  -.5  1.3
S004 1 7249 L AUS        .0400  .0115 -.0182 -.0411 -.0095 -.0171 -2.3  -.6 -1.1
S004 1 7249 L CGS       -.0003  .0213  .0128 -.0090 -.0024  .0230  -.6  -.1  1.1
S004 1 7249 L CRL        .0318  .0344  .0426 -.0436  .0220  .0403 -1.0   .4   .7
S004 1 7249 L4 CSR       .0117 -.0116  .0129 -.0054  .0199 -.0037  -.1   .3  -.1
S004 1 7249 L DGFI       .0020 -.0159  .0043  .0052  .0130 -.0089   .1   .3  -.2
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S004 1 7249 C GRIM      -.0016 -.0148  .0236  .0079  .0262  .0054   .1   .2   .0
S004 1 7249 C1 CSR      -.0058  .0132  .0058 -.0006 -.0047  .0148   .0  -.1   .4

21602 WUHAN

Positions
M001 1 WUHN P CODE       .0035 -.0071  .0018 -.0002  .0056 -.0059  -.1  1.2 -1.4 98: 53
M001 1 WUHN P IGS       -.0027  .0055  .0028  .0002 -.0007  .0067   .1  -.4  3.7 98:214
M001 1 WUHN P NCL        .0015 -.0033 -.0018  .0000  .0003 -.0040   .0   .1 -1.5 98:136
M001 1 WUHN P NOAA       .0023 -.0043 -.0059 -.0003 -.0026 -.0072  -.1  -.9 -2.2 98: 45
S003 1 7236 L AUS       -.0233 -.0004  .0439  .0214  .0331  .0303   .5   .7   .7 96: 97
S003 1 7236 L CRL        .0133 -.0249 -.0084 -.0018  .0071 -.0285  -.1   .2  -.7 95:350
S003 1 7236 L4 CSR       .0028  .0128  .0087 -.0078  .0021  .0134  -.1   .0   .1 91: 16
S003 1 7236 L JCET       .0289  .0118 -.0104 -.0312 -.0084 -.0063  -.2   .0   .0 96:160
S003 1 7236 C GRIM       .0369  .0071 -.0060 -.0366 -.0007 -.0105  -.7   .0  -.2 96:101
S003 1 7236 C1 CSR       .0475 -.0149 -.0243 -.0371 -.0040 -.0409  -.3   .0  -.3 94:  1

Velocities
M001 1 WUHN P CODE      -.0010  .0017 -.0013  .0002 -.0021  .0010   .1  -.6   .3
M001 1 WUHN P IGS        .0000 -.0007 -.0009  .0003 -.0004 -.0010   .2  -.3  -.7
M001 1 WUHN P NCL        .0008 -.0027 -.0020  .0003 -.0003 -.0034   .1  -.1 -1.1
M001 1 WUHN P NOAA      -.0008 -.0018 -.0014  .0015 -.0005 -.0019   .6  -.2  -.7
S003 1 7236 L AUS        .0163  .0052  .0047 -.0169  .0051  .0007  -.7   .2   .0
S003 1 7236 L CRL        .0160 -.0202  .0105 -.0062  .0217 -.0162  -.4  1.2  -.8
S003 1 7236 L4 CSR       .0014 -.0110 -.0049  .0033  .0011 -.0116   .1   .0  -.3
S003 1 7236 L JCET       .0094  .0156  .0009 -.0150 -.0044  .0094  -.1   .0   .1
S003 1 7236 C GRIM       .0124  .0112  .0075 -.0159  .0039  .0082  -.5   .1   .2
S003 1 7236 C1 CSR      -.0183  .0028  .0117  .0155  .0050  .0146   .3   .1   .2

21604 PURPLE MOUNTAIN

Positions
S003 1 PURA D GRGS       .0316 -.0298  .0277 -.0134  .0454 -.0203  -.5  2.2  -.8 96:145
S003 1 PURA D9 IGN      -.0122 -.0022  .0118  .0117  .0079  .0096   .5   .4   .4 96:126
S003 1 PURA C GRIM       .0357 -.0343 -.0338 -.0147 -.0036 -.0580  -.5  -.2 -2.3 97:112
S003 1 PURA C1 CSR      -.0062  .0138 -.0033 -.0012 -.0108  .0110  -.1 -1.4  1.3 96:221

Velocities
S003 1 PURA D GRGS       .0051 -.0050 -.0033 -.0021  .0008 -.0075  -.1   .1  -.5
S003 1 PURA D9 IGN      -.0064  .0013  .0029  .0049  .0002  .0051   .4   .0   .4
S003 1 PURA C GRIM       .0100 -.0004  .0021 -.0086  .0046 -.0032  -.4   .3  -.2
S003 1 PURA C1 CSR      -.0003  .0006  .0013  .0000  .0008  .0013   .0   .2   .3

21605 SHANGHAI

Positions
M002 1 SHAO P CODE       .0028 -.0045  .0042 -.0001  .0064 -.0024   .0  1.5  -.6 97:242
M002 1 SHAO P IGS       -.0011  .0013  .0003  .0003 -.0006  .0016   .2  -.4  1.0 97:324
M002 1 SHAO P1 JPL       .0010  .0007  .0005 -.0012  .0004  .0004  -.5   .2   .2 97:109
M002 1 SHAO P NCL       -.0001 -.0005  .0004  .0004  .0006 -.0001   .2   .2   .0 98: 27
M002 1 SHAO P NOAA       .0014 -.0021 -.0045 -.0001 -.0026 -.0045   .0  -.9 -1.4 97:295
S001 1 7837 TIE21605     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7837 L AUS       -.0186 -.0163  .0000  .0243  .0022 -.0036  1.5   .1  -.2 98:307
S001 1 7837 L CGS       -.0084 -.0070  .0047  .0108  .0049  .0011  1.2   .6   .1 94:355
S001 1 7837 L CRL       -.0027 -.0197 -.0044  .0126  .0042 -.0155   .7   .2  -.9 94: 48
S001 1 7837 L4 CSR      -.0036 -.0235 -.0014  .0153  .0082 -.0163   .4   .2  -.3 95:187
S001 1 7837 L DEOS       .0006 -.0237  .0193  .0118  .0272 -.0076   .8  1.6  -.5 92:328
S001 1 7837 L DGFI      -.0151 -.0129  .0258  .0196  .0237  .0106  1.7  2.1   .9 94:347
S001 1 7837 L JCET       .0015  .0069  .0038 -.0048  .0006  .0063  -.6   .1   .7 98:112
S001 1 7837 C GRIM       .0148  .0118  .0033 -.0188  .0016  .0038 -1.0   .1   .2 96: 63
S001 1 7837 C1 CSR      -.0054  .0114  .0024 -.0013 -.0044  .0120  -.1  -.3   .7 97:183
S008 1 7226 R SHA       -.0117  .0022  .0042  .0088 -.0006  .0090   .0   .0   .0 86:165
S009 1 7227 TIE21605    -.0390  .0202  .0308  .0229  .0070  .0480  1.1   .3  2.4 97:  1
S009 1 7227 R GIUB       .0040 -.0021  .0014 -.0024  .0032 -.0026  -.5   .7  -.6 95:273
S009 1 7227 R GSFC       .0039 -.0013  .0006 -.0027  .0021 -.0024 -1.0   .8  -.8 95:360
S009 1 7227 R SHA        .0034 -.0037 -.0016 -.0010  .0012 -.0050  -.3   .4 -1.5 96:185

Velocities
M002 1 SHAO P CODE      -.0007  .0011 -.0016  .0000 -.0020  .0003   .0  -.7   .1
M002 1 SHAO P IGS       -.0005 -.0013 -.0010  .0011 -.0004 -.0013   .8  -.3  -.9
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M002 1 SHAO P1 JPL       .0014 -.0015  .0000 -.0004  .0010 -.0017  -.3   .7 -1.0
M002 1 SHAO P NCL        .0003 -.0020 -.0014  .0008 -.0002 -.0023   .5  -.1 -1.2
M002 1 SHAO P NOAA       .0000 -.0021 -.0017  .0011 -.0005 -.0024   .4  -.2 -1.0
S001 1 7837 L AUS       -.0099  .0066 -.0097  .0050 -.0138  .0042   .5 -1.4   .4
S001 1 7837 L CGS       -.0029  .0005  .0010  .0023 -.0002  .0022   .8  -.1   .8
S001 1 7837 L CRL       -.0053  .0045  .0052  .0023  .0010  .0083   .4   .2  1.6
S001 1 7837 L4 CSR      -.0051  .0020  .0038  .0033  .0010  .0057   .5   .2   .8
S001 1 7837 L DEOS      -.0044 -.0017 -.0005  .0047 -.0009  .0004   .9  -.2   .1
S001 1 7837 L DGFI      -.0015 -.0038  .0004  .0032  .0016 -.0019   .9   .4  -.5
S001 1 7837 L JCET      -.0071  .0086  .0050  .0016 -.0014  .0121   .4  -.3  2.9
S001 1 7837 C GRIM       .0036  .0064  .0024 -.0064  .0002  .0043 -1.0   .0   .7
S001 1 7837 C1 CSR      -.0041  .0041  .0010  .0014 -.0020  .0053   .2  -.3   .7
S008 1 7226 R SHA       -.0073 -.0055 -.0020  .0091 -.0012 -.0018   .0   .0   .0
S009 1 7227 R GIUB       .0007 -.0002 -.0006 -.0004 -.0002 -.0008  -.3  -.2  -.5
S009 1 7227 R GSFC       .0003  .0003 -.0003 -.0004 -.0004  .0000  -.5  -.5  -.1
S009 1 7227 R SHA        .0009 -.0003 -.0009 -.0006 -.0004 -.0011  -.4  -.2  -.7

21609 KUNMING

Positions
M001 1 KUNM P IGS       -.0008  .0018 -.0008  .0004 -.0015  .0014   .1  -.3   .2 99:339
M001 1 KUNM P NOAA       .0022 -.0063 -.0065 -.0008 -.0031 -.0088  -.2  -.5 -1.1 99: 95
S002 1 7820 L4 CSR      -.0225 -.0093  .0220  .0240  .0217  .0056  1.0   .5   .1 99:126
S002 1 7820 C GRIM       .0416  .0038  .0070 -.0414  .0087 -.0021  -.7   .1   .0 99: 74
S002 1 7820 C1 CSR      -.0012  .0113  .0192 -.0013  .0126  .0183   .0   .1   .1 99:178

Velocities
M001 1 KUNM P IGS       -.0023  .0038  .0013  .0014 -.0006  .0044   .3  -.1   .4
M001 1 KUNM P NOAA       .0043  .0011  .0006 -.0044  .0005  .0004  -.3   .0   .0
S002 1 7820 L4 CSR       .0101 -.0279  .0208 -.0037  .0313 -.0178  -.2  1.1  -.5
S002 1 7820 C GRIM       .0030  .0527 -.0109 -.0146 -.0313  .0414   .0  -.1   .1
S002 1 7820 C1 CSR       .0367 -.0296 -.0142 -.0292  .0028 -.0395  -.2   .0  -.1

21611 CHANGCHUN

Positions
S001 1 7237 L AUS       -.0111 -.0021 -.0080  .0103 -.0091 -.0021  1.0 -1.0  -.2 99:132
S001 1 7237 L CGS       -.0051 -.0197  .0028  .0156  .0111 -.0075  1.8  1.2  -.8 97:115
S001 1 7237 L CRL       -.0125 -.0295  .0023  .0273  .0133 -.0105  1.1   .6  -.5 96:266
S001 1 7237 L4 CSR      -.0159 -.0130  .0329  .0205  .0247  .0218   .8   .7   .6 98:238
S001 1 7237 L DEOS      -.0013 -.0494  .0108  .0298  .0351 -.0210   .3   .3  -.2 95:267
S001 1 7237 L DGFI      -.0153 -.0276  .0237  .0285  .0265  .0066  2.1  2.0   .5 97:138
S001 1 7237 L JCET       .0026  .0061  .0103 -.0056  .0051  .0096  -.8   .6  1.1 99:231
S001 1 7237 C GRIM       .0202  .0038 -.0028 -.0187  .0040 -.0081  -.6   .1  -.3 97:209
S001 1 7237 C1 CSR       .0006  .0069 -.0131 -.0045 -.0131 -.0052  -.6 -1.3  -.5 98:143

Velocities
S001 1 7237 L AUS       -.0127  .0139 -.0190  .0023 -.0266  .0003   .2 -2.7   .0
S001 1 7237 L CGS       -.0080  .0067  .0127  .0026  .0021  .0161   .7   .5  3.5
S001 1 7237 L CRL       -.0048  .0051  .0081  .0010  .0011  .0106   .1   .1  1.3
S001 1 7237 L4 CSR      -.0072 -.0012  .0069  .0065  .0028  .0071   .8   .3   .7
S001 1 7237 L DEOS      -.0020 -.0028  .0004  .0033  .0010 -.0006   .2   .1   .0
S001 1 7237 L DGFI       .0018 -.0068 -.0021  .0025  .0030 -.0062   .4   .6 -1.1
S001 1 7237 L JCET      -.0022  .0028  .0025  .0002 -.0006  .0043   .0  -.1   .5
S001 1 7237 C GRIM      -.0066  .0086  .0195  .0004  .0066  .0213   .0   .3   .8
S001 1 7237 C1 CSR      -.0047  .0060  .0080  .0004  .0005  .0110   .1   .1  1.2

21612 URUMQI

Positions
M001 1 URUM P CODE       .0047 -.0004  .0024 -.0047  .0019  .0015 -1.1   .2   .2 99:356
M001 1 URUM P GFZ        .0022  .0007  .0020 -.0021  .0009  .0019 -1.0   .2   .5 99:116
M001 1 URUM P IGS       -.0002 -.0014 -.0015  .0002 -.0001 -.0021   .1   .0  -.6  0: 20
M001 1 URUM P NOAA       .0000 -.0015 -.0075 -.0001 -.0044 -.0063   .0  -.8 -1.2 99:140
S001 1 7330 R GIUB       .0036  .0013  .0039 -.0035  .0018  .0038  -.7   .2   .5 98: 94
S001 1 7330 R GSFC       .0029 -.0006  .0004 -.0029  .0006 -.0001 -1.2   .1   .0 98:285
S001 1 7330 R SHA        .0017  .0000  .0005 -.0017  .0003  .0005  -.5   .1   .1 98:103

Velocities
M001 1 URUM P CODE       .0160  .0366  .0281 -.0145 -.0055  .0463 -1.0  -.1   .9
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M001 1 URUM P GFZ       -.0007 -.0019  .0020  .0006  .0028  .0000   .3   .7   .0
M001 1 URUM P IGS        .0004  .0032  .0015 -.0003 -.0012  .0033  -.2  -.2   .7
M001 1 URUM P NOAA      -.0007 -.0001 -.0015  .0007 -.0010 -.0011   .1  -.1  -.1
S001 1 7330 R GIUB       .0021  .0004 -.0009 -.0021 -.0010 -.0002  -.5  -.1   .0
S001 1 7330 R GSFC       .0004 -.0021 -.0039 -.0005 -.0014 -.0042  -.2  -.2  -.7
S001 1 7330 R SHA       -.0004  .0039  .0006  .0006 -.0022  .0033   .2  -.4   .6

21613 LHASA

Positions
M001 1 LHAS P CODE       .0011 -.0055  .0050 -.0010  .0071 -.0023  -.3  1.4  -.5 97:303
M001 1 LHAS P GFZ        .0018 -.0018 -.0026 -.0018 -.0014 -.0029  -.7  -.3  -.6 98:118
M001 1 LHAS P IGS       -.0004  .0014 -.0001  .0004 -.0008  .0012   .4  -.5   .6 98:155
M001 1 LHAS P1 JPL       .0029  .0025  .0022 -.0029  .0007  .0032 -1.4   .2   .8 97:186
M001 1 LHAS P NCL        .0004 -.0021 -.0008 -.0003  .0003 -.0022  -.2   .1  -.8 98: 16
M001 1 LHAS P NOAA       .0018  .0000 -.0016 -.0018 -.0013 -.0008  -.5  -.4  -.2 97:276

Velocities
M001 1 LHAS P CODE       .0007 -.0005 -.0034 -.0006 -.0028 -.0021  -.3  -.7  -.5
M001 1 LHAS P GFZ        .0006  .0005  .0000 -.0006 -.0003  .0004  -.4  -.1   .1
M001 1 LHAS P IGS       -.0002  .0026  .0014  .0001  .0000  .0030   .2   .0  1.8
M001 1 LHAS P1 JPL       .0002 -.0051 -.0022 -.0001  .0006 -.0056  -.1   .2 -1.7
M001 1 LHAS P NCL        .0001 -.0035 -.0021 -.0001 -.0001 -.0041   .0  -.1 -1.3
M001 1 LHAS P NOAA       .0015 -.0025 -.0026 -.0014 -.0010 -.0035  -.6  -.4 -1.2

21614 SHAANXI

Positions
M001 1 XIAN P CODE       .0019 -.0053  .0039  .0000  .0064 -.0024   .0  1.4  -.6 98: 64
M001 1 XIAN P IGS       -.0015  .0013  .0003  .0010 -.0007  .0016   .6  -.3   .6 98: 72
M001 1 XIAN P1 JPL       .0004  .0008  .0034 -.0006  .0024  .0025  -.3   .8   .8 98:111
M001 1 XIAN P NCL        .0011 -.0012 -.0022 -.0007 -.0010 -.0024  -.4  -.4 -1.0 98:111
M001 1 XIAN P NOAA       .0021 -.0008 -.0026 -.0017 -.0013 -.0027  -.5  -.4  -.8 98: 41

Velocities
M001 1 XIAN P CODE      -.0006  .0019 -.0010 -.0001 -.0020  .0011   .0  -.5   .3
M001 1 XIAN P IGS       -.0016  .0016  .0011  .0010 -.0003  .0023   .5  -.1   .6
M001 1 XIAN P1 JPL       .0001 -.0026 -.0003  .0008  .0011 -.0022   .3   .3  -.6
M001 1 XIAN P NCL       -.0007  .0005  .0009  .0005  .0004  .0011   .2   .1   .3
M001 1 XIAN P NOAA       .0003 -.0022 -.0025  .0005 -.0008 -.0032   .2  -.3 -1.0

21701 KASHIMA

Positions
M002 1 7335 L AUS       -.0103 -.0187  .0122  .0210  .0122  .0040   .5   .3   .1 98:150
M002 1 7335 L CGS       -.0194 -.0043 -.0161  .0156 -.0203  .0005   .4  -.5   .0 99:207
M002 1 7335 L CRL       -.0082 -.0232 -.0011  .0231  .0040 -.0074   .9   .1  -.2 99:126
M002 1 7335 L4 CSR      -.0113 -.0318  .0202  .0317  .0230  .0026  1.1   .8   .1 99:291
M002 1 7335 L DEOS      -.0446 -.1364  .0117  .1337  .0400 -.0352   .2   .0   .0 95:135
M002 1 7335 L JCET      -.0022  .0019  .0066 -.0001  .0037  .0062   .0   .4   .6 99:243
M002 1 7335 C GRIM       .0310 -.0042  .0180 -.0164  .0302 -.0110  -.4   .7  -.3 99:161
M002 1 7335 C1 CSR      -.0030 -.0067  .0053  .0071  .0054  .0016   .1   .1   .0 99:326
S001 1 1856 R GIUB       .0045 -.0007 -.0004 -.0023  .0020 -.0034  -.8   .6 -1.0 95:185
S001 1 1856 R GSFC       .0017 -.0012  .0012 -.0002  .0022 -.0010  -.1   .7  -.3 95:164
S001 1 1856 R SHA        .0042 -.0026 -.0024 -.0007  .0009 -.0054  -.2   .2 -1.5 96:257
S004 1 1857 R GIUB       .0087 -.0009 -.0011 -.0048  .0034 -.0065 -1.2   .7 -1.4 93:323
S004 1 1857 R GSFC      -.0023  .0018 -.0006  .0001 -.0022  .0020   .0  -.5   .4 95: 54
S004 1 1857 R SHA       -.0069  .0091  .0103 -.0026  .0018  .0150  -.5   .3  2.7 95:195
S006 1 7334 R GSFC      -.0012  .0024 -.0041 -.0011 -.0048 -.0004  -.2  -.9  -.1  0:128

Velocities
M002 1 7335 L AUS        .0054 -.0109 -.0020  .0050  .0049 -.0101   .2   .2  -.4
M002 1 7335 L CGS       -.0369  .0135  .0742  .0129  .0383  .0736   .1   .2   .5
M002 1 7335 L CRL        .0027 -.0065  .0113  .0033  .0128  .0017   .1   .5   .1
M002 1 7335 L4 CSR      -.0246  .0110  .0101  .0070 -.0071  .0270   .3  -.2   .9
M002 1 7335 L DEOS       .0022  .0222  .0022 -.0186 -.0055  .0114  -.1   .0   .1
M002 1 7335 L JCET       .0279 -.0097 -.0238 -.0102 -.0030 -.0365  -.4  -.1 -1.3
M002 1 7335 C GRIM       .0632 -.0677 -.1411  .0123 -.0604 -.1571   .0  -.2  -.5
M002 1 7335 C1 CSR       .0043 -.0058 -.0046  .0018  .0004 -.0084   .0   .0   .0
S001 1 1856 R GIUB       .0013 -.0005 -.0007 -.0004  .0002 -.0014  -.4   .2 -1.3
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S001 1 1856 R GSFC       .0008 -.0004 -.0005 -.0002  .0000 -.0010  -.6   .1 -2.4
S001 1 1856 R SHA        .0011 -.0002 -.0009 -.0005 -.0001 -.0013  -.4  -.1 -1.0
S004 1 1857 R GIUB      -.0014  .0030  .0013 -.0014 -.0007  .0032  -.8  -.3  1.6
S004 1 1857 R GSFC      -.0011  .0007 -.0016  .0002 -.0021  .0001   .3 -3.4   .2
S004 1 1857 R SHA       -.0015  .0024  .0011 -.0009 -.0007  .0028  -.6  -.4  1.7
S006 1 7334 R GSFC       .0079  .0036  .0005 -.0078  .0027 -.0028  -.4   .1  -.1

21702 MIZUSAWA

Positions
S009 1 7314 R GSFC      -.0020  .0007  .0041  .0007  .0019  .0041   .1   .1   .3 91:289
S009 1 7314 R SHA       -.0037 -.0023  .0011  .0041 -.0001  .0018   .1   .0   .0 91:307
S010 1 7324 R GIUB      -.0018  .0028  .0063 -.0011  .0029  .0064  -.1   .1   .3 93:331
S010 1 7324 R GSFC       .0028 -.0003  .0000 -.0016  .0015 -.0018  -.1   .1  -.1 95: 15
S010 1 7324 R SHA        .0000  .0000  .0040  .0000  .0031  .0025   .0   .2   .2 93:338

Velocities
S009 1 7314 R GSFC      -.1373  .1753  .1378 -.0506 -.0299  .2552  -.3  -.2  1.3
S009 1 7314 R SHA       -.0049  .0192 -.0178 -.0119 -.0238  .0010  -.1  -.1   .0
S010 1 7324 R GIUB       .0267 -.0243 -.0147  .0022  .0114 -.0372   .0   .2  -.7
S010 1 7324 R GSFC      -.0010  .0011  .0008 -.0002 -.0003  .0017   .0  -.1   .3
S010 1 7324 R SHA        .0308 -.0291 -.0192  .0034  .0118 -.0449   .1   .3 -1.2

21704 KOGANEI

Positions
M001 1 7328 L AUS       -.0194  .0086 -.0064  .0061 -.0171  .0128   .2  -.7   .5 98:301
M001 1 7328 L CGS        .0092 -.0389 -.0016  .0236  .0175 -.0271   .8   .6  -.9 99:168
M001 1 7328 L CRL       -.0046 -.0204  .0080  .0185  .0121 -.0033   .8   .4  -.1 98:209
M001 1 7328 L4 CSR      -.0111 -.0327  .0182  .0321  .0223  .0002  1.2   .8   .0 99:291
M001 1 7328 L DEOS      -.0068 -.0402  .0191  .0350  .0277 -.0059   .1   .1   .0 95: 88
M001 1 7328 L JCET      -.0044  .0062  .0043 -.0019 -.0008  .0085  -.3  -.1  1.4 99:160
M001 1 7328 C GRIM       .0335  .0011  .0073 -.0226  .0204 -.0159  -.4   .3  -.2 99:  1
M001 1 7328 C1 CSR       .0006 -.0083  .0020  .0059  .0050 -.0036   .1   .1  -.1 99:281
S002 1 7308 L AUS        .0050 -.0048 -.0018  .0004  .0026 -.0066   .0   .1  -.2 97:  1
S002 1 7308 L CGS        .0072 -.0375 -.0165  .0238  .0040 -.0339  1.2   .2 -1.7 96:118
S002 1 7308 L CRL        .0051 -.0318  .0014  .0208  .0154 -.0192  1.0   .6  -.8 96:334
S002 1 7308 L4 CSR       .0012 -.0131  .0222  .0092  .0236  .0053   .1   .2   .1 95:140
S002 1 7308 L DEOS      -.0333 -.0089  .0083  .0284 -.0047  .0207   .1   .0   .1 93:  1
S002 1 7308 L DGFI      -.0391 -.0058  .0425  .0298  .0194  .0459  1.1   .8  1.7 96:366
S002 1 7308 L JCET       .0086  .0043 -.0082 -.0089 -.0045 -.0078  -.7  -.4  -.6 96:261
S002 1 7308 C GRIM       .0304  .0015 -.0212 -.0209 -.0043 -.0304  -.5  -.1  -.8 96:321
S002 1 7308 C1 CSR       .0254 -.0080 -.0090 -.0104  .0070 -.0252  -.3   .2  -.6 96:297
S004 1 7327 R GSFC       .0021  .0001 -.0038 -.0014 -.0022 -.0034  -.2  -.4  -.5  0:114

Velocities
M001 1 7328 L AUS        .0007  .0042 -.0265 -.0037 -.0228 -.0137  -.2 -1.1  -.6
M001 1 7328 L CGS        .0024  .0048  .0000 -.0052 -.0008  .0010  -.1   .0   .0
M001 1 7328 L CRL        .0091 -.0078 -.0096  .0000 -.0008 -.0153   .0  -.1 -1.4
M001 1 7328 L4 CSR      -.0005 -.0190 -.0107  .0147 -.0017 -.0159   .9  -.1  -.9
M001 1 7328 L DEOS      -.0061 -.0015  .0014  .0051 -.0010  .0038   .1   .0   .1
M001 1 7328 L JCET       .0127 -.0064 -.0140 -.0034 -.0033 -.0194  -.3  -.3 -1.5
M001 1 7328 C GRIM       .0799  .1004 -.0105 -.1282 -.0111 -.0025  -.1   .0   .0
M001 1 7328 C1 CSR      -.0027 -.0006 -.0045  .0022 -.0046 -.0013   .0   .0   .0
S002 1 7308 L AUS        .0110 -.0018 -.0146 -.0058 -.0062 -.0163  -.1  -.1  -.3
S002 1 7308 L CGS        .0039 -.0044 -.0055  .0008 -.0010 -.0079   .1  -.1  -.8
S002 1 7308 L CRL       -.0232  .0145  .0171  .0040 -.0019  .0319   .2  -.1  1.2
S002 1 7308 L4 CSR       .0014 -.0025 -.0037  .0010 -.0014 -.0043   .0   .0  -.1
S002 1 7308 L DEOS       .0553  .0240  .0351 -.0542  .0439 -.0010   .0   .0   .0
S002 1 7308 L DGFI       .0159 -.0117  .0062 -.0014  .0165 -.0124   .0   .4  -.3
S002 1 7308 L JCET      -.0135  .0118 -.0027 -.0002 -.0127  .0130   .0  -.3   .3
S002 1 7308 C GRIM      -.0120  .0010  .0120  .0070  .0041  .0149   .1   .1   .2
S002 1 7308 C1 CSR       .0055  .0097 -.0099 -.0109 -.0093 -.0041  -.2  -.1  -.1
S004 1 7327 R GSFC       .0063 -.0065 -.0049  .0008  .0013 -.0102   .0   .1  -.4

21718 MIYAZAKI

Positions
S001 1 7312 R GSFC      -.0059  .0032  .0070  .0023  .0026  .0090   .0   .1   .2 87:289
S001 1 7312 R SHA        .0096 -.0198 -.0188  .0060 -.0047 -.0280   .0   .0  -.1 87:288
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Velocities
S001 1 7312 R GSFC      -.0012  .0021  .0011 -.0005 -.0003  .0026   .0   .0   .1
S001 1 7312 R SHA        .0098 -.0091 -.0091 -.0013 -.0006 -.0161   .0   .0  -.1

21725 NOBEYAMA

Positions
S001 1 7244 R GSFC      -.0018  .0024  .0087 -.0006  .0053  .0075   .0   .2   .3 90:245
S001 1 7244 R SHA        .0020 -.0038  .0009  .0015  .0031 -.0027   .1   .1  -.1 90:241

Velocities
S001 1 7244 R GSFC       .0063 -.0072 -.0063  .0012  .0005 -.0114   .0   .0  -.2
S001 1 7244 R SHA        .0005  .0038  .0021 -.0031  .0004  .0030  -.1   .0   .1

21726 SIMOSATO

Positions
S001 1 7838 L AUS        .0181  .0095  .0202 -.0194  .0204  .0058 -1.1  1.2   .3 98: 60
S001 1 7838 L CRL        .0000 -.0105  .0058  .0075  .0088 -.0029   .6   .7  -.2 92:238
S001 1 7838 L4 CSR      -.0057  .0088  .0044 -.0024 -.0020  .0109  -.2  -.1   .7 89:187
S001 1 7838 C GRIM       .0000  .0023 -.0062 -.0016 -.0061 -.0021  -.3 -1.0  -.3 92:130
S001 1 7838 C1 CSR       .0053 -.0055 -.0089  .0003 -.0032 -.0113   .0  -.3 -1.1 95:292

Velocities
S001 1 7838 L AUS        .0114  .0071  .0020 -.0130  .0035 -.0016  -.9   .2  -.1
S001 1 7838 L CRL       -.0005 -.0032 -.0024  .0027 -.0010 -.0028   .7  -.2  -.7
S001 1 7838 L4 CSR      -.0013 -.0028  .0020  .0029  .0023  .0003  1.1   .9   .1
S001 1 7838 C GRIM       .0028  .0044  .0014 -.0051  .0006  .0016 -1.7   .3   .6
S001 1 7838 C1 CSR       .0019 -.0047 -.0027  .0021  .0003 -.0053   .5   .1 -1.2

21729 USUDA

Positions
S001 1 7246 R GSFC       .0009 -.0020  .0073  .0009  .0071  .0026   .0   .1   .0 90:211
S001 1 7246 R SHA       -.0006 -.0033  .0011  .0028  .0019 -.0008   .0   .0   .0 90:211
S007 1 USUD P CODE       .0002 -.0006  .0065  .0003  .0056  .0034   .1  1.4   .9 97:297
S007 1 USUD P GFZ        .0023 -.0003 -.0011 -.0013  .0002 -.0022  -.5   .1  -.8 97:349
S007 1 USUD P IGS       -.0015  .0018  .0012 -.0003 -.0004  .0025  -.3  -.3  1.9 98: 43
S007 1 USUD P1 JPL       .0030 -.0016 -.0026 -.0008 -.0001 -.0042  -.4  -.1 -2.2 96:364
S007 1 USUD P NCL       -.0004 -.0003  .0004  .0005  .0002  .0003   .3   .1   .2 98: 66
S007 1 USUD P NOAA       .0000 -.0028 -.0052  .0021 -.0031 -.0045   .6 -1.0 -1.4 97:311

Velocities
S001 1 7246 R GSFC      -.1109 -.0746 -.0635  .1294 -.0710 -.0105   .1   .0   .0
S001 1 7246 R SHA        .0128  .0117  .0055 -.0173  .0055  .0018  -.1   .0   .0
S007 1 USUD P CODE       .0012  .0001 -.0031 -.0009 -.0020 -.0025  -.4  -.7 -1.0
S007 1 USUD P GFZ        .0004  .0006 -.0001 -.0007 -.0002  .0000  -.5  -.1   .0
S007 1 USUD P IGS       -.0002 -.0010 -.0008  .0009 -.0003 -.0009   .8  -.3  -.8
S007 1 USUD P1 JPL      -.0008 -.0012  .0012  .0014  .0011  .0005  1.4  1.1   .5
S007 1 USUD P NCL        .0000 -.0012 -.0007  .0009 -.0001 -.0011   .6  -.1  -.6
S007 1 USUD P NOAA      -.0006 -.0009 -.0012  .0011 -.0009 -.0008   .5  -.4  -.4

21730 TSUKUBA

Positions
S001 1 7311 TIE21730     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7311 R GSFC      -.0065 -.0119  .0023  .0133  .0034 -.0008   .8   .2  -.1 89:147
S001 1 7311 R SHA       -.0113 -.0089  .0023  .0141  .0001  .0037   .8   .0   .2 89:250
S005 1 TSKB TIE21730    -.0065 -.0059 -.0016  .0087 -.0020  .0000  2.8  -.6   .0 97:  1
S005 1 TSKB P CODE      -.0007  .0000  .0074  .0004  .0057  .0048   .1  1.4  1.3 97:273
S005 1 TSKB P GFZ        .0039 -.0011 -.0027 -.0017  .0000 -.0045  -.6   .0 -1.5 98: 27
S005 1 TSKB P IGS       -.0017  .0019  .0010 -.0004 -.0007  .0026  -.3  -.5  2.0 98:121
S005 1 TSKB P1 JPL       .0021 -.0020 -.0021  .0002  .0000 -.0036   .1   .0 -1.8 97:149
S005 1 TSKB P NCL       -.0005 -.0007  .0004  .0009  .0003  .0002   .5   .1   .1 98: 90
S005 1 TSKB P NOAA       .0000 -.0025 -.0051  .0019 -.0032 -.0043   .6 -1.0 -1.3 97:325
S007 1 7345 R GIUB       .0033 -.0001  .0003 -.0021  .0018 -.0019  -.3   .2  -.2 98:309
S007 1 7345 R SHA        .0019 -.0015 -.0001 -.0001  .0013 -.0020   .0   .2  -.4 98:303

Velocities
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S001 1 7311 R GSFC       .0001  .0028  .0002 -.0022 -.0008  .0015  -.3  -.1   .2
S001 1 7311 R SHA        .0010  .0013  .0020 -.0016  .0016  .0013  -.2   .2   .2
S005 1 TSKB P CODE      -.0009  .0015 -.0009 -.0006 -.0017  .0008  -.3  -.6   .3
S005 1 TSKB P GFZ       -.0001  .0001 -.0001 -.0001 -.0001  .0001   .0  -.1   .1
S005 1 TSKB P IGS       -.0001 -.0009 -.0015  .0008 -.0009 -.0013   .8  -.9 -1.3
S005 1 TSKB P1 JPL      -.0003 -.0009  .0008  .0009  .0009  .0002   .6   .7   .1
S005 1 TSKB P NCL        .0004 -.0018 -.0013  .0011 -.0001 -.0019   .7  -.1 -1.1
S005 1 TSKB P NOAA      -.0009 -.0013 -.0008  .0015 -.0005 -.0006   .7  -.2  -.2
S007 1 7345 R GIUB       .0299 -.0394 -.0319  .0110  .0027 -.0577   .2   .0  -.9
S007 1 7345 R SHA       -.0351  .0055  .0296  .0183  .0060  .0421   .2   .1   .5

21731 SHINTOTSUKAWA

Positions
S001 1 7315 R GSFC      -.0018  .0005  .0043  .0007  .0019  .0042   .0   .1   .2 90:209
S001 1 7315 R SHA       -.0085 -.0050  .0037  .0092  .0002  .0051   .0   .0   .0 90:209
S003 1 7346 R GSFC       .0036 -.0008  .0002 -.0016  .0024 -.0023  -.1   .1  -.1 99:203

Velocities
S001 1 7315 R GSFC       .2960 -.6463  .0672  .3253  .4839 -.4120   .2   .3  -.2
S001 1 7315 R SHA        .0282  .0072  .0511 -.0231  .0493  .0224  -.1   .2   .1
S003 1 7346 R GSFC       .0072  .0008 -.0085 -.0051 -.0026 -.0096   .0   .0  -.1

21732 CHICHIJIMA

Positions
S001 1 7316 TIE21732     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7316 R GSFC      -.0034 -.0003  .0032  .0023  .0018  .0037   .1   .0   .1 89: 38
S001 1 7316 R SHA       -.0015 -.0122 -.0017  .0106  .0014 -.0064   .0   .0   .0 88:335
S002 1 7844 TIE21732     .5316  .5046  .1028 -.7245  .1421 -.0520 -1.4   .3  -.1 97:  1
S002 1 7844 C GRIM      -.0268 -.0217 -.0041  .0336 -.0072  .0052   .2   .0   .0 88: 48
S004 1 7347 R GSFC       .0036 -.0009  .0000 -.0015  .0015 -.0030  -.1   .1  -.2 99:158

Velocities
S001 1 7316 R GSFC       .0326 -.0091 -.0138 -.0128  .0020 -.0342  -.3   .0  -.7
S001 1 7316 R SHA        .0251  .0078 -.0051 -.0216  .0023 -.0157  -.1   .0  -.1
S002 1 7844 C GRIM       .1532  .2316  .0466 -.2769  .0320  .0397  -.2   .0   .0
S004 1 7347 R GSFC      -.0405  .0154  .0117  .0126 -.0085  .0422   .3  -.2   .9

21733 MINAMI TORI SIMA

Positions
S001 1 7300 C GRIM      -.0075 -.0141 -.0106  .0159 -.0099 -.0038   .0   .0   .0 89: 50
S002 1 7310 R GIUB       .0009  .0053  .0058 -.0052  .0046  .0038  -.3   .3   .2 92:334
S002 1 7310 R GSFC       .0049 -.0030 -.0007  .0006  .0017 -.0055   .1   .2  -.4 92:161
S002 1 7310 R SHA       -.0018  .0001  .0053  .0007  .0041  .0037   .1   .3   .2 92:327

Velocities
S001 1 7300 C GRIM       .0629  .1184 -.0140 -.1340 -.0109 -.0100  -.1   .0   .0
S002 1 7310 R GIUB       .0028  .0005 -.0010 -.0017  .0000 -.0025  -.1   .0  -.1
S002 1 7310 R GSFC       .0008 -.0008 -.0018  .0004 -.0012 -.0017   .0  -.2  -.2
S002 1 7310 R SHA        .0002  .0014 -.0014 -.0013 -.0014 -.0002  -.1  -.1   .0

21737 SAGARA

Positions
S001 1 7325 R GSFC       .0000 -.0002  .0033  .0002  .0028  .0018   .0   .1   .0 93: 13
S001 1 7325 R SHA        .0022  .0002  .0061 -.0016  .0058  .0022   .0   .1   .0 93: 11

Velocities
S001 1 7325 R GSFC      -.1077  .0545  .0495  .0312 -.0256  .1241   .1  -.1   .4
S001 1 7325 R SHA        .0367 -.0069  .0019 -.0193  .0197 -.0252  -.1   .1  -.1

21738 DAITO

Positions
S001 1 7326 R SHA       -.0003 -.0030  .0031  .0022  .0037 -.0005   .0   .0   .0 91:144

Velocities
S001 1 7326 R SHA        .0004  .0009 -.0003 -.0009 -.0004  .0003   .0   .0   .0
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21739 MIURA

Positions
M001 1 7337 L AUS       -.0195  .0022 -.0050  .0110 -.0135  .0105   .2  -.3   .3 97:358
M001 1 7337 L CGS        .0273 -.0464 -.0375  .0177 -.0013 -.0632   .3   .0 -1.0 99:126
M001 1 7337 L CRL        .0062 -.0263 -.0071  .0161  .0067 -.0219   .6   .2  -.7 99: 50
M001 1 7337 L4 CSR       .0032 -.0422  .0027  .0301  .0193 -.0228   .8   .5  -.6 99:278
M001 1 7337 L DEOS      -.0184 -.0794  .0233  .0724  .0405 -.0171   .2   .1   .0 95:222
M001 1 7337 L JCET       .0036  .0041  .0004 -.0055  .0004  .0001  -.6   .0   .0 99:113
M001 1 7337 C GRIM       .0183  .0243  .0020 -.0304  .0006  .0027  -.5   .0   .0 99:  9
M001 1 7337 C1 CSR       .0152 -.0255 -.0054  .0096  .0118 -.0261   .1   .1  -.3 99:338
S001 1 7336 R GSFC       .0022  .0004 -.0032 -.0017 -.0018 -.0030  -.3  -.3  -.5  0:119

Velocities
M001 1 7337 L AUS        .0175 -.0106 -.0055 -.0033  .0071 -.0196  -.1   .3  -.7
M001 1 7337 L CGS       -.0267  .0133 -.0042  .0072 -.0202  .0213   .1  -.2   .2
M001 1 7337 L CRL        .0099 -.0212 -.0115  .0098  .0029 -.0240   .4   .1 -1.0
M001 1 7337 L4 CSR       .0094 -.0283 -.0009  .0155  .0140 -.0213   .6   .5  -.8
M001 1 7337 L DEOS      -.0020  .0081 -.0021 -.0049 -.0056  .0043  -.1  -.1   .0
M001 1 7337 L JCET       .0211 -.0232 -.0171  .0040  .0039 -.0353   .2   .2 -1.8
M001 1 7337 C GRIM       .0411 -.0381 -.0004  .0024  .0320 -.0460   .0   .1  -.1
M001 1 7337 C1 CSR       .0095 -.0201 -.0022  .0092  .0098 -.0178   .0   .0  -.1
S001 1 7336 R GSFC       .0219 -.0043 -.0355 -.0109 -.0178 -.0364  -.5  -.8 -1.5

21740 TATEYAMA

Positions
M001 1 7339 L AUS       -.0067  .0016  .0022  .0031 -.0017  .0063   .1  -.1   .2 98:270
M001 1 7339 L CGS       -.0022  .0101  .0170 -.0063  .0092  .0165  -.2   .3   .4 99: 68
M001 1 7339 L CRL       -.0014 -.0119  .0089  .0100  .0111 -.0003   .4   .3   .0 98:354
M001 1 7339 L4 CSR      -.0105 -.0323  .0153  .0314  .0198 -.0017  1.4   .9  -.1 99:288
M001 1 7339 L DEOS       .0030 -.0201  .0039  .0135  .0120 -.0102   .0   .0   .0 94:219
M001 1 7339 L JCET       .0065  .0044  .0011 -.0076  .0022 -.0011 -1.2   .3  -.2 99:151
M001 1 7339 C GRIM       .0267  .0283  .0065 -.0388  .0065  .0019 -1.1   .2   .1 99: 12
M001 1 7339 C1 CSR       .0029 -.0144 -.0004  .0091  .0063 -.0097   .2   .1  -.2 99:306
S001 1 7338 R GSFC       .0012  .0008 -.0027 -.0014 -.0020 -.0019  -.2  -.4  -.3  0:116

Velocities
M001 1 7339 L AUS        .0116 -.0135 -.0098  .0029  .0020 -.0200   .1   .1  -.9
M001 1 7339 L CGS       -.0026  .0035  .0100 -.0010  .0058  .0092   .0   .1   .1
M001 1 7339 L CRL       -.0094 -.0156 -.0060  .0180 -.0033 -.0057  1.3  -.2  -.4
M001 1 7339 L4 CSR      -.0170 -.0254 -.0042  .0304 -.0014 -.0052  1.9  -.1  -.3
M001 1 7339 L DEOS      -.0060 -.0053  .0021  .0079  .0010  .0022   .1   .0   .0
M001 1 7339 L JCET       .0079 -.0268 -.0091  .0154  .0059 -.0244  1.2   .5 -1.9
M001 1 7339 C GRIM       .0440 -.0243  .0188 -.0098  .0437 -.0296  -.1   .2  -.2
M001 1 7339 C1 CSR      -.0142 -.0201  .0000  .0245  .0012 -.0017   .2   .0   .0
S001 1 7338 R GSFC       .0013  .0587 -.0275 -.0457 -.0436  .0145 -1.9 -1.9   .6

21742 AIRA

Positions
S002 1 7348 R GSFC       .0034 -.0012 -.0002 -.0018  .0015 -.0027  -.1   .1  -.2 99:180

Velocities
S002 1 7348 R GSFC      -.0162  .0098 -.0002  .0059 -.0097  .0151   .1  -.2   .3

22003 QUEZON

Positions
M001 1 PIMO P CODE      -.0057  .0127  .0140 -.0017  .0101  .0169  -.1   .7   .6  0: 11
M001 1 PIMO P GFZ        .0048 -.0016 -.0023 -.0033 -.0012 -.0043  -.4  -.2  -.5 99:248
M001 1 PIMO P NOAA       .0002 -.0030 -.0056  .0013 -.0048 -.0040   .1  -.8  -.4 99:229

Velocities
M001 1 PIMO P CODE       .0660 -.0641 -.0176 -.0235  .0055 -.0905  -.1   .0  -.2
M001 1 PIMO P GFZ       -.0001  .0002 -.0006  .0000 -.0006  .0000   .0  -.6   .0
M001 1 PIMO P NOAA       .0073  .0063  .0300 -.0095  .0287  .0092  -.2  1.4   .2

22006 MANILLE
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Positions
S001 1 MANA D GRGS       .0276  .0031  .0435 -.0252  .0450 -.0003  -.8  3.0   .0 95:339
S001 1 MANA D9 IGN      -.0022 -.0008 -.0187  .0023 -.0182 -.0043   .1 -1.1  -.2 96:129
S001 1 MANA C GRIM       .0190 -.0120 -.0220 -.0101 -.0163 -.0249  -.3 -1.0  -.9 96:180
S001 1 MANA C1 CSR      -.0054  .0035 -.0028  .0029 -.0041  .0049   .3  -.6   .5 96:138

Velocities
S001 1 MANA D GRGS       .0022 -.0043  .0056  .0003  .0066 -.0032   .0   .7  -.2
S001 1 MANA D9 IGN      -.0022 -.0044  .0025  .0042  .0030 -.0019   .3   .4  -.2
S001 1 MANA C GRIM       .0026  .0035  .0035 -.0040  .0029  .0025  -.2   .3   .1
S001 1 MANA C1 CSR      -.0002 -.0001  .0020  .0002  .0019  .0005   .0   .6   .1

22306 BANGALORE

Positions
M001 1 IISC P CODE       .0014 -.0080  .0093 -.0031  .0107 -.0052   .0   .2   .0 95:185
M002 1 IISC P CODE       .0040  .0003  .0082 -.0038  .0077  .0030  -.8  1.6   .4 97:263
M002 1 IISC P GFZ        .0029 -.0026 -.0015 -.0034 -.0010 -.0022 -1.0  -.3  -.4 98:212
M002 1 IISC P1 JPL      -.0013  .0001 -.0002  .0013 -.0002 -.0002   .3  -.1   .0 97:299
M002 1 IISC P NCL       -.0005 -.0015  .0000  .0001  .0003 -.0015   .1   .1  -.4 97:315
M002 1 IISC P NOAA       .0031  .0047 -.0002 -.0020 -.0014  .0051  -.4  -.5   .9 97:246

Velocities
M001 1 IISC P CODE       .0026  .0087  .0005 -.0007 -.0016  .0089  -.1  -.4  1.1
M002 1 IISC P CODE       .0026  .0087  .0005 -.0007 -.0016  .0089  -.1  -.4  1.1
M002 1 IISC P GFZ       -.0009  .0002 -.0003  .0010 -.0002 -.0001   .4  -.2  -.1
M002 1 IISC P1 JPL       .0003  .0015  .0006  .0001  .0003  .0016   .0   .2   .4
M002 1 IISC P NCL        .0019  .0069  .0013 -.0004 -.0004  .0072  -.2  -.2  2.1
M002 1 IISC P NOAA       .0040  .0026  .0002 -.0034 -.0006  .0034  -.9  -.2   .6

22601 SINGAPOUR

Positions
M001 1 NTUS P CODE      -.0014  .0191  .0064 -.0032  .0059  .0191  -.5  1.0  2.1 99: 55
M001 1 NTUS P GFZ        .0047 -.0100 -.0012 -.0022 -.0010 -.0109  -.6  -.3 -1.6 99:144
M001 1 NTUS P IGS       -.0003 -.0003  .0002  .0003  .0002 -.0002   .2   .2   .0 99:116
M001 1 NTUS P1 JPL       .0084 -.0016 -.0006 -.0078 -.0005 -.0036 -1.3  -.3  -.4 98:210
M001 1 NTUS P NOAA      -.0013  .0052 -.0033  .0000 -.0035  .0053   .0 -1.1   .5 98:351

Velocities
M001 1 NTUS P CODE      -.0008  .0068 -.0002 -.0008 -.0003  .0068  -.2  -.1   .7
M001 1 NTUS P GFZ        .0029  .0091  .0013 -.0049  .0011  .0082 -1.3   .6  1.0
M001 1 NTUS P IGS        .0016 -.0006  .0004 -.0014  .0004 -.0010  -.6   .4  -.2
M001 1 NTUS P1 JPL       .0001 -.0007 -.0014  .0001 -.0014 -.0007   .0  -.5   .0
M001 1 NTUS P NOAA      -.0009  .0011 -.0018  .0006 -.0018  .0012   .1  -.7   .1

23101 CIBINONG

Positions
M002 1 BAKO TIE23101     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 BAKO P CODE      -.0012  .0248  .0061 -.0060  .0088  .0233  -.6  1.1  1.4 99:344
M002 1 BAKO P NOAA      -.0073  .0029 -.0047  .0062 -.0041  .0054  1.1 -1.2   .8 99: 17
S001 1 CIBB TIE23101    -.0004  .0002 -.0023  .0003 -.0023  .0005   .1 -1.0   .2 97:  1
S001 1 CIBB D GRGS      -.0053 -.0022  .0449  .0058  .0446 -.0057   .2  3.2  -.2 96: 99
S001 1 CIBB D9 IGN      -.0188  .0156  .0333  .0135  .0353  .0165   .5  2.3   .7 96:317
S001 1 CIBB C GRIM       .0336 -.0255 -.0002 -.0248 -.0040 -.0339  -.7  -.3 -1.5 97:  3
S001 1 CIBB C1 CSR       .0153  .0027  .0054 -.0155  .0051 -.0024 -1.3   .8  -.3 97:  0

Velocities
M002 1 BAKO P CODE       .0110 -.0057  .0051 -.0089  .0040 -.0091  -.2   .1  -.1
M002 1 BAKO P NOAA       .0042 -.0046  .0020 -.0027  .0014 -.0058  -.4   .4  -.5
S001 1 CIBB D GRGS       .0027 -.0190 -.0007  .0029 -.0028 -.0188   .1  -.3 -1.2
S001 1 CIBB D9 IGN      -.0066 -.0061  .0030  .0081  .0026 -.0043   .6   .3  -.4
S001 1 CIBB C GRIM       .0049 -.0123 -.0038 -.0011 -.0053 -.0127  -.1  -.7 -1.0
S001 1 CIBB C1 CSR      -.0067 -.0026  .0022  .0072  .0021 -.0008  1.2   .7  -.2

23501 COLOMBO

Positions
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S001 1 COLA D9 IGN      -.0429  .0276  .0259  .0471  .0234  .0226  1.8  1.6  1.0 96:165
S001 1 COLA C GRIM      -.0115 -.0473  .0017  .0030  .0076 -.0481   .1   .6 -2.4 96:248
S001 1 COLA C1 CSR       .0149  .0064 -.0063 -.0136 -.0074  .0081 -1.1 -1.2   .9 96:142

Velocities
S001 1 COLA D9 IGN       .0011 -.0010  .0013 -.0013  .0014 -.0007  -.1   .2  -.1
S001 1 COLA C GRIM       .0048 -.0030 -.0108 -.0052 -.0104 -.0034  -.2  -.9  -.2
S001 1 COLA C1 CSR      -.0013  .0014  .0008  .0015  .0007  .0012   .2   .2   .3

23601 TAIPEI

Positions
M001 1 TAIW P CODE       .0048 -.0078  .0048  .0000  .0082 -.0063   .0  1.5 -1.2 96:315
M001 1 TAIW P GFZ        .0028  .0030  .0006 -.0040  .0001  .0012  -.9   .0   .3 96: 59
M001 1 TAIW P IGS       -.0013  .0038  .0018 -.0009  .0000  .0043  -.4   .0  1.6 96:348
M001 1 TAIW P1 JPL      -.0019  .0018  .0001  .0006 -.0010  .0024   .2  -.3   .6 96:267
M001 1 TAIW P NOAA       .0026 -.0026 -.0036 -.0008 -.0017 -.0048  -.2  -.4  -.9 96:306

Velocities
M001 1 TAIW P CODE       .0004  .0011 -.0027 -.0009 -.0027 -.0005  -.2  -.6  -.1
M001 1 TAIW P GFZ       -.0041  .0031  .0016  .0019 -.0005  .0050   .6  -.2  1.6
M001 1 TAIW P IGS        .0022 -.0049 -.0017  .0006  .0007 -.0055   .2   .2 -1.2
M001 1 TAIW P1 JPL       .0061 -.0071 -.0015 -.0015  .0025 -.0090  -.3   .6 -1.6
M001 1 TAIW P NOAA       .0002 -.0015 -.0021  .0006 -.0013 -.0022   .2  -.4  -.5

23902 TAEJON

Positions
M001 1 TAEJ P CODE      -.0029  .0040  .0116 -.0001  .0064  .0109   .0  1.5  2.8 97:284
M001 1 TAEJ P IGS        .0007 -.0005 -.0012 -.0002 -.0005 -.0014  -.1  -.3  -.8 97:250
M001 1 TAEJ P NCL        .0000 -.0060 -.0074  .0036 -.0031 -.0083   .6  -.5 -1.2 96:169
M002 1 DAEJ P CODE      -.0026  .0071  .0099 -.0022  .0037  .0117  -.3   .5  1.6 99: 35
M002 1 DAEJ P IGS       -.0023 -.0009 -.0025  .0023 -.0024 -.0009   .6  -.6  -.2  0: 59
M002 1 DAEJ P NOAA       .0011 -.0044 -.0063  .0018 -.0026 -.0071   .3  -.5 -1.3 99:226

Velocities
M001 1 TAEJ P CODE       .0044 -.0063 -.0091  .0003 -.0028 -.0116   .1  -.8 -3.5
M001 1 TAEJ P IGS       -.0027  .0036  .0041 -.0001  .0006  .0060   .0   .3  2.9
M001 1 TAEJ P NCL        .0005 -.0029 -.0044  .0014 -.0020 -.0047   .4  -.5 -1.2
M002 1 DAEJ P CODE       .0044 -.0063 -.0091  .0003 -.0028 -.0116   .1  -.8 -3.5
M002 1 DAEJ P IGS        .0018 -.0102 -.0087  .0048 -.0015 -.0126   .6  -.2 -1.6
M002 1 DAEJ P NOAA       .0040 -.0074 -.0104  .0013 -.0035 -.0129   .1  -.2  -.7

23903 SUWON-SHI

Positions
M001 1 SUWN P CODE       .0005 -.0003  .0041 -.0003  .0036  .0021  -.1   .6   .4 98:358
M001 1 SUWN P IGS       -.0029  .0018  .0001  .0013 -.0018  .0026   .4  -.5   .7 99:170
M001 1 SUWN P NOAA       .0015 -.0047 -.0069  .0017 -.0027 -.0079   .4  -.7 -2.0 98:289
S001 1 7353 R GSFC       .0001 -.0005  .0035  .0002  .0031  .0018   .0   .1   .1 95:302

Velocities
M001 1 SUWN P CODE       .0010  .0008 -.0018 -.0012 -.0015 -.0011  -.2  -.2  -.2
M001 1 SUWN P IGS       -.0003 -.0013 -.0017  .0010 -.0008 -.0017   .2  -.2  -.4
M001 1 SUWN P NOAA      -.0007 -.0004 -.0002  .0008 -.0002 -.0001   .2   .0   .0
S001 1 7353 R GSFC      -.8669 -.3216  .3720  .8856  .1351  .4367   .5   .1   .3

24901 BAHREIN (JUFFAR)

Positions
M002 1 BAHR P CODE       .0062  .0015  .0095 -.0038  .0063  .0087 -1.2  1.5  2.4 98: 79
M002 1 BAHR P GFZ        .0035  .0020  .0001 -.0014 -.0016  .0034  -.5  -.5  1.1 98:349
M002 1 BAHR P IGS        .0000 -.0008 -.0007 -.0005 -.0004 -.0009  -.3  -.3  -.7 98:257
M002 1 BAHR P1 JPL      -.0026 -.0026 -.0015  .0003  .0003 -.0040   .1   .2 -1.6 98:101
M002 1 BAHR P NCL       -.0001 -.0003  .0005 -.0001  .0006 -.0001   .0   .3   .0 98:182
M002 1 BAHR P NOAA      -.0014 -.0031 -.0027 -.0009 -.0010 -.0041  -.3  -.4 -1.4 98: 68

Velocities
M002 1 BAHR P CODE      -.0005 -.0006 -.0026  .0000 -.0020 -.0018   .0  -.7  -.6
M002 1 BAHR P GFZ        .0004 -.0016 -.0004 -.0013  .0000 -.0010  -.5   .0  -.4
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M002 1 BAHR P IGS       -.0002 -.0007 -.0007 -.0003 -.0003 -.0009  -.3  -.3  -.7
M002 1 BAHR P1 JPL       .0004  .0024  .0017  .0012  .0006  .0027   .4   .3  1.0
M002 1 BAHR P NCL       -.0018 -.0004 -.0003  .0011  .0004 -.0015   .5   .2  -.6
M002 1 BAHR P NOAA       .0013  .0020  .0007  .0003 -.0004  .0024   .1  -.2   .9

30101 HELWAN

Positions
S001 1 7831 L AUS       -.0180  .0041  .0063  .0129  .0121 -.0084   .3   .2  -.2 97: 35
S001 1 7831 L CGS       -.0054  .0067 -.0067  .0085 -.0053 -.0043   .6  -.3  -.3 92:328
S001 1 7831 L CRL       -.0160  .0033 -.0237  .0111 -.0146 -.0221   .6  -.7 -1.0 92:224
S001 1 7831 L4 CSR      -.0017  .0130 -.0092  .0120 -.0106  .0000   .2  -.2   .0 92:105
S001 1 7831 L DEOS      -.0013  .0116 -.0026  .0106 -.0047  .0030   .8  -.3   .2 93: 52
S001 1 7831 L DGFI       .0005  .0114  .0062  .0095  .0022  .0086   .6   .2   .6 93: 49
S001 1 7831 L JCET       .0051 -.0052 -.0019 -.0071 -.0025  .0005  -.6  -.2   .0 93:343
S001 1 7831 C GRIM      -.0014 -.0197  .0049 -.0161  .0099 -.0075 -1.0   .6  -.4 93:176
S001 1 7831 C1 CSR      -.0050 -.0090 -.0043 -.0051  .0007 -.0099  -.4   .1  -.7 96: 52

Velocities
S001 1 7831 L AUS        .0001  .0044 -.0018  .0037 -.0027  .0012   .1  -.1   .0
S001 1 7831 L CGS        .0015  .0114 -.0071  .0090 -.0098  .0027  1.5 -1.6   .4
S001 1 7831 L CRL        .0000 -.0027  .0098 -.0023  .0092  .0037  -.3   .9   .3
S001 1 7831 L4 CSR      -.0045 -.0056  .0016 -.0024  .0047 -.0051  -.4   .8  -.8
S001 1 7831 L DEOS      -.0012 -.0043  .0044 -.0031  .0054 -.0007  -.5   .8  -.1
S001 1 7831 L DGFI      -.0045 -.0044  .0054 -.0014  .0078 -.0027  -.2  1.2  -.4
S001 1 7831 L JCET      -.0041  .0019 -.0048  .0037 -.0029 -.0046   .3  -.2  -.3
S001 1 7831 C GRIM       .0011 -.0013 -.0074 -.0017 -.0066 -.0035  -.3 -1.1  -.5
S001 1 7831 C1 CSR       .0002 -.0014  .0029 -.0013  .0028  .0010  -.3   .6   .2

30302 HARTEBEESTHOEK

Positions
M002 1 HART TIE30302     .0015 -.0173  .0031 -.0161 -.0001 -.0074 -2.2   .0 -1.0 97:  1
M002 1 HART P CODE       .0219  .0082  .0000 -.0029  .0101  .0208  -.4  1.4  2.5 97: 96
M002 1 HART P GFZ       -.0094 -.0004 -.0041  .0040 -.0074 -.0059   .6 -1.4  -.8 96:186
M002 1 HART P NCL        .0058  .0007  .0003 -.0020  .0026  .0048  -.5   .6  1.0 96:364
M003 1 7501 L AUS       -.0056  .0681  .0233  .0629  .0326  .0139  1.3   .7   .3 95:326
M003 1 7501 L CGS        .0216 -.0269  .0051 -.0338  .0075  .0038 -1.3   .3   .1 97:  1
M003 1 7501 L4 CSR       .0031  .0270 -.0247  .0224 -.0156  .0245   .4  -.3   .3 93:191
M003 1 7501 C1 CSR      -.0121  .0131  .0007  .0172 -.0014 -.0045   .9  -.1  -.2 93:202
M004 1 HRAO TIE30302     .0000 -.0175  .0158 -.0155  .0106 -.0142 -1.9  1.3 -1.7 97:  1
M004 1 HRAO P CODE       .0040 -.0003  .0086 -.0022  .0092 -.0007  -.4  1.7  -.1 98:201
M004 1 HRAO P IGS       -.0006 -.0013  .0018 -.0009  .0011 -.0018  -.4   .6  -.7 99:112
M004 1 HRAO P1 JPL       .0033 -.0007 -.0042 -.0021 -.0026  .0042  -.7 -1.0  1.2 98:270
M004 1 HRAO P NOAA       .0048  .0047 -.0038  .0019 -.0006  .0074   .3  -.1  1.3 98:249
M007 1 HARK TIE30302     .0062 -.0119  .0113 -.0134  .0101 -.0049 -1.8  1.4  -.7 97:  1
M007 1 HARK P CODE      -.0040 -.0050  .0124 -.0026  .0086 -.0107  -.5  1.6 -1.8 98:171
M007 1 HARK P GFZ       -.0060 -.0037  .0041 -.0005  .0006 -.0081  -.1   .2 -1.9 98:288
M007 1 HARK P1 JPL      -.0065 -.0034  .0022  .0000 -.0013 -.0075   .0  -.4 -1.9 98:253
M007 1 HARK P NOAA      -.0035 -.0006  .0008  .0011 -.0008 -.0034   .1  -.1  -.3 99:141
S001 1 7232 TIE30302     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7232 R GIUB       .0021  .0007  .0000 -.0004  .0010  .0020  -.1   .3   .4 95:160
S001 1 7232 R GSFC      -.0021  .0006  .0005  .0015 -.0002 -.0017   .7  -.1  -.7 96: 69
S001 1 7232 R SHA        .0030  .0004  .0014 -.0010  .0025  .0019  -.4  1.1   .7 96:191
S005 1 HBLA TIE30302     .0055 -.0123  .0107 -.0134  .0092 -.0054 -1.7  1.2  -.7 97:  1
S005 1 HBLA D GRGS       .0052  .0253  .0022  .0199  .0092  .0138   .4   .3   .4 98:111
S005 1 HBLA D9 IGN       .0086  .0079  .0042  .0030  .0087  .0083   .1   .3   .3 98:344
S005 1 HBLA C GRIM      -.0536  .0013 -.0039  .0261 -.0239 -.0404   .3  -.4  -.5 93:  1
S005 1 HBLA C1 CSR       .0042  .0080 -.0042  .0051 -.0006  .0085   .4  -.1   .8 98:312
S202 1 HBKA TIE30302     .0060 -.0114  .0097 -.0129  .0088 -.0042 -1.7  1.2  -.6 97:  1
S202 1 HBKA D GRGS      -.0368  .0606  .0379  .0708  .0322 -.0205  2.8  2.1 -1.0 95:109
S202 1 HBKA D9 IGN      -.0044  .0002  .0018  .0022  .0000 -.0043   .1   .0  -.2 95: 62
S202 1 HBKA C GRIM      -.0095 -.0177  .0032 -.0112 -.0044 -.0164  -.4  -.3  -.8 95:244
S202 1 HBKA C1 CSR       .0060 -.0151 -.0027 -.0161 -.0031 -.0004 -1.6  -.5   .0 95: 84

Velocities
M002 1 HART P CODE       .0070  .0030 -.0019 -.0007  .0016  .0077  -.2   .4  1.7
M002 1 HART P GFZ        .0025 -.0021  .0036 -.0030  .0037 -.0005 -1.6  2.8  -.3
M002 1 HART P NCL        .0046 -.0011 -.0027 -.0032 -.0009  .0044  -.8  -.3  1.0
M003 1 7501 L AUS        .0011  .0251  .0167  .0217  .0206  .0041   .8   .8   .2
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M003 1 7501 L CGS        .0062  .0099  .0213  .0059  .0236 -.0002   .0   .0   .0
M003 1 7501 L4 CSR      -.0075 -.2898  .1941 -.2531  .1129 -.2119  -.5   .2  -.4
M003 1 7501 C1 CSR      -.1469 -.1088  .2128 -.0281  .1126 -.2554  -.1   .2  -.5
M004 1 HRAO P CODE       .0070  .0030 -.0018 -.0006  .0017  .0077  -.1   .4  1.7
M004 1 HRAO P IGS        .0001  .0001 -.0004  .0000 -.0003  .0003   .0  -.1   .1
M004 1 HRAO P1 JPL      -.0018 -.0014  .0002 -.0004 -.0008 -.0021  -.1  -.2  -.5
M004 1 HRAO P NOAA      -.0006  .0005  .0016  .0007  .0013 -.0009   .1   .3  -.1
M007 1 HARK P CODE       .0071  .0029 -.0019 -.0007  .0016  .0077  -.2   .4  1.7
M007 1 HARK P GFZ        .0024 -.0025  .0032 -.0033  .0033 -.0005 -1.7  2.3  -.3
M007 1 HARK P1 JPL      -.0009 -.0030 -.0015 -.0022 -.0023 -.0013  -.5  -.6  -.3
M007 1 HARK P NOAA       .0007  .0018 -.0009  .0013 -.0002  .0017   .2   .0   .2
S001 1 7232 R GIUB       .0013 -.0005  .0005 -.0010  .0008  .0006  -.7   .6   .4
S001 1 7232 R GSFC       .0008  .0016  .0002  .0010  .0008  .0012  1.7  1.5  1.7
S001 1 7232 R SHA        .0019  .0004  .0000 -.0006  .0008  .0017  -.5   .7  1.4
S005 1 HBLA D GRGS       .0042  .0019 -.0001 -.0003  .0019  .0041   .0   .2   .3
S005 1 HBLA D9 IGN       .0015 -.0063  .0077 -.0062  .0062 -.0048  -.1   .2  -.1
S005 1 HBLA C GRIM       .0616 -.1019  .0176 -.1188  .0189 -.0013  -.1   .0   .0
S005 1 HBLA C1 CSR      -.0110  .0037  .0117  .0084  .0070 -.0123   .5   .6  -.9
S202 1 HBKA D GRGS       .0042  .0019 -.0001 -.0003  .0019  .0041   .0   .2   .3
S202 1 HBKA D9 IGN       .0041  .0095 -.0001  .0065  .0034  .0073   .3   .2   .4
S202 1 HBKA C GRIM       .0093  .0018 -.0050 -.0028 -.0006  .0104  -.2  -.1   .8
S202 1 HBKA C1 CSR       .0067  .0071 -.0062  .0032 -.0016  .0111   .4  -.3  1.7

30313 MARION ISLAND (P

Positions
S001 1 MARA TIE30313    -.0011  .0129 -.0022  .0108  .0036  .0065   .2   .1   .1 97:  1
S001 1 MARA D GRGS       .0048  .0477 -.0175  .0347  .0122  .0354  1.6   .6  1.9 95:232
S001 1 MARA D9 IGN      -.0189  .0432  .0030  .0457  .0105  .0058  1.9   .5   .3 95:153
S001 1 MARA C GRIM      -.0176  .0147  .0167  .0224  .0079 -.0156  1.2   .5 -1.0 96: 78
S001 1 MARA C1 CSR       .0054 -.0175 -.0041 -.0171 -.0075 -.0014 -2.2 -1.1  -.2 95:215
S002 1 MARB TIE30313     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 MARB D9 IGN      -.0086  .0369  .0177  .0344  .0237 -.0021   .4   .3   .0  0: 41
S002 1 MARB C1 CSR       .0023  .0015 -.0053 -.0002 -.0017  .0057   .0   .0   .1  0: 24

Velocities
S001 1 MARA D GRGS      -.0014 -.0046  .0020 -.0027 -.0015 -.0041  -.2  -.1  -.4
S001 1 MARA D9 IGN       .0034 -.0030  .0003 -.0044  .0009  .0004  -.3   .1   .0
S001 1 MARA C GRIM       .0005 -.0040  .0013 -.0034 -.0006 -.0024  -.3  -.1  -.2
S001 1 MARA C1 CSR       .0002 -.0008 -.0020 -.0008 -.0017  .0012  -.2  -.4   .3
S002 1 MARB D9 IGN       .0500 -.0146  .0039 -.0422  .0250  .0180  -.1   .0   .0
S002 1 MARB C1 CSR      -.0254 -.1609 -.0094 -.1114 -.0931 -.0743  -.4  -.4  -.3

30314 SUTHERLAND

Positions
M001 1 7502 TIE30314     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7502 L CGS        .0059 -.0171  .0348 -.0180  .0291 -.0191  -.8  1.1  -.6 97:  1
M001 1 7502 L4 CSR      -.0336 -.0117  .0109  .0010 -.0099 -.0359   .0  -.1  -.4 93:259
M001 1 7502 C1 CSR      -.0320 -.0093  .0075  .0027 -.0114 -.0321   .2  -.5 -1.4 93:255
M002 1 SUTH TIE30314     .0002 -.0016  .0002 -.0016  .0000 -.0004  -.5   .0  -.1 97:  1
M002 1 SUTH P CODE      -.0016 -.0026  .0131 -.0018  .0097 -.0090  -.3  1.6 -1.5 98:344
M002 1 SUTH P GFZ        .0009 -.0025  .0027 -.0027  .0023 -.0015  -.8   .6  -.3 99: 85
M002 1 SUTH P IGS        .0061  .0003 -.0027 -.0019  .0008  .0063  -.8   .3  2.1 99:219
M002 1 SUTH P NOAA      -.0018  .0015  .0001  .0020 -.0006 -.0010   .3  -.1  -.2 99: 11

Velocities
M001 1 7502 L CGS        .0119  .0103  .0196  .0054  .0245  .0020   .0   .0   .0
M001 1 7502 L4 CSR       .2391  .0603 -.0205 -.0285  .1139  .2178  -.1   .3   .5
M001 1 7502 C1 CSR       .0101  .1174 -.0127  .1061  .0167  .0500   .3   .0   .1
M002 1 SUTH P CODE       .0075  .0031 -.0030  .0002  .0018  .0084   .0   .3  1.1
M002 1 SUTH P GFZ        .0034  .0013  .0012  .0000  .0029  .0024   .0   .8   .6
M002 1 SUTH P IGS       -.0106 -.0053  .0064 -.0011 -.0009 -.0134  -.5  -.3 -3.8
M002 1 SUTH P NOAA       .0043  .0017 -.0019  .0000  .0009  .0049   .0   .1   .6

30602 ASCENSION III

Positions
M001 1 ASC1 TIE30602     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 ASC1 P CODE       .0070 -.0040  .0088 -.0021  .0097  .0065  -.4  2.0   .9 98:221
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M001 1 ASC1 P GFZ       -.0011  .0001  .0004 -.0002  .0002 -.0011  -.1   .1  -.2 98:331
M001 1 ASC1 P IGS        .0004 -.0006  .0009 -.0005  .0010  .0004  -.3   .9   .1 98:341
M001 1 ASC1 P1 JPL       .0040 -.0016 -.0022 -.0005 -.0016  .0045  -.2 -1.1   .8 98: 60
M001 1 ASC1 P NCL        .0019 -.0020  .0007 -.0015  .0010  .0022  -.5   .5   .5 98: 45
M001 1 ASC1 P NOAA       .0005 -.0017  .0027 -.0015  .0028  .0005  -.2   .7   .0 97:344
M001 1 ASC1 P DGFI      -.0105  .0088  .0025  .0059  .0008 -.0126   .7   .2  -.7 98:132
S004 1 ASDB TIE30602     .0006 -.0003  .0001 -.0001  .0001  .0007   .0   .0   .2 97:  1
S004 1 ASDB D9 IGN      -.0022 -.0694  .0266 -.0678  .0285  .0113  -.7   .6   .1 99:275
S004 1 ASDB C GRIM      -.0898  .0338 -.0369  .0105 -.0497 -.0894   .1 -1.2 -1.2 99:122
S004 1 ASDB C1 CSR      -.0356  .0310  .0071  .0212  .0012 -.0428   .5   .1 -1.3 99:258

Velocities
M001 1 ASC1 P CODE       .0076 -.0003 -.0006  .0016  .0005  .0074   .4   .2  1.3
M001 1 ASC1 P GFZ        .0010 -.0013  .0011 -.0010  .0013  .0011  -.4  1.0   .3
M001 1 ASC1 P IGS        .0000  .0004  .0005  .0003  .0004 -.0002   .3   .6  -.1
M001 1 ASC1 P1 JPL      -.0001  .0000 -.0017  .0000 -.0017  .0001   .0 -1.2   .0
M001 1 ASC1 P NCL       -.0009 -.0009  .0002 -.0011  .0001 -.0007  -.4   .0  -.2
M001 1 ASC1 P NOAA       .0019  .0026 -.0012  .0030 -.0010  .0013   .5  -.3   .2
M001 1 ASC1 P DGFI       .0045  .0001 -.0007  .0013 -.0001  .0044   .1   .0   .3
S004 1 ASDB D9 IGN       .0245 -.0483  .0167 -.0407  .0215  .0330  -.1   .1   .1
S004 1 ASDB C GRIM      -.3657  .1442 -.0135  .0492 -.0671 -.3845   .0  -.1  -.4
S004 1 ASDB C1 CSR       .0099 -.0100  .0320 -.0072  .0334  .0076   .0   .4   .1

30604 TRISTAN DA CUNHA

Positions
S001 1 TRIA D GRGS      -.0108 -.0252 -.0144 -.0269 -.0146  .0046 -1.2 -1.0   .3 95:363
S001 1 TRIA D9 IGN       .0205 -.0576  .0579 -.0519  .0656 -.0091 -2.4  4.0  -.5 96:105
S001 1 TRIA C GRIM      -.0085  .0241  .0040  .0218 -.0049 -.0131   .9  -.4 -1.0 96:195
S001 1 TRIA C1 CSR       .0005  .0009 -.0059  .0010 -.0045  .0038   .1  -.9   .7 96:181

Velocities
S001 1 TRIA D GRGS      -.0006 -.0010  .0006 -.0011  .0002 -.0006  -.1   .0  -.1
S001 1 TRIA D9 IGN       .0046  .0001  .0001  .0011  .0027  .0035   .1   .3   .4
S001 1 TRIA C GRIM      -.0088 -.0034 -.0076 -.0052 -.0108 -.0017  -.5 -1.6  -.2
S001 1 TRIA C1 CSR       .0003  .0000  .0001  .0001  .0003  .0001   .0   .1   .0

30606 SAINTE-HELENE

Positions
S002 1 HELA D GRGS       .0199 -.0105 -.0006 -.0085  .0051  .0202  -.2   .3   .9 95: 26
S002 1 HELA C GRIM      -.0253  .0491  .0203  .0464  .0113 -.0344   .5   .3  -.5 93:  1
S002 1 HELA C1 CSR      -.0040 -.0013 -.0028 -.0017 -.0038 -.0029  -.1  -.5  -.3 94:314
S003 1 HELB D GRGS       .0016 -.0065 -.0277 -.0063 -.0260  .0097  -.1  -.7   .2 98:220
S003 1 HELB D9 IGN       .0467 -.0881  .0823 -.0830  .0943  .0305 -1.1  2.3   .6 99:171
S003 1 HELB C GRIM      -.0186  .0041 -.0077  .0022 -.0126 -.0161   .0  -.4  -.4 99: 68
S003 1 HELB C1 CSR      -.0022  .0117 -.0111  .0114 -.0115 -.0002   .3  -.7   .0 99:137

Velocities
S002 1 HELA D GRGS      -.0032 -.0061  .0046 -.0064  .0037 -.0037  -.2   .3  -.2
S002 1 HELA C GRIM      -.0067 -.1295  .0224 -.1295  .0232 -.0002  -.1   .0   .0
S002 1 HELA C1 CSR      -.0031  .0049 -.0026  .0045 -.0035 -.0027   .4  -.6  -.3
S003 1 HELB D GRGS      -.0032 -.0061  .0046 -.0064  .0037 -.0037  -.2   .3  -.2
S003 1 HELB D9 IGN       .0272 -.0539  .0139 -.0509  .0223  .0273  -.3   .2   .2
S003 1 HELB C GRIM       .0093 -.0186 -.0033 -.0176 -.0002  .0116  -.5   .0   .5
S003 1 HELB C1 CSR      -.0284  .0009 -.0032 -.0019 -.0108 -.0263   .0  -.3  -.6

30607 SIGNY ISLAND

Positions
M001 1 SIG1 P SCAR      -.0015  .0056  .0004  .0029 -.0042 -.0028   .6  -.8  -.4 96:236

Velocities
M001 1 SIG1 P SCAR      -.0012 -.0004  .0024 -.0011  .0007 -.0024  -.4   .2  -.5

30608 GOUGH ISLAND

Positions
M001 1 GOUG P CODE       .0061 -.0057  .0083 -.0046  .0108 -.0001  -.6  1.3   .0 99:149
M001 1 GOUG P GFZ        .0012 -.0055  .0001 -.0052  .0015  .0016 -1.5   .3   .3 99:138
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M001 1 GOUG P NOAA      -.0037 -.0005  .0029 -.0012 -.0001 -.0046  -.2   .0  -.8 99: 90
M001 1 GOUG P DGFI       .0062  .0142  .0114  .0151  .0110 -.0046  2.4   .8  -.3 99:363
M001 1 GOUG P2 IGN       .0003 -.0006 -.0008 -.0006 -.0003  .0008  -.1   .0   .1 98:291
M001 1 GOUG P SCAR      -.0052  .0113  .0015  .0103 -.0035 -.0064  1.7  -.3  -.6 98:209

Velocities
M001 1 GOUG P CODE      -.0093  .0058  .0096  .0042  .0008 -.0139   .3   .0  -.7
M001 1 GOUG P GFZ        .0010 -.0007  .0014 -.0006  .0018 -.0001  -.1   .3   .0
M001 1 GOUG P NOAA      -.0001  .0012  .0015  .0012  .0009 -.0013   .1   .1  -.1
M001 1 GOUG P DGFI      -.0002 -.0028 -.0041 -.0028 -.0030  .0029  -.2  -.1   .1
M001 1 GOUG P2 IGN       .0006 -.0002 -.0023 -.0001 -.0014  .0020   .0  -.2   .2
M001 1 GOUG P SCAR      -.0057  .0102 -.0068  .0090 -.0099 -.0012  1.2  -.5  -.1

30802 DIEGO GARCIA

Positions
M001 1 DGAR P CODE       .0061  .0051  .0057 -.0043  .0065  .0059  -.7  1.3   .7 98:210
M001 1 DGAR P GFZ        .0033 -.0055  .0004 -.0048 -.0001 -.0042 -1.2   .0  -.7 99: 43
M001 1 DGAR P IGS        .0001 -.0001 -.0002 -.0001 -.0002  .0000  -.1  -.2   .0 99: 53
M001 1 DGAR P1 JPL      -.0020  .0002  .0001  .0019  .0000 -.0004   .5   .0  -.1 98: 56
M001 1 DGAR P NCL       -.0001 -.0004  .0007  .0000  .0007 -.0005   .0   .3  -.1 98:153
M001 1 DGAR P NOAA       .0001  .0013 -.0026  .0003 -.0024  .0016   .0  -.7   .2 98: 47

Velocities
M001 1 DGAR P CODE       .0056  .0095 -.0017 -.0024 -.0003  .0109  -.5  -.1  1.5
M001 1 DGAR P GFZ       -.0009 -.0019  .0023  .0003  .0020 -.0024   .1  1.1  -.4
M001 1 DGAR P IGS        .0003  .0010 -.0002  .0000 -.0001  .0011   .0  -.1   .4
M001 1 DGAR P1 JPL      -.0019  .0013 -.0002  .0022 -.0001  .0007   .6  -.1   .1
M001 1 DGAR P NCL        .0004 -.0006  .0000 -.0006 -.0001 -.0005  -.2   .0  -.1
M001 1 DGAR P NOAA       .0060  .0050 -.0009 -.0042 -.0001  .0066  -.6   .0   .7

31303 MASPALOMAS

Positions
M001 1 MASP P GFZ       -.0064 -.0011 -.0041 -.0028 -.0009 -.0071 -1.1  -.3 -1.9 96:306
M002 1 MAS1 P CODE       .0046 -.0026  .0102 -.0012  .0066  .0093  -.4  1.5  2.2 97:345
M002 1 MAS1 P GFZ       -.0053 -.0010 -.0039 -.0024 -.0012 -.0061 -1.0  -.4 -1.6 97: 20
M002 1 MAS1 P IGS        .0002 -.0006  .0003 -.0005  .0001  .0004  -.5   .1   .3 98:209
M002 1 MAS1 P1 JPL      -.0018 -.0004 -.0007 -.0009  .0001 -.0018  -.5   .1  -.7 96:289
M002 1 MAS1 P NCL        .0014 -.0001  .0002  .0003 -.0005  .0013   .2  -.2   .5 97:248
M002 1 MAS1 P NOAA      -.0025 -.0018  .0016 -.0024  .0023 -.0009  -.7   .6  -.2 98:  8
M002 1 MAS1 P EUR        .0012 -.0003  .0007  .0000  .0000  .0015   .0   .0   .3 98:183
M002 1 MAS1 P1 IGN      -.0047  .0010 -.0050 -.0003 -.0022 -.0066  -.1  -.5 -1.3 98:346

Velocities
M001 1 MASP P GFZ        .0049  .0004  .0026  .0017  .0002  .0054  1.3   .1  3.0
M002 1 MAS1 P CODE       .0003  .0009 -.0014  .0009 -.0013 -.0006   .5  -.4  -.2
M002 1 MAS1 P GFZ        .0050  .0004  .0025  .0017  .0000  .0053  1.5   .0  3.0
M002 1 MAS1 P IGS        .0002  .0002 -.0002  .0002 -.0003  .0001   .3  -.3   .0
M002 1 MAS1 P1 JPL      -.0006  .0001 -.0015  .0000 -.0010 -.0012   .0  -.8  -.8
M002 1 MAS1 P NCL        .0004 -.0008  .0014 -.0006  .0010  .0012  -.4   .5   .5
M002 1 MAS1 P NOAA      -.0009 -.0004 -.0002 -.0006  .0002 -.0008  -.2   .1  -.2
M002 1 MAS1 P EUR       -.0023 -.0005 -.0014 -.0011 -.0002 -.0024  -.5  -.1  -.5
M002 1 MAS1 P1 IGN      -.0038  .0040 -.0031  .0028 -.0005 -.0056   .8  -.1  -.9

31901 FLORES

Positions
S001 1 FLOA D9 IGN      -.0556 -.0385  .0295 -.0617  .0404 -.0026  -.6   .5   .0 93: 82
S001 1 FLOA C1 CSR       .0010  .0016  .0010  .0019  .0008  .0007   .1   .0   .0 93: 55

Velocities
S001 1 FLOA D9 IGN       .0835  .0748  .0427  .1071  .0121  .0524   .2   .0   .1
S001 1 FLOA C1 CSR       .0011 -.0006 -.0060  .0001 -.0054 -.0028   .0  -.1   .0

31903 SANTA MARIA

Positions
S001 1 SAMB D GRGS      -.0367  .0168  .0036 -.0004  .0272 -.0301   .0  1.0 -1.0 95:251
S001 1 SAMB D9 IGN      -.0695 -.0530  .0379 -.0775  .0546 -.0095 -2.0  1.9  -.3 95:211
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S001 1 SAMB C GRIM      -.0205  .0046 -.0307 -.0046 -.0122 -.0348  -.1  -.4 -1.2 96:253
S001 1 SAMB C1 CSR       .0127 -.0013  .0020  .0042 -.0056  .0109   .3  -.5   .9 96: 91

Velocities
S001 1 SAMB D GRGS       .0009 -.0053  .0109 -.0044  .0069  .0091  -.1   .3   .3
S001 1 SAMB D9 IGN       .0390  .0255  .0049  .0397 -.0108  .0224  1.1  -.4   .7
S001 1 SAMB C GRIM      -.0093  .0174  .0095  .0117  .0171 -.0069   .3   .7  -.3
S001 1 SAMB C1 CSR      -.0090 -.0051 -.0004 -.0084  .0032 -.0050  -.6   .3  -.4

31906 PONTA DELGADA (S

Positions
M001 1 7609 TIE31906     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7609 R GSFC       .0004  .0002  .0002  .0004  .0000  .0004   .0   .0   .0 92:153
M001 1 7609 R SHA       -.0006  .0009 -.0013  .0006 -.0004 -.0015   .0   .0  -.1 92:153
S001 1 PDLB TIE31906     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 PDLB D9 IGN      -.0694 -.0555  .0102 -.0801  .0317 -.0242 -1.1   .5  -.4 99:230
S001 1 PDLB C GRIM      -.0320 -.0078  .0366 -.0209  .0445  .0022  -.2   .7   .0 99:105
S001 1 PDLB C1 CSR       .0073  .0031 -.0098  .0060 -.0110 -.0018   .2  -.5  -.1 99:269

Velocities
M001 1 7609 R GSFC       .4543  .2635  .1349  .4342 -.0742  .3162   .4   .0   .2
M001 1 7609 R SHA        .0253  .0243 -.0046  .0328 -.0112  .0069   .1   .0   .0
S001 1 PDLB D9 IGN       .1025  .0298 -.0005  .0713 -.0491  .0625   .4  -.4   .4
S001 1 PDLB C GRIM      -.2595 -.0911  .0140 -.1945  .1301 -.1452  -.2   .2  -.2
S001 1 PDLB C1 CSR       .0461  .0698  .0098  .0828  .0008  .0149  1.0   .0   .2

32601 YAMOUSSOUKRO

Positions
M001 1 YKRO P CODE       .0036 -.0041  .0090 -.0038  .0084  .0050  -.3   .7   .1 99:300
M001 1 YKRO P GFZ        .0052 -.0007  .0002 -.0003 -.0004  .0053   .0  -.1   .2 99:290

Velocities
M001 1 YKRO P CODE      -.0760  .0229 -.0128  .0158 -.0035 -.0787   .2   .0  -.2
M001 1 YKRO P GFZ        .0000  .0000 -.0001  .0000 -.0001  .0000   .0  -.1   .0

32809 LIBREVILLE

Positions
M002 1 NKLG TIE32809    -.0005 -.0002 -.0002 -.0001 -.0002 -.0006  -.1  -.1  -.2 97:  1
M002 1 NKLG P IGS        .0093  .0006  .0010 -.0010  .0009  .0093  -.3   .4  1.2  0:205
S002 1 LIBA TIE32809     .0004  .0000  .0002  .0000  .0002  .0004   .0   .1   .2 97:  1
S002 1 LIBA D GRGS      -.0138  .0057 -.0337  .0079 -.0336 -.0128   .2 -2.6  -.6 96: 29
S002 1 LIBA D9 IGN      -.0271  .0008  .0025  .0054  .0026 -.0265   .2   .2 -1.1 95:333
S002 1 LIBA C GRIM      -.0478  .0326  .0259  .0402  .0261 -.0415   .5   .7  -.7 93:  1
S002 1 LIBA C1 CSR       .0170 -.0006  .0097 -.0035  .0096  .0167  -.2  1.3  1.5 95:210
S003 1 LIBB TIE32809     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S003 1 LIBB D9 IGN      -.0197 -.0216  .0034 -.0180  .0035 -.0231  -.2   .1  -.4 99:283
S003 1 LIBB C GRIM      -.0467 -.0388 -.0111 -.0304 -.0107 -.0526  -.4  -.4 -1.2 99: 35
S003 1 LIBB C1 CSR       .0109 -.0394 -.0023 -.0407 -.0024  .0041 -1.3  -.2   .2 99:262

Velocities
M002 1 NKLG P IGS        .0049 -.0130 -.0017 -.0136 -.0017  .0026  -.7  -.1   .1
S002 1 LIBA D GRGS      -.0080 -.0057 -.0014 -.0042 -.0014 -.0089  -.2  -.2  -.7
S002 1 LIBA D9 IGN      -.0029 -.0033 -.0006 -.0027 -.0006 -.0034  -.2  -.1  -.2
S002 1 LIBA C GRIM       .0168 -.1360  .0194 -.1369  .0194 -.0062  -.1   .0   .0
S002 1 LIBA C1 CSR      -.0109  .0063  .0004  .0081  .0004 -.0097   .9   .1 -1.6
S003 1 LIBB D9 IGN       .0201 -.0694  .0639 -.0718  .0638  .0085  -.3   .5   .0
S003 1 LIBB C GRIM      -.0039 -.0117 -.0066 -.0109 -.0066 -.0059  -.5  -.7  -.4
S003 1 LIBB C1 CSR      -.0064 -.0116  .0053 -.0103  .0053 -.0082  -.1   .1  -.1

33201 MALINDI

Positions
M001 1 MALI P CODE       .0002 -.0137  .0109 -.0106  .0104 -.0093 -1.2  2.2 -1.0 97: 61
M001 1 MALI P GFZ       -.0051 -.0023 -.0013  .0015 -.0016 -.0053   .3  -.6 -1.1 98:133
M001 1 MALI P IGS        .0015  .0006  .0003 -.0005  .0004  .0015  -.2   .4   .6 98: 75
M001 1 MALI P1 JPL      -.0048  .0019 -.0029  .0045 -.0030 -.0023   .8 -2.2  -.4 98:292
M001 1 MALI P NCL        .0025 -.0043  .0028 -.0049  .0027 -.0010  -.9   .9  -.2 97: 39
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M001 1 MALI P NOAA       .0077  .0056 -.0030 -.0006 -.0025  .0096  -.1  -.9  1.3 98:250
M001 2 MALI P CODE       .0054 -.0008  .0080 -.0041  .0081  .0032  -.4  1.6   .3 98:240

Velocities
M001 1 MALI P CODE      -.0077 -.0135  .0022 -.0053  .0015 -.0147  -.4   .4 -1.2
M001 1 MALI P GFZ        .0066  .0011  .0008 -.0034  .0011  .0057 -1.4  1.0  2.3
M001 1 MALI P IGS       -.0018 -.0015  .0002  .0000  .0001 -.0023   .0   .1 -1.1
M001 1 MALI P1 JPL      -.0048 -.0116  .0041 -.0058  .0035 -.0113  -.8  2.3 -1.5
M001 1 MALI P NCL       -.0038 -.0087  .0032 -.0042  .0027 -.0087  -.7  1.4 -1.4
M001 1 MALI P NOAA      -.0067 -.0090  .0027 -.0025  .0021 -.0111  -.3   .8 -1.1
M001 2 MALI P CODE      -.0077 -.0135  .0022 -.0053  .0015 -.0147  -.4   .4 -1.2

33710 ARLIT

Positions
S001 1 ARLA TIE33710     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 ARLA C1 CSR      -.0952 -.0719  .2302 -.0591  .2513 -.0242  -.2  1.0  -.1 92:326
S002 1 ARMA TIE33710    -.0004 -.0002  .0004 -.0001  .0005 -.0003   .0   .1   .0 97:  1
S002 1 ARMA D GRGS       .0003  .0337 -.0232  .0334 -.0234 -.0031   .6 -1.0  -.1 95:323
S002 1 ARMA D9 IGN      -.0162 -.0105 -.0089 -.0083 -.0028 -.0193  -.2  -.1  -.6 95:277
S002 1 ARMA C GRIM      -.0049 -.0105 -.0035 -.0098 -.0013 -.0070  -.1   .0  -.2 96:253
S002 1 ARMA C1 CSR       .0029  .0040  .0266  .0036  .0241  .0118   .1  1.4   .6 95:278

Velocities
S001 1 ARLA C1 CSR     -1.7087 1.2618 -.3599 1.4708  .1514-1.5670   .2   .0  -.3
S002 1 ARMA D GRGS      -.0047  .0050  .0021  .0056  .0033 -.0032   .2   .2  -.1
S002 1 ARMA D9 IGN      -.0059  .0031  .0012  .0039  .0029 -.0048   .1   .2  -.2
S002 1 ARMA C GRIM      -.0122 -.0005 -.0026  .0011  .0015 -.0124   .0   .1  -.4
S002 1 ARMA C1 CSR       .0010 -.0008 -.0004 -.0009 -.0007  .0007  -.1  -.1   .1

34101 DAKAR

Positions
S004 1 DAKA D GRGS      -.0201 -.0133 -.0124 -.0187 -.0081 -.0178  -.6  -.6  -.9 96: 59
S004 1 DAKA D9 IGN      -.0155 -.0748  .0446 -.0760  .0412  .0188 -2.9  2.7   .9 96:196
S004 1 DAKA C GRIM       .0028 -.0131 -.0194 -.0117 -.0204  .0015  -.3 -1.6   .1 97:  2
S004 1 DAKA C1 CSR       .0065  .0223  .0020  .0232  .0021  .0000  1.8   .3   .0 96:228

Velocities
S004 1 DAKA D GRGS      -.0040  .0009 -.0022 -.0004 -.0011 -.0045   .0  -.1  -.3
S004 1 DAKA D9 IGN       .0016 -.0022 -.0064 -.0016 -.0067  .0005  -.1  -.9   .0
S004 1 DAKA C GRIM      -.0049 -.0035 -.0015 -.0048 -.0005 -.0039  -.3  -.1  -.3
S004 1 DAKA C1 CSR       .0005  .0025  .0008  .0025  .0008  .0000   .4   .2   .0

35001 RABAT

Positions
M001 1 IAVH P NOAA      -.0023 -.0010  .0006 -.0013  .0017 -.0015  -.3   .3  -.2 98:250

Velocities
M001 1 IAVH P NOAA      -.0128  .0005 -.0070 -.0011  .0013 -.0145   .0   .0  -.4

39801 MAHE ISLAND

Positions
M001 1 SEY1 P CODE       .0086 -.0054  .0066 -.0101  .0066 -.0001  -.6  1.1   .0 98:226
M001 1 SEY1 P GFZ        .0051  .0014  .0006 -.0034  .0009  .0040  -.3   .2   .4 99: 94
M001 1 SEY1 P IGS       -.0006 -.0007  .0000  .0001  .0000 -.0009   .0   .0  -.1 98:295
M001 1 SEY1 P1 JPL      -.0029 -.0020  .0014  .0013  .0011 -.0034   .1   .4  -.3 98:126
M001 1 SEY1 P NOAA      -.0002 -.0067 -.0017 -.0037 -.0022 -.0054  -.2  -.4  -.2 99:173

Velocities
M001 1 SEY1 P CODE       .0026 -.0001 -.0011 -.0022 -.0010  .0014  -.2  -.3   .1
M001 1 SEY1 P GFZ        .0032  .0034  .0014 -.0007  .0018  .0045  -.1   .7   .4
M001 1 SEY1 P IGS        .0010  .0017  .0000  .0001  .0001  .0020   .0   .1   .3
M001 1 SEY1 P1 JPL      -.0003  .0005  .0002  .0005  .0002  .0002   .1   .1   .0
M001 1 SEY1 P NOAA      -.0061 -.0146  .0014 -.0033  .0001 -.0155  -.1   .0  -.3

39901 DJIBOUTI
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Positions
S002 1 DJIA D GRGS      -.0520  .0245  .0309  .0534  .0345 -.0148  2.4  2.9  -.7 96: 17
S002 1 DJIA D9 IGN      -.0027  .0173 -.0228  .0146 -.0243  .0050   .7 -1.8   .2 96:194
S002 1 DJIA C GRIM       .0127 -.0140 -.0119 -.0189 -.0116 -.0026  -.8 -1.0  -.1 96:277
S002 1 DJIA C1 CSR       .0099 -.0062 -.0009 -.0113 -.0015  .0028 -1.3  -.3   .3 96:135

Velocities
S002 1 DJIA D GRGS       .0010 -.0038  .0033 -.0034  .0036 -.0012  -.2   .5  -.1
S002 1 DJIA D9 IGN      -.0003  .0002  .0007  .0004  .0007  .0000   .0   .1   .0
S002 1 DJIA C GRIM       .0076 -.0046  .0004 -.0085 -.0001  .0025  -.7   .0   .2
S002 1 DJIA C1 CSR      -.0021  .0012 -.0003  .0023 -.0001 -.0008   .6  -.1  -.2

40101 ST JOHN'S

Positions
M001 1 STJO TIE40101     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 STJO P CODE       .0044 -.0017  .0093  .0025  .0033  .0096  1.0  1.0  2.8 97:305
M001 1 STJO P GFZ       -.0015 -.0018 -.0008 -.0022 -.0010 -.0002 -1.2  -.4  -.1 97:347
M001 1 STJO P IGS       -.0008  .0006 -.0009 -.0003  .0001 -.0013  -.3   .1 -1.1 98:106
M001 1 STJO P1 JPL       .0001 -.0005  .0009 -.0002  .0002  .0010  -.1   .1   .5 97:343
M001 1 STJO P NCL        .0005 -.0003  .0002  .0002 -.0002  .0005   .1  -.1   .3 98: 39
M001 1 STJO P NOAA       .0000 -.0022 -.0001 -.0013 -.0013  .0011  -.6  -.6   .5 97:191
M001 1 STJO P GIA       -.0011  .0001 -.0013 -.0008 -.0003 -.0014  -.5  -.2  -.9 96:339
S002 1 STJB TIE40101     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 STJB C1 CSR      -.0305  .0251 -.0070 -.0090  .0237 -.0311  -.3   .8 -1.0 99:352

Velocities
M001 1 STJO P CODE      -.0010  .0008 -.0030 -.0003 -.0011 -.0031  -.2  -.5 -1.4
M001 1 STJO P GFZ        .0019  .0001  .0011  .0016 -.0001  .0016  1.8  -.1  1.5
M001 1 STJO P IGS       -.0009  .0002 -.0008 -.0006  .0000 -.0010  -.8   .0 -1.2
M001 1 STJO P1 JPL      -.0001 -.0010 -.0004 -.0007 -.0008  .0002  -.6  -.6   .2
M001 1 STJO P NCL       -.0006 -.0008 -.0003 -.0010 -.0004 -.0001  -.8  -.2  -.1
M001 1 STJO P NOAA       .0005 -.0004  .0023  .0002  .0010  .0022   .1   .6  1.2
M001 1 STJO P GIA        .0007 -.0005  .0002  .0003 -.0005  .0007   .3  -.4   .6
S002 1 STJB C1 CSR       .0889  .0767  .1053  .1173  .0763  .0730   .4   .3   .3

40102 ONTARIO-OTTAWA

Positions
S007 1 OTTA C1 CSR       .0061 -.0048 -.0054  .0047 -.0082  .0005   .1  -.1   .0 93:224
S009 1 OTTA D GRGS      -.0072  .0087  .0230 -.0048  .0234  .0092  -.2  1.5   .6 95:275
S009 1 OTTA D9 IGN      -.0131 -.0157 -.0208 -.0166 -.0232 -.0064  -.7 -1.2  -.3 95:269
S009 1 OTTA C GRIM       .0235 -.0053  .0217  .0215  .0074  .0231   .4   .2   .5 93:  1
S011 1 OTTB D GRGS       .0215  .0171  .0225  .0251  .0238  .0081   .5   .7   .2 98:166
S011 1 OTTB D9 IGN       .0038 -.0242 -.0304 -.0023 -.0387 -.0045  -.1 -1.2  -.1 99: 82
S011 1 OTTB C GRIM      -.0241  .0197  .0114 -.0185  .0258 -.0095  -.4  1.0  -.4 99: 40

Velocities
S007 1 OTTA C1 CSR     -1.0595  .3403  .2753 -.9427  .6144 -.2192 -1.3  1.0  -.4
S009 1 OTTA D GRGS       .0019 -.0026  .0086  .0012  .0039  .0082   .1   .3   .7
S009 1 OTTA D9 IGN       .0000  .0074 -.0065  .0018  .0006 -.0096   .1   .0  -.6
S009 1 OTTA C GRIM      -.1233 -.0232  .0114 -.1252  .0137  .0025  -.1   .0   .0
S011 1 OTTB D GRGS       .0019 -.0026  .0086  .0012  .0039  .0082   .1   .3   .7
S011 1 OTTB D9 IGN       .0023 -.0126  .0007 -.0009 -.0086  .0094   .0  -.2   .2
S011 1 OTTB C GRIM      -.0078  .0024 -.0062 -.0070 -.0013 -.0074  -.5  -.1  -.7

40104 ALGONQUIN

Positions
M002 1 ALGO TIE40104     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 ALGO P CODE       .0036 -.0019  .0099  .0032  .0050  .0089  1.4  1.4  2.5 97:317
M002 1 ALGO P GFZ       -.0014 -.0009 -.0012 -.0015 -.0012 -.0005  -.9  -.5  -.2 97:336
M002 1 ALGO P IGS       -.0002 -.0006  .0001 -.0003 -.0004  .0005  -.4  -.3   .4 98:118
M002 1 ALGO P1 JPL       .0008 -.0012  .0005  .0005 -.0006  .0013   .5  -.3   .8 96:268
M002 1 ALGO P NCL        .0000 -.0009  .0004 -.0001 -.0004  .0009  -.1  -.2   .5 98: 77
M002 1 ALGO P NOAA       .0004 -.0014  .0003  .0001 -.0008  .0012   .1  -.4   .6 97:190
M003 1 7410 TIE40104     .0012 -.0106  .0035 -.0010 -.0052  .0099  -.2 -1.2  2.3 97:  1
M003 1 7410 L AUS       -.0519 -.0140  .0167 -.0537  .0095  .0141 -1.1   .2   .3 95:288
M003 1 7410 L CGS       -.0453 -.0112 -.0033 -.0466 -.0035 -.0012 -2.6  -.1   .0 97:  1
M003 1 7410 L4 CSR       .0079 -.0039  .0024  .0069 -.0022  .0055   .3   .0   .1 93:228
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M003 1 7410 L JCET      -.0009  .0024  .0038 -.0003  .0045  .0010  -.1   .9   .2 93:222
M003 1 7410 C GRIM      -.0027 -.0075  .0037 -.0042 -.0023  .0074  -.3  -.1   .3 93:217
M003 1 7410 C1 CSR       .0064  .0036  .0026  .0070  .0033  .0003   .6   .1   .0 93:220
S001 1 7282 TIE40104    -.0009 -.0109  .0071 -.0031 -.0026  .0124 -1.0  -.8  3.9 97:  1
S001 1 7282 R GIUB       .0021  .0013 -.0005  .0023  .0002 -.0009  1.1   .1  -.4 95:287
S001 1 7282 R GSFC       .0002  .0039 -.0035  .0010  .0003 -.0052  1.3   .2 -2.7 97: 15
S001 1 7282 R SHA        .0008  .0022 -.0017  .0012  .0002 -.0026  1.0   .1 -1.2 96:353

Velocities
M002 1 ALGO P CODE      -.0001 -.0006 -.0024 -.0002 -.0021 -.0013  -.2  -.9  -.6
M002 1 ALGO P GFZ        .0013  .0007 -.0005  .0015  .0000 -.0006  2.0   .0  -.6
M002 1 ALGO P IGS       -.0009  .0017 -.0019 -.0005  .0001 -.0026  -.9   .1 -3.3
M002 1 ALGO P1 JPL       .0001  .0004  .0006  .0002  .0007  .0002   .3   .7   .2
M002 1 ALGO P NCL       -.0007 -.0003 -.0002 -.0007 -.0003  .0000  -.6  -.2   .0
M002 1 ALGO P NOAA       .0000 -.0013  .0019 -.0003  .0004  .0022  -.2   .3  1.5
M003 1 7410 L AUS       -.0190 -.0036  .0076 -.0194  .0056  .0052  -.7   .2   .2
M003 1 7410 L CGS       -.0288 -.0078  .0008 -.0298 -.0007  .0017   .0   .0   .0
M003 1 7410 L4 CSR       .0300 -.0097  .0215  .0274  .0036  .0264   .1   .0   .1
M003 1 7410 L JCET       .0170 -.0269 -.0357  .0110 -.0463 -.0049   .1  -.6  -.1
M003 1 7410 C GRIM      -.0046  .0171  .0905 -.0009  .0757  .0528   .0   .2   .1
M003 1 7410 C1 CSR      -.0284  .0019 -.1720 -.0274 -.1140 -.1290  -.1  -.3  -.4
S001 1 7282 R GIUB       .0006 -.0001  .0005  .0006  .0002  .0005   .7   .2   .6
S001 1 7282 R GSFC       .0002  .0000  .0000  .0002  .0000  .0001  1.1   .0   .2
S001 1 7282 R SHA        .0003 -.0002  .0004  .0002  .0000  .0005   .2   .0   .5

40105 PENTICTON

Positions
M001 1 7283 TIE40105     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7283 R GSFC      -.0045 -.0070  .0104 -.0004  .0005  .0133   .0   .0   .4 89: 52
M001 1 7283 R SHA       -.0041 -.0076  .0118  .0002  .0012  .0146   .0   .0   .4 89: 41
M002 1 DRAO TIE40105     .0007  .0002  .0006  .0006  .0008  .0001   .2   .2   .0 97:  1
M002 1 DRAO P CODE       .0036  .0007  .0070  .0028  .0064  .0038  1.1  1.9  1.1 97:289
M002 1 DRAO P GFZ       -.0012  .0016 -.0028 -.0018 -.0013 -.0027 -1.0  -.5 -1.0 97:355
M002 1 DRAO P IGS       -.0001  .0005 -.0010 -.0004 -.0004 -.0010  -.4  -.4  -.9 98:125
M002 1 DRAO P1 JPL       .0018  .0003 -.0018  .0014 -.0003 -.0021   .9  -.2 -1.1 97: 85
M002 1 DRAO P NCL       -.0005 -.0013  .0013  .0002 -.0001  .0019   .1  -.1   .9 98: 79
M002 1 DRAO P NOAA       .0018 -.0014  .0006  .0023  .0001  .0007  1.1   .1   .3 97:239
M002 1 DRAO P GIA       -.0004 -.0006 -.0011 -.0001 -.0013 -.0004  -.1  -.8  -.2 96:316

Velocities
M001 1 7283 R GSFC       .0059  .0123 -.0152 -.0010  .0004 -.0204  -.1   .0 -1.3
M001 1 7283 R SHA        .0065  .0128 -.0162 -.0006  .0003 -.0217  -.1   .0 -1.5
M002 1 DRAO P CODE       .0006 -.0005 -.0023  .0008 -.0016 -.0017   .5  -.7  -.7
M002 1 DRAO P GFZ        .0015 -.0001  .0005  .0013  .0008  .0000  1.6   .7   .0
M002 1 DRAO P IGS        .0005  .0001  .0003  .0004  .0004  .0000   .5   .5   .0
M002 1 DRAO P1 JPL      -.0011 -.0007  .0016 -.0006  .0002  .0019  -.7   .2  1.7
M002 1 DRAO P NCL        .0000 -.0011  .0009  .0005 -.0002  .0013   .4  -.1   .8
M002 1 DRAO P NOAA       .0003 -.0012  .0015  .0008  .0004  .0017   .6   .2  1.0
M002 1 DRAO P GIA        .0001  .0004  .0007 -.0001  .0007  .0003  -.2   .7   .3

40114 OTTAWA

Positions
M001 1 NRC1 P CODE       .0040 -.0023  .0077  .0033  .0031  .0077  1.2   .7  1.7 98:291
M001 1 NRC1 P IGS       -.0008  .0003 -.0006 -.0007 -.0001 -.0008  -.7   .0  -.5 98:322
M001 1 NRC1 P1 JPL      -.0005  .0000  .0007 -.0004  .0006  .0005  -.2   .2   .2 98:240
M001 1 NRC1 P NCL       -.0002  .0058 -.0034  .0013  .0016 -.0064   .2   .2  -.7 96:160
M001 1 NRC1 P NOAA      -.0008 -.0021  .0005 -.0013 -.0009  .0017  -.5  -.3   .5 98:150

Velocities
M001 1 NRC1 P CODE      -.0006  .0000 -.0026 -.0006 -.0017 -.0020  -.3  -.4  -.5
M001 1 NRC1 P IGS       -.0003  .0006 -.0006 -.0002  .0001 -.0009  -.2   .1  -.7
M001 1 NRC1 P1 JPL       .0001 -.0006  .0001  .0000 -.0003  .0005   .0  -.1   .1
M001 1 NRC1 P NCL       -.0008 -.0005  .0007 -.0009  .0003  .0007  -.5   .1   .2
M001 1 NRC1 P NOAA       .0001 -.0012  .0032 -.0002  .0013  .0031  -.1   .4   .9

40118 WHITEHORSE

Positions
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M001 1 7284 R GSFC       .0004  .0012 -.0021 -.0005  .0000 -.0023   .0   .0   .0 86:196
M001 1 7284 R SHA       -.0015  .0000  .0051 -.0011  .0016  .0050   .0   .0   .1 86:196
M001 2 7284 R GSFC      -.0172 -.0180  .0377  .0005 -.0033  .0451   .0   .0   .1 97:  1
M001 2 7284 R SHA        .0130  .0132 -.0263 -.0002  .0033 -.0320   .0   .0  -.1 97:  1

Velocities
M001 1 7284 R GSFC      -.0021 -.0023  .0047  .0001 -.0004  .0056   .0   .0   .1
M001 1 7284 R SHA        .0016  .0016 -.0036  .0000  .0003 -.0042   .0   .0  -.1
M001 2 7284 R GSFC       .0019  .0149 -.0772 -.0092 -.0275 -.0731   .0   .0   .0
M001 2 7284 R SHA        .0179  .0384 -.0786 -.0146 -.0038 -.0880   .0   .0   .0

40124 CALGARY

Positions
M001 1 PRDS P IGS       -.0009  .0019 -.0027 -.0016 -.0007 -.0030  -.7  -.2 -1.0 99: 85
M001 1 PRDS P1 JPL       .0005 -.0015  .0023  .0011  .0005  .0025   .5   .2   .9 98:275

Velocities
M001 1 PRDS P IGS        .0004  .0000  .0004  .0003  .0004  .0002   .2   .2   .1
M001 1 PRDS P1 JPL       .0000 -.0018  .0018  .0007 -.0002  .0025   .2   .0   .5

40127 YELLOWKNIFE

Positions
M001 1 7285 TIE40127     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7285 R GSFC      -.0063 -.0227  .0455  .0037  .0004  .0511   .2   .0  1.0 85:101
M001 1 7285 R SHA       -.0054 -.0210  .0454  .0038  .0021  .0501   .2   .1  1.0 85: 98
M003 1 YELL TIE40127     .0022  .0031 -.0022  .0007  .0023 -.0037   .2   .7 -1.2 97:  1
M003 1 YELL P CODE       .0076  .0082 -.0050  .0035  .0071 -.0093  1.1  1.4 -1.3 96:252
M003 1 YELL P GFZ       -.0019  .0016 -.0033 -.0024 -.0009 -.0032 -1.4  -.4 -1.0 97:363
M003 1 YELL P IGS       -.0005 -.0004 -.0004 -.0003 -.0007 -.0001  -.4  -.7  -.1 98:136
M003 1 YELL P1 JPL      -.0011 -.0015  .0025 -.0004 -.0005  .0030  -.2  -.2  1.0 98: 78
M003 1 YELL P NCL        .0039  .0080 -.0129  .0002  .0019 -.0156   .1   .6 -3.4 97: 12
M003 1 YELL P NOAA       .0019  .0003 -.0021  .0016  .0000 -.0024   .9   .0 -1.0 97:239
M003 1 YELL P GIA       -.0006 -.0001  .0006 -.0005  .0000  .0006  -.3   .0   .3 96:347
M003 2 YELL P CODE       .0032 -.0005  .0074  .0031  .0042  .0062  1.3  1.4  1.4 98: 65
M004 1 7296 TIE40127    -.0021  .0019 -.0113 -.0027 -.0045 -.0104  -.6 -1.0 -2.4 97:  1
M004 1 7296 R GSFC       .0001 -.0017  .0063  .0008  .0016  .0063   .5   .6  1.8 95:183
M004 1 7296 R SHA        .0002 -.0025  .0058  .0012  .0008  .0062   .6   .2  1.6 96: 62
S007 1 YELA TIE40127     .0023 -.0115  .0070  .0068 -.0052  .0106  1.3 -1.0  2.1 97:  1
S007 1 YELA D GRGS      -.0314  .0186 -.0067 -.0362  .0004 -.0077 -2.9   .0  -.7 96:  1
S007 1 YELA D9 IGN       .0400 -.0010 -.0004  .0368  .0137 -.0076  2.4   .9  -.5 96:129
S007 1 YELA C GRIM      -.0055  .0123 -.0157 -.0101  .0007 -.0180  -.9   .1 -2.4 95:323

Velocities
M001 1 7285 R GSFC       .0057  .0203 -.0385 -.0033  .0007 -.0438  -.1   .0  -.4
M001 1 7285 R SHA        .0054  .0186 -.0339 -.0028  .0013 -.0389  -.1   .0  -.5
M003 1 YELL P CODE       .0008  .0010 -.0050  .0003 -.0012 -.0050   .2  -.5 -1.6
M003 1 YELL P GFZ        .0020 -.0005  .0017  .0020  .0011  .0014  2.8  1.1  1.0
M003 1 YELL P IGS        .0003  .0002  .0000  .0002  .0003 -.0001   .4   .4  -.1
M003 1 YELL P1 JPL       .0015  .0013 -.0033  .0008  .0001 -.0038   .8   .0 -2.0
M003 1 YELL P NCL        .0005  .0002 -.0006  .0004  .0001 -.0007   .3   .1  -.3
M003 1 YELL P NOAA      -.0006 -.0023  .0037  .0005 -.0004  .0043   .3  -.2  2.3
M003 1 YELL P GIA        .0003 -.0004  .0014  .0004  .0005  .0013   .5   .5  1.1
M003 2 YELL P CODE       .0008  .0010 -.0050  .0003 -.0012 -.0050   .2  -.5 -1.6
M004 1 7296 R GSFC       .0003  .0004 -.0004  .0002  .0002 -.0005   .3   .3  -.5
M004 1 7296 R SHA        .0005  .0002 -.0007  .0004  .0001 -.0008   .3   .1  -.5
S007 1 YELA D GRGS       .0008  .0007 -.0016  .0005  .0001 -.0019   .1   .0  -.3
S007 1 YELA D9 IGN       .0023 -.0020 -.0030  .0029 -.0021 -.0023   .4  -.3  -.3
S007 1 YELA C GRIM       .0029  .0064  .0033  .0000  .0078 -.0003   .0  1.8  -.1

40128 CHURCHILL

Positions
M002 1 CHUR P CODE       .0032 -.0007  .0078  .0032  .0037  .0069  1.5  1.1  1.6 98: 71
M002 1 CHUR P IGS       -.0003 -.0005 -.0004 -.0002 -.0007  .0000  -.3  -.4   .0 98:274
M002 1 CHUR P1 JPL       .0006  .0005 -.0001  .0005  .0005 -.0003   .3   .2  -.1 98: 92
M002 1 CHUR P NCL        .0000 -.0010  .0013  .0001 -.0002  .0016   .1  -.1   .5 98:136
M002 1 CHUR P NOAA       .0008 -.0011  .0001  .0009 -.0009  .0006   .4  -.3   .2 98: 53
M002 1 CHUR P GIA        .0002  .0010 -.0008  .0001  .0005 -.0012   .1   .2  -.6 97:189
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Velocities
M002 1 CHUR P CODE       .0001  .0000 -.0030  .0002 -.0016 -.0025   .1  -.6  -.8
M002 1 CHUR P IGS        .0001 -.0001  .0002  .0001  .0000  .0002   .1   .0   .1
M002 1 CHUR P1 JPL       .0009  .0013 -.0004  .0008  .0010 -.0011   .4   .3  -.3
M002 1 CHUR P NCL       -.0002 -.0001 -.0005 -.0002 -.0004 -.0004  -.1  -.1  -.1
M002 1 CHUR P NOAA       .0002 -.0005  .0013  .0003  .0003  .0014   .2   .1   .5
M002 1 CHUR P GIA        .0000  .0002 -.0001  .0000  .0001 -.0002   .0   .1  -.1

40129 VICTORIA/SIDNEY

Positions
M001 1 7289 TIE40129     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7289 R GSFC      -.0057  .0005  .0125 -.0051  .0062  .0112  -.2   .1   .3 90:215
M001 1 7289 R SHA       -.0060 -.0005  .0147 -.0047  .0070  .0134  -.2   .2   .3 90:215
M003 1 ALBH TIE40129     .0000  .0015  .0012 -.0009  .0017  .0001  -.3   .5   .0 97:  1
M003 1 ALBH P CODE       .0036  .0000  .0069  .0030  .0060  .0038  1.2  1.7  1.0 98: 14
M003 1 ALBH P IGS        .0000  .0007 -.0015 -.0004 -.0006 -.0015  -.4  -.5 -1.2 98: 60
M003 1 ALBH P1 JPL       .0009 -.0004 -.0006  .0010 -.0003 -.0006   .6  -.2  -.3 97:203
M003 1 ALBH P NCL       -.0005 -.0006  .0004 -.0001 -.0003  .0009   .0  -.1   .4 98: 21
M003 1 ALBH P NOAA       .0011 -.0013  .0007  .0017  .0001  .0008   .8   .0   .3 97:236

Velocities
M001 1 7289 R GSFC       .3331 -.5954 -.2695  .6063 -.4128  .0063   .3  -.2   .0
M001 1 7289 R SHA        .0127 -.0126 -.0014  .0175 -.0036  .0013   .1   .0   .0
M003 1 ALBH P CODE       .0005 -.0006 -.0019  .0008 -.0014 -.0013   .4  -.6  -.5
M003 1 ALBH P IGS        .0009  .0007 -.0007  .0003  .0003 -.0012   .4   .3 -1.2
M003 1 ALBH P1 JPL      -.0002 -.0004  .0017  .0000  .0008  .0016   .0   .6  1.1
M003 1 ALBH P NCL       -.0004 -.0011  .0008  .0003 -.0003  .0014   .2  -.2   .8
M003 1 ALBH P NOAA       .0005 -.0022  .0024  .0016  .0005  .0028  1.1   .3  1.7

40130 HOLBERG

Positions
M001 1 HOLB P IGS        .0004  .0000 -.0003  .0003  .0000 -.0003   .1   .0  -.1 99: 32

Velocities
M001 1 HOLB P IGS        .0013  .0026 -.0020 -.0006  .0009 -.0033  -.1   .2  -.5

40132 LA GRANDE

Positions
M001 1 7411 L AUS       -.1261  .0650  .0282 -.1108  .0882 -.0298 -2.0  1.7  -.6 96:255
M001 1 7411 L CGS        .0563 -.0454  .0107  .0462 -.0385  .0416  1.7  -.9   .9 97:  1
M001 1 7411 L4 CSR       .0098  .0043 -.0015  .0104  .0009 -.0026   .3   .0   .0 94:245
M001 1 7411 C GRIM      -.0118 -.0625 -.0267 -.0239 -.0633  .0133  -.6 -1.0   .2 94:246
M001 1 7411 C1 CSR      -.0038  .0190  .0094  .0000  .0212 -.0039   .0   .5  -.1 94:236

Velocities
M001 1 7411 L AUS       -.0698  .0313  .0180 -.0622  .0466 -.0118 -1.3  1.1  -.3
M001 1 7411 L CGS       -.0895  .0397  .0144 -.0799  .0542 -.0219   .0   .0   .0
M001 1 7411 L4 CSR      -.0067  .2515 -.0684  .0433  .1592 -.2018   .1   .2  -.2
M001 1 7411 C GRIM      -.1012 -.0679  .0452 -.1127 -.0107  .0639  -.1   .0   .1
M001 1 7411 C1 CSR      -.0041  .0422  .0505  .0043  .0638  .0157   .0   .1   .0

40133 SCHEFFERVILLE

Positions
M002 1 SCH2 P CODE       .0037 -.0012  .0062  .0030  .0015  .0066  1.1   .4  1.4 98:323
M002 1 SCH2 P IGS       -.0010  .0005 -.0024 -.0008 -.0007 -.0025  -.6  -.3 -1.1 99: 59
M002 1 SCH2 P1 JPL      -.0013 -.0008  .0027 -.0015  .0014  .0024  -.7   .5   .8 98:280
M002 1 SCH2 P NOAA      -.0024 -.0028  .0011 -.0033 -.0007  .0018 -1.0  -.2   .4 98:280

Velocities
M002 1 SCH2 P CODE      -.0010 -.0001 -.0026 -.0010 -.0012 -.0023  -.4  -.3  -.5
M002 1 SCH2 P IGS       -.0001 -.0001 -.0001 -.0001 -.0001 -.0001  -.1  -.1   .0
M002 1 SCH2 P1 JPL      -.0003  .0001 -.0001 -.0003  .0001 -.0002  -.1   .0   .0
M002 1 SCH2 P NOAA       .0002 -.0014  .0048 -.0004  .0016  .0047  -.1   .4   .9

40134 WILLIAMS LAKE
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Positions
M001 1 WILL P CODE       .0044 -.0002  .0032  .0039  .0037  .0012  1.1   .8   .2 99:120
M001 1 WILL P IGS        .0001 -.0002 -.0004  .0002 -.0003 -.0002   .1  -.2  -.1 99:  3
M001 1 WILL P NCL       -.0002 -.0006  .0003  .0002 -.0002  .0006   .1  -.1   .2 98:163

Velocities
M001 1 WILL P CODE      -.0016 -.0025  .0021 -.0001 -.0011  .0035   .0  -.2   .5
M001 1 WILL P IGS        .0006  .0001  .0001  .0004  .0004 -.0002   .4   .3  -.1
M001 1 WILL P NCL        .0000 -.0010  .0007  .0005 -.0002  .0011   .3  -.1   .4

40135 FLIN FLON

Positions
M001 1 FLIN P CODE       .0037  .0012  .0051  .0034  .0045  .0030  1.5  1.3   .7 98: 54
M001 1 FLIN P IGS       -.0001  .0000 -.0019 -.0001 -.0011 -.0016  -.1  -.6  -.8 98:178
M001 1 FLIN P1 JPL      -.0005  .0002  .0020 -.0005  .0012  .0016  -.3   .4   .5 98:141
M001 1 FLIN P NCL       -.0002 -.0003  .0005 -.0001  .0000  .0006  -.1   .0   .2 98:113
M001 1 FLIN P NOAA       .0009 -.0015  .0008  .0012 -.0006  .0014   .6  -.2   .5 98:  4
M001 1 FLIN P GIA        .0001 -.0007  .0007  .0003 -.0001  .0009   .2  -.1   .5 97:157

Velocities
M001 1 FLIN P CODE       .0001 -.0023  .0001  .0005 -.0018  .0013   .4  -.7   .4
M001 1 FLIN P IGS       -.0001 -.0015  .0017  .0002 -.0003  .0023   .2  -.2  1.3
M001 1 FLIN P1 JPL       .0016  .0010 -.0014  .0013  .0003 -.0019   .7   .1  -.6
M001 1 FLIN P NCL       -.0001  .0001 -.0004 -.0001 -.0001 -.0003  -.1   .0  -.1
M001 1 FLIN P NOAA       .0002 -.0003  .0012  .0002  .0005  .0011   .1   .2   .4
M001 1 FLIN P GIA       -.0011  .0023 -.0012 -.0016  .0010 -.0021 -1.3   .6 -1.3

40136 WHITEHORSE GPS S

Positions
M001 1 WHIT P CODE       .0040  .0002  .0049  .0027  .0050  .0028  1.1  1.6   .6 98: 56
M001 1 WHIT P IGS        .0004  .0000 -.0014  .0003 -.0004 -.0013   .3  -.3  -.8 98:183
M001 1 WHIT P1 JPL      -.0014  .0007  .0002 -.0015 -.0004  .0004  -.8  -.2   .1 98: 64
M001 1 WHIT P NCL       -.0009 -.0012  .0026  .0002 -.0001  .0030   .1   .0  1.1 98:120
M001 1 WHIT P NOAA       .0012  .0002  .0001  .0007  .0009 -.0004   .2   .3  -.1 98: 54
M001 1 WHIT P GIA       -.0009  .0006  .0003 -.0011  .0000  .0003  -.6   .0   .2 97:141

Velocities
M001 1 WHIT P CODE       .0000 -.0008 -.0020  .0006 -.0015 -.0014   .3  -.6  -.4
M001 1 WHIT P IGS       -.0005 -.0006  .0022  .0001  .0004  .0023   .1   .3  1.5
M001 1 WHIT P1 JPL       .0002  .0000  .0005  .0001  .0003  .0003   .1   .1   .1
M001 1 WHIT P NCL       -.0006 -.0004  .0014 -.0001  .0000  .0016  -.1   .0   .5
M001 1 WHIT P NOAA      -.0019 -.0009  .0024 -.0007 -.0006  .0031  -.3  -.2   .8
M001 1 WHIT P GIA        .0003  .0005 -.0010 -.0001  .0000 -.0011  -.1   .0  -.8

40137 LAC DU BONNET

Positions
M001 1 DUBO P CODE       .0044  .0017  .0042  .0042  .0043  .0019  1.6  1.0   .4 98:290
M001 1 DUBO P IGS       -.0002  .0006 -.0019 -.0002 -.0008 -.0018  -.2  -.3  -.7 99: 69
M001 1 DUBO P1 JPL      -.0008  .0003  .0016 -.0008  .0012  .0011  -.5   .4   .4 98:125
M001 1 DUBO P NOAA      -.0009 -.0022  .0016 -.0007 -.0007  .0027  -.3  -.3  1.0 98: 52

Velocities
M001 1 DUBO P CODE      -.0011 -.0048  .0013 -.0006 -.0029  .0041  -.4  -.7   .9
M001 1 DUBO P IGS       -.0006 -.0019  .0012 -.0004 -.0007  .0022  -.4  -.3   .9
M001 1 DUBO P1 JPL       .0017  .0050 -.0029  .0011  .0021 -.0055   .6   .6 -1.6
M001 1 DUBO P NOAA       .0013 -.0003  .0014  .0014  .0007  .0012   .8   .3   .4

40138 NANOOSE

Positions
M001 1 NANO P IGS        .0003  .0001 -.0004  .0002  .0000 -.0005   .1   .0  -.1 99: 27

Velocities
M001 1 NANO P IGS        .0026  .0049 -.0048 -.0006  .0011 -.0073  -.1   .1  -.8

40140 UCLUELET
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Positions
M001 1 UCLU P IGS        .0003  .0001 -.0004  .0002 -.0001 -.0005   .1   .0  -.1 99: 14

Velocities
M001 1 UCLU P IGS        .0023  .0044 -.0041 -.0007  .0010 -.0064  -.1   .1  -.7

40141 WHISTLER

Positions
M001 1 WSLR P IGS        .0002  .0000 -.0004  .0002 -.0002 -.0004   .0   .0  -.1 98:338

Velocities
M001 1 WSLR P IGS        .0020  .0045 -.0043 -.0007  .0010 -.0064  -.1   .1  -.7

40142 CHILLIWACK

Positions
M001 1 CHWK P NOAA       .0027 -.0039  .0034  .0044  .0008  .0038   .8   .1   .6 99:240

Velocities
M001 1 CHWK P NOAA      -.0007 -.0046  .0054  .0019  .0003  .0069   .1   .0   .3

40400 PASADENA

Positions
M001 1 7896 TIE40400     .0000  .0001  .0001 -.0001  .0001  .0000   .0   .0   .0 97:  1
M001 1 7896 L4 CSR      -.0084  .0235 -.0286 -.0185 -.0142 -.0299  -.1  -.1  -.1 80:324
M003 1 7263 TIE40400     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 7263 R GSFC       .0064  .0173 -.0140 -.0025 -.0013 -.0230  -.2  -.1 -1.4 86:243
M003 1 7263 R SHA        .0062  .0143 -.0070 -.0013  .0029 -.0168  -.1   .2  -.9 86:314
M007 1 7272 TIE40400    -.0074  .0016 -.0040 -.0073 -.0045 -.0005 -2.3 -1.4  -.2 97:  1
M007 1 7272 P GFZ       -.0010 -.0010 -.0016 -.0004 -.0021  .0003  -.2  -.7   .1 98:  2
M007 1 7272 P IGS        .0001  .0011 -.0011 -.0004 -.0003 -.0015  -.3  -.2  -.8 98:165
M007 1 7272 P NCL        .0004  .0005  .0000  .0001  .0003 -.0005   .0   .1  -.2 98: 20
M007 1 7272 P2 JPL       .0013  .0049 -.0055 -.0012 -.0018 -.0072   .0  -.1  -.2 99:219
M101 1 WLSN P2 JPL       .0007  .0005  .0000  .0004  .0004 -.0006   .1   .1  -.1 98:261
M301 1 BRAN P NOAA       .0010 -.0017  .0010  .0016  .0002  .0014   .6   .1   .5 97:241
M301 1 BRAN P2 JPL      -.0003 -.0022 -.0010  .0008 -.0020  .0012   .2  -.5   .3 97:286
S201 1 CIT1 P IGS        .0007  .0016 -.0025 -.0002 -.0010 -.0028   .0   .0  -.1 99:147
S201 1 CIT1 P2 JPL       .0000 -.0003  .0000  .0001 -.0002  .0003   .0   .0   .1 97:228

Velocities
M001 1 7896 L4 CSR       .1126 -.7405 -.0097  .4488 -.3451  .4904   .4  -.3   .4
M003 1 7263 R GSFC       .0036  .0067 -.0002  .0000  .0041 -.0064   .0   .4  -.6
M003 1 7263 R SHA        .0044  .0081 -.0019  .0000  .0036 -.0087   .0   .4 -1.0
M007 1 7272 P GFZ        .0000  .0010  .0008 -.0004  .0011 -.0003  -.4   .9  -.2
M007 1 7272 P IGS        .0010  .0010 -.0008  .0004  .0001 -.0016   .3   .1 -1.3
M007 1 7272 P NCL       -.0003 -.0005  .0003  .0000 -.0001  .0006   .0   .0   .3
M007 1 7272 P2 JPL      -.0008  .0000 -.0004 -.0007 -.0006  .0001  -.3  -.3   .0
M101 1 WLSN P2 JPL      -.0034  .0046 -.0020 -.0052 -.0003 -.0032 -1.1  -.1  -.6
M301 1 BRAN P NOAA       .0009 -.0003  .0002  .0009  .0003  .0000   .5   .1   .0
M301 1 BRAN P2 JPL      -.0025 -.0041  .0001 -.0003 -.0026  .0040  -.1  -.9  1.2
S201 1 CIT1 P IGS       -.0016 -.0005  .0091 -.0011  .0068  .0061   .0   .1   .1
S201 1 CIT1 P2 JPL      -.0013  .0009 -.0009 -.0016 -.0006 -.0006  -.7  -.3  -.3

40403 PALOS VERDES

Positions
M001 1 7268 R GSFC       .0020  .0062 -.0032 -.0012  .0009 -.0071  -.1   .0  -.3 88:324
M001 1 7268 R SHA        .0014  .0023  .0022  .0001  .0034 -.0010   .0   .2  -.1 89: 71
M002 1 PVEP P2 JPL       .0005  .0005  .0002  .0002  .0005 -.0004   .0   .1  -.1 98:345

Velocities
M001 1 7268 R GSFC      -.0054 -.0102  .0121  .0001  .0037  .0163   .0   .2  1.0
M001 1 7268 R SHA       -.0045 -.0078  .0091 -.0003  .0026  .0125   .0   .2  1.0
M002 1 PVEP P2 JPL      -.0007  .0002 -.0013 -.0007 -.0011 -.0006  -.2  -.3  -.2

40404 PEARBLOSSOM
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Positions
M001 1 7254 R GSFC       .0008  .0039 -.0030 -.0011 -.0003 -.0049  -.1   .0  -.2 86: 27
M001 1 7254 R SHA        .0041  .0071 -.0011  .0003  .0038 -.0073   .0   .2  -.3 86:121
M101 1 HOLC P NOAA       .0055  .0037 -.0008  .0031  .0027 -.0052   .3   .2  -.4 98:141
M101 1 HOLC P2 JPL       .0026 -.0051 -.0027  .0047 -.0041  .0012   .1  -.1   .0 99:215

Velocities
M001 1 7254 R GSFC      -.0089 -.0146  .0142 -.0011  .0020  .0221  -.1   .1  1.5
M001 1 7254 R SHA       -.0063 -.0087  .0094 -.0015  .0017  .0141  -.2   .2  1.1
M101 1 HOLC P NOAA       .0017  .0008 -.0004  .0012  .0005 -.0015   .6   .3  -.7
M101 1 HOLC P2 JPL      -.0007 -.0004  .0004 -.0005 -.0001  .0008  -.2   .0   .2

40405 GOLDSTONE

Positions
M001 1 7085 TIE40405    -.0074 -.0031 -.0120 -.0051 -.0133 -.0020  -.5 -1.2  -.2 97:  1
M001 1 7085 L4 CSR      -.2830 -.2683 -.0876 -.1311 -.2842  .2485  -.2  -.4   .3 78: 77
M002 1 7115 TIE40405    -.0340 -.0434  .0121 -.0108 -.0213  .0511  -.4  -.9  2.1 97:  1
M002 1 7115 L4 CSR      -.1129 -.1773  .1560 -.0209  .0067  .2608  -.3   .1  2.8 80:188
M006 1 7265 TIE40405     .0045  .0098 -.0109 -.0005 -.0026 -.0151  -.1  -.2 -1.3 97:  1
M006 1 7265 L4 CSR       .0349  .1122 -.0754 -.0196  .0055 -.1381  -.1   .0  -.8 84: 38
M006 1 7265 L DEOS      -.2508  .1215 -.0698 -.2786 -.0599 -.0362 -1.0  -.2  -.1 93:  1
M013 1 7288 TIE40405     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M013 1 7288 R GSFC       .0032  .0083 -.0061 -.0009  .0001 -.0108  -.1   .0  -.5 87:306
M013 1 7288 R SHA        .0047  .0090 -.0020  .0001  .0042 -.0094   .0   .2  -.4 87:306
M013 1 7288 L CGS        .0095  .0128  .0067  .0027  .0145 -.0089   .1   .5  -.3 90:244
M013 1 7288 L CRL       -.0057  .0150 -.0025 -.0118  .0043 -.0102  -.9   .3  -.6 90:328
M013 1 7288 L4 CSR      -.0032  .0088 -.0003 -.0068  .0035 -.0054  -.2   .1  -.1 89:327
M013 1 7288 L DEOS      -.0555  .0221 -.0193 -.0595 -.0189 -.0068  -.8  -.2  -.1 92: 69
M013 1 7288 C GRIM      -.0169  .0183  .0068 -.0233  .0106 -.0032  -.7   .3  -.1 93:  1
S001 1 1514 TIE40405    -.0074 -.0031 -.0120 -.0051 -.0133 -.0020  -.5 -1.2  -.2 97:  1
S005 1 GOMA TIE40405    -.0382 -.0472  .0091 -.0129 -.0268  .0537  -.5 -1.1  2.2 97:  1
S005 1 GOMA D GRGS      -.0011 -.0021  .0293  .0000  .0226  .0189   .0  1.0   .7 95:272
S005 1 GOMA D9 IGN       .0854 -.0137  .0144  .0824  .0269 -.0132  2.4  1.0  -.4 95:242
S005 1 GOMA C GRIM       .0416 -.0066 -.0036  .0401  .0045 -.0126  1.1   .2  -.4 94:  1
S005 1 GOMA C1 CSR       .0424  .0116  .0010  .0326  .0178 -.0235  2.4  1.7 -2.0 95:251
S009 1 7222 TIE40405     .0043  .0097 -.0110 -.0006 -.0028 -.0150  -.1  -.3 -1.3 97:  1
S009 1 7222 R GIUB      -.0028 -.0036  .0032 -.0008  .0000  .0055  -.3   .0  1.5 92:306
S009 1 7222 R GSFC      -.0008  .0018 -.0013 -.0015 -.0004 -.0018 -1.9  -.3 -1.6 90:218
S009 1 7222 R SHA       -.0057 -.0042  .0031 -.0032 -.0011  .0069 -1.3  -.3  2.2 95:361
S009 2 7222 R GIUB      -.0025 -.0016 -.0007 -.0015 -.0021  .0016  -.2  -.2   .1 97:  1
S009 2 7222 R GSFC      -.0027 -.0037  .0044 -.0007  .0009  .0062  -.2   .2  1.1 97:  1
S009 2 7222 R SHA       -.0035 -.0037  .0024 -.0014 -.0009  .0053  -.4  -.2  1.0 97:  1
S014 1 1513 TIE40405    -.0305 -.0365  .0150 -.0108 -.0145  .0464  -.4  -.6  1.9 97:  1
S014 1 1513 R GIUB      -.0075 -.0095  .0108 -.0024  .0019  .0159  -.3   .2  1.4 90:111
S014 1 1513 R GSFC      -.0075 -.0073  .0052 -.0034 -.0014  .0110  -.7  -.2  1.7 89: 12
S014 1 1513 R SHA       -.0100 -.0133  .0133 -.0030  .0014  .0211  -.4   .1  2.2 90:269
S019 1 1515 TIE40405    -.0074 -.0026 -.0135 -.0055 -.0143 -.0031  -.5 -1.3  -.3 97:  1
S019 1 1515 R GIUB       .0046 -.0077  .0118  .0076  .0068  .0107   .5   .3   .5 89:289
S019 1 1515 R GSFC      -.0048 -.0070  .0067 -.0011  .0006  .0108  -.2   .0  1.0 88:221
S019 1 1515 R SHA        .0019 -.0084  .0090  .0055  .0035  .0106   .6   .3   .9 92:187
S019 2 1515 R GIUB       .0025  .0007  .0011  .0019  .0020 -.0008   .5   .4  -.2 97:  1
S019 2 1515 R GSFC       .0011  .0007  .0004  .0006  .0009 -.0007   .3   .4  -.3 97:  1
S019 2 1515 R SHA        .0009 -.0004  .0004  .0010  .0004  .0002   .5   .1   .1 97:  1
S028 1 GOLD TIE40405     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S031 1 GOLD P CODE       .0045  .0020  .0058  .0031  .0070  .0002  1.1  1.8   .1 97:323
S031 1 GOLD P GFZ       -.0023 -.0001 -.0031 -.0020 -.0032 -.0009  -.8 -1.0  -.3 97:166
S031 1 GOLD P IGS        .0014  .0011 -.0013  .0008 -.0001 -.0021   .8  -.1 -1.7 98:105
S031 1 GOLD P NCL       -.0005  .0003 -.0005 -.0006 -.0004 -.0003  -.3  -.2  -.1 97:341
S031 1 GOLD P NOAA      -.0013 -.0033  .0025  .0003  .0000  .0043   .2   .0  1.8 97:255
S031 1 GOLD P2 JPL      -.0012  .0008  .0014 -.0014  .0013  .0007  -.5   .4   .2 95:167
S031 2 GOLD P GFZ       -.0016  .0012 -.0026 -.0020 -.0020 -.0018  -.9  -.7  -.6 98: 14
S031 2 GOLD P2 JPL       .0073 -.0020  .0030  .0074  .0033  .0005   .3   .1   .0 99:218
S035 1 GOLA TIE40405    -.0022 -.0002  .0024 -.0019  .0013  .0023  -.6   .4   .7 97:  1
S035 1 GOLA D GRGS       .0314 -.0178 -.0063  .0360 -.0061 -.0023   .8  -.2  -.1 93:352
S035 1 GOLA D9 IGN       .0945 -.0199  .0006  .0933  .0149 -.0200  2.0   .4  -.5 93:361
S035 1 GOLA C GRIM       .0489 -.0113 -.0392  .0487 -.0250 -.0325  1.6 -1.1 -1.3 93:  1
S035 1 GOLA C1 CSR       .0343  .0066 -.0234  .0276 -.0067 -.0310  1.7  -.5 -2.3 93:278
S037 1 GOMB TIE40405    -.0378 -.0469  .0094 -.0126 -.0263  .0535  -.5 -1.1  2.2 97:  1
S037 1 GOMB D GRGS      -.0006  .0133  .0199 -.0066  .0230  .0020  -.2   .9   .1 98: 19
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S037 1 GOMB D9 IGN       .0728  .0035  .0126  .0635  .0311 -.0220  1.9  1.1  -.8 98:248
S037 1 GOMB C GRIM       .0239  .0330  .0089  .0064  .0305 -.0277   .2  1.6 -1.3 97:345
S037 1 GOMB C1 CSR       .0199  .0183 -.0033  .0095  .0119 -.0226   .9  1.5 -2.6 98:201

Velocities
M001 1 7085 L4 CSR       .9785 1.2333 -.4164  .3150  .5547-1.4983   .1   .2  -.5
M002 1 7115 L4 CSR      -.0520 -.0088  .0130 -.0425 -.0075  .0331  -.9  -.1   .6
M006 1 7265 L4 CSR       .0943  .1382 -.1633  .0216 -.0373 -.2298   .0   .0  -.2
M006 1 7265 L DEOS      -.0011  .0125  .0173 -.0066  .0203  .0014   .0   .0   .0
M013 1 7288 R GSFC       .0402 -.1760  .0313  .1154 -.0547  .1313   .1   .0   .1
M013 1 7288 R SHA       -.0045  .0057  .0083 -.0066  .0085  .0023   .0   .0   .0
M013 1 7288 L CGS       -.0259  .0155 -.0093 -.0301 -.0063 -.0071  -.6  -.1  -.1
M013 1 7288 L CRL       -.0207  .0131  .0131 -.0243  .0121  .0057  -.5   .2   .1
M013 1 7288 L4 CSR      -.0022  .0001 -.0076 -.0020 -.0067 -.0037  -.2  -.5  -.2
M013 1 7288 L DEOS      -.0278  .0055 -.0100 -.0273 -.0126  .0004  -.9  -.5   .0
M013 1 7288 C GRIM      -.1271  .0632 -.0031 -.1419 -.0032 -.0009  -.1   .0   .0
S005 1 GOMA D GRGS       .0075 -.0042  .0008  .0086  .0004  .0007   .3   .0   .0
S005 1 GOMA D9 IGN       .0155  .0029 -.0059  .0126  .0007 -.0112   .2   .0  -.2
S005 1 GOMA C GRIM      -.1273  .0631 -.0031 -.1420 -.0032 -.0009  -.1   .0   .0
S005 1 GOMA C1 CSR       .0322 -.0147  .0083  .0353  .0076  .0037  1.6   .4   .2
S009 1 7222 R GIUB      -.0007 -.0009  .0000 -.0002 -.0006  .0009  -.2  -.5   .8
S009 1 7222 R GSFC      -.0008 -.0010  .0009 -.0002  .0000  .0015  -.7   .0  2.9
S009 1 7222 R SHA       -.0010 -.0009  .0003 -.0004 -.0005  .0012  -.4  -.4  1.0
S009 2 7222 R GIUB      -.0157  .0047 -.0073 -.0162 -.0076 -.0019   .0   .0   .0
S009 2 7222 R GSFC      -.0362 -.0221  .0021 -.0223 -.0192  .0307   .0   .0   .0
S009 2 7222 R SHA       -.0181  .0048 -.0040 -.0183 -.0055  .0009   .0   .0   .0
S014 1 1513 R GIUB      -.0079 -.0080  .0051 -.0034 -.0020  .0116  -.6  -.2  1.5
S014 1 1513 R GSFC      -.0017 -.0027  .0029 -.0003  .0005  .0043  -.2   .2  2.0
S014 1 1513 R SHA       -.0019 -.0030  .0026 -.0004  .0001  .0044  -.2   .0  1.8
S019 1 1515 R GIUB       .0019  .0012 -.0012  .0012  .0001 -.0023   .7   .1 -1.1
S019 1 1515 R GSFC       .0014  .0010 -.0006  .0008  .0004 -.0016   .9   .3 -1.3
S019 1 1515 R SHA        .0015 -.0003 -.0001  .0014  .0001 -.0004  1.1   .1  -.2
S019 2 1515 R GIUB      -.0157  .0047 -.0073 -.0162 -.0076 -.0019   .0   .0   .0
S019 2 1515 R GSFC      -.0363 -.0221  .0021 -.0223 -.0193  .0306   .0   .0   .0
S019 2 1515 R SHA       -.0181  .0048 -.0040 -.0183 -.0055  .0009   .0   .0   .0
S031 1 GOLD P CODE       .0019 -.0027 -.0004  .0029 -.0012  .0011  1.6  -.5   .4
S031 1 GOLD P GFZ        .0032 -.0001 -.0003  .0029  .0005 -.0013  2.5   .4 -1.0
S031 1 GOLD P IGS        .0029  .0004  .0003  .0024  .0012 -.0011  2.9  1.3 -1.2
S031 1 GOLD P NCL       -.0001 -.0024  .0019  .0010  .0002  .0029   .6   .1  1.5
S031 1 GOLD P NOAA       .0044  .0041 -.0024  .0021  .0013 -.0060  1.3   .8 -3.4
S031 1 GOLD P2 JPL       .0002 -.0009  .0011  .0006  .0005  .0012   .3   .3   .6
S031 2 GOLD P GFZ        .0030  .0005  .0000  .0024  .0011 -.0015  2.2   .9 -1.1
S031 2 GOLD P2 JPL       .0012  .0002  .0003  .0010  .0007 -.0004   .5   .3  -.2
S035 1 GOLA D GRGS       .0075 -.0042  .0007  .0086  .0004  .0007   .3   .0   .0
S035 1 GOLA D9 IGN       .0450 -.0213  .0126  .0498  .0111  .0061   .7   .2   .1
S035 1 GOLA C GRIM      -.1271  .0632 -.0031 -.1420 -.0032 -.0009  -.1   .0   .0
S035 1 GOLA C1 CSR      -.0084 -.0026  .0183 -.0063  .0113  .0156  -.2   .5   .6
S037 1 GOMB D GRGS       .0074 -.0042  .0007  .0085  .0003  .0008   .3   .0   .0
S037 1 GOMB D9 IGN      -.0024 -.0036  .0060 -.0005  .0024  .0069   .0   .1   .3
S037 1 GOMB C GRIM      -.0084  .0077  .0052 -.0110  .0060  .0005 -1.2   .6   .0
S037 1 GOMB C1 CSR       .0031 -.0005 -.0036  .0030 -.0024 -.0028   .3  -.3  -.3

40406 SAN FRANCISCO (P

Positions
M001 1 7252 R GSFC       .0015  .0047 -.0039 -.0013 -.0001 -.0062  -.1   .0  -.5 87:218
M001 1 7252 R SHA        .0019  .0032  .0002 -.0001  .0025 -.0028   .0   .2  -.2 87:275
M001 2 7252 R GSFC       .0025  .0047 -.0029 -.0004  .0010 -.0060   .0   .0  -.1 97:  1
M001 2 7252 R SHA       -.0013  .0037 -.0019 -.0031  .0000 -.0031  -.1   .0  -.1 97:  1

Velocities
M001 1 7252 R GSFC       .0003  .0001  .0001  .0002  .0002 -.0001   .0   .0   .0
M001 1 7252 R SHA       -.0001  .0005 -.0006 -.0003 -.0003 -.0007   .0   .0  -.1
M001 2 7252 R GSFC      -.0404 -.0002  .0095 -.0340 -.0059  .0231   .0   .0   .0
M001 2 7252 R SHA       -.0226  .0260  .0042 -.0330  .0093 -.0051   .0   .0   .0

40407 PINYON FLATS

Positions
M001 1 7256 TIE40407     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
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M001 1 7256 R GSFC       .0020  .0050 -.0029 -.0004  .0006 -.0061   .0   .0  -.4 87: 54
M001 1 7256 R SHA        .0048  .0077  .0012  .0009  .0060 -.0069   .1   .4  -.4 87:301
M003 1 PIN1 TIE40407     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 PIN2 TIE40407     .0015  .0012  .0026  .0008  .0031  .0000   .2  1.0   .0 97:  1
M004 1 PIN2 P2 JPL      -.0440 -.0244 -.0081 -.0285 -.0297  .0300 -1.0 -1.0   .9 99:271

Velocities
M001 1 7256 R GSFC       .0031  .0051  .0006  .0005  .0038 -.0046   .1   .4  -.5
M001 1 7256 R SHA        .0007  .0004  .0044  .0004  .0040  .0018   .1   .6   .3
M004 1 PIN2 P2 JPL       .0036 -.0017  .0038  .0040  .0033  .0020   .5   .4   .2

40408 FAIRBANKS

Positions
M001 1 FAIR TIE40408     .0184  .0178 -.0155 -.0051  .0162 -.0246  -.5  1.6 -2.4 97:  1
M001 1 FAIR P CODE       .0049  .0009  .0025  .0018  .0053  .0004   .8  1.8   .1 97:299
M001 1 FAIR P GFZ       -.0009  .0029 -.0061 -.0029 -.0019 -.0058 -1.6  -.8 -1.6 97:296
M001 1 FAIR P IGS       -.0011 -.0003  .0003 -.0004 -.0009  .0007  -.4  -.8   .5 98:124
M001 1 FAIR P1 JPL      -.0014 -.0016  .0021  .0006 -.0009  .0028   .4  -.4   .9 98: 25
M001 1 FAIR P NOAA       .0023 -.0033  .0039  .0040  .0018  .0035  1.6   .6  1.0 98: 18
M001 1 FAIR P CORS       .0014 -.0011 -.0003  .0016  .0004 -.0005  1.0   .2  -.2 98:  9
M001 1 FAIR P GIA        .0020  .0001 -.0016  .0010  .0009 -.0022   .6   .5 -1.1 97: 24
S002 1 7225 TIE40408     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 7225 R GIUB       .0027  .0003 -.0004  .0012  .0020 -.0014   .6  1.0  -.6 95:299
S002 1 7225 R GSFC       .0007  .0002  .0009  .0002  .0010  .0005   .3  1.6   .6 94: 88
S002 1 7225 R SHA        .0006 -.0009  .0011  .0011  .0005  .0009   .8   .4   .6 96:338
S004 1 FAIA TIE40408     .0069  .0095  .0031 -.0043  .0112 -.0018  -.8  2.0  -.4 97:  1
S004 1 FAIA D9 IGN       .0009 -.0086 -.0061  .0077 -.0060 -.0039   .5  -.4  -.2 96:  3
S004 1 FAIA C GRIM       .0212 -.0023 -.0155  .0134  .0085 -.0211  1.5  1.1 -3.0 95:334
S004 1 FAIA C1 CSR      -.0149 -.0073 -.0010 -.0019 -.0153  .0060  -.5 -3.5  1.4 96: 45
S005 1 FAIB TIE40408     .0072  .0098  .0032 -.0044  .0116 -.0019  -.6  1.5  -.3 97:  1
S005 1 FAIB C1 CSR      -.0127 -.0092 -.0046  .0009 -.0162  .0025   .0  -.5   .1  0: 38

Velocities
M001 1 FAIR P CODE      -.0030 -.0023  .0043  .0003 -.0016  .0055   .2  -.9  1.9
M001 1 FAIR P GFZ       -.0019 -.0005  .0061 -.0006  .0009  .0064  -.8   .8  4.0
M001 1 FAIR P IGS       -.0020 -.0004  .0042 -.0007  .0000  .0046 -1.1   .0  3.9
M001 1 FAIR P1 JPL      -.0018 -.0004  .0005 -.0006 -.0014  .0012  -.6 -1.0   .6
M001 1 FAIR P NOAA      -.0025 -.0005  .0025 -.0009 -.0011  .0033  -.5  -.5  1.1
M001 1 FAIR P CORS      -.0008  .0003  .0007 -.0007 -.0002  .0008  -.5  -.1   .3
M001 1 FAIR P GIA       -.0005 -.0002  .0014 -.0001  .0001  .0014  -.1   .1  1.1
S002 1 7225 R GIUB       .0005 -.0001 -.0004  .0003  .0001 -.0005   .4   .2  -.6
S002 1 7225 R GSFC       .0003  .0001 -.0001  .0000  .0002 -.0002   .3  1.5  -.9
S002 1 7225 R SHA        .0001 -.0002 -.0002  .0002 -.0001 -.0002   .2  -.1  -.2
S004 1 FAIA D9 IGN       .0014 -.0030 -.0033  .0033 -.0018 -.0028   .4  -.2  -.3
S004 1 FAIA C GRIM       .0019  .0059 -.0002 -.0040  .0043 -.0022  -.9  1.0  -.6
S004 1 FAIA C1 CSR      -.0011 -.0019 -.0017  .0011 -.0025 -.0007   .5 -1.1  -.3
S005 1 FAIB C1 CSR      -.1976 -.2177 -.3400  .0775 -.4008 -.1880   .1  -.4  -.2

40410 POINT REYES

Positions
M001 1 7251 R GSFC       .0012  .0047 -.0036 -.0015  .0000 -.0058  -.1   .0  -.5 88:348
M001 1 7251 R SHA        .0003  .0015  .0014 -.0005  .0020 -.0003   .0   .1   .0 89:  4

Velocities
M001 1 7251 R GSFC      -.0001 -.0003  .0000  .0001 -.0002  .0003   .0   .0   .0
M001 1 7251 R SHA       -.0004  .0000 -.0001 -.0003 -.0002  .0001  -.1   .0   .0

40412 AUSTIN

Positions
M003 1 7271 R GSFC      -.0001  .0007 -.0015 -.0002 -.0009 -.0013   .0   .0   .0 87:192
M003 1 7271 R SHA       -.0012 -.0003  .0019 -.0012  .0014  .0014  -.1   .0   .0 87:192

Velocities
M003 1 7271 R GSFC       .0178 -.0024  .1041  .0180  .0898  .0526   .0   .0   .0
M003 1 7271 R SHA       -.0003  .0000 -.0017 -.0003 -.0015 -.0009   .0   .0   .0

40416 YAKATAGA
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Positions
M001 1 7277 R GSFC      -.0020 -.0004  .0009 -.0009 -.0011  .0017  -.1  -.1   .1 86:342
M001 1 7277 R SHA        .0007  .0012  .0025 -.0005  .0024  .0015   .0   .1   .1 86:360
M001 2 7277 R GSFC      -.0040 -.0024  .0103 -.0005  .0011  .0113   .0   .0   .1 97:  1
M001 2 7277 R SHA        .0042  .0024 -.0073  .0006  .0006 -.0087   .0   .0  -.1 97:  1

Velocities
M001 1 7277 R GSFC      -.0005 -.0003  .0014  .0000  .0002  .0015   .0   .0   .1
M001 1 7277 R SHA        .0006  .0003 -.0014  .0001 -.0001 -.0015   .0   .0  -.1
M001 2 7277 R GSFC      -.0408 -.0031  .0291 -.0224 -.0152  .0423   .0   .0   .0
M001 2 7277 R SHA       -.0250  .0202  .0282 -.0313  .0075  .0282   .0   .0   .0

40419 KODIAK

Positions
M001 1 7278 R GSFC       .0009  .0000  .0017  .0004  .0016  .0010   .0   .1   .1 88:250
M001 1 7278 R SHA        .0008  .0010  .0028 -.0005  .0025  .0017   .0   .2   .1 88:288
S001 1 KOD1 P CORS      -.0001  .0036 -.0013 -.0032  .0007 -.0019 -1.6   .3  -.7 97:364
S001 1 KOD1 P GIA        .0009 -.0010  .0000  .0013  .0003 -.0001   .7   .1  -.1 97:186

Velocities
M001 1 7278 R GSFC       .0031  .0020  .0022 -.0003  .0043 -.0001  -.1   .4   .0
M001 1 7278 R SHA        .0036  .0019  .0014  .0000  .0042 -.0010   .0   .4  -.1
S001 1 KOD1 P CORS      -.0008 -.0014 -.0001  .0009 -.0012  .0006   .5  -.6   .3
S001 1 KOD1 P GIA       -.0004  .0003  .0005 -.0005  .0001  .0006  -.3   .0   .3

40420 VANDENBERG AFB

Positions
M002 1 7223 TIE40420     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7223 R GSFC       .0011  .0049 -.0040 -.0015 -.0006 -.0062  -.3  -.1 -1.0 88:292
M002 1 7223 R SHA        .0013  .0061 -.0024 -.0019  .0013 -.0063  -.3   .2  -.7 92: 20
M007 1 VNDP TIE40420    -.0039  .0029 -.0002 -.0048  .0001 -.0005 -1.5   .0  -.2 97:  1
M007 1 VNDP P2 JPL       .0019 -.0024  .0009  .0028  .0001  .0015   .9   .0   .4 97:361
M101 1 HARV P2 JPL       .0003  .0002  .0000  .0002  .0002 -.0003   .0   .1  -.1 97:326

Velocities
M002 1 7223 R GSFC       .0001  .0005 -.0002 -.0002  .0001 -.0006  -.1   .1  -.4
M002 1 7223 R SHA       -.0002  .0004 -.0006 -.0004 -.0003 -.0006  -.2  -.2  -.3
M007 1 VNDP P2 JPL      -.0009 -.0025  .0019  .0005  .0000  .0032   .2   .0  1.1
M101 1 HARV P2 JPL       .0002 -.0002  .0001  .0003  .0000  .0002   .1   .0   .1

40421 NOME

Positions
M001 1 7279 R GSFC      -.0017 -.0011  .0021  .0007 -.0008  .0027   .1   .0   .1 87:257
M001 1 7279 R SHA       -.0008  .0013  .0013 -.0015  .0001  .0013  -.1   .0   .0 87:279

Velocities
M001 1 7279 R GSFC       .0005  .0002 -.0001 -.0001  .0005 -.0004   .0   .1   .0
M001 1 7279 R SHA        .0001 -.0004  .0009  .0004  .0003  .0008   .1   .0   .1

40423 SANDPOINT

Positions
M001 1 7280 R GSFC      -.0006 -.0006  .0031  .0004  .0011  .0029   .0   .1   .1 89: 85
M001 1 7280 R SHA       -.0008  .0004  .0022 -.0006  .0008  .0022   .0   .0   .1 89:104

Velocities
M001 1 7280 R GSFC       .0003  .0003 -.0001 -.0002  .0003 -.0003   .0   .0   .0
M001 1 7280 R SHA        .0006  .0004 -.0008 -.0002  .0001 -.0011   .0   .0  -.1

40424 KAUAI

Positions
M004 1 KOKB TIE40424     .0060  .0015  .0003  .0007  .0026 -.0056   .2   .8 -1.8 97:  1
M004 1 KOKB P CODE      -.0043 -.0039  .0077  .0021  .0051  .0079   .6  1.1  1.8 98: 10
M004 1 KOKB P GFZ       -.0009  .0012 -.0001 -.0014 -.0003  .0004  -.5  -.1   .1 97:289
M004 1 KOKB P IGS       -.0047 -.0009  .0023 -.0008  .0003  .0052  -.6   .3  3.1 98:167
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M004 1 KOKB P1 JPL       .0012  .0037 -.0020 -.0031 -.0009 -.0030 -1.7  -.6 -1.2 96:172
M004 1 KOKB P NCL       -.0033  .0020  .0010 -.0031  .0001  .0026  -.5   .0   .3 96:307
M004 1 KOKB P NOAA      -.0052  .0010  .0011 -.0027 -.0007  .0046  -.6  -.2   .9 98: 25
M004 1 KOKB P CORS      -.0037  .0003  .0006 -.0015 -.0007  .0033  -.5  -.3   .8 98:104
S001 1 1311 TIE40424     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 1311 R GIUB      -.0001  .0003  .0015 -.0003  .0014  .0006  -.1   .3   .2 93:117
S001 1 1311 R GSFC      -.0012 -.0013  .0012  .0008  .0005  .0019   .6   .3  1.1 92: 24
S001 1 1311 R SHA        .0028 -.0044 -.0042  .0051 -.0035 -.0026  1.6 -1.0  -.7 95:278
S007 1 7298 TIE40424     .0005  .0021 -.0011 -.0018 -.0006 -.0016  -.5  -.2  -.4 97:  1
S007 1 7298 R GSFC       .0026  .0001  .0002  .0008  .0011 -.0022   .6   .7 -1.2 95:202
S007 1 7298 R SHA        .0030 -.0004  .0001  .0014  .0011 -.0024   .7   .5 -1.1 96:300
S008 1 KOKA TIE40424    -.0041 -.0046  .0011  .0029 -.0010  .0055   .4  -.2  1.0 97:  1
S008 1 KOKA D GRGS      -.0030  .0312 -.0270 -.0303 -.0219 -.0176 -1.4 -1.8 -1.1 96: 14
S008 1 KOKA D9 IGN       .0240 -.0073  .0013  .0152  .0088 -.0180   .7   .6 -1.0 96:148
S008 1 KOKA C GRIM       .0395  .0040 -.0200  .0100 -.0041 -.0431   .4  -.4 -3.1 95:362

Velocities
M004 1 KOKB P CODE       .0020  .0006 -.0020  .0002 -.0011 -.0027   .1  -.4  -.9
M004 1 KOKB P GFZ        .0004  .0008  .0007 -.0006  .0009 -.0003  -.6  1.1  -.5
M004 1 KOKB P IGS        .0040  .0019 -.0007 -.0004  .0010 -.0044  -.4  1.1 -3.5
M004 1 KOKB P1 JPL      -.0018 -.0021  .0022  .0013  .0012  .0031  1.5  1.5  2.7
M004 1 KOKB P NCL        .0077  .0030 -.0024 -.0001  .0009 -.0085  -.1   .4 -2.9
M004 1 KOKB P NOAA       .0024  .0004 -.0005  .0005  .0004 -.0025   .1   .1  -.5
M004 1 KOKB P CORS       .0041  .0018 -.0016 -.0003  .0002 -.0048  -.1   .1 -1.3
S001 1 1311 R GIUB      -.0001 -.0007 -.0006  .0006 -.0007  .0001   .5  -.5   .1
S001 1 1311 R GSFC       .0007 -.0011 -.0011  .0012 -.0010 -.0007  2.3 -1.3  -.9
S001 1 1311 R SHA        .0007 -.0008 -.0017  .0010 -.0015 -.0010   .8 -1.0  -.8
S007 1 7298 R GSFC       .0006  .0009 -.0003 -.0007  .0001 -.0009 -2.4   .2 -2.8
S007 1 7298 R SHA        .0009  .0000 -.0004  .0003 -.0001 -.0009   .2  -.1  -.9
S008 1 KOKA D GRGS       .0011 -.0033 -.0009  .0035 -.0009 -.0002   .3  -.1   .0
S008 1 KOKA D9 IGN       .0026 -.0031 -.0014  .0038 -.0008 -.0018   .4  -.1  -.2
S008 1 KOKA C GRIM       .0004  .0117  .0030 -.0109  .0044 -.0029 -1.1   .9  -.4

40425 SOURDOUGH

Positions
M001 1 7281 R GSFC      -.0009 -.0002  .0000 -.0003 -.0008  .0004   .0  -.1   .0 86: 15
M001 1 7281 R SHA       -.0009  .0006  .0042 -.0010  .0016  .0039  -.1   .1   .2 86: 41
M001 2 7281 R GSFC       .0076  .0028 -.0025  .0020  .0058 -.0058   .0   .1   .0 97:  1
M001 2 7281 R SHA       -.0046 -.0021  .0043 -.0009 -.0024  .0061   .0   .0   .0 97:  1

Velocities
M001 1 7281 R GSFC       .0010  .0004 -.0004  .0002  .0008 -.0008   .0   .1   .0
M001 1 7281 R SHA       -.0005 -.0003  .0002 -.0001 -.0005  .0004   .0   .0   .0
M001 2 7281 R GSFC      -.0445 -.0217 -.0181 -.0073 -.0518  .0064   .0   .0   .0
M001 2 7281 R SHA       -.0289  .0015 -.0184 -.0176 -.0289 -.0058   .0   .0   .0

40426 CAP CANAVERAL I

Positions
S001 1 CCV1 P CORS      -.0001  .0004  .0001  .0000  .0003 -.0003   .0   .1  -.1 97:149

Velocities
S001 1 CCV1 P CORS       .0001  .0001  .0000  .0001  .0000 -.0001   .0   .0   .0

40427 FORT ORD

Positions
M001 1 7266 R GSFC       .0005  .0031 -.0020 -.0012  .0001 -.0035  -.1   .0  -.2 87: 40
M001 1 7266 R SHA        .0026  .0040  .0007  .0001  .0035 -.0034   .0   .2  -.2 87: 69
M002 1 7241 R GSFC       .0011  .0052 -.0040 -.0018 -.0003 -.0064  -.1   .0  -.3 89: 33
M002 1 7241 R SHA        .0013  .0029  .0001 -.0004  .0020 -.0025   .0   .1  -.1 89: 47
M002 2 7241 R GSFC       .0097  .0113 -.0340  .0023 -.0185 -.0321   .0  -.2  -.3 97:  1
M002 2 7241 R SHA        .0094  .0065 -.0332  .0046 -.0204 -.0282   .1  -.2  -.3 97:  1

Velocities
M001 1 7266 R GSFC       .0002  .0004  .0009 -.0001  .0010  .0002   .0   .1   .0
M001 1 7266 R SHA       -.0012 -.0007  .0019 -.0007  .0008  .0021  -.1   .1   .2
M002 1 7241 R GSFC       .0013  .0010 -.0046  .0006 -.0027 -.0040   .0  -.2  -.2
M002 1 7241 R SHA        .0012  .0005 -.0049  .0008 -.0033 -.0037   .1  -.2  -.2
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M002 2 7241 R GSFC      -.0512  .0001  .0298 -.0436  .0080  .0393   .0   .0   .0
M002 2 7241 R SHA       -.0333  .0265  .0243 -.0422  .0225  .0104   .0   .0   .0

40428 SANTA PAULA I

Positions
M001 1 7255 R GSFC       .0001  .0026 -.0016 -.0012  .0000 -.0028  -.1   .0  -.1 88:343
M001 1 7255 R SHA        .0013  .0032  .0001 -.0004  .0020 -.0028   .0   .1  -.1 88:346

Velocities
M001 1 7255 R GSFC       .0022  .0037 -.0027  .0001  .0002 -.0050   .0   .0  -.3
M001 1 7255 R SHA       -.0007 -.0001 -.0005 -.0006 -.0006  .0000  -.1  -.1   .0

40429 ALBUQUERQUE

Positions
S001 1 7884 L AUS        .0073  .0105  .0050  .0041  .0110 -.0071   .1   .2  -.1 96:357
S001 1 7884 L CGS        .0452  .0377 -.0164  .0326  .0146 -.0496  1.1   .3 -1.0 97:  1
S001 1 7884 L4 CSR       .0321 -.0168  .0077  .0355  .0023  .0101   .4   .0   .1 96:327
S001 1 7884 L DEOS       .0691  .0120  .0103  .0629  .0263 -.0196   .1   .0   .0 94:137
S001 1 7884 L JCET      -.0027 -.0036 -.0035 -.0016 -.0053  .0014  -.2  -.6   .2 96: 56
S001 1 7884 C1 CSR       .0228  .0286 -.0026  .0138  .0173 -.0293   .4   .3  -.5 96:314

Velocities
S001 1 7884 L AUS        .0160  .0186 -.0063  .0101  .0077 -.0220   .2   .1  -.4
S001 1 7884 L CGS        .0013  .0231 -.0021 -.0053  .0112 -.0197   .0   .0   .0
S001 1 7884 L4 CSR       .0493  .0538 -.0352  .0320  .0087 -.0739   .2   .0  -.3
S001 1 7884 L DEOS      -.0069 -.0053 -.0145 -.0051 -.0159 -.0025   .0  -.1   .0
S001 1 7884 L JCET       .0272  .0340  .0067  .0165  .0286 -.0292  1.6  1.9 -2.0
S001 1 7884 C1 CSR       .0462  .0479 -.0226  .0307  .0153 -.0614   .2   .0  -.2

40430 BLACK BUTTE

Positions
M001 1 7269 R GSFC       .0013  .0059 -.0050 -.0014 -.0009 -.0076  -.1  -.1  -.4 87: 93
M001 1 7269 R SHA        .0026  .0060 -.0017 -.0002  .0022 -.0063   .0   .1  -.3 87: 73

Velocities
M001 1 7269 R GSFC       .0006  .0006 -.0001  .0003  .0004 -.0007   .0   .0   .0
M001 1 7269 R SHA       -.0014 -.0032  .0027  .0001  .0003  .0044   .0   .0   .3

40431 DEADMAN LAKE

Positions
M001 1 7267 R GSFC      -.0021 -.0012  .0007 -.0013 -.0005  .0021   .0   .0   .0 87:248
M001 1 7267 R SHA        .0027  .0055 -.0010  .0000  .0026 -.0057   .0   .1  -.2 87:255

Velocities
M001 1 7267 R GSFC       .0162  .0335 -.0250 -.0003  .0003 -.0448   .0   .0  -.5
M001 1 7267 R SHA       -.0055 -.0109  .0083 -.0001  .0000  .0147   .0   .0   .3

40432 ELY

Positions
M001 1 7286 R GSFC       .0000  .0026 -.0015 -.0011  .0004 -.0028  -.1   .0  -.2 88:103
M001 1 7286 R SHA        .0010  .0018  .0007  .0001  .0018 -.0011   .0   .1  -.1 88:129

Velocities
M001 1 7286 R GSFC       .0007  .0017 -.0017 -.0001 -.0001 -.0025   .0   .0  -.2
M001 1 7286 R SHA       -.0009 -.0005  .0008 -.0006  .0000  .0012  -.1   .0   .1

40433 QUINCY

Positions
M001 1 7051 TIE40433    -.0001 -.0007 -.0008  .0002 -.0011  .0000   .1  -.3   .0 97:  1
M001 1 7051 L4 CSR      -.0549 -.0449  .1331 -.0240  .0592  .1367  -.2   .4  1.0 81: 69
M002 1 7109 TIE40433     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7109 L AUS       -.0024  .0114  .0011 -.0079  .0063 -.0058  -.6   .5  -.5 94:132
M002 1 7109 L CGS        .0130 -.0011  .0017  .0117  .0050 -.0033  1.8   .9  -.6 92:283
M002 1 7109 L CRL        .0097  .0031 -.0063  .0067  .0001 -.0099  1.0   .0 -1.4 91:237
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M002 1 7109 L4 CSR       .0065  .0041 -.0041  .0035  .0012 -.0079   .9   .2 -1.6 91:124
M002 1 7109 L DEOS       .0132 -.0040 -.0024  .0133  .0003 -.0041  1.9   .0  -.5 92: 90
M002 1 7109 L DGFI       .0068 -.0028 -.0097  .0073 -.0067 -.0071  1.2 -1.1 -1.1 93:  9
M002 1 7109 L JCET       .0000  .0020 -.0012 -.0010  .0002 -.0021  -.7   .1 -1.1 94:341
M002 1 7109 C GRIM       .0016 -.0047 -.0025  .0038 -.0040  .0008  1.4 -1.8   .4 91:291
M002 1 7109 C1 CSR       .0005  .0025 -.0058 -.0009 -.0029 -.0055  -.5 -1.3 -2.5 94:327
M004 1 7221 TIE40433    -.0002 -.0001 -.0002 -.0001 -.0003  .0000  -.1  -.2   .0 97:  1
M004 1 7221 R GSFC      -.0024  .0053 -.0070 -.0048 -.0032 -.0070  -.6  -.3  -.7 88:  3
M004 1 7221 R SHA       -.0017  .0036 -.0019 -.0033  .0000 -.0030  -.3   .0  -.2 88:130
M004 1 7221 P CODE       .0047  .0016  .0054  .0032  .0066  .0006  1.1  1.6   .2 97:230
M004 1 7221 P IGS        .0010  .0026 -.0033 -.0005 -.0007 -.0042  -.2  -.2 -1.3 97:267
M004 1 7221 P NCL        .0052  .0109 -.0095 -.0011  .0005 -.0153  -.2   .1 -2.2 96:184
M004 1 7221 P CORS      -.0015 -.0069  .0048  .0022 -.0007  .0082   .7  -.2  2.4 98: 17
M005 1 7886 TIE40433     .0004 -.0004  .0000  .0006  .0000  .0001   .2   .0   .0 97:  1
M005 1 7886 L4 CSR       .0077  .0827 -.0441 -.0359  .0143 -.0857  -.4   .1  -.8 84:197
M005 1 7886 L DEOS       .0057  .0316 -.0537 -.0114 -.0219 -.0575  -.1  -.2  -.5 93:  1

Velocities
M001 1 7051 L4 CSR       .0086 -.0584 -.0080  .0374 -.0355  .0298   .4  -.3   .3
M002 1 7109 L AUS       -.0008 -.0054 -.0014  .0021 -.0044  .0030   .3  -.6   .4
M002 1 7109 L CGS        .0000 -.0011 -.0023  .0005 -.0023 -.0008   .3 -1.8  -.5
M002 1 7109 L CRL       -.0008 -.0027 -.0023  .0007 -.0036  .0006   .2 -1.0   .2
M002 1 7109 L4 CSR       .0017 -.0019 -.0023  .0025 -.0023 -.0009  1.9 -1.7  -.6
M002 1 7109 L DEOS       .0027 -.0066 -.0053  .0058 -.0068 -.0001  1.4 -1.8   .0
M002 1 7109 L DGFI       .0004 -.0060 -.0006  .0034 -.0036  .0034  1.2 -1.3  1.2
M002 1 7109 L JCET      -.0010 -.0023  .0016  .0003 -.0003  .0029   .3  -.2  2.0
M002 1 7109 C GRIM      -.0046  .0034  .0017 -.0057  .0016  .0007 -2.1  1.1   .4
M002 1 7109 C1 CSR      -.0015 -.0011  .0014 -.0007  .0000  .0022  -.5   .0  1.3
M004 1 7221 R GSFC       .0004 -.0013  .0030  .0010  .0017  .0026   .2   .3   .4
M004 1 7221 R SHA        .0001 -.0013  .0022  .0008  .0010  .0022   .2   .2   .4
M004 1 7221 P CODE      -.0015 -.0051  .0007  .0014 -.0028  .0044   .7 -1.1  1.8
M004 1 7221 P IGS       -.0013 -.0052  .0034  .0015 -.0007  .0062   .6  -.2  1.9
M004 1 7221 P NCL       -.0015 -.0063  .0027  .0019 -.0019  .0065   .5  -.4  1.4
M004 1 7221 P CORS      -.0026 -.0044  .0027  .0000 -.0012  .0057   .0  -.4  1.7
M005 1 7886 L4 CSR      -.0285 -.0203 -.0121 -.0140 -.0299  .0168  -.1  -.2   .1
M005 1 7886 L DEOS       .0018  .0152  .0193 -.0063  .0237  .0017   .0   .0   .0

40434 MOUNT HOPKINS

Positions
M002 1 7888 L4 CSR      -.0188  .0172  .0270 -.0237  .0279  .0062  -.1   .1   .0 82: 56
S001 1 7921 L4 CSR      -.0528  .0392 -.0117 -.0632 -.0006 -.0213  -.5   .0  -.1 78: 50

Velocities
M002 1 7888 L4 CSR      -.0063  .0427  .1122 -.0211  .1152  .0269   .0   .1   .0
S001 1 7921 L4 CSR       .0137 -.0070  .0008  .0153 -.0002  .0018   .3   .0   .0

40436 SAN DIEGO - OTAY

Positions
M002 1 7062 TIE40436     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7062 L4 CSR      -.0797 -.0228  .0138 -.0608 -.0187  .0549  -.6  -.2   .4 81:313
M003 1 7035 TIE40436    -.0006  .0000 -.0004 -.0006 -.0004  .0000  -.2  -.1   .0 97:  1
M003 1 7035 L CGS       -.0087  .0064  .0159 -.0107  .0144  .0070  -.4   .4   .2 97:  1
M003 1 7035 L4 CSR       .0176  .0187 -.0017  .0073  .0119 -.0216   .1   .1  -.2 88:241
M003 1 7035 C GRIM       .0383 -.0110 -.0085  .0391 -.0032 -.0109  1.3  -.1  -.3 88:245

Velocities
M002 1 7062 L4 CSR       .0307  .0058 -.0382  .0247 -.0219 -.0366  1.0  -.8 -1.2
M003 1 7035 L CGS       -.0337  .0308  .0183 -.0440  .0220 -.0005   .0   .0   .0
M003 1 7035 L4 CSR       .1840  .1802 -.0926  .0828  .0533 -.2553   .1   .1  -.4
M003 1 7035 C GRIM       .0094  .0769  .0718 -.0263  .0997 -.0227   .0   .1   .0

40437 MAMMOTH LAKES

Positions
M001 1 7259 R GSFC       .0018  .0084 -.0042 -.0025  .0017 -.0090  -.1   .0  -.2 85:182
M001 1 7259 R SHA        .0008  .0024  .0045 -.0005  .0051  .0008   .0   .1   .0 85:206
M002 1 CASA P2 JPL       .0011  .0012  .0005  .0004  .0013 -.0009   .1   .2  -.1 99: 46
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Velocities
M001 1 7259 R GSFC      -.0055 -.0120  .0044  .0010 -.0046  .0131   .0  -.2   .4
M001 1 7259 R SHA       -.0065 -.0151  .0052  .0016 -.0059  .0161   .1  -.2   .6
M002 1 CASA P2 JPL      -.0003  .0019 -.0014 -.0012 -.0002 -.0021  -.2   .0  -.2

40438 BEAR LAKE

Positions
M001 1 7082 TIE40438     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7082 L4 CSR       .0811 -.3997 -.2232  .2214 -.3949  .1056  1.6 -1.6   .4 80:162
M002 1 7046 TIE40438     .0004 -.0012 -.0010  .0008 -.0014  .0000   .3  -.4   .0 97:  1
M002 1 7046 L CGS       -.0049 -.0259  .0386  .0049  .0114  .0450   .3   .5  1.9 91: 80
M002 1 7046 L4 CSR      -.0131 -.0333  .0332  .0000  .0008  .0488   .0   .0   .8 91: 65
M002 1 7046 L DEOS      -.0024  .0288  .0517 -.0128  .0558  .0153  -.2   .7   .2 92: 73
M002 1 7046 L DGFI      -.0120 -.0154  .0194 -.0055  .0019  .0269  -.2   .1  1.1 91:122
M002 1 7046 C GRIM      -.0194 -.0182  .0336 -.0114  .0089  .0403  -.6   .3  1.3 91:272

Velocities
M001 1 7082 L4 CSR       .0330  .0254 -.0646  .0214 -.0242 -.0697   .5  -.4 -1.1
M002 1 7046 L CGS       -.0275  .0288  .0411 -.0362  .0418  .0150 -1.2  1.0   .4
M002 1 7046 L4 CSR      -.0158  .0276  .0347 -.0248  .0391  .0083 -1.1  1.2   .2
M002 1 7046 L DEOS      -.0096  .0430  .0264 -.0247  .0440 -.0095  -.6  1.1  -.2
M002 1 7046 L DGFI      -.0130  .0332  .0268 -.0242  .0374 -.0015  -.9  1.3  -.1
M002 1 7046 C GRIM       .0176 -.0020 -.0338  .0171 -.0221 -.0260   .0   .0   .0

40439 OWENS VALLEY

Positions
M001 1 7114 TIE40439     .0002 -.0002 -.0001  .0003 -.0001  .0000   .1   .0   .0 97:  1
M001 1 7114 L4 CSR      -.0238  .0216  .0057 -.0312  .0093 -.0027  -.4   .1   .0 80:275
M003 1 7084 TIE40439     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 7084 L4 CSR       .2049  .9726 -.8302 -.2806 -.0841-1.2615  -.4  -.1 -1.4 78: 69
M004 1 7853 TIE40439     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 7853 R GSFC      -.0027  .0036 -.0022 -.0041 -.0006 -.0028  -.3   .0  -.2 87:306
M004 1 7853 R SHA       -.0021  .0016  .0027 -.0026  .0023  .0013  -.2   .1   .1 87:306
M004 1 7853 L CGS       -.0891  .0123  .0258 -.0842  .0015  .0406 -3.5   .1  1.8 97:  1
M004 1 7853 L4 CSR       .0051 -.0097 -.0311  .0091 -.0285 -.0140   .2  -.5  -.2 89: 18
M004 1 7853 L DEOS      -.0177 -.0669  .0701  .0161  .0151  .0960   .2   .1   .8 91:271
M004 1 7853 C GRIM       .0210  .0051 -.0350  .0160 -.0191 -.0327   .8  -.9 -1.5 88:328
S002 1 7207 TIE40439    -.0094 -.0197  .0085  .0011 -.0064  .0225   .2  -.7  2.6 97:  1
S002 1 7207 R GIUB       .0065  .0053 -.0018  .0032  .0032 -.0072   .3   .3  -.6 87:104
S002 1 7207 R GSFC       .0091  .0209 -.0189 -.0018 -.0013 -.0295  -.3  -.2 -3.8 86:320
S002 1 7207 R SHA        .0088  .0194 -.0182 -.0014 -.0016 -.0280  -.2  -.1 -2.5 91:168
S006 1 7616 R GIUB       .0028  .0021  .0002  .0014  .0021 -.0024   .7   .7  -.9 95:151
S006 1 7616 R GSFC      -.0005 -.0020  .0023  .0005  .0006  .0030   .5   .4  2.2 95:153
S006 1 7616 R SHA       -.0007 -.0028  .0025  .0007  .0003  .0037   .3   .1  1.4 96: 84

Velocities
M001 1 7114 L4 CSR       .0106  .0379 -.0107 -.0087  .0147 -.0371  -.2   .3  -.8
M003 1 7084 L4 CSR      -.0714 -.6290 -.8775  .2353-1.0542 -.0630   .1  -.4   .0
M004 1 7853 R GSFC      -.5460  .4527 -.0542 -.6953  .0414 -.1441  -.4   .0  -.1
M004 1 7853 R SHA       -.0213  .0213  .0032 -.0288  .0078 -.0049  -.1   .0   .0
M004 1 7853 L CGS       -.0291  .0123 -.0113 -.0315 -.0108 -.0045   .0   .0   .0
M004 1 7853 L4 CSR       .0079  .0327 -.0060 -.0086  .0149 -.0295  -.4   .5 -1.1
M004 1 7853 L DEOS      -.0036 -.0324  .0262  .0122  .0025  .0400   .3   .1  1.1
M004 1 7853 C GRIM      -.0051 -.0122  .0130  .0012  .0024  .0183   .0   .0   .3
S002 1 7207 R GIUB      -.0023 -.0053  .0009  .0005 -.0027  .0051   .1  -.4   .7
S002 1 7207 R GSFC      -.0001 -.0005 -.0001  .0001 -.0003  .0003   .1  -.3   .3
S002 1 7207 R SHA       -.0003 -.0001 -.0007 -.0002 -.0007 -.0002  -.2  -.5  -.1
S006 1 7616 R GIUB       .0000 -.0016  .0023  .0008  .0010  .0025   .7   .8  2.1
S006 1 7616 R GSFC       .0006  .0007 -.0005  .0002  .0001 -.0010   .9   .4 -3.7
S006 1 7616 R SHA       -.0009 -.0026  .0021  .0005  .0000  .0034   .4   .0  2.5

40440 WESTFORD

Positions
M001 1 7091 TIE40440     .0053  .0072 -.0012  .0073  .0026 -.0046  2.2   .6 -1.1 97:  1
M001 1 7091 L CGS       -.0060  .0207 -.0150  .0009  .0036 -.0260   .0   .1  -.7 90:288
M001 1 7091 L4 CSR      -.0211  .0135  .0123 -.0157  .0223 -.0060  -.5   .3  -.1 87:148
M001 1 7091 C GRIM       .0108  .0037 -.0062  .0115 -.0045 -.0043   .7  -.2  -.2 90: 21
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S002 1 7205 TIE40440     .0057  .0089 -.0014  .0082  .0035 -.0059  2.4   .8 -1.3 97:  1
S002 1 7205 R GIUB      -.0002 -.0034  .0017 -.0012 -.0009  .0035  -.3  -.2   .6 90:118
S002 1 7205 R GSFC      -.0015  .0012 -.0014 -.0011  .0001 -.0022  -.5   .0  -.4 89:127
S002 1 7205 R SHA       -.0051 -.0002 -.0022 -.0049 -.0006 -.0025 -1.3  -.1  -.4 94:343
S003 1 7209 TIE40440     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S003 1 7209 R GIUB       .0019  .0003  .0010  .0019  .0005  .0009   .9   .2   .4 95: 98
S003 1 7209 R GSFC       .0003  .0011 -.0006  .0007  .0002 -.0011  1.1   .2 -1.1 94:  3
S003 1 7209 R SHA        .0009  .0001  .0011  .0009  .0006  .0009   .7   .4   .6 96:332
S020 1 WES2 TIE40440    -.0068  .0117 -.0103 -.0027  .0014 -.0168  -.6   .2 -2.8 97:  1
S020 1 WES2 P CODE       .0032 -.0040  .0134  .0018  .0066  .0126   .7  1.8  3.5 97:302
S020 1 WES2 P GFZ       -.0021 -.0030 -.0008 -.0030 -.0020  .0010 -1.6  -.8   .4 97:351
S020 1 WES2 P IGS        .0017  .0001 -.0015  .0017 -.0014 -.0007  1.9 -1.0  -.5 98: 75
S020 1 WES2 P1 JPL       .0048 -.0012 -.0019  .0042 -.0032  .0007  1.6  -.9   .2 98:133
S020 1 WES2 P NCL        .0009 -.0030  .0051 -.0001  .0016  .0058  -.1   .5  1.7 96:296
S020 1 WES2 P NOAA      -.0001 -.0019  .0010 -.0007 -.0005  .0019  -.4  -.2   .9 97:158
S020 1 WES2 P CORS      -.0013  .0010 -.0001 -.0009  .0008 -.0011  -.7   .4  -.6 97:145
S020 2 WES2 P CODE       .0035 -.0007  .0087  .0031  .0052  .0071  1.1  1.1  1.6 97:275

Velocities
M001 1 7091 L CGS        .0461  .0173 -.0015  .0492  .0001 -.0023   .7   .0   .0
M001 1 7091 L4 CSR       .0009 -.0032 -.0050 -.0002 -.0059 -.0010   .0  -.5  -.1
M001 1 7091 C GRIM      -.0061  .0063 -.0001 -.0037  .0053 -.0059  -.3   .2  -.3
S002 1 7205 R GIUB       .0006 -.0016  .0006  .0001 -.0007  .0017   .0  -.3   .7
S002 1 7205 R GSFC      -.0008  .0004 -.0010 -.0006 -.0003 -.0011 -1.6  -.4 -1.6
S002 1 7205 R SHA       -.0008  .0001 -.0006 -.0008 -.0002 -.0006  -.7  -.2  -.6
S003 1 7209 R GIUB       .0005 -.0001  .0004  .0004  .0001  .0005   .6   .2   .6
S003 1 7209 R GSFC       .0002  .0000 -.0001  .0002 -.0001  .0000  2.0  -.5   .0
S003 1 7209 R SHA        .0002 -.0001  .0002  .0001  .0001  .0002   .1   .1   .2
S020 1 WES2 P CODE      -.0012  .0011 -.0032 -.0008 -.0014 -.0032  -.5  -.6 -1.4
S020 1 WES2 P GFZ        .0007  .0018 -.0014  .0013  .0000 -.0020  1.6   .0 -1.8
S020 1 WES2 P IGS       -.0011  .0019 -.0020 -.0005  .0000 -.0030  -.6   .0 -2.8
S020 1 WES2 P1 JPL      -.0013 -.0010  .0019 -.0016  .0011  .0016 -1.3   .6  1.0
S020 1 WES2 P NCL        .0000 -.0035  .0013 -.0012 -.0013  .0033  -.5  -.3   .8
S020 1 WES2 P NOAA       .0000 -.0004  .0012 -.0001  .0007  .0011  -.1   .4   .7
S020 1 WES2 P CORS       .0001  .0000 -.0001  .0000 -.0001  .0000   .1  -.1   .0
S020 2 WES2 P CODE      -.0012  .0011 -.0032 -.0008 -.0014 -.0032  -.5  -.6 -1.4

40441 GREENBANK

Positions
S001 1 7204 R GIUB       .0010  .0060  .0090  .0020  .0106  .0011   .3   .8   .1 91:203
S001 1 7204 R GSFC       .0008 -.0014  .0000  .0005 -.0009  .0012   .5  -.3   .4 93:148
S001 1 7204 R SHA        .0011  .0043 -.0024  .0019  .0006 -.0046   .8   .1 -1.0 95:135
S004 1 7214 R GIUB      -.0005 -.0007  .0035 -.0006  .0024  .0027  -.2   .4   .4 92:199
S004 1 7214 R GSFC      -.0008  .0021 -.0020 -.0004 -.0002 -.0030  -.3  -.1  -.8 90:213
S004 1 7214 R SHA        .0007 -.0033  .0025  .0001 -.0001  .0042   .0   .0   .9 95:189
S004 2 7214 R GIUB       .0019 -.0022  .0064  .0015  .0034  .0059   .5   .8  1.4 97:  1
S004 2 7214 R GSFC       .0009 -.0043  .0038  .0001  .0002  .0058   .1   .1  2.5 97:  1
S004 2 7214 R SHA        .0008 -.0030  .0012  .0003 -.0009  .0032   .2  -.4  1.4 97:  1
S005 1 7248 R GSFC       .0032 -.0023 -.0009  .0027 -.0025  .0016   .7  -.2   .1 92:305
S005 1 7248 R SHA       -.0011  .0026 -.0006 -.0007  .0013 -.0025  -.1   .2  -.3 92:307
S007 1 7208 R GIUB       .0035 -.0024  .0039  .0031  .0012  .0047  1.4   .4  1.9 96: 73
S007 1 7208 R SHA        .0003  .0044 -.0022  .0010  .0009 -.0047   .8   .5 -2.5 97:  1

Velocities
S001 1 7204 R GIUB      -.0054  .0177 -.0130 -.0022  .0012 -.0224  -.2   .1 -1.2
S001 1 7204 R GSFC       .0002 -.0008  .0007  .0001  .0001  .0011   .3   .1  1.3
S001 1 7204 R SHA        .0001  .0002  .0001  .0002  .0001 -.0001   .1   .1   .0
S004 1 7214 R GIUB       .0002 -.0015  .0015 -.0001  .0002  .0021  -.1   .2  1.6
S004 1 7214 R GSFC       .0000 -.0014  .0014 -.0002  .0002  .0019  -.7   .4  2.8
S004 1 7214 R SHA        .0001 -.0007  .0007  .0000  .0001  .0009   .0   .1   .9
S004 2 7214 R GIUB      -.0143 -.0029 -.0018 -.0146 -.0016 -.0008   .0   .0   .0
S004 2 7214 R GSFC      -.0353 -.0322  .0089 -.0404 -.0088  .0255   .0   .0   .0
S004 2 7214 R SHA       -.0168 -.0029  .0023 -.0170  .0019  .0014   .0   .0   .0
S005 1 7248 R GSFC      -.2490 -.2237 -.3206 -.2846 -.3607 -.0613  -.1  -.2   .0
S005 1 7248 R SHA       -.0125  .0393  .0499 -.0053  .0644 -.0010   .0   .3   .0
S007 1 7208 R GIUB       .0002  .0016 -.0018  .0004 -.0005 -.0023   .5  -.4 -2.0
S007 1 7208 R SHA        .0001  .0011 -.0018  .0003 -.0007 -.0019   .3  -.7 -1.8

40442 FORT DAVIS
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Positions
M001 1 7086 TIE40442    -.0033  .0021  .0023 -.0037  .0026  .0001  -.4   .3   .0 97:  1
M001 1 7086 L CGS        .0192 -.0069  .0061  .0203  .0042  .0049  1.2   .2   .2 97:  1
M001 1 7086 L4 CSR      -.0059 -.0077  .0145 -.0038  .0079  .0150  -.4   .5   .8 86:313
M001 1 7086 L DEOS       .0306  .0258 -.0445  .0235 -.0217 -.0506  1.7 -1.2 -3.3 93:  1
M001 1 7086 C GRIM      -.0020 -.0249  .0134  .0041 -.0010  .0280   .4  -.1  2.3 93:  1
M005 1 7885 TIE40442    -.0034  .0021  .0023 -.0039  .0026  .0001  -.4   .3   .0 97:  1
M005 1 7885 L4 CSR       .0124 -.0788  .0696  .0311  .0224  .0987   .2   .1   .3 82:234
M006 1 7080 TIE40442     .0003  .0028 -.0033 -.0004 -.0014 -.0040   .0  -.2  -.4 97:  1
M006 1 7080 M FSG        .0073  .0006  .0021  .0069  .0031 -.0010   .2   .1   .0 93:  1
M006 1 7080 L AUS       -.0056 -.0034  .0041 -.0046  .0012  .0061  -.3   .1   .5 97:256
M006 1 7080 L CGS        .0145 -.0016 -.0061  .0145 -.0043 -.0048  1.8  -.7  -.7 94:291
M006 1 7080 L CRL        .0024 -.0029  .0015  .0030  .0002  .0027   .6   .0   .4 91:178
M006 1 7080 L4 CSR      -.0003 -.0110  .0077  .0024  .0011  .0132   .6   .2  1.9 91:362
M006 1 7080 L DEOS       .0087 -.0015 -.0038  .0088 -.0029 -.0025  1.1  -.3  -.3 92:173
M006 1 7080 L DGFI       .0021 -.0072 -.0059  .0038 -.0084  .0026   .5 -1.2   .4 93: 78
M006 1 7080 L JCET      -.0007 -.0040  .0030  .0003  .0005  .0050   .2   .3  2.5 96:142
M006 1 7080 C GRIM      -.0057  .0064 -.0075 -.0071 -.0040 -.0080 -1.2 -1.4 -2.6 93:  1
M006 1 7080 C1 CSR      -.0017 -.0066  .0042 -.0001  .0001  .0080   .0   .1  3.5 96:174
M008 1 7850 TIE40442    -.0013  .0053  .0030 -.0025  .0050 -.0026  -.3   .6  -.3 97:  1
M008 1 7850 R GSFC      -.0039 -.0030  .0017 -.0031 -.0005  .0042  -.3   .0   .2 88:281
M008 1 7850 R SHA       -.0026 -.0061  .0059 -.0011  .0017  .0086  -.1   .1   .4 88:281
M008 1 7850 L AUS        .0012 -.0093  .0297  .0034  .0211  .0226   .2  1.3  1.3 93:233
M008 1 7850 L CGS       -.0630  .0036 -.0187 -.0620 -.0221  .0006 -3.3  -.8   .0 97:  1
M008 1 7850 L4 CSR      -.0001 -.0290  .0123  .0070 -.0038  .0304   .2  -.1   .4 93: 67
M008 1 7850 L DEOS       .0088 -.0126 -.0098  .0116 -.0136  .0037   .5  -.5   .2 93:  1
M008 1 7850 L DGFI      -.0069 -.0112 -.0022 -.0040 -.0083  .0096  -.2  -.5   .6 92:233
M008 1 7850 L JCET      -.0033 -.0157  .0106  .0006  .0010  .0192   .1   .1  2.2 93: 76
M008 1 7850 C GRIM      -.0100 -.0201  .0017 -.0048 -.0097  .0197  -.4  -.6  1.0 91:330
M008 1 7850 C1 CSR      -.0036 -.0249  .0120  .0026 -.0024  .0277   .2  -.1  1.3 93: 77
M009 1 7900 TIE40442    -.0053  .0006 -.0004 -.0053 -.0007  .0004 -1.7  -.2   .1 97:  1
M009 1 7900 R GSFC       .0112  .0191 -.0114  .0063  .0010 -.0241   .5   .0  -.9 88:283
M009 1 7900 R SHA        .0116  .0150 -.0064  .0076  .0034 -.0182   .6   .2  -.7 88:283
M012 1 MDO1 TIE40442    -.0046  .0042  .0067 -.0055  .0073  .0008  -.6   .8   .1 97:  1
M012 1 MDO1 P CODE       .0047  .0057  .0044  .0032  .0072 -.0035  1.2  1.8 -1.0 97:281
M012 1 MDO1 P GFZ       -.0001  .0001 -.0021 -.0001 -.0018 -.0011  -.1  -.6  -.4 98: 63
M012 1 MDO1 P IGS        .0001  .0020 -.0013 -.0004 -.0001 -.0023  -.4  -.1 -1.4 98:101
M012 1 MDO1 P1 JPL       .0006 -.0056  .0024  .0019 -.0006  .0058  1.5  -.4  2.8 96:195
M012 1 MDO1 P NCL       -.0001  .0003 -.0001 -.0002  .0000 -.0003  -.1   .0  -.1 98: 86
M012 1 MDO1 P NOAA       .0003 -.0006  .0003  .0005  .0000  .0006   .2   .0   .2 97:124
M012 1 MDO1 P CORS       .0011  .0006 -.0007  .0010 -.0002 -.0011   .6  -.1  -.5 97: 33
S001 1 7086 TIE40442    -.0033  .0021  .0023 -.0037  .0026  .0001  -.4   .3   .0 97:  1
S002 1 7206 TIE40442    -.0033  .0021  .0023 -.0037  .0026  .0001  -.4   .3   .0 97:  1
S003 1 7216 TIE40442     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S003 1 7216 R GIUB       .0000 -.0045  .0036  .0011  .0009  .0056   .2   .1   .9 89:268
S003 1 7216 R GSFC      -.0008  .0003  .0008 -.0008  .0008  .0003  -.7   .4   .1 88:238
S017 1 7613 TIE40442    -.0075 -.0055  .0038 -.0059 -.0003  .0081 -1.9  -.1  2.5 97:  1
S017 1 7613 R GIUB       .0024  .0022 -.0002  .0018  .0012 -.0024   .8   .4 -1.0 95:  9
S017 1 7613 R GSFC       .0007 -.0003  .0011  .0007  .0009  .0007  1.0   .7   .5 94:282
S017 1 7613 R SHA        .0013  .0005 -.0013  .0011 -.0007 -.0014   .7  -.3  -.5 96:128

Velocities
M001 1 7086 L CGS       -.0261  .0019 -.0103 -.0258 -.0112 -.0014   .0   .0   .0
M001 1 7086 L4 CSR       .0011 -.0050 -.0014  .0022 -.0036  .0033   .7  -.6   .5
M001 1 7086 L DEOS      -.0053  .0013  .0041 -.0054  .0035  .0022   .0   .0   .0
M001 1 7086 C GRIM      -.1398  .0327 -.0043 -.1436 -.0048 -.0004  -.1   .0   .0
M005 1 7885 L4 CSR      -.1167 -.3755  .0910 -.0223 -.1221  .3841   .0  -.1   .2
M006 1 7080 M FSG        .0002  .0001  .0002  .0002  .0003  .0000   .1   .1   .0
M006 1 7080 L AUS        .0016  .0003  .0012  .0015  .0014  .0000   .2   .2   .0
M006 1 7080 L CGS        .0014 -.0019 -.0019  .0019 -.0024  .0003   .8 -1.3   .2
M006 1 7080 L CRL        .0011 -.0023 -.0029  .0016 -.0035  .0002   .4 -1.2   .1
M006 1 7080 L4 CSR       .0032 -.0023 -.0030  .0036 -.0033 -.0003  2.8 -2.5  -.2
M006 1 7080 L DEOS       .0054 -.0062 -.0064  .0067 -.0079  .0008  1.9 -2.0   .2
M006 1 7080 L DGFI       .0039 -.0018 -.0050  .0042 -.0047 -.0019  1.7 -2.0  -.9
M006 1 7080 L JCET       .0003 -.0019  .0007  .0008 -.0003  .0019  1.4  -.3  2.1
M006 1 7080 C GRIM      -.1398  .0327 -.0043 -.1436 -.0048 -.0004  -.1   .0   .0
M006 1 7080 C1 CSR       .0007  .0005 -.0004  .0005  .0000 -.0007   .9   .0  -.7
M008 1 7850 R GSFC      -.2732 -.0145  .0833 -.2616  .0307  .1115  -.2   .0   .1
M008 1 7850 R SHA       -.0049  .0001  .0035 -.0048  .0024  .0027   .0   .0   .0
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M008 1 7850 L AUS       -.0151 -.0023 -.0150 -.0141 -.0159 -.0026  -.9 -1.0  -.2
M008 1 7850 L CGS       -.0261  .0019 -.0103 -.0258 -.0112 -.0014   .0   .0   .0
M008 1 7850 L4 CSR       .0482  .0400 -.0241  .0371  .0051 -.0557   .2   .0  -.2
M008 1 7850 L DEOS      -.0053  .0013  .0041 -.0054  .0035  .0022   .0   .0   .0
M008 1 7850 L DGFI       .0039 -.0018 -.0050  .0042 -.0047 -.0019  1.7 -2.0  -.9
M008 1 7850 L JCET      -.0033  .0465 -.0054 -.0145  .0180 -.0409  -.1   .1  -.2
M008 1 7850 C GRIM      -.0044  .0002  .0022 -.0044  .0014  .0019 -1.2  1.4  1.4
M008 1 7850 C1 CSR      -.0139  .0235  .0170 -.0192  .0245 -.0081  -.1   .1   .0
M009 1 7900 R GSFC       .1792 -.1996 -.1792  .2220 -.2309  .0382   .1  -.1   .0
M009 1 7900 R SHA        .0022 -.0036 -.0021  .0030 -.0033  .0015   .0   .0   .0
M012 1 MDO1 P CODE       .0003 -.0023 -.0003  .0008 -.0013  .0017   .5  -.5   .7
M012 1 MDO1 P GFZ        .0015  .0012  .0002  .0012  .0009 -.0012  1.1   .6  -.7
M012 1 MDO1 P IGS        .0002 -.0006  .0014  .0003  .0009  .0012   .4   .8   .9
M012 1 MDO1 P1 JPL      -.0006  .0013  .0003 -.0009  .0008 -.0008 -1.3   .9  -.7
M012 1 MDO1 P NCL       -.0008 -.0034  .0026  .0001  .0004  .0043   .0   .2  1.8
M012 1 MDO1 P NOAA       .0003 -.0003  .0015  .0003  .0012  .0010   .2   .7   .5
M012 1 MDO1 P CORS       .0004  .0005  .0005  .0003  .0008 -.0002   .3   .6  -.1
S003 1 7216 R GIUB       .0016  .0016  .0002  .0012  .0011 -.0016  1.0   .6  -.7
S003 1 7216 R GSFC      -.0007 -.0034  .0021  .0001  .0001  .0041   .1   .0  1.4
S017 1 7613 R GIUB       .0008 -.0003  .0002  .0009  .0001  .0002  1.0   .1   .2
S017 1 7613 R GSFC       .0001  .0000 -.0002  .0000 -.0001 -.0001   .3  -.6  -.5
S017 1 7613 R SHA        .0004  .0005 -.0012  .0003 -.0007 -.0011   .3  -.6  -.9

40445 MAUI

Positions
M001 1 7210 TIE40445     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7210 L AUS        .0120 -.0040  .0163  .0085  .0186 -.0030   .9  1.8  -.4 96: 31
M001 1 7210 L CGS        .0053 -.0148  .0065  .0157  .0057  .0033  2.1  1.2   .6 93:295
M001 1 7210 L CRL       -.0029 -.0082  .0032  .0063  .0009  .0067   .8   .1   .6 91:348
M001 1 7210 L4 CSR       .0060 -.0005  .0011  .0029  .0029 -.0045   .7   .7  -.8 91:275
M001 1 7210 L DEOS       .0102 -.0113 -.0033  .0145 -.0014 -.0056  1.8  -.1  -.8 92:299
M001 1 7210 C GRIM      -.0044 -.0045 -.0009  .0023 -.0030  .0052   .5  -.8  1.0 92: 60
M001 1 7210 C1 CSR      -.0009  .0000 -.0032 -.0004 -.0033 -.0004  -.2 -1.8  -.2 96: 26
M002 1 7120 TIE40445     .0004 -.0005  .0016  .0006  .0015  .0003   .2   .5   .1 97:  1
M002 1 7120 R GSFC       .0208  .0124 -.0061 -.0030  .0027 -.0246  -.1   .1  -.8 88:190
M002 1 7120 R SHA        .0184  .0126 -.0022 -.0041  .0057 -.0213  -.2   .3  -.7 88:190
M002 1 7120 L4 CSR      -.0040  .0220 -.0341 -.0217 -.0301 -.0169  -.4  -.5  -.2 81:129
S005 1 7210 TIE40445     .0001  .0000  .0000  .0000  .0000 -.0001   .0   .0   .0 97:  1
S005 1 7210 M FSG       -.1903 -.1756 -.0834  .0842 -.1646  .1995   .6 -1.1  1.5 93:  1

Velocities
M001 1 7210 L AUS       -.0004 -.0017  .0049  .0014  .0042  .0028   .4  1.1  1.0
M001 1 7210 L CGS       -.0020 -.0021 -.0015  .0011 -.0024  .0020   .6 -2.1  1.3
M001 1 7210 L CRL        .0000 -.0026 -.0023  .0024 -.0025  .0001   .9  -.5   .0
M001 1 7210 L4 CSR      -.0004 -.0040 -.0002  .0035 -.0009  .0018  2.5  -.8  1.5
M001 1 7210 L DEOS       .0018 -.0073 -.0031  .0075 -.0034  .0001  1.7  -.8   .0
M001 1 7210 C GRIM      -.0039  .0050  .0020 -.0061  .0013  .0021 -1.7  1.1   .9
M001 1 7210 C1 CSR       .0007 -.0007  .0005  .0009  .0006 -.0002  1.0   .6  -.2
M002 1 7120 R GSFC       .6860 -.0582  .4894  .3295  .6715 -.3924   .3   .8  -.3
M002 1 7120 R SHA        .0724 -.0499  .0994  .0748  .1093 -.0081   .3   .5   .0
M002 1 7120 L4 CSR      -.0552  .0211  .0610 -.0415  .0422  .0609  -.8   .8   .9
S005 1 7210 M FSG       -.0278 -.0239 -.0157  .0107 -.0271  .0273   .5 -1.2  1.3

40449 OCOTILLO

Positions
M001 1 7270 R GSFC       .0375  .0736 -.0596  .0017 -.0054 -.1017   .0  -.1  -.9 85: 32
M001 1 7270 R SHA        .0077  .0096 -.0055  .0027  .0019 -.0130   .1   .0  -.2 85: 27

Velocities
M001 1 7270 R GSFC       .0783  .1325 -.0754  .0129  .0197 -.1698   .1   .1  -.5
M001 1 7270 R SHA       -.0035 -.0181  .0002  .0047 -.0094  .0151   .0  -.1   .1

40451 WASHINGTON

Positions
M101 1 7101 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M101 1 7101 L4 CSR      -.0544  .0131  .1336 -.0500  .1196  .0646  -.1   .1   .1 79:149
M102 1 7102 TIE40451    -.0077 -.0014 -.0001 -.0078  .0002 -.0004 -2.5   .1  -.1 97:  1
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M102 1 7102 R GSFC       .0029  .0003  .0011  .0029  .0006  .0010   .7   .1   .1 91:202
M102 1 7102 R SHA        .0028 -.0023  .0012  .0022 -.0009  .0030   .3  -.1   .3 91:226
M102 1 7102 L4 CSR      -.0265  .0282  .0312 -.0194  .0453 -.0063  -.4   .4  -.1 81:319
M103 1 7103 TIE40451    -.0003 -.0001  .0000 -.0003  .0000  .0000  -.1   .0   .0 97:  1
M103 1 7103 L4 CSR       .0229 -.0311  .0789  .0152  .0389  .0773   .2   .2   .4 82:201
M104 1 7104 TIE40451     .0001  .0000  .0000  .0001  .0000  .0000   .0   .0   .0 97:  1
M104 1 7104 L4 CSR      -.1529  .2032 -.0596 -.1026  .1002 -.2183  -.3   .1  -.3 79:108
M105 1 7105 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M105 1 7105 L AUS        .0000  .0013 -.0043  .0003 -.0025 -.0037   .0  -.3  -.5 96:353
M105 1 7105 L CGS        .0116  .0042 -.0036  .0123 -.0019 -.0034  1.8  -.4  -.7 93:226
M105 1 7105 L CRL       -.0018  .0001 -.0027 -.0017 -.0018 -.0020  -.3  -.2  -.3 91:178
M105 1 7105 L4 CSR       .0036 -.0052  .0028  .0023 -.0016  .0063   .8  -.3  1.2 91:266
M105 1 7105 L DEOS       .0063 -.0075  .0017  .0044 -.0042  .0079   .6  -.6  1.2 92: 49
M105 1 7105 L DGFI       .0038 -.0033 -.0092  .0030 -.0098 -.0026   .5 -1.7  -.5 93: 99
M105 1 7105 L JCET      -.0001  .0019 -.0022  .0004 -.0006 -.0028   .4  -.4 -1.8 96:272
M105 1 7105 C GRIM      -.0027 -.0037 -.0025 -.0034 -.0039  .0007  -.7 -1.8   .3 93:  1
M105 1 7105 C1 CSR       .0004  .0017  .0016  .0008  .0022 -.0002   .7  1.2  -.1 96:283
M106 1 7100 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M106 1 7100 L4 CSR       .0581 -.2753 -.2484 -.0061 -.3701  .0621   .0  -.3   .0 77:299
M108 1 7065 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M108 1 7065 L4 CSR      -.2626 -.4207  .8727 -.3516  .4578  .8212  -.2   .1   .2 76:161
M111 1 7899 TIE40451     .0000  .0000  .0001  .0000  .0001  .0000   .0   .0   .0 97:  1
M111 1 7899 L4 CSR      -.0177  .0893 -.0266  .0031  .0366 -.0875   .0   .1  -.2 80:255
M112 1 7063 TIE40451     .0003 -.0008 -.0010  .0001 -.0013  .0000   .0  -.4   .0 97:  1
M112 1 7063 L4 CSR      -.0369  .0323  .0849 -.0286  .0911  .0225  -.7   .9   .2 80:191
M113 1 7106 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M113 1 7106 L4 CSR      -.0891  .0039  .0824 -.0858  .0792  .0332   .0   .0   .0 95: 56
M114 1 7125 TIE40451     .0001 -.0005 -.0006  .0000 -.0008  .0000   .0  -.2   .0 97:  1
M114 1 7125 L4 CSR      -.0399  .1052 -.0005 -.0148  .0698 -.0870  -.2   .4  -.5 85:163
M114 1 7125 L DEOS       .0034 -.0057  .0097  .0020  .0036  .0110   .0   .0   .0 93:  1
M114 1 7125 C GRIM      -.0102  .0456 -.0144  .0005  .0182 -.0454   .0   .2  -.5 93:  1
M116 1 7130 TIE40451     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M116 1 7130 L4 CSR      -.0214  .0207 -.0024 -.0161  .0138 -.0209  -.1   .0   .0 86:339
M117 1 7920 TIE40451     .0006 -.0008  .0000  .0005 -.0006  .0007   .1  -.2   .2 97:  1
M117 1 7920 L CGS       -.0701  .0035 -.0481 -.0675 -.0251 -.0453 -1.1  -.2  -.3 97:  1
M117 1 7920 L4 CSR      -.0034  .0032 -.0036 -.0026 -.0003 -.0053   .0   .0   .0 90:239
M117 1 7920 L DEOS       .0004 -.0031 -.0099 -.0003 -.0096 -.0038   .0  -.2  -.1 93:  1
M117 1 7920 L JCET      -.0033  .0068  .0039 -.0016  .0077 -.0033  -.2  1.1  -.5 94:212
M117 1 7920 C GRIM       .0018 -.0116  .0051 -.0009 -.0034  .0123   .0  -.1   .3 93:  1
M120 1 7918 TIE40451     .0013 -.0043  .0030  .0003 -.0005  .0053   .1  -.2  1.7 97:  1
M120 1 7918 L AUS        .0099  .0241 -.0352  .0151 -.0140 -.0386   .3  -.3  -.8 96:293
M120 1 7918 L CGS        .0188  .0020 -.0143  .0188 -.0126 -.0072  1.5  -.8  -.5 97:  1
M120 1 7918 L CRL        .0016  .0003 -.0132  .0017 -.0103 -.0083   .2  -.9  -.7 92:244
M120 1 7918 L4 CSR       .0105 -.0102 -.0035  .0079 -.0104  .0074   .5  -.3   .2 94:217
M120 1 7918 L DEOS       .0096  .0034 -.0078  .0102 -.0053 -.0057   .7  -.4  -.4 93:  1
M120 1 7918 L DGFI      -.0036  .0002 -.0130 -.0035 -.0094 -.0089  -.3  -.9  -.9 92:272
M120 1 7918 L JCET      -.0007  .0031 -.0023  .0001  .0002 -.0039   .0   .0  -.8 96: 21
M120 1 7918 C GRIM       .0041 -.0041 -.0026  .0031 -.0052  .0022   .4  -.4   .2 91:301
M120 1 7918 C1 CSR       .0005 -.0036  .0101 -.0003  .0056  .0092   .0   .5   .7 96: 19
M121 1 7919 L4 CSR      -.0110  .0475 -.0114  .0001  .0219 -.0451   .0   .0  -.1 86:113
M123 1 GODE TIE40451     .0047 -.0143  .0070  .0013 -.0040  .0161   .3  -.8  3.2 97:  1
M123 1 GODE P CODE       .0030  .0009  .0077  .0031  .0061  .0047  1.3  1.6  1.3 97:307
M123 1 GODE P IGS       -.0011  .0020 -.0014 -.0006  .0002 -.0026  -.6   .1 -1.4 98:226
M123 1 GODE P1 JPL      -.0006  .0003  .0000 -.0005  .0002 -.0003  -.4   .1  -.2 97: 20
M123 1 GODE P NCL       -.0005 -.0003 -.0001 -.0006 -.0002  .0000  -.3  -.1   .0 98:121
M123 1 GODE P NOAA      -.0004 -.0027  .0014 -.0010 -.0005  .0029  -.5  -.2  1.2 97:150
M123 1 GODE P CORS      -.0003  .0006 -.0009 -.0002 -.0003 -.0010  -.2  -.2  -.6 97:230
M125 1 7108 TIE40451     .0037  .0036 -.0022  .0044 -.0001 -.0034  1.4   .0 -1.1 97:  1
M125 1 7108 R GSFC       .0009 -.0008  .0029  .0007  .0016  .0026   .5   .6   .9 95: 49
M125 1 7108 R SHA        .0011 -.0023  .0019  .0006 -.0001  .0031   .2   .0   .9 95: 70
S003 1 USNO P CODE       .0036 -.0028  .0083  .0029  .0042  .0079  1.1  1.0  2.0 98:183
S003 1 USNO P IGS       -.0006  .0004 -.0006 -.0005 -.0001 -.0007  -.5  -.1  -.4 98:336
S003 1 USNO P1 JPL       .0011  .0027 -.0007  .0017  .0009 -.0024   .9   .4  -.8 98:206

Velocities
M101 1 7101 L4 CSR      -.2969 -.0195  .1995 -.2935  .1857  .0878  -.2   .2   .1
M102 1 7102 R GSFC       .0002 -.0011 -.0017  .0000 -.0020 -.0002   .0  -.2   .0
M102 1 7102 R SHA       -.0001  .0000 -.0019 -.0001 -.0014 -.0012   .0  -.2  -.1
M102 1 7102 L4 CSR       .0015  .0289 -.0456  .0081 -.0179 -.0503   .4  -.4 -1.0
M103 1 7103 L4 CSR      -.0468  .0727 -.0803 -.0290 -.0112 -.1138  -.3  -.1  -.5
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M104 1 7104 L4 CSR       .3326 -.0051  .3794  .3227  .2439  .3016   .1   .1   .1
M105 1 7105 L AUS        .0055 -.0007 -.0019  .0052 -.0027  .0004  1.6  -.9   .1
M105 1 7105 L CGS        .0010 -.0005 -.0028  .0009 -.0027 -.0012   .5 -2.4 -1.1
M105 1 7105 L CRL        .0013 -.0008 -.0027  .0011 -.0028 -.0009   .3 -1.0  -.3
M105 1 7105 L4 CSR       .0023 -.0002 -.0035  .0022 -.0031 -.0016  1.7 -2.9 -1.6
M105 1 7105 L DEOS       .0060 -.0055 -.0056  .0045 -.0086  .0016  1.3 -2.6   .5
M105 1 7105 L DGFI       .0026 -.0023 -.0035  .0021 -.0045  .0000   .9 -2.4   .0
M105 1 7105 L JCET      -.0001  .0004 -.0008  .0000 -.0004 -.0008   .0  -.5 -1.1
M105 1 7105 C GRIM      -.1306 -.0258  .0031 -.1330  .0053 -.0016  -.1   .0   .0
M105 1 7105 C1 CSR      -.0003  .0003 -.0005 -.0002 -.0002 -.0006  -.3  -.2  -.7
M106 1 7100 L4 CSR       .0155 -.0700  .0446 -.0008 -.0105  .0838   .0   .0   .0
M108 1 7065 L4 CSR       .0397  .0053 -.0488  .0398 -.0404 -.0277   .0   .0   .0
M111 1 7899 L4 CSR      -.4531 -.7624 -.4982 -.6150 -.7894  .1828  -.3  -.4   .1
M112 1 7063 L4 CSR      -.0033  .0162 -.0543  .0005 -.0318 -.0471   .0  -.9 -1.3
M113 1 7106 L4 CSR       .0438 -.0131 -.0285  .0397 -.0364 -.0003   .0   .0   .0
M114 1 7125 L4 CSR      -.0787 -.0231 -.1192 -.0819 -.0955 -.0715  -.1  -.1  -.1
M114 1 7125 L DEOS       .0042 -.0117 -.0142  .0014 -.0188  .0006   .0   .0   .0
M114 1 7125 C GRIM      -.1306 -.0258  .0031 -.1330  .0053 -.0016  -.1   .0   .0
M116 1 7130 L4 CSR      -.1101  .0383  .0302 -.0985  .0627 -.0294  -.1   .1   .0
M117 1 7920 L CGS       -.0282 -.0039 -.0009 -.0283  .0010 -.0026   .0   .0   .0
M117 1 7920 L4 CSR       .0051  .0004 -.0076  .0050 -.0063 -.0042   .1  -.1  -.1
M117 1 7920 L DEOS       .0042 -.0117 -.0142  .0014 -.0188  .0006   .0   .0   .0
M117 1 7920 L JCET       .0014  .0529 -.0288  .0134  .0098 -.0579   .2   .2  -.9
M117 1 7920 C GRIM      -.1306 -.0258  .0031 -.1330  .0053 -.0016  -.1   .0   .0
M120 1 7918 L AUS       -.0116 -.0162  .0131 -.0150  .0019  .0184  -.3   .0   .4
M120 1 7918 L CGS       -.0282 -.0039 -.0009 -.0283  .0010 -.0026   .0   .0   .0
M120 1 7918 L CRL        .0014 -.0009 -.0004  .0011 -.0010  .0007   .2  -.3   .2
M120 1 7918 L4 CSR       .0030 -.0036  .0027  .0021 -.0005  .0050   .4   .0   .4
M120 1 7918 L DEOS       .0042 -.0117 -.0142  .0014 -.0188  .0006   .0   .0   .0
M120 1 7918 L DGFI       .0027 -.0023 -.0035  .0021 -.0045 -.0001   .9 -2.3   .0
M120 1 7918 L JCET       .0020 -.0033  .0048  .0012  .0014  .0059   .1   .1   .4
M120 1 7918 C GRIM      -.0044 -.0015  .0023 -.0047  .0015  .0018 -1.4  1.8  2.0
M120 1 7918 C1 CSR       .0048 -.0027  .0021  .0040 -.0007  .0042   .2   .0   .1
M121 1 7919 L4 CSR       .5158 -.3323 -.3249  .4265 -.5301  .1381   .2  -.2   .1
M123 1 GODE P CODE       .0000 -.0024 -.0007 -.0006 -.0020  .0014  -.4  -.8   .6
M123 1 GODE P IGS       -.0012  .0002 -.0001 -.0011  .0002 -.0005 -1.4   .1  -.3
M123 1 GODE P1 JPL      -.0005  .0011 -.0002 -.0002  .0006 -.0010  -.3   .5  -.9
M123 1 GODE P NCL       -.0007 -.0028  .0019 -.0013 -.0001  .0031 -1.0  -.1  1.3
M123 1 GODE P NOAA      -.0002 -.0002  .0006 -.0002  .0004  .0006  -.2   .2   .3
M123 1 GODE P CORS      -.0001  .0006 -.0010  .0001 -.0003 -.0011   .1  -.4 -1.1
M125 1 7108 R GSFC      -.0002  .0001  .0015 -.0002  .0013  .0009  -.2   .6   .4
M125 1 7108 R SHA        .0009 -.0014  .0036  .0005  .0018  .0035   .4   .7  1.4
S003 1 USNO P CODE       .0008  .0000 -.0011  .0007 -.0010 -.0005   .4  -.3  -.1
S003 1 USNO P IGS        .0002  .0018 -.0003  .0006  .0008 -.0016   .6   .5  -.9
S003 1 USNO P1 JPL       .0001  .0003  .0006  .0002  .0006  .0001   .1   .2   .0

40452 BLOOMINGTON

Positions
M001 1 7291 R GSFC       .0005  .0041 -.0027  .0007  .0005 -.0048   .0   .0  -.1 87:232
M001 1 7291 R SHA       -.0033 -.0001  .0049 -.0033  .0039  .0030  -.1   .0   .0 87:232

Velocities
M001 1 7291 R GSFC      -.0266 -.0318 -.0024 -.0285 -.0209  .0218   .0   .0   .0
M001 1 7291 R SHA        .0004  .0005  .0000  .0005  .0003 -.0003   .0   .0   .0

40453 CARROLLTON

Positions
M001 1 7228 R GSFC      -.0006  .0013 -.0012 -.0005 -.0003 -.0018   .0   .0   .0 87:200

Velocities
M001 1 7228 R GSFC       .0000  .0001  .0003  .0000  .0003  .0001   .0   .0   .0

40454 LEONARD

Positions
M001 1 7292 R GSFC      -.0005 -.0010  .0014 -.0004  .0005  .0017   .0   .0   .0 87:236
M001 1 7292 R SHA       -.0005 -.0003  .0003 -.0005  .0001  .0005   .0   .0   .0 87:236
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Velocities
M001 1 7292 R GSFC      -.0008 -.0540  .0036  .0046 -.0286  .0457   .0   .0   .0
M001 1 7292 R SHA        .0000  .0009 -.0001 -.0001  .0005 -.0007   .0   .0   .0

40455 MILES CITY

Positions
M001 1 7038 R GSFC      -.0001 -.0003  .0004  .0000  .0001  .0005   .0   .0   .0 88:107
M001 1 7038 R SHA        .0004  .0028 -.0007 -.0004  .0015 -.0024   .0   .0   .0 88:107

Velocities
M001 1 7038 R GSFC      -.0504  .0003  .0260 -.0485  .0081  .0281   .0   .0   .0
M001 1 7038 R SHA        .0007  .0000 -.0004  .0006 -.0002 -.0004   .0   .0   .0

40456 PIETOWN

Positions
M001 1 PIE1 TIE40456     .0036 -.0040  .0094  .0047  .0063  .0075  1.5  2.0  2.4 97:  1
M001 1 PIE1 P CODE       .0056  .0084  .0017  .0027  .0069 -.0071  1.1  1.8 -2.0 97:295
M001 1 PIE1 P IGS        .0001  .0053 -.0042 -.0015 -.0006 -.0066 -1.3  -.4 -3.6 98:220
M001 1 PIE1 P NCL        .0015  .0047 -.0043 -.0001 -.0008 -.0065   .0  -.2 -1.6 97:112
M001 1 PIE1 P NOAA      -.0001 -.0034  .0021  .0009 -.0002  .0039   .5  -.1  1.6 97:143
M001 1 PIE1 P CORS       .0005 -.0028  .0015  .0014 -.0002  .0029   .8  -.1  1.5 97: 55
S001 1 7234 TIE40456     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7234 R GIUB       .0009 -.0002  .0014  .0009  .0012  .0007   .4   .4   .3 95: 23
S001 1 7234 R GSFC       .0006  .0021 -.0013 -.0001  .0002 -.0026  -.1   .1 -1.9 94:142
S001 1 7234 R SHA        .0011  .0036 -.0035 -.0001 -.0007 -.0051   .0  -.3 -2.1 96:234

Velocities
M001 1 PIE1 P CODE      -.0008 -.0014 -.0010 -.0003 -.0017  .0007  -.2  -.7   .3
M001 1 PIE1 P IGS       -.0005  .0018 -.0001 -.0010  .0008 -.0013 -1.1   .6  -.9
M001 1 PIE1 P NCL       -.0018 -.0012  .0009 -.0013 -.0002  .0019  -.6   .0   .5
M001 1 PIE1 P NOAA      -.0003  .0012 -.0002 -.0007  .0004 -.0010  -.5   .2  -.6
M001 1 PIE1 P CORS      -.0001  .0019 -.0013 -.0007  .0000 -.0022  -.7   .0 -1.8
S001 1 7234 R GIUB       .0003  .0006 -.0007  .0001 -.0002 -.0010   .1  -.2 -1.2
S001 1 7234 R GSFC       .0003 -.0005  .0005  .0004  .0002  .0006  3.3  1.0  2.8
S001 1 7234 R SHA        .0000  .0002 -.0007  .0000 -.0004 -.0005   .0  -.4  -.5

40457 SEATTLE

Positions
M001 1 7229 R GSFC      -.0008  .0007 -.0007 -.0010 -.0003 -.0006   .0   .0   .0 89: 98
M001 1 7229 R SHA       -.0001  .0003  .0016 -.0002  .0012  .0011   .0   .0   .0 90:213

Velocities
M001 1 7229 R GSFC       .0001  .0003  .0003  .0000  .0004  .0000   .0   .0   .0
M001 1 7229 R SHA       -.0001  .0054 -.0057 -.0030 -.0005 -.0073  -.1   .0  -.1

40458 MALIBU/SADDLE PE

Positions
M001 1 SPK1 P2 JPL       .0002  .0002  .0001  .0001  .0002 -.0002   .0   .1   .0 97:339

Velocities
M001 1 SPK1 P2 JPL       .0001 -.0003  .0001  .0002  .0000  .0003   .1   .0   .1

40460 LA JOLLA/SCRIPPS

Positions
M004 1 SIO3 P IGS       -.0034 -.0035 -.0044 -.0014 -.0062  .0016   .0  -.2   .0 99:261
M004 1 SIO3 P2 JPL       .0002 -.0001  .0002  .0002  .0002  .0001   .1   .1   .0 97:318

Velocities
M004 1 SIO3 P IGS       -.0148 -.0172  .0019 -.0052 -.0104  .0196  -.1  -.1   .2
M004 1 SIO3 P2 JPL       .0002  .0002 -.0001  .0001  .0001 -.0003   .0   .0  -.1

40461 WHITTIER

Positions
M001 1 WHC1 P2 JPL       .0002  .0002  .0001  .0001  .0002 -.0002   .0   .1   .0 97:321
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M002 1 WHI1 P2 JPL       .0005  .0004  .0000  .0002  .0003 -.0005   .0   .1  -.1 96:255

Velocities
M001 1 WHC1 P2 JPL       .0007 -.0007  .0004  .0009  .0001  .0005   .3   .0   .2
M002 1 WHI1 P2 JPL      -.0053  .0039 -.0014 -.0065 -.0006 -.0015  -.7  -.1  -.2

40463 LOS ALAMOS, NM

Positions
S001 1 7611 R GIUB       .0017 -.0001  .0016  .0016  .0015  .0007   .8   .6   .3 95: 26
S001 1 7611 R GSFC       .0010  .0014 -.0003  .0005  .0007 -.0015   .8   .6 -1.2 94:137
S001 1 7611 R SHA        .0016  .0005  .0003  .0014  .0008 -.0006   .9   .3  -.2 96:189

Velocities
S001 1 7611 R GIUB       .0004 -.0006  .0006  .0006  .0002  .0007   .7   .2   .8
S001 1 7611 R GSFC       .0002  .0000 -.0001  .0002  .0000 -.0001  1.2  -.1  -.5
S001 1 7611 R SHA        .0005  .0001 -.0002  .0004  .0000 -.0003   .4   .0  -.3

40465 NORTH LIBERTY

Positions
M001 1 NLIB TIE40465     .0017 -.0025  .0036  .0018  .0010  .0042   .6   .3  1.3 97:  1
M001 1 NLIB P CODE       .0037 -.0006  .0087  .0038  .0061  .0062  1.7  1.6  1.7 97:300
M001 1 NLIB P GFZ       -.0018  .0007 -.0026 -.0019 -.0016 -.0022 -1.1  -.5  -.8 98: 47
M001 1 NLIB P IGS       -.0002  .0007 -.0007 -.0002  .0000 -.0010  -.3   .0  -.6 98:113
M001 1 NLIB P1 JPL      -.0001 -.0017 -.0001 -.0001 -.0012  .0012  -.1  -.6   .6 96:117
M001 1 NLIB P NCL        .0003  .0003 -.0001  .0003  .0002 -.0003   .2   .1  -.1 98: 85
M001 1 NLIB P NOAA      -.0010 -.0009  .0006 -.0010 -.0002  .0011  -.5  -.1   .5 97:142
M001 1 NLIB P CORS      -.0012  .0010 -.0010 -.0012 -.0001 -.0014  -.9  -.1  -.7 97: 72
S001 1 7612 TIE40465     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7612 R GIUB       .0027  .0047 -.0019  .0026  .0018 -.0048  1.2   .7 -1.9 95:162
S001 1 7612 R GSFC       .0009 -.0023  .0027  .0009  .0005  .0035  1.8   .3  2.4 96: 13
S001 1 7612 R SHA        .0000  .0028 -.0026 -.0001 -.0001 -.0038   .0   .0 -1.1 95:200

Velocities
M001 1 NLIB P CODE       .0009  .0002 -.0023  .0009 -.0015 -.0017   .7  -.6  -.7
M001 1 NLIB P GFZ        .0023  .0023 -.0015  .0023  .0005 -.0028  2.7   .3 -1.8
M001 1 NLIB P IGS        .0003  .0023 -.0009  .0003  .0009 -.0023   .4   .7 -1.8
M001 1 NLIB P1 JPL      -.0011  .0008  .0003 -.0011  .0008 -.0004 -2.2   .8  -.4
M001 1 NLIB P NCL        .0002  .0008 -.0001  .0002  .0005 -.0007   .2   .2  -.3
M001 1 NLIB P NOAA       .0002 -.0001  .0016  .0002  .0011  .0012   .2   .7   .7
M001 1 NLIB P CORS       .0004  .0006  .0002  .0004  .0005 -.0003   .5   .4  -.3
S001 1 7612 R GIUB       .0004 -.0013  .0004  .0004 -.0006  .0013   .5  -.4   .9
S001 1 7612 R GSFC       .0001 -.0004  .0001  .0001 -.0002  .0004   .7  -.6  1.2
S001 1 7612 R SHA       -.0002  .0006 -.0017 -.0002 -.0008 -.0016  -.2  -.5 -1.0

40466 KITT PEAK

Positions
S001 1 7610 R GIUB       .0019  .0003  .0018  .0016  .0020  .0001   .7   .7   .1 95:221
S001 1 7610 R GSFC       .0012  .0020 -.0009  .0004  .0005 -.0024   .4   .3 -1.6 95:282
S001 1 7610 R SHA        .0015 -.0008  .0015  .0017  .0012  .0009   .8   .4   .3 96: 99

Velocities
S001 1 7610 R GIUB       .0003 -.0014  .0014  .0008  .0006  .0017   .7   .4  1.3
S001 1 7610 R GSFC       .0002  .0000  .0000  .0002  .0001 -.0001  1.2   .3  -.2
S001 1 7610 R SHA        .0009 -.0003  .0007  .0010  .0006  .0003   .8   .4   .2

40469 CHINA LAKE

Positions
M001 1 COSO P2 JPL       .0002  .0001  .0001  .0001  .0002 -.0001   .0   .0   .0 98: 48

Velocities
M001 1 COSO P2 JPL       .0002 -.0006  .0001  .0004 -.0002  .0005   .1   .0   .1

40471 HANCOCK

Positions
S001 1 7618 R GIUB       .0018  .0029 -.0009  .0026  .0008 -.0023  1.2   .3  -.8 95:332
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S001 1 7618 R GSFC       .0016 -.0007  .0011  .0013  .0000  .0016  1.5   .0   .9 96:310
S001 1 7618 R SHA        .0000  .0012  .0006  .0004  .0012 -.0004   .2   .3  -.1 95:335

Velocities
S001 1 7618 R GIUB       .0010 -.0010  .0014  .0006  .0001  .0019   .5   .1  1.0
S001 1 7618 R GSFC       .0001 -.0003  .0002  .0000 -.0001  .0003  -.1  -.1   .7
S001 1 7618 R SHA        .0000  .0001  .0013  .0000  .0011  .0008   .0   .6   .5

40472 COLORADO SPRINGS

Positions
S003 1 AMCT P CODE       .0041  .0007  .0054  .0038  .0053  .0021  1.1   .8   .3 98:189
S004 1 AMC2 P CODE       .0051  .0016  .0028  .0045  .0039 -.0005  1.3   .7  -.1 99:167
S004 1 AMC2 P IGS        .0003  .0028 -.0022 -.0004  .0001 -.0036  -.2   .0 -1.1 99:338
S004 1 AMC2 P NOAA      -.0016 -.0147  .0119  .0022  .0001  .0189   .5   .0  3.0 99:145

Velocities
S003 1 AMCT P CODE       .0008 -.0033  .0029  .0016  .0004  .0041   .4   .1   .5
S004 1 AMC2 P CODE       .0008 -.0033  .0029  .0016  .0004  .0041   .4   .1   .5
S004 1 AMC2 P IGS       -.0009 -.0016  .0009 -.0005 -.0004  .0020  -.2  -.1   .4
S004 1 AMC2 P NOAA       .0008 -.0049  .0032  .0020 -.0004  .0055   .2   .0   .4

40473 BREWSTER

Positions
S001 1 7614 R GIUB       .0024  .0017  .0008  .0012  .0025 -.0012   .6  1.0  -.5 95:204
S001 1 7614 R GSFC       .0005 -.0003  .0010  .0006  .0007  .0007   .7   .5   .5 95:262
S001 1 7614 R SHA        .0004 -.0018  .0022  .0012  .0004  .0025   .6   .2  1.0 96:119

Velocities
S001 1 7614 R GIUB       .0005  .0002  .0006  .0003  .0008  .0001   .3   .7   .1
S001 1 7614 R GSFC       .0003  .0001  .0000  .0002  .0001 -.0001  1.0   .4  -.5
S001 1 7614 R SHA        .0002 -.0013  .0012  .0008  .0001  .0016   .6   .0  1.2

40474 LAKE MATHEWS

Positions
M001 1 MATH P NOAA       .0006 -.0022  .0010  .0016 -.0001  .0019   .6   .0   .7 97:167

Velocities
M001 1 MATH P NOAA       .0015  .0012 -.0003  .0008  .0007 -.0016   .5   .4  -.9

40477 MAUNA KEA

Positions
M001 1 MKEA TIE40477    -.0004 -.0034  .0023  .0030  .0015  .0025  1.5   .8  1.0 97:  1
M001 1 MKEA P CODE       .0019 -.0018  .0054  .0024  .0054  .0009   .6  1.1   .2 98: 49
M001 1 MKEA P IGS       -.0004  .0008  .0003 -.0009  .0003  .0002  -.5   .2   .1 98:182
M001 1 MKEA P1 JPL      -.0006  .0011  .0005 -.0013  .0004  .0003  -.5   .2   .1 98: 42
M001 1 MKEA P NCL       -.0008 -.0006  .0002  .0002 -.0002  .0009   .1  -.1   .3 98: 93
M001 1 MKEA P NOAA       .0014  .0035 -.0017 -.0026 -.0007 -.0031  -.5  -.2  -.6 98: 46
S001 1 7617 TIE40477     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7617 R GIUB       .0025  .0009  .0020  .0002  .0027 -.0018   .1   .8  -.6 95:249
S001 1 7617 R GSFC      -.0027 -.0021  .0024  .0008  .0011  .0039   .4   .6  1.6 96:248
S001 1 7617 R SHA       -.0009 -.0013  .0026  .0008  .0020  .0022   .3   .6   .6 95:362

Velocities
M001 1 MKEA P CODE       .0030  .0003 -.0025  .0010 -.0014 -.0035   .3  -.4  -.8
M001 1 MKEA P IGS        .0036  .0013 -.0003  .0003  .0010 -.0037   .2   .8 -1.9
M001 1 MKEA P1 JPL       .0035  .0001 -.0006  .0013  .0006 -.0032   .5   .3  -.8
M001 1 MKEA P NCL        .0041  .0006 -.0006  .0011  .0008 -.0040   .4   .3 -1.1
M001 1 MKEA P NOAA      -.0003 -.0014  .0005  .0011  .0002  .0010   .3   .1   .2
S001 1 7617 R GIUB       .0000 -.0010  .0005  .0010  .0003  .0005   .6   .2   .3
S001 1 7617 R GSFC       .0008  .0009 -.0002 -.0005  .0002 -.0011 -1.1   .3 -2.2
S001 1 7617 R SHA       -.0007 -.0009  .0013  .0005  .0009  .0014   .3   .5   .8

40478 CHATSWORTH

Positions
M002 1 ROCK P NOAA       .0005 -.0023  .0012  .0015  .0000  .0022   .6   .0   .8 97:226
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M002 1 ROCK P2 JPL       .0031  .0036 -.0018  .0010  .0011 -.0048   .3   .3 -1.3 97:307
S101 1 OAT2 P2 JPL       .0012  .0023  .0010 -.0001  .0023 -.0016   .0   .7  -.4 97:282

Velocities
M002 1 ROCK P NOAA       .0012  .0007 -.0005  .0007  .0002 -.0013   .4   .1  -.6
M002 1 ROCK P2 JPL       .0002  .0006 -.0003 -.0001  .0001 -.0007   .0   .1  -.2
S101 1 OAT2 P2 JPL       .0019  .0014  .0035  .0010  .0041  .0002   .4  1.5   .1

40479 BLYTHE

Positions
M001 1 BLYT P2 JPL       .0171  .0155  .0123  .0090  .0220 -.0109   .4   .9  -.4 99:304

Velocities
M001 1 BLYT P2 JPL      -.0003 -.0004  .0000 -.0001 -.0003  .0004   .0  -.1   .1

40480 BOMMER CANYON

Positions
M001 1 TRAK P NOAA       .0010 -.0019  .0007  .0017  .0000  .0014   .7   .0   .5 97:242
M001 1 TRAK P2 JPL      -.0001  .0008  .0006 -.0005  .0009 -.0002  -.1   .3   .0 97:296

Velocities
M001 1 TRAK P NOAA       .0014  .0010 -.0002  .0008  .0007 -.0014   .4   .3  -.7
M001 1 TRAK P2 JPL       .0002 -.0003  .0001  .0003  .0000  .0002   .1   .0   .1

40481 YUCAIPA

Positions
M001 1 CRFP P NOAA       .0010 -.0018  .0009  .0017  .0001  .0014   .7   .0   .5 97:247
M001 1 CRFP P2 JPL      -.0079 -.0068 -.0084 -.0039 -.0123  .0033  -.1  -.4   .1 99:267

Velocities
M001 1 CRFP P NOAA       .0016  .0012 -.0004  .0009  .0007 -.0017   .5   .3  -.8
M001 1 CRFP P2 JPL      -.0004 -.0009  .0009  .0001  .0002  .0013   .0   .1   .4

40482 LONG BEACH CITY

Positions
M001 1 LBCH P2 JPL       .0004  .0004  .0000  .0001  .0002 -.0004   .0   .0  -.1 98: 40

Velocities
M001 1 LBCH P2 JPL      -.0001 -.0013  .0004  .0005 -.0003  .0012   .1   .0   .2

40483 WESTLAKE/ALLEN O

Positions
S001 1 AOA1 P IGS        .0001 -.0026  .0020  .0013  .0004  .0030   .1   .0   .1 99:256
S001 1 AOA1 P2 JPL       .0001  .0000  .0001  .0001  .0001  .0000   .0   .0   .0 97:242

Velocities
S001 1 AOA1 P IGS       -.0010 -.0099  .0058  .0039 -.0004  .0108   .1   .0   .1
S001 1 AOA1 P2 JPL       .0002  .0002 -.0002  .0000  .0000 -.0004   .0   .0  -.1

40484 CHILAO FLATES/SA

Positions
M001 1 CHIL P NOAA       .0008 -.0018  .0008  .0016 -.0001  .0014   .6   .0   .5 97:227
M001 1 CHIL P2 JPL       .0005  .0003  .0004  .0003  .0006 -.0001   .1   .2   .0 97:322

Velocities
M001 1 CHIL P NOAA       .0014  .0009 -.0002  .0008  .0007 -.0013   .5   .3  -.6
M001 1 CHIL P2 JPL      -.0001 -.0004 -.0003  .0001 -.0004  .0002   .0  -.2   .0

40485 LONGDON YARD/IRW

Positions
M001 1 LONG P NOAA       .0008 -.0019  .0009  .0017  .0000  .0016   .6   .0   .5 97:249
M001 1 LONG P2 JPL       .0015  .0021  .0001  .0003  .0015 -.0021   .1   .3  -.4 98:244
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Velocities
M001 1 LONG P NOAA       .0014  .0009 -.0003  .0008  .0006 -.0014   .4   .3  -.6
M001 1 LONG P2 JPL      -.0016 -.0048  .0014  .0009 -.0016  .0050   .2  -.3   .8

40486 PINEMEADOW

Positions
M001 1 ROCH P NOAA       .0015 -.0015  .0008  .0021  .0003  .0010   .7   .1   .3 98: 31
M001 1 ROCH P2 JPL      -.0092 -.0057 -.0152 -.0056 -.0178 -.0008  -.2  -.6   .0 99:267

Velocities
M001 1 ROCH P NOAA       .0014  .0013 -.0002  .0007  .0008 -.0016   .3   .3  -.6
M001 1 ROCH P2 JPL       .0022 -.0004 -.0011  .0021 -.0006 -.0012   .4  -.1  -.2

40487 LOS ANGELES

Positions
M001 1 USC1 P2 JPL      -.0001 -.0005 -.0002  .0002 -.0005  .0003   .1  -.1   .1 97:279
M002 1 UCLP P2 JPL       .0005  .0008  .0003  .0001  .0008 -.0006   .0   .2  -.2 97:260

Velocities
M001 1 USC1 P2 JPL      -.0017 -.0025  .0007 -.0003 -.0011  .0029  -.1  -.4  1.0
M002 1 UCLP P2 JPL       .0020  .0023 -.0006  .0006  .0012 -.0028   .3   .5 -1.0

40488 CATALINA ISLAND

Positions
M001 1 CAT1 P IGS        .0017  .0046 -.0020 -.0007  .0010 -.0052   .0   .0  -.2 99:209
M001 1 CAT1 P2 JPL       .0002 -.0001  .0002  .0002  .0001  .0001   .1   .0   .0 97:246

Velocities
M001 1 CAT1 P IGS       -.0008  .0001 -.0015 -.0008 -.0014 -.0005   .0   .0   .0
M001 1 CAT1 P2 JPL       .0003  .0001 -.0001  .0002  .0000 -.0003   .1   .0  -.1

40489 HAT CREEK

Positions
S001 1 7218 R GIUB       .0008  .0032 -.0066 -.0010 -.0029 -.0067  -.1  -.3  -.7 88:155
S001 1 7218 R GSFC       .0012  .0048 -.0031 -.0015  .0007 -.0056  -.7   .2 -1.9 88:298
S001 1 7218 R SHA        .0018  .0070 -.0040 -.0021  .0015 -.0078  -.3   .2 -1.1 92:157

Velocities
S001 1 7218 R GIUB       .0009  .0012 -.0022  .0001 -.0007 -.0026   .0  -.2  -.6
S001 1 7218 R GSFC       .0007  .0014 -.0010 -.0001  .0002 -.0018  -.1   .1 -1.2
S001 1 7218 R SHA        .0001  .0010 -.0013 -.0004 -.0003 -.0016  -.3  -.2  -.9

40490 MARYLAND POINT

Positions
S001 1 7217 R GIUB      -.0011 -.0051 -.0019 -.0022 -.0045  .0025  -.2  -.2   .1 89: 80
S001 1 7217 R GSFC      -.0020  .0058 -.0013 -.0007  .0027 -.0056  -.2   .3  -.6 88: 34
S001 1 7217 R SHA        .0012  .0014 -.0006  .0015  .0002 -.0012   .2   .0  -.1 89: 37

Velocities
S001 1 7217 R GIUB      -.0013  .0122 -.0020  .0014  .0060 -.0108   .1   .2  -.3
S001 1 7217 R GSFC      -.0003  .0003 -.0002 -.0002  .0000 -.0004  -.2   .0  -.1
S001 1 7217 R SHA       -.0001 -.0002  .0001 -.0002 -.0001  .0002  -.1   .0   .1

40491 FLAGSTAFF

Positions
M002 1 7891 TIE40491     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7891 L4 CSR      -.0517  .0537  .0667 -.0678  .0723  .0133  -.4   .3   .0 81:194
M003 1 7261 TIE40491    -.0001  .0001  .0001 -.0001  .0002  .0000   .0   .1   .0 97:  1
M003 1 7261 R GSFC       .0006  .0039 -.0027 -.0009  .0000 -.0047  -.1   .0  -.2 87:328
M003 1 7261 R SHA       -.0003 -.0006  .0026  .0000  .0017  .0021   .0   .1   .1 88:165

Velocities
M002 1 7891 L4 CSR       .4285 -.5555  .5209  .6031  .2189  .5932   .4   .1   .4
M003 1 7261 R GSFC       .0005  .0011  .0001  .0000  .0007 -.0009   .0   .1  -.1
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M003 1 7261 R SHA       -.0005  .0000  .0003 -.0005  .0002  .0003  -.1   .0   .0

40492 VERNAL

Positions
M001 1 7892 L4 CSR      -.0249  .0175  .0593 -.0293  .0505  .0322  -.2   .2   .1 81:310
M002 1 7290 R GSFC       .0000  .0019 -.0013 -.0007  .0002 -.0022  -.1   .0  -.1 88:309
M002 1 7290 R SHA        .0006  .0020  .0007 -.0001  .0019 -.0011   .0   .1  -.1 88:324

Velocities
M001 1 7892 L4 CSR      -.1095 -.3477  .1922  .0133 -.0893  .4021   .1  -.2   .9
M002 1 7290 R GSFC       .0002  .0012 -.0004 -.0002  .0005 -.0011   .0   .0  -.1
M002 1 7290 R SHA       -.0002  .0008 -.0003 -.0005  .0002 -.0007  -.1   .0   .0

40493 YUMA

Positions
M001 1 7894 R GSFC       .0011  .0055 -.0049 -.0013 -.0011 -.0072  -.2  -.1  -.6 87: 90
M001 1 7894 R SHA        .0016  .0036  .0005  .0000  .0026 -.0030   .0   .2  -.2 87:126
M001 1 7894 L4 CSR      -.0048  .0669 -.0124 -.0319  .0217 -.0563  -.1   .1  -.2 83:121

Velocities
M001 1 7894 R GSFC      -.0004 -.0024  .0023  .0006  .0006  .0032   .1   .1   .3
M001 1 7894 R SHA       -.0005 -.0021  .0020  .0004  .0005  .0029   .1   .1   .3
M001 1 7894 L4 CSR      -.5274 -.1171  .2416 -.4330  .0271  .4025  -.5   .0   .4

40496 PLATTEVILLE

Positions
M001 1 7112 TIE40496     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7112 L CGS        .0081 -.0123  .0292  .0110  .0160  .0263   .7   .9  1.4 88: 55
M001 1 7112 L CRL       -.0018 -.0074 -.0065  .0002 -.0099  .0016   .0  -.7   .1 91: 82
M001 1 7112 L4 CSR      -.0075 -.0052  .0379 -.0060  .0245  .0298  -.3   .5   .6 85:243
M001 1 7112 L DEOS       .0017 -.0005  .0165  .0018  .0126  .0107   .0   .3   .2 91:287
M001 1 7112 C GRIM       .0108 -.0107 -.0056  .0132 -.0091  .0022   .9  -.4   .1 90: 53
M002 1 7258 TIE40496     .0000  .0000  .0001  .0000  .0001  .0000   .0   .1   .0 97:  1
M002 1 7258 R GSFC       .0007  .0040 -.0034 -.0003  .0000 -.0052  -.1   .0  -.4 87:312
M002 1 7258 R SHA        .0018  .0061 -.0026  .0002  .0021 -.0066   .0   .2  -.5 88: 51

Velocities
M001 1 7112 L CGS       -.0025  .0022 -.0043 -.0030 -.0023 -.0039  -.7  -.4  -.6
M001 1 7112 L CRL        .0035 -.0217  .0122  .0089 -.0037  .0232   .7  -.2  1.1
M001 1 7112 L4 CSR       .0016  .0018 -.0073  .0011 -.0042 -.0063   .3  -.4  -.6
M001 1 7112 L DEOS       .0018 -.0056 -.0049  .0032 -.0069  .0006   .3  -.7   .1
M001 1 7112 C GRIM      -.0079 -.0041 -.0007 -.0066 -.0044  .0041  -.7  -.3   .3
M002 1 7258 R GSFC       .0018  .0057 -.0025  .0003  .0019 -.0061   .1   .3  -.9
M002 1 7258 R SHA        .0009  .0037 -.0013  .0000  .0015 -.0038   .0   .2  -.6

40497 MONUMENT PEAK

Positions
M001 1 7110 TIE40497     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7110 L AUS       -.0100  .0003 -.0036 -.0091 -.0053  .0016 -1.3  -.7   .2 96:209
M001 1 7110 L CGS        .0145 -.0003 -.0014  .0131  .0022 -.0059  2.1   .5 -1.2 93:262
M001 1 7110 L CRL        .0090 -.0016 -.0005  .0088  .0010 -.0024  1.6   .2  -.4 91: 82
M001 1 7110 L4 CSR       .0062  .0050 -.0004  .0033  .0036 -.0063  1.1  1.0 -1.6 91:102
M001 1 7110 L DEOS       .0100 -.0064 -.0004  .0118 -.0011  .0009  1.8  -.1   .1 92:135
M001 1 7110 L DGFI       .0051 -.0046 -.0033  .0067 -.0038 -.0002  1.3  -.6   .0 92:224
M001 1 7110 L JCET       .0008  .0016 -.0018  .0000 -.0005 -.0024   .0  -.4 -2.1 96:205
M001 1 7110 C GRIM       .0015 -.0040 -.0034  .0031 -.0044  .0006  1.1 -2.0   .3 91:294
M001 1 7110 C1 CSR      -.0003  .0007 -.0022 -.0005 -.0016 -.0016  -.5 -1.1 -1.1 96:210
M002 1 7220 TIE40497    -.0003  .0002  .0000 -.0004  .0000  .0000  -.1   .0   .0 97:  1
M002 1 7220 L4 CSR      -.0499 -.1096  .0958  .0040  .0151  .1531   .0   .1  1.0 84:356
M003 1 7274 TIE40497     .0059 -.0026  .0046  .0064  .0040  .0023  2.0  1.3   .7 97:  1
M003 1 7274 R GSFC       .0123  .0250 -.0165 -.0001  .0012 -.0324   .0   .1 -3.3 87:147
M003 1 7274 R SHA        .0139  .0216 -.0095  .0028  .0059 -.0266   .2   .5 -2.0 87:316
M003 1 7274 L4 CSR      -.0287 -.0735  .0443  .0070 -.0055  .0901   .1   .0   .5 85:177
M004 1 MONP TIE40497     .0008  .0026 -.0030 -.0005 -.0010 -.0039  -.1  -.3 -1.2 97:  1
M004 1 MONP P CODE       .0038 -.0008  .0069  .0037  .0063  .0029  1.3  1.5   .8 98: 71
M004 1 MONP P IGS       -.0008 -.0003 -.0005 -.0006 -.0008  .0002  -.3  -.4   .1 98:131
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M004 1 MONP P NCL       -.0013 -.0025  .0025 -.0001  .0006  .0037   .0   .2  1.2 98:135
M004 1 MONP P2 JPL      -.0011 -.0051  .0013  .0013 -.0017  .0050   .0  -.1   .2 99:243

Velocities
M001 1 7110 L AUS        .0004 -.0027 -.0017  .0015 -.0027  .0010   .6 -1.0   .4
M001 1 7110 L CGS        .0007 -.0027 -.0022  .0018 -.0030  .0005  1.0 -2.8   .4
M001 1 7110 L CRL       -.0001 -.0021 -.0028  .0009 -.0034  .0001   .2 -1.1   .0
M001 1 7110 L4 CSR       .0018 -.0035 -.0019  .0032 -.0029  .0009  2.6 -2.5   .8
M001 1 7110 L DEOS       .0044 -.0068 -.0061  .0069 -.0073  .0002  1.8 -2.0   .0
M001 1 7110 L DGFI       .0019 -.0036 -.0041  .0033 -.0047 -.0003  1.5 -2.2  -.1
M001 1 7110 L JCET      -.0001  .0005  .0008 -.0003  .0009  .0001  -.6  1.5   .2
M001 1 7110 C GRIM      -.0046  .0029  .0013 -.0054  .0014  .0003 -1.8  1.1   .1
M001 1 7110 C1 CSR      -.0008  .0000  .0015 -.0007  .0011  .0011 -1.3  1.6  1.7
M002 1 7220 L4 CSR      -.0132 -.0197  .0164 -.0030  .0010  .0286  -.1   .0   .4
M003 1 7274 R GSFC       .0023 -.0049  .0068  .0042  .0039  .0065  1.1   .8  1.2
M003 1 7274 R SHA        .0020 -.0053  .0066  .0041  .0034  .0068  1.1   .7  1.3
M003 1 7274 L4 CSR     -1.3789  .0995  .1328-1.2791 -.1733  .5126 -1.3  -.2   .5
M004 1 MONP P CODE       .0010  .0010 -.0016  .0004 -.0006 -.0020   .2  -.2  -.7
M004 1 MONP P IGS        .0008  .0020 -.0001 -.0001  .0011 -.0019  -.1   .4  -.7
M004 1 MONP P NCL        .0006  .0008  .0019  .0001  .0021  .0002   .0   .6   .1
M004 1 MONP P2 JPL       .0006  .0003  .0027  .0004  .0026  .0010   .2  1.0   .3

40498 VLA

Positions
S001 1 7619 R GSFC      -.0008  .0101 -.0086 -.0038 -.0019 -.0126   .0   .0  -.1 83:208
S001 1 7619 R SHA        .0016  .0054 -.0018 -.0001  .0017 -.0057   .0   .0   .0 83:208

Velocities
S001 1 7619 R GSFC      -.0494 -.0734  .0220 -.0248 -.0294  .0826   .0   .0   .1
S001 1 7619 R SHA        .0012  .0017 -.0005  .0006  .0007 -.0019   .0   .0   .0

40499 RICHMOND

Positions
M002 1 7295 TIE40499     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7295 L AUS       -.0047  .0035  .0026 -.0041  .0042 -.0027  -.1   .1   .0 96:344
M002 1 7295 L CGS        .0065  .0030  .0001  .0069  .0009 -.0016   .5   .0  -.1 93:248
M002 1 7295 L CRL       -.0014 -.0006  .0034 -.0014  .0029  .0018  -.1   .2   .1 93:125
M002 1 7295 L4 CSR       .0002  .0039 -.0022  .0008 -.0004 -.0044   .0   .0  -.1 92: 87
M002 1 7295 L DEOS       .0087 -.0075 -.0042  .0073 -.0076  .0061   .4  -.4   .4 93: 14
M002 1 7295 L DGFI       .0011 -.0070 -.0136 -.0001 -.0154  .0005   .0 -1.0   .0 93:285
M002 1 7295 P GFZ       -.0049  .0134 -.0171 -.0026 -.0094 -.0201  -.3  -.9 -1.3 93:175
M002 1 7295 C GRIM      -.0052 -.0014 -.0013 -.0054 -.0014 -.0001  -.4  -.1   .0 93:  1
M002 1 7295 C1 CSR       .0042 -.0030  .0051  .0037  .0030  .0055   .3   .2   .2 95: 45
M005 1 RCM4 TIE40499    -.0011  .0004  .0022 -.0010  .0022  .0004  -.2   .4   .1 97:  1
M005 1 RCM4 P GFZ       -.0080  .0212 -.0159 -.0043 -.0047 -.0269  -.2  -.2  -.8 93:335
S001 1 7219 TIE40499     .0048  .0031 -.0149  .0052 -.0124 -.0085  1.7 -3.9 -2.7 97:  1
S001 1 7219 R GIUB       .0009 -.0003  .0018  .0008  .0014  .0012   .3   .4   .3 92:338
S001 1 7219 R GSFC      -.0002  .0007 -.0014  .0000 -.0010 -.0012   .0  -.6  -.7 90:271
S001 1 7219 R SHA        .0006 -.0032  .0021  .0000  .0005  .0038   .0   .2  1.0 95:248
S015 1 RICA TIE40499    -.0047 -.0047  .0050 -.0054  .0028  .0056  -.5   .3   .5 97:  1
S016 1 RIDA TIE40499    -.0047 -.0047  .0050 -.0054  .0028  .0056 -1.1   .6  1.1 97:  1
S016 1 RIDA D9 IGN       .0208 -.0025 -.0294  .0201 -.0291 -.0073   .8 -1.8  -.4 96:185
S016 1 RIDA C1 CSR       .0192  .0130 -.0036  .0211  .0009 -.0102  2.2   .2 -1.6 96:162
S018 1 RCM5 TIE40499    -.0061 -.0125  .0156 -.0081  .0092  .0169 -1.6  1.8  3.3 97:  1
S018 1 RCM5 P CODE      -.0001  .0238 -.0009  .0039  .0093 -.0215  1.0  1.6 -3.5 95:334
S019 1 7201 R GIUB       .0023  .0009  .0012  .0024  .0013  .0001   .6   .2   .0 96:  0
S019 1 7201 R GSFC       .0006 -.0017  .0016  .0003  .0007  .0023   .1   .1   .4 95:357
S019 1 7201 R SHA        .0006 -.0004  .0010  .0005  .0007  .0009   .2   .2   .2 95:358
S020 1 RCM6 P CODE       .0040 -.0033  .0099  .0033  .0073  .0078  1.2  1.6  1.7 97:274
S020 1 RCM6 P GFZ       -.0008  .0052 -.0062  .0001 -.0033 -.0074   .0  -.8 -1.4 97:346
S020 1 RCM6 P IGS       -.0004  .0002 -.0008 -.0003 -.0006 -.0005  -.3  -.4  -.2 97:319
S020 1 RCM6 P DGFI       .0110 -.0067  .0043  .0097  .0002  .0095  1.1   .0   .5 96:307

Velocities
M002 1 7295 L AUS        .0023  .0095 -.0099  .0039 -.0051 -.0124   .1  -.1  -.2
M002 1 7295 L CGS        .0071 -.0085  .0000  .0056 -.0041  .0086   .8  -.4   .7
M002 1 7295 L CRL        .0034 -.0032 -.0064  .0028 -.0074  .0006   .5 -1.1   .1
M002 1 7295 L4 CSR       .0043 -.0040  .0008  .0036 -.0013  .0046   .7  -.1   .3
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M002 1 7295 L DEOS       .0078 -.0066 -.0063  .0066 -.0090  .0043  1.0 -1.1   .5
M002 1 7295 L DGFI       .0048 -.0034 -.0010  .0042 -.0027  .0034   .4  -.3   .4
M002 1 7295 P GFZ        .0003  .0019 -.0021  .0006 -.0011 -.0025   .2  -.4  -.6
M002 1 7295 C GRIM      -.1455 -.0231  .0036 -.1473  .0039  .0002  -.1   .0   .0
M002 1 7295 C1 CSR      -.0131  .0099 -.0257 -.0113 -.0180 -.0219  -.1  -.1  -.1
M005 1 RCM4 P GFZ        .0003  .0019 -.0021  .0006 -.0011 -.0025   .2  -.4  -.6
S001 1 7219 R GIUB       .0005 -.0002  .0004  .0005  .0002  .0005   .5   .2   .4
S001 1 7219 R GSFC       .0001 -.0007  .0005  .0000  .0001  .0009   .1   .2  1.3
S001 1 7219 R SHA        .0002 -.0007  .0004  .0001  .0001  .0008   .1   .1   .8
S016 1 RIDA D9 IGN       .0031 -.0025 -.0037  .0027 -.0046  .0011   .2  -.6   .1
S016 1 RIDA C1 CSR       .0049  .0011 -.0016  .0050 -.0013 -.0009  1.1  -.5  -.3
S018 1 RCM5 P CODE      -.0005 -.0017 -.0017 -.0008 -.0023  .0007  -.3  -.5   .1
S019 1 7201 R GIUB      -.0080  .0159 -.0092 -.0052 -.0009 -.0193  -.4   .0  -.6
S019 1 7201 R GSFC      -.0075  .0155 -.0018 -.0048  .0055 -.0157  -.5   .3  -.6
S019 1 7201 R SHA       -.0072  .0144  .0006 -.0047  .0072 -.0137  -.5   .4  -.6
S020 1 RCM6 P CODE      -.0005 -.0017 -.0017 -.0008 -.0023  .0007  -.3  -.5   .1
S020 1 RCM6 P GFZ        .0003  .0019 -.0021  .0006 -.0011 -.0025   .2  -.4  -.6
S020 1 RCM6 P IGS       -.0009  .0001 -.0001 -.0009  .0000 -.0002  -.5   .0   .0
S020 1 RCM6 P DGFI      -.0016  .0031 -.0068 -.0010 -.0047 -.0059  -.1  -.2  -.2

40503 SOCORRO ISLAND

Positions
S002 1 SOCA TIE40503     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S003 1 SODA TIE40503     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S003 1 SODA D9 IGN       .0054 -.0580  .0064  .0258 -.0108  .0516   .5  -.3  1.2 96:248
S003 1 SODA C GRIM      -.0482  .0080  .0375 -.0479  .0324  .0213  -.3   .4   .2 93:  1
S004 1 SODB TIE40503     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S004 1 SODB D9 IGN      -.0007 -.0211  .0173  .0069  .0100  .0244   .1   .2   .4 99:132
S004 1 SODB C GRIM      -.0280  .0424  .0075 -.0413  .0167 -.0256  -.5   .5  -.4 99: 76
S004 1 SODB C1 CSR      -.0043 -.0038 -.0040 -.0026 -.0054  .0036  -.1  -.2   .1 99:137

Velocities
S003 1 SODA D9 IGN      -.0145  .0515  .0086 -.0320  .0219 -.0379  -.4   .4  -.5
S003 1 SODA C GRIM      -.1745  .0833  .0130 -.1928  .0172 -.0104  -.1   .0   .0
S004 1 SODB D9 IGN       .0049 -.0147 -.0101  .0098 -.0134  .0081   .1  -.2   .1
S004 1 SODB C GRIM       .0079  .0052 -.0093  .0056 -.0063 -.0102   .1  -.3  -.3
S004 1 SODB C1 CSR      -.0248 -.0196 -.0062 -.0161 -.0146  .0237  -.2  -.3   .4

40504 MAZATLAN

Positions
M001 1 7122 L AUS        .0007  .0140  .0203 -.0032  .0241 -.0044  -.1   .6  -.1 95: 33
M001 1 7122 L CGS        .0092 -.0023  .0140  .0095  .0130  .0051   .7  1.5   .5 88:364
M001 1 7122 L CRL        .0048 -.0117  .0028  .0080 -.0013  .0101   .7  -.1   .6 91:120
M001 1 7122 L4 CSR      -.0054 -.0074  .0131 -.0031  .0086  .0131  -.5  1.0  1.0 89:107
M001 1 7122 L DEOS       .0117 -.0106 -.0081  .0143 -.0101  .0031   .9  -.5   .2 92:156
M001 1 7122 L DGFI       .0026  .0107 -.0029 -.0006  .0017 -.0113   .0   .1 -1.0 91:138
M001 1 7122 L JCET       .0071  .0006 -.0143  .0067 -.0121 -.0080   .3  -.3  -.3 93: 10
M001 1 7122 C GRIM       .0120 -.0157 -.0059  .0159 -.0100  .0084  1.5 -1.2   .8 89:256
M001 1 7122 C1 CSR      -.0019  .0024  .0051 -.0025  .0054  .0004  -.3   .5   .0 92:350

Velocities
M001 1 7122 L AUS       -.0003 -.0092 -.0022  .0023 -.0056  .0073   .1  -.3   .4
M001 1 7122 L CGS        .0005 -.0071  .0004  .0025 -.0023  .0063   .9  -.9  2.0
M001 1 7122 L CRL       -.0001  .0019 -.0075 -.0006 -.0062 -.0046  -.1  -.5  -.3
M001 1 7122 L4 CSR       .0019 -.0022 -.0007  .0025 -.0013  .0011  1.3  -.6   .4
M001 1 7122 L DEOS       .0051 -.0062 -.0076  .0066 -.0087  .0012  1.7 -1.9   .2
M001 1 7122 L DGFI       .0011 -.0044  .0010  .0022 -.0006  .0040   .2  -.1   .4
M001 1 7122 L JCET       .0131 -.0962 -.1938  .0398 -.2131  .0045   .1  -.3   .0
M001 1 7122 C GRIM      -.0058 -.0002  .0017 -.0056  .0009  .0023 -1.2   .3   .5
M001 1 7122 C1 CSR      -.0389  .0327  .0164 -.0466  .0232 -.0122  -.3   .1   .0

40505 CABO SAN LUCAS

Positions
M001 1 7882 L AUS       -.0606  .0329  .0184 -.0682  .0210 -.0024 -1.5   .5  -.1 95:339
M001 1 7882 L CGS        .0232 -.0035  .0014  .0230  .0031 -.0037  1.2   .1  -.1 93:116
M001 1 7882 L CRL        .0090 -.0116 -.0072  .0124 -.0097  .0044  1.1  -.8   .4 93:138
M001 1 7882 L4 CSR       .0060  .0107 -.0057  .0020 -.0005 -.0134   .1   .0  -.2 92:181
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M001 1 7882 L DEOS       .0126 -.0042 -.0120  .0133 -.0109 -.0050   .6  -.4  -.2 92:355
M001 1 7882 L DGFI       .0126 -.0039 -.0156  .0132 -.0141 -.0066   .6  -.7  -.4 93:180
M001 1 7882 C GRIM      -.0022 -.0124 -.0017  .0022 -.0064  .0108   .1  -.4   .5 91:255
M001 1 7882 C1 CSR      -.0073  .0078  .0043 -.0095  .0058 -.0028  -.5   .3  -.1 94:100

Velocities
M001 1 7882 L AUS       -.0401  .0277  .0091 -.0471  .0132 -.0080 -1.6   .5  -.3
M001 1 7882 L CGS       -.0026  .0030 -.0079 -.0035 -.0065 -.0048  -.2  -.4  -.2
M001 1 7882 L CRL       -.0057  .0009 -.0074 -.0056 -.0073 -.0019  -.7  -.8  -.2
M001 1 7882 L4 CSR       .0014 -.0037 -.0003  .0026 -.0014  .0026   .4  -.2   .2
M001 1 7882 L DEOS       .0036 -.0100 -.0070  .0068 -.0096  .0048   .4  -.7   .3
M001 1 7882 L DGFI      -.0017 -.0007 -.0046 -.0013 -.0047 -.0007  -.1  -.2   .0
M001 1 7882 C GRIM      -.0025  .0022  .0033 -.0031  .0035  .0002  -.4   .5   .0
M001 1 7882 C1 CSR      -.0387 -.0944 -.1149 -.0044 -.1456  .0491   .0  -.3   .1

40506 ENSENADA

Positions
M001 1 7883 L AUS       -.0668  .0597  .0355 -.0863  .0429 -.0022 -1.8   .9   .0 96: 28
M001 1 7883 L CGS        .0095 -.0108  .0156  .0133  .0105  .0128   .7   .4   .5 93:129
M001 1 7883 L CRL        .0044 -.0033  .0009  .0054  .0003  .0013   .5   .0   .1 93: 14
M001 1 7883 L4 CSR       .0055  .0021 -.0067  .0040 -.0035 -.0072   .1  -.1  -.1 92:187
M001 1 7883 L DEOS       .0089 -.0046 -.0036  .0100 -.0031 -.0017   .5  -.1  -.1 92:277
M001 1 7883 L DGFI       .0039  .0006 -.0110  .0032 -.0083 -.0076   .2  -.5  -.4 93: 44
M001 1 7883 C GRIM      -.0101 -.0063 -.0018 -.0062 -.0068  .0077  -.4  -.4   .4 92:350
M001 1 7883 C1 CSR       .0004 -.0126 -.0007  .0059 -.0064  .0092   .3  -.3   .4 94:  6

Velocities
M001 1 7883 L AUS       -.0331  .0228  .0074 -.0398  .0093 -.0012 -1.3   .3   .0
M001 1 7883 L CGS        .0065  .0087  .0019  .0020  .0072 -.0081   .1   .3  -.3
M001 1 7883 L CRL        .0029  .0034  .0047  .0011  .0062 -.0012   .1   .6  -.1
M001 1 7883 L4 CSR       .0028 -.0082 -.0018  .0062 -.0048  .0043   .4  -.3   .2
M001 1 7883 L DEOS       .0014 -.0075 -.0055  .0046 -.0079  .0023   .4  -.7   .2
M001 1 7883 L DGFI       .0057 -.0018  .0037  .0059  .0037  .0011   .3   .2   .1
M001 1 7883 C GRIM      -.0054  .0061  .0021 -.0075  .0034 -.0015  -.7   .3  -.1
M001 1 7883 C1 CSR       .0274  .0451  .0421  .0048  .0633 -.0231   .0   .2  -.1

40507 AGUASCALIENTES (

Positions
M001 1 INEG P GFZ       -.0005  .0026 -.0022 -.0010 -.0011 -.0031  -.1  -.1  -.1 99:339

Velocities
M001 1 INEG P GFZ        .0201  .0067  .0121  .0182  .0153 -.0056   .8   .6  -.1

40508 CICESE

Positions
M001 1 CICE P2 JPL       .0003  .0002  .0001  .0001  .0002 -.0002   .0   .1  -.1 97:150
M002 1 CIC1 P IGS        .0006 -.0004 -.0010  .0008 -.0009 -.0004   .1  -.1   .0  0:139
M002 1 CIC1 P NOAA       .0035  .0012  .0008  .0026  .0021 -.0018   .5   .4  -.3 99:217

Velocities
M001 1 CICE P2 JPL      -.0001  .0008 -.0003 -.0005  .0001 -.0008  -.1   .0  -.2
M002 1 CIC1 P IGS        .0026  .0053 -.0044  .0000 -.0006 -.0074   .0   .0  -.4
M002 1 CIC1 P NOAA      -.0005  .0015  .0054 -.0011  .0051  .0019  -.1   .3   .1

40601 MOIN/COSTA-RICA

Positions
M001 1 MOIN P CODE       .0030  .0083  .0071  .0040  .0083 -.0065  1.0  1.5  -.5 97:223
M001 1 MOIN P1 JPL       .0010 -.0004 -.0001  .0009 -.0001  .0005   .2  -.1   .1 97: 56
M001 1 MOIN P NOAA       .0028 -.0025  .0026  .0025  .0021  .0033   .3   .4   .2 97:127
M001 1 MOIN P DGFI      -.0012  .0070 -.0019 -.0004 -.0006 -.0073   .0  -.1  -.2 96:291

Velocities
M001 1 MOIN P CODE      -.0009 -.0210  .0000 -.0034 -.0036  .0205  -.4  -.4   .6
M001 1 MOIN P1 JPL      -.0023  .0033 -.0008 -.0019 -.0001 -.0037  -.3   .0  -.3
M001 1 MOIN P NOAA      -.0052 -.0025 -.0008 -.0054 -.0011  .0017  -.5  -.2   .1
M001 1 MOIN P DGFI      -.0074  .0015 -.0038 -.0072 -.0033 -.0030  -.5  -.2  -.1
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40701 SANTIAGO DE CUBA

Positions
S001 1 1953 L AUS       -.0493 -.0516  .0115 -.0605 -.0022  .0396 -1.1   .0   .8 96:266
S001 1 1953 L CGS        .0116  .0146 -.0086  .0149 -.0042 -.0135   .8  -.2  -.4 93: 81
S001 1 1953 L CRL        .0154  .0047  .0132  .0161  .0127  .0038   .5   .3   .1 94:202
S001 1 1953 L4 CSR      -.0252 -.2071  .0709 -.0753  .0001  .2071  -.2   .0   .2 92: 67
S001 1 1953 L DEOS       .0281  .0405  .0117  .0371  .0220 -.0264   .6   .3  -.5 93:102
S001 1 1953 L JCET      -.0401 -.0329  .0070 -.0469 -.0009  .0231  -.4   .0   .1 94:333
S001 1 1953 C GRIM       .0027 -.0517 -.0078 -.0101 -.0247  .0451  -.1  -.1   .2 94:337
S001 1 1953 C1 CSR      -.0853 -.1285  .0340 -.1143 -.0035  .1090  -.8   .0   .4 95:146

Velocities
S001 1 1953 L AUS       -.0047 -.0193 -.0038 -.0093 -.0096  .0152  -.2  -.2   .4
S001 1 1953 L CGS       -.0041  .0248 -.0091  .0021  .0001 -.0266   .3   .0 -2.0
S001 1 1953 L CRL       -.0229 -.0042 -.0142 -.0232 -.0128 -.0064  -.8  -.4  -.1
S001 1 1953 L4 CSR       .0008 -.0185  .0032 -.0038 -.0032  .0181   .0   .0   .1
S001 1 1953 L DEOS      -.0016 -.0334  .0180 -.0098  .0059  .0362  -.4   .2  1.2
S001 1 1953 L JCET       .0127 -.0200 -.0142  .0074 -.0211  .0163   .0  -.1   .0
S001 1 1953 C GRIM      -.0052 -.0132 -.0017 -.0083 -.0055  .0102  -.1  -.1   .1
S001 1 1953 C1 CSR      -.0317  .0697 -.0542 -.0136 -.0252 -.0894  -.1  -.1  -.2

41505 BUENOS-AIRES

Positions
M002 1 IGM0 P DGFI      -.0019 -.0031  .0001 -.0033  .0010  .0013  -.4   .1   .1  0:283

Velocities
M002 1 IGM0 P DGFI       .0077 -.0071  .0027  .0029  .0079  .0068   .1   .3   .3

41507 RIO GRANDE

Positions
M003 1 RIOZ TIE41507    -.0003  .0016 -.0004  .0003 -.0015 -.0007   .1  -.7  -.3 97:  1
M003 1 RIOZ P SCAR       .0062 -.0092 -.0199  .0022 -.0030  .0225   .4  -.3  2.3 95: 20
M004 1 RIOG TIE41507    -.0010 -.0041 -.0039 -.0025  .0005  .0052  -.8   .2  1.6 97:  1
M004 1 RIOG P CODE       .0111  .0050  .0068  .0122  .0037 -.0057  1.4   .4  -.6 99:356
M004 1 RIOG P GFZ        .0025  .0028  .0019  .0034 -.0002 -.0025  1.0  -.1  -.6 98:365
M004 1 RIOG P IGS        .0000  .0033  .0045  .0012  .0002 -.0054   .6   .1 -1.9 99:292
M004 1 RIOG P NOAA      -.0050  .0064  .0091 -.0022 -.0010 -.0120  -.4  -.1 -1.8 99:187
M004 1 RIOG P DGFI      -.0026 -.0110  .0036 -.0066  .0096  .0025 -1.2  1.0   .2  0:358
S003 1 RIOA TIE41507     .0004 -.0005 -.0003  .0002  .0003  .0006   .1   .2   .3 97:  1
S003 1 RIOA D GRGS      -.0038  .0110  .0082  .0007 -.0046 -.0135   .0  -.2  -.6 94: 75
S003 1 RIOA D9 IGN      -.0213  .0291  .0046 -.0087 -.0255 -.0243  -.3 -1.0 -1.0 94: 61
S003 1 RIOA C GRIM       .0048  .0424  .0495  .0205 -.0010 -.0620   .7   .0 -2.3 93:  1
S003 1 RIOA C1 CSR      -.0207 -.0169  .0228 -.0256  .0198 -.0138 -1.0   .7  -.5 93:353
S004 1 RIOB TIE41507     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S004 1 RIOB D GRGS       .0100  .0098 -.0132  .0130 -.0120  .0075   .7  -.8   .5 96:343
S004 1 RIOB D9 IGN      -.0023  .0153 -.0514  .0037 -.0425  .0326   .1 -1.6  1.2 98: 57
S004 1 RIOB C1 CSR      -.0025 -.0143 -.0111 -.0077  .0033  .0162 -1.4   .6  2.9 97:209

Velocities
M003 1 RIOZ P SCAR       .0063 -.0052  .0067  .0039  .0098 -.0011   .0   .0   .0
M004 1 RIOG P CODE      -.0046  .0225  .0135  .0043 -.0102 -.0243   .1  -.2  -.4
M004 1 RIOG P GFZ        .0045 -.0017 -.0033  .0035  .0007  .0046  1.7   .3  2.0
M004 1 RIOG P IGS        .0000  .0018  .0018  .0007 -.0003 -.0024   .3  -.1  -.7
M004 1 RIOG P NOAA       .0063 -.0001 -.0005  .0058  .0017  .0018   .4   .1   .1
M004 1 RIOG P DGFI      -.0021  .0123  .0120  .0028 -.0027 -.0169   .2  -.1  -.5
S003 1 RIOA D GRGS      -.0023 -.0026 -.0016 -.0031  .0003  .0021  -.2   .0   .2
S003 1 RIOA D9 IGN       .0055 -.0014 -.0022  .0045  .0014  .0038   .1   .0   .1
S003 1 RIOA C GRIM      -.0757 -.0446  .0055 -.0870  .0135  .0030  -.1   .0   .0
S003 1 RIOA C1 CSR       .0067 -.0043 -.0102  .0046 -.0008  .0121   .1   .0   .3
S004 1 RIOB D GRGS      -.0023 -.0026 -.0016 -.0031  .0003  .0022  -.2   .0   .2
S004 1 RIOB D9 IGN      -.0004 -.0099  .0070 -.0041  .0114 -.0003  -.3   .7   .0
S004 1 RIOB C1 CSR      -.0021 -.0007 -.0041 -.0021 -.0026  .0032  -.6  -.7   .9

41510 LA PLATA

Positions
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M001 1 LPGS P CODE       .0067 -.0029  .0064  .0042  .0087  .0012   .8  1.6   .2 98: 37
M001 1 LPGS P GFZ        .0030  .0015 -.0004  .0033 -.0001  .0005  1.0   .0   .1 98:212
M001 1 LPGS P IGS        .0019 -.0006  .0001  .0013  .0009  .0012   .7   .5   .6 98:141
M001 1 LPGS P1 JPL      -.0004  .0034  .0018  .0015 -.0003 -.0036   .5  -.1 -1.1 98: 21
M001 1 LPGS P NCL       -.0007  .0030  .0014  .0010 -.0005 -.0032   .2  -.1  -.6 96:295
M001 1 LPGS P NOAA      -.0003  .0037  .0037  .0017  .0012 -.0049   .4   .3 -1.1 97:336
M001 1 LPGS P DGFI      -.0033 -.0016 -.0010 -.0037 -.0010  .0003  -.5  -.1   .0 98:266
M001 1 LPGS P SCAR      -.0070  .0123  .0089  .0006 -.0008 -.0167   .1  -.1 -1.7 97:194

Velocities
M001 1 LPGS P CODE       .0028 -.0001 -.0008  .0023  .0002  .0017   .7   .1   .5
M001 1 LPGS P GFZ       -.0004  .0022  .0023  .0008  .0007 -.0030   .4   .4 -1.5
M001 1 LPGS P IGS       -.0010  .0001  .0013 -.0008  .0007 -.0012  -.6   .5  -.8
M001 1 LPGS P1 JPL      -.0002  .0005 -.0007  .0001 -.0009 -.0001   .0  -.4   .0
M001 1 LPGS P NCL       -.0051  .0041  .0033 -.0021 -.0008 -.0069  -.5  -.2 -1.4
M001 1 LPGS P NOAA       .0003 -.0016 -.0009 -.0006  .0002  .0017  -.2   .1   .6
M001 1 LPGS P DGFI      -.0036  .0028  .0030 -.0015  .0000 -.0053  -.2   .0  -.6
M001 1 LPGS P SCAR       .0014 -.0022 -.0004  .0000  .0012  .0023   .0   .2   .3

41511 CORDOBA GPS SITE

Positions
M001 1 CORD P CODE       .0099  .0003  .0061  .0091  .0073  .0002   .6   .4   .0  0: 11
M001 1 CORD P GFZ        .0029  .0055  .0022  .0049 -.0001 -.0043   .6   .0  -.4  0: 17
M001 1 CORD P IGS       -.0004 -.0009  .0028 -.0007  .0028 -.0009  -.1   .5  -.1  0:129

Velocities
M001 1 CORD P CODE      -.0321 -.0103 -.0051 -.0334 -.0068 -.0012  -.2   .0   .0
M001 1 CORD P GFZ       -.0001  .0001  .0000  .0000 -.0001 -.0001   .0  -.1  -.1
M001 1 CORD P IGS        .0001 -.0047 -.0019 -.0019  .0006  .0047  -.1   .0   .2

41512 BAHIA BLANCA

Positions
M001 1 VBCA P DGFI      -.0015 -.0038 -.0006 -.0031  .0012  .0024  -.4   .1   .2  0:229

Velocities
M001 1 VBCA P DGFI       .0241 -.0316 -.0115  .0066  .0155  .0378   .3   .4  1.1

41602 FORTALEZA

Positions
M001 1 FORT TIE41602    -.0077  .0015 -.0014 -.0036 -.0018 -.0068 -1.1  -.6 -2.2 97:  1
M001 1 FORT P CODE       .0109 -.0123  .0081 -.0029  .0091  .0156  -.6  2.2  2.9 97:178
M001 1 FORT P GFZ        .0083 -.0062 -.0027  .0003 -.0020  .0105   .1  -.8  2.6 97:268
M001 1 FORT P IGS        .0028 -.0016  .0002  .0005  .0004  .0032   .2   .4  1.5 97:362
M001 1 FORT P1 JPL      -.0034  .0036  .0012  .0007  .0009 -.0050   .3  1.2 -1.8 96:101
M001 1 FORT P NCL        .0021 -.0004 -.0003  .0009 -.0002  .0019   .3  -.1   .6 97:350
M001 1 FORT P NOAA      -.0025 -.0033  .0046 -.0041  .0046 -.0002  -.7  1.7   .0 97: 71
M001 1 FORT P DGFI       .0016  .0041  .0025  .0042  .0024 -.0015   .4   .8  -.1 98: 65
M001 1 FORT P SCAR      -.0044  .0103  .0006  .0053 -.0001 -.0099   .5   .0  -.9 96:282
S001 1 7297 TIE41602     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7297 R GIUB       .0004  .0028 -.0009  .0024 -.0010 -.0013   .8  -.3  -.4 95:184
S001 1 7297 R GSFC      -.0045  .0040 -.0007  .0004 -.0011 -.0060   .1 -1.0 -2.3 96:160
S001 1 7297 R SHA       -.0037  .0036  .0022  .0005  .0019 -.0052   .2  1.3 -1.9 96:256

Velocities
M001 1 FORT P CODE      -.0035  .0022  .0003 -.0004  .0000 -.0041  -.1   .0 -1.0
M001 1 FORT P GFZ       -.0028  .0037  .0007  .0012  .0004 -.0045   .6   .5 -2.1
M001 1 FORT P IGS        .0003  .0008  .0011  .0008  .0011 -.0003   .5  1.7  -.2
M001 1 FORT P1 JPL       .0029  .0012 -.0016  .0027 -.0015  .0016  1.8 -3.2  1.0
M001 1 FORT P NCL        .0003  .0009 -.0002  .0009 -.0002 -.0003   .3  -.1  -.1
M001 1 FORT P NOAA      -.0001  .0011 -.0015  .0009 -.0015 -.0007   .2  -.8  -.2
M001 1 FORT P DGFI       .0051 -.0023 -.0015  .0013 -.0011  .0055   .1  -.4   .4
M001 1 FORT P SCAR       .0033  .0000 -.0004  .0020 -.0002  .0026   .3  -.1   .4
S001 1 7297 R GIUB       .0005 -.0005  .0010 -.0001  .0010  .0006  -.1   .9   .4
S001 1 7297 R GSFC       .0002  .0004 -.0002  .0004 -.0002 -.0001   .7  -.6  -.1
S001 1 7297 R SHA        .0006 -.0003  .0008  .0001  .0009  .0006   .1   .9   .6

41603 CUIBA
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Positions
M001 1 CUIB P DGFI      -.0028 -.0008  .0010 -.0028  .0007 -.0011  -.4   .2  -.1 99: 88

Velocities
M001 1 CUIB P DGFI      -.0004 -.0004  .0010 -.0005  .0010 -.0001  -.1   .2   .0

41604 NATAL

Positions
S001 1 7929 L4 CSR      -.0006 -.0054  .0686 -.0047  .0685 -.0045   .0   .7   .0 80:218

Velocities
S001 1 7929 L4 CSR       .0031  .0007 -.0120  .0023 -.0118  .0034   .0  -.3   .1

41606 BRASILIA

Positions
M001 1 BRAZ P CODE       .0019 -.0034  .0080 -.0009  .0087  .0014  -.1  1.6   .2 96:358
M001 1 BRAZ P GFZ        .0001  .0017 -.0023  .0012 -.0026 -.0005   .2  -.6  -.1 96:309
M001 1 BRAZ P IGS        .0039 -.0029 -.0006  .0010  .0007  .0048   .3   .3  1.3 97:163
M001 1 BRAZ P1 JPL      -.0008 -.0022 -.0001 -.0021  .0002  .0011  -.5   .1   .2 97: 69
M001 1 BRAZ P NOAA      -.0022  .0020  .0040 -.0003  .0030 -.0039  -.1   .9  -.7 97:257
M001 1 BRAZ P DGFI      -.0052  .0014  .0017 -.0029  .0004 -.0048  -.4   .1  -.6 98:282
M001 1 BRAZ P SCAR      -.0048  .0108  .0033  .0037  .0001 -.0117   .4   .0 -1.1 98:157

Velocities
M001 1 BRAZ P CODE       .0045 -.0015  .0011  .0023  .0022  .0036   .3   .5   .5
M001 1 BRAZ P GFZ        .0081 -.0048 -.0001  .0028  .0024  .0087   .3   .6  1.1
M001 1 BRAZ P IGS        .0000  .0000  .0013 -.0001  .0012 -.0003   .0   .3   .0
M001 1 BRAZ P1 JPL       .0018  .0002 -.0014  .0015 -.0011  .0014   .4  -.6   .4
M001 1 BRAZ P NOAA      -.0004 -.0001 -.0005 -.0003 -.0006 -.0001  -.1  -.2   .0
M001 1 BRAZ P DGFI      -.0024  .0006 -.0002 -.0014 -.0007 -.0019  -.2  -.2  -.2
M001 1 BRAZ P SCAR      -.0100  .0096  .0016 -.0010 -.0023 -.0137  -.1  -.4 -1.2

41609 CACHOEIRA PAULIS

Positions
S001 1 CACB D GRGS       .0634  .0392  .0265  .0726  .0311  .0056  2.8  1.9   .2 95:344
S001 1 CACB D9 IGN       .0377 -.0891  .0275 -.0364  .0600  .0721 -1.4  3.2  3.0 96:102
S001 1 CACB C GRIM      -.0078  .0222 -.0022  .0102 -.0102 -.0187   .3  -.6  -.7 96:225
S001 1 CACB C1 CSR      -.0109  .0177 -.0200  .0048 -.0263 -.0110   .4 -3.0 -1.0 96: 20

Velocities
S001 1 CACB D GRGS       .0067  .0040  .0000  .0076  .0008  .0018   .4   .1   .1
S001 1 CACB D9 IGN       .0035 -.0025  .0007  .0007  .0023  .0036   .1   .2   .3
S001 1 CACB C GRIM       .0208  .0061 -.0145  .0190 -.0094  .0152   .9  -.6   .7
S001 1 CACB C1 CSR      -.0006  .0054 -.0035  .0034 -.0048 -.0026   .6 -1.1  -.4

41610 CURITIBA/PARANA

Positions
M001 1 PARA P DGFI      -.0010 -.0020  .0000 -.0020  .0004  .0008  -.3   .1   .1 98:317
M001 1 PARA P SCAR      -.0005  .0066 -.0003  .0039 -.0026 -.0047   .3  -.3  -.4 95:187

Velocities
M001 1 PARA P DGFI       .0015  .0002 -.0009  .0013 -.0005  .0011   .2  -.1   .1
M001 1 PARA P SCAR      -.0078  .0014  .0099 -.0050  .0064 -.0098  -.2   .4  -.5

41611 PRESIDENTE PRUDE

Positions
M001 1 UEPP P DGFI      -.0017 -.0014  .0005 -.0022  .0005 -.0002  -.3   .1   .0 98:331

Velocities
M001 1 UEPP P DGFI       .0004 -.0006  .0006 -.0001  .0008  .0004   .0   .1   .1

41612 BOM JESUS DA LAP

Positions
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M001 1 BOMJ P DGFI      -.0002 -.0018  .0006 -.0014  .0008  .0009  -.2   .2   .1 98:342

Velocities
M001 1 BOMJ P DGFI      -.0034  .0021  .0015 -.0008  .0006 -.0041  -.1   .1  -.4

41613 VICOSA

Positions
M001 1 VICO P DGFI       .0002 -.0017  .0000 -.0012  .0005  .0012  -.1   .1   .1 99: 43

Velocities
M001 1 VICO P DGFI      -.0024  .0022  .0024  .0000  .0011 -.0039   .0   .2  -.4

41614 MANAUS

Positions
M001 1 MANA P DGFI      -.0026  .0010  .0013 -.0017  .0011 -.0022  -.2   .4  -.2 98:243

Velocities
M001 1 MANA P DGFI      -.0018  .0039  .0014  .0004  .0012 -.0044   .0   .3  -.2

41615 IMPERATRIZ

Positions
M001 1 IMPZ P DGFI       .0007 -.0014  .0011 -.0004  .0013  .0014   .0   .4   .1 99:234

Velocities
M001 1 IMPZ P DGFI      -.0145  .0163  .0038  .0004  .0017 -.0221   .0   .3 -1.1

41703 EASTER ISLAND

Positions
M002 1 7097 TIE41703     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 7097 L CGS       -.0026 -.0436 -.0134  .0121  .0073  .0435   .8   .4  2.2 92:183
M002 1 7097 L CRL       -.0050 -.0291 -.0140  .0049  .0009  .0323   .4   .1  2.2 91:313
M002 1 7097 L4 CSR       .0094  .0079  .0067  .0062  .0011 -.0125   .2   .0  -.2 92: 38
M002 1 7097 L DEOS      -.0016 -.0196 -.0181  .0051 -.0074  .0252   .3  -.4  1.6 93:182
M002 1 7097 L DGFI       .0009 -.0130 -.0131  .0051 -.0062  .0166   .4  -.5  1.5 93: 45
M002 1 7097 C GRIM       .0178  .0157 -.0190  .0116 -.0264 -.0098   .6 -1.4  -.4 93:  1
M002 1 7097 C1 CSR      -.0012 -.0109 -.0008  .0025  .0041  .0099   .2   .2   .4 94: 67
M003 1 EIS1 TIE41703     .0009 -.0043 -.0047  .0023 -.0025  .0055   .7  -.8  1.7 97:  1
M003 1 EIS1 P CODE       .0029 -.0054  .0032  .0045  .0047  .0022   .8   .9   .4 97:253
M003 1 EIS1 P GFZ        .0010 -.0022 -.0035  .0017 -.0023  .0031   .5  -.6   .7 98: 94
M003 1 EIS1 P IGS        .0010  .0017  .0017  .0003  .0006 -.0025   .2   .3 -1.0 98:165
M003 1 EIS1 P1 JPL       .0030  .0047  .0032  .0013  .0004 -.0063   .6   .2 -2.2 97: 67
M003 1 EIS1 P NCL        .0024  .0026  .0023  .0014  .0006 -.0039   .4   .2 -1.2 98:104
M003 1 EIS1 P NOAA       .0024  .0053 -.0005  .0005 -.0031 -.0049   .1  -.7  -.8 97:140
M003 1 EIS1 P DGFI      -.0063  .0057  .0002 -.0078 -.0013 -.0030  -.7  -.1  -.2 98:216
M003 1 EIS1 P SCAR      -.0138 -.0080 -.0013 -.0103  .0044  .0114 -1.7   .6  1.2 96:301
S008 1 EASA TIE41703    -.0056 -.0249  .0054  .0030  .0163  .0201   .3  1.6  2.0 97:  1
S008 1 EASA D GRGS       .0179 -.0295  .0125  .0267  .0211  .0138  1.3  1.7   .9 95:344
S008 1 EASA D9 IGN      -.0310 -.0097 -.0119 -.0260 -.0017  .0227 -1.2  -.1  1.2 96: 96
S008 1 EASA C GRIM      -.0095  .0306  .0061 -.0191 -.0063 -.0257 -1.0  -.7 -2.2 95:112
S008 1 EASA C1 CSR       .0010 -.0050 -.0018  .0026  .0004  .0048   .4   .1   .9 96:204

Velocities
M002 1 7097 L CGS        .0024 -.0041  .0026  .0036  .0037  .0016   .5   .4   .1
M002 1 7097 L CRL        .0016  .0001 -.0044  .0015 -.0042  .0014   .2  -.5   .1
M002 1 7097 L4 CSR       .0025  .0047  .0014  .0008 -.0012 -.0053   .1  -.2  -.5
M002 1 7097 L DEOS      -.0025 -.0033 -.0061 -.0012 -.0036  .0063  -.2  -.5   .8
M002 1 7097 L DGFI      -.0003 -.0028 -.0030  .0007 -.0014  .0038   .1  -.2   .6
M002 1 7097 C GRIM      -.0640  .0261 -.0041 -.0690 -.0051 -.0011   .0   .0   .0
M002 1 7097 C1 CSR      -.0001  .0066  .0060 -.0023  .0025 -.0083  -.1   .1  -.3
M003 1 EIS1 P CODE      -.0012  .0082  .0039 -.0039  .0001 -.0083 -1.1   .0 -2.2
M003 1 EIS1 P GFZ        .0000  .0003 -.0017 -.0001 -.0016  .0005   .0 -1.7   .5
M003 1 EIS1 P IGS       -.0014 -.0022  .0006 -.0006  .0017  .0019  -.4  1.1  1.0
M003 1 EIS1 P1 JPL       .0019 -.0001 -.0002  .0018 -.0004 -.0004  1.4  -.3  -.2
M003 1 EIS1 P NCL       -.0002  .0003  .0021 -.0003  .0017 -.0012  -.1   .7  -.4
M003 1 EIS1 P NOAA      -.0024  .0010  .0027 -.0026  .0024 -.0014  -.7   .8  -.3
M003 1 EIS1 P DGFI       .0004 -.0022  .0063  .0011  .0064 -.0012   .1   .5  -.1
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M003 1 EIS1 P SCAR       .0075  .0032  .0022  .0060 -.0005 -.0059  1.6  -.1  -.9
S008 1 EASA D GRGS       .0013  .0087 -.0002 -.0016 -.0041 -.0076  -.1  -.5  -.8
S008 1 EASA D9 IGN       .0007 -.0052 -.0020  .0024  .0004  .0051   .2   .0   .6
S008 1 EASA C GRIM       .0020  .0119  .0001 -.0021 -.0054 -.0106  -.3 -1.3 -2.2
S008 1 EASA C1 CSR      -.0034  .0058 -.0054 -.0051 -.0068 -.0014 -1.6 -3.1  -.6

41705 SANTIAGO

Positions
M001 1 7400 TIE41705     .0023 -.0016  .0016  .0016  .0026  .0010   .5   .8   .3 97:  1
M001 1 7400 L4 CSR      -.4347 -.0423  .0090 -.4242 -.0493 -.0920 -3.8  -.3  -.5 84:107
M001 1 7400 L DEOS      -.5542 -.0522  .0165 -.5403 -.0595 -.1214  -.4  -.1  -.1 93:  1
M001 1 7400 P SCAR      -.0001  .0011 -.0007  .0002 -.0012 -.0005   .1  -.2  -.1 96:198
M003 1 SANT TIE41705     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 SANT P CODE       .0075 -.0068  .0028  .0048  .0073  .0059  1.1  1.5  1.1 97:276
M003 1 SANT P GFZ        .0031 -.0008 -.0026  .0027 -.0012  .0029   .8  -.3   .8 97:322
M003 1 SANT P IGS        .0009 -.0011  .0002  .0005  .0009  .0010   .4   .6   .6 98:136
M003 1 SANT P1 JPL      -.0021  .0061  .0054  .0000  .0010 -.0083   .0   .5 -3.6 96:161
M003 1 SANT P NCL        .0018  .0009  .0008  .0020  .0005 -.0006   .7   .2  -.2 98: 21
M003 1 SANT P NOAA      -.0017  .0099  .0078  .0017  .0011 -.0125   .4   .3 -2.5 98: 25
M003 1 SANT P DGFI      -.0035  .0004 -.0005 -.0031 -.0012 -.0010  -.5  -.1  -.1 98:133
M003 1 SANT P2 IGN       .0017  .0051  .0028  .0032  .0000 -.0051   .4   .0  -.6 97:195
M003 1 SANT P SCAR      -.0033  .0046  .0002 -.0016 -.0028 -.0046  -.4  -.5  -.7 96:214
M004 1 7404 L CGS       -.0169  .0528  .0262  .0015 -.0084 -.0607   .0  -.2 -1.1 97:  1
M004 1 7404 L4 CSR       .0184 -.1138 -.0849 -.0203 -.0091  .1414   .0   .0   .1 96:139
M004 1 7404 L DEOS       .0461 -.0100 -.0242  .0401 -.0067  .0339   .1   .0   .1 92: 49
M004 1 7404 C1 CSR      -.0032 -.0438 -.0092 -.0175  .0143  .0388  -.2   .1   .4 96:171
S006 1 1404 TIE41705     .0048  .0065  .0066  .0067  .0030 -.0074  2.1   .9 -2.3 97:  1
S006 1 1404 R GIUB       .0032 -.0030 -.0082  .0020 -.0048  .0077   .4  -.8  1.2 94:299
S006 1 1404 R GSFC       .0017 -.0036 -.0056  .0004 -.0025  .0064   .1  -.7  1.6 94:308
S006 1 1404 R SHA        .0043 -.0060 -.0035  .0021  .0009  .0079   .6   .2  1.9 95: 74
S007 1 SANA TIE41705     .0364 -.0169  .0189  .0287  .0312  .0131  1.0  1.0   .4 97:  1
S007 1 SANA D GRGS       .0565 -.0168  .0060  .0477  .0241  .0256  1.2   .9   .9 94:350
S007 1 SANA D9 IGN      -.0164  .0039  .0051 -.0142 -.0008 -.0104  -.3   .0  -.3 94:356
S007 1 SANA C GRIM       .0419  .0048  .0170  .0411  .0194 -.0015   .8   .6   .0 97:  1
S007 1 SANA C1 CSR      -.0120 -.0015 -.0031 -.0119 -.0040 -.0004  -.9  -.5   .0 94:285
S008 1 SAOB TIE41705     .0035 -.0040  .0033  .0020  .0054  .0024   .5  1.2   .5 97:  1
S008 1 SAOB D GRGS      -.0005  .0120  .0063  .0035 -.0010 -.0131   .0   .0  -.2 97:351
S008 1 SAOB D9 IGN      -.0246 -.0145 -.0034 -.0280  .0002  .0065  -.5   .0   .1 99: 35
S008 1 SAOB C1 CSR      -.0304  .0325 -.0136 -.0179 -.0336 -.0267 -1.0 -2.7 -2.0 98:118

Velocities
M001 1 7400 L4 CSR       .0342  .1692 -.2282  .0883 -.2722  .0006   .1  -.3   .0
M001 1 7400 L DEOS      -.0404 -.0146 -.0143 -.0429 -.0118  .0082   .0   .0   .0
M001 1 7400 P SCAR      -.0045  .0007  .0024 -.0040  .0009 -.0031 -1.4   .2  -.7
M003 1 SANT P CODE       .0019  .0025  .0009  .0026 -.0002 -.0020   .9  -.1  -.6
M003 1 SANT P GFZ       -.0001  .0035  .0027  .0011  .0004 -.0042   .8   .3 -2.5
M003 1 SANT P IGS       -.0013 -.0013  .0007 -.0016  .0010  .0003 -1.6   .9   .2
M003 1 SANT P1 JPL       .0010 -.0002 -.0008  .0009 -.0004  .0009   .9  -.3   .7
M003 1 SANT P NCL       -.0008  .0011  .0015 -.0003  .0005 -.0019  -.1   .2  -.8
M003 1 SANT P NOAA       .0009 -.0038 -.0029 -.0004 -.0003  .0048  -.1  -.1  1.2
M003 1 SANT P DGFI      -.0012 -.0023 -.0001 -.0019  .0009  .0015  -.3   .1   .2
M003 1 SANT P2 IGN       .0007 -.0029 -.0020 -.0003  .0000  .0036  -.1   .0   .6
M003 1 SANT P SCAR      -.0024  .0012  .0040 -.0019  .0023 -.0038  -.6   .6  -.8
M004 1 7404 L CGS        .0136 -.0074  .0104  .0104  .0150  .0039   .0   .0   .0
M004 1 7404 L4 CSR       .0146  .0303  .0641  .0238  .0407 -.0549   .1   .1  -.1
M004 1 7404 L DEOS      -.0104 -.0063 -.0053 -.0119 -.0030  .0050  -.1   .0   .0
M004 1 7404 C1 CSR       .0415 -.0815 -.0604  .0122 -.0009  .1089   .0   .0   .2
S006 1 1404 R GIUB       .0005 -.0009  .0008  .0001  .0013  .0004   .0   .4   .1
S006 1 1404 R GSFC      -.0015  .0013  .0011 -.0010  .0000 -.0020  -.7   .0 -1.1
S006 1 1404 R SHA       -.0008  .0000  .0009 -.0007  .0006 -.0007  -.4   .3  -.3
S007 1 SANA D GRGS       .0149  .0031 -.0057  .0151 -.0037  .0048   .4  -.1   .2
S007 1 SANA D9 IGN       .0005 -.0106 -.0255 -.0030 -.0157  .0225  -.1  -.5   .6
S007 1 SANA C GRIM      -.0981 -.0482  .0140 -.1086  .0187  .0029  -.1   .0   .0
S007 1 SANA C1 CSR       .0075  .0178 -.0188  .0130 -.0236 -.0016  1.2 -3.1  -.2
S008 1 SAOB D GRGS       .0149  .0031 -.0057  .0151 -.0037  .0048   .4  -.1   .2
S008 1 SAOB D9 IGN       .0060 -.0210  .0045 -.0013  .0157  .0159   .0   .3   .3
S008 1 SAOB C1 CSR      -.0078 -.0077 -.0021 -.0099  .0008  .0051  -.6   .1   .4

41706 CERRO TOLOLO
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Positions
M001 1 7401 L CRL        .0051 -.0132  .0117  .0005  .0172  .0064   .0  1.5   .5 90:260
M001 1 7401 L4 CSR       .0111 -.0611 -.0359 -.0096 -.0002  .0711  -.4   .0  1.4 89:339
M001 1 7401 L DEOS       .0193 -.0297  .0284  .0085  .0418  .0155   .2   .9   .4 92:362
M001 1 7401 C GRIM       .0075 -.0037 -.0206  .0059 -.0148  .0155   .5 -1.0   .9 90:272

Velocities
M001 1 7401 L CRL       -.0120  .0623  .0568  .0092  .0175 -.0828   .4   .6 -2.6
M001 1 7401 L4 CSR      -.0049  .0424  .0343  .0094  .0087 -.0533   .8   .5 -2.4
M001 1 7401 L DEOS       .0093  .0009  .0172  .0091  .0160 -.0067   .6   .8  -.3
M001 1 7401 C GRIM      -.0015  .0435  .0285  .0129  .0037 -.0503   .5   .1 -1.1

41708 IQUIQUE

Positions
S001 1 IQUB D GRGS      -.0184 -.0200  .0055 -.0242  .0095  .0098  -.4   .4   .2 95:275
S001 1 IQUB D9 IGN      -.0340  .0323  .0203 -.0208  .0045 -.0464  -.1   .0  -.3 97:345

Velocities
S001 1 IQUB D GRGS      -.0093  .0036  .0050 -.0075  .0024 -.0079  -.2   .1  -.3
S001 1 IQUB D9 IGN      -.0995  .0911  .0174 -.0621 -.0251 -.1184  -.1   .0  -.2

41709 SEST

Positions
S001 1 7239 R GSFC      -.0039  .0115 -.0005  .0001 -.0063 -.0104   .0  -.2  -.2 90:133
S001 1 7239 R SHA       -.0009  .0009 -.0004 -.0005 -.0009 -.0008   .0   .0   .0 90:133

Velocities
S001 1 7239 R GSFC       .1589 -.4374  .1342  .0056  .3445  .3404   .0   .5   .4
S001 1 7239 R SHA       -.0126  .0258 -.0398 -.0034 -.0487 -.0054   .0  -.2   .0

41710 CARIQUIMA

Positions
S001 1 CARB D GRGS      -.0360 -.0252  .0038 -.0427  .0070  .0085  -.7   .2   .2 95:221

Velocities
S001 1 CARB D GRGS      -.0402  .0101  .0088 -.0338  .0003 -.0256  -.6   .0  -.6

41718 PUNTA ARENAS II

Positions
M001 1 PUN1 P SCAR      -.0018  .0050  .0000  .0000 -.0043 -.0031   .0  -.7  -.5 96:142

Velocities
M001 1 PUN1 P SCAR      -.0015 -.0002  .0028 -.0015  .0014 -.0024  -.6   .3  -.5

41901 BOGOTA

Positions
M001 1 BOGT P CODE       .0059 -.0054  .0099  .0042  .0093  .0076   .8  2.2   .9 97:230
M001 1 BOGT P1 JPL      -.0021  .0029 -.0009 -.0012 -.0006 -.0035  -.3  -.4  -.5 98: 80
M001 1 BOGT P NOAA       .0007  .0007  .0018  .0008  .0019 -.0004   .2   .8  -.1 97:119
M001 1 BOGT P DGFI       .0055 -.0087  .0019  .0029  .0011  .0100   .3   .2   .4 98: 87

Velocities
M001 1 BOGT P CODE      -.0011  .0015 -.0009 -.0007 -.0008 -.0018  -.2  -.3  -.3
M001 1 BOGT P1 JPL       .0042  .0007 -.0001  .0042 -.0001  .0005  1.1  -.1   .1
M001 1 BOGT P NOAA      -.0017 -.0022  .0006 -.0023  .0005  .0017  -.7   .2   .4
M001 1 BOGT P DGFI       .0022 -.0035  .0009  .0012  .0005  .0040   .1   .1   .2

42004 SAN CRISTOBAL (G

Positions
S001 1 GALA D GRGS       .0695 -.0119  .0252  .0694  .0253  .0120  1.9  1.8   .5 96: 80
S001 1 GALA D9 IGN      -.0092 -.0149 -.0143 -.0093 -.0141  .0150  -.3  -.8   .6 96:218
S001 1 GALA C GRIM      -.0007 -.0151 -.0045 -.0008 -.0042  .0152   .0  -.3   .8 97:136
S001 1 GALA C1 CSR      -.0137  .0089  .0005 -.0136  .0003 -.0090  -.9   .0  -.8 96:342
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Velocities
S001 1 GALA D GRGS       .0034 -.0062  .0013  .0034  .0014  .0062   .2   .2   .5
S001 1 GALA D9 IGN       .0003  .0004  .0005  .0003  .0005 -.0004   .0   .1   .0
S001 1 GALA C GRIM      -.0016 -.0037 -.0005 -.0016 -.0004  .0037  -.1   .0   .2
S001 1 GALA C1 CSR       .0020  .0019  .0014  .0020  .0014 -.0019   .2   .4  -.3

42005 SANTA CRUZ

Positions
M001 1 GALA P CODE       .0047 -.0155  .0062  .0048  .0064  .0153   .8  1.1  1.1 98:315
M001 1 GALA P GFZ        .0005  .0089 -.0055  .0004 -.0056 -.0089   .1 -1.7 -1.0 99: 60
M001 1 GALA P IGS       -.0009 -.0013  .0028 -.0009  .0028  .0013  -.5  2.2   .3 99:289
M001 1 GALA P1 JPL       .0020  .0019 -.0008  .0020 -.0008 -.0019   .6  -.8  -.3 97:254
M001 1 GALA P NOAA       .0046 -.0008  .0014  .0046  .0015  .0008   .6   .5   .1 97:203
M001 1 GALA P DGFI       .0126 -.0011  .0001  .0126  .0001  .0010  1.5   .0   .0 98:261

Velocities
M001 1 GALA P CODE       .0040 -.0036  .0018  .0040  .0018  .0036   .6   .5   .2
M001 1 GALA P GFZ        .0007 -.0015  .0018  .0007  .0018  .0015   .2   .8   .1
M001 1 GALA P IGS        .0004 -.0001  .0039  .0004  .0039  .0001   .3  3.8   .0
M001 1 GALA P1 JPL       .0011  .0001 -.0030  .0011 -.0030  .0000   .3 -2.8   .0
M001 1 GALA P NOAA      -.0028 -.0024 -.0032 -.0028 -.0031  .0024  -.4 -1.3   .2
M001 1 GALA P DGFI       .0025 -.0069  .0031  .0025  .0032  .0068   .3   .6   .2

42006 RIO BAMBA

Positions
M001 1 RIOP P IGS       -.0004  .0212  .0069  .0038  .0062 -.0211   .4  1.2  -.9  0: 38
M001 1 RIOP P NOAA      -.0010 -.0123  .0003 -.0034  .0007  .0119  -.3   .1   .6 99:141
M001 1 RIOP P DGFI      -.0036  .0270  .0005  .0018 -.0003 -.0272   .1  -.1  -.6  0:235

Velocities
M001 1 RIOP P IGS        .0027  .0312  .0044  .0088  .0035 -.0301   .3   .2  -.5
M001 1 RIOP P NOAA      -.0008  .0289  .0040  .0049  .0032 -.0286   .1   .3  -.5
M001 1 RIOP P DGFI      -.0033  .0136  .0057 -.0006  .0053 -.0141   .0   .3  -.2

42202 AREQUIPA

Positions
M003 1 7403 TIE42202     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 7403 L AUS       -.0063 -.0032 -.0069 -.0070 -.0064  .0029  -.6  -.5   .4 95:174
M003 1 7403 L CGS        .0141  .0059 -.0099  .0153 -.0098  .0017  1.6 -1.5   .2 97:  1
M003 1 7403 L CRL        .0059 -.0012 -.0071  .0052 -.0060  .0049   .6  -.7   .5 92:255
M003 1 7403 L4 CSR       .0037  .0091 -.0074  .0064 -.0092 -.0051   .9 -1.3  -.4 94: 28
M003 1 7403 L DEOS       .0008 -.0071 -.0138 -.0015 -.0112  .0106  -.1  -.9  1.1 93:  1
M003 1 7403 L DGFI       .0060 -.0019 -.0125  .0051 -.0110  .0071   .7 -1.5  1.3 93:215
M003 1 7403 C GRIM       .0012  .0044  .0013  .0026  .0002 -.0040   .4   .0 -1.0 93:  1
M003 1 7403 C1 CSR       .0021 -.0016  .0008  .0015  .0014  .0019   .6   .6   .5 96: 35
M005 1 AREQ TIE42202    -.0003 -.0046 -.0042 -.0018 -.0029  .0053  -.6  -.9  1.7 97:  1
M005 1 AREQ P CODE       .0080 -.0080  .0051  .0050  .0078  .0083  1.1  1.8  1.5 97:272
M005 1 AREQ P GFZ        .0038 -.0015 -.0034  .0031 -.0025  .0035  1.0  -.8   .9 98: 40
M005 1 AREQ P IGS        .0008 -.0005  .0007  .0006  .0009  .0006   .4   .7   .3 98:165
M005 1 AREQ P1 JPL      -.0045  .0079  .0036 -.0018  .0009 -.0096  -.9   .7 -3.3 96:307
M005 1 AREQ P NCL        .0020 -.0002 -.0004  .0018 -.0002  .0009   .7  -.1   .3 97:326
M005 1 AREQ P NOAA      -.0014  .0098  .0046  .0018  .0017 -.0107   .4   .6 -2.1 97:131
M005 1 AREQ P DGFI      -.0034 -.0016 -.0001 -.0037  .0000  .0005  -.6   .0   .0 98:101
M005 1 AREQ P SCAR      -.0030  .0007  .0010 -.0026  .0005 -.0019  -.4   .1  -.2 96:198
S001 1 7907 TIE42202     .0012 -.0042  .0087 -.0002  .0096  .0017  -.1  3.0   .5 97:  1
S001 1 7907 L CGS        .0019 -.0022 -.0030  .0011 -.0022  .0034   .1  -.3   .3 90: 76
S001 1 7907 L CRL       -.0031 -.0151 -.0026 -.0077  .0013  .0135  -.6   .1   .6 91:  7
S001 1 7907 L4 CSR       .0011  .0043  .0150  .0025  .0133 -.0079   .1   .6  -.2 84:217
S001 1 7907 L DEOS       .0002  .0107 -.0249  .0035 -.0267 -.0027   .2 -1.2  -.1 93: 20
S001 1 7907 L DGFI      -.0127  .0111  .0056 -.0085  .0012 -.0156  -.3   .0  -.6 90:329
S001 1 7907 C GRIM      -.0128  .0135 -.0038 -.0078 -.0084 -.0150  -.7  -.9 -1.0 93:  1
S005 1 AREA TIE42202     .0004 -.0010 -.0003  .0000  .0000  .0011   .0   .0   .5 97:  1
S005 1 AREA D GRGS      -.0071  .0261  .0203  .0016  .0118 -.0317   .0   .6 -1.1 96:281
S005 1 AREA D9 IGN      -.0312  .0250  .0054 -.0216 -.0043 -.0338  -.6  -.2 -1.1 97:229
S005 1 AREA C GRIM       .0126  .0554  .0092  .0296 -.0049 -.0491  1.1  -.4 -2.6 92:114
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Velocities
M003 1 7403 L AUS        .0030 -.0023  .0025  .0021  .0033  .0023   .4   .6   .6
M003 1 7403 L CGS        .0004 -.0036  .0125 -.0008  .0130 -.0001   .0   .0   .0
M003 1 7403 L CRL        .0019 -.0002 -.0029  .0017 -.0025  .0016   .5  -.7   .5
M003 1 7403 L4 CSR       .0035 -.0011 -.0033  .0030 -.0026  .0030  2.1 -1.7  1.5
M003 1 7403 L DEOS      -.0364 -.0123 -.0136 -.0384 -.0130  .0040   .0   .0   .0
M003 1 7403 L DGFI       .0027  .0016 -.0042  .0031 -.0042  .0006  1.4 -1.6   .3
M003 1 7403 C GRIM      -.1270 -.0469  .0165 -.1353  .0170 -.0007  -.1   .0   .0
M003 1 7403 C1 CSR      -.0002 -.0036 -.0010 -.0013  .0000  .0035 -1.1   .0  1.8
M005 1 AREQ P CODE       .0007  .0039  .0007  .0019 -.0003 -.0035   .6  -.1  -.9
M005 1 AREQ P GFZ        .0005  .0004 -.0002  .0005 -.0003 -.0001   .5  -.3  -.2
M005 1 AREQ P IGS       -.0018  .0010  .0018 -.0014  .0013 -.0020 -1.3  1.6 -1.3
M005 1 AREQ P1 JPL       .0019  .0015 -.0014  .0022 -.0016 -.0004  1.8 -1.8  -.2
M005 1 AREQ P NCL       -.0005  .0017  .0007  .0000  .0001 -.0019   .0   .1  -.7
M005 1 AREQ P NOAA       .0003 -.0024 -.0004 -.0005  .0003  .0023  -.2   .1   .7
M005 1 AREQ P DGFI       .0007 -.0062 -.0003 -.0013  .0014  .0059  -.2   .2   .5
M005 1 AREQ P SCAR      -.0021 -.0056 -.0010 -.0038  .0004  .0048  -.9   .1   .6
S001 1 7907 L CGS        .0004  .0027 -.0006  .0013 -.0012 -.0021   .5  -.8  -.9
S001 1 7907 L CRL        .0073 -.0053 -.0076  .0052 -.0052  .0092   .3  -.4   .4
S001 1 7907 L4 CSR      -.0057  .0074 -.0035 -.0030 -.0059 -.0075  -.6 -1.2  -.8
S001 1 7907 L DEOS       .0053  .0004 -.0099  .0051 -.0092  .0040  1.6 -1.7   .9
S001 1 7907 L DGFI       .0027  .0016 -.0042  .0031 -.0042  .0006  1.4 -1.6   .3
S001 1 7907 C GRIM      -.1270 -.0469  .0165 -.1353  .0170 -.0007  -.1   .0   .0
S005 1 AREA D GRGS       .0086 -.0007 -.0007  .0080  .0003  .0035   .3   .0   .2
S005 1 AREA D9 IGN       .0010 -.0128 -.0035 -.0032  .0002  .0129  -.2   .0   .9
S005 1 AREA C GRIM      -.0069 -.0025  .0012 -.0073  .0012 -.0001 -1.9  1.1  -.1

42301 MONTEVIDEO

Positions
M001 1 MON1 P SCAR      -.0024  .0057  .0018  .0012 -.0021 -.0060   .2  -.4 -1.0 97:229

Velocities
M001 1 MON1 P SCAR      -.0008 -.0001  .0007 -.0007  .0004 -.0007  -.2   .1  -.2

42402 MARACAIBO

Positions
M001 1 MARA P DGFI       .0011  .0016  .0010  .0015  .0012 -.0010   .2   .2  -.1 99:296

Velocities
M001 1 MARA P DGFI       .0018 -.0033  .0007  .0006  .0000  .0038   .0   .0   .1

42501 BERMUDA

Positions
M001 1 7067 L4 CSR      -.0894  .0870  .0420 -.0436  .0980 -.0763  -.1   .1  -.1 78:220
M002 1 7294 R GSFC      -.0006  .0001  .0008 -.0005  .0008  .0002   .0   .0   .0 87:218
M002 1 7294 R SHA       -.0135  .0484 -.0340  .0085 -.0023 -.0600   .2   .0  -.9 87:218
S004 1 BRMU P CODE       .0030  .0008  .0077  .0030  .0062  .0046  1.1  1.6  1.3 97:246
S004 1 BRMU P GFZ       -.0008  .0010 -.0033 -.0003 -.0021 -.0029  -.1  -.7 -1.0 98: 80
S004 1 BRMU P IGS       -.0004  .0007 -.0006  .0000 -.0001 -.0009   .0  -.1  -.7 98:103
S004 1 BRMU P1 JPL       .0001 -.0009  .0002 -.0003 -.0003  .0008  -.2  -.2   .4 96:123
S004 1 BRMU P NCL        .0003 -.0005 -.0002  .0001 -.0005  .0004   .0  -.2   .2 98: 39
S004 1 BRMU P NOAA      -.0008 -.0040  .0034 -.0024  .0011  .0046 -1.0   .5  1.7 97:147
S004 1 BRMU P DGFI       .0086 -.0082  .0024  .0043 -.0039  .0107   .3  -.3   .6 96:295

Velocities
M001 1 7067 L4 CSR       .1298  .2821 -.4207  .2380 -.2487 -.3936   .1  -.1  -.2
M002 1 7294 R GSFC      -.8294 -.0842 -.1970 -.7857 -.0172 -.3410  -.7   .0  -.2
M002 1 7294 R SHA       -.0824 -.0254 -.0026 -.0854  .0044 -.0118  -.4   .0  -.1
S004 1 BRMU P CODE       .0009 -.0030  .0001 -.0005 -.0016  .0027  -.3  -.7  1.2
S004 1 BRMU P GFZ        .0012  .0016 -.0011  .0018 -.0004 -.0014  1.4  -.3  -.9
S004 1 BRMU P IGS       -.0009  .0007  .0000 -.0005  .0006 -.0009  -.5   .6  -.8
S004 1 BRMU P1 JPL       .0000 -.0004  .0004 -.0002  .0001  .0005  -.2   .1   .5
S004 1 BRMU P NCL       -.0009 -.0006  .0001 -.0011  .0000  .0002  -.7   .0   .1
S004 1 BRMU P NOAA       .0002 -.0014  .0016 -.0004  .0006  .0020  -.2   .4  1.2
S004 1 BRMU P DGFI      -.0033  .0052 -.0084 -.0008 -.0039 -.0097   .0  -.2  -.4

42601 KINGSTON
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Positions
S001 1 JAMA P CODE       .0059 -.0037  .0066  .0049  .0048  .0067   .8   .6   .6  0:  5

Velocities
S001 1 JAMA P CODE       .0047 -.0009  .0005  .0044 -.0001  .0020   .1   .0   .0

43001 THULE

Positions
M001 1 THU1 P CODE       .0034  .0004  .0028  .0033 -.0002  .0029  1.5  -.1   .6 98: 34
M001 1 THU1 P GFZ       -.0001 -.0006  .0039 -.0003  .0004  .0039  -.2   .2   .9 98:163
M001 1 THU1 P IGS       -.0003  .0002 -.0040 -.0002 -.0007 -.0040  -.3  -.7 -1.9 98:166
M001 1 THU1 P1 JPL      -.0002 -.0010  .0026 -.0005 -.0002  .0028  -.5  -.1   .7 97:205
M001 1 THU1 P NCL        .0000 -.0007  .0000 -.0003 -.0006  .0002  -.2  -.4   .1 98: 73
M001 1 THU1 P NOAA       .0008  .0011 -.0025  .0012  .0001 -.0026   .7   .1  -.7 97:328
M001 1 THU1 P EUR        .0003 -.0012  .0043 -.0001 -.0002  .0045  -.1  -.1   .6 98:228
M001 1 THU1 P GIA       -.0006  .0001  .0015 -.0005  .0007  .0014  -.3   .4   .6 97:154

Velocities
M001 1 THU1 P CODE       .0001 -.0005 -.0045 -.0001 -.0015 -.0043  -.1  -.9 -1.1
M001 1 THU1 P GFZ        .0021  .0003  .0005  .0021 -.0004  .0006  2.7  -.3   .2
M001 1 THU1 P IGS        .0002  .0002  .0002  .0003  .0001  .0002   .5   .2   .1
M001 1 THU1 P1 JPL      -.0002  .0003  .0006 -.0001  .0005  .0005  -.1   .4   .2
M001 1 THU1 P NCL       -.0005 -.0004 -.0013 -.0006 -.0005 -.0012  -.6  -.4  -.5
M001 1 THU1 P NOAA      -.0004 -.0003  .0017 -.0005  .0003  .0017  -.4   .2   .6
M001 1 THU1 P EUR       -.0004 -.0018  .0027 -.0011 -.0009  .0030  -.7  -.3   .3
M001 1 THU1 P GIA       -.0007 -.0001  .0007 -.0007  .0003  .0007  -.7   .3   .4

43005 KELLYVILLE (KANG

Positions
M001 1 KELY P CODE       .0032 -.0013  .0044  .0017 -.0011  .0053   .5  -.3   .8 99:  3
M001 1 KELY P IGS       -.0007 -.0005 -.0020 -.0008 -.0007 -.0019  -.6  -.5  -.7 98:129
M001 1 KELY P1 JPL      -.0013 -.0009  .0018 -.0016  .0008  .0016  -.8   .3   .4 97:352
M001 1 KELY P NCL        .0002  .0000 -.0016  .0002 -.0007 -.0014   .1  -.4  -.5 97:300
M001 1 KELY P NOAA      -.0002 -.0011  .0001 -.0008 -.0006  .0004  -.3  -.2   .1 97:252
M001 1 KELY P EUR        .0025 -.0024  .0098  .0004  .0007  .0104   .2   .2  1.6 98:202

Velocities
M001 1 KELY P CODE      -.0010  .0015 -.0073  .0002 -.0012 -.0074   .1  -.2  -.8
M001 1 KELY P IGS        .0006 -.0004  .0005  .0002 -.0004  .0007   .2  -.3   .3
M001 1 KELY P1 JPL       .0006 -.0007  .0025  .0000  .0001  .0027   .0   .0   .7
M001 1 KELY P NCL       -.0015  .0011 -.0041 -.0005  .0000 -.0044  -.3   .0 -1.5
M001 1 KELY P NOAA      -.0005 -.0005  .0030 -.0007  .0011  .0028  -.3   .5   .8
M001 1 KELY P EUR       -.0003 -.0008 -.0003 -.0007 -.0005 -.0001  -.3  -.1   .0

43201 SAINTE CROIX

Positions
M001 1 CRO1 TIE43201     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 CRO1 P CODE       .0008  .0053  .0058  .0029  .0068 -.0025   .8  1.5  -.5 98: 38
M001 1 CRO1 P1 JPL       .0011 -.0016  .0003  .0003 -.0003  .0019   .1  -.2   .5 97:195
M001 1 CRO1 P NCL        .0002  .0010 -.0009  .0006 -.0006 -.0010   .2  -.2  -.3 97:349
M001 1 CRO1 P NOAA       .0010 -.0063  .0050 -.0018  .0029  .0074  -.5  1.1  1.7 97:245
M001 1 CRO1 P CORS       .0026 -.0018  .0027  .0016  .0017  .0035   .5   .8   .9 97:305
M001 1 CRO1 P DGFI       .0025 -.0072  .0022 -.0009 -.0002  .0079  -.1   .0   .5 98: 71
S001 1 7615 TIE43201     .0014  .0008  .0052  .0016  .0050  .0015   .5  1.6   .5 97:  1
S001 1 7615 R GIUB       -.0006  .0099 -.0037  .0037 -.0007 -.0099  1.2  -.2 -2.6 95:245
S001 1 7615 R GSFC       .0007  .0001 -.0004  .0007 -.0004  .0001   .3  -.3   .0 97: 10
S001 1 7615 R SHA        .0026 -.0008  .0002  .0020 -.0004  .0018   .5  -.1   .4 95:147

Velocities
M001 1 CRO1 P CODE       .0041 -.0060  .0010  .0011 -.0012  .0072   .4  -.4  1.8
M001 1 CRO1 P1 JPL       .0002  .0007 -.0017  .0005 -.0015 -.0011   .2 -1.0  -.4
M001 1 CRO1 P NCL        .0031 -.0054  .0015  .0005 -.0004  .0064   .2  -.2  1.5
M001 1 CRO1 P NOAA       .0013 -.0018  .0005  .0004 -.0002  .0022   .1  -.1   .7
M001 1 CRO1 P CORS       .0011 -.0014 -.0002  .0004 -.0007  .0016   .2  -.4   .5
M001 1 CRO1 P DGFI       .0024 -.0049 -.0008  .0000 -.0024  .0049   .0  -.4   .4
S001 1 7615 R GIUB       -.0009  .0008  .0005 -.0005  .0008 -.0009  -.3   .4  -.3
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S001 1 7615 R GSFC       .0005 -.0007  .0007  .0001  .0004  .0010   .3   .9  1.5
S001 1 7615 R SHA      -.0022  .0055 -.0012  .0004  .0007 -.0060   .2   .4 -2.5

43401 BRIDGETOWN

Positions
S001 1 BARB P CODE       .0096 -.0127  .0101  .0019  .0063  .0177   .4  1.1  3.1 99:  3
S001 1 BARB P GFZ      -.0039  .0100 -.0056  .0017 -.0030 -.0115   .4  -.9 -2.3 99: 74
S001 1 BARB P IGS      -.0007  .0007  .0004 -.0003  .0006 -.0009  -.1   .4  -.3 99:127
S001 1 BARB P NOAA       .0053 -.0100  .0067 -.0005  .0040  .0125  -.1   .8  1.2 98:346
S001 1 BARB P DGFI       .0119 -.0088  .0114  .0058  .0080  .0159   .4  1.1   .9 99:330

Velocities
S001 1 BARB P CODE     -.0012  .0006 -.0011 -.0008 -.0008 -.0013  -.1  -.2  -.2
S001 1 BARB P GFZ      -.0010 -.0018 -.0007 -.0018 -.0009  .0009  -.4  -.3   .1
S001 1 BARB P IGS        .0002  .0001  .0009  .0002  .0009  .0002   .1   .5   .1
S001 1 BARB P NOAA     -.0043 -.0038 -.0014 -.0056 -.0016  .0007  -.5  -.3   .1
S001 1 BARB P DGFI       .0030 -.0067 -.0013 -.0008 -.0029  .0068   .0  -.3   .3

43602 GRAND TURK

Positions
M002 1 7068 L4 CSR     -.0446  .0482  .0682 -.0266  .0855 -.0309   .0   .0   .0 78:256

Velocities
M002 1 7068 L4 CSR       .0017 -.0010 -.0029  .0013 -.0032  .0003   .0   .0   .0

49801 POTATO POINT/ALA

Positions
S001 1      P GIA        .0006  .0006 -.0011 -.0002  .0002 -.0014   .0   .0  -.2 97:205

Velocities
S001 1      P GIA      -.0024 -.0019  .0038  .0002 -.0008  .0048   .0  -.1   .5

49802 GUSTAVUS/ALASKA

Positions
S001 1 GUS1 P CORS       .0003  .0006  .0005 -.0002  .0008  .0001  -.1   .2   .0 97:260
S002 1 GUS2 P CORS       .0014 -.0005 -.0001  .0014  .0005 -.0004   .6   .2  -.1 98:155
S002 1 GUS2 P GIA      -.0007  .0005  .0005 -.0008  .0001  .0005  -.4   .1   .2 97:330

Velocities
S001 1 GUS1 P CORS     -.0035  .0010  .0034 -.0032  .0003  .0039 -1.4   .1  1.1
S002 1 GUS2 P CORS       .0001 -.0015  .0005  .0011 -.0006  .0010   .5  -.2   .3
S002 1 GUS2 P GIA        .0003 -.0004 -.0007  .0004 -.0004 -.0005   .3  -.2  -.2

49803 CAPE HINCHINBROO

Positions
S001 1 CHI1 P CORS     -.0014 -.0003 -.0004 -.0005 -.0013  .0003  -.1  -.2   .0 97:296
S001 1 CHI1 P GIA        .0003  .0005 -.0002 -.0002  .0004 -.0005  -.1   .1  -.2 97:267

Velocities
S001 1 CHI1 P CORS       .0028  .0009 -.0018  .0008  .0016 -.0030   .1   .2  -.3
S001 1 CHI1 P GIA      -.0009 -.0007  .0011  .0001 -.0004  .0015   .0  -.1   .3

49804 COLD BAY/ALASKA

Positions
S001 1 BAY1 P CORS       .0021  .0035  .0003 -.0027  .0027 -.0015 -1.3   .9  -.5 97:352
S001 1 BAY1 P GIA      -.0011 -.0010 -.0013  .0006 -.0018 -.0003   .3  -.9  -.1 97:174

Velocities
S001 1 BAY1 P CORS     -.0003 -.0013 -.0005  .0012 -.0009  .0000   .7  -.4   .0
S001 1 BAY1 P GIA      -.0006  .0004  .0005 -.0006 -.0001  .0006  -.4  -.1   .3

49839 ORONO

Positions
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S001 1 ORO_ P CORS      -.0006 -.0005  .0000 -.0007 -.0002  .0002  -.3  -.1   .1 98:288

Velocities
S001 1 ORO_ P CORS       .0001  .0003 -.0008  .0002 -.0004 -.0007   .1  -.1  -.2

49840 BRUNSWICK

Positions
S001 1 BRU1 P CORS      -.0007 -.0003  .0003 -.0008  .0001  .0002  -.4   .1   .1 98:  3

Velocities
S001 1 BRU1 P CORS       .0002  .0000 -.0005  .0002 -.0004 -.0003   .1  -.2  -.1

49841 CHATHAM

Positions
S001 1 CHT1 P CORS      -.0007 -.0003  .0003 -.0007  .0002  .0002  -.4   .1   .1 97:322

Velocities
S001 1 CHT1 P CORS       .0002 -.0001 -.0004  .0001 -.0004 -.0002   .1  -.2  -.1

49842 NEW CASTLE

Positions
S002 1 POR2 P CORS      -.0008 -.0003  .0005 -.0009  .0004  .0003  -.5   .2   .1 97:136

Velocities
S002 1 POR2 P CORS       .0002 -.0001 -.0003  .0001 -.0004 -.0001   .1  -.2   .0

49843 MONTAUK POINT

Positions
S001 1 MNP1 P CORS      -.0008 -.0002  .0005 -.0008  .0004  .0003  -.4   .2   .1 97: 97

Velocities
S001 1 MNP1 P CORS       .0002 -.0001 -.0003  .0001 -.0003 -.0001   .1  -.1   .0

49844 MONTPELIER

Positions
S001 1 VCAP P CORS      -.0006 -.0004  .0000 -.0006 -.0002  .0001  -.3  -.1   .0 98:263

Velocities
S001 1 VCAP P CORS       .0002  .0002 -.0006  .0002 -.0003 -.0006   .1  -.1  -.1

49845 CAPE HENLOPEN

Positions
S001 1 CHL1 P CORS      -.0005 -.0001  .0002 -.0005  .0001  .0001  -.4   .1   .1 97:283

Velocities
S001 1 CHL1 P CORS       .0001  .0001 -.0004  .0001 -.0003 -.0003   .1  -.2  -.2

49846 KITTY HAWK

Positions
S001 1 DUCK P CORS      -.0003  .0000 -.0001 -.0003  .0000 -.0002  -.1   .0  -.1 98:290

Velocities
S001 1 DUCK P CORS       .0001  .0001 -.0004  .0002 -.0003 -.0003   .0  -.1  -.1

49847 CAPE HENRY

Positions
S001 1 CHR1 P CORS      -.0004 -.0001  .0002 -.0005  .0002  .0001  -.3   .1   .0 97:296

Velocities
S001 1 CHR1 P CORS       .0001  .0001 -.0003  .0001 -.0002 -.0002   .1  -.1  -.1

49848 RICHMOND
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Positions
S001 1 RIC1 P CORS      -.0003  .0000 -.0002 -.0003 -.0001 -.0002  -.2   .0  -.1 98:277

Velocities
S001 1 RIC1 P CORS       .0001  .0001 -.0004  .0002 -.0003 -.0003   .1  -.1  -.1

49849 YOUNGSTOWN

Positions
S001 1 YOU1 P CORS      -.0005 -.0004  .0001 -.0005 -.0001  .0003  -.3   .0   .1 98: 65

Velocities
S001 1 YOU1 P CORS       .0002  .0003 -.0005  .0002 -.0002 -.0005   .2  -.1  -.2

49850 PITTSBURGH

Positions
S001 1 PIT1 P CORS      -.0003 -.0001 -.0002 -.0003 -.0002 -.0001  -.2  -.1   .0 98:304

Velocities
S001 1 PIT1 P CORS       .0002  .0002 -.0004  .0002 -.0002 -.0004   .1   .0  -.1

49851 CHARLESTON

Positions
S001 1 CHA1 P CORS      -.0001  .0001  .0002 -.0001  .0003  .0000  -.1   .1   .0 97:341

Velocities
S001 1 CHA1 P CORS       .0001  .0000  .0000  .0001  .0000  .0000   .1   .0   .0

49852 KEY WEST NAVAL

Positions
S001 1 KYW1 P CORS       .0002  .0006  .0003  .0003  .0005 -.0003   .2   .2  -.1 98:183

Velocities
S001 1 KYW1 P CORS       .0002 -.0004  .0005  .0001  .0003  .0006   .1   .1   .1

49853 ASHEVILLE

Positions
S001 1 ASHV P CORS      -.0001  .0001  .0001 -.0001  .0001  .0000   .0   .0   .0 98:300

Velocities
S001 1 ASHV P CORS       .0002 -.0001  .0001  .0002  .0000  .0002   .1   .0   .0

49854 DETROIT

Positions
S001 1 DET1 P CORS      -.0004 -.0003  .0001 -.0004 -.0001  .0003  -.3   .0   .1 98: 33

Velocities
S001 1 DET1 P CORS       .0002  .0003 -.0003  .0002  .0000 -.0004   .2   .0  -.2

49855 NEEBISH ISLAND

Positions
S003 1 NEB3 P CORS      -.0004 -.0005  .0002 -.0005 -.0002  .0004  -.3  -.1   .2 98: 14

Velocities
S003 1 NEB3 P CORS       .0002  .0004 -.0003  .0002  .0000 -.0005   .2   .0  -.2

49856 CHEBOYGAN

Positions
S001 1 CHB1 P CORS      -.0004 -.0005  .0002 -.0005 -.0002  .0004  -.3  -.1   .2 97:333

Velocities
S001 1 CHB1 P CORS       .0002  .0003 -.0003  .0002  .0000 -.0004   .2   .0  -.3
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49857 CINCINNATI

Positions
S001 1 GALB P CORS      -.0002  .0000 -.0001 -.0002  .0000 -.0001  -.1   .0   .0 99:332

Velocities
S001 1 GALB P CORS       .0003  .0000  .0001  .0003  .0000  .0001   .1   .0   .0

49858 MARIETTA

Positions
S001 1 ATL1 P CORS       .0000  .0002  .0001  .0000  .0002 -.0002   .0   .1   .0 99:312

Velocities
S001 1 ATL1 P CORS       .0003 -.0007  .0006  .0002  .0001  .0010   .1   .0   .2

49859 ERLANDER

Positions
S001 1 ERLA P CORS      -.0002  .0000  .0000 -.0002  .0000  .0000  -.1   .0   .0 98:290

Velocities
S001 1 ERLA P CORS       .0002  .0001  .0000  .0002  .0000 -.0001   .1   .0   .0

49860 WHITEFISH POINT

Positions
S001 1 WHP1 P CORS      -.0005 -.0005  .0002 -.0005 -.0002  .0005  -.3  -.1   .2 97:287

Velocities
S001 1 WHP1 P CORS       .0002  .0004 -.0003  .0002  .0000 -.0005   .2   .0  -.3

49861 STURGEON BAY

Positions
S001 1 STB1 P CORS      -.0004 -.0004  .0001 -.0004 -.0002  .0003  -.3  -.1   .1 97:361

Velocities
S001 1 STB1 P CORS       .0002  .0003 -.0002  .0002  .0001 -.0004   .2   .0  -.2

49862 MILWAUKEE

Positions
S001 1 MIL1 P CORS      -.0003 -.0003  .0001 -.0003 -.0002  .0002  -.2  -.1   .1 98: 18

Velocities
S001 1 MIL1 P CORS       .0002  .0003 -.0002  .0002  .0001 -.0003   .2   .0  -.2

49863 MOBILE

Positions
S001 1 MOB1 P CORS       .0001  .0002  .0000  .0001  .0001 -.0002   .1   .1  -.1 98: 28

Velocities
S001 1 MOB1 P CORS       .0000  .0001  .0001  .0000  .0001  .0000   .0   .1   .0

49864 UPPER KEWEENAW

Positions
S001 1 KEW1 P CORS      -.0003 -.0003  .0000 -.0003 -.0002  .0003  -.2  -.1   .1 98: 62

Velocities
S001 1 KEW1 P CORS       .0002  .0004 -.0003  .0002  .0001 -.0005   .1   .0  -.2

49865 SUMMERFIELD

Positions
S003 1 STL3 P CORS      -.0001 -.0001  .0000 -.0001 -.0001  .0000  -.1   .0   .0 98: 59
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Velocities
S003 1 STL3 P CORS       .0001  .0003 -.0001  .0001  .0001 -.0002   .1   .1  -.1

49866 ENGLISH TURN

Positions
S001 1 ENG1 P CORS       .0002  .0002 -.0001  .0002  .0001 -.0002   .1   .0  -.1 97:364

Velocities
S001 1 ENG1 P CORS       .0000  .0001  .0001  .0000  .0002  .0000   .0   .1   .0

49867 FRENCH BAYOU

Positions
S002 1 MEM2 P CORS       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:360

Velocities
S002 1 MEM2 P CORS       .0000  .0002  .0000  .0000  .0001 -.0002   .0   .1  -.1

49868 TEEDS GROVE

Positions
S001 1 RIS1 P CORS      -.0001  .0000 -.0001 -.0001 -.0001 -.0001  -.1   .0   .0 98:278

Velocities
S001 1 RIS1 P CORS       .0001  .0002 -.0001  .0001  .0001 -.0002   .1   .0  -.1

49869 VICKSBURG

Positions
S001 1 VIC1 P CORS       .0001  .0001 -.0001  .0001  .0000 -.0001   .1   .0   .0 97:313

Velocities
S001 1 VIC1 P CORS       .0000  .0002  .0001  .0000  .0002 -.0001   .0   .1  -.1

49870 ALMA

Positions
S001 1 STP1 P CORS      -.0002 -.0002 -.0001 -.0002 -.0002  .0000  -.1  -.1   .0 98:112

Velocities
S001 1 STP1 P CORS       .0001  .0004 -.0002  .0001  .0001 -.0004   .1   .0  -.1

49871 WISCONSIN POINT

Positions
S001 1 WIS1 P CORS      -.0003 -.0003 -.0001 -.0002 -.0002  .0002  -.2  -.1   .1 98: 65

Velocities
S001 1 WIS1 P CORS       .0001  .0004 -.0002  .0001  .0001 -.0005   .1   .1  -.2

49872 GALVESTON

Positions
S001 1 GAL1 P CORS       .0003  .0003 -.0002  .0003  .0000 -.0004   .2   .0  -.2 97:338

Velocities
S001 1 GAL1 P CORS      -.0001  .0001  .0002 -.0001  .0002  .0000  -.1   .1   .0

49873 SALLISAW

Positions
S001 1 SAL1 P CORS       .0002  .0001 -.0001  .0002 -.0001 -.0002   .1   .0  -.1 98: 54

Velocities
S001 1 SAL1 P CORS       .0000  .0003  .0000 -.0001  .0002 -.0002   .0   .1  -.1

49874 PERRY

Positions
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S001 1 KAN1 P CORS       .0001  .0000 -.0001  .0001 -.0001 -.0001   .1   .0   .0 98:144

Velocities
S001 1 KAN1 P CORS       .0000  .0004 -.0001 -.0001  .0002 -.0003   .0   .1  -.1

49875 NEODESHA

Positions
S001 1 NDSK P CORS       .0002  .0001 -.0001  .0002 -.0001 -.0001   .1   .0  -.1 98:111

Velocities
S001 1 NDSK P CORS      -.0001  .0004  .0000 -.0001  .0002 -.0003  -.1   .1  -.1

49876 PALESTINE

Positions
S001 1 PATT P CORS       .0003  .0005 -.0002  .0002  .0001 -.0006   .1   .0  -.1 98:212

Velocities
S001 1 PATT P CORS      -.0001 -.0001  .0003 -.0001  .0002  .0003   .0   .1   .1

49877 MORRIS

Positions
S001 1 PATT P CORS       .0002 -.0001 -.0001  .0002 -.0001  .0000   .2  -.1   .0 97:282

Velocities
S001 1 PATT P CORS      -.0001  .0004  .0000 -.0001  .0002 -.0003  -.1   .1  -.2

49878 ARANSAS PASS

Positions
S003 1 ARP3 P CORS       .0005  .0005 -.0003  .0004 -.0001 -.0006   .2   .0  -.2 97:331

Velocities
S003 1 ARP3 P CORS      -.0001  .0001  .0002 -.0001  .0002  .0000  -.1   .1   .0

49879 HAVILAND

Positions
S001 1 HVLK P CORS       .0003  .0000 -.0002  .0003 -.0001 -.0002   .2  -.1  -.1 98: 59

Velocities
S001 1 HVLK P CORS      -.0001  .0004  .0000 -.0002  .0002 -.0003  -.1   .1  -.1

49880 WACHAPREAGUE

Positions
S001 1 VIMS P CORS      -.0003  .0004 -.0007 -.0002 -.0003 -.0008  -.1  -.1  -.3 97:337

Velocities
S001 1 VIMS P CORS      -.0001  .0003 -.0007 -.0001 -.0004 -.0007   .0  -.2  -.3

49881 JAYTON

Positions
S001 1 JTNT P CORS       .0004  .0005 -.0003  .0003  .0000 -.0006   .1   .0  -.2 98:217

Velocities
S001 1 JTNT P CORS      -.0002  .0001  .0002 -.0002  .0002  .0001  -.1   .1   .0

49882 GRANADA

Positions
S001 1 GDAC P CORS       .0003  .0002 -.0003  .0003 -.0001 -.0004   .2   .0  -.1 98:134

Velocities
S001 1 GDAC P CORS      -.0002  .0004  .0000 -.0002  .0002 -.0003  -.1   .1  -.1

49883 TUCUMCARI
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Positions
S001 1 TCUN P CORS       .0004  .0006 -.0004  .0002  .0001 -.0008   .1   .0  -.2 98:332

Velocities
S001 1 TCUN P CORS      -.0003  .0000  .0003 -.0003  .0002  .0003  -.1   .0   .1

49884 WHITE SANDS

Positions
S001 1 WSMN P CORS       .0007  .0002 -.0005  .0007 -.0003 -.0006   .3  -.1  -.2 97:225

Velocities
S001 1 WSMN P CORS      -.0002  .0004  .0001 -.0003  .0003 -.0002  -.2   .2  -.1

49885 SALT LAKE CITY

Positions
S001 1 RBUT P CORS       .0004 -.0003 -.0001  .0004 -.0002  .0000   .1   .0   .0 98:231

Velocities
S001 1 RBUT P CORS      -.0006 -.0004  .0005 -.0004  .0000  .0007  -.1   .0   .1

49886 POINT LOMA

Positions
S003 1 PLO3 P CORS       .0007 -.0009  .0002  .0010 -.0001  .0005   .4  -.1   .2 98: 80

Velocities
S003 1 PLO3 P CORS      -.0006 -.0001  .0002 -.0005  .0000  .0005  -.2   .0   .2

49887 POINT ARGUELLO

Positions
S001 1 PAR1 P CORS       .0008 -.0012  .0002  .0013 -.0002  .0006   .5  -.1   .2 97:340

Velocities
S001 1 PAR1 P CORS      -.0007 -.0005  .0004 -.0004 -.0001  .0009  -.1   .0   .2

49888 APPLETON

Positions
S001 1 GWEN P CORS       .0005 -.0006  .0002  .0007 -.0001  .0003   .3   .0   .1 98:200

Velocities
S001 1 GWEN P CORS      -.0004  .0000  .0002 -.0004 -.0001  .0003  -.1   .0   .1

49889 ROBINSON POINT

Positions
S001 1 RPT1 P CORS       .0007 -.0007  .0001  .0010  .0000  .0002   .5   .0   .1 97:322

Velocities
S001 1 RPT1 P CORS      -.0004  .0001  .0001 -.0004 -.0001  .0002  -.2   .0   .1

49890 PIGEON POINT

Positions
S001 1 PPT1 P CORS       .0006 -.0015  .0005  .0013 -.0002  .0010   .6  -.1   .4 97:359

Velocities
S001 1 PPT1 P CORS      -.0008 -.0006  .0004 -.0004 -.0002  .0010  -.2  -.1   .5

49891 POINT BLUNT

Positions
S001 1 PBL1 P CORS       .0007 -.0015  .0005  .0014 -.0002  .0010   .6  -.1   .4 97:299

Velocities
S001 1 PBL1 P CORS      -.0007 -.0005  .0004 -.0003 -.0002  .0009  -.2  -.1   .5
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49892 WHIDBEY ISLAND

Positions
S001 1 WHD1 P CORS       .0007 -.0006  .0001  .0009  .0000  .0002   .4   .0   .1 98:  6

Velocities
S001 1 WHD1 P CORS      -.0004  .0001  .0000 -.0004 -.0001  .0001  -.2   .0   .1

49893 FORT STEVENS

Positions
S001 1 FTS1 P CORS       .0007 -.0007  .0001  .0009  .0000  .0002   .5   .0   .1 98: 17

Velocities
S001 1 FTS1 P CORS      -.0005 -.0001  .0002 -.0003 -.0001  .0004  -.2   .0   .2

49894 MENDOCINO

Positions
S001 1 CME1 P CORS       .0006 -.0014  .0005  .0013 -.0001  .0010   .6  -.1   .4 98:  9

Velocities
S001 1 CME1 P CORS      -.0007 -.0005  .0004 -.0003 -.0003  .0009  -.2  -.1   .4

49895 UPOLU POINT

Positions
S001 1 UPO1 P CORS       .0005  .0016 -.0009 -.0012 -.0005 -.0013  -.4  -.2  -.3 98: 11

Velocities
S001 1 UPO1 P CORS       .0009  .0003 -.0003  .0001  .0000 -.0010   .0   .0  -.3

49896 KOKOLE POINT

Positions
S001 1 KOK1 P CORS       .0001  .0015 -.0007 -.0014 -.0004 -.0009  -.4  -.2  -.2 98: 21

Velocities
S001 1 KOK1 P CORS       .0009  .0003 -.0005  .0000 -.0001 -.0011   .0   .0  -.3

49901 WRIGHTWOOD

Positions
M001 1 TABL P NOAA       .0011 -.0017  .0008  .0018  .0001  .0013   .6   .0   .4 97:283
M001 1 TABL P2 JPL       .0023 -.0050 -.0007  .0044 -.0025  .0023   .1  -.1   .1 99:236

Velocities
M001 1 TABL P NOAA       .0014  .0009 -.0001  .0008  .0007 -.0012   .4   .3  -.5
M001 1 TABL P2 JPL       .0003 -.0005 -.0005  .0005 -.0006 -.0001   .1  -.2   .0

49902 MOUNT LEE

Positions
M001 1 LEEP P NOAA       .0008 -.0023  .0012  .0018  .0001  .0020   .7   .0   .7 97:226
M001 1 LEEP P2 JPL       .0002  .0021 -.0024 -.0008 -.0009 -.0030  -.2  -.3  -.8 97:311

Velocities
M001 1 LEEP P NOAA       .0015  .0008 -.0001  .0009  .0007 -.0013   .5   .4  -.6
M001 1 LEEP P2 JPL      -.0011 -.0008 -.0005 -.0006 -.0011  .0007  -.2  -.4   .3

49903 HOLLYDALE

Positions
M001 1 HOLP P NOAA       .0011 -.0012  .0005  .0016  .0001  .0007   .6   .0   .3 97:220
M001 1 HOLP P2 JPL      -.0045 -.0128  .0042  .0020 -.0040  .0135   .4  -.7  2.2 98:347

Velocities
M001 1 HOLP P NOAA       .0014  .0010 -.0003  .0008  .0006 -.0014   .4   .3  -.7
M001 1 HOLP P2 JPL       .0074  .0133 -.0057  .0002  .0038 -.0158   .0   .6 -2.3
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49904 DURMID HILL

Positions
M001 1 DHLG P2 JPL       .0186  .0168  .0109  .0094  .0219 -.0134   .4   .8  -.4 99:284

Velocities
M001 1 DHLG P2 JPL      -.0006 -.0010  .0000 -.0001 -.0007  .0010   .0  -.2   .2

49905 PACOIMA

Positions
M001 1 DAM1 P NOAA       .0011 -.0017  .0007  .0018  .0000  .0012   .6   .0   .4 98: 67
M001 1 DAM1 P2 JPL       .0004  .0000 -.0009  .0004 -.0006 -.0006   .1  -.2  -.1 97:326
M002 1 DAM2 P2 JPL       .0001 -.0007  .0001  .0004 -.0002  .0005   .1  -.1   .1 98: 50
M003 1 CMP9 P NOAA       .0010 -.0019  .0008  .0018  .0000  .0015   .7   .0   .5 97:244
M003 1 CMP9 P2 JPL       .0008  .0025  .0002 -.0005  .0016 -.0020  -.1   .4  -.5 97:316

Velocities
M001 1 DAM1 P NOAA       .0028  .0021  .0002  .0015  .0020 -.0025   .6   .7  -.8
M001 1 DAM1 P2 JPL       .0012 -.0001  .0003  .0011  .0006 -.0002   .4   .2  -.1
M002 1 DAM2 P2 JPL       .0007 -.0007 -.0010  .0010 -.0010 -.0004   .3  -.2  -.1
M003 1 CMP9 P NOAA       .0009  .0002 -.0001  .0007  .0002 -.0006   .4   .1  -.3
M003 1 CMP9 P2 JPL      -.0008  .0009 -.0001 -.0012  .0001 -.0004  -.4   .0  -.1

49906 CLAREMONT/LA VER

Positions
M001 1 CLAR P NOAA       .0010 -.0015  .0006  .0016  .0000  .0011   .6   .0   .4 97:226
M001 1 CLAR P2 JPL      -.0009 -.0032  .0011  .0007 -.0010  .0033   .2  -.3   .9 97:335

Velocities
M001 1 CLAR P NOAA       .0013  .0011 -.0001  .0007  .0008 -.0014   .4   .4  -.7
M001 1 CLAR P2 JPL       .0003 -.0020 -.0010  .0011 -.0017  .0008   .4  -.6   .3

49907 SOLOMONS ISLAND

Positions
S001 1 SOL1 P IGS       -.0018  .0038 -.0037 -.0009 -.0004 -.0055  -.2  -.1 -1.0 98:359
S001 1 SOL1 P1 JPL      -.0003  .0002  .0001 -.0003  .0002 -.0001  -.2   .1   .0 97:363
S001 1 SOL1 P CORS       .0000 -.0003  .0000 -.0001 -.0002  .0003   .0  -.1   .1 97:144

Velocities
S001 1 SOL1 P IGS       -.0028  .0023 -.0035 -.0022 -.0009 -.0045  -.3  -.1  -.4
S001 1 SOL1 P1 JPL       .0003  .0008  .0002  .0005  .0006 -.0004   .3   .3  -.2
S001 1 SOL1 P CORS       .0000  .0000 -.0006  .0000 -.0005 -.0003   .0  -.3  -.2

49908 ANNAPOLIS

Positions
S001 1 USNA P IGS       -.0010 -.0012 -.0011 -.0012 -.0015  .0000  -.3  -.3   .0 98:325
S001 1 USNA P1 JPL       .0001  .0006  .0001  .0002  .0004 -.0003   .1   .2  -.1 98: 20

Velocities
S001 1 USNA P IGS       -.0013  .0005 -.0051 -.0012 -.0034 -.0038  -.2  -.4  -.4
S001 1 USNA P1 JPL       .0000  .0006  .0000  .0001  .0004 -.0004   .1   .2  -.2

49909 SAN NICOLAS ISLA

Positions
S001 1 SNI1 P2 JPL       .0004  .0003  .0000  .0002  .0003 -.0004   .0   .1  -.1 98:175

Velocities
S001 1 SNI1 P2 JPL      -.0001 -.0005  .0002  .0002 -.0001  .0005   .1   .0   .1

49910 NORTHRIDGE

Positions
S001 1 CSN1 P2 JPL       .0211  .0198  .0078  .0091  .0219 -.0183   .3   .8  -.6 99:218
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Velocities
S001 1 CSN1 P2 JPL      -.0005 -.0011  .0000  .0001 -.0007  .0010   .0  -.2   .2

49911 AZUSA

Positions
M001 1 AZU1 P2 JPL       .0003  .0001  .0001  .0002  .0002 -.0001   .0   .0   .0 98:178

Velocities
M001 1 AZU1 P2 JPL      -.0001 -.0011  .0003  .0004 -.0004  .0010   .1  -.1   .2

49912 TORRANCE AIRPORT

Positions
M001 1 TORP P2 JPL       .0003  .0002  .0000  .0001  .0002 -.0002   .0   .0   .0 98:203

Velocities
M001 1 TORP P2 JPL      -.0003 -.0015  .0003  .0005 -.0006  .0014   .1  -.1   .2

49913 HORN POINT

Positions
S001 1 HNPT P1 JPL       .0001 -.0001  .0014  .0001  .0010  .0010   .1   .4   .3 98:174
S001 1 HNPT P CORS      -.0015  .0030 -.0054 -.0007 -.0022 -.0059  -.2  -.4 -1.1 98:339

Velocities
S001 1 HNPT P1 JPL       .0007  .0002  .0001  .0008  .0001  .0000   .3   .0   .0
S001 1 HNPT P CORS      -.0003 -.0002  .0001 -.0003  .0000  .0002  -.2   .0   .1

49914 KEYBISCAYNE/MIAM

Positions
S001 1 AOML P CODE       .0051 -.0081  .0095  .0037  .0048  .0121  1.0   .8  2.0 99:140
S001 1 AOML P GFZ        .0000  .0077 -.0068  .0013 -.0028 -.0098   .5  -.8 -2.3 99:155
S001 1 AOML P IGS       -.0007  .0005  .0003 -.0006  .0005 -.0004  -.4   .2  -.1 99:251
S001 1 AOML P NOAA      -.0009 -.0072  .0050 -.0021  .0015  .0084  -.6   .4  1.8 98:290
S001 1 AOML P CORS       .0003  .0011  .0006  .0005  .0010 -.0007   .2   .4  -.2 98:316
S002 1 MIA1 P CORS       .0000  .0007  .0001  .0001  .0003 -.0006   .0   .1  -.2 97: 83

Velocities
S001 1 AOML P CODE       .0017 -.0009 -.0015  .0015 -.0019  .0005   .3  -.2   .0
S001 1 AOML P GFZ        .0014 -.0007  .0003  .0012 -.0001  .0010   .5   .0   .2
S001 1 AOML P IGS       -.0010  .0006 -.0003 -.0009  .0001 -.0008  -.5   .0  -.2
S001 1 AOML P NOAA       .0016 -.0039  .0030  .0009  .0009  .0050   .2   .2   .7
S001 1 AOML P CORS       .0001 -.0005  .0014  .0000  .0010  .0010   .0   .3   .2
S002 1 MIA1 P CORS       .0001 -.0001  .0001  .0001  .0001  .0002   .0   .0   .0

49915 SAN CLEMENTE ISL

Positions
M001 1 SCIP P NOAA       .0027 -.0006  .0005  .0026  .0008 -.0004   .7   .2  -.1 98:296

Velocities
M001 1 SCIP P NOAA       .0016  .0010 -.0001  .0009  .0008 -.0014   .2   .2  -.3

49917 WIDE CANYON

Positions
M001 1 WIDE P NOAA       .0023 -.0009  .0006  .0024  .0006  .0002   .7   .2   .1 98:222

Velocities
M001 1 WIDE P NOAA       .0015  .0011 -.0002  .0009  .0007 -.0015   .3   .2  -.4

49935 COLLEGE/ALASKA

Positions
M001 1 CLGO P IGS       -.0051 -.0072  .0121  .0034 -.0023  .0144   .4  -.2  1.1  0:246
M001 1 CLGO P GIA        .0001  .0001 -.0003  .0000  .0000 -.0004   .0   .0  -.2 97:188

Velocities
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M001 1 CLGO P IGS       -.0018 -.0103 -.0086  .0077 -.0100 -.0048   .2  -.2  -.1
M001 1 CLGO P GIA        .0000  .0005 -.0004 -.0004  .0001 -.0005  -.4   .1  -.3

49936 GARNER/ALASKA

Positions
M001 1 GRNR P GIA        .0005  .0007 -.0015 -.0003  .0000 -.0017  -.1   .0  -.3 98: 30

Velocities
M001 1 GRNR P GIA        .0029  .0017 -.0071  .0000 -.0001 -.0079   .0   .0  -.6

49995 KENAI/ALASKA

Positions
S001 1 KEN1 P CORS       .0005  .0018 -.0012 -.0013  .0005 -.0017  -.7   .2  -.6 98:  6
S001 1 KEN1 P GIA        .0009 -.0001  .0001  .0005  .0007 -.0003   .3   .3  -.1 97:246

Velocities
S001 1 KEN1 P CORS       .0007 -.0005 -.0009  .0008 -.0001 -.0010   .5  -.1  -.4
S001 1 KEN1 P GIA       -.0014  .0002  .0007 -.0008 -.0007  .0011  -.7  -.5   .7

49997 CENTRAL/ALASKA

Positions
S001 1 CENA P GIA        .0004  .0021 -.0027 -.0014  .0003 -.0030  -.2   .0  -.4 98:233

Velocities
S001 1 CENA P GIA        .0021 -.0007 -.0016  .0017  .0005 -.0020   .2   .1  -.2

49998 ANNETTE ISLAND/A

Positions
S001 1 AIS1 P CORS       .0003 -.0011  .0016  .0010  .0004  .0017   .5   .2   .7 98: 11
S001 1 AIS1 P GIA        .0001  .0003 -.0004 -.0001  .0000 -.0005   .0   .0  -.3 97:164

Velocities
S001 1 AIS1 P CORS      -.0011 -.0012  .0021  .0000 -.0001  .0027   .0   .0  1.2
S001 1 AIS1 P GIA       -.0003  .0005 -.0003 -.0006  .0000 -.0004  -.4   .0  -.2

50103 CANBERRA

Positions
M106 1 7843 TIEAUS01     .0013 -.0009  .0014  .0001  .0002 -.0021   .0   .1 -1.2 97:  1
M107 1 ORRO TIEAUS01     .0015 -.0009  .0012  .0000 -.0001 -.0021   .0  -.1 -2.5 97:  1
M108 1 TIDB TIEAUS01     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .1 97:  1
M108 1 TIDB TIEAUS03     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M108 1 TIDB TIEAUS05     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M108 1 TIDB P CODE       .0069 -.0053  .0135  .0010  .0060 -.0149   .1   .8 -1.9 96:352
M108 1 TIDB P GFZ        .0010 -.0077  .0020  .0060 -.0011 -.0051  1.6  -.3 -1.4 97:281
M108 1 TIDB P IGS        .0004 -.0004  .0007  .0001  .0002 -.0009   .1   .2  -.7 98:141
M108 1 TIDB P1 JPL       .0029  .0006 -.0009 -.0020 -.0020 -.0013  -.8  -.8  -.5 98: 54
M108 1 TIDB P NOAA       .0044  .0014  .0008 -.0035 -.0011 -.0030  -.9  -.3  -.8 98: 48
M108 1 TIDB P SCAR       .0061  .0001  .0005 -.0033 -.0026 -.0045  -.5  -.3  -.6 97:103
M108 2 TIDB P CODE      -.0044  .0046  .0014 -.0017  .0047  .0042  -.4  1.0   .9 98: 84
M108 2 TIDB P GFZ        .0026 -.0060  .0012  .0038 -.0021 -.0051  1.1  -.6 -1.4 98: 77
M108 2 TIDB P1 JPL       .0039  .0014 -.0006 -.0032 -.0020 -.0018 -1.4  -.9  -.7 98:127
M108 2 TIDB P NCL        .0091 -.0059  .0118  .0004  .0033 -.0156   .0   .3 -1.4 96:133
S001 1 1543 R GSFC       .0693  .0417  .0237 -.0715 -.0026 -.0446   .0   .0   .0 91:227
S001 1 1543 R SHA        .0105 -.0083  .0228  .0017  .0109 -.0240   .0   .0   .0 91:186
S003 1 7943 L4 CSR       .0450 -.0334 -.0251  .0054 -.0530 -.0307   .1  -.8  -.4 80:175
S007 1 7843 TIEAUS01     .0035  .0019  .0025 -.0034  .0009 -.0031 -1.8   .5 -1.8 97:  1
S007 1 7843 L AUS       -.0202  .0063 -.0250  .0051 -.0084  .0313   .2  -.3  1.0 95:298
S007 1 7843 L CGS       -.0194 -.0025 -.0030  .0121  .0065  .0142  1.8  1.0  2.2 94:275
S007 1 7843 L CRL       -.0061 -.0005 -.0011  .0036  .0020  .0047   .4   .2   .5 91:247
S007 1 7843 L4 CSR      -.0052 -.0038 -.0013  .0059  .0004  .0028   .9   .1   .3 92:334
S007 1 7843 L DEOS      -.0252  .0058 -.0102  .0080  .0061  .0259   .3   .2   .9 92:333
S007 1 7843 L DGFI      -.0272  .0055 -.0068  .0093  .0097  .0252   .5   .5  1.3 94: 69
S007 1 7843 C GRIM      -.0131  .0148 -.0186 -.0059 -.0042  .0261  -.3  -.2  1.1 93:  1
S010 1 1545 TIEAUS03    -.0006  .0032  .0046 -.0024  .0050 -.0009  -.7  1.5  -.3 97:  1
S010 1 1545 R GIUB       .0087 -.0027  .0006 -.0021 -.0046 -.0076  -.5 -1.0 -1.5 95: 14
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S010 1 1545 R GSFC       .0041 -.0017 -.0007 -.0007 -.0032 -.0032  -.2  -.7  -.6 94:307
S010 1 1545 R SHA        .0014 -.0009  .0028  .0000  .0013 -.0030   .0   .3  -.6 96: 38
S201 1 ORRA TIE50103     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S201 1 ORRA D GRGS      -.0326 -.0178  .0067  .0321  .0164  .0113   .8   .5   .3 94:197
S201 1 ORRA D9 IGN       .0182  .0156 -.0126 -.0228 -.0146  .0012  -.6  -.5   .0 94:158
S201 1 ORRA C GRIM      -.0179 -.0469  .0145  .0494  .0066 -.0157  1.6   .3  -.6 93:  1
S201 1 ORRA C1 CSR      -.0009  .0147  .0057 -.0121  .0095  .0035 -1.1  1.0   .3 94:115
S202 1 ORRB TIEAUS01     .0019 -.0011  .0013  .0000 -.0003 -.0025   .0  -.2 -1.7 97:  1
S202 1 ORRB TIE50103    -.0125  .0106  .0243 -.0026  .0292 -.0010  -.3  2.9  -.1 97:  1
S202 1 ORRB D GRGS      -.0663  .0178  .0147  .0190  .0504  .0450   .3  1.1   .9 97:269
S202 1 ORRB D9 IGN      -.0350  .0257 -.0139 -.0040  .0139  .0433  -.1   .3   .7 97:293
S202 1 ORRB C1 CSR      -.0241  .0295 -.0029 -.0129  .0185  .0308  -.7  1.3  2.0 97:247

Velocities
M108 1 TIDB P CODE       .0042 -.0007  .0020 -.0015 -.0006 -.0044  -.5  -.2 -1.3
M108 1 TIDB P GFZ        .0036  .0042 -.0020 -.0054 -.0022  .0004 -3.5 -1.4   .2
M108 1 TIDB P IGS        .0003  .0006 -.0002 -.0007 -.0002  .0001  -.7  -.2   .1
M108 1 TIDB P1 JPL       .0007 -.0003 -.0016 -.0001 -.0018  .0003   .0  -.9   .1
M108 1 TIDB P NOAA      -.0070  .0023 -.0036  .0016  .0012  .0080   .5   .4  2.7
M108 1 TIDB P SCAR      -.0040  .0028 -.0032 -.0003  .0003  .0058  -.1   .1  1.2
M108 2 TIDB P CODE       .0042 -.0007  .0020 -.0015 -.0006 -.0044  -.5  -.2 -1.3
M108 2 TIDB P GFZ        .0038  .0040 -.0023 -.0054 -.0026  .0003 -3.7 -1.8   .2
M108 2 TIDB P1 JPL      -.0002  .0000 -.0028  .0001 -.0022  .0018   .0  -.9   .7
M108 2 TIDB P NCL       -.0045 -.0003  .0007  .0026  .0027  .0026   .6   .6   .5
S001 1 1543 R GSFC      -.0082 -.0610  .0179  .0565  .0005 -.0303   .0   .0   .0
S001 1 1543 R SHA       -.0002 -.0007  .0007  .0007  .0005 -.0005   .0   .0   .0
S003 1 7943 L4 CSR      -.0039 -.0259  .0392  .0243  .0260 -.0310   .9   .8 -1.0
S007 1 7843 L AUS        .0065  .0016  .0022 -.0048 -.0010 -.0051  -.4  -.1  -.4
S007 1 7843 L CGS       -.0002  .0011  .0017 -.0008  .0018 -.0004  -.4   .8  -.2
S007 1 7843 L CRL       -.0023  .0018 -.0007 -.0004  .0011  .0027  -.1   .3   .6
S007 1 7843 L4 CSR      -.0029  .0009  .0022  .0007  .0035  .0012   .6  2.4   .8
S007 1 7843 L DEOS      -.0076  .0011  .0009  .0030  .0049  .0052   .2   .4   .4
S007 1 7843 L DGFI      -.0048  .0025  .0003  .0004  .0034  .0043   .1   .5   .6
S007 1 7843 C GRIM       .0263  .1062  .0454 -.1046  .0558 -.0002   .0   .0   .0
S010 1 1545 R GIUB      -.0016  .0005  .0008  .0004  .0016  .0008   .2  1.0   .4
S010 1 1545 R GSFC      -.0012  .0009  .0013 -.0002  .0019  .0005  -.2  2.3   .5
S010 1 1545 R SHA       -.0003  .0000  .0009  .0001  .0008 -.0003   .1   .5  -.2
S201 1 ORRA D GRGS      -.0217  .0143 -.0202 -.0011 -.0013  .0329   .0   .0  1.0
S201 1 ORRA D9 IGN      -.0019  .0084 -.0046 -.0062 -.0003  .0075  -.1   .0   .2
S201 1 ORRA C GRIM       .0263  .1062  .0454 -.1046  .0558 -.0002  -.1   .0   .0
S201 1 ORRA C1 CSR       .0042  .0003 -.0062 -.0025 -.0070  .0009  -.2  -.7   .1
S202 1 ORRB D GRGS      -.0217  .0143 -.0202 -.0011 -.0013  .0329   .0   .0  1.0
S202 1 ORRB D9 IGN       .0053 -.0267  .0005  .0202 -.0103 -.0152   .1  -.1  -.1
S202 1 ORRB C1 CSR       .0240 -.0040  .0171 -.0089  .0007 -.0284  -.2   .0  -.8

50107 YARRAGADEE

Positions
M001 1 7090 TIEAUS04     .0001  .0000 -.0001  .0000 -.0001  .0000  -.1  -.2  -.1 97:  1
M001 1 7090 L AUS        .0024 -.0006 -.0051 -.0019 -.0053  .0011  -.3  -.7   .2 96:181
M001 1 7090 L CGS       -.0111 -.0046 -.0001  .0120  .0002  .0005  1.9   .1   .1 93:257
M001 1 7090 L CRL        .0015 -.0042  .0094  .0005  .0060 -.0085   .1   .9 -1.1 91:186
M001 1 7090 L4 CSR      -.0026 -.0020  .0010  .0032  .0005 -.0011  1.0   .1  -.3 91:166
M001 1 7090 L DEOS      -.0118  .0011  .0088  .0102  .0106  .0010  1.3  1.3   .1 93:  3
M001 1 7090 L DGFI      -.0083 -.0024  .0098  .0085  .0092 -.0035  1.6  1.4  -.7 93: 52
M001 1 7090 L JCET       .0005 -.0031  .0015  .0009 -.0001 -.0033   .9  -.1 -2.8 96: 99
M001 1 7090 C GRIM       .0076  .0059 -.0042 -.0095 -.0027  .0039 -1.8 -1.2  1.2 93:  1
M001 1 7090 C1 CSR       .0002 -.0036  .0030  .0014  .0010 -.0043  1.2   .6 -3.1 96:149
M004 1 YAR1 TIEAUS04     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 YAR1 P CODE      -.0011  .0039  .0037 -.0006  .0051  .0017  -.2  1.1   .4 98: 11
M004 1 YAR1 P GFZ       -.0044 -.0001 -.0034  .0041 -.0021  .0032  1.2  -.6   .8 98:  3
M004 1 YAR1 P IGS        .0002 -.0011  .0007  .0002  .0001 -.0013   .2   .1  -.9 98:157
M004 1 YAR1 P NCL        .0009 -.0004  .0002 -.0006 -.0002 -.0008  -.2  -.1  -.3 98: 58
M004 1 YAR1 P NOAA      -.0077  .0092 -.0059  .0030  .0005  .0130   .7   .1  2.8 98:164
M004 1 YAR1 P SCAR       .0014 -.0054  .0022  .0011 -.0007 -.0058   .2  -.1  -.8 97: 12
M004 2 YAR1 P GFZ       -.0038  .0000 -.0035  .0034 -.0023  .0032  1.0  -.6   .8 98: 17
M006 1 YARR TIEAUS04     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S006 1 YARA TIEAUS04     .0001  .0059 -.0153 -.0026 -.0108  .0120  -.7 -2.5  2.9 97:  1
S006 1 YARA D GRGS       .0094 -.0259  .0211  .0026  .0051 -.0343   .1   .3 -1.7 96: 63
S006 1 YARA D9 IGN      -.0209  .0089 -.0026  .0150  .0060  .0161   .6   .3   .7 96: 13
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S006 1 YARA C GRIM      -.0004 -.0388  .0173  .0170 -.0018 -.0388  1.1  -.2 -3.1 93:  1
S006 1 YARA C1 CSR      -.0050 -.0089  .0144  .0084  .0097 -.0121  1.1  1.7 -1.8 96:121
S007 1      TIEAUS04     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S009 1 7847 L4 CSR      -.0958  .1435 -.0470  .0252  .0418  .1720   .0   .0   .0 96: 83
S009 1 7847 C GRIM       .0045  .0001 -.0018 -.0041 -.0025 -.0007   .0   .0   .0 91:300
S010 1 YARB TIEAUS04     .0001  .0000 -.0001 -.0001 -.0001  .0000  -.2  -.3   .0 97:  1
S010 1 YARB D9 IGN      -.0174  .0022  .0081  .0148  .0116  .0043   .2   .2   .1  0: 31
S010 1 YARB C1 CSR       .0227 -.0087  .0219 -.0168  .0106 -.0260  -.5   .4  -.9  0:  8

Velocities
M001 1 7090 L AUS        .0039  .0011  .0008 -.0040  .0004 -.0010 -1.5   .1  -.4
M001 1 7090 L CGS       -.0004 -.0005  .0024  .0006  .0019 -.0014   .3  1.8 -1.1
M001 1 7090 L CRL       -.0016  .0013  .0009  .0009  .0017  .0012   .3   .5   .4
M001 1 7090 L4 CSR      -.0023  .0006  .0024  .0018  .0029  .0002  1.6  2.7   .2
M001 1 7090 L DEOS      -.0051  .0005  .0014  .0044  .0025  .0017  1.4   .6   .3
M001 1 7090 L DGFI      -.0023  .0012  .0036  .0016  .0042  .0001   .8  1.9   .0
M001 1 7090 L JCET       .0002  .0002 -.0003 -.0003 -.0002  .0002  -.6  -.4   .4
M001 1 7090 C GRIM       .0730  .0639  .0499 -.0933  .0564 -.0011  -.1   .0   .0
M001 1 7090 C1 CSR       .0003  .0005 -.0005 -.0005 -.0003  .0005  -.9  -.4   .7
M004 1 YAR1 P CODE       .0011  .0026 -.0004 -.0021  .0005  .0018  -.8   .2   .6
M004 1 YAR1 P GFZ        .0044  .0019  .0001 -.0048  .0000 -.0002 -3.3   .0  -.1
M004 1 YAR1 P IGS       -.0005  .0035 -.0011 -.0010  .0007  .0035 -1.2   .7  3.2
M004 1 YAR1 P NCL       -.0011  .0027 -.0018 -.0002 -.0001  .0034  -.1  -.1  1.5
M004 1 YAR1 P NOAA      -.0001 -.0027  .0007  .0012 -.0006 -.0025   .4  -.2  -.7
M004 1 YAR1 P SCAR       .0020 -.0027  .0008 -.0006 -.0009 -.0033  -.2  -.2  -.7
M004 2 YAR1 P GFZ        .0045  .0021  .0002 -.0050  .0002 -.0001 -3.1   .1  -.1
S006 1 YARA D GRGS      -.0006 -.0101  .0054  .0048  .0003 -.0104   .3   .0  -.9
S006 1 YARA D9 IGN      -.0066  .0002  .0023  .0059  .0035  .0015   .5   .4   .1
S006 1 YARA C GRIM       .0730  .0638  .0499 -.0933  .0564 -.0011  -.1   .0   .0
S006 1 YARA C1 CSR       .0027  .0015  .0027 -.0030  .0025 -.0012  -.8   .9  -.4
S009 1 7847 L4 CSR      -.0604 -.0176  .0163  .0621  .0191  .0008   .0   .0   .0
S009 1 7847 C GRIM       .0041  .0020  .0010 -.0046  .0009 -.0004 -1.4   .8  -.2
S010 1 YARB D9 IGN      -.1054 -.0814  .0317  .1301  .0139 -.0403   .2   .0  -.1
S010 1 YARB C1 CSR      -.1475 -.1372 -.0702  .1920 -.0909 -.0191   .5  -.3  -.1

50108 PARKES

Positions
S001 1 7202 R GSFC       .0083 -.0023 -.0001 -.0024 -.0046 -.0069  -.1  -.2  -.2 93:154
S001 1 7202 R SHA        .0016 -.0024  .0006  .0012 -.0009 -.0025   .1   .0  -.1 94:260

Velocities
S001 1 7202 R GSFC      -.0128  .0088 -.0073 -.0007  .0023  .0170   .0   .1   .8
S001 1 7202 R SHA        .0108 -.0078  .0095  .0009  .0008 -.0163   .0   .0  -.8

50116 HOBART

Positions
M001 1 UF05 TIEAUS02    -.0009 -.0016  .0000  .0018 -.0001  .0000  1.4  -.1   .0 97:  1
M002 1 UF03 TIEAUS02    -.0009 -.0014  .0001  .0017  .0000  .0000  1.1   .0   .0 97:  1
M003 1 HOB1 TIEAUS02     .0000 -.0001 -.0001  .0001 -.0001  .0000   .1  -.2   .0 97:  1
M003 1 HOB1 P GFZ       -.0177 -.0186  .0075  .0252  .0088 -.0015  2.9   .9  -.2 94:361
M004 1 HOB2 TIEAUS02     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 HOB2 P CODE      -.0026  .0042  .0008 -.0022  .0036  .0027  -.5   .8   .6 98: 31
M004 1 HOB2 P GFZ        .0001 -.0039 -.0024  .0032 -.0033  .0001   .9  -.9   .0 98:186
M004 1 HOB2 P IGS        .0010 -.0012  .0022  .0005  .0007 -.0026   .4   .5 -1.8 98:253
M004 1 HOB2 P1 JPL       .0014 -.0003  .0000 -.0005 -.0009 -.0010  -.2  -.4  -.5 97:224
M004 1 HOB2 P NCL       -.0007 -.0004 -.0001  .0007  .0002  .0004   .3   .1   .1 98: 85
M004 1 HOB2 P NOAA       .0008  .0035 -.0021 -.0033 -.0008  .0023  -.9  -.2   .6 97:357
M004 1 HOB2 P2 IGN       .0000 -.0003  .0000  .0003 -.0001 -.0001   .1   .0   .0 98:285
M004 1 HOB2 P SCAR       .0038  .0006 -.0001 -.0026 -.0020 -.0020  -.4  -.3  -.3 97:220
S002 1 7242 TIEAUS02    -.0030 -.0049  .0000  .0058 -.0001 -.0001  2.9  -.1   .0 97:  1
S002 1 7242 R GIUB       .0105 -.0033  .0014 -.0029 -.0062 -.0088  -.6 -1.3 -1.8 95: 68
S002 1 7242 R GSFC       .0052 -.0005  .0010 -.0023 -.0024 -.0041  -.9  -.9 -1.5 95:183
S002 1 7242 R SHA        .0036 -.0002  .0030 -.0018  .0001 -.0043  -.6   .0 -1.3 96:100

Velocities
M003 1 HOB1 P GFZ        .0042  .0039 -.0007 -.0055 -.0015 -.0006 -2.9  -.8  -.3
M004 1 HOB2 P CODE       .0029 -.0005  .0023 -.0011 -.0001 -.0036  -.4   .0 -1.1
M004 1 HOB2 P GFZ        .0041  .0039 -.0006 -.0055 -.0014 -.0006 -3.5  -.8  -.3
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M004 1 HOB2 P IGS        .0010 -.0003  .0011 -.0003  .0001 -.0015  -.3   .1 -1.4
M004 1 HOB2 P1 JPL      -.0008  .0006 -.0030  .0000 -.0015  .0028   .0 -1.0  1.9
M004 1 HOB2 P NCL       -.0002 -.0016  .0004  .0015 -.0002 -.0008   .6  -.1  -.3
M004 1 HOB2 P NOAA      -.0045  .0010 -.0015  .0016  .0019  .0042   .6   .7  1.5
M004 1 HOB2 P2 IGN      -.0015  .0001 -.0014  .0007 -.0001  .0019   .3  -.1   .9
M004 1 HOB2 P SCAR      -.0011  .0002  .0008  .0004  .0013  .0002   .1   .3   .0
S002 1 7242 R GIUB       .0000  .0004  .0013 -.0004  .0011 -.0007  -.2   .6  -.4
S002 1 7242 R GSFC      -.0006  .0015  .0012 -.0010  .0017  .0001 -1.4  2.2   .2
S002 1 7242 R SHA        .0005  .0003  .0007 -.0005  .0003 -.0007  -.4   .2  -.5

50119 MOUNT STROMLO

Positions
M001 1 STR0 TIEAUS05     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 STR1 TIEAUS05     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7849 TIEAUS05     .0000  .0001  .0000 -.0001  .0000  .0000  -.1   .0   .1 97:  1
S001 1 7849 L AUS        .0082 -.0012 -.0112 -.0032 -.0135  .0002  -.5 -2.0   .0 99:283
S001 1 7849 L CGS       -.0079 -.0109  .0096  .0134  .0085 -.0046  1.1   .8  -.4 99: 79
S001 1 7849 L CRL       -.0039  .0003  .0013  .0018  .0031  .0021   .1   .1   .1 99: 29
S001 1 7849 L4 CSR      -.0102 -.0034  .0151  .0082  .0164 -.0030   .7  1.3  -.2 99:188
S001 1 7849 L DEOS      -.0100  .0010 -.0088  .0043 -.0019  .0125   .3  -.1   .8 93:  1
S001 1 7849 L DGFI      -.0104  .0002  .0090  .0052  .0125  .0021   .5  1.2   .2 96:145
S001 1 7849 L JCET      -.0058 -.0006  .0003  .0035  .0030  .0036   .6   .4   .6 99:261
S001 1 7849 C GRIM       .0156  .0310 -.0023 -.0346 -.0004  .0034 -1.5   .0   .2 99:  1
S001 1 7849 C1 CSR       .0044 -.0033  .0034  .0006 -.0004 -.0064   .1  -.1 -1.4 99:155
S002 1 MSOB TIEAUS05     .0000 -.0001  .0000  .0001  .0000  .0000   .1   .0   .0 97:  1
S002 1 MSOB D9 IGN       .0352  .0174 -.0194 -.0330 -.0281 -.0061  -.5  -.5  -.1 99:285
S002 1 MSOB C GRIM       .0418  .0012 -.0055 -.0226 -.0249 -.0256  -.4  -.6  -.5 99: 87
S002 1 MSOB C1 CSR       .0267  .0276  .0104 -.0374  .0035 -.0130 -1.9   .2  -.8 99:258

Velocities
S001 1 7849 L AUS       -.0200  .0094  .0233  .0022  .0317  .0045   .2  2.1   .3
S001 1 7849 L CGS       -.0081  .0058 -.0112 -.0008 -.0034  .0146   .0  -.2   .7
S001 1 7849 L CRL       -.0035  .0011  .0148  .0008  .0141 -.0056   .0   .7  -.3
S001 1 7849 L4 CSR       .0061 -.0041  .0104  .0003  .0043 -.0120   .0   .5 -1.4
S001 1 7849 L DEOS      -.0630  .0250  .0943  .0110  .1157  .0001   .0   .0   .0
S001 1 7849 L DGFI      -.0023  .0001  .0024  .0011  .0031  .0003   .5  1.4   .1
S001 1 7849 L JCET       .0112 -.0100  .0138  .0028  .0028 -.0201   .2   .2 -1.2
S001 1 7849 C GRIM       .0289  .1043  .0475 -.1043  .0555 -.0039  -.1   .0   .0
S001 1 7849 C1 CSR       .0047 -.0040  .0074  .0010  .0025 -.0092   .1   .3  -.9
S002 1 MSOB D9 IGN       .0426  .0020  .0330 -.0237  .0064 -.0480  -.1   .0  -.3
S002 1 MSOB C GRIM       .0048 -.0029  .0132  .0000  .0075 -.0122   .0   .3  -.5
S002 1 MSOB C1 CSR       .0118 -.0396  .0386  .0279  .0138 -.0472   .4   .3  -.8

50127 COCO ISLANDS

Positions
M001 1 COCO P CODE      -.0011  .0207  .0010 -.0013  .0053  .0200  -.3  1.0  2.8 98:227
M001 1 COCO P GFZ        .0018 -.0089  .0007 -.0007 -.0012 -.0090  -.2  -.3 -1.7 99:  3
M001 1 COCO P IGS        .0001 -.0003  .0000 -.0001  .0000 -.0003   .0   .0  -.1 98:220
M001 1 COCO P1 JPL       .0016 -.0063  .0012 -.0009 -.0002 -.0066  -.4  -.1 -1.1 98:  1
M001 1 COCO P NCL        .0005 -.0029  .0004 -.0002 -.0002 -.0029  -.1  -.1  -.6 97:208
M001 1 COCO P NOAA      -.0039  .0006 -.0026  .0038 -.0023  .0016   .8  -.7   .2 98: 70

Velocities
M001 1 COCO P CODE       .0004  .0056 -.0006 -.0011  .0006  .0055  -.3   .2   .9
M001 1 COCO P GFZ        .0038  .0034  .0001 -.0042  .0007  .0028 -2.0   .4   .6
M001 1 COCO P IGS        .0017  .0017  .0000 -.0018  .0003  .0014 -1.6   .3   .6
M001 1 COCO P1 JPL      -.0026  .0007 -.0021  .0025 -.0019  .0014   .9  -.8   .2
M001 1 COCO P NCL       -.0014 -.0113  .0028  .0028  .0004 -.0114   .9   .1 -1.9
M001 1 COCO P NOAA      -.0002  .0012  .0002  .0000  .0005  .0011   .0   .2   .2

50133 PERTH

Positions
M001 1 PERT P CODE      -.0024  .0065  .0016 -.0007  .0050  .0050  -.2  1.1  1.1 98: 26
M001 1 PERT P IGS       -.0008  .0005 -.0006  .0005  .0000  .0010   .4   .0   .6 98: 72
M001 1 PERT P1 JPL       .0018 -.0018  .0027 -.0008  .0011 -.0034  -.4   .6 -1.5 97:104
M001 1 PERT P NCL        .0002  .0006 -.0006 -.0004 -.0003  .0007  -.2  -.1   .3 98: 22
M001 1 PERT P NOAA      -.0017 -.0022 -.0003  .0025 -.0010 -.0009   .6  -.3  -.2 98:  9
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M001 1 PERT P2 IGN       .0015 -.0011 -.0004 -.0008 -.0012 -.0012  -.3  -.2  -.2 98:274
M001 1 PERT P SCAR       .0012 -.0057  .0013  .0014 -.0018 -.0055   .3  -.3  -.8 97:  4

Velocities
M001 1 PERT P CODE       .0022 -.0004  .0016 -.0018  .0007 -.0020  -.6   .2  -.6
M001 1 PERT P IGS        .0002  .0010 -.0001 -.0007  .0004  .0007  -.6   .3   .6
M001 1 PERT P1 JPL       .0005  .0012 -.0013 -.0010 -.0006  .0014  -.8  -.5  1.0
M001 1 PERT P NCL        .0000 -.0006 -.0001  .0002 -.0004 -.0004   .1  -.2  -.2
M001 1 PERT P NOAA      -.0006 -.0002  .0015  .0006  .0013 -.0007   .2   .5  -.3
M001 1 PERT P2 IGN       .0002  .0013 -.0024 -.0008 -.0015  .0022  -.3  -.4   .6
M001 1 PERT P SCAR       .0009 -.0020  .0010  .0000 -.0003 -.0024   .0  -.1  -.5

50134 DARWIN I

Positions
M001 1 DARW P CODE      -.0027  .0080  .0032 -.0032  .0048  .0069  -.4   .6   .9 99:304
M001 1 DARW P IGS        .0027 -.0006  .0013 -.0017  .0008 -.0024  -.4   .3  -.5  0: 69

Velocities
M001 1 DARW P CODE      -.0086  .0107 -.0028 -.0006  .0003  .0140   .0   .0   .6
M001 1 DARW P IGS       -.0042  .0063 -.0009 -.0010  .0008  .0075  -.1   .2   .7

50135 MACQUARIE ISLAND

Positions
M001 1 MAC1 P CODE       .0033  .0014  .0076 -.0024  .0023 -.0077  -.6   .5 -1.5 98: 22
M001 1 MAC1 P GFZ        .0016 -.0043 -.0011  .0035 -.0031 -.0008  1.0  -.8  -.2 98:193
M001 1 MAC1 P IGS        .0001 -.0002  .0005  .0002  .0001 -.0005   .2   .1  -.3 98:198
M001 1 MAC1 P1 JPL      -.0012  .0008 -.0019 -.0003  .0000  .0023  -.2   .0   .9 97:179
M001 1 MAC1 P NCL       -.0066  .0005 -.0076  .0019  .0007  .0099   .4   .1  1.5 97:135
M001 1 MAC1 P NOAA       .0035  .0043  .0033 -.0053  .0005 -.0037 -1.3   .1  -.9 97:341
M001 1 MAC1 P2 IGN      -.0015 -.0002  .0000  .0007  .0011  .0007   .3   .4   .2 98:190
M001 1 MAC1 P SCAR      -.0044  .0054 -.0071 -.0035  .0008  .0093  -.6   .1  1.0 97:241

Velocities
M001 1 MAC1 P CODE       .0001  .0011 -.0009 -.0011 -.0003  .0009  -.4  -.1   .2
M001 1 MAC1 P GFZ        .0043  .0043 -.0006 -.0056 -.0024 -.0009 -3.6 -1.1  -.4
M001 1 MAC1 P IGS        .0002  .0002  .0009 -.0003  .0005 -.0008  -.4   .4  -.7
M001 1 MAC1 P1 JPL       .0008 -.0008 -.0013  .0004 -.0016  .0005   .4 -1.1   .3
M001 1 MAC1 P NCL       -.0031 -.0008 -.0022  .0019  .0009  .0033   .8   .3  1.2
M001 1 MAC1 P NOAA      -.0020  .0001  .0003  .0007  .0018  .0009   .2   .6   .3
M001 1 MAC1 P2 IGN      -.0008 -.0007 -.0001  .0009  .0003  .0004   .5   .2   .2
M001 1 MAC1 P SCAR       .0012 -.0012  .0035  .0007  .0007 -.0038   .2   .1  -.6

50136 JABIRU

Positions
M001 1 JAB1 P NOAA      -.0021  .0013 -.0036  .0007 -.0030  .0031   .1  -.6   .4 99:103

Velocities
M001 1 JAB1 P NOAA      -.0027  .0019 -.0002  .0007  .0005  .0033   .1   .1   .2

50137 ALICE SPRINGS/TE

Positions
M001 1 ALIC P CODE      -.0047  .0098  .0008 -.0034  .0048  .0092  -.5   .7  1.4 99:122
M001 1 ALIC P IGS        .0007  .0011  .0008 -.0013  .0008  .0000  -.3   .3   .0  0: 64
M001 1 ALIC P NOAA       .0001 -.0021 -.0010  .0014 -.0015 -.0011   .3  -.4  -.2 98:329

Velocities
M001 1 ALIC P CODE       .0078 -.0066  .0050 -.0011  .0005 -.0114  -.1   .1 -1.2
M001 1 ALIC P IGS        .0050 -.0043  .0032 -.0006  .0003 -.0073  -.1   .1 -1.1
M001 1 ALIC P NOAA      -.0046  .0036 -.0018  .0009  .0007  .0060   .1   .1   .9

50138 CEDUNA

Positions
M001 1 CEDU P CODE       .0007  .0039  .0040 -.0032  .0046 -.0001  -.6   .7   .0 99: 54
M001 1 CEDU P IGS        .0011  .0007  .0011 -.0012  .0008 -.0008  -.3   .2  -.2  0: 33
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Velocities
M001 1 CEDU P CODE       .0011  .0005  .0007 -.0012  .0004 -.0007  -.2   .1  -.1
M001 1 CEDU P IGS        .0012  .0002  .0007 -.0010  .0002 -.0010  -.2   .0  -.2

50139 KARRATHA

Positions
M001 1 KARR P CODE      -.0005  .0058  .0035 -.0022  .0052  .0038  -.4   .8   .6 99: 63
M001 1 KARR P IGS        .0019 -.0008  .0012 -.0013  .0005 -.0019  -.4   .2  -.4  0: 22
M001 1 KARR P NOAA      -.0036  .0025 -.0029  .0021 -.0014  .0046   .4  -.3   .8 98:352

Velocities
M001 1 KARR P CODE       .0002  .0036 -.0004 -.0019  .0008  .0031  -.2   .1   .3
M001 1 KARR P IGS        .0013  .0002  .0006 -.0012  .0004 -.0006  -.2   .1  -.1
M001 1 KARR P NOAA      -.0032  .0050 -.0017  .0006  .0005  .0061   .1   .1   .8

50140 TOWNSVILLE/CAPE

Positions
M001 1 TOW2 P CODE      -.0029  .0055  .0022 -.0030  .0039  .0044  -.5   .6   .7 99: 69
M001 1 TOW2 P IGS        .0008  .0001  .0013 -.0005  .0011 -.0010  -.2   .4  -.3  0: 44
M001 1 TOW2 P NOAA       .0018  .0019 -.0025 -.0026 -.0026  .0003  -.5  -.6   .1 98:362

Velocities
M001 1 TOW2 P CODE       .0038  .0001  .0015 -.0021  .0003 -.0035  -.3   .1  -.5
M001 1 TOW2 P IGS        .0006 -.0001  .0004 -.0003  .0002 -.0007  -.1   .1  -.1
M001 1 TOW2 P NOAA      -.0050  .0026 -.0009  .0006  .0010  .0056   .1   .2   .7

50207 CHATHAM ISLAND

Positions
M001 1 CHAT TIE50207     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 CHAT P CODE       .0007  .0035  .0038 -.0035  .0021 -.0033  -.8   .4  -.7 98: 35
M001 1 CHAT P GFZ        .0037 -.0036  .0000  .0038 -.0024 -.0025  1.1  -.6  -.6 98:261
M001 1 CHAT P IGS        .0002 -.0003  .0014  .0003  .0009 -.0010   .4   .6  -.7 98:110
M001 1 CHAT P1 JPL      -.0021 -.0001 -.0022 -.0001 -.0001  .0031   .0  -.1  1.3 97:330
M001 1 CHAT P NCL        .0006 -.0007  .0004  .0007 -.0001 -.0007   .3   .0  -.2 98: 50
M001 1 CHAT P NOAA       .0044  .0098 -.0001 -.0095 -.0035 -.0035 -2.3  -.9  -.9 97:337
M001 1 CHAT P2 IGN      -.0027  .0007 -.0017 -.0008  .0007  .0031  -.3   .2   .9 97:362
M001 1 CHAT P SCAR      -.0075  .0027 -.0104 -.0032 -.0024  .0125  -.7  -.3  1.4 97:180
S001 1 CHAB TIE50207    -.0014 -.0017 -.0007  .0016  .0005  .0016   .5   .2   .5 97:  1
S001 1 CHAB D9 IGN      -.0216 -.0161  .0551  .0148  .0553 -.0221   .2  1.2  -.5 99:215
S001 1 CHAB C GRIM       .0592  .0576  .0056 -.0539 -.0394 -.0489 -1.2 -1.7 -2.1 99:104
S001 1 CHAB C1 CSR       .0044  .0588  .0262 -.0585  .0134 -.0239 -3.0   .8 -1.5 99:214

Velocities
M001 1 CHAT P CODE       .0018 -.0001 -.0003  .0002 -.0014 -.0011   .1  -.4  -.3
M001 1 CHAT P GFZ        .0000  .0028 -.0016 -.0028 -.0012  .0010 -1.7  -.5   .4
M001 1 CHAT P IGS       -.0015  .0001 -.0007 -.0002  .0005  .0016  -.2   .5  1.4
M001 1 CHAT P1 JPL       .0006 -.0002 -.0006  .0003 -.0008  .0000   .2  -.4   .0
M001 1 CHAT P NCL        .0005 -.0015  .0012  .0015  .0006 -.0012   .7   .2  -.5
M001 1 CHAT P NOAA       .0001  .0006  .0026 -.0005  .0018 -.0019  -.2   .6  -.6
M001 1 CHAT P2 IGN      -.0007 -.0001  .0006  .0000  .0009  .0001   .0   .4   .0
M001 1 CHAT P SCAR       .0000  .0033  .0010 -.0033  .0006 -.0009 -1.1   .1  -.1
S001 1 CHAB D9 IGN       .0352 -.0087  .0408  .0108  .0053 -.0532   .1   .0  -.4
S001 1 CHAB C GRIM       .2602 -.1349 -.1307  .1503 -.2688 -.0904   .3  -.8  -.3
S001 1 CHAB C1 CSR       .0095  .0563  .0170 -.0556  .0033 -.0211  -.7   .1  -.3

50209 AUCKLAND

Positions
M001 1 AUCK P CODE      -.0005  .0035  .0032 -.0034  .0030 -.0013  -.8   .6  -.3 98: 42
M001 1 AUCK P IGS        .0000 -.0006  .0011  .0006  .0008 -.0007   .6   .6  -.4 98:157
M001 1 AUCK P1 JPL       .0010  .0003  .0001 -.0004 -.0005 -.0009  -.3  -.2  -.4 97:308
M001 1 AUCK P NCL        .0004 -.0010  .0008  .0010  .0003 -.0009   .4   .1  -.3 98: 74
M001 1 AUCK P NOAA       .0035  .0088 -.0023 -.0091 -.0035 -.0007 -2.3  -.9  -.2 97:352
M001 1 AUCK P2 IGN      -.0005  .0017  .0006 -.0017  .0009  .0002  -.4   .3   .1 98: 83
M001 1 AUCK P SCAR      -.0041  .0052 -.0083 -.0048 -.0039  .0086 -1.0  -.4   .9 97:194

Velocities
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M001 1 AUCK P CODE       .0023 -.0002  .0004  .0000 -.0011 -.0021   .0  -.3  -.6
M001 1 AUCK P IGS       -.0012  .0003 -.0003 -.0002  .0005  .0012  -.2   .4  1.0
M001 1 AUCK P1 JPL       .0002 -.0003 -.0010  .0002 -.0010  .0004   .2  -.5   .2
M001 1 AUCK P NCL        .0001 -.0014  .0009  .0014  .0006 -.0007   .6   .2  -.2
M001 1 AUCK P NOAA       .0001  .0004  .0024 -.0004  .0019 -.0015  -.1   .6  -.5
M001 1 AUCK P2 IGN      -.0008  .0002  .0002 -.0001  .0007  .0005   .0   .3   .2
M001 1 AUCK P SCAR       .0019  .0020  .0031 -.0022  .0015 -.0033  -.7   .2  -.4

50501 GUAM

Positions
M002 1 GUAM TIE50501     .0123 -.0068 -.0037 -.0015 -.0003 -.0145  -.3  -.1 -2.8 97:  1
M002 1 GUAM P CODE       .0045 -.0033  .0040  .0001  .0052 -.0045   .0  1.1  -.8 97:194
M002 1 GUAM P GFZ        .0105 -.0025 -.0027 -.0040 -.0003 -.0104 -1.0  -.1 -2.4 97:340
M002 1 GUAM P IGS       -.0023  .0018  .0006 -.0002 -.0001  .0029  -.1  -.1  1.5 98: 96
M002 1 GUAM P1 JPL      -.0053  .0017  .0019  .0017  .0006  .0056   .6   .4  1.8 97: 80
M002 1 GUAM P NCL       -.0009  .0003  .0004  .0003  .0002  .0009   .1   .1   .3 97:360
M002 1 GUAM P NOAA      -.0080  .0041 -.0002  .0013 -.0023  .0086   .2  -.7  1.6 97:256
S001 1 GUAB TIE50501     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 GUAB D GRGS       .0064 -.0479  .0049  .0355  .0124 -.0307  1.3   .9 -1.3 96:144
S001 1 GUAB D9 IGN       .0277  .0505 -.0639 -.0573 -.0636 -.0088 -2.2 -3.9  -.4 96:350
S001 1 GUAB C GRIM       .0561  .0122 -.0289 -.0422 -.0190 -.0446 -1.5 -1.5 -1.7 97: 47
S001 1 GUAB C1 CSR       .0126 -.0128  .0070  .0033  .0110 -.0155   .3  1.9 -1.8 97: 33

Velocities
M002 1 GUAM P CODE      -.0052  .0059  .0004 -.0018 -.0014  .0075  -.4  -.4  1.6
M002 1 GUAM P GFZ       -.0018  .0006  .0002  .0006 -.0002  .0018   .2  -.1   .6
M002 1 GUAM P IGS       -.0001 -.0010 -.0003  .0009 -.0002 -.0005   .7  -.3  -.4
M002 1 GUAM P1 JPL       .0036 -.0009 -.0014 -.0014 -.0005 -.0037  -.6  -.6 -1.7
M002 1 GUAM P NCL        .0001 -.0009 -.0003  .0007 -.0001 -.0007   .3  -.1  -.3
M002 1 GUAM P NOAA      -.0015 -.0007 -.0006  .0014 -.0008  .0007   .4  -.3   .2
S001 1 GUAB D GRGS      -.0011 -.0001  .0009  .0007  .0007  .0010   .0   .1   .1
S001 1 GUAB D9 IGN      -.0034 -.0009 -.0014  .0027 -.0019  .0019   .2  -.2   .2
S001 1 GUAB C GRIM       .0016  .0065  .0032 -.0063  .0025  .0031  -.4   .3   .2
S001 1 GUAB C1 CSR      -.0028  .0006 -.0005  .0011 -.0011  .0024   .2  -.3   .5

50503 AMERICAN SAMOA

Positions
M001 1 7096 L4 CSR       .0258 -.0188 -.0351  .0227 -.0396 -.0130   .3  -.4  -.1 80:138

Velocities
M001 1 7096 L4 CSR      -.0050  .0432  .0301 -.0434  .0286 -.0094  -.3   .2   .0

50505 KWAJALEIN ATOLL

Positions
M001 1 7092 TIE50505     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 7092 L4 CSR      -.2582  .0762  .0976 -.0184  .0524  .2809  -.2   .6   .8 80:225
S003 1 4968 TIE50505     .0001  .0001  .0005 -.0001  .0005  .0000   .0   .2   .0 97:  1
S003 1 4968 R GSFC      -.0095  .0041  .0082 -.0020  .0064  .0114  -.3   .6   .6 86:180
S003 1 4968 R SHA       -.0099  .0014  .0127  .0007  .0109  .0120   .1   .6   .6 86:277

Velocities
M001 1 7092 L4 CSR      -.1453  .3133  .2588 -.2743  .2211  .2492  -.8   .8   .5
S003 1 4968 R GSFC       .0000 -.0011  .0003  .0011  .0003 -.0002   .2   .1   .0
S003 1 4968 R SHA        .0001 -.0004 -.0001  .0004 -.0001 -.0002   .1   .0   .0

50506 KWAJALEIN ATOLL

Positions
M001 1 KWJ1 P CODE      -.0071  .0024  .0060 -.0009  .0048  .0083  -.2  1.0  1.2 98: 17
M001 1 KWJ1 P GFZ        .0124 -.0005 -.0020 -.0021 -.0001 -.0124  -.6   .0 -2.1 98:188
M001 1 KWJ1 P IGS       -.0022  .0009  .0007 -.0004  .0003  .0024  -.2   .3   .9 98: 44
M001 1 KWJ1 P1 JPL       .0051 -.0021 -.0010  .0009 -.0002 -.0055   .4  -.1 -1.1 98: 14
M001 1 KWJ1 P NCL       -.0002 -.0007  .0000  .0007  .0000  .0001   .3   .0   .0 98: 92
M001 1 KWJ1 P NOAA      -.0173  .0015 -.0004  .0022 -.0030  .0170   .3  -.8  1.9 97:293

Velocities
M001 1 KWJ1 P CODE      -.0024  .0037 -.0008 -.0031 -.0013  .0029  -.6  -.4   .4
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M001 1 KWJ1 P GFZ       -.0016  .0000 -.0007  .0003 -.0010  .0014   .1  -.7   .5
M001 1 KWJ1 P IGS       -.0002  .0001  .0003 -.0001  .0003  .0003   .0   .3   .1
M001 1 KWJ1 P1 JPL      -.0009  .0004  .0002 -.0002  .0000  .0010  -.1   .0   .2
M001 1 KWJ1 P NCL        .0000 -.0007  .0002  .0007  .0002 -.0002   .3   .1   .0
M001 1 KWJ1 P NOAA       .0005  .0005 -.0007 -.0006 -.0006 -.0005  -.1  -.2  -.1

51001 PORT MORESBY

Positions
S001 1 MORA D GRGS      -.0644 -.0553 -.0018  .0814  .0021  .0242  1.9   .1   .6 94:166
S001 1 MORA D9 IGN       .0484  .0479 -.0745 -.0665 -.0759 -.0024 -1.8 -3.5  -.1 95:241
S001 1 MORA C GRIM       .0208 -.0110 -.0150 -.0020 -.0186 -.0207   .0  -.8  -.5 97:237
S001 1 MORA C1 CSR      -.0003  .0046  .0082 -.0037  .0085  .0013  -.3  1.1   .1 95: 92

Velocities
S001 1 MORA D GRGS      -.0226 -.0150  .0030  .0249  .0047  .0102   .5   .2   .2
S001 1 MORA D9 IGN      -.0057 -.0013 -.0028  .0042 -.0021  .0045   .3  -.2   .3
S001 1 MORA C GRIM      -.0075 -.0041 -.0031  .0075 -.0024  .0046   .4  -.2   .3
S001 1 MORA C1 CSR      -.0005  .0014  .0011 -.0009  .0013  .0010  -.1   .4   .2

66001 MC MURDO

Positions
M003 1 MCM4 P CODE       .0059  .0019  .0131 -.0032 -.0024 -.0140  -.7  -.5 -2.1 97:309
M003 1 MCM4 P GFZ        .0020 -.0054  .0070  .0048 -.0017 -.0075  1.5  -.5 -1.3 98: 94
M003 1 MCM4 P IGS       -.0003 -.0007 -.0021  .0008 -.0004  .0021   .8  -.3   .8 98: 19
M003 1 MCM4 P1 JPL      -.0018  .0022 -.0050 -.0018  .0011  .0053 -1.3   .7  1.2 96:363
M003 1 MCM4 P NCL        .0041 -.0005  .0101 -.0005 -.0019 -.0107  -.1  -.5 -1.7 97: 45
M003 1 MCM4 P NOAA       .0051  .0058  .0143 -.0069 -.0005 -.0148 -1.6  -.1 -2.6 97:245
M003 1 MCM4 P2 IGN      -.0024  .0016 -.0017 -.0009  .0023  .0023  -.3   .7   .3 98:  2
M003 1 MCM4 P SCAR      -.0119  .0077 -.0436 -.0048  .0038  .0454 -1.1   .7  2.8 96:311
S006 1 MCM2 P CODE      -.0052  .0000 -.0142  .0012  .0019  .0150   .0   .0   .2 96:216

Velocities
M003 1 MCM4 P CODE      -.0008  .0023 -.0101 -.0021 -.0009  .0101  -.7  -.3  2.1
M003 1 MCM4 P GFZ        .0009  .0035 -.0105 -.0036 -.0023  .0103 -2.8 -1.4  2.7
M003 1 MCM4 P IGS       -.0001  .0003  .0017 -.0003  .0005 -.0017  -.4   .5  -.7
M003 1 MCM4 P1 JPL      -.0010  .0002 -.0022  .0001  .0005  .0023   .1   .4   .7
M003 1 MCM4 P NCL        .0013 -.0021  .0088  .0017  .0001 -.0089   .6   .0 -1.5
M003 1 MCM4 P NOAA       .0002  .0000  .0030  .0000  .0005 -.0030   .0   .1  -.7
M003 1 MCM4 P2 IGN       .0012 -.0008  .0046  .0005 -.0003 -.0048   .3  -.1 -1.1
M003 1 MCM4 P SCAR       .0012  .0004  .0057 -.0007  .0002 -.0057  -.2   .0  -.5
S006 1 MCM2 P CODE      -.0008  .0023 -.0101 -.0021 -.0009  .0101  -.7  -.3  2.1

66004 MAWSON STATION

Positions
M001 1 MAW1 P CODE       .0041 -.0021  .0092 -.0046  .0035 -.0085  -.8   .5  -.9 99: 59
M001 1 MAW1 P IGS        .0002  .0010  .0011  .0003  .0014 -.0006   .1   .4  -.1  0: 77
M001 1 MAW1 P NOAA      -.0016  .0018  .0063  .0022  .0032 -.0055   .5   .6  -.9 98:339
M001 1 MAW1 P2 IGN       .0002 -.0002 -.0024 -.0003 -.0010  .0022  -.1  -.2   .3 99: 96
M001 1 MAW1 P SCAR       .0007  .0093 -.0092  .0036  .0044  .0118   .7   .6   .9 96:299

Velocities
M001 1 MAW1 P CODE       .0004  .0013  .0008  .0003  .0015 -.0002   .0   .2   .0
M001 1 MAW1 P IGS       -.0001  .0033 -.0033  .0016  .0014  .0042   .6   .3   .5
M001 1 MAW1 P NOAA       .0025  .0036 -.0067 -.0006  .0015  .0078  -.1   .2   .8
M001 1 MAW1 P2 IGN       .0005  .0001 -.0025 -.0003 -.0007  .0025  -.1  -.1   .3
M001 1 MAW1 P SCAR      -.0007  .0011  .0015  .0011  .0012 -.0011   .4   .3  -.2

66005 PALMER STATION

Positions
M001 1 PAL1 P SCAR      -.0021  .0053  .0005  .0004 -.0049 -.0029   .1 -1.0  -.5 96:195
M002 1 PALM P DGFI        .0064 -.0005  .0056  .0055  .0054 -.0037  1.1   .6  -.3  0:323
M002 1 PALM P2 IGN      -.0018 -.0007  .0015 -.0019  .0005 -.0015  -.4   .1  -.1 98:244
M002 1 PALM P SCAR      -.0034  .0032  .0067 -.0017 -.0011 -.0079  -.4  -.2  -.9 98:107

Velocities
M001 1 PAL1 P SCAR      -.0023 -.0018  .0037 -.0028  .0021 -.0030 -1.2   .6  -.7
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M002 1 PALM P DGFI      -.0057  .0079 -.0007 -.0017 -.0090 -.0034  -.1  -.4  -.1
M002 1 PALM P2 IGN      -.0006  .0005 -.0058 -.0003 -.0031  .0049  -.1  -.6   .6
M002 1 PALM P SCAR      -.0011  .0001  .0001 -.0010 -.0004 -.0004  -.2   .0   .0

66006 SYOWA

Positions
S001 1 SYOB TIE66006    -.0127 -.0169  .0128 -.0050 -.0146 -.0193  -.1  -.3  -.4 97:  1
S001 1 SYOB D GRGS       .0078 -.0021 -.0316 -.0066 -.0070  .0312  -.6  -.7  3.0 95:264
S001 1 SYOB D9 IGN       .0211  .0196  .0010  .0017  .0272  .0094   .1  2.0   .6 95:198
S001 1 SYOB C GRIM       .0056  .0006  .0375 -.0031  .0178 -.0333  -.2  1.0 -1.6 93:  1
S001 1 SYOB C1 CSR      -.0091 -.0148 -.0215 -.0056 -.0231  .0142 -1.0 -3.9  1.9 95:302
S002 1 SYOG TIE66006     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 SYOG P GFZ        .0091  .0003 -.0084 -.0055  .0037  .0104  -.9   .5   .7 99:244
S002 1 SYOG P IGS        .0011  .0001  .0000 -.0006  .0008  .0004  -.2   .2   .0  0:147
S002 1 SYOG P NOAA      -.0034  .0017  .0093  .0035  .0019 -.0092   .5   .2  -.8 99:197
S002 1 SYOG P2 IGN      -.0029 -.0039  .0094 -.0012 -.0011 -.0104  -.2  -.1  -.6 99:186
S002 1 SYOG P SCAR       .0026  .0103 -.0136  .0063  .0031  .0157  1.3   .5  1.3 96:242
S003 1 SYPB TIE66006     .0003  .0003 -.0003  .0000  .0003  .0004   .0   .1   .2 97:  1
S003 1 SYPB D9 IGN       .0100  .0164  .0360  .0063  .0299 -.0271   .2   .8  -.7 99:286
S003 1 SYPB C GRIM      -.0155 -.0071  .0170  .0044 -.0093 -.0218   .2  -.4  -.8 98:308
S003 1 SYPB C1 CSR      -.0204 -.0191 -.0103 -.0017 -.0297 -.0004  -.1 -2.1   .0 99:264
S004 1 7342 TIE66006    -.0175  .0013  .0495  .0122  .0059 -.0508   .6   .2 -1.1 97:  1
S004 1 7342 R GSFC       .0122  .0163 -.0216  .0048  .0108  .0273   .3   .7  1.1 99:334

Velocities
S001 1 SYOB D GRGS      -.0040  .0023  .0013  .0043 -.0011 -.0018   .6  -.1  -.2
S001 1 SYOB D9 IGN      -.0026  .0060  .0078  .0063  .0045 -.0066   .7   .5  -.6
S001 1 SYOB C GRIM       .0382 -.0446  .0006 -.0587  .0012 -.0002   .0   .0   .0
S001 1 SYOB C1 CSR      -.0025  .0116  .0024  .0105  .0059 -.0003  2.7  1.4  -.1
S002 1 SYOG P GFZ        .0011  .0007 -.0031 -.0002  .0001  .0033   .0   .0   .6
S002 1 SYOG P IGS       -.0025  .0001  .0023  .0017 -.0009 -.0028   .2  -.1  -.1
S002 1 SYOG P NOAA       .0093  .0022 -.0299 -.0042 -.0027  .0309  -.1   .0   .4
S002 1 SYOG P2 IGN      -.0055 -.0070  .0149 -.0019 -.0028 -.0170  -.1  -.1  -.4
S002 1 SYOG P SCAR      -.0028 -.0009  .0079  .0011  .0003 -.0084   .4   .1 -1.1
S003 1 SYPB D9 IGN       .0152 -.0043  .0272 -.0130  .0181 -.0222  -.1   .2  -.2
S003 1 SYPB C GRIM      -.0061  .0029 -.0019  .0061 -.0033  .0007  1.1  -.6   .1
S003 1 SYPB C1 CSR      -.0221 -.0263 -.0228 -.0062 -.0397  .0091  -.1  -.7   .1
S004 1 7342 R GSFC      -.0276 -.0563 -.0215 -.0258 -.0610 -.0004  -.2  -.4   .0

66007 ROTHERA

Positions
M001 1 ROT1 TIE66007     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 ROT1 P SCAR      -.0019  .0060 -.0001  .0005 -.0058 -.0023   .1 -1.0  -.3 96:108
S001 1 ROTA TIE66007     .0156 -.0210 -.0732  .0066 -.0045  .0773   .1   .0   .8 97:  1
S001 1 ROTA D GRGS       .0098  .0045 -.0006  .0107 -.0007  .0003  1.0  -.1   .0 96: 32
S001 1 ROTA D9 IGN       .0027  .0236 -.0102  .0113 -.0232  .0014   .8 -1.6   .1 96: 70
S001 1 ROTA C1 CSR      -.0004 -.0110  .0052 -.0044  .0113 -.0010 -1.0  2.1  -.2 96:221

Velocities
M001 1 ROT1 P SCAR      -.0015  .0006  .0052 -.0011  .0009 -.0053  -.5   .2  -.8
S001 1 ROTA D GRGS      -.0028 -.0006  .0036 -.0029  .0010 -.0035  -.4   .2  -.5
S001 1 ROTA D9 IGN      -.0008 -.0041  .0017 -.0023  .0039 -.0003  -.3   .6   .0
S001 1 ROTA C1 CSR      -.0009  .0022 -.0024  .0000 -.0031  .0013   .0 -1.2   .5

66008 O'HIGGINS

Positions
M001 1 OHIG TIE66008     .0043  .0011 -.0053  .0042 -.0012  .0053  1.3  -.4  1.7 97:  1
M001 1 OHIG P CODE       .0042  .0045  .0130  .0059  .0044 -.0124  1.0   .7 -1.7 97:359
M001 1 OHIG P GFZ        .0000 -.0007 -.0001 -.0004  .0005  .0003  -.1   .1   .1 98: 79
M001 1 OHIG P IGS       -.0002  .0004  .0014  .0000  .0002 -.0014   .0   .1  -.6 98:126
M001 1 OHIG P1 JPL      -.0039  .0036  .0085 -.0014 -.0008 -.0099  -.7  -.3 -2.7 97:129
M001 1 OHIG P NCL        .0001 -.0003  .0025 -.0001  .0014 -.0021   .0   .4  -.6 98: 29
M001 1 OHIG P NOAA      -.0037  .0069  .0103  .0006 -.0024 -.0127   .1  -.5 -2.3 97:290
M001 1 OHIG P DGFI      -.0002 -.0036 -.0089 -.0021 -.0014  .0093  -.3  -.1   .7 98:245
M001 1 OHIG P2 IGN       .0022 -.0011 -.0053  .0012 -.0005  .0057   .2  -.1   .7 97:264
M001 1 OHIG P SCAR       .0017  .0028 -.0079  .0029 -.0048  .0064   .7  -.8   .9 97:135
M003 1 OHG1 P SCAR      -.0003  .0034 -.0043  .0016 -.0047  .0025   .4  -.9   .4 96:272
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S001 1 7245 TIE66008     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S001 1 7245 R GIUB       .0098 -.0040 -.0244  .0062 -.0033  .0256   .8  -.4  2.2 95: 57
S001 1 7245 R GSFC       .0076 -.0070 -.0215  .0027 -.0007  .0237   .6  -.1  2.8 95:253
S001 1 7245 R SHA        .0101 -.0094 -.0194  .0035  .0032  .0233   .7   .5  2.9 95: 97

Velocities
M001 1 OHIG P CODE       .0024  .0013 -.0018  .0027 -.0006  .0017   .7  -.1   .3
M001 1 OHIG P GFZ        .0022  .0020  .0001  .0029 -.0005 -.0004  1.7  -.2  -.2
M001 1 OHIG P IGS       -.0004 -.0004 -.0012 -.0005 -.0004  .0011  -.4  -.3   .6
M001 1 OHIG P1 JPL      -.0011 -.0004 -.0051 -.0011 -.0025  .0045  -.6 -1.1  1.4
M001 1 OHIG P NCL       -.0013 -.0019 -.0003 -.0021  .0007  .0007  -.7   .2   .2
M001 1 OHIG P NOAA       .0002 -.0025 -.0037 -.0012  .0003  .0043  -.3   .1  1.1
M001 1 OHIG P DGFI      -.0037  .0041  .0041 -.0010 -.0030 -.0061  -.2  -.4  -.5
M001 1 OHIG P2 IGN       .0011 -.0010 -.0020  .0004  .0003  .0024   .1   .1   .4
M001 1 OHIG P SCAR       .0012  .0005  .0028  .0012  .0014 -.0024   .4   .3  -.4
M003 1 OHG1 P SCAR       .0005 -.0012 -.0001 -.0002  .0011  .0007  -.1   .3   .1
S001 1 7245 R GIUB       .0022 -.0027 -.0004  .0004  .0029  .0019   .1   .5   .3
S001 1 7245 R GSFC       .0011 -.0021 -.0021 -.0002  .0012  .0029  -.1   .4   .7
S001 1 7245 R SHA        .0013 -.0021  .0007  .0000  .0025  .0005   .0   .6   .1

66009 SANAE

Positions
M001 1 VESL P CODE       .0031 -.0023  .0140 -.0022  .0075 -.0123  -.3  1.0 -1.2 99:103
M001 1 VESL P GFZ        .0052 -.0005 -.0044 -.0002  .0036  .0058  -.1   .5   .5 99:296
M001 1 VESL P NOAA      -.0042  .0034  .0084  .0032 -.0015 -.0093   .6  -.3 -1.5 99: 90
M001 1 VESL P DGFI       .0100  .0044 -.0144  .0049  .0047  .0167  1.0   .6  1.0  0: 65
M001 1 VESL P2 IGN       .0006 -.0014 -.0053 -.0014 -.0010  .0052  -.4  -.2   .5 98:331
M001 1 VESL P SCAR       .0000  .0073 -.0110  .0073 -.0038  .0103  1.3  -.5   .8 98:192

Velocities
M001 1 VESL P CODE      -.0044  .0061  .0287  .0058  .0046 -.0287   .5   .3 -1.1
M001 1 VESL P GFZ       -.0009 -.0017 -.0004 -.0018 -.0009  .0001 -1.7  -.9   .1
M001 1 VESL P NOAA       .0001  .0047  .0002  .0047 -.0001 -.0002   .8   .0   .0
M001 1 VESL P DGFI      -.0005  .0092 -.0058  .0092 -.0027  .0052  1.0  -.1   .1
M001 1 VESL P2 IGN       .0008  .0042  .0014  .0042  .0010 -.0011  1.3   .2  -.1
M001 1 VESL P SCAR       .0007  .0032  .0035  .0032  .0016 -.0031   .7   .1  -.1

66010 DAVIS

Positions
M001 1 DAV1 P CODE       .0022 -.0008  .0048 -.0023  .0015 -.0045  -.5   .3  -.7 98:  3
M001 1 DAV1 P GFZ       -.0020  .0021 -.0126  .0024 -.0031  .0123   .7  -.8  2.5 98: 74
M001 1 DAV1 P IGS       -.0001 -.0006  .0007  .0000 -.0003 -.0008   .0  -.2  -.4 98:257
M001 1 DAV1 P1 JPL      -.0003 -.0014  .0065  .0000  .0011 -.0065   .0   .4 -1.5 97:126
M001 1 DAV1 P NCL        .0005 -.0015 -.0003 -.0008 -.0014 -.0002  -.3  -.4  -.1 98: 61
M001 1 DAV1 P NOAA      -.0012 -.0015  .0111  .0008  .0024 -.0109   .2   .5 -2.2 97:302
M001 1 DAV1 P2 IGN       .0006 -.0005 -.0008 -.0007 -.0006  .0006  -.2  -.2   .1 99:  2
M001 1 DAV1 P SCAR       .0018  .0072 -.0072 -.0003  .0043  .0095  -.1   .6   .7 96:323

Velocities
M001 1 DAV1 P CODE       .0018  .0010  .0005 -.0016  .0014  .0001  -.5   .4   .0
M001 1 DAV1 P GFZ        .0055  .0009  .0011 -.0052  .0023 -.0003 -3.8  2.0  -.4
M001 1 DAV1 P IGS        .0004  .0014 -.0006 -.0001  .0011  .0011  -.1  1.0   .6
M001 1 DAV1 P1 JPL      -.0014  .0015 -.0044  .0017 -.0005  .0046  1.3  -.3  1.7
M001 1 DAV1 P NCL       -.0003  .0000 -.0038  .0003 -.0014  .0035   .1  -.5  1.1
M001 1 DAV1 P NOAA       .0003  .0026 -.0031  .0002  .0013  .0038   .1   .4  1.1
M001 1 DAV1 P2 IGN       .0004  .0003 -.0031 -.0003 -.0008  .0031  -.1  -.2   .6
M001 1 DAV1 P SCAR      -.0001  .0032 -.0026  .0007  .0019  .0036   .3   .4   .4

66011 CASEY

Positions
M001 1 CAS1 P CODE       .0006 -.0005  .0040 -.0003  .0010 -.0040  -.1   .2  -.6 97:346
M001 1 CAS1 P IGS        .0001 -.0016  .0041  .0005  .0002 -.0044   .5   .1 -2.1 98:177
M001 1 CAS1 P1 JPL      -.0025  .0011 -.0078  .0020 -.0014  .0079   .5  -.3  1.2 98:241
M001 1 CAS1 P NCL       -.0002  .0005 -.0062  .0000 -.0020  .0059   .0  -.6  1.7 98:  4
M001 1 CAS1 P NOAA       .0020 -.0023  .0129 -.0010  .0026 -.0129  -.2   .6 -2.7 97:206
M001 1 CAS1 P2 IGN       .0008  .0012 -.0020 -.0011 -.0001  .0022  -.4   .0   .4 98:295
M001 1 CAS1 P SCAR      -.0002  .0105 -.0172 -.0035  .0021  .0198  -.9   .3  1.9 97: 12
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Velocities
M001 1 CAS1 P CODE       .0019 -.0004  .0037 -.0017  .0005 -.0038  -.6   .2  -.9
M001 1 CAS1 P IGS        .0000  .0015 -.0016 -.0005  .0007  .0021  -.7   .7  1.5
M001 1 CAS1 P1 JPL      -.0003 -.0002  .0020  .0004  .0007 -.0018   .1   .2  -.4
M001 1 CAS1 P NCL       -.0007 -.0009 -.0015  .0009 -.0011  .0011   .4  -.4   .4
M001 1 CAS1 P NOAA       .0001 -.0004  .0035  .0000  .0011 -.0034   .0   .3 -1.0
M001 1 CAS1 P2 IGN       .0005 -.0004 -.0008 -.0004 -.0009  .0005  -.2  -.3   .1
M001 1 CAS1 P SCAR       .0001  .0008 -.0002 -.0004  .0006  .0004  -.1   .1   .1

66012 BASE FREI / GREA

Positions
M001 1 GRW1 P SCAR      -.0024  .0050  .0006  .0005 -.0046 -.0031   .1  -.7  -.4 98:  3

Velocities
M001 1 GRW1 P SCAR      -.0007  .0003  .0002 -.0004 -.0004 -.0005  -.1  -.1  -.1

66015 FERRAZ

Positions
M001 1 FERR P SCAR      -.0029  .0057  .0003  .0005 -.0055 -.0032   .1  -.6  -.3 99: 25

Velocities
M001 1 FERR P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66016 ARCTOWSKI

Positions
M001 1 ARCT P SCAR      -.0029  .0055 -.0001  .0004 -.0055 -.0028   .1  -.6  -.3 99: 20

Velocities
M001 1 ARCT P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66017 BASE ARTIGAS

Positions
M001 1 ART1 P SCAR      -.0019  .0053 -.0006  .0011 -.0052 -.0021   .3  -.9  -.3 97:101

Velocities
M001 1 ART1 P SCAR      -.0007 -.0002  .0010 -.0007  .0003 -.0010  -.3   .1  -.2

66018 BELGRANO

Positions
M001 1 BEL1 P SCAR       .0000  .0062 -.0030  .0051 -.0041  .0022   .8  -.6   .1 95: 30
M002 1 BELG P SCAR      -.0043  .0062  .0037  .0027 -.0061 -.0051   .2  -.3  -.1 98: 34

Velocities
M001 1 BEL1 P SCAR      -.0014  .0001  .0019 -.0008 -.0008 -.0021   .0   .0   .0
M002 1 BELG P SCAR       .0188  .0011 -.0325  .0116  .0076  .0349   .0   .0   .0

66019 DALLMANN

Positions
M001 1 DAL1 P SCAR      -.0018  .0057  .0007  .0014 -.0048 -.0033   .4  -.9  -.5 96:224
M002 1 DALL P SCAR      -.0026  .0049  .0037  .0003 -.0032 -.0058   .1  -.5  -.7 98:146

Velocities
M001 1 DAL1 P SCAR      -.0012  .0001  .0043 -.0009  .0013 -.0041  -.4   .4  -.9
M002 1 DALL P SCAR      -.0010 -.0016 -.0154 -.0017 -.0064  .0141  -.3  -.7  1.0

66021 ELEPHANT ISLAND

Positions
M001 1 ELE1 P SCAR      -.0014  .0054 -.0001  .0019 -.0047 -.0024   .4  -.8  -.3 96:214

Velocities
M001 1 ELE1 P SCAR      -.0012 -.0003  .0026 -.0012  .0009 -.0024  -.4   .2  -.5
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66022 ESPERANZA

Positions
M001 1 ESP1 P SCAR      -.0015  .0054 -.0006  .0017 -.0050 -.0019   .4  -.9  -.3 96:184

Velocities
M001 1 ESP1 P SCAR      -.0011 -.0004  .0024 -.0012  .0009 -.0023  -.4   .2  -.4

66023 FORSTER / Schirm

Positions
M001 1 FOR1 P SCAR      -.0026  .0064 -.0003  .0068 -.0012 -.0001  1.6  -.2   .0 96:350
M002 1 FOR2 P SCAR      -.0007  .0061 -.0020  .0061 -.0001  .0021  1.2   .0   .2 96: 59

Velocities
M001 1 FOR1 P SCAR      -.0023  .0006  .0017  .0010 -.0015 -.0023   .4  -.4  -.3
M002 1 FOR2 P SCAR       .0045  .0024 -.0086  .0014  .0018  .0097   .0   .0   .0

66024 FOSSIL BLUFF

Positions
M001 1 FOS1 P SCAR      -.0018  .0062 -.0005  .0006 -.0062 -.0016   .2 -1.1  -.2 96: 63

Velocities
M001 1 FOS1 P SCAR      -.0012 -.0003  .0024 -.0012  .0007 -.0024  -.5   .2  -.3

66025 HAAG NUNATAK

Positions
M001 1 HAAG P SCAR      -.0019  .0061  .0004 -.0006 -.0061 -.0018  -.2  -.9  -.1 96: 20

Velocities
M001 1 HAAG P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66026 KLIMENT OHRIDSKI

Positions
M001 1 KOH1 P SCAR      -.0034  .0047  .0039 -.0006 -.0034 -.0061  -.1  -.4  -.5 98: 19

Velocities
M001 1 KOH1 P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66027 KOTTAS BERGE

Positions
M001 1 KOTA P SCAR      -.0029  .0060  .0001  .0054 -.0037 -.0011   .6  -.2   .0 98: 25

Velocities
M001 1 KOTA P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66028 MAITRI

Positions
M001 1 MAIT P SCAR      -.0033  .0074  .0015  .0079 -.0011 -.0020  1.4  -.1  -.1 98:179

Velocities
M001 1 MAIT P SCAR       .0091 -.0023  .0060 -.0041  .0100 -.0029  -.7   .7  -.1

66029 MARAMBIO

Positions
M001 1 MAR1 P SCAR      -.0013  .0056 -.0009  .0020 -.0053 -.0015   .5 -1.0  -.2 96:104

Velocities
M001 1 MAR1 P SCAR      -.0011 -.0004  .0025 -.0011  .0009 -.0023  -.4   .2  -.4

66030 ZHONG SHANG

Positions
M001 1 ZHON P SCAR       .0000  .0072 -.0028  .0017  .0056  .0051   .4   .6   .3 97:302
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Velocities
M001 1 ZHON P SCAR      -.0006  .0021 -.0005  .0011  .0016  .0011   .3   .2   .1

66031 NOTTER POINT/ AN

Positions
M001 1 NOT1 P SCAR      -.0015  .0054 -.0003  .0014 -.0050 -.0022   .3  -.9  -.3 96:177

Velocities
M001 1 NOT1 P SCAR      -.0012 -.0004  .0026 -.0012  .0010 -.0025  -.5   .3  -.5

66032 PETER I ISLAND

Positions
M001 1 PET1 P SCAR      -.0036  .0049  .0043 -.0036 -.0030 -.0058  -.7  -.2  -.2 98: 25

Velocities
M001 1 PET1 P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66033 ARTURO PRAT

Positions
M001 1 PRA1 P SCAR      -.0016  .0054 -.0003  .0014 -.0050 -.0022   .3  -.9  -.3 96:181

Velocities
M001 1 PRA1 P SCAR      -.0011 -.0004  .0026 -.0012  .0010 -.0024  -.4   .3  -.5

66034 SAN MARTIN

Positions
M001 1 SMR1 P SCAR      -.0020  .0059 -.0001  .0005 -.0058 -.0022   .1 -1.0  -.2 96:179

Velocities
M001 1 SMR1 P SCAR      -.0012 -.0003  .0026 -.0013  .0008 -.0025  -.5   .2  -.4

66035 PUNTA SPRING - A

Positions
M001 1 SPR1 P SCAR      -.0015  .0055 -.0003  .0013 -.0051 -.0021   .3  -.9  -.3 96:144

Velocities
M001 1 SPR1 P SCAR      -.0012 -.0005  .0027 -.0013  .0010 -.0025  -.5   .3  -.5

66036 TERRA NOVA BAY

Positions
M001 1 TNB1 P SCAR      -.0034  .0060 -.0050 -.0048  .0034  .0061 -1.1   .6   .5 97:174

Velocities
M001 1 TNB1 P SCAR      -.0001  .0005 -.0004 -.0005  .0001  .0004  -.2   .0   .0

66037 TROLL

Positions
M001 1 TROL P SCAR      -.0009  .0054  .0001  .0055 -.0006 -.0003  1.1  -.1   .0 97: 20

Velocities
M001 1 TROL P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66038 VERNADSKI

Positions
M001 1 VER1 P SCAR      -.0036  .0048  .0044 -.0012 -.0035 -.0064  -.2  -.4  -.6 98: 21

Velocities
M001 1 VER1 P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

66039 WASA
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Positions
M001 1 WASA P SCAR      -.0010  .0054 -.0008  .0050 -.0024  .0001   .9  -.3   .0 97: 20

Velocities
M001 1 WASA P SCAR       .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0

82001 ISABELLA

Positions
S003 1 PUR3 P CORS       .0016 -.0009  .0018  .0011  .0012  .0020   .2   .4   .3 98:281

Velocities
S003 1 PUR3 P CORS       .0001 -.0009 -.0002 -.0002 -.0005  .0008   .0  -.1   .1

91201 KERGUELEN

Positions
M002 1 KERG TIE91201     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M002 1 KERG P CODE       .0044  .0053 -.0009 -.0024  .0043  .0049  -.5   .9  1.0 97:323
M002 1 KERG P IGS        .0004  .0010 -.0015 -.0001 -.0002  .0018  -.1  -.1  1.2 98:108
M002 1 KERG P1 JPL      -.0029 -.0060  .0046  .0007 -.0020 -.0078   .2  -.5 -1.9 98:304
M002 1 KERG P NCL        .0009 -.0004 -.0001 -.0010 -.0001  .0000  -.3   .0   .0 97:357
M002 1 KERG P NOAA       .0058  .0002 -.0003 -.0054  .0014  .0016  -.7   .1   .2 99: 31
M002 1 KERG P2 IGN      -.0009 -.0051  .0037 -.0009 -.0015 -.0061  -.2  -.4 -1.5 99: 90
M002 1 KERG P SCAR       .0027  .0058 -.0006 -.0006  .0045  .0046  -.1   .6   .6 96:239
S002 1 KERA TIE91201    -.0001  .0005 -.0010  .0002 -.0003  .0011   .1  -.1   .4 97:  1
S002 1 KERA D GRGS       .0720 -.0377 -.0235 -.0805 -.0238  .0105 -2.4  -.9   .4 94: 35
S002 1 KERA D9 IGN      -.0313  .0153 -.0043  .0346  .0001  .0058  1.0   .0   .2 94: 39
S002 1 KERA C GRIM       .0327 -.0405  .0350 -.0444  .0023 -.0442 -1.0   .1 -1.3 93:  1
S003 1 KERB TIE91201     .0000  .0004 -.0011  .0002 -.0004  .0011   .1  -.2   .5 97:  1
S003 1 KERB D GRGS       .0364 -.0316 -.0170 -.0450 -.0243  .0015 -1.9 -1.4   .1 96:322
S003 1 KERB D9 IGN      -.0557  .0270  .0064  .0616  .0091 -.0006  2.6   .4   .0 97:143
S003 1 KERB C GRIM      -.0054 -.0181  .0193 -.0010 -.0018 -.0269   .0  -.1 -2.1 96:322
S003 1 KERB C1 CSR       .0059  .0057  .0085 -.0036  .0111 -.0016  -.5  1.7  -.3 97:214

Velocities
M002 1 KERG P CODE       .0019 -.0001  .0012 -.0018  .0012 -.0006  -.6   .4  -.2
M002 1 KERG P IGS        .0000  .0002  .0012  .0000  .0009 -.0008   .0   .7  -.6
M002 1 KERG P1 JPL      -.0003  .0018 -.0006  .0009  .0008  .0015   .4   .3   .5
M002 1 KERG P NCL       -.0007 -.0032  .0021 -.0004 -.0011 -.0037  -.2  -.4 -1.4
M002 1 KERG P NOAA       .0007  .0016 -.0007 -.0001  .0009  .0017   .0   .2   .4
M002 1 KERG P2 IGN       .0009  .0018 -.0046 -.0003 -.0015  .0048  -.1  -.3  1.0
M002 1 KERG P SCAR      -.0006  .0025  .0008  .0014  .0022  .0008   .4   .4   .1
S002 1 KERA D GRGS      -.0023  .0081 -.0058  .0049  .0014  .0089   .3   .1   .7
S002 1 KERA D9 IGN      -.0295  .0269  .0012  .0369  .0124  .0091   .7   .3   .2
S002 1 KERA C GRIM       .0876 -.0317 -.0043 -.0931 -.0030  .0030  -.1   .0   .0
S003 1 KERB D GRGS      -.0023  .0081 -.0059  .0049  .0014  .0089   .3   .1   .7
S003 1 KERB D9 IGN       .0041  .0042  .0007 -.0024  .0045  .0029  -.2   .4   .3
S003 1 KERB C GRIM      -.0014 -.0045 -.0159 -.0002 -.0140  .0090   .0 -1.6  1.0
S003 1 KERB C1 CSR      -.0019  .0020  .0009  .0025  .0016  .0001   .6   .4   .0

91401 AMSTERDAM

Positions
S001 1 AMSA D GRGS       .0772 -.0295 -.0181 -.0817 -.0218  .0014 -3.0 -1.3   .1 95:105
S001 1 AMSA D9 IGN      -.0790  .0296  .0145  .0835  .0188  .0005  3.0   .9   .0 95: 50
S001 1 AMSA C GRIM      -.0327 -.0452  .0464  .0222  .0053 -.0689   .3   .1 -1.5 93:  1
S001 1 AMSA C1 CSR       .0049  .0020 -.0041 -.0043 -.0014  .0049  -.4  -.2   .6 95: 66
S002 1 AMSB D GRGS       .0563 -.0133 -.0353 -.0578 -.0284  .0209  -.4  -.3   .2 98:214
S002 1 AMSB D9 IGN      -.0651  .0454  .0244  .0733  .0379  .0091  1.5  1.0   .2 99:196
S002 1 AMSB C GRIM      -.0125 -.0293 -.0351  .0058 -.0469 -.0033   .1 -1.6  -.1 99: 61
S002 1 AMSB C1 CSR       .0127  .0034  .0040 -.0117  .0069  .0023  -.6   .5   .2 99:196

Velocities
S001 1 AMSA D GRGS       .0087 -.0001 -.0076 -.0085 -.0049  .0061  -.4  -.4   .4
S001 1 AMSA D9 IGN       .0006 -.0065  .0023 -.0020 -.0020 -.0063  -.1  -.1  -.3
S001 1 AMSA C GRIM       .1270 -.0398 -.0090 -.1325 -.0142 -.0036  -.1   .0   .0
S001 1 AMSA C1 CSR       .0019 -.0046 -.0005 -.0028 -.0029 -.0029  -.4  -.5  -.5
S002 1 AMSB D GRGS       .0087 -.0001 -.0076 -.0085 -.0049  .0061  -.4  -.3   .4
S002 1 AMSB D9 IGN       .0106 -.0227  .0081 -.0153 -.0058 -.0207  -.1  -.1  -.2
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S002 1 AMSB C GRIM       .0088  .0143 -.0078 -.0055  .0036  .0173  -.2   .2  1.1
S002 1 AMSB C1 CSR       .0045  .0042  .0095 -.0035  .0106 -.0019  -.1   .3   .0

91501 ILE DES PETRELS

Positions
M001 1 DUM1 TIE91501     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M001 1 DUM1 P2 IGN       .0003  .0008 -.0006 -.0008  .0000  .0007  -.3   .0   .1 98:340
M001 1 DUM1 P SCAR      -.0072  .0048 -.0069  .0010  .0052  .0098   .1   .4   .4 95:173
S001 1 ADEA TIE91501    -.0328 -.0126 -.0089  .0307  .0121  .0149  1.0   .4   .5 97:  1
S001 1 ADEA D GRGS      -.0228 -.0089 -.0158  .0215  .0045  .0192  2.2   .5  2.0 95:359
S001 1 ADEA D9 IGN       .0338 -.0095 -.0403 -.0144 -.0453  .0243 -1.1 -3.4  1.7 96: 19
S001 1 ADEA C GRIM      -.0148 -.0085  .0203  .0160  .0134 -.0163  1.9  1.7 -2.5 95:361
S001 1 ADEA C1 CSR       .0093  .0009 -.0066 -.0067 -.0086  .0035 -1.9 -2.3   .9 96:148

Velocities
M001 1 DUM1 P2 IGN       .0027  .0009  .0028 -.0024 -.0002 -.0032  -.7  -.1  -.5
M001 1 DUM1 P SCAR       .0064 -.0044  .0489 -.0008  .0123 -.0479   .0   .4  -.9
S001 1 ADEA D GRGS      -.0050 -.0051  .0045  .0071  .0023 -.0039  1.2   .4  -.7
S001 1 ADEA D9 IGN      -.0074  .0008  .0024  .0042  .0066  .0002   .7  1.1   .0
S001 1 ADEA C GRIM      -.0025 -.0015 -.0005  .0027  .0007  .0008   .7   .2   .2
S001 1 ADEA C1 CSR      -.0041  .0006  .0022  .0022  .0041 -.0006  1.3  2.3  -.3

92201 PAPEETE (TAHITI)

Positions
M003 1 PAMA P CODE       .0155  .0044  .0103  .0041  .0051 -.0180   .4   .6 -1.4 96: 82
M003 1 PAMA P GFZ       -.0181 -.0129 -.0036  .0020  .0033  .0222   .2   .4  1.7 94:344
M003 1 PAMA P IGS        .0032  .0018  .0003  .0001 -.0008 -.0035   .0  -.3  -.7 96:250
M003 1 PAMA P NOAA      -.0082  .0037 -.0075 -.0074 -.0056  .0072  -.6  -.7   .6 96:221
M006 1 TAHI TIE92201     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M006 1 TAHI P CODE      -.0052  .0000  .0032 -.0026  .0044  .0033  -.2   .6   .3 97:297
M006 1 TAHI P GFZ        .0139 -.0007  .0017  .0076 -.0019 -.0116   .7  -.3 -1.0 97:298
M006 1 TAHI P IGS       -.0093 -.0017 -.0026 -.0033  .0002  .0093  -.7   .1  1.8 97:312
M007 1 7124 TIE92201    -.0007  .0038  .0017 -.0036  .0012 -.0018 -1.1   .4  -.6 97:  1
M007 1 7124 L AUS        .0186 -.0140 -.0159  .0215 -.0179 -.0037   .7  -.5  -.1 98: 54
M007 1 7124 L CGS        .0058 -.0133 -.0093  .0144 -.0083  .0045   .8  -.6   .2 98:342
M007 1 7124 L CRL        .0058 -.0156 -.0132  .0164 -.0118  .0067   .8  -.3   .3 98:165
M007 1 7124 L4 CSR       .0113 -.0152 -.0068  .0188 -.0071  .0001   .7  -.4   .0 99: 34
M007 1 7124 L DEOS      -.0003  .0471 -.0170 -.0408 -.0234 -.0174  -.2  -.2  -.1 91:212
M007 1 7124 L DGFI       .0092 -.0164 -.0076  .0188 -.0072  .0027   .7  -.3   .1 98:335
M007 1 7124 L JCET       .1175  .0633  .0510  .0048  .0083 -.1426   .1   .1 -1.6 98:143
M007 1 7124 C1 CSR       .0014 -.0020 -.0011  .0025 -.0011  .0001   .3  -.2   .0 99:  7
M009 1 THTI TIE92201    -.0003  .0008 -.0016 -.0009 -.0016  .0003  -.3  -.5   .1 97:  1
M009 1 THTI P CODE      -.0045 -.0085  .0003  .0050  .0028  .0077   .5   .3   .7 99:251
M009 1 THTI P GFZ        .0065  .0029  .0001  .0008 -.0020 -.0067   .1  -.3  -.7 99:184
M009 1 THTI P IGS       -.0029 -.0024  .0008  .0006  .0019  .0033   .1   .7   .7  0: 46
M009 1 THTI P NOAA      -.0150 -.0008 -.0074 -.0069 -.0030  .0150  -.5  -.3  1.1 99:153
S007 1 PAPB TIE92201    -.0015 -.0024 -.0019  .0013 -.0011  .0030   .4  -.3  1.0 97:  1
S007 1 PAPB D GRGS       .0032  .0289  .0114 -.0233  .0056 -.0200  -.6   .3  -.6 96:170
S007 1 PAPB D9 IGN       .0158  .0078  .0512  .0012  .0435 -.0322   .0  1.7  -.9 96:203
S007 1 PAPB C GRIM       .0327  .0709  .0458 -.0446  .0243 -.0750  -.2   .2  -.4 93:  1
S007 1 PAPB C1 CSR      -.0005  .0384  .0061 -.0333  .0001 -.0200 -2.2   .0 -1.5 96:235
S008 1 PAQB TIE92201    -.0011  .0000 -.0018 -.0006 -.0014  .0014  -.1  -.4   .4 97:  1
S008 1 PAQB D GRGS       .0645 -.0369 -.0396  .0645 -.0489 -.0233   .6  -.8  -.2 98:100
S008 1 PAQB D9 IGN       .0166 -.0172  .0656  .0233  .0608 -.0252   .4  1.7  -.5 99:175
S008 1 PAQB C GRIM       .0598  .1334 -.0036 -.0848 -.0394 -.1124 -1.6 -1.5 -2.5 99: 98
S008 1 PAQB C1 CSR       .0058  .0411  .0122 -.0326  .0038 -.0283 -1.7   .3 -1.7 99:197

Velocities
M003 1 PAMA P CODE      -.0147 -.0012 -.0012 -.0064  .0029  .0130  -.4   .3   .7
M003 1 PAMA P GFZ        .0008 -.0003 -.0007  .0007 -.0008 -.0003   .1  -.3  -.1
M003 1 PAMA P IGS        .0075 -.0096  .0032  .0121  .0026 -.0025   .9   .4  -.2
M003 1 PAMA P NOAA       .0068 -.0027 -.0019  .0058 -.0031 -.0037   .2  -.2  -.1
M006 1 TAHI P CODE      -.0102 -.0144 -.0091  .0073 -.0038  .0180   .3  -.2   .7
M006 1 TAHI P GFZ       -.0007  .0010 -.0007 -.0013 -.0007  .0003 -1.2  -.6   .3
M006 1 TAHI P IGS       -.0150 -.0083 -.0087 -.0004 -.0031  .0190   .0  -.3  1.1
M007 1 7124 L AUS       -.0182  .0291  .0038 -.0343  .0039 -.0003 -1.2   .1   .0
M007 1 7124 L CGS       -.0034 -.0024 -.0039  .0004 -.0024  .0052   .0  -.1   .2
M007 1 7124 L CRL       -.0038 -.0031 -.0002  .0008  .0012  .0047   .1   .1   .3
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M007 1 7124 L4 CSR      -.0055 -.0080 -.0043  .0041 -.0015  .0097   .3  -.1   .6
M007 1 7124 L DEOS       .0005 -.0124  .0001  .0110  .0019  .0056   .4   .1   .2
M007 1 7124 L DGFI       .0039  .0013  .0009  .0009 -.0004 -.0041   .0   .0  -.1
M007 1 7124 L JCET      -.0007  .0041 -.0072 -.0039 -.0073  .0008   .0   .0   .0
M007 1 7124 C1 CSR      -.0040 -.0046 -.0038  .0020 -.0019  .0066   .1  -.2   .4
M009 1 THTI P CODE      -.0102 -.0144 -.0091  .0072 -.0038  .0180   .3  -.2   .7
M009 1 THTI P GFZ       -.0007  .0009 -.0007 -.0012 -.0006  .0003 -1.1  -.6   .3
M009 1 THTI P IGS        .0056 -.0007  .0014  .0034  .0000 -.0047   .5   .0  -.5
M009 1 THTI P NOAA       .0006  .0000 -.0004  .0003 -.0006 -.0004   .0   .0   .0
S007 1 PAPB D GRGS       .0094  .0054 -.0005  .0001 -.0037 -.0102   .0  -.2  -.3
S007 1 PAPB D9 IGN       .0075  .0070 -.0096 -.0022 -.0122 -.0067   .0  -.4  -.2
S007 1 PAPB C GRIM      -.1157  .1718  .0312 -.2067  .0336  .0028  -.1   .0   .0
S007 1 PAPB C1 CSR       .0003  .0144 -.0186 -.0122 -.0200 -.0016  -.6 -1.7  -.1
S008 1 PAQB D GRGS       .0094  .0054 -.0005  .0001 -.0037 -.0102   .0  -.2  -.3
S008 1 PAQB D9 IGN      -.0399 -.0510 -.0221  .0238 -.0029  .0641   .2   .0   .6
S008 1 PAQB C GRIM       .0029 -.0016 -.0068  .0029 -.0070  .0004   .1  -.2   .0
S008 1 PAQB C1 CSR      -.0337 -.0253 -.0138  .0048 -.0005  .0441   .1   .0   .9

92202 HUAHINE ( MOTU H

Positions
M002 1 7121 TIE92202     .0013  .0002  .0002  .0004 -.0001 -.0013   .1   .0  -.4 97:  1
M002 1 7121 L CGS       -.0298 -.0170  .0189  .0004  .0280  .0274   .0  1.8  1.1 85: 26
M002 1 7121 L4 CSR       .0005  .0201  .0059 -.0173  .0027 -.0114  -.3   .1  -.1 85: 53
M002 1 7121 L DEOS      -.0647 -.0508 -.0152  .0131  .0088  .0822   .2   .1  1.1 94:203
M002 1 7121 C GRIM       .0285 -.0173  .0123  .0289  .0070 -.0194   .2   .0  -.1 93:  1
M004 1 7123 TIE92202     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M004 1 7123 L CGS        .0278 -.0606 -.0063  .0665 -.0046  .0066   .8  -.1   .1 97:  1
M004 1 7123 L CRL       -.0073 -.0111  .0018  .0062  .0051  .0108   .4   .4   .6 91:117
M004 1 7123 L4 CSR       .0122  .0051  .0067  .0015  .0026 -.0145   .0   .1  -.2 90:186
M004 1 7123 L DEOS      -.0093 -.0252  .0044  .0175  .0101  .0182   .7   .3   .7 93:  1
M004 1 7123 L DGFI       .0004 -.0065 -.0060  .0059 -.0049  .0044   .3  -.3   .3 91:207
M004 1 7123 C GRIM      -.0063  .0141 -.0079 -.0154 -.0079  .0010  -.2  -.1   .0 93:  1
M004 1 7123 C1 CSR       .0006  .0107 -.0211 -.0091 -.0218  .0006  -.2  -.8   .0 93:213
S009 1 HUAA TIE92202    -.0024 -.0021 -.0011  .0007 -.0002  .0033   .2  -.1  1.0 97:  1
S009 1 HUAA D9 IGN       .0347  .0396  .0445 -.0178  .0284 -.0602  -.4  1.0 -1.4 93:363
S009 1 HUAA C GRIM       .0815  .0155  .0379  .0259  .0136 -.0864   .5   .5 -1.9 93:356
S009 1 HUAA C1 CSR       .0266  .0463  .0033 -.0276 -.0100 -.0447 -1.6 -1.0 -2.8 93:254

Velocities
M002 1 7121 L CGS        .0080 -.0064 -.0025  .0095 -.0036 -.0031   .7  -.3  -.2
M002 1 7121 L4 CSR       .0200 -.0243  .0040  .0310  .0022 -.0066  1.2   .1  -.2
M002 1 7121 L DEOS      -.0022 -.0062 -.0032  .0043 -.0016  .0056   .4  -.2   .7
M002 1 7121 C GRIM      -.1091  .1816  .0330 -.2118  .0338 -.0023  -.1   .0   .0
M004 1 7123 L CGS       -.0432  .0672  .0259 -.0797  .0263 -.0024   .0   .0   .0
M004 1 7123 L CRL        .0025 -.0009 -.0031  .0021 -.0035 -.0008   .2  -.3   .0
M004 1 7123 L4 CSR      -.0024 -.0035 -.0030  .0019 -.0018  .0045   .2  -.2   .4
M004 1 7123 L DEOS      -.0758  .0812  .0848 -.1077  .0890  .0015   .0   .0   .0
M004 1 7123 L DGFI      -.0045  .0004  .0094 -.0025  .0101  .0009  -.2   .7   .1
M004 1 7123 C GRIM      -.1091  .1816  .0330 -.2118  .0338 -.0023  -.1   .0   .0
M004 1 7123 C1 CSR       .0523  .0509  .0421 -.0192  .0200 -.0795  -.1   .1  -.3
S009 1 HUAA D9 IGN      -.0039  .0095  .0015 -.0102  .0011 -.0016  -.1   .0   .0
S009 1 HUAA C GRIM       .0000  .0063  .0033 -.0055  .0022 -.0039  -.2   .1  -.1
S009 1 HUAA C1 CSR      -.0027  .0317 -.0079 -.0290 -.0113 -.0101 -1.0  -.6  -.4

92403 RAPA

Positions
S001 1 RAQB D GRGS      -.0033 -.0339 -.0008  .0256  .0097  .0203   .7   .4   .7 97:220
S001 1 RAQB D9 IGN      -.0168 -.0288  .0265  .0136  .0377  .0147   .3  1.3   .4 97:279
S001 1 RAQB C GRIM       .0075  .0269  .0041 -.0175 -.0065 -.0212  -.6  -.3  -.8 97: 70
S001 1 RAQB C1 CSR      -.0046  .0034 -.0031 -.0054 -.0020  .0030  -.4  -.2   .3 97:269

Velocities
S001 1 RAQB D GRGS       .0072  .0020 -.0039  .0026 -.0067 -.0044   .1  -.3  -.1
S001 1 RAQB D9 IGN       .0022 -.0124  .0046  .0114  .0066  .0027   .3   .3   .1
S001 1 RAQB C GRIM       .0003  .0250 -.0012 -.0201 -.0080 -.0126  -.3  -.2  -.2
S001 1 RAQB C1 CSR       .0056  .0038  .0030  .0001 -.0004 -.0074   .0   .0  -.6

92701 NOUMEA
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Positions
M003 1 NOUM TIE92701     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M003 1 NOUM P CODE      -.0050  .0049  .0011 -.0036  .0032  .0051  -.7   .5   .8 98:324
M003 1 NOUM P GFZ        .0092 -.0005 -.0024 -.0016 -.0056 -.0075  -.3 -1.0 -1.0 99:246
M003 1 NOUM P IGS        .0011 -.0004  .0027  .0001  .0021 -.0021   .1  1.0  -.6 99:166
M003 1 NOUM P NOAA       .0014  .0069 -.0039 -.0071 -.0035  .0017 -1.4  -.8   .3 98:323
S001 1 NOUA TIE92701    -.0024 -.0008  .0041  .0013  .0046  .0004   .4  1.5   .1 97:  1
S001 1 NOUA D GRGS      -.0094  .0605  .0103 -.0566  .0184  .0177 -1.5   .9   .7 96: 23
S001 1 NOUA D9 IGN       .0220  .0223 -.0118 -.0268 -.0170 -.0105  -.9  -.8  -.4 96:262
S001 1 NOUA C GRIM       .0481  .0047  .0079 -.0159 -.0100 -.0453  -.4  -.6 -1.9 97:121
S001 1 NOUA C1 CSR       .0070  .0135 -.0174 -.0148 -.0174  .0033 -1.2 -2.4   .4 96:290

Velocities
M003 1 NOUM P CODE       .0051 -.0009  .0019 -.0003 -.0002 -.0055  -.1   .0  -.7
M003 1 NOUM P GFZ       -.0008 -.0001 -.0020  .0003 -.0016  .0015   .0  -.2   .1
M003 1 NOUM P IGS       -.0002  .0010 -.0016 -.0009 -.0014  .0010  -.5  -.6   .3
M003 1 NOUM P NOAA       .0011  .0015  .0027 -.0017  .0022 -.0017  -.3   .4  -.2
S001 1 NOUA D GRGS      -.0024 -.0053  .0016  .0057  .0018  .0004   .2   .1   .0
S001 1 NOUA D9 IGN      -.0064 -.0007  .0063  .0022  .0081  .0032   .1   .8   .3
S001 1 NOUA C GRIM       .0004  .0001 -.0066 -.0002 -.0062  .0022   .0  -.5   .1
S001 1 NOUA C1 CSR      -.0016  .0005 -.0002 -.0001  .0004  .0016   .0   .1   .4

92722 WANAHAM/ILE LIFO

Positions
S001 1 LIFB D GRGS      -.0304  .0553 -.0067 -.0472  .0085  .0415  -.9   .4  1.2 95:305
S001 1 LIFB D9 IGN       .0078  .0200 -.0304 -.0212 -.0295  .0078  -.1  -.3   .1 97:344
S001 1 LIFB C GRIM       .0061 -.0595  .0065  .0567 -.0007 -.0202  1.0   .0  -.6 96:249

Velocities
S001 1 LIFB D GRGS       .0003  .0179  .0038 -.0176  .0048  .0021  -.4   .3   .1
S001 1 LIFB D9 IGN       .1317 -.0929  .0618  .0615  .0050 -.1612   .1   .0  -.3
S001 1 LIFB C GRIM      -.0055  .0203  .0036 -.0186  .0069  .0080  -.4   .3   .2

92802 TANNA

Positions
S001 1 TANB D GRGS      -.0264  .0696 -.0030 -.0634  .0102  .0377 -1.1   .4  1.0 95:346
S001 1 TANB D9 IGN       .0048  .0084 -.0265 -.0091 -.0261  .0059  -.1  -.3   .0 97:332
S001 1 TANB C GRIM      -.0030 -.0585  .0024  .0581 -.0004 -.0083   .9   .0  -.2 96:323

Velocities
S001 1 TANB D GRGS       .0047  .0271  .0028 -.0275  .0028 -.0005  -.6   .1   .0
S001 1 TANB D9 IGN       .1177 -.0606  .1403  .0377  .0898 -.1666   .0   .2  -.3
S001 1 TANB C GRIM      -.0022  .0291  .0102 -.0282  .0122  .0037  -.4   .4   .1

92901 WALLIS

Positions
S001 1 WALA D GRGS      -.0060 -.0061 -.0231  .0057 -.0210  .0115   .2 -1.3   .5 95:322
S001 1 WALA D9 IGN      -.0394  .0121  .0276 -.0147  .0357  .0311  -.5  2.0  1.2 96:232
S001 1 WALA C GRIM       .0215  .0092  .0033 -.0078 -.0019 -.0223  -.2  -.1 -1.2 96:169
S001 1 WALA C1 CSR      -.0080 -.0092 -.0243  .0087 -.0217  .0139   .1  -.4   .2 96: 54

Velocities
S001 1 WALA D GRGS       .0087 -.0098  .0025  .0104  .0006 -.0084   .5   .1  -.6
S001 1 WALA D9 IGN      -.0070 -.0080  .0019  .0075  .0036  .0069   .5   .4   .6
S001 1 WALA C GRIM       .0006  .0059  .0002 -.0058  .0000 -.0010  -.4   .0  -.1
S001 1 WALA C1 CSR       .0008 -.0075  .0038  .0075  .0037 -.0012   .2   .2   .0

97301 KOUROU

Positions
M210 1 KOUR TIE97301     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
M210 1 KOUR P CODE       .0026 -.0048  .0086 -.0008  .0081  .0062  -.1  1.9  1.0 97: 37
M210 1 KOUR P GFZ       -.0001  .0024 -.0020  .0014 -.0018 -.0022   .3  -.6  -.4 96:177
M210 1 KOUR P IGS        .0018 -.0016  .0014  .0005  .0012  .0024   .2  1.3   .9 98:242
M210 1 KOUR P1 JPL       .0004 -.0001  .0008  .0003  .0008  .0004   .1   .9   .1 95:261
M210 1 KOUR P NCL       -.0017  .0020 -.0011 -.0001 -.0009 -.0027   .0  -.4  -.7 97:288
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M210 1 KOUR P NOAA      -.0004 -.0037  .0024 -.0026  .0022  .0029  -.3   .7   .3 98:190
M210 1 KOUR P DGFI      -.0042 -.0010  .0009 -.0039  .0011 -.0016  -.3   .3  -.1 97:345
M210 1 KOUR P SCAR       .0074 -.0002  .0033  .0058  .0028  .0049   .5   .7   .4 96:267
S004 1 KRUB TIE97301     .0620 -.0305 -.0468  .0308 -.0521  .0575   .6 -1.0  1.1 97:  1
S004 1 KRUB D GRGS      -.0164  .0024 -.0134 -.0115 -.0123 -.0130  -.5 -1.1  -.6 96: 40
S004 1 KRUB D9 IGN      -.0126 -.0449  .0086 -.0373  .0061  .0287 -1.6   .4  1.2 96:186
S004 1 KRUB C GRIM      -.0186  .0251 -.0097  .0005 -.0069 -.0320   .0  -.7 -1.4 96:244
S004 1 KRUB C1 CSR       .0076 -.0011  .0055  .0054  .0049  .0059   .6  1.0   .7 96:265
S005 1 KRUA TIE97301     .0620 -.0305 -.0468  .0308 -.0521  .0574   .6 -1.0  1.1 97:  1

Velocities
M210 1 KOUR P CODE       .0006  .0012 -.0005  .0012 -.0004 -.0006   .2  -.2  -.1
M210 1 KOUR P GFZ        .0016 -.0006  .0001  .0009  .0000  .0014   .4   .0   .5
M210 1 KOUR P IGS       -.0006  .0015  .0013  .0004  .0014 -.0014   .3  2.2  -.8
M210 1 KOUR P1 JPL      -.0014  .0009 -.0011 -.0006 -.0009 -.0016  -.4 -1.9 -1.0
M210 1 KOUR P NCL       -.0004 -.0002  .0003 -.0004  .0003  .0000  -.1   .2   .0
M210 1 KOUR P NOAA       .0015 -.0033  .0012 -.0008  .0009  .0036  -.2   .4   .8
M210 1 KOUR P DGFI       .0011 -.0044 -.0021 -.0018 -.0025  .0040  -.1  -.6   .2
M210 1 KOUR P SCAR      -.0024  .0006  .0001 -.0016  .0002 -.0019  -.2   .1  -.2
S004 1 KRUB D GRGS       .0019  .0031  .0045  .0034  .0046 -.0009   .2   .6  -.1
S004 1 KRUB D9 IGN       .0062 -.0026  .0002  .0034 -.0003  .0059   .3   .0   .5
S004 1 KRUB C GRIM      -.0058 -.0021 -.0002 -.0059 -.0001 -.0019  -.5   .0  -.2
S004 1 KRUB C1 CSR       .0062  .0041  .0029  .0074  .0028  .0007  1.7  1.1   .2

97401 LA REUNION

Positions
S001 1 REUA TIE97401     .0000 -.0001  .0000  .0000  .0000 -.0001   .0   .0   .0 97:  1
S001 1 REUA D GRGS       .0151  .0136  .0109 -.0048  .0173  .0145  -.2  1.3   .7 95:317
S001 1 REUA D9 IGN      -.0654  .0486  .0116  .0814  .0120 -.0013  3.6   .8  -.1 95:259
S001 1 REUA C GRIM      -.0581 -.0119  .0301  .0411  .0126 -.0507   .7   .4 -1.0 93:  1
S001 1 REUA C1 CSR       .0142 -.0102 -.0083 -.0175 -.0078  .0026 -1.9 -1.3   .3 95:281
S002 1 REUB TIE97401     .0000  .0000  .0000  .0000  .0000  .0000   .0   .0   .0 97:  1
S002 1 REUB D GRGS      -.0104  .0157  .0068  .0175  .0090  .0042   .1   .1   .0 98: 32
S002 1 REUB D9 IGN      -.0466  .0360  .0216  .0588  .0213 -.0047  1.2   .6  -.1 99:207
S002 1 REUB C GRIM      -.0116 -.0133 -.0211  .0021 -.0260 -.0087   .0 -1.0  -.2 99: 12
S002 1 REUB C1 CSR       .0189 -.0238  .0028 -.0290 -.0006 -.0093 -1.4   .0  -.5 99:201

Velocities
S001 1 REUA D GRGS       .0033 -.0021 -.0007 -.0039 -.0006  .0004  -.3  -.1   .0
S001 1 REUA D9 IGN       .0001 -.0013  .0033 -.0008  .0027 -.0021  -.1   .3  -.2
S001 1 REUA C GRIM       .1096 -.0702  .0132 -.1301  .0138 -.0011  -.1   .0   .0
S001 1 REUA C1 CSR      -.0019  .0025 -.0018  .0030 -.0013  .0015   .6  -.4   .3
S002 1 REUB D GRGS       .0033 -.0021 -.0007 -.0039 -.0006  .0004  -.3  -.1   .0
S002 1 REUB D9 IGN       .0374  .0059  .0084 -.0275  .0172  .0212  -.2   .2   .2
S002 1 REUB C GRIM       .0137  .0060 -.0073 -.0080 -.0022  .0145  -.5  -.2  1.0
S002 1 REUB C1 CSR       .0346 -.0282  .0082 -.0445  .0063 -.0063  -.8   .2  -.1
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ITRF2000 Workshop Recommendations

Prepared by Jim Ray

The ITRF2000 Workshop was held on 2-3 November 2000 at the Ecole Nationale des Sciences Gographiques (ENSG), a part of the Institut Gographique National (IGN), in Champs-sur-Marne, France. The meeting was organized by the Laboratoire de Recherche en Godsie (LAREG), which hosts the ITRF section for the International Earth Rotation Service. More than 35 researchers from most of the major ITRF contributors attended.

Following opening remarks by Michel Kasser, LAREG Director, and by Claude Boucher, head of the ITRF section, the first day of the workshop was devoted to presentations describing the various solutions which have been contributed to ITRF2000. Of the solutions which have removable constraints and are suitable for the global combination, the following numbers are available: 3 from VLBI, 7 from SLR, 1 from LLR, 6 from GPS global solutions, 2 from DORIS, and 1 from a multi-technique combination. In addition, another 6 GPS solutions are usable directly in the global combination for regional densifications. The remaining GPS densification solutions will be linked to the ITRF2000 in a second step.

The second half of the workshop dealt with reports based on a preliminary analysis of the ITRF2000 data sets. These reports described the characteristics and methodology of the preliminary combination, differences among the submitted solutions, differences compared to ITRF97, problem areas, uncertainties in the methods used by the analysts, an examination of the combination residuals, and questions of datum specification.

The final part of the workshop consisted of a discussion of a set of recommendations, based on the information presented earlier. Those recommendations should be available for presentation at the IERS Directing Board meeting in December 2000. They are summarized below:

- Relative weighting of solutions
  In a report by P. Sillard (IGN), the robustness of applying Helmert weighting to rescale the variance matrices of the submitted solutions was shown to be better when based on the the global combination than on combinations of solutions of the same technique only. It was agreed that the relative weightings should be based on the global combination.
- Editing and outlier detection
  An examination of the preliminary solution residuals shows a number of cases where an individual solution for some particular site differs from the combination by a relatively large amount. It was proposed that an editing criteria be applied to reject observed coordinates with residuals exceeding 4 times their re-scaled errors. All such rejections should be reported so that analysts are aware.

  In addition, any other data problems and significant residuals for local site ties should be reported in the final ITRF2000 report. It is particularly important that information about the local ties is fed back to the station managers.
- Datum: ITRF2000 origin
  It was agreed that the specification of the origin and its linear rate of change be defined by the weighted combination of all the SLR solutions (7).

- Datum: ITRF2000 scale
  It was agreed that the specification of the scale and its linear rate of change be defined by the weighted combination of the all the SLR and VLBI solutions (10).

  There was extended discussion of general relativistic time scales and the scale differences that result using either TDT/TT (terrestrial time) or TCG (geocentric time). G. Petit (BIPM) described the basis for the current IAU/IUGG recommendation to use TCG. However, for the ITRF, the time scale choice is purely a matter of convenience with the only observable consequence being a scale difference of 0.7 ppb. Errors due to adopting the TDT/TT framework enter at the $10^{-}17$ level, about 7 orders of magnitude below the current geodetic capability but only 2 orders below current frequency standards. The TCG frame will be required in the near future by those working on frequency standards under development.

  Nonetheless, despite considerable and enduring confusion on this point, it does not appear that any space geodetic analysis group which contributes to ITRF uses TCG, nor are there any known users who do. Thus, the change made in ITRF94 (and the subsequent related realizations ITRF96 and ITRF97) to shift the global scale by applying an a posteriori rescaling of [1 + (0.6969... ppb)] has resulted in uniform inconsistency with the entire user community, including the IGS and its orbits. Since the effect is small (4.5 mm at the Earth's surface; 18 mm at GPS satellite altitude), this inconsistency has been nearly negligible. However, with ITRF2000 the time scale effect is significant at the level of a few formal sigmas for the global combination and should therefore be considered carefully.

  Based on this discussion, the majority view of the attendees was that ITRF2000 should revert to the conventions of ITRF realizations before ITRF94, consistent with TDT/TT time. All coordinate results should be distributed in this framework and clearly described as such. To satisfy any users needing an ITRF consistent with TCG time, as recommended by the IAU/IUGG, two alternatives were proposed: 1) provide the formulation needed to re-scale the ITRF2000 frame by [1 + (0.6969... ppb)]; or 2) provide a secondary set of coordinates with the re-scaling already applied but only if these are kept in a separate location with very carefully controlled user access.

  Note that a consequence of this change, together with the natural evolution of the contributed data, is that the shift in scale from ITRF97 to ITRF2000 will be about -2 ppb at epoch 2000.

- Datum: ITRF2000 orientation
  In keeping with previous ITRF realizations, it was agreed that the ITRF2000 will be aligned to match ITRF97 in orientation at the reference epoch 1997.0. In performing this alignment only those 64 sites which meet certain quality specifications as described by Z. Altamimi (IGN) will be used. This minimizes potential problems due to spurious site motions and other errors. The criteria for the selected sites (about 60 out of 385 total sites in ITRF2000) are:
  - continuously observed for at least 3 years
  - located away from plate boundaries and deformation zones
  - velocity uncertainty (in the combination) better than 3 mm/y
  - velocity residuals less than 3 mm/y for at least 3 different solutions.

- Datum: ITRF2000 orientation rate
  It could not be completely agreed at the workshop how best to specify the linear rates of change of the orientation angles. Generally, it

is necessary to impose a condition to achieve no net rotation of the global frame with respect to the Earth's crust, as recommended by the IUGG. In the past this was done by minimizing differences with respect to the geological plate model NNR-NUVEL1A. However, deficiencies in this model have been noted in recent years. Other models are being developed which are based on empirical geodetic observations (e.g., APKIM by H. Drewes, DGFI), improved geological models, or combinations of data types.

It was agreed that members of the IERS Working Group on the ITRF Datum, particularly the sub-group on the rotational datum, would work during November 2000 to resolve this question and to develop a consensus on the best method to apply to ITRF2000, recognizing the need to finalize it by the beginning of 2001. The final recommendations should be available for presentation at the IERS Directing Board meeting in December 2000.

Regardless of which model is adopted as the rotation reference for the no-net-rotation condition, this minimal constraint should also be applied using only a suitable subset of sites selected for high quality. The sub-group will also evaluate whether the preliminary set of sites and selection criteria are optimal.

- Densification
  Some additional regional solutions are being sought or considered to inclusion in the final ITRF2000 realization. This is only feasible where data analysis have been performed but exporting of suitable SINEX files has not been done for particular reasons.
- User interface
  It is widely agreed that improved user education and interfaces with the IERS are needed. A complete descriptive report will be prepared for ITRF2000, as has been done with previous realizations. All input solutions and output product files will be made available via the new IERS data base system currently under development.
- IERS Conventions
  Improved interactions of the technique services and their analysis centers are needed with the IERS Conventions in order to ensure the highest level of consistency and understanding. Inputs should be sent to C. Boucher (IGN) for integration.

ITRF2000 JGR Publication

The permisson to reprint the publication

Altamimi, Z., P. Sillard, and C. Boucher, ITRF2000: A new release of the International Terrestrial Reference Frame for earth science applications, *J. Geophys. Res.*, *107*(B10), 2214, doi:10.1029/2001JB000561, 2002.

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ITRF2000: A new release of the International Terrestrial Reference Frame for earth science applications

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[1] For the first time in the history of the International Terrestrial Reference Frame, the ITRF2000 combines unconstrained space geodesy solutions that are free from any tectonic plate motion model. Minimum constraints are applied to these solutions solely in order to define the underlying terrestrial reference frame (TRF). The ITRF2000 origin is defined by the Earth center of mass sensed by satellite laser ranging (SLR) and its scale by SLR and very long baseline interferometry. Its orientation is aligned to the ITRF97 at epoch 1997.0, and its orientation time evolution follows, conventionally, that of the no-net-rotation NNR-NUVEL-1A model. The ITRF2000 orientation and its rate are implemented using a consistent geodetic method, anchored over a selection of ITRF sites of high geodetic quality, ensuring a datum definition at the 1 mm level. This new frame is the most extensive and accurate one ever developed, containing about 800 stations located at about 500 sites, with better distribution over the globe compared to past ITRF versions but still with more site concentration in western Europe and North America. About 50% of station positions are determined to better than 1 cm, and about 100 sites have their velocity estimated to at (or better than) 1 mm/yr level. The ITRF2000 velocity field was used to estimate relative rotation poles for six major tectonic plates that are independent of the TRF orientation rate. A comparison to relative rotation poles of the NUVEL-1A plate motion model shows vector differences ranging between 0.03° and 0.08°/m.y. (equivalent to approximately 1–7 mm/yr over the Earth's surface). ITRF2000 angular velocities for four plates, relative to the Pacific plate, appear to be faster than those predicted by the NUVEL-1A model. The two most populated plates in terms of space geodetic sites, North America and Eurasia, exhibit a relative Euler rotation pole of about 0.056 (±0.005)°/m.y. faster than the pole predicted by NUVEL-1A and located about (10°N, 7°E) more to the northwest, compared to that model. *INDEX TERMS:* 1709 History of Geophysics: Geodesy; 8155 Tectonophysics: Plate motions—general; 1229 Geodesy and Gravity: Reference systems; 1247 Geodesy and Gravity: Terrestrial reference systems; *KEYWORDS:* reference systems and frames, terrestrial reference systems and frames, tectonic plate motion, ITRF

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1. Introduction

[2] One of the ultimate goals of space geodesy is to estimate point positions on the Earth surface as accurately as possible. Meanwhile, point positions are neither observable nor absolute quantities and then have to be determined with respect to some reference. We refer to "terrestrial reference system" (TRS) as the mathematical object satisfying an ideal definition and in which point positions will be expressed. Nevertheless, the access to point positions requires some observational means allowing their link to the mathematical object. We therefore call a "terrestrial reference frame" (TRF), a physical materialization of the TRS, making use of observations derived from space geodesy techniques.

[3] The distinction between "system" and "frame" is then subtle since the former is rather invariable and inaccessible while the latter is accessible and perfectible. The general concepts of reference systems and frames have been extensively discussed in the 1980s within the astronomical and geodetic communities [*Kovalevsky et al.*, 1989]. They are largely described by *Boucher* [2000]. The use of space geodesy techniques since the 1980s has deeply improved positioning over the Earth's surface: The uncertainties initially of decimetric level are now of centimetric, even millimetric level.

[4] Nevertheless, each technique and each data analysis define and realize its own TRS. Therefore a multitude of TRF could exist, having systematic differences and bias

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when one is compared to another. This fact led the International Union of Geodesy and Geophysics (IUGG) and the International Association of Geodesy (IAG) to adopt a unique TRS, called the International Terrestrial Reference System (ITRS) for all Earth science applications [*Geodesist's Handbook*, 1992]. For the general description of the ITRS, see *McCarthy* [1996]. The ITRS origin is defined by the center of mass of the whole Earth, including oceans and the atmosphere. Its unit of length is the meter (SI) so that this scale is consistent with the geocentric coordinate time (TCG), in agreement with IAU/IUGG resolutions (1991), see the appendix of *McCarthy* [1992]. The use of TCG ensures that all physical quantities take the same value in the terrestrial coordinate system as in the barycentric system (or in any other planetocentric system). The mean rate of the coordinate time TCG coincides with the mean rate of the proper time of an observer situated at the geocenter (with the Earth removed), whereas the mean rate of the terrestrial time (TT) coincides with the mean rate of the proper time of an observer situated on the geoid [*Petit*, 2000]. The two timescales differ in rate by ($TCG - TT \approx 0.7 \times 10^{-9}$). Its orientation is consistent with that of the Bureau International de l'Heure (BIH) at 1984.0. Its orientation time evolution is ensured by a no-net-rotation condition with regards to horizontal tectonic motions over the whole Earth.

[5] The basic idea of ITRF is to combine station positions (and velocities) computed by various analysis centers, using observations of space geodesy techniques, such as very long baseline interferometry (VLBI), lunar and satellite laser ranging (LLR and SLR), Global Positioning System (GPS), and Doppler Orbitography Radiopositionning Integrated by Satellite (DORIS). The combination method has proved its efficiency to produce a global reference frame which benefits from the strengths of all these different techniques.

[6] The history of ITRF goes back to 1984, when for the first time a combined TRF (called BTS84), was established using station coordinates derived from VLBI, LLR, SLR, and Doppler/TRANSIT (the predecessor of GPS) observations [*Boucher and Altamimi*, 1985]. BTS84 was realized in the framework of the activities of BIH, being a coordinating center for the international project called Monitoring of Earth Rotation and Intercomparison of Techniques (MERIT) [*Wilkins*, 1989]. Three other successive BTS realizations were then achieved, ending with BTS87 [see *Observatoire de Paris*, 1986, 1987, 1988], when in 1988, the IERS was created by the IUGG and the International Astronomical Union (IAU).

[7] Since the first ITRS realization, namely, ITRF88, eight other ITRF versions were established and published, each of which superseded and replaced its predecessor. Substantial improvements have since been constantly made in the data analysis strategy to achieve optimal combination for ITRF generation [*Altamimi et al.*, 1993; *Boucher and Altamimi*, 1993, 1996; *Sillard et al.*, 1998].

[8] As the ITRF solutions are widely used in geodetic and geophysical applications, the ITRF2000 is intended to be an improved frame in terms of quality, network and datum definition. The ITRF2000 solution reflects the actual quality of space geodesy solutions, being free from any external constraints. It includes primary core stations observed by VLBI, LLR, SLR, GPS, and DORIS (usually used in previous ITRF versions) as well as regional GPS networks for its densification. To ensure its time evolution stability, the ITRF2000 orientation rate has been implemented on a selection of high quality geodetic sites. (All ITRF2000 results and related files are available at http://lareg.ensg.ign.fr/ITRF/ITRF2000.)

2. ITRF2000 Input Data

2.1. Space Geodesy Solutions

[9] In order to facilitate the exchange of space geodesy results between analysis centers and research groups, a well-documented and flexible format was necessary. A working group was formed in 1994 by the International GPS Service (IGS), involving ITRF section, to establish such a format. The SINEX acronym (Software Independent Exchange) was suggested by *Blewitt et al.* [1994], and the first versions, 0.04, 0.05, and 1.00 evolved from the work and contributions of the SINEX Working Group chaired by G. Blewitt. The SINEX format was then born and widely used by all IGS and IERS analysis centers. SINEX format, by its structure, is designed to contain estimated parameters such as station positions, velocities, Earth orientation parameters, and estimated and a priori (constraint) matrices.

[10] From the beginning of the ITRF2000 project, the IERS analysis centers were encouraged and assisted to provide TRF solutions without any external constraint that would disturb their results. The rationale behind this goal is to try to assess the real quality of station positions and velocities provided by space geodesy techniques. The submitted geodetic solutions incorporated in the ITRF2000 combination are of three types, according to the initial constraints applied upon all or a subset of stations: (1) removable constraints, solutions for which the estimated station positions/velocities are constrained to external values within an uncertainty $\sigma \approx 10^{-5}$ m for positions and m/yr for velocities; this type of constraints is easily removable as described in Appendix A; (2) loose constraints, solutions where the uncertainty applied to the constraints is $\sigma \geq 1$ m for positions and $\geq$10 cm/yr for velocities; and (3) minimum constraints used solely to define the TRF using a minimum amount of required information, in a similar approach to the one described in Appendix A.

[11] These solutions are basically station positions and velocities with full variance matrices provided in SINEX format. These data are listed in Table 1, where for each solution the type of constraints, loose, removable, or minimum, is indicated. Observations used in these solutions span about 20 years for pioneering space geodesy techniques (LLR, VLBI, SLR) and approximately 10 years for GPS and DORIS techniques.

2.2. Local Surveys in Collocation Sites

[12] When combining TRF solutions provided by different techniques, it is essential to have sufficient collocation sites. A collocation site is defined by the fact that two or more space geodesy instruments are occupying simultaneously or subsequently very close locations which are very precisely surveyed in three dimensions, using classical surveys or the GPS technique. Classical surveys are usually direction angles, distances, and spirit leveling measurements between instrument reference points or geodetic markers. Adjustments of local surveys are performed by national

Table 1. Individual TRF Solutions Used in the ITRF2000 Combination

Analysis Center (AC)	AC TRF	Data Span	Stn.[a]	C[b]	σ_s[c]	σ_s[d]
VLBI						
Geodetic Institute of Bonn University (GIUB)	00 R 01	84–99	51	L	3.718	3.663
Goddard Space Flight Center (GSFC)	00 R 01	79–99	130	L	2.558	1.684
Shanghai Astronomical Observatory (SHA)	00 R 01	79–99	127	L	2.372	1.742
LLR						
Forschungseinrichtung Satellitengeodaesie (FSG)	00 M 01	77–00	3	L	2.979	
SLR						
Australian Surveying and Land Information Group (AUS)	00 L 01	92–00	55	L	0.056	0.057
Centro Geodesia Spaziale, Matera (CGS)	00 L 01	84–99	94	L	5.576	5.506
Communications Research Laboratory (CRL)	00 L 02	90–00	60	L	2.748	2.521
Center for Space Research (CSR)	00 L 04	76–00	139	L	3.098	2.798
Delft Ins. Earth Oriented Space Research (DEOS)	00 L 01	83–99	91	L	7.026	6.193
Deutsches Geodädtisches Forschungsinstitut (DGFI)	00 L 01	90–00	43	R	15.393	13.690
Joint Center for Earth System Technology, GSFC (JCET)	00 L 05	93–00	48	L	8.103	8.165
GPS						
Center for Orbit Determination in Europe (CODE)	00 P 03	93–00	160	M	78.088	65.852
GeoForschungsZentrum Potsdam (GFZ)	00 P 01	93–00	98	M	0.328	0.304
International GPS Service by Natural Resources Canada (IGS)	00 P 46	96–00	179	M	1.095	0.921
Jet Propulsion Laboratory (JPL)	00 P 01	91–99	112	M	8.847	7.663
Univ of Newcastle upon Tyne (NCL)	00 P 01	95–99	90	M	3.392	3.222
NOAA, National Geodetic Survey (NOAA)	00 P 01	94–00	165	R	58.908	56.640
DORIS						
Groupe de Recherche de Geodesie Spatiale (GRGS)	00 D 01	93–00	66	L	3.498	3.517
Institut Géographique National (IGN)	00 D 09	92–00	80	M	10.384	10.507
Multitechnique						
GRIM5 (GRGS+GFZ): SLR + DORIS + PRARE (GRIM)	00 C 01	85–99	183	L	1.418	1.841
CSR: SLR + DORIS on TOPEX (CSR)	00 C 01	93–00	147	L	4.409	4.119
GPS densification						
CORS Network by NOAA (CORS)	00 P 01	94–99	80	R	57.233	48.287
South America network by Deutsches Geodädtisches Forschungsinstitut (DGFI)	00 P 01	96–00	31	L	116.539	122.005
IAG Subcommission for Europe (EUREF) by Bundesamt für Kartographie und Geodaesie (EUR)	00 P 03	96–00	81	M	9.608	8.607
Geophysical Institute, University of Alaska (GIA)	00 P 01	96–99	20	M	6.412	6.450
Institut Géographique National (IGN)	00 P 01	98–00	28	M	4.677	4.705
Antartica network by Institut Géographique National (IGN)	00 P 02	95–00	17	M	4.266	4.058
Jet Propulsion Laboratory (JPL)	00 P 02	91–99	28	M	14.928	12.856
REGAL Network, France (REGAL)	00 P 03	96–00	29	M	10.131	8.943
Antarctica SCAR network by Institut für Planetare Geodaesie, TU Dresden (SCAR)	00 P 02	95–99	66	R	89.690	84.192

[a] Number of stations in each solution.
[b] Type of constraints applied by the individual analysis centers: L, loose; R, removable; M, minimum.
[c] The σ_s^1 is the square root of the estimated variance factor (see equation (A16)) resulting from the ITRF2000 combination.
[d] The σ_s^2 is the square root of the estimated variance factor resulting from the per-technique combinations.

geodetic agencies operating space geodesy instruments to provide differential coordinates (local ties) connecting the collocated instruments.

[13] Collocation sites represent a key element of the ITRF combination, connecting the individual TRF networks together. In addition to space geodesy solutions listed in Table 1, local ties between collocated stations are introduced in the combination with proper variances. They were collected since the beginning of ITRF activities from different sources; see, for instance, *Boucher et al.* [1999].

[14] The procedure adopted for ITRF2000 combination is to include local ties as independent solutions per site with full variance matrices using SINEX format. Unfortunately, local tie SINEX files were submitted to ITRF section by only one group, e.g., The Australian Surveying and Land Information Group (AUSLIG) for all the Australian collocation sites. Consequently, the other local ties used in the ITRF2000 combination were first converted into a complete set of positions for each site, provided in SINEX format. This has been achieved by solving for the following system of observation equations:

$$\begin{pmatrix} \Delta x_s^{i,j} \\ \Delta y_s^{i,j} \\ \Delta z_s^{i,j} \end{pmatrix} = \begin{pmatrix} x^j - x^i \\ y^j - y^i \\ z^j - z^i \end{pmatrix}, \quad (1)$$

where $(\Delta x_s^{i,j}, \Delta y_s^{i,j}, \Delta z_s^{i,j})$ are the geocentric components of the tie vector linking two points i and j, of a given data set s. The standard deviations (SD) $(\sigma\Delta x_s^{i,j}, \sigma\Delta y_s^{i,j}, \sigma\Delta z_s^{i,j})$ for each local tie vector are used to compute a diagonal variance matrix. If these SD are not available, they are computed by

$$\sigma_{\text{computed}} = \sqrt{\sigma_1^2 + \sigma_2^2}, \quad (2)$$

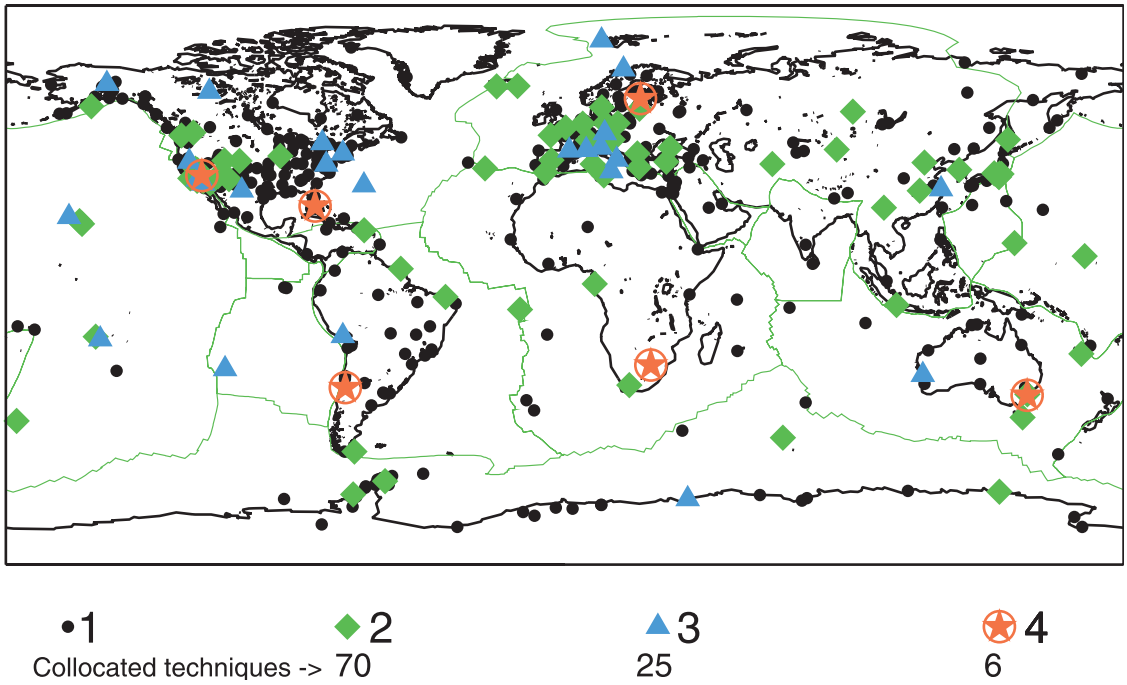

Figure 1. ITRF2000 Network and number of sites with collocated techniques.

where $\sigma_1 = 3$ mm and

$$\sigma_2 = 10^{-6} \times \sqrt{(\Delta x_s^{i,j})^2 + (\Delta y_s^{i,j})^2 + (\Delta z_s^{i,j})^2}$$

The equation system (1) needs, of course, initial coordinates for one point per tie vector set s, which are taken from ITRF solutions. Figure 1 shows the coverage of the ITRF2000 network, highlighting the sites with collocated techniques.

3. ITRF2000 Data Analysis

[15] Major innovations are implemented to enhance and to improve the ITRF2000 combined solution, e.g., (1) unconstrained individual solutions are used and to which minimim constraints are added in order to accurately define the underlying TRF in origin, scale, orientation and time evolution; (2) the ITRF2000 origin is defined by the center of mass as sensed by SLR; and (3) in order to achieve better definition of its orientation time evolution, this latter is established upon a selection of sites of high geodetic quality.

[16] The ITRF2000 analysis strategy is a collection of procedures and algorithms implemented in CATREF software. The basic equations used in the different CATREF modules are given in Appendix A.

[17] The following steps were followed to generate the ITRF2000 combined solution:

1. The constraints of the originally constrained solutions were removed and minimum constraints were applied, using equations (A12), (A13), and (A14). Similar approach of constraint handling is used by [*Davies and Blewitt*, 2000]. For more details about minimum constraints, see [*Sillard and Boucher*, 2001].
2. Minimum constraints were added to loosely constrained solutions, using equation (A15).
3. Solutions where analysis centers already applied minimum constraints were used as they are.
4. For each individual solution, station positions were propagated to epochs of minimal position variances (EMPV), using equations (A20), (A21), and (A22). In order to assess the relative qualities of the individual solutions used in the ITRF combination, we compute the commonly known weighted root mean scatter (WRMS) per solution based on the postfit residuals. The experience showed that the computed EMPV, at which the residuals are computed, corresponds approximately to the central epoch of observations of each station. Therefore, propagating station positions at their EMPV's ensures a more "realistic" WRMS evaluation, in positions, for each individual solution.
5. Individual solutions were analyzed, by comparisons and combinations within each technique for quality control and consistency evaluation.
6. All individual solutions together with local ties were finally combined, using the physical model described in Appendix A: equations (A9), (A10), and (A11).

[18] The last step is in fact the most critical one and includes a first run, variance factor estimation, subsequent iterations as well as outlier rejections. In the first run, a preliminary variance factor (σ_s^2, as given by equation (A16)) is estimated for each individual solution. The individual solutions are then weighted by the variance factors estimated in the first run (used as multiplicative factors of the individual variance matrices) and the combination is iterated. Inspection of postfit residuals is then performed for outlier rejections: A station is rejected if any position or velocity component exhibits a residual exceeding a certain chosen threshold. For the ITRF2000 solution it was decided to reject stations having a position or velocity normalized residual (raw residual divided by its observation a priori

error) exceeding a threshold of 4. Note that in each iteration, new individual variance factors are estimated which are then used to rescale the individual matrices for the next iteration. Outlier rejections are also operated before the next iteration. The combination is repeated until the individual variance factors as well as the variance factor of the global combination converge to unity and outlier rejections are no longer needed. This iterative process allows a refined estimation of variance factors, free from outlier influence, to the level of the chosen threshold.

[19] Five iterations were necessary to produce the final robust and refined ITRF2000 solution. The outlier rejections represent about 1% of the total data included in the ITRF2000 combination. The final estimated individual variance factors are listed in Table 1.

[20] The method used for variance component estimation described in Appendix A (section A5) shows that the more solutions included in the combination the better estimation of variance factors is obtained and the lesser number of iterations is needed. For more details concerning constraint handling and ITRF analysis strategy, see *Altamimi et al.* [2002].

4. Datum Definition

[21] From a geodetic point of view, a TRS realization through a TRF, requires 14 parameters: three translations (origin), one scale factor, three rotations (orientation) and the seven corresponding rates. Given the fact that the 14 parameters should be viewed as relative values between two TRFs, their selection should correspond to the adopted TRS definition that one wants to satisfy. However, space geodesy observations do not carry all the necessary information to completely realize a TRS. While satellite techniques are sensitive to the Earth center of mass (a natural TRF origin), VLBI is not (whose TRF origin is arbitrary defined through some constraints); the scale is dependent on the modelling of some physical parameters; and the TRF orientation (unobservable by any technique) is arbitrary or conventionally defined, through specific constraints.

[22] The Earth center of mass is the point with respect to which the orbit of dynamical techniques (LLR, SLR, GPS, DORIS) is referred. However, the center of mass is affected by various geodynamic processes of mass redistribution in the Earth interior and surface envelopes [*Barkin*, 1999], causing time variations of its position with respect to the Earth surface. In other words, the geocentric motion of the tracking stations due to this effect, is known as "geocenter motion" and likely involves periodic and secular components. Presently, most of the analysis centers do not explicitly include this effect in their models. Therefore the origin of the resulting TRF coincides in practice with the position of the center of mass averaged over the period of the used observations. In practice, the dynamical techniques have currently limited abilities to accurately measure the geocenter motion [*Ray*, 1999]. For more details on the geocenter motion and variation, see, for instance, *Watkins and Eanes* [1997], *Greff-Lefftz* [2000], *Chen et al.* [1999], and *Dong et al.* [1997].

[23] When generating a combined TRF (such as the ITRF), different options could be adopted to specify explicitly the 14 datum parameters. While the seven parameters should be selected at a given epoch, the selection of scale and translation rates depends on the significance of the relative rates of the individual TRFs included in the combination.

[24] The translation rates between satellite TRFs are heavily dependent on the network configuration, the orbit and the used observations. They may also be affected by the geocenter secular motion. The scale rate is influenced by station vertical motions and other modelling such as the troposphere, as well as technique-specific effects, such as VLBI, GPS, and DORIS antenna-related effects, and SLR station-dependent ranging biases. The orientation rate, although it could be arbitrarily chosen, should have a geophysical meaning due to tectonic plate motions.

[25] Therefore a TRS realization should take into account motions and deformations of the Earth's crust, simply because space geodesy observing sites are located on that deforming crust. Meanwhile, since space geodesy techniques make use of positions and/or motions of space objects, such as satellites and extra-galactic radio-sources in case of VLBI, consistency between Celestial Reference Frame (CRF), TRF, and EOP (connecting the two frames) should naturally be ensured for each individual (technique) TRS realization. Therefore the ITRF, being one of the three IERS global references, should be consistent with the ICRF and EOP series.

[26] Moreover, fundamental equations of Earth rotation theory are all related to a coordinate system in which any motion or deformation of the Earth does not contribute to its net angular momentum [*Munk and MacDonald*, 1973; *Kinoshita and Sasao*, 1989]. To achieve this goal, a generally accepted approach is the use of the Tisserand system of mean axes defined by minimizing the kinetic energy given by

$$T = \frac{1}{2}\int_C V^2 dm, \tag{3}$$

where dm is a mass element and V is its velocity. The most intuitive choice of the integration domain C is the Earth's crust since, as it has already been mentioned, it "carries" our geodetic observing sites and the signals of its motion and deformation are contained in the observations.

[27] One of the goals of defining a minimal kinetic energy T on the crust is to minimize its global motion that would affect the EOP. Meanwhile, deeper geodynamic processes such as mantle convection and the core–mantle boundary will still influence the Earth rotation. Minimizing T leads to null linear p and angular h momentums [see *Boucher*, 1989]:

$$p = \int_C V dm = 0 \tag{4}$$

$$h = \int_C X \times V dm = 0, \tag{5}$$

where X is the dm position vector.

[28] Equations (4) and (5) theoretically define the TRF translation and rotation rates, respectively. The scale rate, although it is not foreseen in this approach, corresponds to a physical quantity estimated by space geodesy techniques.

[29] Given the fact that satellite (dynamical) techniques estimate the geocenter motion, and so station positions are referred to the center of mass as a natural TRF origin, equation (4) is no longer needed. Meanwhile, equation (5) represents the definition of the no-net-rotation (NNR) condition over the crust.

[30] A rigorous application of equation (5) requires knowledge of the crust density as well as its thickness which may vary spatially, especially between oceans and continents. However, a difficulty occurs when one wants to evaluate the integral of equation (5). A summation is then used instead, over a certain number of observing stations or tectonic plates representing the lithosphere. Each one of these two possibilities (stations or plates) leads to a different implementation of the NNR condition.

[31] The approach of applying the NNR condition over observing stations requires careful investigation. The implied stations should satisfy minimum criteria, such as having a long enough observing period (say at least three years) and being distributed optimally over the whole Earth's surface. Moreover, the use of equation (5) in this approach needs objective selection (or delimitation) of each area element associated with each station which should take its geophysical environment into account.

4.1. Background of ITRF Datum Definition

[32] Since the ITRF94, we have started to use full variance matrices of the individual solutions incorporated in the global combination. At that time, the ITRF94 datum was achieved as follows [*Boucher et al.*, 1996]: (1) the origin (the three translation components), by a weighted mean of some SLR and GPS solutions; (2) the scale, by a weighted mean of VLBI, SLR and GPS solutions, corrected by 0.7 ppb to meet the IUGG and IAU requirement to be in TCG (geocentric coordinate time) time frame instead of TT (terrestrial time) used by the analysis centers; (3) the orientation was aligned to the ITRF92 [*Boucher et al.*, 1993]; and (4) the time evolution was ensured by aligning the ITRF94 velocity field to the model NNR-NUVEL-1A (adapted from NNR-NUVEL-1 [*Argus and Gordon*, 1991], according to *DeMets et al.* [1994]) over the seven rates of the transformation parameters.

[33] The ITRF96 was then aligned to the ITRF94, and the ITRF97 was aligned to the ITRF96 using the 14 transformation parameters [*Boucher et al.*, 1998, 1999]. Analysis of the individual solutions submitted to the ITRF2000 reveals that the ITRF97 exhibits a Z translation (and rate) with respect to most of the SLR solutions, as well as a scale factor.

[34] It then became necessary to define the ITRF2000 datum to agree with the updated space geodesy data, and it was thus decided to adopt the following datum definition:

1. The scale and its rate are defined by a weighted average of VLBI and the most consistent SLR solutions. Unlike the ITRF97 scale expressed in TCG-frame, that of the ITRF2000 is expressed in TT-frame, following the recommendations of the ITRF2000 Workshop (November 2000). This decision was adopted in order to satisfy space geodetic analysis centers contributed to ITRF2000 who use a time scale consistent with TT-frame.
2. The translations and their rates are defined by a weighted average of the most consistent SLR solutions.
3. The orientation is aligned to that of ITRF97 at epoch 1997.0 and its rate to be such that there is no-net-rotation rate with respect to NNR-NUVEL-1A. Note that the orientation as well as its rate are defined upon a selection of ITRF sites with high geodetic quality, satisfying the following criteria: (1) continuously observed during at least 3 years; (2) located on rigid parts of tectonic plates and far away from deforming zones; and (3) velocity formal error (as result of the ITRF 2000 combination) less than 3 mm/yr; and (4) velocity residuals less than 3 mm/yr for at least three different solutions;

[35] On the basis of the ITRF2000 analysis, sites selection (one point per site) was performed using the above criteria yielding 96 sites satisfying criteria 1, 3, and 4. In sites having more than one station, the priority is given to the station satisfying best criterion 3 and (if they are of the same quality) then to station with longer observation period. Note that none of the DORIS stations satisfies the above criteria. Assignment of sites to rigid tectonic plates and deforming zones was then performed with the help of D. F. Argus (following *Argus and Gordon* [1996]), providing 55 sites on rigid plates and 41 sites on deforming zones, listed in Table 2. In Table 2, sites are ordered within each plate by increasing east longitude. The 41 sites located on deforming zones were obviously not used in the orientation definition. From the 55 sites on rigid plates, only 50 sites were used, the remaining five sites being rejected for the following reasons:

1. Bahrein (Arabian plate) and Easter Island (Nazca plate) are found to have estimated ITRF2000 velocities which disagree with NNR-NUVEL-1A by about 6 and 10 mm/yr, respectively.
2. Tromso (Eurasian plate) and Flin-Flon (North American plate) show about 2 mm/yr postfit residual after NNR absolute rotation pole estimation.
3. Richmond site (United States), having more than 8 years of VLBI observations, exhibits about 15 mm position discrepancy between ITRF2000 and ITRF97 estimates due to imprecise local ties deweighted in ITRF2000 and not in ITRF97. Including this site in the core list would bias the ITRF2000/ ITRF97 orientation alignment at epoch 1997.0.

[36] Consequently, only 50 "core" sites on rigid plates were used in the ITRF2000 orientation and rate definition, shown on Figure 2.

4.2. Implementation of the ITRF2000 Datum

[37] When combining individual solutions using a physical model such as the one implemented in CATREF software and briefly described in Appendix A (equations (A9), (A10), and (A11)), the combined frame has to be defined by specifying the 14 parameters corresponding to the datum definition. Equivalently, the normal matrix, constructed by accumulating normal equations (equation (A10)-type) of the individual solutions, has a rank deficiency corresponding to the 14 transformation parameters.

[38] There are several ways to define the TRF datum in the combination model. A very simple case is to fix given values (e.g., zeros) to the 14 parameters of one solution among those included in the combination. In contrast, the implementation of the ITRF2000 datum was achieved as

Table 2. High-Quality Geodetic ITRF2000 Sites

Domes	Code[a]	Name	T[b]	Plate	λ, deg	ϕ, deg
		Sites on Rigid Plates				
31303M002	MASP	MasPalomas	P	AFRC	344.367	27.764
91201M002	KERG	Kerguelen	P	ANTA	70.256	−49.351
66010M001	DAV1	Davis	P	ANTA	77.973	−68.577
66011M001	CAS1	Casey	P	ANTA	110.520	−66.283
66001M003	MCMU	McMurdo	P	ANTA	166.669	−77.838
24901M002	BAHR	Bahrein	P	ARAB	50.608	26.209
50107M001	7090	Yarragadee	L	AUST	115.347	−29.046
50133M001	PERT	Perth	P	AUST	115.885	−31.802
50116S002	7242	Hobart	R	AUST	147.441	−42.804
50103S010	1545	Canberra	R	AUST	148.978	−35.398
13212S001	7840	Herstmonceux	L	EURA	0.336	50.867
13101M004	BRUS	Brussels	P	EURA	4.359	50.798
13504M003	KOSG	Kootwijk	P	EURA	5.810	52.178
14209S001	7203	Effelsberg	R	EURA	6.884	50.525
14001S001	7810	Zimmerwald	L	EURA	7.465	46.877
14208M001	OBER	Oberpfaffen.	P	EURA	11.280	48.086
10402S002	7213	Onsala	R	EURA	11.926	57.396
14201S004	7224	Wettzell	R	EURA	12.877	49.145
14106M003	POTS	Potsdam	P	EURA	13.066	52.379
11502M002	GOPE	Pecny	P	EURA	14.786	49.914
11001S002	7839	Graz	L	EURA	15.493	47.067
12205S001	7811	Borowiec	L	EURA	17.075	52.277
10302M003	TROM	Tromso	P	EURA	18.938	69.663
12209M001	LAMA	Lamkowko	P	EURA	20.670	53.892
10403M002	KIRU	Kiruna	P	EURA	20.968	67.857
12204M001	JOZE	Jozefoslaw	P	EURA	21.032	52.097
10503S011	METS	Metsahovi	P	EURA	24.395	60.217
12330M001	ZWEN	Zwenigorod	P	EURA	36.759	55.699
13407S010	1565	Madrid	R	EURA	355.749	40.427
13406M001	VILL	Villafranca	P	EURA	356.048	40.444
41703M003	EISL	Easter Islands	P	NAZC	250.617	−27.148
40127M003	YELL	Yellowknife	P	NOAM	245.519	62.481
40442S017	7613	Fort Davis	R	NOAM	256.053	30.637
40135M001	FLIN	Flin Flow	P	NOAM	258.022	54.726
40128M002	CHUR	Churchill	P	NOAM	265.911	58.759
40465S001	7612	North Liberty	R	NOAM	268.426	41.771
40499S001	7219	Richmond	R	NOAM	279.615	25.614
40441S001	7204	Greenbank	R	NOAM	280.164	38.438
40104S001	7282	Algonquin	R	NOAM	281.927	45.955
40451M105	7105	Washington	L	NOAM	283.172	39.021
40114M001	NRC1	Ottawa	P	NOAM	284.376	45.454
40471S001	7618	Hancock	R	NOAM	288.013	42.934
40440S003	7209	Westford	R	NOAM	288.506	42.613
43001M001	THU1	Thule	P	NOAM	291.212	76.537
42501S004	BRMU	Bermuda	P	NOAM	295.304	32.370
40101M001	STJO	St. John's	P	NOAM	307.322	47.595
43005M001	KELY	Kellyville	P	NOAM	309.055	66.987
50506M001	KWJ1	Kwajalein	P	PCFC	167.730	8.722
50207M001	CHAT	Chatham Island	P	PCFC	183.434	−43.956
40424S001	1311	Kauai	R	PCFC	200.335	22.126
40477S001	7617	Mauna Kea	R	PCFC	204.544	19.801
41510M001	LPGS	La Plata	P	SOAM	302.068	−34.907
97301M210	KOUR	Kourou	P	SOAM	307.194	5.252
41602S001	7297	Fortaleza	R	SOAM	321.574	−3.878
30602M001	ASC1	Ascension	P	SOAM	345.588	−7.951
		Deforming Zone Sites				
10002S001	7835	Grasse	L		6.921	43.755
10202M001	REYK	Reykjavik	P		338.045	64.139
12313M001	IRKT	Irkoutsk	P		104.316	52.219
12334M001	KIT3	Kitab	P		66.885	39.135
12348M001	POL2	Poligan	P		74.694	42.680
12711S001	7230	Bologna	R		11.647	44.520
12717S001	7547	Noto	R		14.989	36.876
12725M003	CAGL	Cagliari	P		8.973	39.136
12734S005	7243	Matera	R		16.704	40.650
12750M002	UPAD	Padova	P		11.878	45.407
21602M001	WUHN	Wuhan	P		114.357	30.532
21605S009	7227	Shanghai	R		121.200	31.099
21613M001	LHAS	Lhasa	P		91.104	29.657
21701S001	1856	Kashima	R		140.663	35.954
21726S001	7838	Simosato	L		135.937	33.578

Table 2. (continued)

Domes	Code[a]	Name	T[b]	Plate	λ, deg	ϕ, deg
21729S007	USUD	Usuda	P		138.362	36.133
21730S001	7311	Tsukuba	R		140.087	36.106
30302S001	7232	Hartebeest'k	R		27.685	−25.890
40105M002	DRAO	Penticton	P		240.375	49.323
40129M003	ALBH	Albert Head	P		236.513	48.390
40134M001	WILL	Williams Lake	P		237.832	52.237
40136M001	WHIT	Whitehorse	P		224.778	60.751
40400M007	JPLM	Pasadena	P		241.827	34.205
40405S009	7222	Goldstone	R		243.112	35.332
40408S002	7225	Fairbanks	R		212.502	64.978
40433M002	7109	Quincy	L		239.055	39.975
40439S002	7207	Owens Valley	R		241.717	37.231
40456S001	7234	Poetown	R		251.881	34.301
40463S001	7611	Los Alamos	R		253.754	35.775
40466S001	7610	Kitt Peak	R		248.388	31.956
40473S001	7614	Brewster	R		240.317	48.131
40489S001	7218	Hat Creek	R		238.529	40.817
40497M001	7110	Monument Peak	L		243.577	32.892
40504M001	7122	Mazatlan	L		253.541	23.343
41705S006	1404	Santiago	R		289.332	−33.151
42202M005	AREQ	Arequipa	P		288.507	−16.466
43201S001	7615	Sainte Croix	R		295.416	17.757
50127M001	COCO	Coco Islands	P		96.834	−12.188
50135M001	MAC1	Macquarie Island	P		158.936	−54.500
50209M001	AUCK	Auckland	P		174.834	−36.603
50501M002	GUAM	Guam	P		144.868	13.589

[a] Code holds for CDP (Crustal Dynamic Project) number or IGS/GPS four-character identification.
[b] IERS space geodesy technique abbreviation: R, VLBI; L, SLR; and P, GPS.

follows: (1) origin, by fixing to zero the translation and translation rate parameters between ITRF2000 and the weighted mean of the SLR solutions of five analysis centers: CGS, CRL, CSR, DGFI, and JCET; (2) scale, by fixing to zero the scale and scale rate parameters between ITRF2000 and the weighted mean of the above five SLR solutions and the VLBI solutions of the analysis centers: GIUB, GSFC, and SHA; and (3) orientation, by adding to the combination model a TRF datum equation (restricted to the orientation and its rate) given by

$$B(X_0 - X) = 0, \tag{6}$$

where (1) $B = (A^T A)^{-1} A^T$ and A is the design matrix of partial derivatives (restricted to its last three columns), as given by equation (A6) of Appendix A; (2) X_0, ITRF97

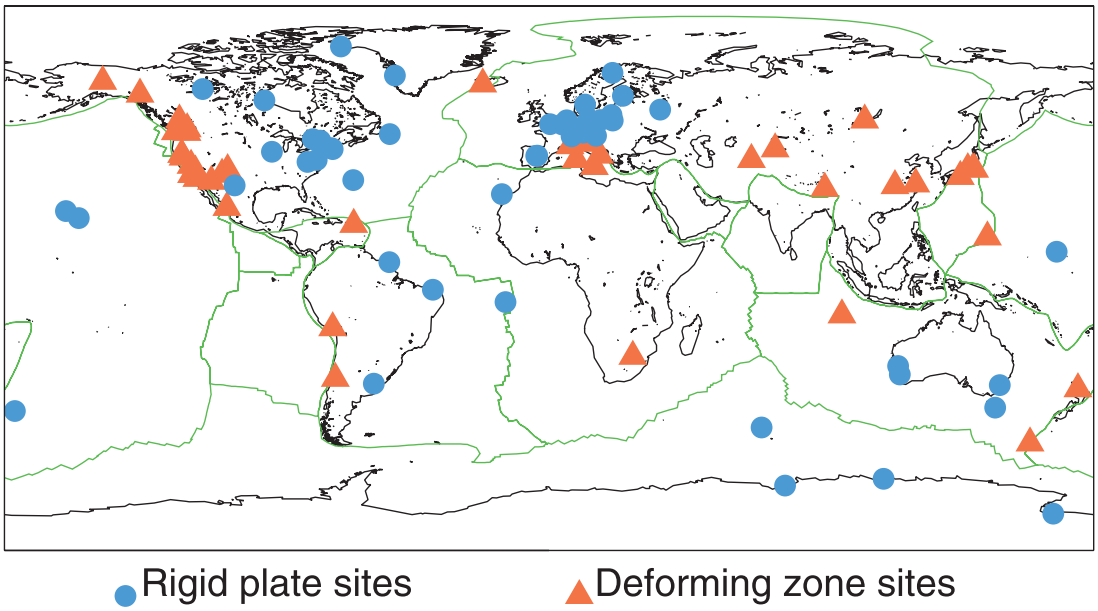

Figure 2. ITRF2000 high-quality sites. Note that only the 50 sites on rigid plates (circles) were used in the orientation rate definition of the ITRF2000 (see text).

Table 3. Transformation Parameters (at Epoch 1997.0) and Their Rates From ITRF2000 to ITRF97 and Rates to NNR-NUVEL-1A[a]

	*T*1	*T*2	*T*3	*D*	*R*1	*R*2	*R*3
			From ITRF2000 to ITRF97 (50 Stations)[b]				
	6.7	6.1	−18.5	1.55[c]	0.000	0.000	0.000
±	0.3	0.3	0.3	0.05	0.012	0.012	0.014
Rates	0.0	−0.6	−1.4	0.01	−0.001	0.004	0.019
±	0.3	0.3	0.3	0.05	0.012	0.012	0.014
			From ITRF2000 to ITRF97 (50 Stations)[d]				
	6.6	6.1	−18.5	1.55[c]	−0.003	0.001	−0.002
±	0.6	0.6	0.6	0.12	0.018	0.015	0.018
Rates	0.0	−0.6	−1.4	0.05	−0.001	0.002	0.019
±	0.6	0.6	0.6	0.09	0.015	0.015	0.015
			From ITRF2000 to NNR-NUVEL-1A (50 Stations)[b]				
Rates	0.3	0.2	0.4	−0.13	0.000	0.000	0.000
±	0.2	0.2	0.2	0.03	0.009	0.009	0.010
			From ITRF2000 to NNR-NUVEL-1A (50 Stations)[d]				
Rates	0.2	0.3	0.2	−0.11	0.001	0.000	0.002
±	0.6	0.6	0.6	0.18	0.015	0.015	0.018

[a] Units are mm for the translations and mm/yr for their rates; ppb (10^{-9}) for the scale and ppb/yr for its rate; mas for the rotations and mas/yr for their rates.
[b] Values obtained using unit weight matrix.
[c] The ITRF97 scale is expressed in the TCG frame, whereas that of the ITRF2000 is in the TT frame. The actual scale difference is then 0.85 ppb.
[d] Values obtained using a weight matrix constructed upon the inverses of the two full matrices.

positions at epoch 1997.0 defining the rotation angles and NNR-NUVEL-1A velocities defining the rotation rates; and (3) *X*, estimated station positions and velocities. It should be noted that equation (6), only applied upon the 50 selected sites, introduces six equations defining the ITRF2000 orientation (and its time evolution) and not more.

[39] The consequence of this new datum definition is that there are some significant parameter differences between the ITRF2000 and the previous ITRF97. To assess these differences as accurately as possible, 14 transformation parameters were estimated between these two frames upon the 50 core sites, yielding the values listed in Table 3. Table 3 lists also the rates of the seven transformation parameters between ITRF2000 and NNR-NUVEL-1A, also estimated upon the 50 sites.

[40] As described in Appendix A (section A2), the estimated transformation parameters between two solutions depends on the weight matrix used in this estimation. To estimate the 14 transformation parameters between ITRF2000 and ITRF97, we performed three comparisons using respectively three different options: (1) unit weights (identity matrix); (2) cumulated diagonal terms of the two inverses of the variance matrices; and (3) cumulated inverses of the two full variance matrices. The resulting values of the three sets of the 14 parameters are statically equivalent (e.g., differences are less than the formal errors, at one σ). In Table 3 we list the values of the first option (i.e., using unit weights) since it is fully consistent with the way we ensured the ITRF2000 orientation alignment to ITRF97 at epoch 1997.0, using equation (6). Meanwhile, in order to assess a statistically realistic accuracy of this alignment, Table 3 also lists the values of the third option, (i.e., using the two full matrices).

[41] Similarly, the rates of the seven transformation parameters between ITRF2000 and NNR-NUVEL-1A are listed in Table 3, following the first and third options. Since NNR-NUVEL-1A is a horizontal model, we assumed zero vertical velocity for each one of the 50 core sites. Note however that the third option consists in constructing the weight matrix upon the inverse of the full variance matrix of ITRF2000 and the inverse of a variance matrix resulting from the adoption of 3 and 10 mm/yr, respectively, for horizontal and vertical errors

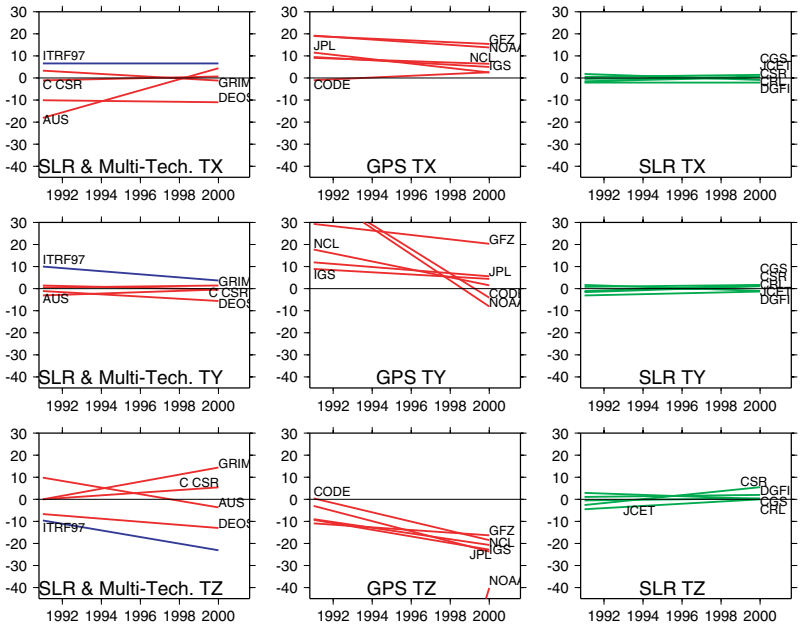

Figure 3. Translation variations (mm) of SLR, multitechnique, and GPS solutions. The third column plots show the translation variations of the five SLR solutions whose weighted average was used to define the ITRF2000 origin.

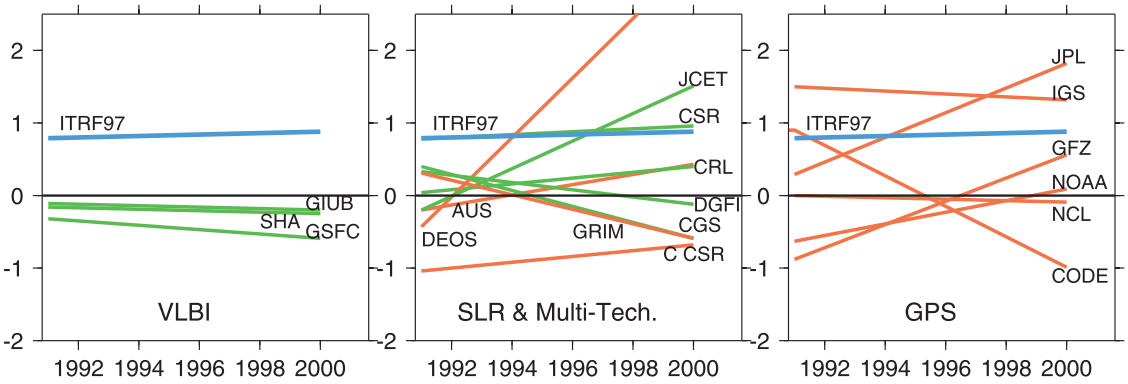

Figure 4. Scale variations (ppb) of VLBI, SLR and multitechnique, and GPS solutions. Green lines (grey in B&W version) indicate solutions whose scale weighted average was used to define the ITRF2000 scale. The ITRF97 scale, inserted on these plots, is reduced to TT frame (see text).

for NNR-NUVEL-1A velocities. The values listed in Table 3 show null rotation rates between ITRF2000 and NNR-NUVEL-1A, but small translation and scale rates which (although they are meaningless since NNR-NUVEL-1A is derived using equation (5) type, defining three rotation rate parameters) are most likely due to ITRF2000 vertical velocities for which NNR-NUVEL-1A provides no information.

[42] The two sets of the transformation parameters listed in Table 3 show no significant differences between the two estimates. This fact reflects the robustness of the selection of the 50 high-quality geodetic sites. The errors listed in Table 3 indicate that the orientation alignment of ITRF2000 to ITRF97 at epoch 1997.0 is ensured at (or better than) the 1 mm level. Similarly, the ITRF2000 orientation rate alignment to NNR-NUVEL-1A is also at the 1 mm/yr level.

5. ITRF2000 Results

[43] The results of the ITRF2000 global combination are (1) station positions at epoch 1997.0, (2) station velocities (stations within the same site are constrained to have the same velocity), (3) transformation parameters (at epoch 1997.0) and their rates between ITRF2000 and each individual frame, after removing the original constraints (if any) and applying minimum constraints, and (4) postfit residuals for each individual solution included in the global combination. Note that station positions and velocities, as well as transformation parameters are all estimated simultaneously, in a single adjustment, using the combination model described in Appendix A (section A3).

[44] Since we combine solutions with minimum constraints, we assume that the rotation parameters are uninformative. This statement is also valid for the relative origins of VLBI TRFs. Therefore we will focus on the relative scales and origins of satellite-derived solutions as well as the relative scales of VLBI solutions.

5.1. Individual TRF Origin and Scale Differences

[45] Selecting the time interval 1991–2000 as the "common" observation period of the analyzed solutions, Figure 3 shows the linear variation of the translation components for SLR and GPS solutions, relative to the ITRF2000 origin (mean of the five selected SLR solutions). Figure 4 illustrates the linear variation of the scale for VLBI, SLR, and GPS solutions, relative to the ITRF2000 scale (mean of the three VLBI and five SLR solutions). The linear variations shown in Figures 3 and 4 were computed by propagating each parameter value from epoch 1997.0 to the end point epochs (e.g., 1991.0 and 2000.0), using the relation

$$P(t) = P(1997.0) + \dot{P} \times (t - 1997.0), \qquad (7)$$

where P is a transformation parameter and $\dot{P}$ is its time derivative (rate).

[46] DORIS solutions are not represented on Figures 3 and 4, their origin differences being in the range 1–10 cm and their scale differences in the 3–8 ppb range. Note, however, that the multitechnique GRIM and CSR solutions are shown on SLR plots, since they are dominated by SLR data, especially in terms of datum definition.

[47] Figure 3 clearly shows the good agreement between the five selected SLR solutions over the three translation components, within 2 mm in X and Y and 5 mm in Z, over the whole 1991–2000 selected period. Moreover, the translation rates of the 5 SLR solutions are not significant, since they are within their uncertainties which range between 0.2 and 0.4 mm/yr in X and Y and between 0.5 and 1.0 mm/yr in Z.

[48] However, GPS solutions exhibit large discrepancies and in particular around X and Y components. Note that the translation variations of IGS, JPL, and NCL solutions follow the ITRF97, since these three centers have translated their individual solutions to the ITRF97. Note also the peculiar, unexplained large slope of CODE and NOAA solutions in the Y component, and the large Z translation of NOAA solution.

[49] Figure 4 shows the full scale agreement between the three VLBI solutions on the one hand and, on the other hand, that most of the SLR scale differences are within 1 ppb (10^{-9}). Note that the scale rates of the three VLBI solutions are completely negligible, given their uncertainty which is about 0.05 ppb/yr. On the other hand, among the 5 selected SLR solutions, three of them (CSR, CRL, and DGFI) have statistically negligible scale rates, e.g., they are within the error bare (about ±0.06 ppb/y). The scale rates of the two other solutions (CGS and JCET) are −0.11 and 0.19 (±0.06) ppb/yr, respectively. Given their opposite slopes and

Table 4. Accuracy of the ITRF2000's Origin and Scale's Datum Definition and Long-Term Stability[a]

Parameter/Rate	WRMS(1997.0)	WRMS(Over 10 years)
	Scale	
D, ppb	0.2 (≈1.2 mm)	0.5 (≈3 mm)
$\dot{D}$, ppb/yr	0.03 (≈0.2 mm/yr)	
	Origin Components	
T_x, mm	0.4	1.4
$\dot{T}_x$, mm/yr	0.1	
T_y, mm	0.5	1.5
$\dot{T}_y$, mm/yr	0.1	
T_z, mm	0.9	3.9
$\dot{T}_z$, mm/yr	0.3	

[a] Note that one ppb scale difference is equivalent to a shift of about 6 mm in station heights.

their disagreement with the three other SLR solutions, it is most likely that the vertical velocities of some stations in these two solutions are mismodeled.

[50] In order to assess the accuracy of the ITRF2000 scale and origin definition, we computed WRMS values over scale and translation differences (with respect to ITRF2000) upon the three VLBI and five SLR solutions used in the scale and origin definition. These values listed in Table 4 indicate an accuracy of the scale and origin at epoch 1997.0 at (or better than) the 1 mm level and 0.3 mm/yr for their rates.

[51] Moreover, in order to evaluate the long-term stability of the ITRF2000 scale and origin, the WRMS are propagated over 10 years and listed in Table 4. The propagated WRMS values over 10 years suggest a frame stability better than 4 mm in origin and better than 0.5 ppb in scale (equivalent to a shift of approximately 3 mm in station heights). Note however that the WRMS of the Z translation component is larger than those of X and Y. This fact is most likely due to the SLR network configuration having much more stations in the northern hemisphere.

5.2. ITRF2000 Quality Evaluation

[52] The quality of the ITRF2000 depends on the relative qualities of the contributing solutions as well as on the combination strategy equally applied to these solutions. As overall quality indicators of the individual solutions included in the ITRF2000 combination, WRMS values per technique are summarized in Table 5. The WRMS are computed over the residuals of all stations of a particular solution, using equation (A19). The WRMS values listed in Table 5 indicate that a level of 2–5 mm in positions and 1–2 mm/yr in velocities is reached by some of these solutions.

[53] It is also interesting to compare the ITRF2000 to the previous ITRF97 solution in terms of formal errors, both in positions and velocities. The formal errors are those resulting from the final global combination after the estimation of solution variance factors and weighting of solutions within the combination. They correspond to the square root of the diagonal terms of the inverse of the normal matrix of the whole combined solution (i.e., ITRF2000 estimated standard deviations). The histograms presented in Figure 5 illustrate the spherical errors computed, for each point position and velocity by the square root of the square sum of the errors of the three components. Equivalently, the spherical error corresponds to the trace of the variance of the position (respectively, velocity) vector. The significance and justification of the spherical error representation is described in Appendix A (section A7). These spherical errors were then arranged in 5 intervals for each centimeter for position errors and 5 intervals for each millimeter for velocity errors. This figure shows on the one hand an improvement of ITRF2000 compared to ITRF97 and, on the other hand, about 50% of station positions have an error less than 1 cm, and about 100 sites with velocities determined at (or better) than 1 mm/yr level.

[54] In general, it is assumed that the variance matrix associated with a given solution contains both the precision of the estimated station positions and velocities as well as the TRF datum definition effect. Therefore it is important to note that the spherical errors shown in Figure 5 reflect not only the precision of ITRF2000 station positions and velocities but also the accuracy of its datum definition, which is at the one 1 mm level.

[55] The ITRF2000 errors are more meaningful than those of ITRF97 given the fact that the individual solutions included in the ITRF2000 combination are unconstrained. The factors that reduce the ITRF2000 errors compared to ITRF97 include: minimum constraints approach equally applied to the individual solutions, outlier rejections, better use of the local ties in collocation sites (see below) and the improved quality of the individual solutions.

[56] Moreover, in order to have more insight about the significance of the ITRF2000 errors, per-technique combinations were performed whose spherical errors are shown in Figure 6. For these per-technique combinations (free from local ties), we used all the solutions included in the official ITRF2000 global combination as well as the same strategy analysis. In addition, we also estimated individual variance factors which are found to be slightly optimistic compared to those obtained from ITRF2000 combination. Variance factor differences between ITRF2000 and per-technique estimates may reach 20% (see Table 1). All the per-technique spherical errors shown in Figure 6 are those obtained from the per-technique combinations. We see clearly that they are generally more optimistic than those of the ITRF2000 combination (see, for example, VLBI position and velocity errors and GPS position errors). Reasons for such differences include local ties (for which we adopted unity variance factors, except for the dew-

Table 5. Summary of 3-D WRMS of the Individual Solutions Included in the ITRF2000 Combination

Technique	NS[a]	Position[b]		Velocity[c]	
		S[d]	L[e]	S	L
VLBI	3	2	3	1	1
LLR	1	50	50	5	5
SLR	7	2	14	1	5
GPS	6	2	5	1	2
DORIS	2	25	30	4	5
Multitechnique	2	6	9	2	2
GPS densification	9	1	8	1	4

[a] Number of solutions.
[b] Position 3-D WRMS in mm.
[c] Velocity 3-D WRMS in mm/yr.
[d] Smallest WRMS.
[e] Largest WRMS.

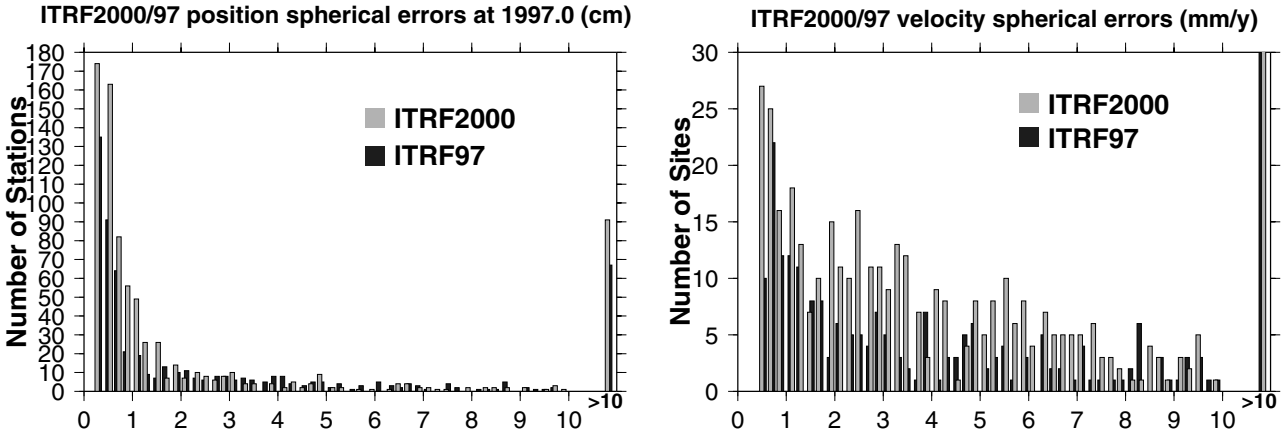

Figure 5. ITRF2000 and ITRF97 spherical errors in positions (left) at epoch 1997.0 and in velocities (right). Units are cm for positions and mm/yr for velocities. Note that position errors are for all stations, while velocity errors are for all sites since stations within the same site were constrained to have the same velocity.

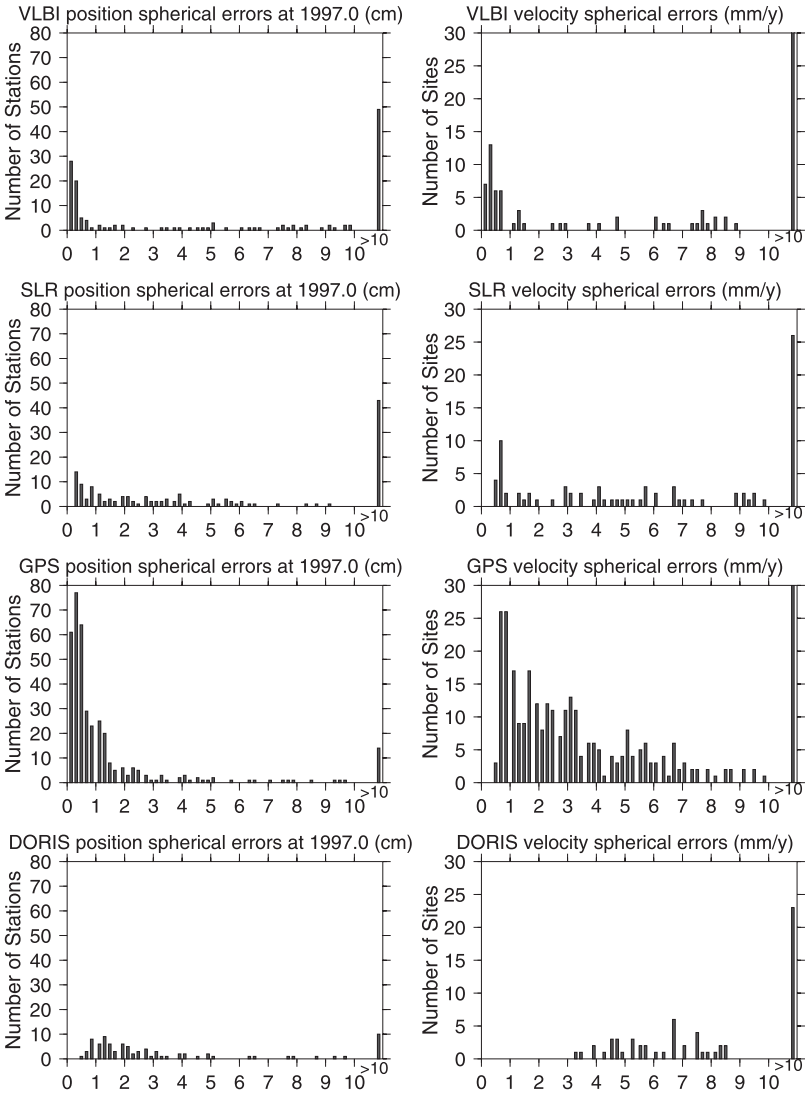

Figure 6. Spherical errors (left) in positions at epoch 1997.0 and (right) in velocities as results from per-technique combinations.

eighted ones) and possible systematic discrepancies between techniques.

5.3. ITRF2000 and Collocation Sites

[57] As illustrated in Figure 1, the ITRF2000 contains 101 sites having 2, 3 or 4 collocated techniques. Unfortunately, local ties are not all available at the time of the ITRF2000 computation. While about 200 local tie vectors were included in the combination, 38 were missing, 25 of which are highly important, given their geographic location and/or quality of their geodetic instruments. On the other hand, among the included local ties, 20 vectors are declared as dubious since their postfit residuals are larger than or equal to 1 cm. Note that ''dubious'' means either local ties or space geodesy estimates are imprecise or in error. In order to preserve the implied collocations in the combination, dubious local ties having normalized residuals exceeding the threshold of 4 were deweighted rather than rejected. Deweighting the dubious local ties consists in rescaling their standard deviations by a factor of 10, so that their normalized residuals in the final combination become less than the adopted threshold. This is for instance the case of three highly important sites where VLBI-GPS local ties disagree with space geodesy estimates. These sites are Fairbanks (Alaska), O'Higgins (Antarctica), and Westford (Massachusetts), having residuals in the vertical components, of about 2, 3, and 2 cm, respectively. In order to assess how this kind of discrepancies would affect the combination, we performed a global combination test (using all the data included in the ITRF2000) in which we assigned an error of 1 mm (instead of 6 mm used in the official ITRF2000 combination) to the VLBI-GPS local tie in Westford site. As result of this combination test, almost all VLBI and GPS coordinates are shifted in the vertical component, compared to the official ITRF2000 values, by about 1 mm for VLBI and 3 mm for GPS. The effect on the transformation parameters is found to be only in the scale factor: The relative scale factors between all VLBI and GPS solutions are affected by about 0.5 ppb. Therefore deweighting dubious local ties avoids contaminating space geodesy estimates (and so ITRF2000 results) by possible local tie errors.

6. ITRF2000 and Plate Tectonics

[58] Global relative plate motion models were derived using geological and geophysical data records, averaged over the past few million years, such as RM2 of *Minster and Jordan* [1978] and the current widely used NUVEL-1A of *DeMets et al.* [1990, 1994], dividing the lithosphere into tectonic plates (about 10 large plates and some small ones).

[59] From these relative models, absolute plate motion models were derived and referred to the fixed deep mantle assumed to be rigid or having negligible motions compared to those of tectonic plates. Two different assumptions are generally used in deriving absolute models: (1) the plates (implicitly the lithosphere) have no-net-rotation over the mantle; and (2) hot spots have no motion with respect to the mantle, or at least negligible motion as compared to those of tectonic plates. Generally, these two types of absolute models are performed by estimating the rotation pole of one plate, according to one of the two assumptions, and then deriving rotation poles of the remaining plates, using the relative models, by vector subtraction.

[60] Early absolute plate motion models were discussed by *Solomon and Sleep* [1974], followed by those of *Minster and Jordan* [1978]: AM0-2 using assumption 1 and AM1-2 using assumption 2 and the current widely used model NNR-NUVEL-1A. While relative motions of tectonic plates are clearly determined (providing motion of one plate relative to another one), absolute models are very sensitive to the underlying assumption (or TRF definition), and their differences may reach several milliarc seconds (mas) per year: the difference between AM0-2 and AM1-2 is about 1 mas/yr (3 cm/yr on the Earth surface); the velocity between NNR-NUVEL-1 and HS2-NUVEL-1 [*Gripp and Gordon*, 1990] may reach 37 mm/yr [*Argus and Gordon*, 1991].

[61] The geological NNR absolute plate motion models mentioned above are derived with a summation over assumed rigid plates using an equilibrium equation, given by *Solomon and Sleep* [1974], and easily derivable from Tisserand's equation (5) of null angular momentum. Simplifications are used in the generation of these models such as the assumption of a uniform density for all plates and neglecting their thickness variations.

[62] The alignment in orientation rate of the ITRF2000 to NNR-NUVEL-1A is then an implicit application of the NNR condition. This procedure is fully equivalent to minimizing the global rotation rate between ITRF2000 and NNR-NUVEL-1A. In addition, even if the relative model NUVEL-1A (on which the absolute model NNR-NUVEL-1A is based) has possible deficiencies, this will not disrupt the internal consistency of the ITRF2000, being insensitive to the datum definition.

6.1. ITRF2000 Velocity Field

[63] As stations within the same site were constrained to have the same velocity, ITRF2000 velocities of such sites are the average (in least squares sense) of those of individual stations available in the different solutions included in the combination. Therefore possible velocity discrepancies between solutions (or techniques) should then appear in the postfit residuals. Inspection of site velocity residuals reveals some discrepancies within and between techniques, in particular in the vertical component. As an example, in Fairbanks site (Alaska), all the GPS vertical velocity residuals are discrepant in the same direction compared to VLBI, and differences between GPS solutions may reach 5 mm/yr. Thus the velocity of this site is entirely determined by VLBI.

[64] Although the ITRF2000 orientation rate is aligned to that of NNR-NUVEL-1A, it is important to quantify the residual velocities between the two velocity fields. Figure 7 shows horizontal velocity differences between ITRF2000 and NNR-NUVEL-1A over 49 sites of the 50 selected ones (ordered as in Table 2), distributed over six plates having at least four sites. The 50th site, MasPalomas, is on the geodetically poor African plate. In Figure 7, we clearly see per-plate systematic residuals between the two velocity fields, as for example along the north–south direction: about 1.5 mm/yr for Eurasia and, in the opposite direction, about 2 mm/yr for North America. This behavior suggests a relative angular velocity difference for these two plates of approximately 3 mm/yr between ITRF2000 and NUVEL-

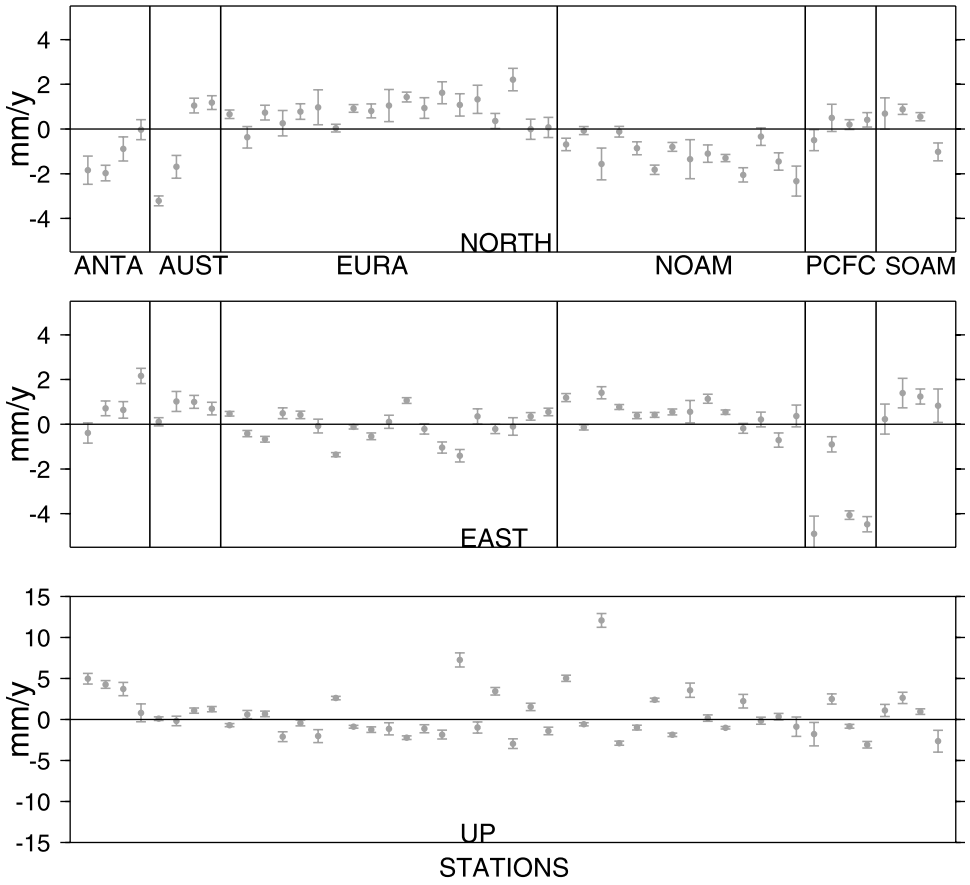

Figure 7. Velocity differences (ITRF2000 minus NNR-NUVEL-1A) in mm/yr for 49 core stations used in the orientation and rate definition. Note that UP differences are in fact vertical velocities since NNR-NUVEL-1A is a horizontal model.

1A estimates. Most importantly along the east–west component, the velocity residuals of the Pacific plate reach about 4 mm/yr for three sites. These per-plate systematic differences indicate the inadequacy of the NUVEL-1A model to describe the current plate motions as seen by the ITRF2000 results. This residual behavior also means that although we ensured the ITRF2000 alignment to NNR-NUVEL-1A, differences between the two, in terms of site velocities may exceed 3 mm/yr. Meanwhile it should be emphasized that these differences do not at all disrupt the internal consistency of the ITRF2000, simply because the alignment defines the ITRF2000 orientation rate and nothing more. The absolute rotation poles predicted by NNR-NUVEL-1A model are not equal to those which would be estimated using ITRF2000 velocities. In addition, while an ITRF2000 estimated rotation pole for a given plate depends on the sites used and the level of rigidity of that plate, NNR-NUVEL-1A always yields the same rotation pole for any sub-set of sites on that plate.

[65] In order to illustrate the discussion above, we used ITRF2000 velocities to estimate NNR absolute rotation poles for six tectonic plates, listed in Table 6. In this estimation we used the 49 sites on rigid plates listed in Table 2, augmented by O'Higgins (Antarctica plate) and Haleakala (Pacific plate) to improve the geometry and number, respectively, of sites distributed over these two plates. The linearized observation model used is based on the well-known equation linking the Euler vector ω_p with point velocity $\dot{X}_i$, of position vector X_i, located on plate p:

$$\dot{X}_i = \omega_p \times X_i. \tag{8}$$

The full variance matrix of the 51 site velocities was extracted from the ITRF2000 SINEX file and used in the Euler vectors estimation in a single inversion, thus preserving the correlations between velocity parameters. In addition, as illustrated in Figure 8, postfit velocity residuals resulting from this estimation of NNR absolute rotation poles are within ±1 mm/yr level.

6.2. ITRF2000 Relative Plate Motion Model

[66] Using the six NNR absolute rotation poles, relative poles were then derived by vector subtraction and listed in Table 7. Relative rotation poles are insensitive to the TRF orientation rate, even though the ITRF2000 velocity field is aligned to NNR-NUVEL-1A. It is then instructive to compare ITRF2000 relative poles to those predicted by NUVEL-1A, as listed in Table 7. Table 7 shows that

Table 6. ITRF2000 NNR Absolute Rotation Poles

Plate	ϕ, °N	λ, °E	ω, deg/m.y.
ANTA	61.830	−125.574	0.231
±	2.143	3.689	0.015
AUST	32.327	39.437	0.614
±	0.652	0.816	0.006
EURA	57.965	−99.374	0.260
±	1.211	2.710	0.005
NOAM	−5.036	−83.144	0.194
±	1.142	1.945	0.003
PCFC	−64.176	110.194	0.666
±	0.404	1.345	0.005
SOAM	−21.457	−134.631	0.113
±	2.806	4.762	0.005

differences between the two range between 0.03° and 0.08°/m.y., equivalent to approximately 1–7 mm/yr over the Earth's surface, at the geometric "barycenter" of each plate. As shown in Table 7, relative to the Pacific plate, we find that the angular velocities of the other plates inferred from ITRF2000 results appear to be faster than those predicted by NUVEL-1A model, except for the Australian plate. In addition, we found that the Australia and Eurasia rotation poles, relative to the Pacific plate, are located about 5 and 7°, respectively, more to the east than those predicted by NUVEL-1A model.

[67] Moreover, the ITRF2000 results show a relative motion between the two most populated plates in terms of geodetic sites, Eurasia and North America, faster than that of NUVEL-1A, by about 0.056 (±0.005) °/m.y. The location of their relative rotation pole is found to be about at 10° in latitude and 7° in longitude more to the northwest, compared to NUVEL-1A prediction.

7. Conclusions

[68] The ITRF2000 is the most extensive and accurate version of the International Terrestrial Reference Frame ever developed, containing about 800 stations located on about 500 sites. The densification part increases access to the ITRF2000 for various Earth science applications. The internal consistency of the independent SLR and VLBI solutions included in ITRF2000 allowed an accurate implementation of the global frame origin and scale at the 1 mm level. The accuracy of its long-term stability, evaluated over 10 years, is estimated to be better than 4 mm in origin and better than 0.5 ppb in scale, equivalent to a shift in station heights of approximately 3 mm over the Earth's surface. The ITRF2000's strength is that it combines space geodesy TRF solutions that are free from any external constraint, reflecting the actual precision of space geodesy techniques for station position and velocity estimates over the Earth's crust. Geophysical information inferred from this frame, such as tectonic plate motions, allows meaningful comparisons with the existing geological models, such as NUVEL-1A. Although the ITRF2000 orientation rate alignment to NNR-NUVEL-1A is ensured at the 1 mm/yr level, differences between the two may reach 3 mm/yr or more but do not alter the internal consistency of the ITRF2000. These differences are the consequence of significant disagreement between ITRF2000 and NUVEL-1A in terms of relative plate motion. This important finding indicates clearly that space geodesy techniques combined together can be used to estimate a global plate motion model (for a limited number of plates), or at least to contribute significantly to a mixed geodetic–geological model. Moreover, the densified ITRF2000 global frame provides a vast velocity field permitting detailed and localized crustal deformation evaluation in plate interiors as well as along plate boundaries. Seeking more refined datum definition in orientation rate, we finally believe that more and more thorough geodetic-based investigations have to be carried out in future to apply the NNR condition upon space geodesy observing sites which contain, unlike assumed rigid plates, more pertinent information related to the kinematic properties of the Earth's crust. The link of this condition to Earth rotation theory should also be taken into account. Finally, we believe

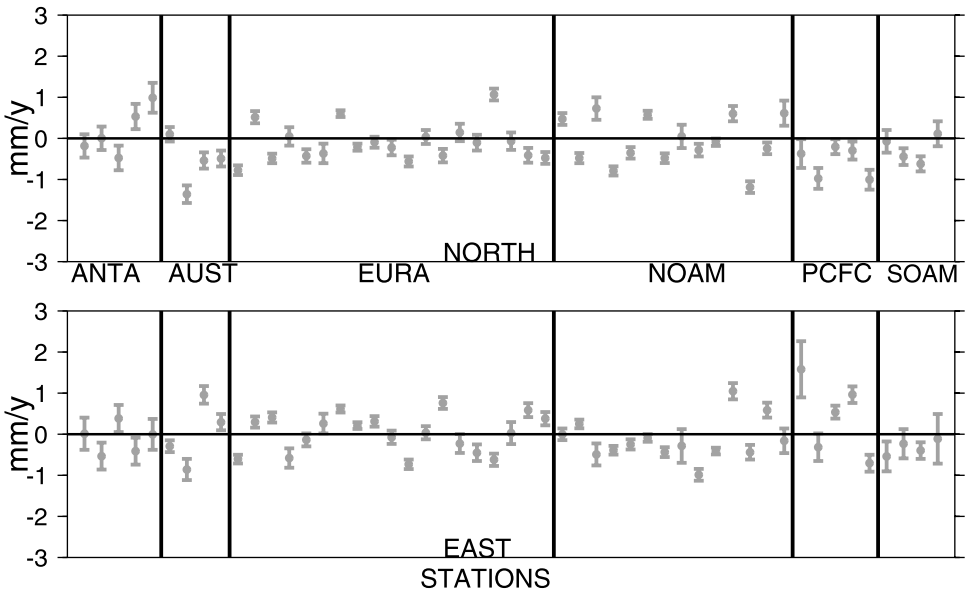

Figure 8. Postfit velocity residuals in mm/yr for 51 sites used in the estimation of ITRF2000 NNR absolute rotation poles.

Table 7. ITRF2000 Relative Rotation Poles[a]

Plate	ϕ, °N	λ, °E	Ω_x	Ω_y	Ω_z	Ω	Ω_N	$\Delta\Omega$	$\delta\Omega$
				Relative to Pacific Plate					
ANTA	65.688	−84.208	0.000640	−0.006305	0.014029	0.882	0.870	0.025	0.7
AUST	61.482	6.530	0.008747	0.001001	0.016203	1.057	1.074	0.054	4.9
EURA	63.118	−79.215	0.001357	−0.007126	0.014309	0.919	0.859	0.083	6.9
NOAM	50.488	−75.134	0.002152	−0.008107	0.010171	0.755	0.749	0.036	2.2
SOAM	−58.070	−85.633	−0.000463	0.006058	−0.009749	0.658	0.637	0.041	3.9
				Relative to North America Plate					
EURA	73.032	128.99	−0.000794	0.000981	0.004138	0.248	0.214	0.056	4.6

[a] Ω_x, Ω_y, Ω_z are the three Cartesian components of the relative rotation pole in radians/m.y. Ω and Ω_N are ITRF2000 and NUVEL-1A relative rotation pole vectors, respectively, in deg/m.y. $\Delta\Omega = |\Omega - \Omega_N|$. $\delta\Omega$ is the magnitude of velocity differences in mm/yr over the Earth's surface, at the "barycenter" of each moving plate relative to the reference one. Uncertainties are not listed but could easily be computed from Table 6.

that improvement of future ITRF solutions would not be significant without improving the local ties in the collocation sites.

Appendix A: Basic Equations for Comparison and Combination of Terrestrial Reference Frames

A1. Transformation Between Terrestrial Reference Systems

[69] The standard relation of transformation between two reference systems is a Euclidian similarity of seven parameters: three translations, one scale factor, and three rotations, designated respectively, $T1$, $T2$, $T3$, D, $R1$, $R2$, $R3$, and their first time derivatives: $\dot{T}1$, $\dot{T}2$, $\dot{T}3$, $\dot{D}$, $\dot{R}1$, $\dot{R}2$, $\dot{R}3$. The transformation of a coordinate vector X_1, expressed in a reference system (1), into a coordinate vector X_2, expressed in a reference system (2), is given by

$$X_2 = X_1 + T + DX_1 + RX_1 \tag{A1}$$

with

$$T = \begin{pmatrix} T1 \\ T2 \\ T3 \end{pmatrix} \quad R = \begin{pmatrix} 0 & -R3 & R2 \\ R3 & 0 & -R1 \\ -R2 & R1 & 0 \end{pmatrix}.$$

[70] IT is assumed that equation (A1) is linear for sets of station coordinates provided by space geodesy techniques (origin difference is about a few hundred meters, and differences in scale and orientation are of 10^{-5} level).

[71] Generally, X_1, X_2, T, D, R are functions of time. Differentiating equation (A1) with respect to time gives

$$\dot{X}_2 = \dot{X}_1 + \dot{T} + \dot{D}X_1 + D\dot{X}_1 + \dot{R}X_1 + R\dot{X}_1. \tag{A2}$$

Since D and R are of 10^{-5} level and $\dot{X}$ is about 10 cm per year, the terms $D\dot{X}_1$ and $R\dot{X}_1$ are negligible, about 0.1 mm over 100 years. Therefore equation (A2) could be written as

$$\dot{X}_2 = \dot{X}_1 + \dot{T} + \dot{D}X_1 + \dot{R}X_1. \tag{A3}$$

A2. Estimation of the Seven Transformation Parameters and Their Rates Between Two TRFs

[72] Least squares adjustment is commonly used to estimate the seven transformation parameters and their rates between two TRFs. For this purpose, equations (A1) and (A3) are rewritten as

$$X_2 = X_1 + A\theta \tag{A4}$$

$$\dot{X}_2 = \dot{X}_1 + A\dot{\theta}, \tag{A5}$$

where θ and $\dot{\theta}$ are the vectors of the seven transformation parameters and their rates, respectively. A is the design matrix of partial derivatives constructed upon approximate station positions $(\ldots, x_0^i, \ldots)$, where $1 < i < n$ and n is the number of stations:

$$A = \begin{pmatrix} . & . & . & . & . & . & . \\ 1 & 0 & 0 & x_0^i & 0 & z_0^i & -y_0^i \\ 0 & 1 & 0 & y_0^i & -z_0^i & 0 & x_0^i \\ 0 & 0 & 1 & z_0^i & y_0^i & -x_0^i & 0 \\ . & . & . & . & . & . & . \end{pmatrix}. \tag{A6}$$

[73] Least squares adjustment yields solutions for θ and $\dot{\theta}$ of equations (A4) and (A5) as follows:

$$\theta = (A^T P_x A)^{-1} A^T P_x (X_2 - X_1) \tag{A7}$$

$$\dot{\theta} = (A^T P_v A)^{-1} A^T P_v (\dot{X}_2 - \dot{X}_1). \tag{A8}$$

The estimated transformation parameters (and their rates) depend on the choice of the weight matrix P_x for station positions, and P_v for station velocities. There are mainly three choices for the weight matrix: unit weights, $P_x = I$ (respectively $P_v = I$), where I is the identity matrix; cumulated diagonal terms of the two inverses of the variance matrices associated with solutions X_1 and X_2; and cumulated inverses of the two full variance matrices.

[74] It is usually not guaranteed that the three cases will yield the same estimated values. It is, on the other hand, well known that the seven transformation parameters are correlated, particularly in the case of regional networks. Note that if the two implied TRFs are of the same quality, having global coverage, with no erroneous positions (velocities) and with well-conditioned variance matrices, the above three cases should theoretically provide the same estimated values of the transformation parameters.

[75] Note that equations (A7) and (A8) could be solved for in a single least squares adjustment in the case where the two frames contain station positions as well as velocities. In this case, the design matrix has 14 columns instead of seven given in equation (A6), the last seven columns are similar to the seven first ones, as derived from equation (A3).

A3. ITRF Combination Model

[76] A general physical model is given below, simultaneously combining station positions as well as velocities. Assuming that for each individual solution s, and each point i, we have position X_s^i at epoch t_s^i and velocity $\dot{X}_s^i$, expressed in a given TRF k.

[77] The combination consists in estimating: positions X_{itrf}^i at a given epoch t_0 and velocities $\dot{X}_{\text{itrf}}^i$, expressed in ITRS and transformation parameters T_k at an epoch t_k and their rates $\dot{T}_k$, from the ITRF to each individual frame k. The general combination physical model is given by

$$\begin{cases} X_s^i = X_{\text{itrf}}^i + \left(t_s^i - t_0\right)\dot{X}_{\text{itrf}}^i \\ \qquad + T_k + D_k X_{\text{itrf}}^i + R_k X_{\text{itrf}}^i \\ \qquad + \left(t_s^i - t_k\right)\left[\dot{T}_k + \dot{D}_k X_{\text{itrf}}^i + \dot{R}_k X_{\text{itrf}}^i\right] \\ \\ \dot{X}_s^i = \dot{X}_{\text{itrf}}^i + \dot{T}_k + \dot{D}_k X_{\text{itrf}}^i + \dot{R}_k X_{\text{itrf}}^i \end{cases} \tag{A9}$$

where for each individual frame k, D_k, T_k, and R_k are respectively the scale factor, the translation vector and the rotation matrix.

[78] The combination model given in equation (A9) provides for each individual solution s the following normal equation:

$$\begin{pmatrix} A1_s^T \\ \\ A2_s^T \end{pmatrix} P_s \left(A1_s \quad A2_s\right) \begin{pmatrix} X \\ \\ T_k \end{pmatrix} = \begin{pmatrix} A1_s^T P_s B_s \\ \\ A2_s^T P_s B_s \end{pmatrix}, \tag{10}$$

where $A1_s$ and $A2_s$ are design matrices defined (for each point i) by

$$A1_s^i = \begin{pmatrix} I & dt_s^i I \\ \\ 0 & I \end{pmatrix}, \quad A2_s^i = \begin{pmatrix} A_s^i & dt_k^i A_s^i \\ \\ 0 & A_s^i \end{pmatrix} \tag{A11}$$

with $dt_s^i = t_s^i - t_0$, $dt_k^i = t_s^i - t_k$, and A_s^i is the design matrix relative to point i as defined by equation (A6). P_s is the weight matrix (the inverse of the variance matrix of solution s) and B_s is the vector of (Observed−Computed) parameters, in terms of least squares adjustment. The unknown parameters in equation (A10) are X: station positions & velocities and T_k: transformation parameters from ITRF to frame k.

A4. Constraint Handling

[79] In the case where constraints are introduced in an estimated solution X_s^{est}, containing station positions and velocities, the selected method of combination is to remove them by subtracting the inverse of the estimated (Σ_s^{est}) and constraint (Σ_s^{const}) matrices:

$$\left(\Sigma_s^{\text{unc}}\right)^{-1} = \left(\Sigma_s^{\text{est}}\right)^{-1} - \left(\Sigma_s^{\text{const}}\right)^{-1}. \tag{A12}$$

Note that it is most likely that the resulting unconstrained matrix $(\Sigma_s^{\text{unc}})^{-1}$ is singular due to the fact that it has a rank deficiency corresponding to some of the TRF datum parameters among the 14 ones (three translations, one scale factor, three rotations; and their corresponding rates). To complete this rank deficiency, minimum constraints are then added to obtain the minimally constrained variance matrix Σ_s^{mc}:

$$\left(\Sigma_s^{\text{mc}}\right)^{-1} = \left(\Sigma_s^{\text{unc}}\right)^{-1} + \left(B^T \Sigma_\theta^{-1} B\right), \tag{A13}$$

where $B = (A^T A)^{-1} A^T$ is the matrix containing all the information necessary to define the TRF datum, depending on the shape of the implied network. Note that B is made up of appropriate columns of A given in equation (A6). Σ_θ is a diagonal matrix containing small variances for the 14 transformation parameters. The resulting deconstrained solution ($\overline{X}_s$) then becomes

$$\overline{X}_s = \Sigma_s^{\text{mc}} \left[\left(\Sigma_s^{\text{est}}\right)^{-1} X_s^{\text{est}} - \left(\Sigma_s^{\text{const}}\right)^{-1} X_s^{\text{const}}\right], \tag{A14}$$

where X_s^{const} is the a priori parameter vector with which constraints were applied.

[80] In the case of a loosely constrained solution (e.g., in which some station positions and velocities are constrained to a priori values with $\sigma \geq 1$ m for positions and ≥ 10 cm/yr for velocities), the corresponding variance matrix is augmented by minimum constraints in order to define the TRF datum using:

$$\Sigma_s^{\text{mc}} = \Sigma_s^{\text{est}} - \Sigma_s^{\text{est}} B^T \left(B \Sigma_s^{\text{est}} B^T + \Sigma_\theta\right)^{-1} B \Sigma_s^{\text{est}}. \tag{A15}$$

A5. Variance Component Estimation and RMS

[81] When combining solutions of station positions and velocities coming from heterogeneous sources, it is therefore postulated that each individual variance matrix is known to a given scale factor (or variance factor: σ_s). This latter is computed iteratively through a variance components estimation technique.

[82] Designating by v_s the vector of position and velocity postfit residuals of solution s, the variance factor is computed by

$$\sigma_s^2 = \frac{v_s^T P_s v_s}{f_s}. \tag{A16}$$

As seen in equation (A16), f_s is the generalization of the redundancy factor appearing in the classical estimate of the variance factor (χ^2) of a least squares adjustment. That is why we define f_s as the redundancy factor given by

$$f_s = 6n_s - \text{tr}\left(A_s \nu A_s^T P_s\right) \tag{A17}$$

with n_s number of stations of solution s; ν inverse of the normal matrix of the whole combined solution; A_s design matrix of partial derivatives of solution s; P_s weight matrix of solution s: ($P_s = \Sigma_s^{-1}$). A similar procedure of variance component estimation is used by *Davies and Blewitt* [2000].

[83] The usual RMS estimator is computed using

$$\mathrm{RMS}_s = \sqrt{\frac{{v_s^X}^T v_s^X}{f_s^X}}, \tag{A18}$$

where v_s^X is the vector of residuals restricted to station positions, and f_s^X is the redundancy factor computed over station positions, estimated as in equation (A17).

[84] The weighted RMS (WRMS) is computed by

$$\mathrm{WRMS}_s = \sqrt{\frac{{v_s^X}^T D\left(\Sigma_s^X\right)^{-1} v_s^X}{\frac{\mathrm{tr}\left(D\left(\Sigma_s^X\right)^{-1}\right)}{3n_s} \times f_s^X}} \tag{A19}$$

with $D(\Sigma_s^X)$ being a diagonal matrix extracted from the original individual variance matrix, related to the station positions part. Velocity RMS and WRMS estimators are also derived in a similar way as equations (A18) and (A19).

A6. Epoch of Minimal Position Variance

[85] For a given station with position vector X at epoch t_s and velocity vector $\dot{X}$, the variance propagation law gives its variance at epoch t as

$$\mathrm{Var}(X(t)) = \mathrm{Var}(X(t_s)) + 2(t - t_s)\,\mathrm{Cov}\left(X, \dot{X}\right) + (t - t_s)^2 \mathrm{Var}\left(\dot{X}\right). \tag{A20}$$

The epoch of minimal position variance t is the epoch which minimizes the variance of the station position so that:

$$\frac{d[\mathrm{tr}(\mathrm{Var}(X(t)))]}{dt} = 0. \tag{A21}$$

Note that we minimize the *trace* of the variance computed over the 3 components (x, y, z) of the position vector X, taking into account its velocity components ($\dot{x}$, $\dot{y}$, $\dot{z}$), so that

$$t = t_s - \frac{[\mathrm{Cov}(x, \dot{x}) + \mathrm{Cov}(y, \dot{y}) + \mathrm{Cov}(z, \dot{z})]}{[\mathrm{Var}(\dot{x}) + \mathrm{Var}(\dot{y}) + \mathrm{Var}(\dot{z})].} \tag{A22}$$

A7. Spherical Error

[86] Let X_i be the vector of Cartesian coordinates of point i at a given epoch, and Σ_i the associated covariance matrix. There exists a local frame in which Σ_i becomes diagonal. Let P being the rotation matrix that defines the frame transformation. By construction, $P\Sigma_i P^T$ is a diagonal matrix and is actually the variance of the vector U_i defined by ($\mathbb{E}$ is the expectancy)

$$U_i = P(X_i - \mathbb{E}(X_i)) = \begin{pmatrix} u_i^1 \\ u_i^2 \\ u_i^3 \end{pmatrix}.$$

The components u_i^j of U_i are random variables which can be interpreted as error terms over the three coordinates of the rotated vector PX_i. Let us consider the norm of the ith point error vector: $\Delta_i = \sqrt{{u_i^1}^2 + {u_i^2}^2 + {u_i^3}^2}$. One can see that $\mathbb{E}(\Delta_i^2) = \mathrm{tr}(P\Sigma_i P^T) = \mathrm{tr}(\Sigma_i)$ and, finally, the spherical error defined by

$$\delta_i = \sqrt{\mathbb{E}(\Delta_i^2)} = \sqrt{\mathrm{tr}(\Sigma_i)}$$

can be interpreted as the square root of the second moment of the random variable Δ_i (i.e., $\delta_i = \sqrt{\mathrm{Var}(\Delta_i) + [\mathbb{E}(\Delta_i)]^2}$).

[87] Thus the spherical error δ_i measures the dispersion (in the distance sense) of the error vector $X_i - \mathbb{E}(X_i)$ around the true position $\mathbb{E}(X_i)$ of the ith point.

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References

Altamimi, Z., C. Boucher, and L. Duhem, The worldwide centimetric terrestrial reference frame and its associated velocity field, *Adv. Space Res.*, *13*(11), 151–160, 1993.

Altamimi, Z., C. Boucher, and P. Sillard, New trends for the realization of the International Terrestrial Reference System, *Adv. Space Res.*,*30*(2), 175–184, 2002.

Argus, D. F., and R. G. Gordon, No-net-rotation model of current plate velocities incorporating plate motion model NUVEL-1, *Geophys. Res. Lett.*, *18*, 2038–2042, 1991.

Argus, D. F., and R. G. Gordon, Tests of the rigid-plate hypothesis and bounds on intraplate deformation using geodetic data from very long baseline interferometry, *J. Geophys. Res.*, *101*, 13,555–13,572, 1996.

Barkin, Y. V., Secular effects in the motion of the Earth's center of masses, in *IERS Analysis Campaign to Investigate Motions of the Geocenter*, edited by J. Ray, *IERS Tech. Note 25*, pp. 3–13, Obs. de Paris, Paris, 1999.

Blewitt, G., Y. Bock, and J. Kouba, Constraining the IGS polyhedron by distributed processing, in *Densification of ITRF Through Regional GPS Networks*, edited by J. F. Zumberge and R. Liu, pp. 21–37, IGS Cent. Bur., Jet Propul. Lab., Pasadena, Calif., 1994.

Boucher, C., Current intercomparisons between CTS's, in *Reference Frames in Astronomy and Geophysics*, edited by J. Kovalevsky, I. I. Mueller, and B. Kolaczek, Kluwer Acad., Norwell, Mass., 1989.

Boucher, C., Terrestrial coordinate systems and frames, in *Encyclopedia of Astronomy and Astrophysics*, Version 1.0, pp. 3289–3292, Inst. of Phys. Publ., Bristol, UK, 2000.

Boucher, C., and Z. Altamimi, Towards an improved realization of the BIH terrestrial frame, *The MERIT/COTES Report on Earth Rotation and Reference Frames*, vol. 2, edited by I. I. Mueller, pp. 551–564, Ohio State Univ., Dep. of Geol. Sci., Columbus, 1985.

Boucher, C., and Z. Altamimi, Development of a conventional terrestrial reference frame, in *Contributions of Space Geodesy to Geodynamics: Earth Dynamics*, *Geodyn. Ser.*, vol. 24, edited by D. E. Smith and D. L. Turcotte, pp. 89–97, AGU, Washington, D. C., 1993.

Boucher, C., and Z. Altamimi, International Terrestrial Reference Frame, *GPS World*, *7*, 71–74, 1996.

Boucher, C., Z. Altamimi, and L. Duhem, ITRF92 and its associated velocity field, *IERS Tech. Note15*, Obs. de Paris, Paris, 1993.

Boucher, C., Z. Altamimi, M. Feissel, and P. Sillard, Results and analysis of the ITRF94, *IERS Tech. Note20*, Obs. de Paris, Paris, 1996.

Boucher, C., Z. Altamimi, and P. Sillard, Results and analysis of the ITRF96, *IERS Tech. Note24*, Obs. de Paris, Paris, 1998.

Boucher, C., Z. Altamimi, and P. Sillard, The 1997 International Terrestrial Reference Frame (ITRF97), *IERS Tech. Note27*, Obs. de Paris, Paris, 1999.

Chen, J. L., C. R. Wilson, R. J. Eanes, and R. S. Nerem, Geophysical interpretation of observed geocenter variations, *J. Geophys. Res.*, *104*, 2683–2690, 1999.

Davies, P., and G. Blewitt, Methodology for global geodetic time series estimation: A new tool for geodynamics, *J. Geophys. Res.*, *105*, 11,083–11,100, 2000.

DeMets, C., R. G. Gordon, D. F. Argus, and S. Stein, Current plate motions, *Geophys. J. Int.*, *101*, 425–478, 1990.

DeMets, C., R. G. Gordon, D. F. Argus, and S. Stein, Effect of recent revisions of the geomagnetic reversal timescale on estimates of current plate motions, *Geophys. Res. Lett.*, *21*, 2191–2194, 1994.

Dong, D., J. O. Dickey, Y. Chao, and M. K. Cheng, Geocenter variations caused by atmosphere, ocean and surface ground water, *Geophys. Res. Lett.*, *24*, 1867–1870, 1997.

Geodesist's Handbook, *Bull. God.*, *66*, 128 pp., 1992.

Greff-lefftz, M., Secular variation of the geocenter, *J. Geophys. Res.*, *105*, 25,685–25,692, 2000.

Gripp, A. E., and R. G. Gordon, Current plate velocities relative to the hotspots incorporating the NUVEL-1 global plate motion model, *Geophys. Res. Lett.*, *17*, 1109–1112, 1990.

Kinoshita, H., and T. Sasao, Theoretical aspects of the Earth rotation, in *Reference Frames in Astronomy and Geophysics*, edited by J. Kovalevsky, I. I. Mueller, and B. Kolaczek, pp. 173–211, Kluwer Acad., Norwell, Mass., 1989.

Kovalevsky, J., I. I. Mueller, and B. Kolaczek (Eds.), *Reference Frames in Astronomy and Geophysics*, 474 pp., Kluwer Acad., Norwell, Mass., 1989.

McCarthy, D., (Ed.), *IERS Standards*, *IERS Tech. Note 13*, Obs. de Paris, Paris, 1992.

McCarthy, D., (Ed.), *IERS Conventions*, *IERS Tech. Note 21*, Obs. de Paris, Paris, 1996.

Minster, J. B., and T. H. Jordan, Present-day plate motions, *J. Geophys. Res.*, *83*, 5331–5354, 1978.

Munk, W. H., and G. J. F. Macdonald, *The Rotation of the Earth: A Geophysical Discussion*, 323 pp., Cambridge Univ. Press, New York, 1973.

Observatoire de Paris, BIH annual reports for 1985, Paris, 1986.

Observatoire de Paris, BIH annual reports for 1986, Paris, 1987.

Observatoire de Paris, BIH annual reports for 1987, Paris, 1988.

Petit, G., Report of the BIPM/IAU Joint Committee on relativity for space-time reference systems and metrology, in *Proceedings of IAU Colloquium 180*, edited by K. J. Johnston et al., pp. 275–282, U.S. Nav. Obs., Washington, D. C., 2000.

Ray, J., (Ed.), IERS analysis campaign to investigate motions of the geocenter, *IERS Tech. Note 25*, 121 pp., Obs. de Paris, Paris, 1999.

Sillard, P., and C. Boucher, Review of algebraic constraints in terrestrial reference frame datum definition, *J. Geod.*, *75*, 63–73, 2001.

Sillard, P., Z. Altamimi, and C. Boucher, The ITRF96 realization and its associated Velocity field, *Geophys. Res. Lett.*, *25*, 3223–3226, 1998.

Solomon, S. C., and N. H. Sleep, Some simple physical models for absolute plate motions, *J. Geophys. Res.*, *79*, 2557–2567, 1974.

Watkins, M. M., and R. J. Eanes, Observations of tidally coherent variations in the geocenter, *Geophys. Res. Lett.*, *24*, 2231–2234, 1997.

Wilkins, G. A., Review of the achievements of project MERIT for the intercomparison of techniques for monitoring the rotation of the Earth, in *The Earth's Rotation and Reference Frames for Geodesy and Geodynamics*, *Proc. IAU Symp.*, vol. 128, edited by A. K. Babcock and G. A. Wilkins, pp. 227–232, Kluwer Acad., Norwell, Mass., 1989.

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