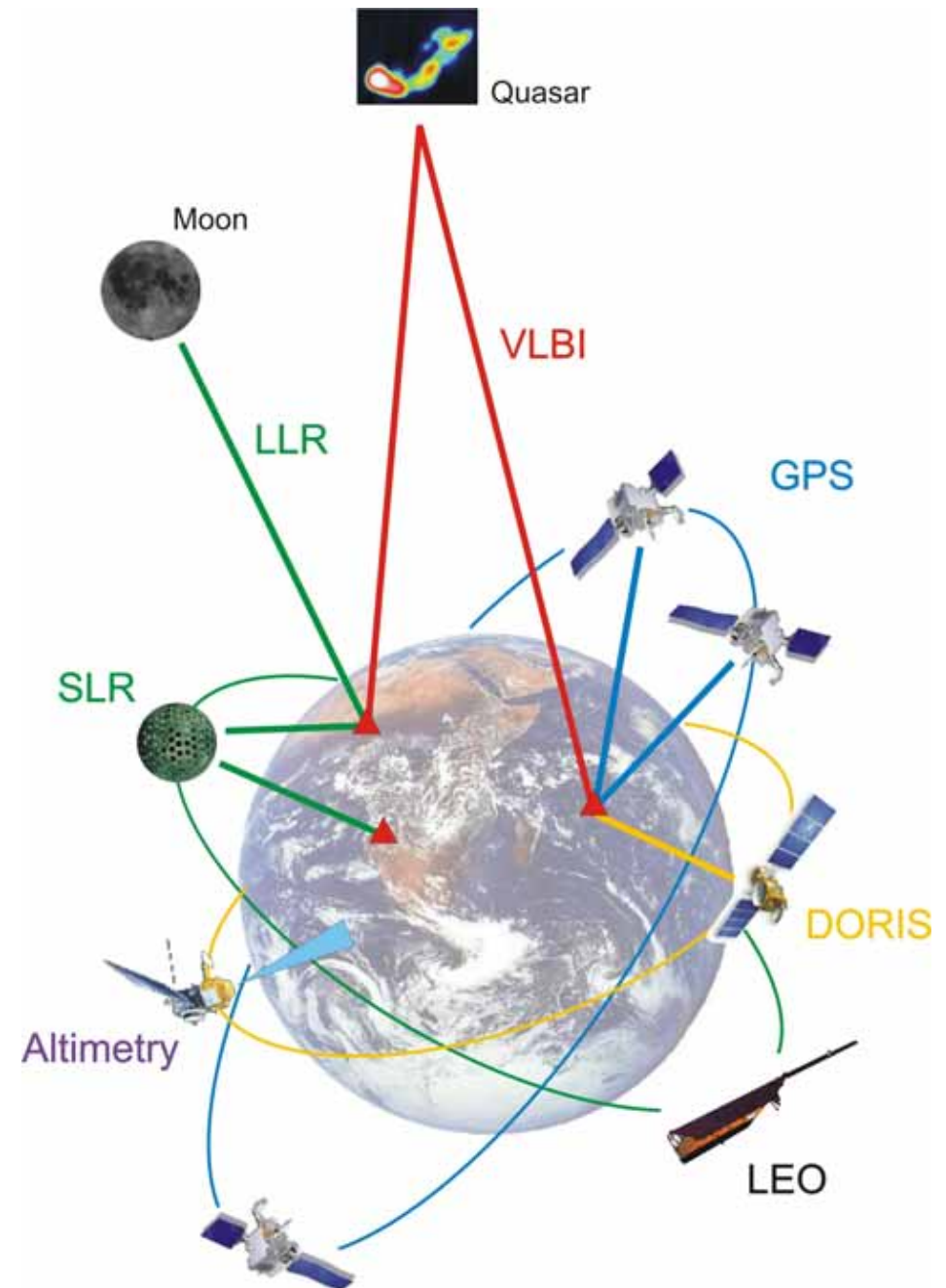


WELCOME

to the

IERS WORKSHOP ON COMBINATION 2005

GeoForschungsZentrum (GFZ)
Potsdam, Germany
October 10-11, 2005



Present and Future Combination

Parameter space for a rigorous combination:

Parameter Type		VLBI	GPS/ GLON.	DORIS/ PRARE	SLR	LLR	Alti- metry
ICRF	Quasar Coord. (ICRF)	X					
	Nutation	X	(X)		(X)	X	
	Polar Motion	X	X	X	X	X	
	UT1	X					
	Length of Day (LOD)		X	X	X	X	
	Coord.+Veloc.(ITRF)	X	X	X	X	X	(X)
ITRF	Geocenter		X	X	X		X
	Gravity Field		X	X	X	(X)	X
	Orbits		X	X	X	X	X
	LEO Orbits		X	X	X		X
Atmosphere	Ionosphere	X	X	X			X
	Troposphere	X	X	X			X
	Time/Freq.; Clocks	(X)	X		(X)		

Earth Rotation Gravity Field

Campaigns and Projects in the Last Few Years

- **IERS EOP Alignment Campaign**
 - Inconsistencies between EOP series aligned to ITRF2000/ICRF and the official C04 and Bulletin A series, e.g., offsets up to 0.2 mas in the y-pole component
 - Combined adjustment of ITRF and EOPs needed to overcome such problems and inconsistencies
- **IERS SINEX Combination Campaign**
 - SINEX format definition extended for other techniques than GPS and is now the crucial basis for all combination work
 - First experiences were collected with SINEX files from different techniques and combination strategies
- **IERS Combination WG and IERS Co-location WG**
 - Set up to coordinate the steps and activities aimed at a set of combined IERS products and improvement of local ties, respectively

Campaigns and Projects in the Last Few Years

- **CONT'02 Campaign Activities (2003/2004/...)**
 - Detailed analysis of combination strategies including UT1/LOD and nutation
 - Analysis of local ties; combination of troposphere zenith delays
- **IERS Combination Pilot Project (Febr. 2004)**
 - Goal: a major step towards more consistent, routinely generated IERS products.
 - Rigorous combination of “weekly” SINEX solutions made available by the various Technique Services
 - Site coordinates, EOPs, and, possibly, quasar coordinates
- **IERS Long Time Series for ITRF2004 / IERS CPP (Dec. 2004)**
 - Call for long time series of combined weekly intra-technique solutions from all major techniques

Meetings and Workshops

IERS Workshops discussing Combination Issues:

- IERS Workshop in Munich in November 2002
- IERS Retreat in Paris in April 2003
- IERS Workshop in Matera in October 2003 (Co-location)
- IERS Workshop in Napa Valley in December 2004
- IERS Workshop in Potsdam in October 2005

IERS Combination WG and CPP Meetings:

- IERS CRC Meeting in Nice 2002
- IERS CRC Meeting in Nice 2003
- IERS Combination WG and CPP Meeting in Nice 2004
- IERS Combination WG and CPP Meeting in Vienna 2005
- IERS Combination WG and CPP Meeting in Cairns 2005

Sessions at Conferences

Sessions on Integration/Combination of the Space Geodetic Techniques:

- **AGU Spring 2002:** Combination and Integration of Space Techniques
- **EGS 2002:** Evolving space geodesy techniques (SLR, GPS, DORIS, Altimetry, VLBI): Combination of techniques
- **COSPAR PSD1/B2.:** Integrated Space Geodetic Systems and Satellite Dynamics
- **EGS 2003:** Interactions and Combination of Space Geodesy Techniques
- **EGS 2004:** Combination of Space Geodetic Techniques
- **COSPAR 2004:** GGOS Sessions
- **AGU Fall 2004:** Combination/Integration
- **EGU 2005:** Updating the IERS Conventions, Reference Systems
- **IAG 2005:** Advances in global/regional reference frames, GGOS

Progress made

- Routine weekly combined intra-technique solutions available (except DORIS) according to schedule. No such solutions available one year ago (except GPS).
- Long homogeneous (reprocessed) time series of weekly combined intra-technique solutions available from all techniques (except DORIS/GPS). No such solutions available one year ago.
- Software developments for the combination efforts (intra- and inter-technique)
- Studies on combination strategies (SINEX Campaign, CONT'02, CPP, ...), assessment of systematic errors, datum problems, ...
- Developments of combination software on observation level (GRGS, TU Munich, GFZ, ...)
- Assessment of local ties and co-location issues
- First ITRF2004 results available based on weekly solutions

Important steps towards yearly IERS200x realizations and weekly routine IERS product generation

IERS Workshop 2005: Program

Monday, October 10:

Session 1: Multi year solutions: ITRF200x/local ties

chaired by Z. Altamimi and D. Angermann

Session 2: Weekly solutions: station coordinates, non-linear station behaviours, systematic effects, etc.

chaired by E. Pavlis and R. Biancale

Tuesday, October 11:

Session 3: EOPs: Multi-year solutions, current analysis, weekly solutions, rapid products

chaired by D. Gambis, J. Vondrak, and W. Wooden

Session 4: Comparison / validation with other time series

chaired by R. Gross and T. van Dam

Session 5: Status of projects, future products and structure of the IERS

chaired by C. Ma and M. Rothacher

IAG Services Contributing to GGOS

Global Geodetic Observing System (GGOS)

Geometry

IERS

IGS

IVS

ILRS

IDS

Gravity

IGFS

BGI

IGeS

ICET

ICGEM

Sea Level

PSMSL

IAS

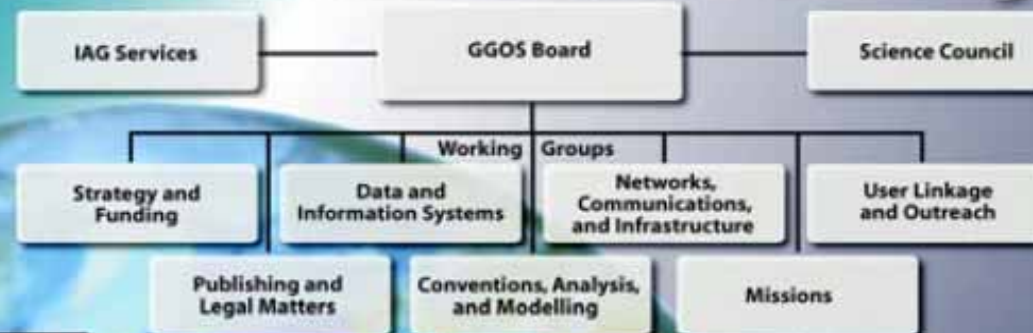
Others

BIPM

IBS

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graph TD
    ICSU[ICSU  
International Council for Science] --> IUGG[IUGG  
Int. Union of Geodesy and Geophysics]
    IUGG --> IAG[IAG  
Int. Association of Geodesy]
    IUGG --> Commission[Commission]
    IAG --> Services[Services]
    IAG --> GGOS[GGOS  
Global Geodetic Observing System]
  
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A series of four globes arranged in a row, decreasing in size from left to right. The first globe shows a full-strength Earth magnetic field with a clear dipole pattern, with red and blue poles. The subsequent globes show the field weakening and becoming more complex, with multiple poles, representing the process of a magnetic reversal.

Geo-hazards

The slide features a photograph of a landslide on the left and a line graph on the right. The graph has a vertical axis labeled 'mm' and a horizontal axis labeled 'Time'. It contains three data series: a blue line that remains relatively flat, a green line that shows a slight downward trend, and a red line that shows a significant downward trend.



Ice Mass Balance

International
ODS
Service (IDS)

International
GNSS Service
(IGS)

International Gravity Field Service (IGFS)

International
VLBI Service
(IVS)

International Earth
Rotation and Reference
Systems Service (IERS)

Geodetic Space Techniques

Satellite Altimetry

Satellite-to-satellite tracking (GRACE)

Atmospheric Sounding (CHAMP)

Geometry and Kinematics

Gravity Field and its Variability

Earth Orientation and Rotation

GGOS
<http://www.ggos.org>

IAQ services are based on more than 400 global observation stations.