

DRAFT

Minutes of the 1. Meeting of the IERS WG on Combination

The 1st meeting of the IERS working group on Combination took place during the European Geophysical Union assembly in Nice on Thursday, April 29, 2004 from 8:30-10:30 h (agenda see Annex 1).

Introduction and Status of the IERS Combination Pilot Project (CPP)

Markus Rothacher, chair of the working group, welcomed the participants of the meeting (list of participants see annex 2). He reviewed the background and the reasons why the working group was created with the final goal to combine rigorously all common parameters of all observing techniques for consistent IERS products. In the following the principle concept of the schedule for the solution was discussed.

The responsible techniques analysis centres weekly "SINEX" solutions of all available space techniques should be made available 8 weeks after the observation as an intra-technique solution. A combined inter-technique solution will be prepared within the following 4 weeks. In a follow on 4 weeks period this solution will be validated before release.

Overview of Proposals

The IERS WG on Combination solicited proposals for the following four components necessary to perform the work envisaged in the IERS Combination Pilot Project:

- Generation of "Weekly" Intra-Technique SINEX Files (step 1)
- Generation of Combined Weekly Inter-Technique Solutions (step 2)
- Validation of Combined Weekly Inter-Technique Solutions (step 3)
- Generation of Special Combined Inter-Technique Products (Special combination).

17 proposals for the IERS Combination Pilot Project have been submitted to the IERS (table 1). Several institutions participate in various steps and special combinations. Detailed information are given at http://www.iers.org/iers/about/wg/wg3/cfp_cpp.html.

Table 1 List of participating institutions and their contributions (extract)

Organization/ Institution/ Service	Cooperating Institutes	Step 1: Intra- technique	Step 2: Inter- technique	Step 3: Validation	Special Combinations
International DORIS Service	Collecte Localisation Satellites (CLS)	DORIS	-	-	-
International GPS Service	-	GPS	-	-	-
International Laser Ranging Service	ILRS pilot project „pos+eop“ (ASI; DGFI; GFZ; NCL; NSGF)	SLR	-	-	-
International VLBI Service for Geodesy and Astrometry	-	VLBI	-	-	-
Astronomical Institute of Czech Academy of Science	Czech Technical University, Department of Geodesy	-	-	-	GPS+VLBI + SLR + DORIS: 2 strategies

Agenzia Spatiale Italiana	Politecnico di Milano; Istituto Nazionale di Geofisica e Vulcanologia; Telespazio SpA	-	VLBI+GPS+S LR+ DORIS (+LLR)	-	-
Geoscience Australia	-	VLBI	-	-	-
Centre National d'Etudes Spatiales	CLS	DORIS	-	-	-
Deutsches Geodätisches Forschungsinstitut	-	-	VLBI+GPS+S SLR+ DORIS (+LLR)	-	-
Groupe de Recherches de Géodésie Spatiale	CLS; CNES; Noveltis; Observatoire Côte d'azur; Observatoire de Paris; Observatoire de Bordeaux; IGN	-	-	-	GPS+VLBI+SLR+ LLR+DORIS: observation level
Institut Géographique National	Observatoire de Paris; Bureau International des Poids et Mesures	-	VLBI+GPS+S LR+ DORIS (+LLR)	station coordinates, polar motion, UT1/LOD, celestial pole offsets, quasar coordinates	-
Institut Géographique National	JPL	DORIS	-	-	-
Joint Center for Earth Systems Technology, NASA Goddard ILRS Analysis Center	Space Geodesy Branch NASA Goddard	SLR	SLR + LEO GPS (summer 2004)	station coordinates, polar motion, LOD (summer 2004)	GPS+SLR+ DORIS (end of 2004): including orbits
Jet Propulsion Laboratory	-	-	-	polar motion, UT1/LOD	-
School of Civil Engineering and Geosciences, University of Newcastle upon Tyne	-	GPS; SLR	GPS, SLR	station coordinates, polar motion, LOD	-
U.S. Naval Observatory	-	-	VLBI+GPS+S LR+ DORIS+LLR	polar motion, UT1/LOD, nutration	subdaily ERPs; daily nutation (VLBI+GPS)
Wuhan University	-	-	VLBI+GPS+S LR+ DORIS+LLR	station coordinates, polar motion, LOD, nutration, quasar coordinates	-

Status and Future of the IERS CPP

IERS database for the CPP

Bernd Richter gave a short report on the status of the IERS database. During the last weeks the IERS database has been set up and first experiences downloading contributions for the IERS Combination Pilot Project (CPP) are being gained. For downloading by the CPP participants the ftp-server responds in an active and passive mode.

The archive currently comprises only "intra-technique" solutions from the Technique Centres (IVS, IGS, IDS) or from specific institutions (NCL: SLR, GPS - IGN/JPL: DORIS). Since the various solutions are not only prepared for the IERS but also for the technique services, all file names are in accordance with the naming conventions of the respective service. Thus, the downloaded files are renamed according to the CPP naming conventions.

A Web-page will be prepared explaining the schemes used to rename the original files with respect to the CPP naming conventions and showing the original location (i.e. ftp-archive) of the files. In addition a bulletin board will be offered showing the newest files with respect to the CPP in the IERS data archive; this page will be dynamically built each time it is called. Also a Web-page is available containing all e-mails from the CPP e-mail exploder.

Short contributions by the IERS CPP participants

(problems encountered etc., first results)

Ron Noomen summarized the results of the ILRS analysis workshop held a few days before. The achievements of the ILRS pilot project are the fine tuning of the solutions to derive a SINEX file as standardized output, to define the number of satellites used for the standard products, but also the number of parameters used in the solution. Since November 2003 weekly solutions are provided by 5 individual analysis centres and a combined intra-technique solution by 3 analysis centres. From June 5, 2004 on ASI will be responsible for the combined weekly solution which will be made available for the CPP. (presentation see annex 3)

Jan Kostelecký described the two strategies they follow at the AICAS Combination Centre. Details can be seen in annex 4. As a lack at the present time it was stated that only GPS solution are available for combination and the local ties information is missing.

Zuheir Altamimi and Jim Ray gave a short review of problems and suggestions to improve the CPP. Their concerns are related to the weekly combination strategy (over-use of tie information, weakness of network inter-connectability) and the combination of satellite-based LOD with VLBI UT1&LOD (UT1 results only when VLBI data are available, simple rigorous methods inadequate for LOD). Suggestions for alternative approaches are described in details in their presentation (annex 5). For the same subject see also annex 6, pages 22-31).

Additional presentations were given by Giuseppe Bianco (ASI) and Daniel Gambis (GRGS).

Tasks of the IERS WG on Combination

In the following Markus Rothacher summarized the tasks of the IERS working group on Combination:

- Coordination of the Combination Pilot Project (CPP)
- Standards for a Rigorous Combination
- Document on "Rigorous Combination of the IERS Products"
- Systematic Biases, Local Ties and Co-Location
- Validation of Combined Products
- Long Term Series of SINEX Files
- Definition of future IERS products
- Additional Combination Aspects

Details to the listed items can be read in annex 6 pages 12-15. For the document on "Rigorous Combination of the IERS Products" (see also annex 6, pages 19-21).

IERS CPP Workshop in Autumn 2004

After some discussion it has been decided that the workshop will be shifted to December to get more experiences in the practical work of combinations and to include data sets just recently available. The 2-days workshop will be held in the vicinity of San Francisco on December 9-10, 2004.

Initiative „IERS2005“

At the end Markus Rothacher proposed an initiative for first rigorously combined solution: $IERS2005 = ITRF2005 + EOP2005 + ICRF2005$.

- IERS2005 will be based on "weekly" SINEX files from all techniques (site coordinates, EOP, and quasar coordinates) over the entire history of their data acquisition.
- The Technique Services (TS) should deliver time series as homogeneous as possible over a time span as long as possible (following IERS conventions). For this consequent follow-up of the CPP a draft time table is given. (annex 6, pages 16-18).

Annexes