



IDS

Meeting minutes

IDS AWG - Paris - March 26-27, 2014

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1. Context

Hereafter are the minutes of the IDS AWG meeting held at CNES Paris on March 26-27.

The main objective of this meeting was to report some status on IDS ITRF2013 reprocessing.

All the slides displayed during this meeting are available at <http://ids-doris.org/report/meeting-presentations/ids-awg-03-2014.html>

2. Day 1 - March 26th

2.1. ITRF2008 vs ITRF2013

By Frank Lemoine

Main differences wrt ITRF2008 processing:

- New Earth time variable gravity fields.
- Correction of a priori frequency for some stations.
- DORIS beacons phase laws (implemented by 5 of 6 ACs).
- SAA corrected data for Jason-1 and Spot-5.
- New satellites: Jason-2, Cryosat-2, HY-2A (optional) and Saral (optional).

2.2. Analysis of DORIS map corrections using phase measurements

By Flavien Mercier and Alexandre Couhert

Estimations show scale differences between 2 sets of solutions as well as differences on up estimates for some stations.

Phase maps seem to vary site by site → will station by station phase maps become necessary?

2.3. Status of ITRF2013 preparation

By Zuheir Altamimi

- ITRF2013 should be ready by Summer 2014.
- Solutions are requested without load corrections.
- IERS plans to estimate both annual and semi-annual signals of coordinates times series as well as post-seismic velocities. Improvements of time series discontinuities are also in preparation.
- IGS asked for one more month → IGS delivery will happen mid April.
- IVS and ILRS should deliver its combined solution by end of March.

Action 1 to C. Tourain and J. Saunier: to provide a table giving an indicator about the quality of phase center position of each site (TBC)

2.4. Doris ground antennas Radio Frequency characterization Status

By Cédric Tourain

- Alcatel and Starec phase laws are available for all zenithal angles from 0 to 90 degrees and all azimuthal angles.
- Distance between 400Mh and 2GHz centre of phase is set to 487mm.

- Phase corrections in the ANTEX-like file have an opposite sign to the GNSS ANTEX convention. As such, corrections must be added to modeled quantities or be subtracted to measured values.

Action 2 to C. Tourain: to provide a new file compliant with the GNSS ANTEX convention (TBC)

2.5. ITRF2013 reprocessing status from the ACs

ESA by Michiel Otten

- One new series (10) with phase laws from early 1993 to late 2012.
- HY-2A is included, Saral is not.
- ESA 10 includes Jason-1 from 2002 until Jason-2' launch.
- Tropospheric biases are estimated for each satellite, a multi-satellite estimation is used for the gradients.
- 2013 should be delivered to ESOC ftp site before April 2014.

GOP by Petr Stepanek

- 3 series were delivered 42, 43 (=42 without cross-track harmonics) and 44 (=43 without HY-2A).
- Saral is not included.
- Data processed in iterative process. SRP and drag estimates from 1st run taken in 2nd iteration as a priori with constraints, strong for SRP, loose for drag.
- Time period 1995-2005 should be reprocessed due to an error in the implementation of Alcatel phase laws.
- New deliveries of series 43 between 1993 and 2005 should be ready by middle of April.
- Then, one solution with Jason-1 will be processed.
- Petr also presented one slide on the scale jump of the multi-satellites solution early 2012. This jump seems to be correlated with scale jumps of Jason-2 and Cryosat-2 single satellite solutions.

GSC by Frank Lemoine

- 2 series: GSC 23 (1993-2013) and GSC 24(=GSC 23 + Jason-1 + HY-2A).
- Saral is not included.
- Use phase laws, SAA corrected data and more frequent Cd adjustments.

Action 3 to GSC: to provide list of edited stations in SINEX files (TBC)

IGN & INA by Pascal Willis

- IGN
 - 2 series: IGN 13 and IGN 15 (IGN13+phase laws)
 - HY-2A and Saral are both included
 - Tz offset in 1998 is due to erroneous Spot-4 files → new delivery happened on March 25
 - After final validation of IGN 15, Pascal will work on IGN 16 = IGN 15 + tropospheric gradients
- INA
 - series 08 (without phase laws) should be completed (1993 to 2003) by the end of the week
 - No Jason-1
 - HY-2A and Saral are not included

LCA by Hugues Capdeville

- One new series (40) with phase laws from early 1993 to late 2013.
- HY-2A and Saral not included
- Solar radiation pressure coefficients of Cryosat-2, Envisat, Jason-1 & -2, Spot-2, -3, -4, -5, and Topex have been revisited → reductions of residuals of empirical accelerations.
- Needs for further investigations on Cryosat-2 (strong Tz) and HY-2A (high scale).

2.6. Analysis of AC Solutions

By Guilhem Moreaux

- ESA: scale discrepancy from 2002 to end of Topex, i.e. during first half of Jason-1 including → should submit one solution without Jason-1 for the former time period
- GOP: Should reprocess 1993-2004
- GSC: ok
- IGN: ok (IDS CC should evaluate latest delivery of 1998).
- INA: ok
- LCA: should look at time period after end of Spot-4 while EOPs are more scattered
- Scale jump early 2012: to further investigate, ACs are asked to submit single satellite solutions over 2011, 2012 and 2013.

Action 4 to IGN and INA: to complete the analysis summary chart

Action 5 to ESA: to submit 2002-2004 without Jason-1

Action 6 to GOP: to reprocess 1993-2004 and to submit a new series for that period

Action 7 to all ACs: to provide single-satellite series over 2011, 2012, 2013, in particular for Jason-2, Cryosat-2, HY-2A

Action 8 to G. Moreaux: to plot formal errors by station

Action 9 to A. Couhert: to check processing chain for Jason-2 and Cryosat-2

Action 10 to J.M. Lemoine: to distribute EIGEN6S2.extended (=EIGEN6S2+drifts over 2012 and 2013)

2.7. ITRF2013 discussions

By All

- Depending on investigations on the scale jump early 2012, IDS should make some recommendations to IERS on its scale validity for this time period.
- IGN asked for more information before not including Saral in its multi-satellites solution(s).
- IERS would appreciate a first IDS combined solution around April 20th to present early results at EGU
 - IDS updated schedule
 - Backward processing (since 2011) of V1 will start on March 31st for an IERS delivery no later than April 20th
 - V2 processing will start after first feedbacks from IERS on V1. V2 should include GOP contribution for 1993-2005 as well as updated series. V2 has to be delivered to IERS before end of May.

3. Day 2 - March 27th

3.1. DORIS satellites constellation update

By Pascale Ferrage

5 operational missions

Spot-5 will be ended in 2015

6 future missions (4 are under approval)

The DORIS 2.2 format will be abandoned starting with the next mission (Sentinel-3A), set for launch in 2015. Data will be available for the forthcoming missions in DORIS/RINEX format only.

3.2. DORIS network status

By Jérôme Saunier

- Current network:

58 stations of which 8 beacons are out of order: 4 for more than one year, Monument Peak, Socorro, Santa Cruz, Yuzhno-Sakhalinsk; 4 for over a year Santiago, Marion Island (South Africa), Manilla (Phillapines), Port Moresby (PNG).

11 new co-locations with GNSS thanks to Regina, 21 high precision local ties surveys in the last 3 years

- DORIS antennas:

CNES and IGN defined areas for improvement:

- work with the manufacturer: improving the manufacturing process; it has been consolidated to avoid misalignment, perpendicularity and centering defaults
- work with IGN: considering devices that will facilitate surveys; an instrumental optical access point is defined
- work at CNES: consolidating the phase corrections to be applied; recent analysis of dispersion show the STAREC antenna is not azimuth dependent.

3.3. CNES reprocessing plans for the next POD standards

By Eva Jalabert and Alexandre Couhert

- GDR-E standards are currently being defined. TRF and Earth Orientation will be based on ITRF2013. New possible models among others: FES2012, seasonal non-tidal geocenter motion (from J. Ries), EIGEN_03series, DTM-2013 (available at <http://www.atmop.eu/index.php/models>). Switch to GDR-E is tentatively scheduled in December 2014.
- Estimation of Jason-1 initial centre of mass. The value estimated by CNES in the early life of Jason-1 (+2cm on the X component wrt Jason-1 prime contractor's value) is confirmed within 2 mm. The following initial values [m] of the center of gravity coordinates (Xinit, Yinit, Zinit) are recommended to be used for Jason-1: 0.955, 0, 0 with the offsets (Dx, Dy, Dz) specified in the file <ftp://ftp.ids-doris.org/pub/ids/satellites/ja1mass.txt>.

3.4. Analysis of Cryosat2, and DORIS station adjustment with SLR

By Ernst Shrama

- Analysis results of Cryosat-2 using SLR+DORIS data were presented.
- Background models. EIGEN5c, GRACE-derived Time-variable gravity FES2004, macromodel, quaternions generated at TU Delft from spacecraft data, DPOD2008/SLRF2008.
- Median RMS: 0.40 mm/s. 1.58 cm. Mean differences with CNES/C2 orbits: Cross-track: 4.29 cm; 1.65 cm radial; 4.25 cm along-track.
- In terms of number of passes for DORIS stations, 3 stations supply -2.7×10^3 passes, whereas 60 stations supply less than 1.0×10^4 passes. These are polar orbiting stations.
- Future plans: adjust emissivity and/or other macromodel parameters for Cryosat2.
- Adjusted DORIS stations wrt. SLR reference frame. Reference frame: IDS to ILRS seems to be consistent at the $1e-9$ level for rotations and 10 mm for dz.

3.5. SARAL processing update

By Frank Lemoine

SARAL SLR and DORIS data were processed from 13-02/17 to 13-12/22. Measurement offsets were estimated for both the SLR and DORIS tracking point offsets. A -4.06 cm (+Z) offset was found for DORIS, and -4.54 cm (+Z) offset was found for SLR. The +Z direction on SARAL is along-track. The average of the two corrections was imputed to the SARAL Center of Mass, and it is assumed the supplied CoM is incorrect. The SLR offsets were further adjusted once the new CoM was applied and an adjustment of +1.57 cm in X (+X) was found. The new adopted CoM are (-0.0112, -0.0067, -0.6152) (meters). With the new offsets we obtain fits of 1.576 cm (SLR) and 0.4142 mm/s (DORIS) compared to 2.137 cm (SLR) and 0.4152 mm/s (DORIS) with the a priori information.

The SARAL altimeter data downloaded from AVISO (GDR-T) are found to be time-tagged at the transmit time, in contrast to what is applied for Jason-2 where the GDR data are time-tagged at bounce time.

Gravity tests with various gravity models were applied to SARAL.

3.6. Satellite Modelling at UCL

By Marek Ziebart and Stuart Grey

- UCL presented a summary of their activities to produce improved non-conservative force models for the DORIS satellites.
- UCL will compute "UCL/Jason-1"-like models for Jason-2, Cryosat-2, SPOT-4, SPOT-5 and TOPEX/Poseidon; Will process complete time series of mission orbits with partners, and analyze impact on the reference frame and other geodetic products.
- Discussed a re-definition of the total solar irradiance. New canonical value of 1361 W/m² rather than -1366 W/m². The irradiance also has solar cycle and many shorter period variations. Would be interested in testing this in conjunction with DORIS Analysis Centers.

3.7. Recent DORIS-related activities at GFZ

By Sergei Rudenko

- GFZ presented the results of a study to investigate the application of a suite of time-variable gravity models to the POD processing for the following altimeter satellites: ERS-1, ERS-2, TOPEX/Poseidon, and Envisat. The impact of the change in TVG modeling on mean-sea level trends was also assessed.
- GFZ uses Earth Parameter and Orbit System - Orbit Computation (EPOS-OC).
- Results discussed in paper published recently in Adv. Space Res. Rudenko S., et al., Influence of time-variable geopotential models on precise orbits of altimetry satellites, Adv. Space Res., doi: DOI : 10.1016/j.asr.2014.03.010.
- VER6 orbits of Envisat, TOPEX/Poseidon, ERS-1, ERS-2, are at the following URL: <ftp://ftp.gfz-potsdam.de/pub/home/kg/orbit/SLCCI>.

3.8. DORIS ground antennas Radio Frequency characterization status

CNES SALP provided to IDS a phase center position and a associated phase law for DORIS STAREC ground antennas.

In order to complete this information, an error budget was established for the antenna.

The different errors sources were analyzed through several measurement campaigns. This analysis gives values for the dispersion on the up component and also on the N/E component.

The DORIS STAREC antenna is now well characterized, and a work performed with the manufacturer improved the error budget for antennas to be produced.

3.9. IDS web site news

By Laurent Soudarin

- Elections for 2 positions for 2015- 2018 by the IDS Associates: Analysis Coordinator and Member-at-large (John Ries's seat). Call for nomination in May, call for vote in October.
- IDS annual activity report in preparation together with reports for IERS and IAG. Still some missing reports.
- New version of plottool (<http://ids-doris.org/plottool/>) including:
 - For station position series: ACs series + IDS combined series + IGS combined series for GNSS stations collocated with DORIS
 - Outputs from Combination Center
 - A network viewer

AWG members are invited to use it and give feedbacks before announcing this new version by DORISmail.

3.10. Next AWG

AWG in October 2014 in Konstanz (Germany).

All information at <http://ids-doris.org/report/meeting-presentations/ids-workshop-2014.html>