

3.4.4 International DORIS Service (IDS)

General The IDS website URL is <<http://ids.cls.fr>>. The IDS Terms of Reference are available at <<http://ids.cls.fr/html/organization/tor.html>>. The present organization of the IDS is similar to that of the other technique-oriented services. It is described at <http://ids.cls.fr/html/report/Organization_IDS_030701.pdf>.

Network The DORIS permanent network is shown on Figure 1. Site logs are available at <<http://ids.cls.fr/html/doris/sitelog.html>>.

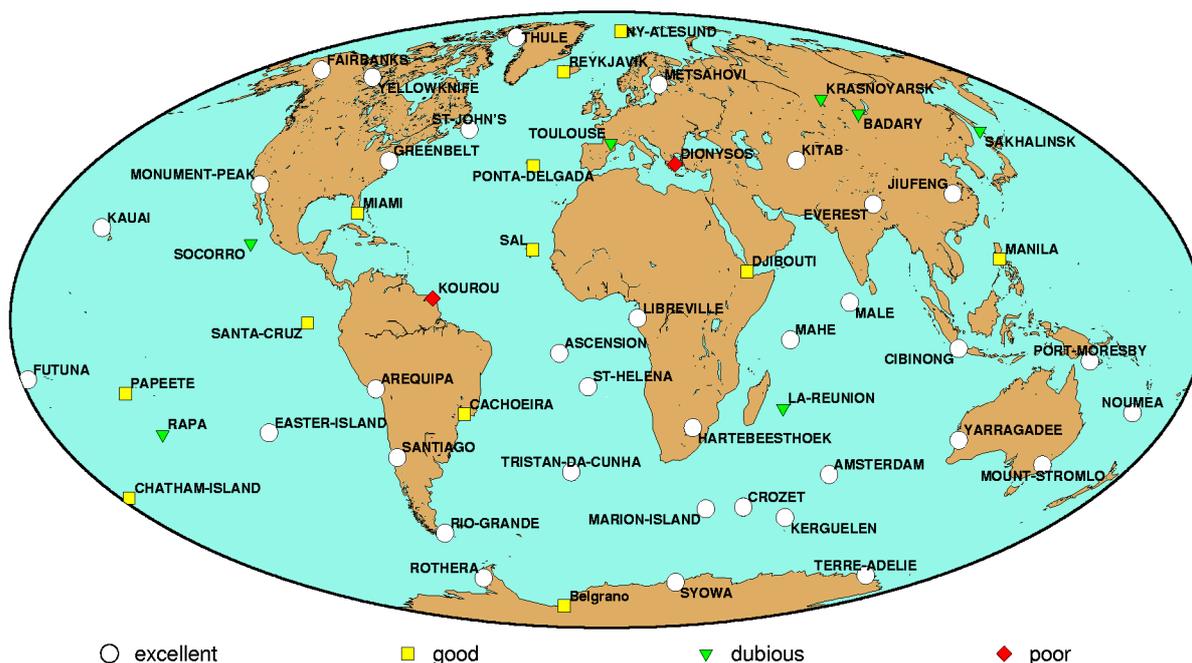


Fig. 1: Estimated stability of the DORIS permanent stations (January 2006)

The stations rejuvenation program initiated in 2000 was continued, as illustrated in Figure 2. In 2005 the following stations were renovated in order to improve the long term stability of the antenna support:

- Rothera (British base in Antarctica)
- Belgrano (Argentine base in Antarctica). This station, initially installed in 2004 following a joint AWI-IAA proposal to the IDS, is now included in the DORIS permanent network thanks to its excellent results.
- Nouméa (New-Caledonia)
- Libreville (Gabon)

Moreover, the following new stations were installed:

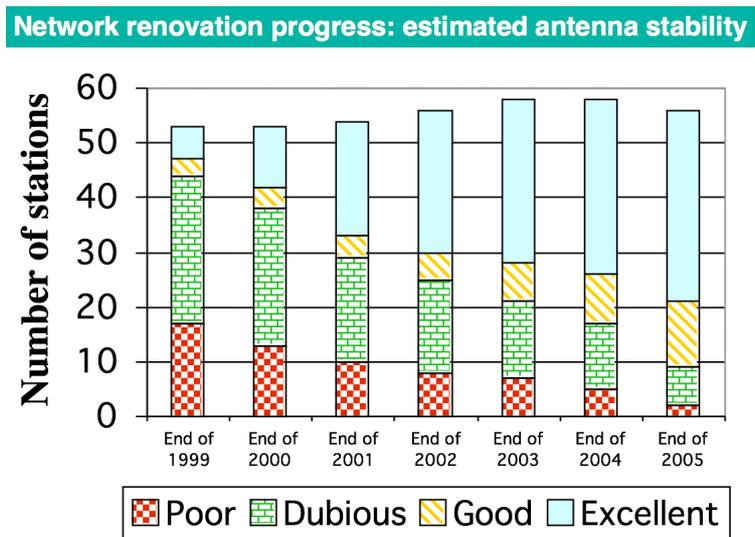
- Male (Maldives), replacing Colombo
- Santa Cruz (Galapagos, Ecuador), replacing Galapagos

3.4.4 International DORIS Service (IDS)

- Monument Peak (California, USA), replacing Goldstone

The total number of DORIS stations is down to 56, but this apparent decrease takes into account the official removal of several stations which actually had stopped transmitting several years ago. At the end of 2005, 47 out of 56 stations (in the permanent orbitography network) are considered to have good or excellent stability. We note that the VLBI operations closure at Fairbanks in 2005 has not resulted in the closure of the DORIS station there since the IGN has reached an agreement with the host agency (NOAA).

Figure 2: DORIS permanent network renovation



The status of co-locations with currently operating stations of the other techniques contributing to IERS (located less than 10 km away from DORIS) is as follows.

- GPS : 37 sites
- SLR : 9 sites
- VLBI : 7 sites

Observing satellites and data flow

Five DORIS-equipped satellites are currently operated: Spot 2, 4 & 5, Jason 1 and Envisat, with altitudes ranging from 800 to 1300 km. CryoSat was lost due to a launch failure on Saturday, October 8, 2005, but CryoSat-2 should be launched in March 2009 to replace it. Jason-2/OSTM should be launched in June 2008 and Alti-KA in June 2009.

The observations (including SPOT 3 and Topex/Poseidon missions) are stored at the two IDS Data Centers (NASA/CDDIS: <ftp://cddisa.gsfc.nasa.gov/pub/doris>; IGN: <ftp://lareg.ensg.ign.fr/pub/doris>). The Data Centers organisation is described at <http://lareg.ensg.ign.fr/IDS/doc/struct_dc.html>. The DORIS data delivery latency has stabilized at 20–30 days for most satellites, with latency of data delivery for DORIS data from ENVISAT showing the

most improvement in 2005.

Currently the most active groups are IGN/JPL, INASAN and LEGOS/CLS as they have submitted long time series of solutions to the data centers, under the Sinex format when applicable. Other centers are providing partial results or are still in development: Geoscience Australia/GSFC, CNES/SOD, CNES/SSALTO, VUGTK (Prag), IAA.

H. Capdeville and J.M. Lemoine (J. Geodesy, 2006) have prepared a model to correct the JASON-1 DORIS data for the perturbation due to the South Atlantic Anomaly (SAA). This radiation-related disturbances deleteriously affects station positioning performance through the impact on the JASON Doris oscillator. We plan in 2006 analysis campaigns to validate this model's utility. This is an important issue, as the number of satellites in the weekly solution directly affects the quality of the derived products. In this context, the continuation of a robust DORIS satellite constellation is extremely important.

IDS products, contributions to IERS data analyses

As of January 2006, main IDS available products are as follows.

- weekly IGN-JPL times series of terrestrial reference frames (TRF) including daily polar motion to contribute to the Combination Pilot Project
- weekly IGN-JPL time series of station coordinates
- weekly IGN-JPL time series of TRF translation and scale parameters
- weekly INASAN times series of terrestrial reference frames (TRF) including daily polar motion
- weekly INASAN time series of TRF translation and scale parameters
- weekly LEGOS-CLS times series of terrestrial reference frames (TRF) including daily polar motion
- monthly LEGOS-CLS time series of station coordinates
- weekly CNES/SSALTO times series of terrestrial reference frames (TRF) including daily polar motion
- weekly CNES/SSALTO time series of station coordinates
- weekly GSFC times series of terrestrial reference frames (TRF) including daily polar motion

The IDS submitted three SINEX time series to the ITRF2005 solution. An important issue for DORIS is the differing scale of the weekly time series combinations wrt to ITRF2000. For example the IGN/JPL and LEGOS/CLS scales differ by 50 mm (Tavernier et al., 2006, J. Geodesy). This might be traced to differing modelling standards at the analysis centers or details in the modelling of the troposphere refraction correction and mapping functions. We plan to elucidate this issue in 2006.

3.4.4 International DORIS Service (IDS)

Journal of Geodesy special issue

In 2005, the IDS GB agreed to organize a special issue for DORIS data analysis and contributions. 18 manuscripts were submitted, and publication is set for 2006. Pascal Willis has served as guest editor for this special issue with Will Featherstone.

Analysis Coordination

Martine Feissel-Vernier retired at the end of October 2005 and left the function of IDS Analysis Coordinator that she initiated in February 2002. Frank Lemoine was then elected to replace her. The Analysis Coordination tasks (<http://lareg.ensg.ign.fr/IDS>) are run jointly by the Analysis Coordinator and the Central Bureau at CLS.

Following the release of the first gravity field models derived from the Grace mission in 2003, an analysis campaign was launched to study the impact of the gravity field model on the derived terrestrial and orbital reference frames, and to develop tools for the comparison, validation and combination of terrestrial reference frames. The final report of the campaign was issued in 2005.

An IDS Workshop took place in March 2006 in Venice. The discussion topics included DORIS system and network improvements, operational issues, analysis strategies, DORIS orbits and ionospheric parameters, and reference frame and combination issues. See the contributions at http://ids.cls.fr/html/report/ids_workshop_2006/welcome.html. This meeting provided an opportunity to intensify the technical discussions between the analysis centers.

Stability analyses of time series of station coordinates showed that the DORIS geodetic results are affected by white noise, while GPS time series are affected by flicker noise. This implies that the long term stability of the DORIS terrestrial reference frame results might be comparable to that of the other techniques.

*Hervé Fagard, Martine Feissel-Vernier,
Frank Lemoine, Gilles Tavernier*