Overview

The current report presents the different activities held by all components of the International DORIS Service (IDS). In a first step, we will present the current status of the DORIS system (available satellites and tracking network). In a second step, we will present the activities of the IDS Central Bureau (IDS Web site management and DORIS-related email distributions). We will then focus on the most recent activities conducted by the Analysis Centers (ACs) and the Analysis Coordination. Finally, we will present other activities related to meetings and publications.

1 DORIS system

1.1 DORIS satellites

During this report period (2011), the number of DORIS satellites has increased up to seven (see Table 1).

Satellite	Start	End	Type
SPOT-2	31-MAR-90 04-NOV-92	04-JUL-90 15-JUL-09	Remote sensing
TOPEX/Poseidon	25-SEP-92	01-NOV-04	Altimetry
SPOT-3	01-FEB-94	09-NOV-96	Remote sensing
SPOT-4	01-MAY-98	–	Remote sensing
SPOT-5	11-JUN-02	–	Remote sensing
Jason-1	15-JAN-02	–	Altimetry
ENVISAT	13-JUN-02	–	Altimetry, Environment
Jason-2	12-JUL-08	–	Altimetry
Cryosat-2	30-MAY-10	–	Altimetry
HY-2A	1-OCT-11	–	Altimetry

Table 1: DORIS data available at IDS Data Centers. As of December 2011

On August 15 2011, a new DORIS satellite (HY-2A) was launched including the last generation receiver (DGXX) on-board: digital, 7-channel, allowing direct phase measurement like GPS (instead of Doppler data).

In the near future, several new DORIS satellites are already planned (and approved): SARAL/Altika, Sentinel-3A, Jason-3, … This should increase or at least stabilize the number of DORIS satellites in the 2012–2016 time period.

1.2 DORIS network

The station at Monument Peak, CA, USA was closed in 2010 because of conflicts in frequency with a nearby TV relay station. Since then, 56 stations make up the DORIS permanent network and two additional stations are dedicated to experimentation: Gavdos (Crete, Greece) and Grasse (France).
Two new models of beacon came out this year:
Model 3.1 with mainly software improvement, becoming more simple and strong. Two stations have been equipped this year: Toulouse and Yarragadee.
Model 3.2 is more interesting with regard to the station configuration. This beacon works with optic cables and requires an extend amplifier. This allows till 80m distance between the beacon and the antenna, compared with 15m for regular cables. It will be easier to meet the sky view and stability requirements for DORIS antenna.
The remote control system allowing distance settings on the beacon is still being deployed: 23 stations are now equipped.

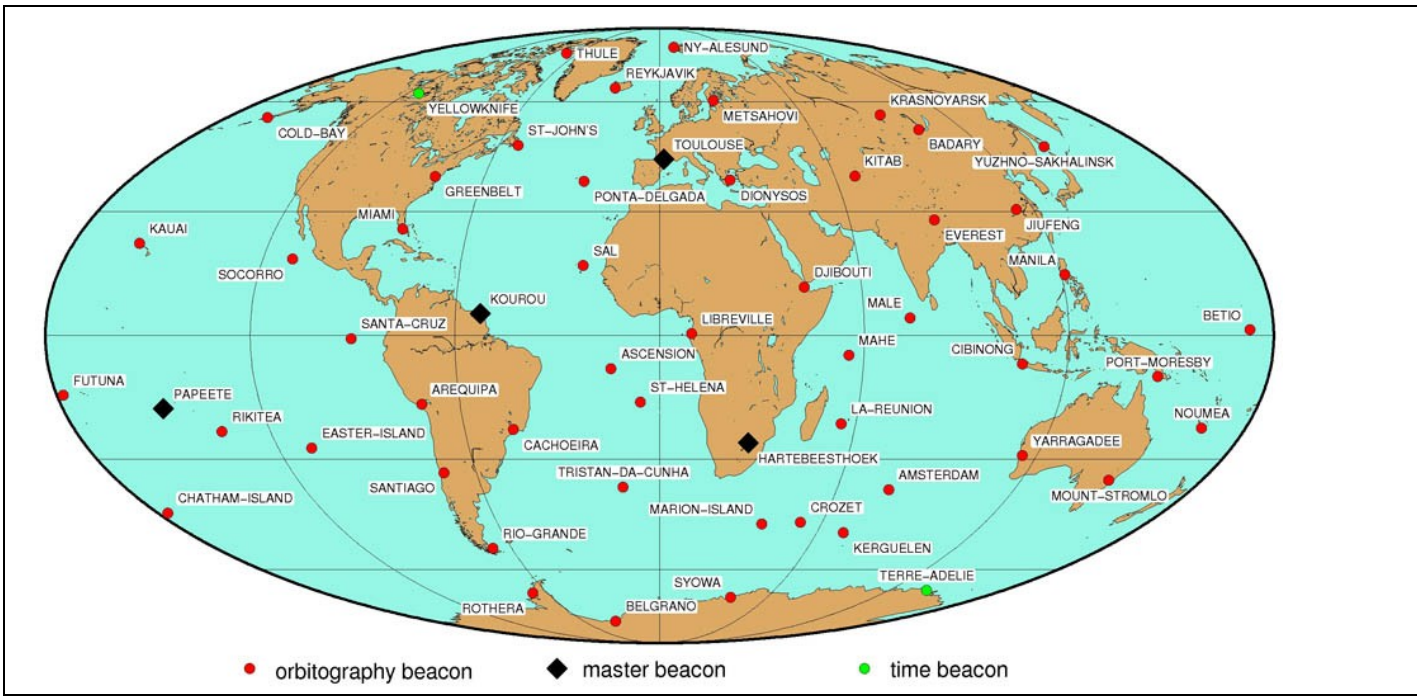

Fig. 1: The permanent DORIS network – 56 stations (as on Dec. 2011).

2 IDS Governing Board

The current Governing Board (GB) was elected at the end of 2008 (see Table 2). On GB's request, a Working Group was formed on September 2010 to review and update the IDS Terms of Reference. The WG, chaired by Mike Pearlman, proposed a revised version, which was first adopted by the GB, then by the IAG Executive Committee at the XXVth IUGG General Assembly in July 2011. The main evolutions of the text are:

- Revision of the election process of the GB members; the members at large are elected by the Associates Members, and not by the GB.
- Addition of a representative for the Combination Center.
- Addition of a DORIS system representative appointed by CNES
- Appointment of the network representative by IGN

The new Terms of Reference will be applied for the renewal of the GB whose term is ending in December 2012.

Name	Institution	Country	Mandate
Pascale Ferrage	CNES	France	Member at large
Bruno Garayt	IGN	France	Network representative
Frank Lemoine	GSFC	USA	Analysis Coordinator
Chopo Ma	GSFC	USA	IERS representative
Carey Noll	GSFC	USA	Data flow Coordinator
Michiel Otten	ESOC	Germany	IAG representative
John Ries	U. Texas/CSR	USA	Member at large
Laurent Soudarin	CLS	France	Director IDS Central Bureau
Pascal Willis (chair)	IGN/IPGP	France	Analysis Center representative

Table 2: Composition of the IDS Governing Board (since January 2010)

3 IDS Central Bureau

3.1 IDS Web and ftp sites

The IDS Central Bureau maintains the IDS web (http://ids-doris.org) and ftp (ftp://ftp.ids-doris.org/pub/ids) sites. In 2011, the web site was enriched with:

- a photo gallery (http://ids-doris.org/gallery.html) proposing pictures from some local teams of agencies hosting the DORIS stations, as well as photos taken during AWG meetings, IDS workshops, and GB meetings;
- the presentations of the AWG meeting held on May 23-24, 2011, in Paris, France (http://ids-doris.org/report/meeting-presentations/ids-awg-05-2011.html);
- a new page about the next IDS Workshop to be held in Venice on September 2012 (http://ids-doris.org/report/meeting-presentations/ids-workshop-2012.html);
- several activity reports (IDS Activity report for 2010, 2007-2011 Report for the International Association of Geodesy, 2008-2009 Report for IERS) as well as the minutes of the IDS GB meetings held in 2011 (http://ids-doris.org/report/governing-board.html);
- 7 new references of articles published in 2011. See the list of the peer-reviewed publications related to DORIS (http://ids-doris.org/report/publications/peer-reviewed-journals.html#2011);
- 7 updated versions of site logs provided by IGN for Amsterdam Island, Easter Island, Chatham Island, Cibinong, Crozet, Kerguelen, Male, Marion Island, Monument Peak, Mount Stromlo, Rikitea (http://ids-doris.org/network/sitelogs.html);
- new pictures and fish-eye views of the visibility obstruction for Nouméa, Rothera, Dionysos, Djibouti, Marion Island, Toulouse, Fairbanks, Amsterdam Island, Crozet, Rikitea, Cold Bay, Greenbelt, Ascension, Krasnoyarsk (http://ids-doris.org/network/sitelogs.html).

New documents and files were put on the IDS ftp site, in particular a new version of the document describing the DORIS satellite models implemented in CNES POE processing. It includes clarifications on Spot-5 solar panel offset. (ftp://ftp.ids-doris.org/pub/ids/satellites/DORISSatelliteModels.pdf)

Access to the IDS website is still steadily increasing from month to month since spring 2000. In late 2011, this website was accessed about 2000 times each month on a regular basis.

3.2 IDS Mail system

Several types of emails are distributed by the IDS Central Bureau:
- DORISMail: general DORIS interest
- DORISReports: reports related to DORIS data and products
- AWG and IDS Analysis Forum: technical discussion between analysis centers, combination and coordination
- DORISstations: information about station events (data gap, positioning discontinuities)

Everyone is welcome to subscribe to any of these emails. See more details on <http://ids-doris.org/report/mails.html>.

4 IDS Data Centers

The IDS data flow organization remains the same. It is based on two data centers: one on the East Coast of the U.S. (CDDIS at NASA GSFC) and one in Europe (IGN in France). They are both exact mirrors of each other, and so, are able to continue on an operational basis, even if one of them is inaccessible due to a temporary failure.
These two data centers archive the DORIS data as well as the IDS products (station coordinates and velocity, geocenter motion, earth orientation parameters, ionosphere data, etc.).
Data from HY-2A launched in 2011 are now archived in the IDS Data Centers, in data format 2.1 and in RINEX version 3.0 (phase data), as it is the case for the DGXX receivers on Jason-2 and Cryosat-2.

5 IDS Analysis Centers

Like the other technique services in IAG, IDS has now a large number of independent Analysis Centers. All seven analysis centers that participated in ITRF2008 continue to remain active, participating in the IDS activities.

Acronym	Analysis Center	Country	Software package
ESA	ESOC	Germany	NAPEOS
GAU	Geoscience Australia	Australia	GEODYN
GOP	Geodetic Observatory Pecny	Czech Rep.	Bernese
GSC	GSFC	USA	GEODYN
IGN	IGN	France	GIPSY/OASIS
INA	INASAN	Russia	GIPSY/OASIS
LCA	CNES/CLS	France	GINS/DYNAMO

Table 3: List of IDS Analysis Centers routinely participating in the analysis activities in 2011.

An Analysis Working Group (AWG) meeting was held this year at the Bureau des Longitudes, Paris, France, May 23-24, 2011, with 19 participants from all the active analysis centers (ESA, GAU, GSC, GOP, IGN, INA, LCA), as well as the CNES, GRGS, CLS, TU Delft, and UCL (University College London) and the GFZ. The principal themes concerned:

(1) the status of the IDS Combination;
(2) the presentation of the first results concerning analysis of Cryosat-2 data;
(3) a detailed report concerning analysis and use of the RINEX phase data for DORIS data analysis;
(4) plans for the operational update to ITRF2008 (DPOD2008);
(5) future plans for improved modeling of the nonconservative forces on the DORIS satellites by UCL;
(6) tests regarding attempts to implement a DORIS phase center correction as a station correction;
(7) analysis of a hypothesis concerning a phase center offset between the Alcatel and Starec antennae.
In addition GFZ (S. Rudenko) presented the capabilities of the E/POS software to process LEO satellite data, include DORIS data.

6 IDS Combination

In line with the successful DORIS contribution to ITRF2008, IDS decided to extend the combination process to an operational service. In 2011, the combination procedure has been upgraded and consists now in 3 steps:
1) evaluation of ACs SINEXs w.r.t. ITRF2008
2) combination of all ACs series
3) evaluation of ACs SINEXs w.r.t. the IDS combined series.
The IDS combined series has been extended since last delivery for ITRF2008. At the end of 2011, this multi-ACs series stops at the end of the first quarter of 2011.
The Combination Center also analysed the so-called Jason-2 Jason-1 like series (i.e. Jason-2 2DFCs) provided by LCA. That series, which has been designed to better understand the impact of the 7 DORIS frequency channels (DFCs) of the new DORIS DGXX receiver, used the Jason-1, 2 tandem period (September to December 2008). The analysis shows that the increase of DFCs on the DGXX receiver has a positive impact on the Tz parameter.

7 Meetings

In 2011, the IDS organized a DORIS Analysis Working Group meeting in Paris, France, on May 23-24, 2011.
All the presentations from the meeting are made available by the Central Bureau on the IDs website at http://ids-doris.org/report/meeting-presentations/ids-awg-05-2011.html.

8 Publications

Two DORIS Special Issues were published in the past few years, the first one in the Journal of Geodesy 80(8-11), 2006, the second one in Advances in Space Research (volumes 45 and 46, issue 12), 2010.

IDS published a 2011 activity report that was broadly distributed to all DORIS participants and relevant services (see <http://ids-doris.org/report/governing-board.html#activity>).

All DORIS related articles published in international peer-reviewed journals are available on the IDS Web site<http://ids-doris.org/report/publications/peer-reviewed-journals.html>.

Conclusions

In conclusion, the DORIS community had a productive year in 2011. Seven analysis centers routinely participated in the analysis activities. The combination process has been extended to an operational service. The ACs were asked to continue their series in so far as was possible to be consistent with their ITRF2008 submissions.

A third DORIS/DGXX has been placed in orbit on board the HY-2A satellite. This new receiver generation brings more data (7-channel receiver), better quality (equivalent to 0.3 mm/s) and the possibility to process these data using a GPS-type technique (access to raw DORIS phase measurement instead of Doppler data). In the near future several new satellites equipped with DGXX instruments should be launched, insuring a minimum of four DORIS satellites for the 2012–2016 time period.

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