

International Doris Service

IDS REPORT 2010

IERS Directing Board Meeting #51

Paris Observatory, Paris, FRANCE

October 9, 2010



Outline

1. **Satellite Constellation Status.**
2. **Network Status.**
3. **DORIS data and Data Center Status.**
4. **Central Bureau Report.**
5. **DORIS Special Issue (Adv. Space Research).**
6. **New IDS Citation.**
7. **Analysis Center Activities (Post-ITRF2008).**

Report by Frank Lemoine, with contributions from Pascale Ferrage, Pascal Willis, Laurent Soudarin, Carey Noll, Jérôme Saunier

DORIS Constellation Status - Current Missions

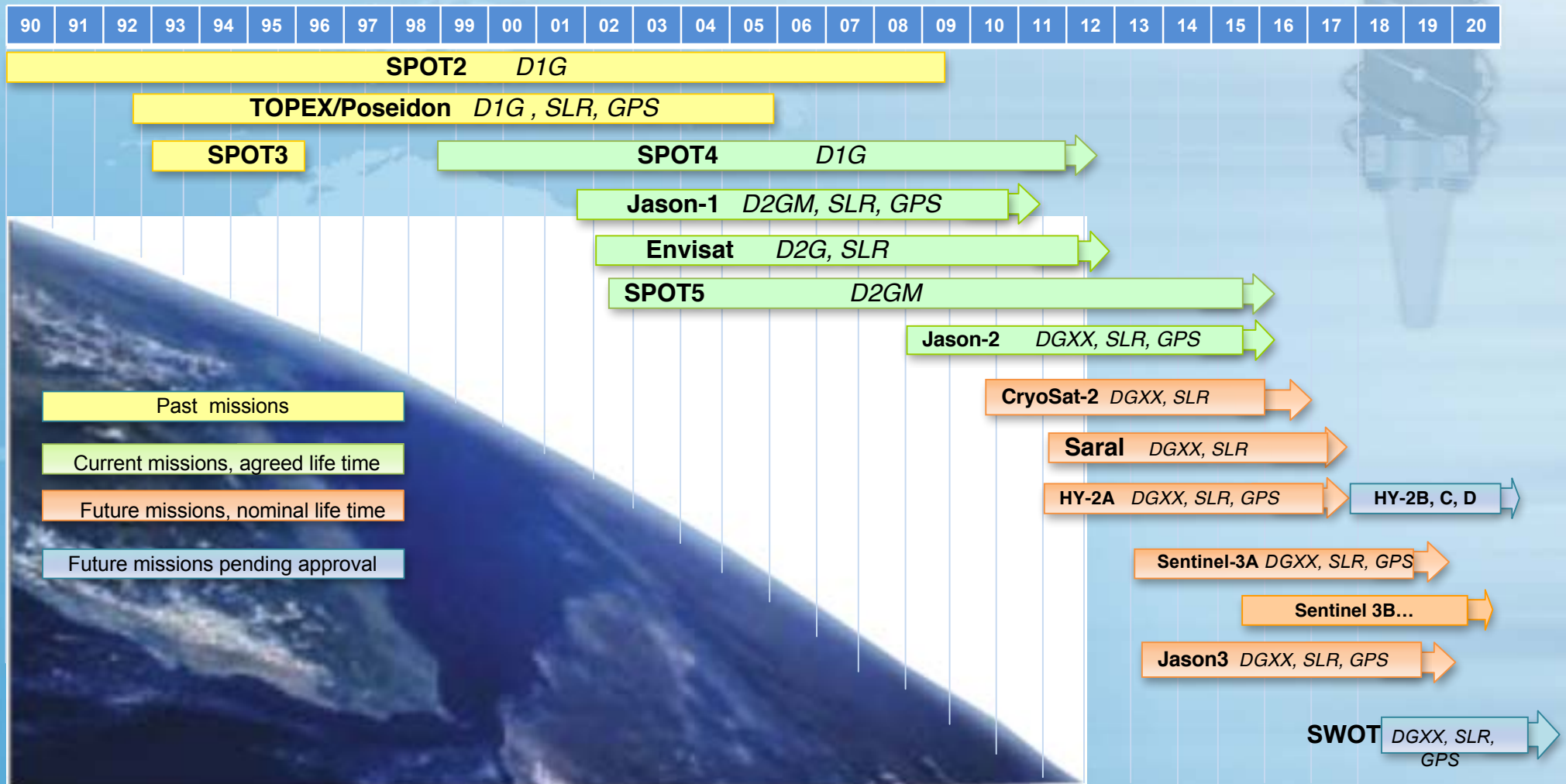
- **CRYOSAT-2** (ESA): 717 km, 92° April 8, 2010 → end 2013, (DGXX + LRA)
- **JASON-2** (CNES/NASA): 1336 km, 66° June 2008 → end 2013, (DGXX+LRA+GPS)
- **ENVISAT** (ESA): 800 km, 98.5° March 2002 → 2013, (D2GM + LRA)
(Oct 2010: orbit change: altitude reduction -17.4 km)
- **SPOT5** (CNES): 830 km, 98° May 2002 → 2015 (D2GM only)
- **JASON-1** (CNES/NASA) 1336 km, 66° Dec 2001 → end 2011 (D2G+LRA+GPS)
- **SPOT4** (CNES): 830 km, 98° March 98 → 2012

DORIS Constellation Status - Future Missions

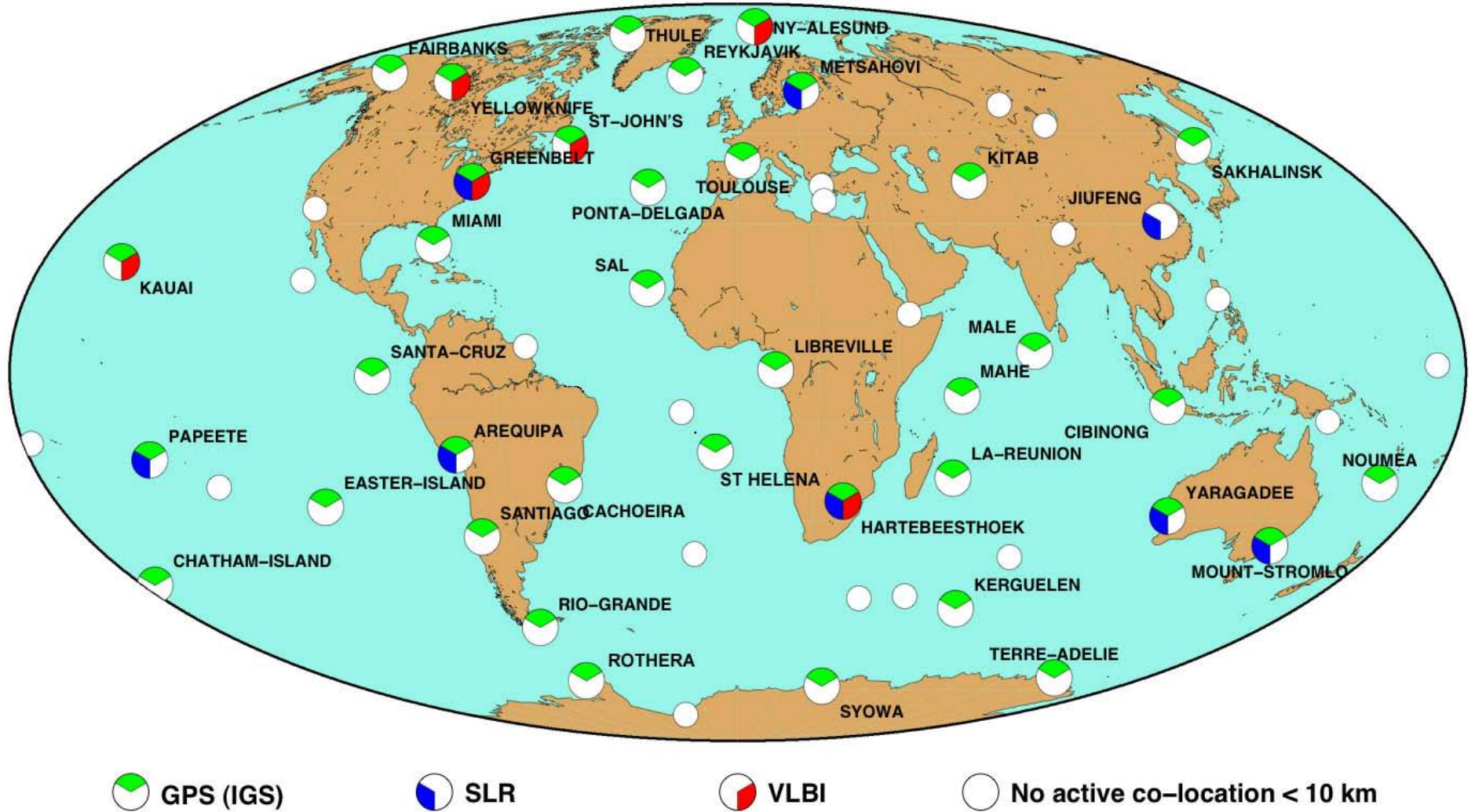


- **SARAL/ALTI-KA (ISRO)** : 800km, 98.5° Mid 2011, (5 years), (DGXX + LRA)
- **HY2A (CNSA)** : 963km, 99.3° June 2011, (3 years), (DGXX+LRA, GPS)
... then HY2B, 2C, 2D...
- **SENTINEL3A (GMES)** : 814km, 98.6° April 2013, (7 years), (DGXX+LRA+GPS),
Sentinel 3B: 12 to 30 months later
- **JASON-3 (Eumetsat/NOAA/CNES)** : 1336 km, 66° Summer 2013 (DGXX+LRA+GPS),
- **SWOT (NASA/CNES)** : 970km, 78° 2020 (DGXX+LRA+GPS),

DORIS CONSTELLATION SUMMARY



Network



Network events, 2009

- November 2009: Papeete becomes the 4th master beacon
- **November 2009: Reconnaissance in Alaska to search for new site**
(prepare for decommission of Fairbanks)
- November 2009: Beacon replacement at Rothera
- October 2009: Major renovation at Krasnoyarsk
- **September 2009: Restarting (interruption of 4 years) at Badary**
- August 2009: co-location survey at Grasse
- June 2009: Beacon replacement at Ponta Delgada
- May 2009: Equipment upgrade at Sal
- May 2009: Beacon replacement at Kauai
- May 2009: Beacon replacement at Greenbelt
- **April 2009: Reconnaissance and signature of agreement at Riyadh**
- April 2009: Antenna raising at Amsterdam
- April 2009: Beacon replacement at Mahe
- March 2009: Antenna raising at Crozet
- March 2009: Monument replacement following damage at Rikitea
- February 2009: Beacon replacement at La Reunion
- January 2009: Antenna support replacement at Cibirong
- **January 2009: Reconnaissance with a view to install at Tamanrasset**

Network events, 2010

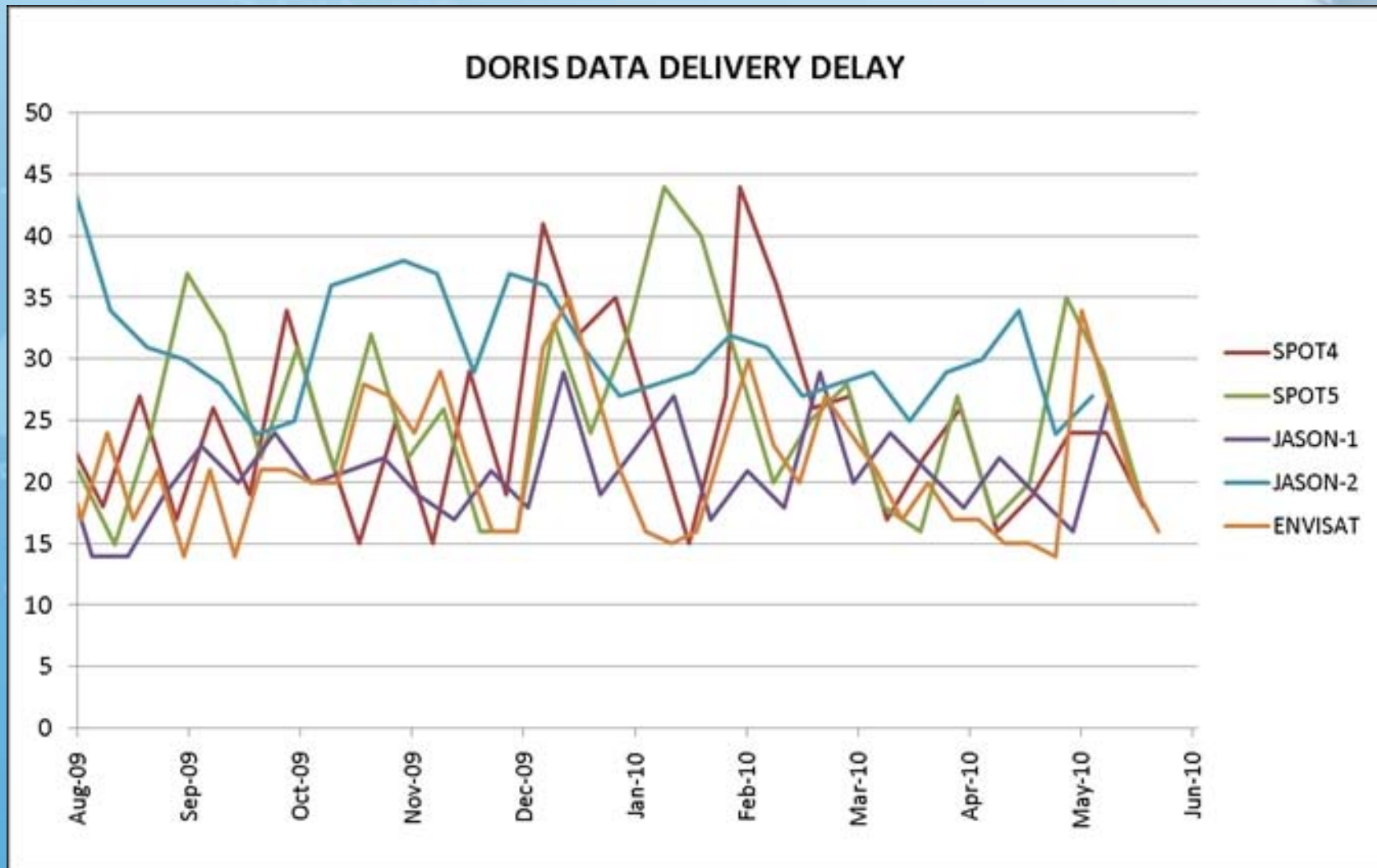
- **October 2010: New station at Cold Bay (AK) in progress...**
- **October 2010: Equipment upgrade at Kourou**
- **September 2010: Beacon replacement at Amsterdam**
- **June 2010: Local tie survey (new GNSS station) at Saint Helena**
- **June 2010: Major renovation (antenna moving...) at Ascension**
- **June 2010: Beacon out of order at Santa Cruz (remains unsolved)**
- **May 2010: Beacon replacement at Mount Stromlo**
- **May 2010: Local tie survey (new GNSS station) at Libreville**
- **May 2010: Beacon replacement at Cibinong**
- **May 2010: Equipment upgrade at Male**
- **April 2010: Beacon replacement at Marion Island**
- **April 2010: Coordinates update following earthquake at Santiago**
- **April 2010: Beacon replacement at Easter Island**
- **March 2010: Beacon replacement at Chatham**
- **February 2010: Equipment upgrade at HBK**
- **February 2010: Shutdown at Monument Peak (CA)**

Network improvement

- Installation of a remote management system (13 stations)
- Standardization of the stations configuration
- Respect for system requirements
- Beacon model 3.0 deployment almost completed :
 - Fairbanks, Futuna : 2.0
 - Socorro : 1.0
- Maintenance operation on each master beacon every year



DORIS Data Latency



DORIS RINEX data status

DORIS Measurements are available daily in Receiver Independent “GPS like format” for: JASON-2 (since July 2008) , CRYOSAT-2 (since May 2010) and future missions...
.....With a latency of only a few days

Documentation on RINEX files is available on IDS website:
http://www.ids-doris.org/pub/ids/data/RINEX_DORIS.pdf

Measurements are dated (event : signal arrival at antenna phase center) in two ways :

In On Board Time

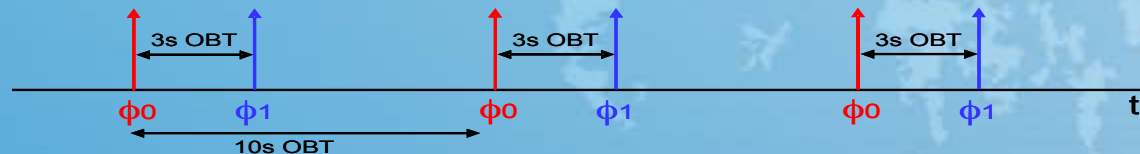
Pseudorange measurements on Time Beacons may be used for all measurements redatation

In International Atomic Time scale

By means of the [TAI - OBT] field

Time correspondence is currently estimated by the OBSW (DIODE) with an accuracy of few microseconds

Two sets of phase measurements “ ϕ_0 ” and “ ϕ_1 ” are available:



IDS DATA CENTER AND DATA FLOW UPDATE (1/2)

➔ Main directory structure at data centers:

- **/doris/data: data in DORIS and RINEX formats**
- **/doris/products: all derived products**
- **/doris/ancillary: other information to help in use of data**
 - ◆ Quaternions
 - ◆ Other TBD
- **/general: data summaries, general information**
- **/doris/cb_mirror: copy of files from IDS CB ftp site**

IDS DATA CENTER AND DATA FLOW UPDATE (2/2)

◆ New satellite data (DGXX instrument):

- Jason-2 and CryoSat-2 (delivery began Jul-2010)
- Data archived in DORIS and RINEX formats

◆ Jason-2 data reissue:

- Error in ionospheric correction field for RINEX 2.2 format
- Data reissued early Mar-2010 and DORISmail issued
- Error in phase center position header record; re-issue required for data from 2008 through mid-2010

◆ SPOT-4 data reissue:

- Data from 05/98-01/99 contain an erroneous offset correction (Willis et al, 2005)
- Data reissued 21-Sep-2010 and DORISmail issued

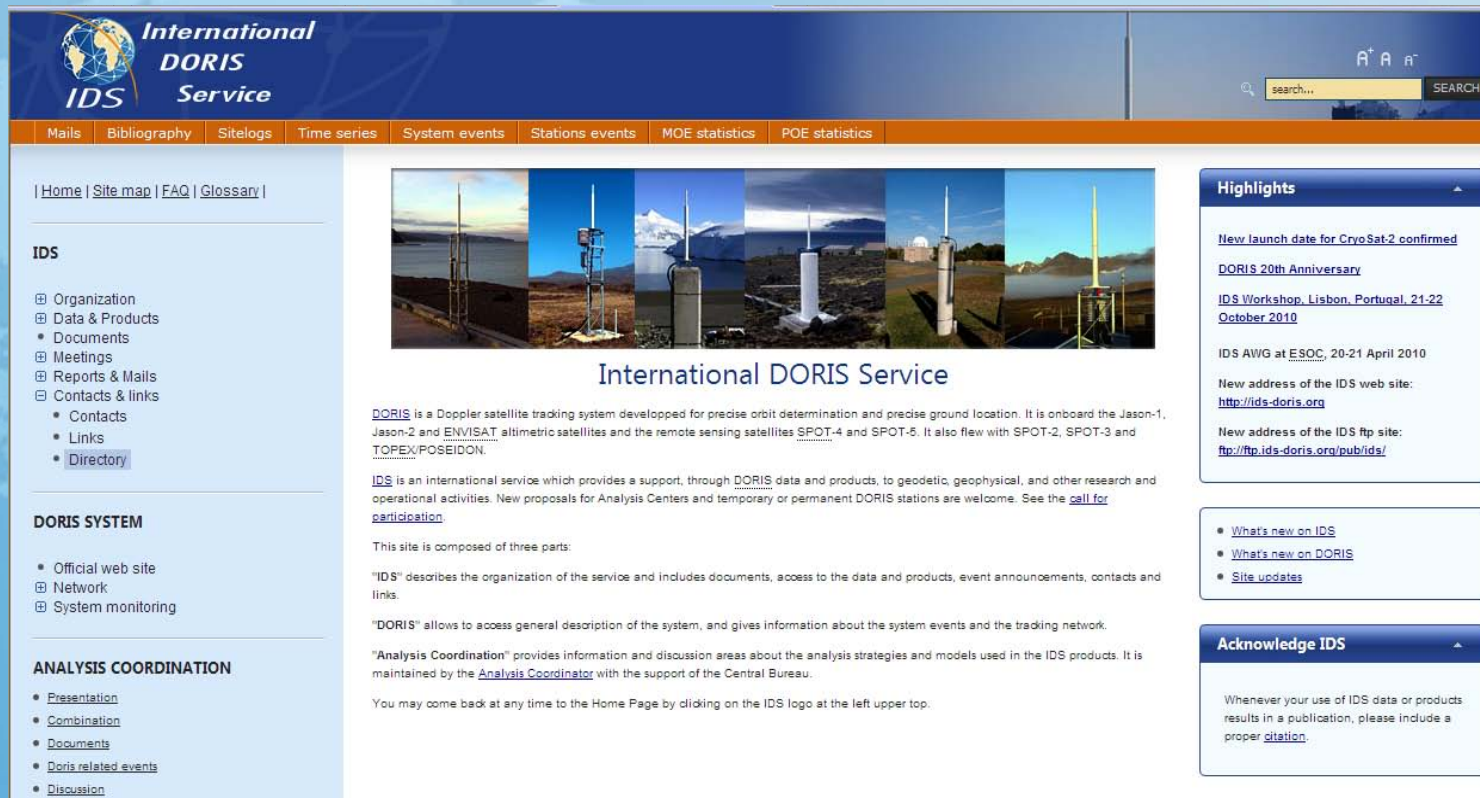
◆ POE orbits (in SP3 format) from CNES-SSALTO for SPOT4 and SPOT5, Envisat, Jason, and CryoSat since May-10

IDS web site: ids-doris.org

Central Bureau ftp site: [ftp.ids-doris.org](ftp://ftp.ids-doris.org)

Mailing lists: all changed to @ids-doris.org

Web site: New version since March 2010



The screenshot shows the homepage of the International DORIS Service. The header features the IDS logo and the text "International DORIS Service". A navigation bar includes links for Mails, Bibliography, Sitemaps, Time series, System events, Stations events, MOE statistics, and POE statistics. A search bar is located in the top right corner. The main content area is divided into three columns. The left column contains a sidebar with links to Home, Site map, FAQ, and Glossary, followed by a section for IDS (Organization, Data & Products, Meetings, Reports & Mails, Contacts & links) and a section for DORIS SYSTEM (Official web site, Network, System monitoring). The middle column features a large image of a DORIS station, the title "International DORIS Service", and a detailed description of the system, its components, and its purpose. The right column contains a "Highlights" section with links to new launch dates, anniversaries, workshops, and AWG meetings, followed by a "What's new on IDS" section and an "Acknowledge IDS" section.

International DORIS Service

DORIS is a Doppler satellite tracking system developed for precise orbit determination and precise ground location. It is onboard the Jason-1, Jason-2 and ENVISAT altimetric satellites and the remote sensing satellites SPOT-4 and SPOT-5. It also flew with SPOT-2, SPOT-3 and TOPEX/POSEIDON.

IDS is an international service which provides a support, through DORIS data and products, to geodetic, geophysical, and other research and operational activities. New proposals for Analysis Centers and temporary or permanent DORIS stations are welcome. See the [call for participation](#).

This site is composed of three parts:

- "IDS" describes the organization of the service and includes documents, access to the data and products, event announcements, contacts and links.
- "DORIS" allows to access general description of the system, and gives information about the system events and the tracking network.
- "Analysis Coordination" provides information and discussion areas about the analysis strategies and models used in the IDS products. It is maintained by the [Analysis Coordinator](#) with the support of the Central Bureau.

You may come back at any time to the Home Page by clicking on the IDS logo at the left upper top.

Highlights

- [New launch date for CryoSat-2 confirmed](#)
- [DORIS 20th Anniversary](#)
- [IDS Workshop, Lisbon, Portugal, 21-22 October 2010](#)
- IDS AWG at ESOC, 20-21 April 2010
- New address of the IDS web site: <http://ids-doris.org>
- New address of the IDS ftp site: <ftp://ftp.ids-doris.org/pub/ids/>

What's new on IDS

- [What's new on IDS](#)
- [What's new on DORIS](#)
- [Site updates](#)

Acknowledge IDS

Whenever your use of IDS data or products results in a publication, please include a proper [citation](#).

DORIS SPECIAL ISSUE

- **Guest Editor:** Pascal Willis.
- **Published in two volumes of Advances in Space Research (Elsevier)**
- **Main scientific themes:** Precise orbit determination, terrestrial reference frame; DORIS technology, troposphere, ionosphere, geophysics and sea level; DORIS data processing and combination.
- **25 submitted articles (April 2009 – November 2009)**
- **Volume 45(12) June 15, 2010: 10 articles; 134 pages.**
- **Volume 46(12) December 15, 2010; 12 articles; 178 page.**
- **First authors (accepted papers only): 20**
 - 11 institutions (first author)
 - 5 countries (first author)

IDS Citation Update

New DORIS citation:

**P. Willis, H. Fagard, P. Ferrage, F.G. Lemoine,
C.E. Noll, R. Noomen, M. Otten, J.C. Ries, M. Rothacher,
L. Soudarin, G. Tavernier, and J.J. Valette,
The International DORIS Service (IDS): Toward maturity,
Adv. Space Res., 45(12), 1408-1410, doi:10.1016/j.asr.2009.11.018,
2010.**

**All services and users requested to use this new citation when using IDS data
and products.**

Analysis Update

- **IDS Analysis Working Group Meeting, at ESOC, Darmstadt, Germany.**
 - ♦ May 26-27, 2010.
- **Guilhem Moreaux (CLS) is new IDS Combination Center Coordinator.**
- **Present Activities:**
 - (1) **Extend series developed for ITRF2008; Develop operational combination. (Series extended through July 2010 with & without J2).**
 - (2) **Assess contribution of Jason-2 to DORIS Combination (per-week, Jason-2 doubles contribution in terms amount of DORIS data).**
 - (3) **Process data from Cryosat-2. Assess contribution to combination.**
 - (4) **Remedy individual issues in analysis center submissions for ITRF2008.**
 - (5) **Assess potential SAA problem on SPOT-5 - which might deleteriously affect South American stations (not at same level as Jason-1) -- (*Stepanek et al., 2010*).**
 - (6) **Update processing standards for individual analysis centers.**
 - (7) **Prepare for IDS Workshop in Lisbon, Portugal, in conjunction with Jason-2 OSTST meeting (Oct 20-22, 2010).**



<http://ids-doris.org>



Australian Government
Geoscience Australia

INSTITUTE OF ASTRONOMY
RUSSIAN ACADEMY OF SCIENCES



Newcastle
University