

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

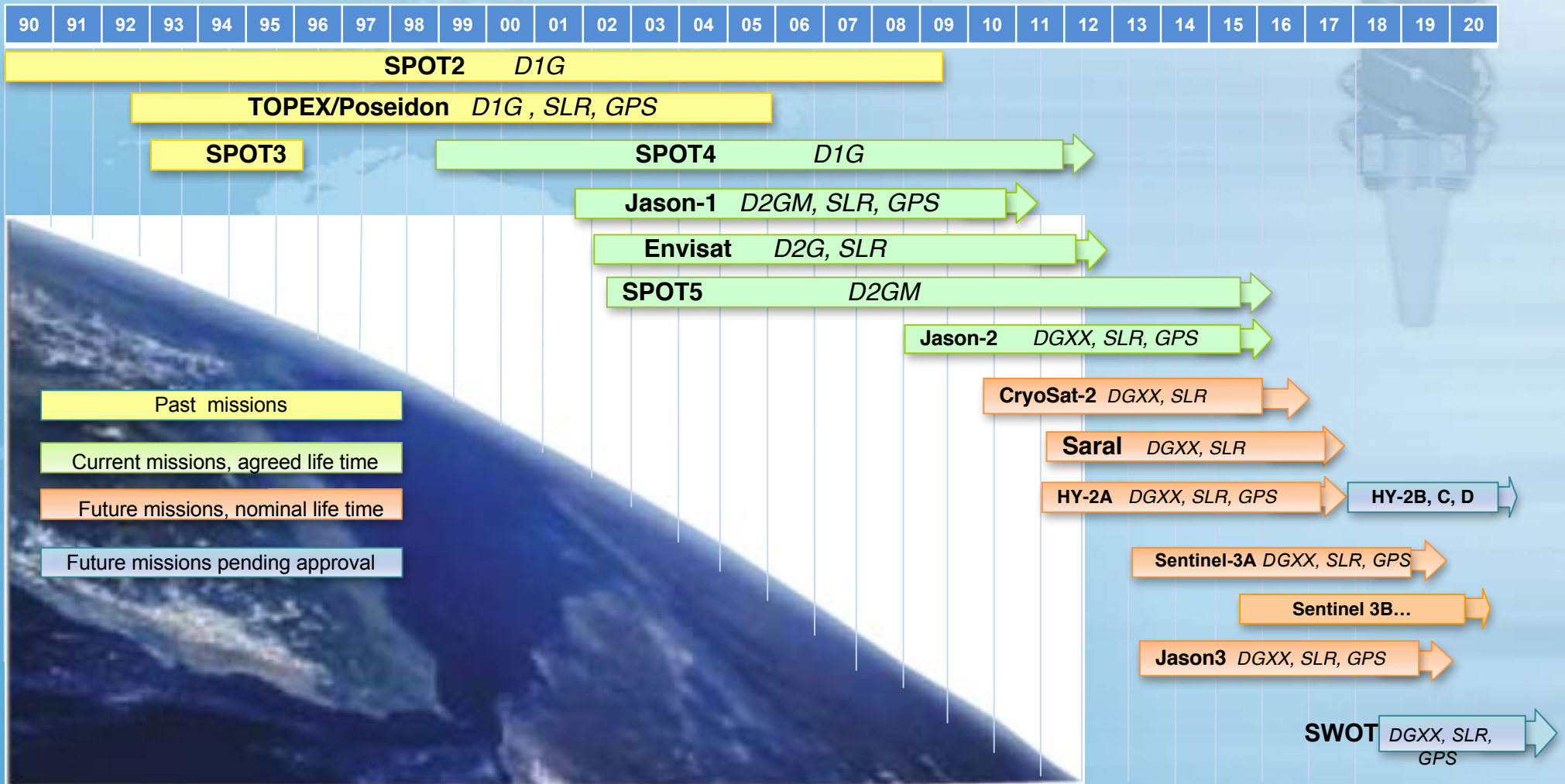
- **CRYOSAT-2** (ESA): 717 km, 92° April 8, 2010 → end 2013, (DGXX + LRA)
- **JASON-2** (CNES/NASA): 1336 km, 66° June 2008 → end 2013, (DGXX+LRA+GPS)
- **ENVISAT** (ESA): 800 km, 98.5° March 2002 → 2013, (D2GM + LRA)
(Oct 2010: orbit change: altitude reduction -17.4 km)
- **SPOT5** (CNES): 830 km, 98°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

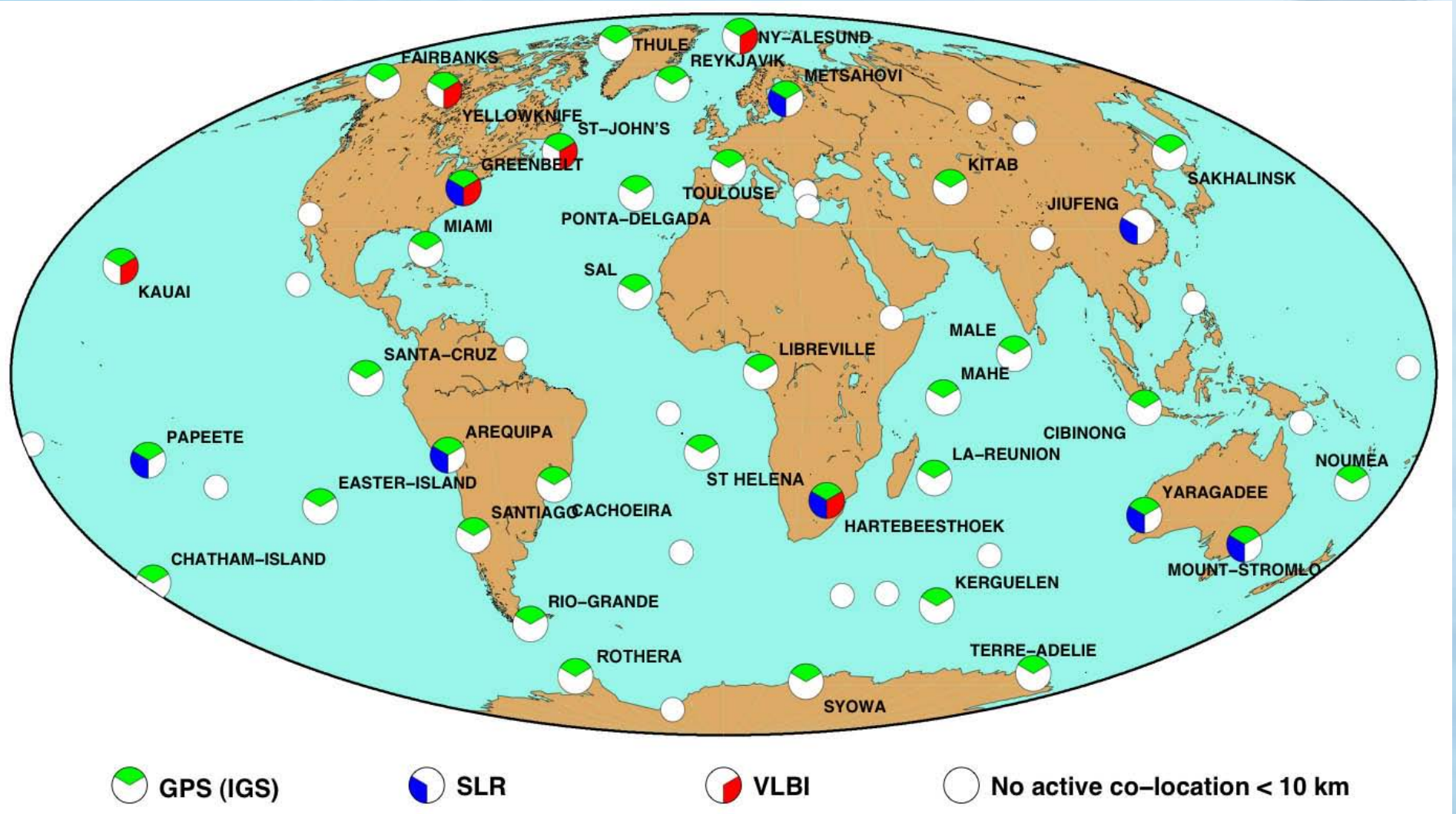


- **SARAL/ALTI-KA (ISRO)** : 800km, 98.5° Mid 2011, (5 years), (DGXX + LRA)
- **HY2A (CNSA)** : 963km, 99.3° June 2011, (3 years), (DGXX+LRA, GPS)
... then HY2B, 2C, 2D...
- **SENTINEL3A (GMES)** : 814km, 98.6° April 2013, (7 years), (DGXX+LRA+GPS),
Sentinel 3B: 12 to 30 months later
- **JASON-3 (Eumetsat/NOAA/CNES)** : 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 Cibinong
- **January 2009: Reconnaissance with a view to install at Tamanrasset**

Network events, 2010

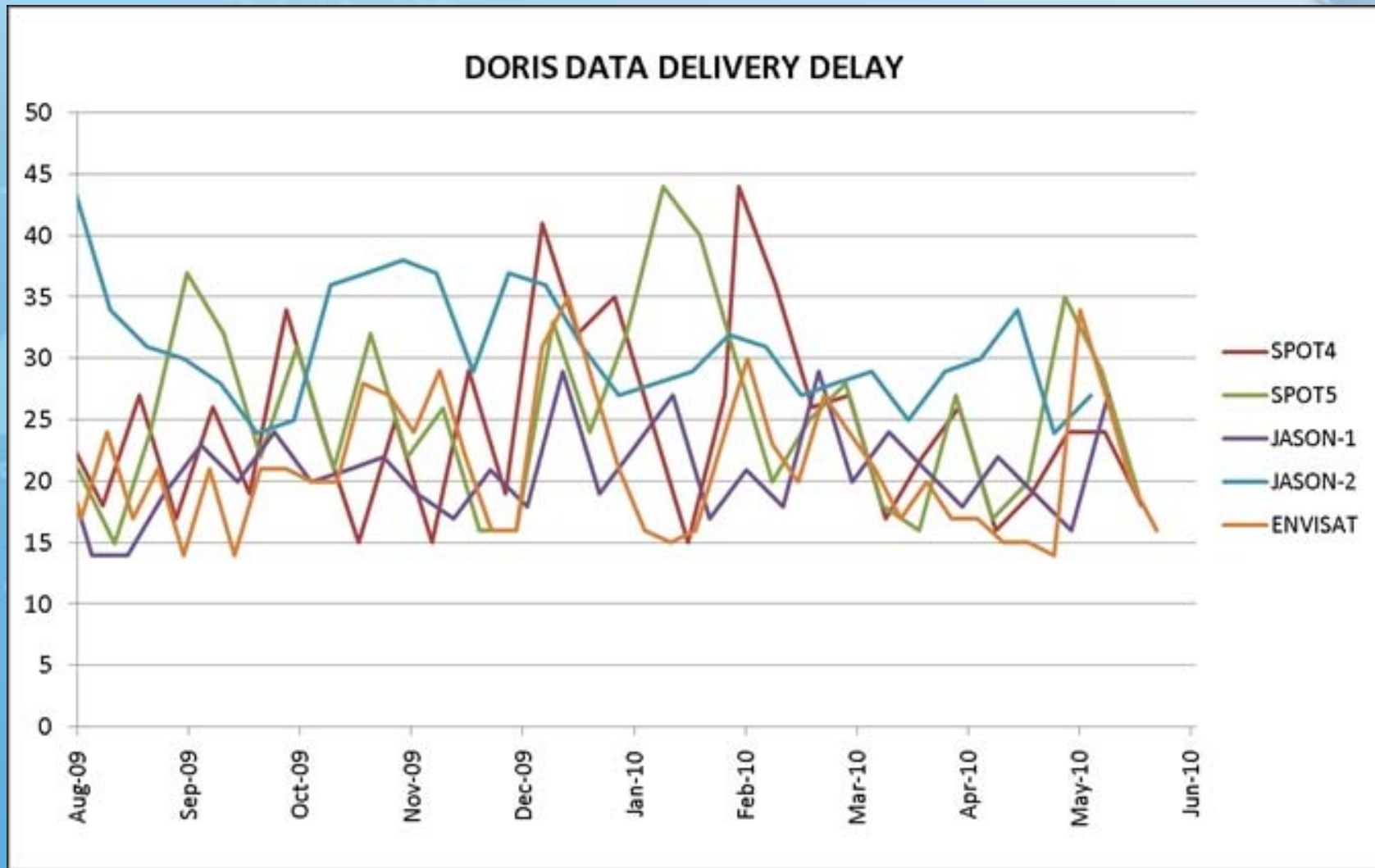
- **October 2010: New station at Cold Bay (AK) in progress...**
- **October 2010: Equipment upgrade at Kourou**
- **September 2010: Beacon replacement at Amsterdam**
- **June 2010: Local tie survey (new GNSS station) at Saint Helena**
- **June 2010: Major renovation (antenna moving...) at Ascension**
- **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

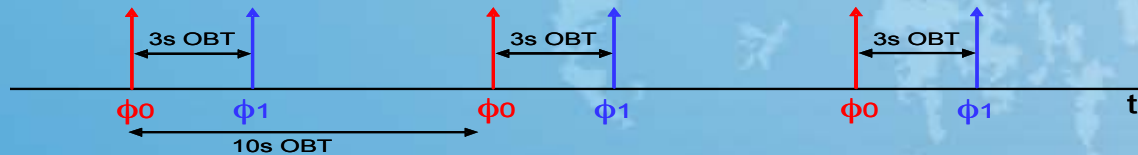
Pseudorange measurements on Time Beacons may be used for all measurements redatation

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**

A historical map of the world, likely from the 17th or 18th century, showing continents, oceans, and various geographical features. The map is rendered in a sepia or aged tone with intricate details and Latin text.

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

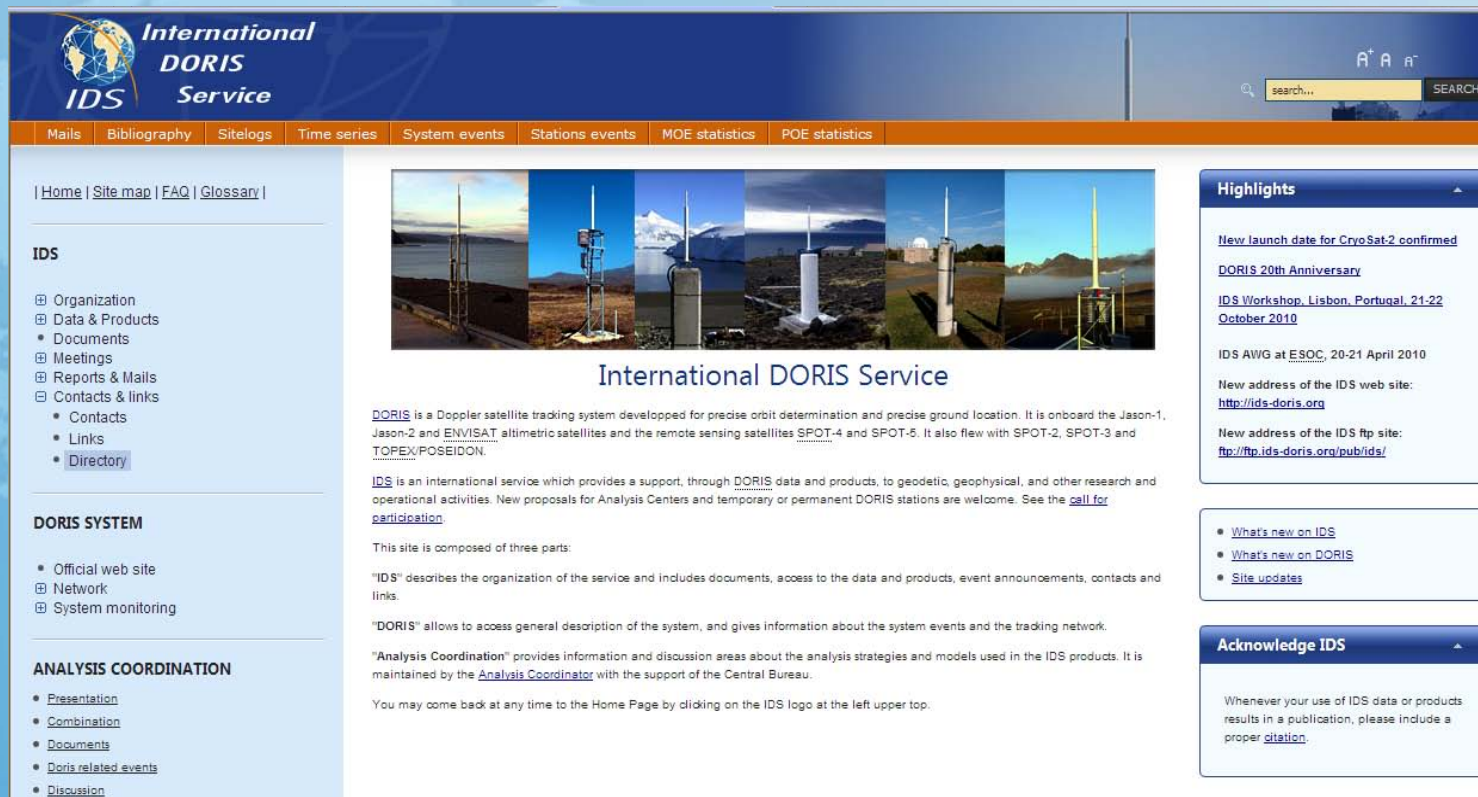
◆ **SPOT-4 data reissue:**

- 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 website. The header features the IDS logo and navigation tabs 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 titled "International DORIS Service" and includes a banner image of DORIS stations. Below the banner, there is a description of the service and its components. The left sidebar contains a navigation menu with sections for IDS, DORIS SYSTEM, and ANALYSIS COORDINATION. The right sidebar features a "Highlights" section with news items and a "What's new" section with links to updates. The footer includes the IDS logo and the DORIS logo.

International DORIS Service

[Home](#) | [Site map](#) | [FAQ](#) | [Glossary](#)

IDS

- Organization
- Data & Products
 - Documents
- Meetings
- Reports & Mails
- Contacts & links
 - Contacts
 - Links
 - Directory

DORIS SYSTEM

- Official web site
- Network
- System monitoring

ANALYSIS COORDINATION

- Presentation
- Combination
- Documents
- Doris related events
- Discussion

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 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
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Newcastle
University