



IDS news

IDS AWG, online meeting, March 24, 2025

Governing Board for 2025-2026



- New elected members (2025-2028)
 - Hugues Capdeville, CLS, France : Analysis Centers' representative
 - Anna Kelley, CDDIS, USA: Data Centers' representative
 - Maria Tsakiri, NTUA, Greece: Member at large
- New appointed members (2025-2028)
 - Mathis Blossfeld, DGFI-TUM, Germany: IERS representative
 - Cécile Manfredi, CNES, France: CNES System representative
- Working Group chairs (ex-officio)
 - Patrick Schreiner, GFZ, Germany (WG "Integrated Clock Correction Strategies for DORIS«)
 - Ningbo Wang, CAS, China (WG "NRT Ionospheric Applications")
- Other members
 - Guilhem Moreaux, France: Combination Center representative
 - Laura Sanchez, Germany: Member at large
 - Jérôme Saunier, France: IGN Network's Representative
 - Ernst Schrama, The Netherlands: IAG representative
 - Laurent Soudarin, France: Director of the Central Bureau
 - Petr Stepanek, Czech Republic: Analysis Coordinator

→ **Guilhem Moreaux elected as the new Chair of the IDS GB for 2025-2028**

→ **Frank Lemoine joins the Central Bureau**

→ **Karine Le Bail is the IDS representative within the GGOS GB**

Swot quaternions



[IDS Workshop, September 2024]

In June 2024, CNES began delivering quaternions files (netcdf) and solar panel angles (xml) to IGN DC.

But the format of quaternions and their overly large sample size is not suited to the processing of ACs.

A lighter version of the quaternions in a simpler format will be available in the coming weeks

[mail to AWG, 25 Feb. 2025]

- **New dataset of Swot quaternions in "Jason-3" format (*) is now distributed on the flow to IGN DC**
- **The files contain around 2 hours of data**
- **Full dataset from Feb. 1 2023 is available**
- Files stored in /pub/doris/ancillary/quaternions/swo/YYYY with the usual naming convention: swoqbodyYYYYMMDDHHMMSS_yyyymmddhnmss.LLL
- Quaternions provided by the platform to DORIS to be used by DIODE and downlinked by flow.
- Distribution of the .nc to IGN is stopped

NB: both quaternion datasets are stored in the same directories (difference: extension .nc for netcdf)

NB: the solar panel files swoqsolp (.xml) are only available from March 21, 2024, for now

After validation by the AWG:

- .nc files will be removed
- "J3" format files will be distributed to IGN and CDDIS, and the datasets (incl. swoqsol) completed

(*) format description in https://ids-doris.org/documents/BC/ancillary/quaternions/jason1_2_3_quaternion_solar_panel.pdf

« NRT » data



As of July 5, 2024, RINEX DORIS data and real-time DORIS orbits are available for the current missions with a latency of < 3 hrs, at the IGN data center.
They are mainly intended for the WG “NRT ionospheric application”.

The NRT data and orbit products are distributed on the flow (best effort; no “NRT” operational constraint).
They are stored for a limited time (purge with 2-month delay).

Availability > 90%

NRT data	Cryosat2	HY-2C	HY-2D	Jason-3	Saral	Sentinel-3A	Sentinel-3B	Sentinel-64	Swot
RINEX	✓	✓	✓	✓	✓	✓	✓	✓	✓
DIODE TRIODE	no	N/A	N/A	✓	✓	✓	✓	✓	✓

NB:

- Triode is a ground component that calculates the orbit from the DORIS measurements, as Diode does on board

However:

- the orbit may be less accurate than that calculated by DIODE; for example, there is a one-meter error for SWOT. But this has no impact on WG NRT applications.
- Cryosat not included in Triode
- DIODE is not on HY-2C and HY-2D → no “NRT” orbit available
- **switch to DIODE orbit to be done (increasing orbit precision and including Cryosat2)**

CNES/POD orbits in POE-G standards



The first Jason-3 precise orbits (cycle 500) in the new POE-G standards delivered early March. They are flagged with the version number **VV=30** (first file is ssaja330.b25028.e25032.DG_.sp3)

Format:

precision of the position/velocity extended with one digit
→ the format (f14.6) is replaced by (f14.7) in 'P' and 'V' blocks

Header (Copernicus Quality Working group recommendations)

```
/* PCV:IGS20
/* OL/AL/SS:FES2014b NONE   ITRF2020 YNY ORB:CoM CLK:CoM
/*
/*
```

IGS20 PCV was applied

Ocean tidal Loading corrections from **FES2014b** model applied to Center of Mass (with “Yes” flag)

Atmosphere tidal Loading corrections: **NONE** (with “No” flag)

Seasonal Signals from ITRF2020 applied to Center of Mass (with “Yes” flag)

ORBit and **CLock**s expressed at the Center of Mass (**CoM**)

Calendar of the switches to the POE-G standards :

- April: Sentinel-6A as well as Sentinel-3A/B.
- Then Cryosat2, SWOT, Saral, HY-2C&D

Documentation:

- summary of the changes between the previous POE-F and the new POE-G POD standards:
https://ids-doris.org/documents/BC/data/POD_configuration_POEG.pdf
- Updated readme files at DCs: products/orbits/ssa/README_SP3.txt and products/orbits/ssa/ja3/ README_SP3_ja3.txt

Reference

Moyard et al. (2023). CNES preliminary POE-G precise orbit performances for the Sentinel-6 MF mission. 2023 Ocean Surface Topography Science Team Meeting. DOI: 10.24400/527896/a03- 2023.386

Documentation



Most of the files available at <ftp://ftp.ids-doris.org/pub/ids/> can be seen at <https://ids-doris.org/documents/BC/> too.

- **Version 1.19 “DORIS satellites models implemented in POE processing by the CNES SOD”**

Updates for POE-G POD processings:

- HY-2C: Z-component of 2Ghz and 400 Mhz phase centers as measured on the ground before launch
- Jason-2&3: optical properties of body and solar panels
- Sentinel-3A&B: optical properties of solar panels
- Sentinel-6A: Conrad’s 12-surface model (except infrared properties)

+ updated [https/ftp](https://ftp.) links

<https://ids-doris.org/documents/BC/satellites/DORISSatelliteModels.pdf>

(NB: previous versions in “archive”: ex. https://ids-doris.org/documents/BC/satellites/archives/SatelliteModels_Ed1Rev18.pdf)

- Documents «**characteristics for POD processing** » in progress for **HY-2D**, planned for Sentinel-3A&B
- List of **stations connected to external time and frequency references** available soon

Publications



❑ Newsletter #11 (December 2024)

- Contribution of DORIS to Global Ionospheric Scintillation Mapping (M. Cherrier and P. Yaya, CLS)
- DORIS application for the gravity field (A. Löcher, University of Bonn)
- DORIS back in Rapa Nui (J. Saunier, IGN)
- The host agency in short: Hanga Roa (E. Santibáñez, PRS)
- IDS life & DORIS news

❑ Newsletter #12 (in preparation)

❑ IDS Activity Report 2024

REMINDER: contributions expected for April 8

→ new IDS reference paper planned



Contribution of DORIS to Global Ionospheric Scintillation Mapping

By Marie Cherrier and Philippe Yaya (CLS)

Ionospheric scintillations due to ionosphere irregularities may severely degrade GNSS data in equatorial and high latitudes regions. Networks of ground based GNSS receivers are used to derive maps of scintillation intensity, but it inevitably leads to sparse coverage. To improve the scintillation coverage, the DORIS system might be a solution.

What are "ionospheric scintillations"?

In certain regions (at high latitudes and along the equatorial sector) and at certain local times (mainly after sunset), the ionosphere may become highly turbulent. These turbulences are due to the development of small-scale irregularities, principally plasma bubbles at low latitudes, and particles precipitation when a coronal mass ejection (CME) arrives at Earth at high latitudes. The presence of such structures can seriously affect the nature of radio waves, and thus alter High Frequency (HF) Communication and Navigation systems, as they propagate through the ionosphere. The term "ionospheric scintillation" has been used to describe this effect on the radio signals. They are of two types: amplitude scintillations (mainly observed at the equator), and phase scintillations (mainly observed at high latitudes).

As the current solar cycle continues to progress, the level of amplitude scintillation observed worldwide by GNSS receivers also increases. It peaks during the equinoxes and occurs during the night, starting at sunset. One of DORIS frequency channel (2 GHz) is not so far from the GNSS L1 frequency (1.5 GHz), therefore DORIS signal may also be affected by scintillations. The current solar cycle, cycle 25, reached its maximum in 2024. This maximum is expected to last between one and two years. With the cycle's peak being reached, phase scintillations are becoming more frequent and intense. DORIS beacons data can provide indicators of the event's intensity.

This research work was presented at the IDS Workshop 2024.
[10.24400/172077103-2024.3923](https://doi.org/10.24400/172077103-2024.3923)



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Next events



- **Genesis Science Workshop 2025, April 3-4, in Matera**
- **Next IDS AWG meeting in Athens, November 6-7, at NTUA.**

Host: Maria Tsakiri

- AWG on Thursday all day and Friday morning
- visit of Dionysos Satellite Observatory on Friday afternoon
- GB meeting TBD

- Next DORIS mission: **Sentinel-6B in November 2025**
then HY-2E and Sentinel-3C in 2026.



The presentations of the AWG meeting will be available on IDS web:
IDS > Documentation > Meeting presentations > IDS AWG 03-2025

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