



GEODESY FOR A RESILIENT AFRICA

July 3th, 2026

DORIS special session



3. The International DORIS Service: tools and services for users

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Centre for Earth
Observation Science



What we will cover

What is the IDS?

Missions, organization, components

The DORIS data and IDS products

Data availability, list of data and products, access

IDS website and information channels

Structure, links; documentation

Online tools and webservice

Discover the station network, display time series



IDS

Who am I?

Laurent Soudarin
(CLS, France)



1991-1995 **PhD in Geophysics and Space Technics**
Precise positioning and plate tectonic from DORIS space system

1997-2016 **Research Engineer in Space Geodesy**
Analysis of DORIS data for orbitography and precise positioning purposes

2003 – now **Director of the Central Bureau of the International DORIS Service (IDS)**
Coordination of the IDS activities

What is the IDS?

The International DORIS Service is a service of the International Association of Geodesy created in 2003 to:

- develop and support DORIS scientific applications,
- provide access to DORIS data, products and documents,
- contribute to the IERS (International Earth Rotation and Reference Systems Service) realizations (ITRF),
- support GGOS (Global Geodetic Observing System) objectives.

See IAG website for links to the services: <https://geodesy.science/iag/>

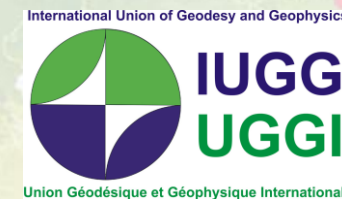


+ GGOS

+ 11 technical services: IGS (GNSS), ILRS (SLR/LLR),
IVS (VLBI), IERS (ITRF), ...



+ 7 associations



+ 39 scientific
Unions and
Associations



ids.central.bureau@ids-doris.org

IDS organization

DORIS system: onboard receivers; ground network; control center at CNES providing the IDS with DORIS data and relevant information

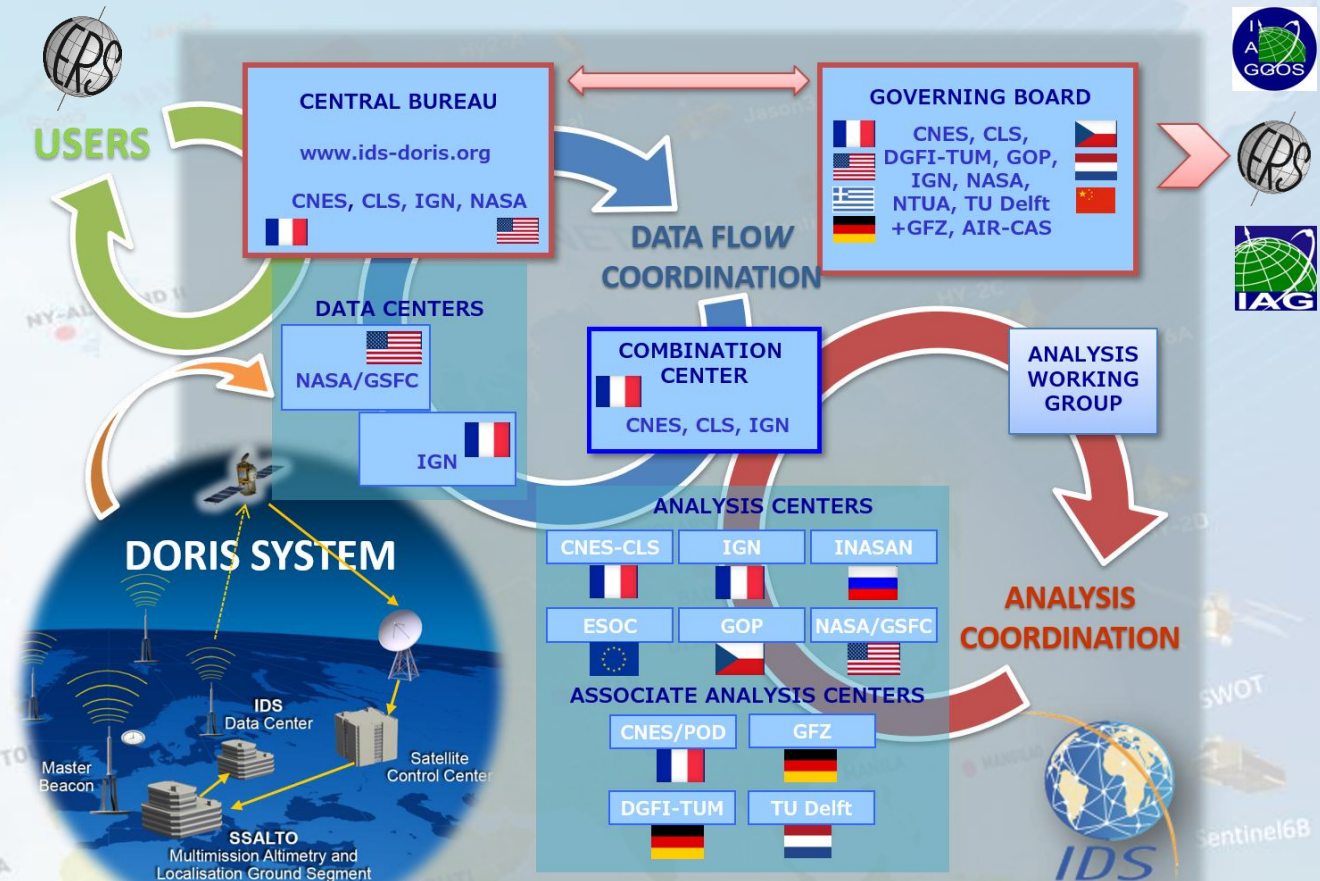
Data centers: make data and products available, free of charge and with open access

Analysis Groups: process data and conduct research activities

Combination Center: combines processing results from analysis groups and generates IDS combined products for DORIS's contribution to the ITRF updates.

Central Bureau: oversees the overall management of the IDS (coordination, communication, documentation, reporting, meetings, etc.)

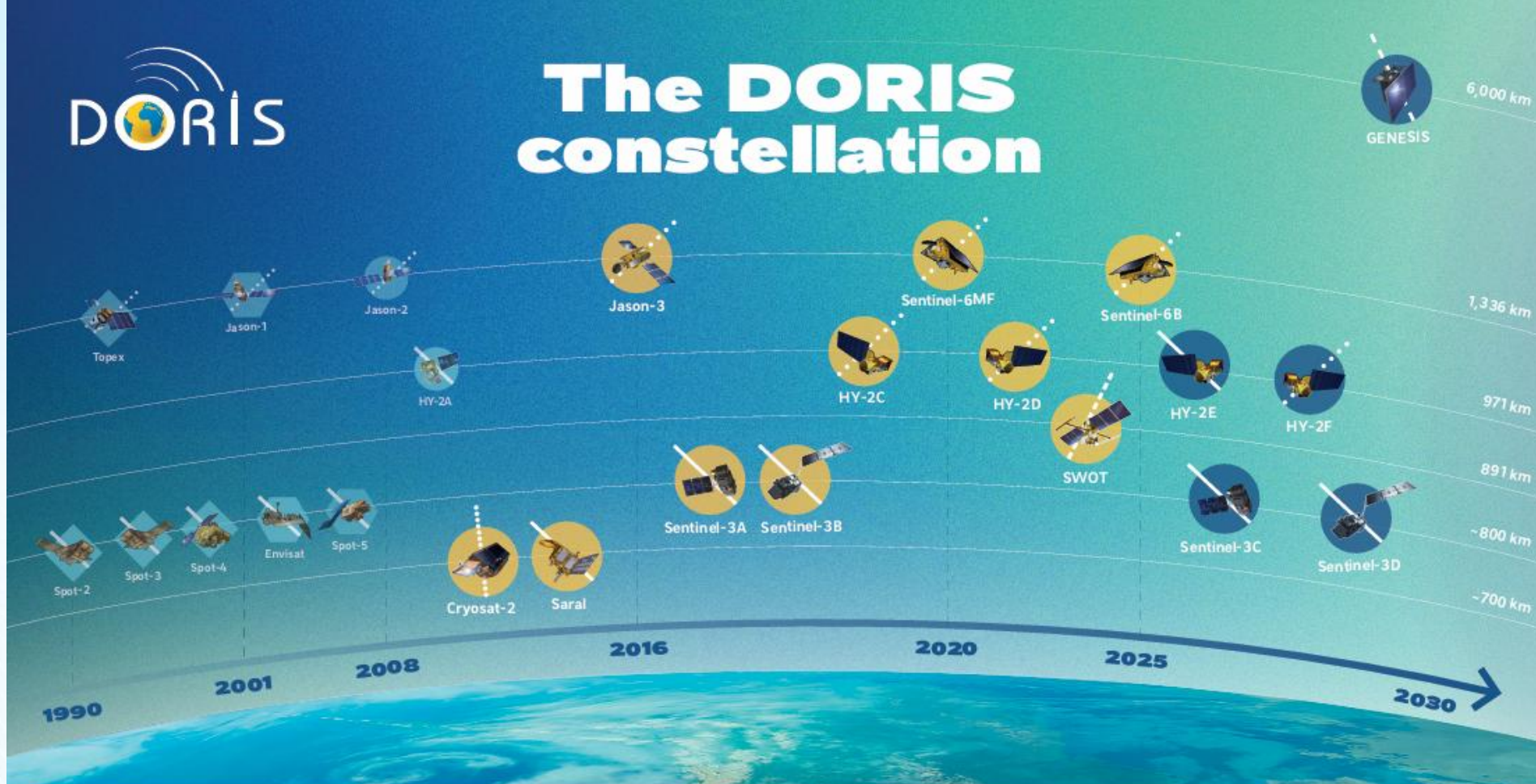
Governing Board: sets policy and maintains relationships with IAG and its services



Users: IERS for ITRF realizations, geodesists, geophysicists, atmospheric scientists, ...



The DORIS constellation



3 GENERATIONS OF DORIS INSTRUMENTS



5 ORBIT PLANES



PAST MISSIONS

CURRENT MISSIONS

FUTURE MISSIONS

Spot-2 Topex	Spot-3 Spot-4	Jason-1 Envisat	Spot-5 Jason-2	HY-2A
Cryosat-2 Saral	Jason-3 Sentinel-3A	Sentinel-3B HY-2C	Sentinel-6MF HY-2D	SWOT Sentinel-6B
HY-2E Sentinel-3C	HY-2F Sentinel-3D	GENESIS		

9

1990-2020

10

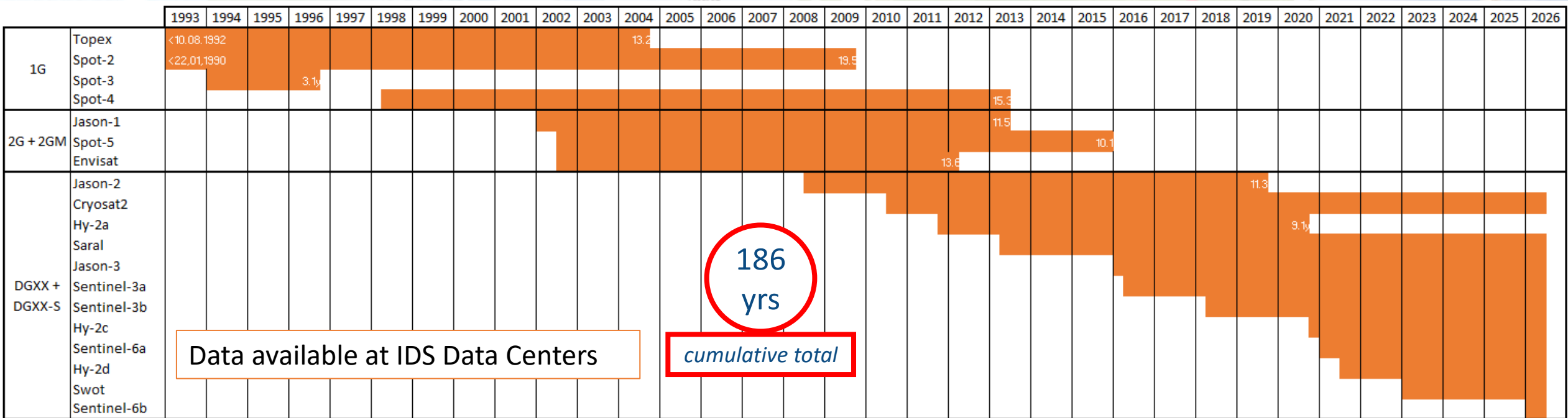
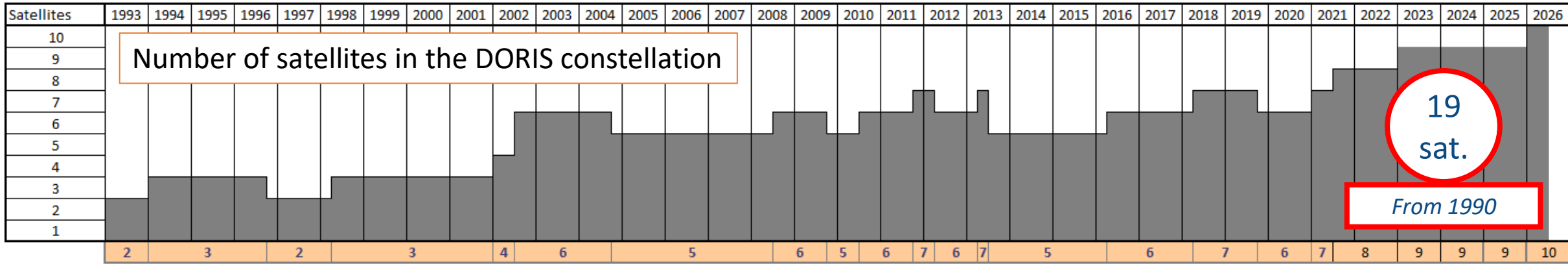
2010-now

5

From 2026



Number of satellites and collected data as of July, 1st, 2026



DORIS data and IDS products

DORIS data and ancillary

- DORIS data (RINEX format)
 - daily files for POD processing
 - on the flow for Near Real Time applications (<3h) eg. iono

NB: 1 file contains the measurements collected by one on-board DORIS instrument from all the received stations

(GNSS: 1 file by station received from the GNSS constellation)

- Satellite attitude information (quaternions)
- List of satellite maneuvers (maintenance, plane change, collision avoidance)
- Variation of satellite mass and center of mass

IDS products

- satellite orbit ephemerides
- station coordinates at a reference epoch and velocity solutions
- time series of station coordinates differences
- Earth pole coordinates
- New: ionospheric products
- In development: tropospheric products

DORIS data and IDS products are free of charge and can be retrieved from the two IDS Data Centers
CDDIS: <https://cddis.nasa.gov/archive/doris/> and other protocols (registration required)
IGN: <ftp://doris.ign.fr/pub/doris/>

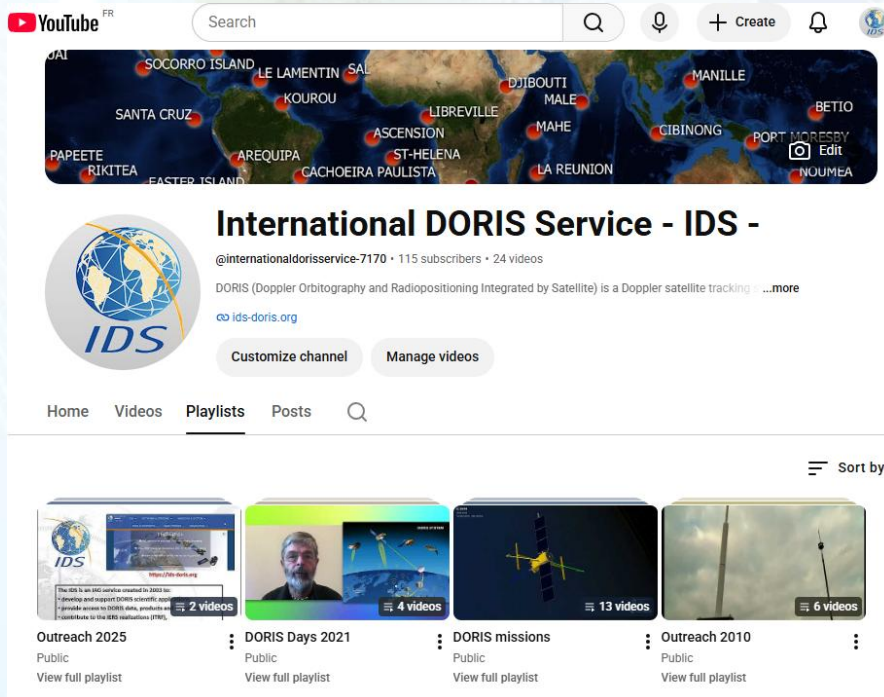
IDS information channels

Website: ids-doris.org

LinkedIn: [#idsdoris](#)

Github: github.com/idsdorisorg

YouTube: [@internationaldoriservice-7170](#)



IDS Web site <https://ids-doris.org>



IDS

Organization of the service, meeting calendars, contact and links, photo gallery.



Network & Stations

Ground network, stations, sitelogs, maps, network viewer, station position times series.



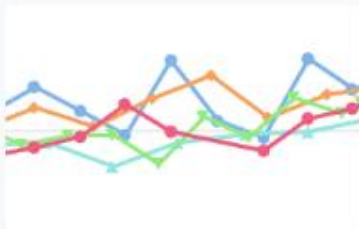
Missions & System

The DORIS technique, the satellites, orbit residuals time series.



Data and products

Access to data, products, information.



User corner

Information for users (beginner, competent, expert), plottools of the webservice.



Resources

Technical and IDS documents, bibliography, presentations, newsletter, outreach, mails.

Discover IDS

- Organization
- Table of Data & Products
- Bibliography
- Newsletter
- IDS video channel
- Presentations at IDS meetings
- Technical documents

Discover DORIS

- The DORIS technique (*in progress*)
- The satellites
- The network
- The stations (sitelogs)
- Network on Google Earth

DORIS system monitoring

- Table of system events
- Visualize products time series
- POE statistics
- Network viewer

IDS Documentation

The IDS provides documents tailored to different types of internet users

Beginner level:

Leaflets, videos, ...

Intermediate level:

- material (slides, video recordings) from courses on DORIS and applications given during DORIS days.
- Jupyter Notebooks developed to present trivial DORIS data analysis tasks
- presentations of the DORIS system and IDS products at summer schools

Expert level:

Technical documents and input material useful for data and product users



What does each beacon contribute to the observations ?

Let's extract e.g. C1 observations that are performed w.r.t the beacon DIOB:

```
In [4]: import matplotlib.pyplot as plt
import matplotlib.dates as mdates
import numpy as np
from dsoclasses.time.pyattotime import at2pt

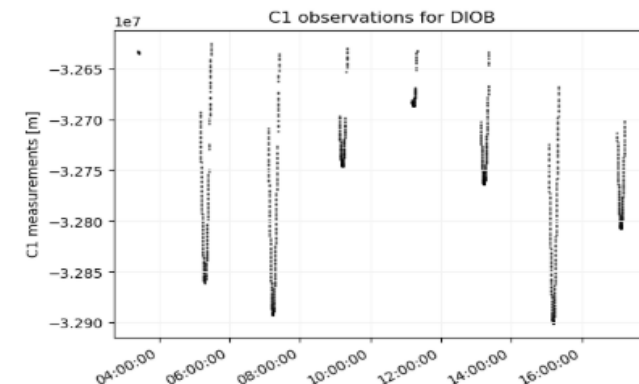
# get the internal id of the 'DIOB' beacon:
site_id = rxn.name2id('DIOB')

# store measurements here (time, C1)
t = []; C1 = [];

# only consider one day of measurements, so we can have a clearer view
t0 = rxn.time_first_obs

# for every block in RINEX ...
for block in rxn:
    # stop if we reached next day
    if (block.t()-t0).total_seconds() > 86400: break
    # for every beacon in the (current) data block ...
    for beacon, data in block:
        # match the site
        if beacon == site_id:
            # got DIOB! store the data
            t.append(block.t())
            C1.append(data['C1']['value'])

# plot results
plt.scatter([at2pt(t) for t in t], C1, color='black', alpha=0.5, s=.8)
plt.grid(color='0.95')
plt.ylabel("C1 measurements [m]")
plt.title("C1 observations for DIOB")
# Format the datetime x-axis
ax = plt.gca()
ax.xaxis.set_major_formatter(mdates.DateFormatter("%H:%M:%S"))
# auto-rotate date labels for readability
plt.gcf().autofmt_xdate()
plt.show()
```



A Jupyter notebook freely available on IDS github

<https://github.com/idsdorisorg/DORISdays2025/tree/main/JupyterLab>



IDS Documentation



DORIS bibliography:

- List of DORIS publications in international peer-reviewed journals

[Home](#) / [Resources](#) / [Articles](#) / [DORIS bibliography](#)

IDS publications:

- Newsletter
- Annual activity reports

[Home](#) / [Resources](#) / [IDS publications](#) / [Newsletter](#)

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Presentations:

- Presentations at workshops and meetings organized by IDS
- Other IDS-related presentations in international assemblies

[Home](#) / [Resources](#) / [Presentations](#) / [Presentations at IDS meetings](#)



337

articles in the list on July 1st, 2026
→ Intermediate and expert levels



Expert level



Beginner level
To subscribe



IDS online tools and webservice



Tools for:

Discovering the station network

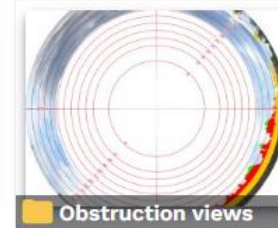
- Pictures in the Gallery
- Virtual tour on Google Earth
- Sitelogs (descriptive record of a site)

DORIS system monitoring

- Table of events

GALLERY - STATIONS

- Category List
- Local teams (29)
- DORIS equipment (411)
- Obstruction views (59)



Home / IDS / Gallery

Home / Network & Stations / Network on Google Earth

Network on Google Earth

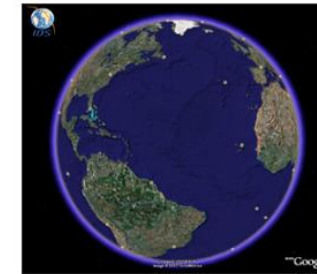
Make a virtual tour of the DORIS network with Google Earth.



DORIS network on Google Earth:

[Download the file](#)

Depending on the resolution of the image, we sometimes adjusted the position of the antenna of the station according to our knowledge of the site. Some positions could still be improved with your help. Comments, maps and pictures are welcome at any time to help us to improve the virtual tour and should be e-mailed to the [Central Bureau](#).



The **IDS Webservice** provides tools to browse time series of DORIS-related products.

<https://apps.ids-doris.org/apps/> or <https://ids-doris.org/webservice>



Online tool: station sitelogs



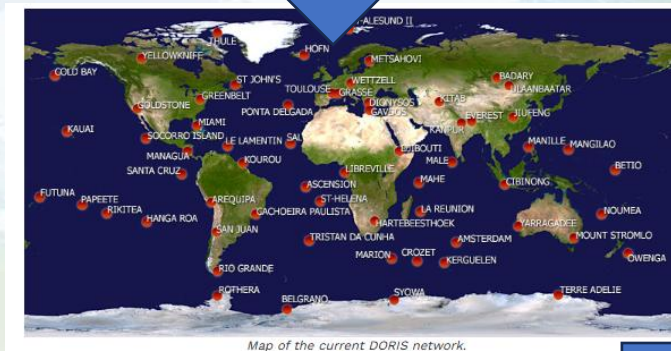
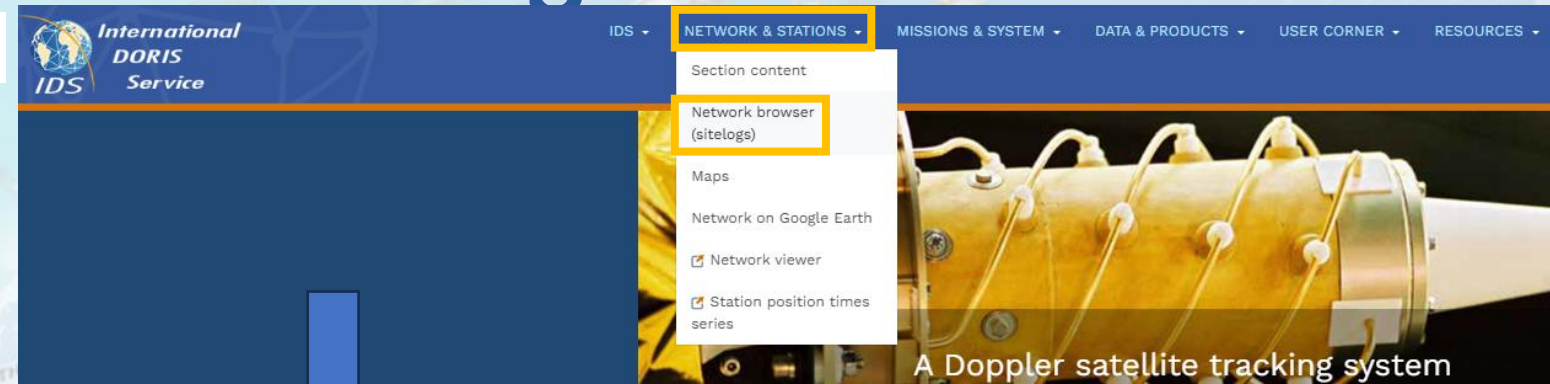
Home / Network & Stations / Network browser (sitelogs)

A site log is a descriptive record of a site.

The metadata contains information about the site:

- its identification;
- its equipment and its development history;
- a list of other notable instruments installed at the site;
- contact information.

The sitelogs of the past and current DORIS sites are all on the IDS website.



Map of the current DORIS network.

The DORIS stations list					
Name	Country	Latitude	Longitude	Previous codes	Code
AJACCIO*	FRANCE	41° 56'	8° 46'		AJAB
AMSTERDAM	FRANCE (Amsterdam Island)	-37° 48'	77° 34'	AMSA, AMSB, AMTB, AMUB	AMVB
AREQUIPA	PERU	-16° 28'	288° 30'	AREA, AREB	ARFB
ARLIT*	NIGER	18° 47'	7° 22'	ARLA	ARMA
ASCENSION	UNITED KINGDOM (South Atlantic Ocean)	-7° 55'	345° 40'	ASDB	ASEB
BADARY	RUSSIA	51° 46'	102° 14'	BADA	BADB
BELGRANO	ANTARCTICA (Argentine base)	-77° 52'	325° 22'	BELB	BEMB
BETIO	KIRIBATI	1° 21'	172° 55'		BETB
BREST*	FRANCE	48° 24'	355° 30'		BRBA
CACHOEIRA-PAULISTA	BRAZIL	-22° 41'	314° 60'	CACB	CADB
CANBERRA-ORRORAL*	AUSTRALIA	-35° 38'	148° 56'	ORRA	ORRB
CARIQUIMA*	CHILE	-19° 29'	291° 19'		CARB
CHATHAM-ISLAND*	NEW ZEALAND	-43° 57'	183° 26'		CHAB
CIBINONG	INDONESIA	-6° 29'	106° 51'	CIBB, CIBC	CIDB

DORIS station LIBREVILLE - GABON



Site logs
LICB20131003.LOG (current; see below)
LICB20130128.LOG
LICB20120202.LOG
LICB200812.LOG
LICB200806.LOG

Other pictures (More in the Gallery)
LICB.jpg
LICB-met-station.jpg
LICB-2.jpg
LICB-obstructions-2010-05-v1.jpg
LIBB.jpg

Site news

Doris mails

No 0790 ITRF2008-DPO02008 coordinates for all DORIS
No 0432 DORIS station upgrade at Libreville (Gabon)
No 0328 DORIS summary files available from IGN 2011 Analysis Center
No 0073 Antenna change at Libreville

Local events

Date	Acronym	Information provided
2025/05/16	LICB	BEACON INSTALLED
2025/05/15	LICB	BEACON REMOVED
2009/05/01	LICB	Corrupted data END
2009/02/19	LICB	Corrupted data START
2005/11/30	LICB	LICB START
2005/11/28	LIBB	LIBB END

LIBREVILLE DORIS site description form

0. Form

Prepared by : SIMB (DORIS installation and maintenance department)
Date prepared : 03/10/2013
Report type : UPDATE

1. Site location information

Site name : LIBREVILLE
Site DORES number : 32809
Host agency : CNES / STATION ARIANE
City : N'Koltang
State or province :
Country : GABON
Tectonic plate : AFRC
Geological information :

Geographical coordinates (ITRF) :
North Latitude : 0 deg 21' 14''
East Longitude : 9 deg 40' 20''
Ellipsoid height : 33 m
Approximate altitude : 23 m

2. DORIS antenna and reference point information

2.1

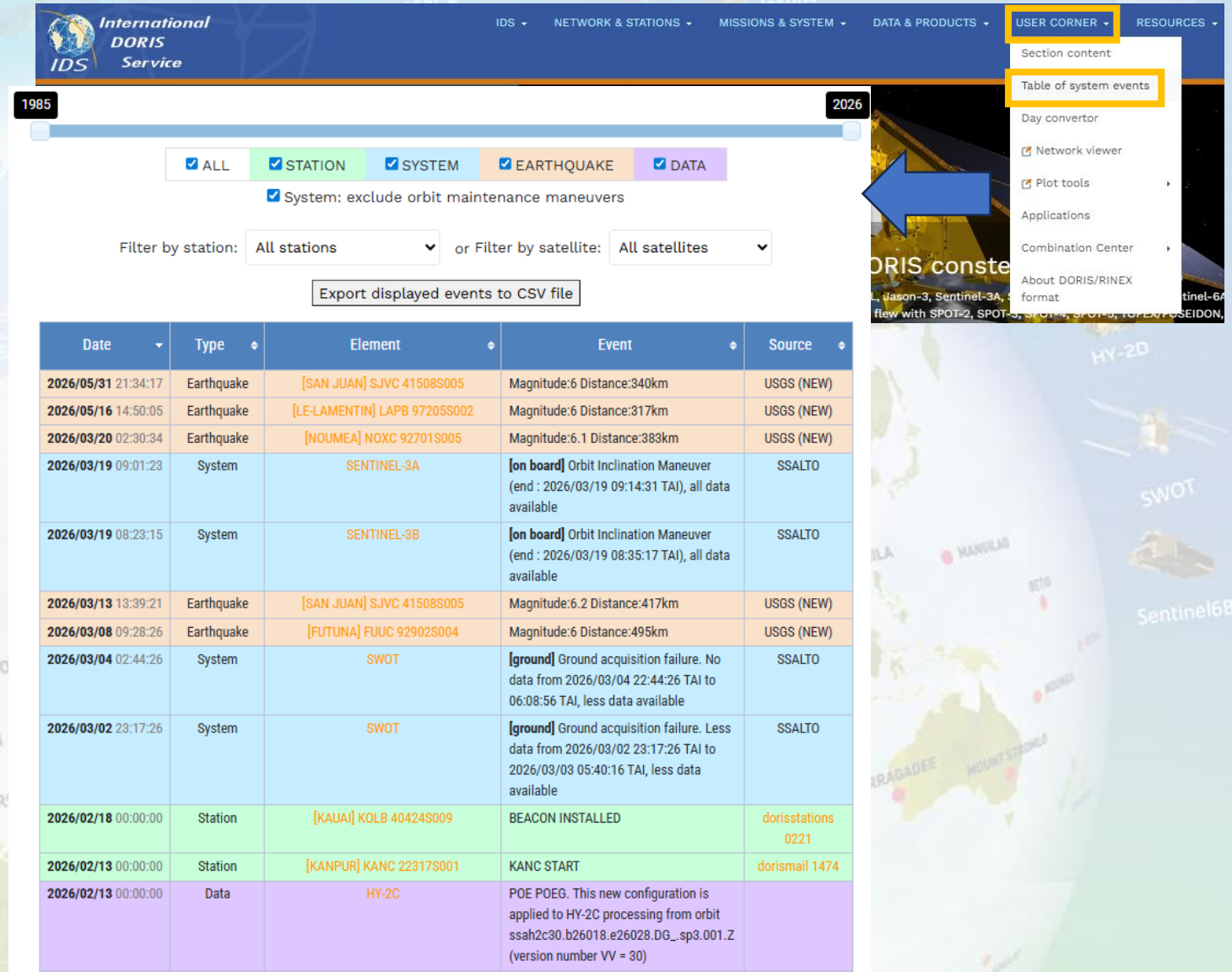
Four character ID : LIBA
Antenna model : Alcatel
Antenna serial number :
IERS DORES number : 328095002
CNES/IGN number : 328091
DORIS SSALTO number : 13
Date installed (dd/mm/yy) : 10/01/1988
Date removed (dd/mm/yy) : 04/02/1999
Antenna support type : 1 metre tower
Installed on : The side wall of a one storied building
Height above ground mark : 3.441 m
Ground mark type : Brass mark 20 mm diameter fixed in the basement of the building
Ground mark DORES number : 32809M003
Notes :

Online tool: table of events

Chronology of the main events that occurred on the DORIS space segment and ground segment.

- System: satellites, DORIS instruments, Satellite Control Center, DORIS control and data processing center, acquisition station
- Station: new site, new installation, change of beacon equipment, data gap, invalid data
- Data: events impacting data (not delivered data, data redelivery, change in POE data processing, ...)
- Earthquake with magnitude larger than 6 in the vicinity of DORIS sites (less than 500 km) based on USGS Earthquake notifications

Usage: help to understand POD and station position results



The screenshot shows the 'International DORIS Service' website. The 'USER CORNER' menu is open, highlighting 'Table of system events'. The main interface features a timeline from 1985 to 2026, filter buttons for ALL, STATION, SYSTEM, EARTHQUAKE, and DATA, and a table of events.

Date	Type	Element	Event	Source
2026/05/31 21:34:17	Earthquake	[SAN JUAN] SJVC 41508S005	Magnitude:6 Distance:340km	USGS (NEW)
2026/05/16 14:50:05	Earthquake	[LE-LAMENTIN] LAPB 97205S002	Magnitude:6 Distance:317km	USGS (NEW)
2026/03/20 02:30:34	Earthquake	[NOUMEA] NOXC 92701S005	Magnitude:6.1 Distance:383km	USGS (NEW)
2026/03/19 09:01:23	System	SENTINEL-3A	[on board] Orbit Inclination Maneuver (end : 2026/03/19 09:14:31 TAI), all data available	SSALTO
2026/03/19 08:23:15	System	SENTINEL-3B	[on board] Orbit Inclination Maneuver (end : 2026/03/19 08:35:17 TAI), all data available	SSALTO
2026/03/13 13:39:21	Earthquake	[SAN JUAN] SJVC 41508S005	Magnitude:6.2 Distance:417km	USGS (NEW)
2026/03/08 09:28:26	Earthquake	[FUTUNA] FUUC 92902S004	Magnitude:6 Distance:495km	USGS (NEW)
2026/03/04 02:44:26	System	SWOT	[ground] Ground acquisition failure. No data from 2026/03/04 22:44:26 TAI to 06:08:56 TAI, less data available	SSALTO
2026/03/02 23:17:26	System	SWOT	[ground] Ground acquisition failure. Less data from 2026/03/02 23:17:26 TAI to 2026/03/03 05:40:16 TAI, less data available	SSALTO
2026/02/18 00:00:00	Station	[KAUAI] KOLB 40424S009	BEACON INSTALLED	dorisstations 0221
2026/02/13 00:00:00	Station	[KANPUR] KANC 22317S001	KANC START	dorismail 1474
2026/02/13 00:00:00	Data	HY-2C	POE POEG. This new configuration is applied to HY-2C processing from orbit ssah2c30.b26018.e26028.DG_sp3.001.Z (version number VV = 30)	

Web service: Network Viewer

<https://apps.ids-doris.org/apps/map.html>

or ids-doris.org/webservice

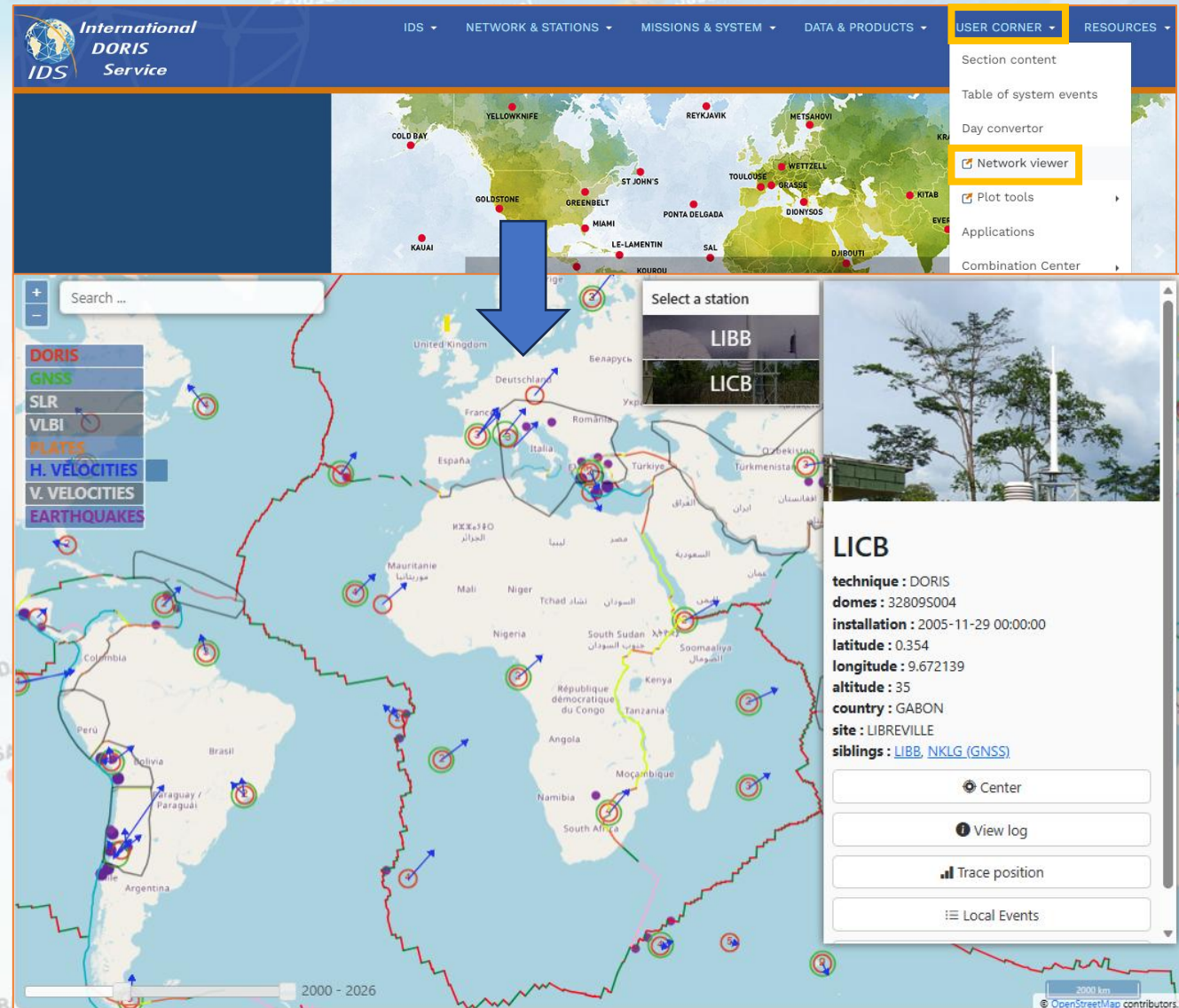
A network viewer to select sites.

You can display:

- DORIS sites since network deployment start
- IGS, ILRS, IVS sites colocated with DORIS
- Plate boundaries from Bird, 2003
- Horizontal and vertical velocity vectors from IDS solution
- Earthquakes with a magnitude ≥ 6 around DORIS stations (USGS source)

You can access to:

- Sitelog
- DORIS combined time series from the IDS CC + GNSS combined time series at colocated sites from the IGS TRF Combination Center
- Local events



Web service : DORIS coordinate time series

<https://apps.ids-doris.org/apps/stcdtool.html>

or ids-doris.org/webservice

A plot tool to display time series of station position differences at observation epochs relative to a reference position.

The plot tool contains utilities for :

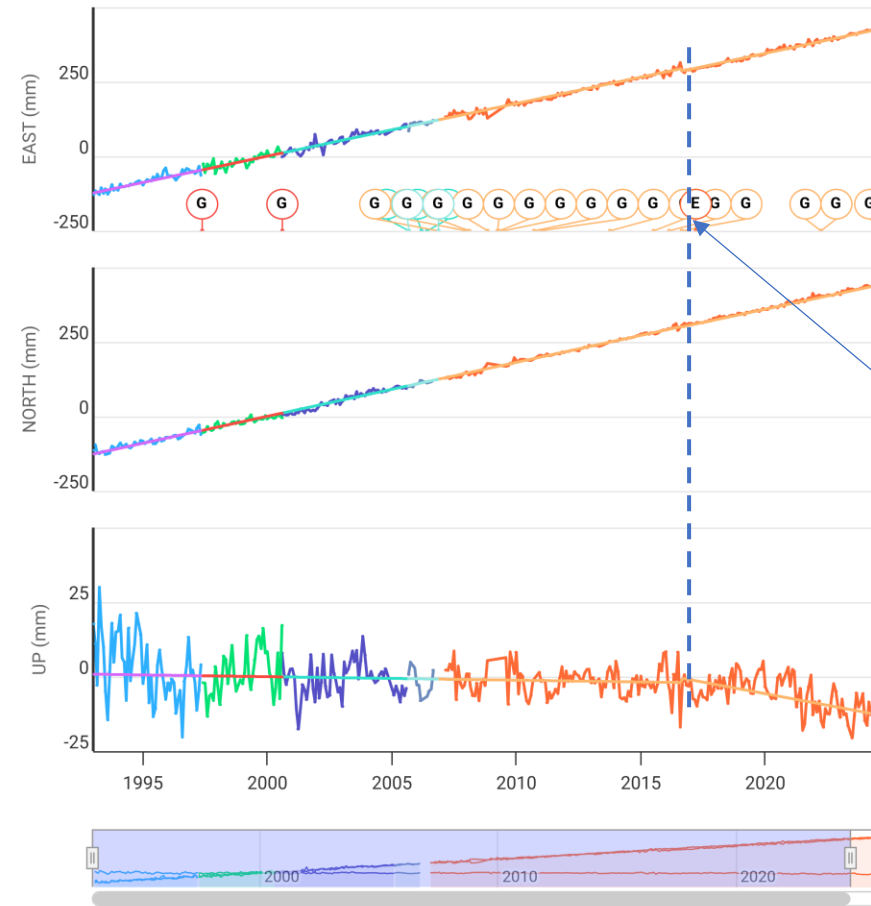
- selecting charts to plot
- displaying time series
- changing plot appearance
- specifying scaling
- downloading data, plots, graph statistics.

They are equipped with statistic tools for the calculation of mean, slope and rms.

Several series can be viewed and compared on the same graph.

Additional data to display: station events, earthquakes

Coordinate evolution for DORIS station at Hartebeesthoek
Successive antennas: **HBKA**, **HLA**, **HBKB**, **HBLB**, **HBMB**



2017.04.03
Earthquake
Mag. 6.5
Distance 441 km

Series (Click to hide)

HBKA ids26wd03 HBKB ids26wd03 HBLA ids26wd03 HBMB ids26wd03
HBLB ids26wd03 HBKA dpo26wd03 HBKB dpo26wd03 HBLA dpo26wd03
HBMB dpo26wd03 HBLB dpo26wd03

Highcharts.com

ids.central.bureau@ids-doris.org



Web service : Precise Orbit Determination statistics

<https://apps.ids-doris.org/apps/poetool.html>

or ids-doris.org/webservice

A plot tool to display orbit residuals and amount of station measurements from Precise Orbit Ephemeris routine processing by CNES.

You can display:

- RMS of post-fit orbit residual ,
 - total and/or validated number of DORIS measurements,
- per arc, for the whole network or for a selected station.

Orbit residuals refer to the differences between the calculated positions of the satellite and its observed position.

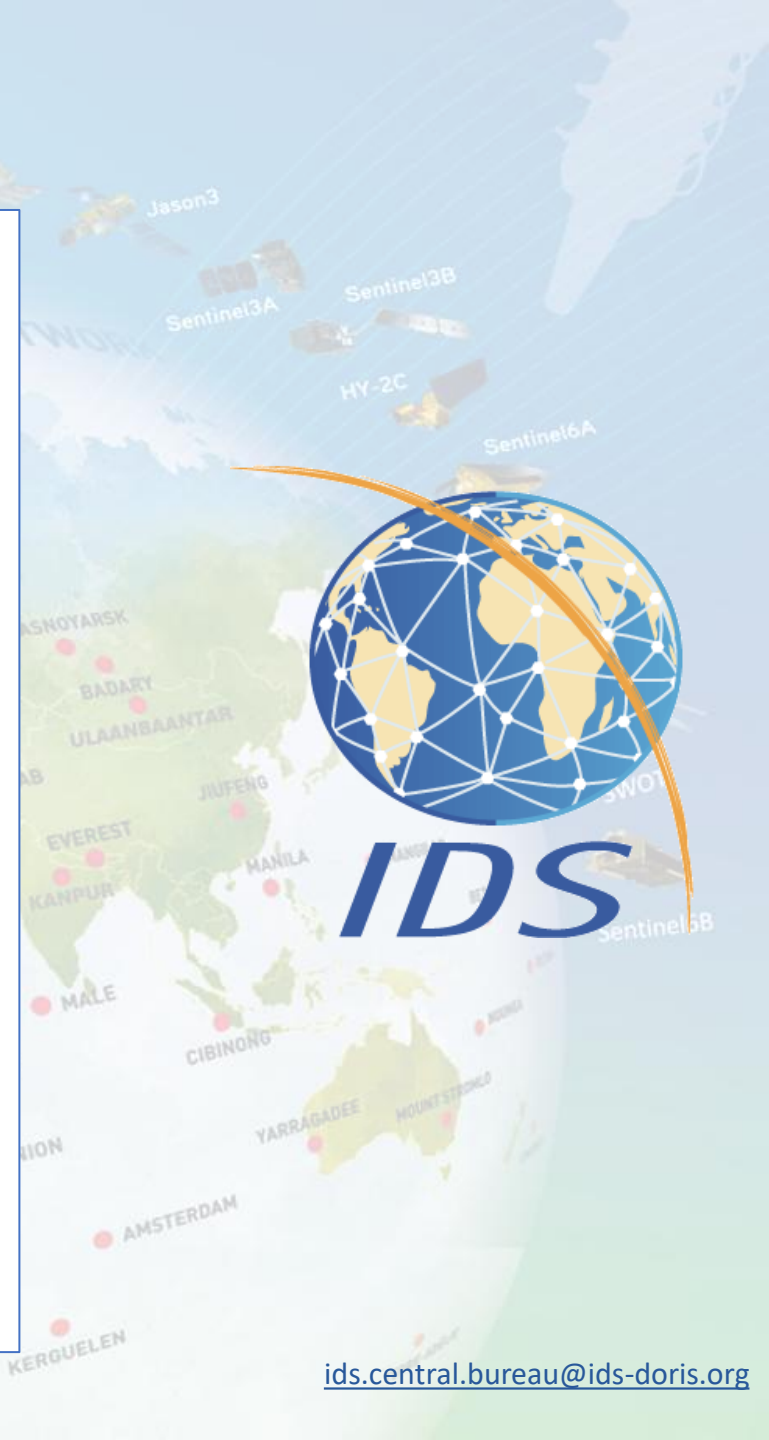
They indicate the quality of POD processing and DORIS measurements of each station.

For DORIS, they are expressed in mm/s (radial velocity).
The DORIS measurement noise is specified as 0.3 mm/s.



Key points to take home

- IDS is an IAG service that supports geodetic and geophysical research activities through DORIS data and derived products
- IDS contributes to the IERS realizations of the International Terrestrial Reference Frame (ITRF)
- IDS provides access to DORIS data, products and documents
- DORIS data and IDS products can be retrieved from the two IDS Data Centers (IGN and CDDIS)
- IDS products can be interactively displayed and analyzed from the IDS website



Come and join the IDS Community



- Read IDS **publications** available at <https://ids-doris.org>
 - Newsletters**
Regular information on the DORIS system and the life of IDS.
 - Annual activity reports**
Progress reports about IDS, DORIS system, user service, analysis activities.
- Meet IDS members and DORIS experts at **meetings**
 - IDS Analysis Working Group** (twice a year)
 - IDS Workshop** (every two years)and also at AGU, EGU, IAG assemblies, GGOS events ...
- Attend **courses** organized by IDS
 - DORIS Days**
- Follow us on **LinkedIn #idsdoris**
- Subscribe to IDS information **mailing list dorismail**



IDS website: <https://ids-doris.org>
Contact: ids.central.bureau@ids-doris.org
LinkedIn: <https://www.linkedin.com/company/ids-doris>

IDS Workshop
Wiesbaden, Germany; June 23-25, 2026

ids.central.bureau@ids-doris.org