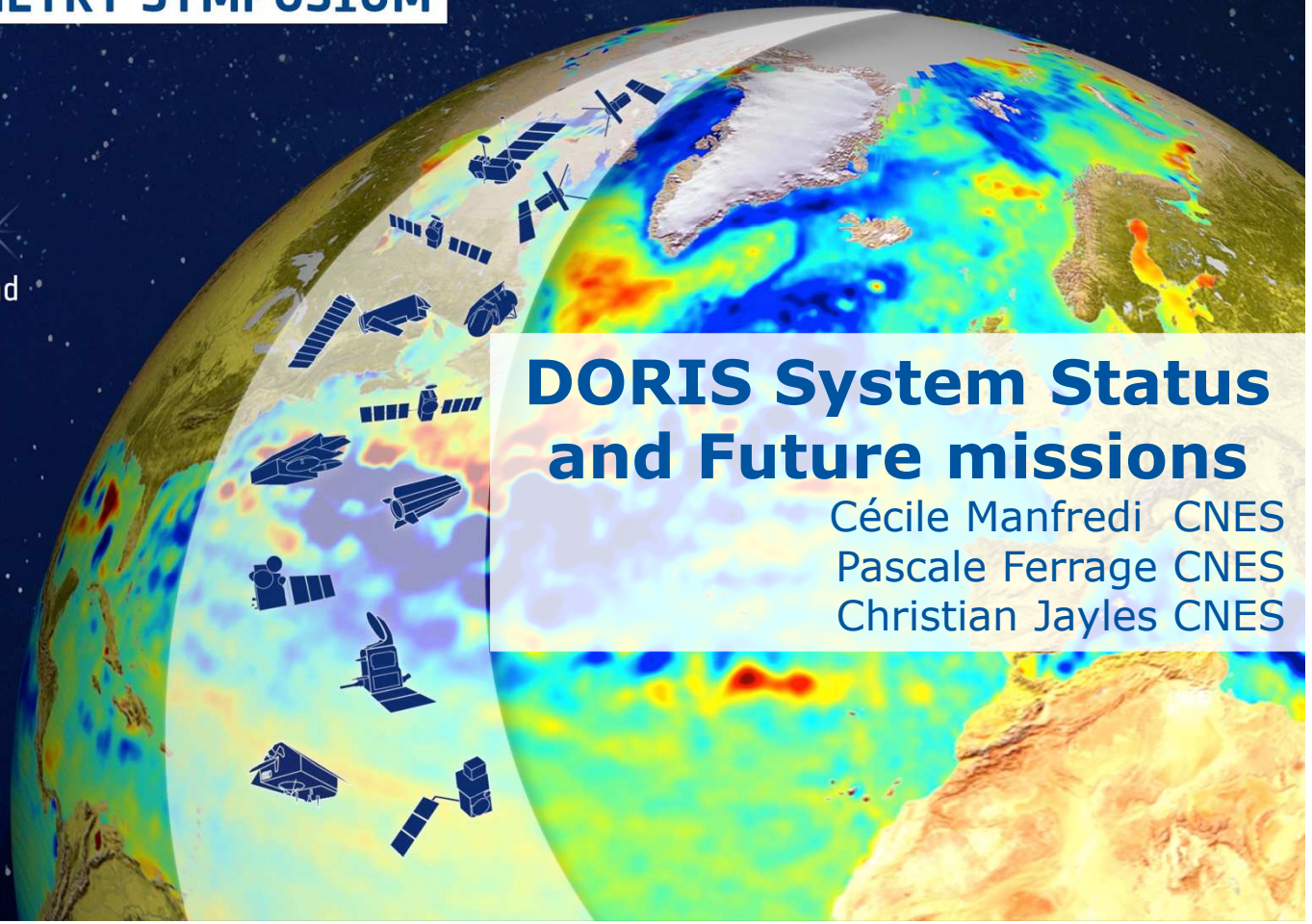
cnes
CENTRE NATIONAL D'ÉTUDES SPATIALES

esa
European Space Agency

→ 25 YEARS OF PROGRESS
IN RADAR ALTIMETRY SYMPOSIUM

IDS WORKSHOP

24–29 September 2018
Ponta Delgada, São Miguel Island
Azores Archipelago, Portugal



DORIS System Status and Future missions

Cécile Manfredi CNES
Pascale Ferrage CNES
Christian Jayles CNES

IDS

DORIS MISSIONS

Today 7 satellites / 14 missions have contributed to IDS since 1990

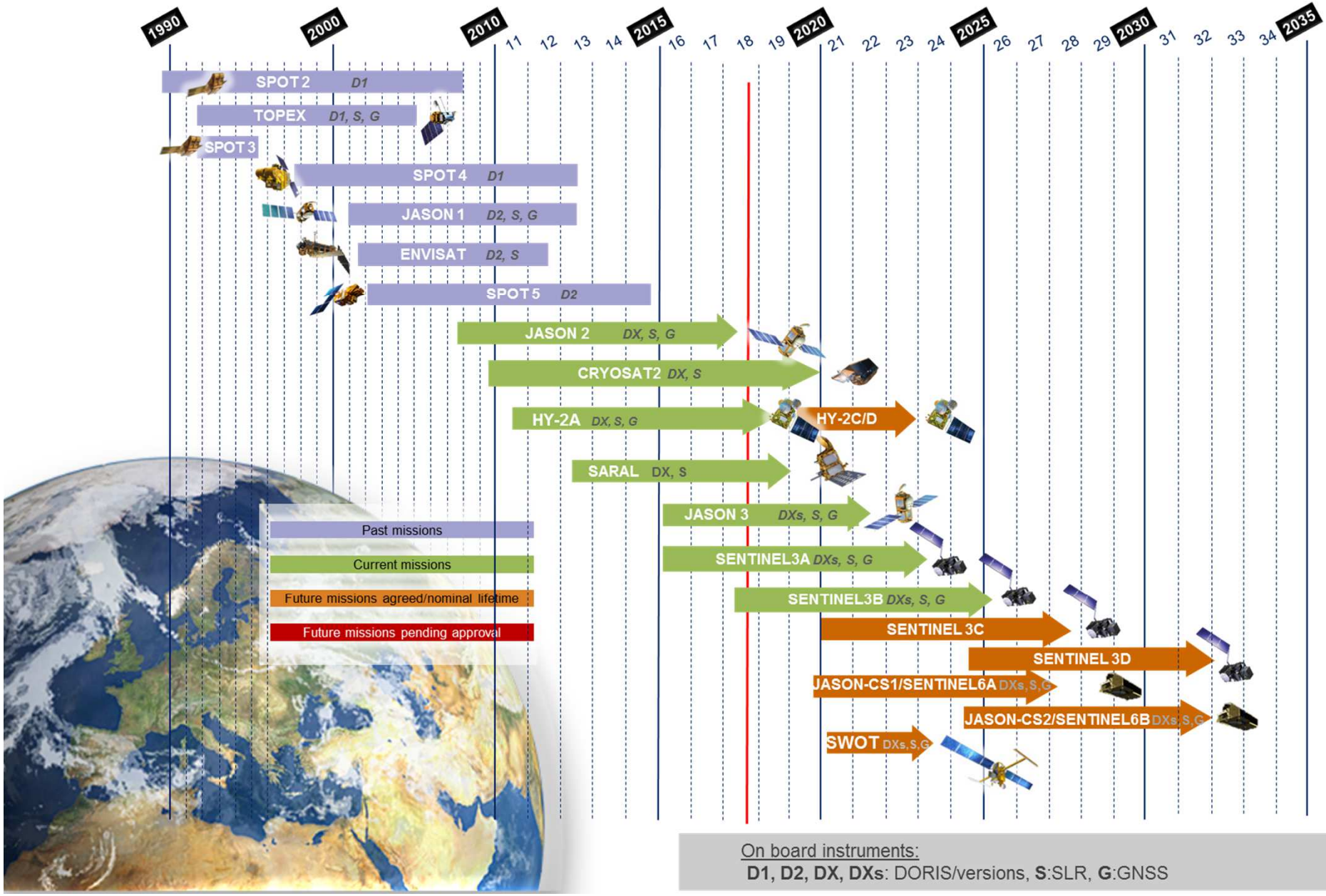
- **SENTINEL 3B (GMES)** : 814km, 98.6° **April 25th 2018** ➔2026 (DGXXS+LRA+GPS)
- SENTINEL 3A (GMES) : 814km, 98.6° Feb. 16th 2016 ➔2024 (DGXXS+LRA+GPS)
- JASON3 (Eumetsat/NOAA/NASA/CNES) : 1336 km, 66° January 17th 2016 ➔ 2022(DGXXS+LRA+GPS)
- SARAL (CNES/ISRO): 800km, 98.5° February 2013 → 2019 (DGXX+LRA)
- HY2-A (CNSA, NSOAS): 960km, 99° August 2011 → 2019+ (DGXX+LRA+GPS)
- CRYOSAT-2 (ESA): 717 km, 92° April 2010 → end 2020 (DGXX + LRA)
- JASON2 (**Eumetsat/NOAA/NASA/CNES**): 1336 km, 66° June 2008 → 2019 (DGXX+LRA+GPS)
  10 years on June 20th !

Many future missions

- Sentinel 3C, 3D (ESA/Eumetsat/CNES) : 814km — 2020, 2025 (7 years)
  DORIS DGXX-S with mini USO
  DORIS instrument development on-going : TRR (Tests Readiness Review) planned for the beginning of 2019, in T-DMS
- JASON-CS1&2/ SENTINEL 6A, 6B : 1336km — end 2020, 2025 (7 years)
  (ESA/Eumetsat/EU/Cnes/Noaa/Nasa)
  DORIS DGXX-S with mini USO
  DORIS instrument development on-going : TRR (Tests Readiness Review) planned for the end of 2018, in T-DMS
- SWOT (Cnes/Nasa/CSA/UKSA) : 970km, 78° — 2021 (3 years)
  DORIS DGXX-S with USO NG
  DORIS instrument development on-going : end of validation tests planned for 2019 spring, in T-DMS

- HY2-C (NSOAS) : 958km — October 2019
- HY2-D — Oct. 2020
- *HY2E-F-G-H : (DORIS not confirmed)*

DORIS CONSTELLATION



On board instruments:
D1, D2, DX, DXs: DORIS/versions, **S**:SLR, **G**:GNSS

New ground Antenna STAREC D

- 20 + 20 antennas, from batches 2016-2017

- **NEW RF characteristics (vs STAREC B, C)**

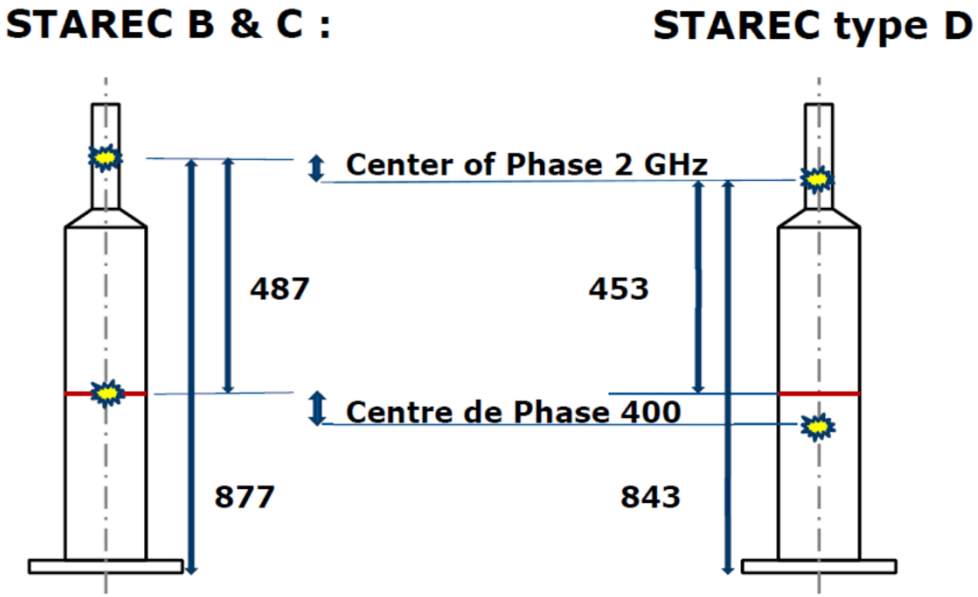
✓ New center of phase 2 GHz (34 mm lower than on STAREC B,C)

✓ New center of phase 400 MHz (39 mm lower than on STAREC B, C)

✓ New phase law (vs STAREC B,C)➔ definition and validation in progress

- **IDS will be informed** by DORISmail, and the **documentation will be updated** accordingly

- Antennas will be deployed from 2019



Fourth generation Beacon B4G

- **Designed to be operational up to 2033**
  - ✓ New electronic (with up to-date components)
  - ✓ Better masks clearance expected thanks to longer distance between beacon and antenna (up to 50 m)

- **Schedule : On time**
  - ✓ April 2018: Prototype installed at CLS (shifted frequency) : Test of 10 days of measurements : successful, with a nominal functioning, and beacon recognized by satellites
  - ✓ Delivery of the pre-serie model done in July, and the beacon was installed at CLS (in place of prototype) : from mid-July, perfect functionning
  - ✓ Delivery of the first batch of series beacons: from March 2019

On board DORIS receiver

Technical expertise concerning radiations

- Better characterization of USO Radiation Sensitivity will be performed for future instruments ➔ models of frequency correction can be implemented in the Analysis Centers on-ground processing

- Future R&T study : Reduce the Oscillators Radiations sensitivity and even improve their characterization.

- Sentinel 3A, B, C, D, Jason CS1&2 : with coupled GNSS & DORIS ➔ Real time observation of the DORIS USO frequency (by the GNSS)
  - ✓ Available in the TM
  - ✓ Useful to correct the SAA effect on ground processing
  - ✓ ➔ Process to be discussed and implemented

Perspectives

- On-going R&T study: Architecture for a receiver using both DORIS and GNSS signals:
  - ✓ See presentation "Architecture for a combined GNSS-DORIS receiver" by C. Jayles and Al


cnes
CENTRE NATIONAL D'ÉTUDES SPATIALES
esa
European Space Agency
Thank you !
EUMETSAT
NASA
ECMWF
ThalesAlenia Space
OceanDataLab
CLS