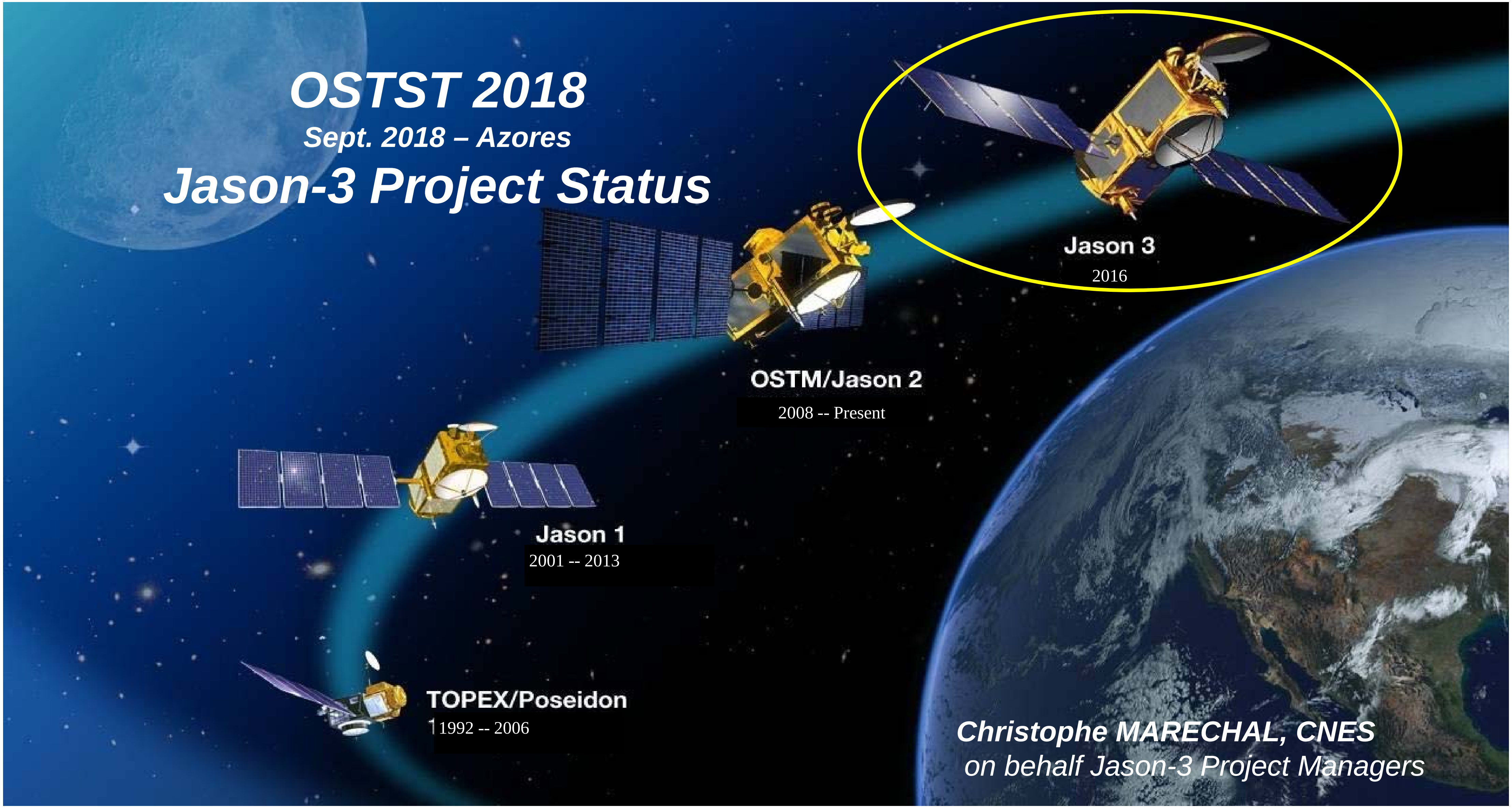
OSTST 2018

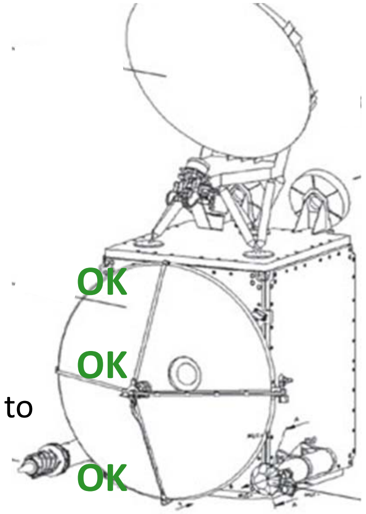
Sept. 2018 – Azores

Jason-3 Project Status



Christophe MARECHAL, CNES
on behalf Jason-3 Project Managers

Platform Status

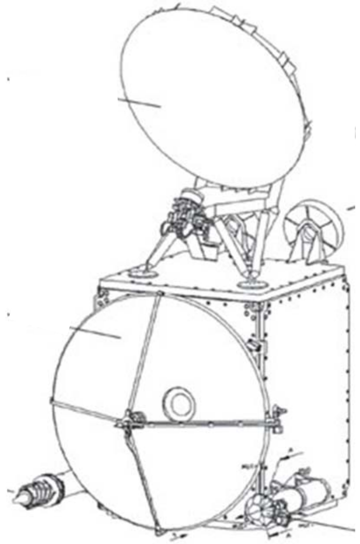


- The Jason-2 satellite bus is **OK**
  - Command / control , RF on **PMA** — **OK**
    - On-Board Software, Mass Memory, Telemetry & Telecommand system
  - Thermal aspects: — **OK**
    - Active thermal control works successfully and is sized with significant margins to meet further worst case conditions
  - Electrical aspects : — **OK**
    - Satellite power and consumption are within the power, consumption and energetic budgets
  - AOCS (attitude and orbit control system) : — **OK**
    - Gyros 1 and 2 fully operational only under 25°C
    - Other AOCS units work nominally, AOCS control laws work as expected when gyros OK

- Exceptional activities :
  - Unused equipment destocking (gyro, STR) — **OK**
  - STR monitoring, SADM expertise, PCE expertise — **OK**
  - Gyro calibration — **OK**

Jason-3 is fully operational with all redundant systems available

Payload Status



- **Core Payload**
  - **POSEIDON3 (99,99%)** OK
  - **DORIS (100%)** OK
  - **AMR (99.6%)** OK
  - **GPSP-B (100%)** OK

- **Passengers**
  - CARMEN / AMBRE OK
  - LPT OK

- **Exceptional activities :**
  - POS3B DEM upload August 31st 2017 OK

➔ **Fully OPERATIONAL with redundancy available for POS-3, DORIS & AMR**

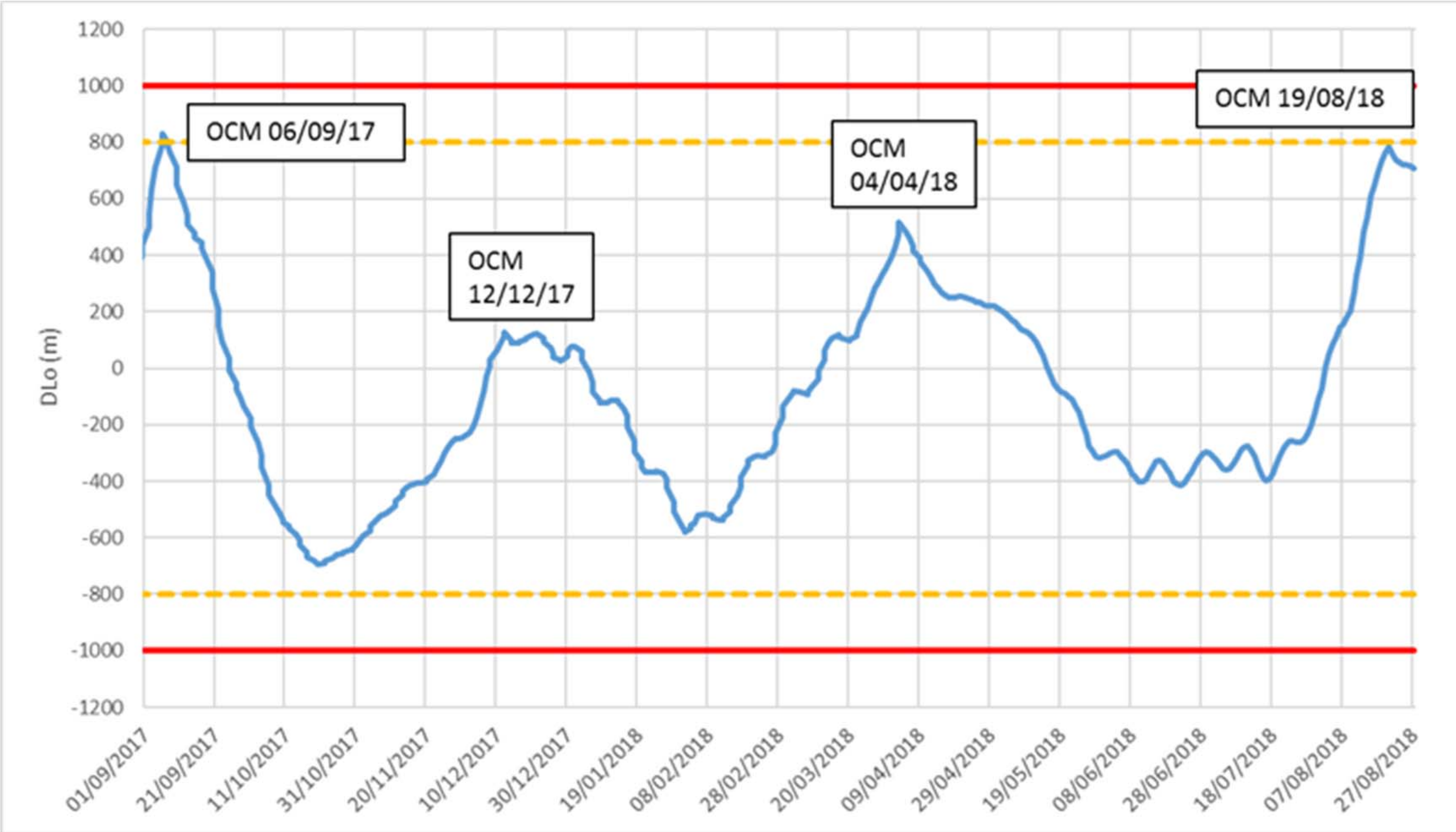
➔ **Passengers fully operation**

Ground & Operations Status

- Earth terminals :
  - Usingen – USG2, + partial USG1 shadowing **OK**
  - Wallops, Fairbanks and Barrow (CDAS) **OK**
- Control Centers :
  - JCCC CNES Control center **OK**
    - all the elements are OK
  - SOCC NOAA Control center **OK**
    - all the elements are OK
- Instrument Commanding and Monitoring Centers :
  - SSALTO for CNES instruments **OK**
  - JPL Mission facility for NASA/JPL instruments **OK**
  - Passengers Mission centers **OK**

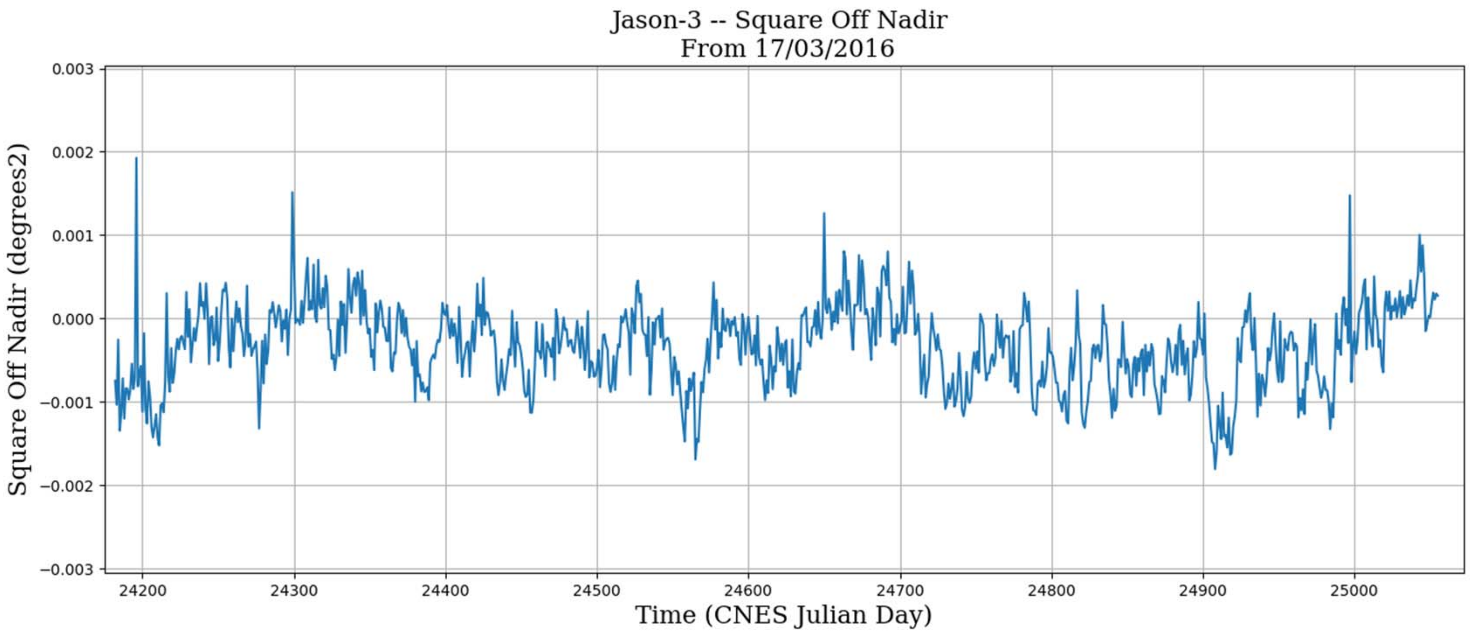
Routine navigation and guidance

- **Very smooth operations**



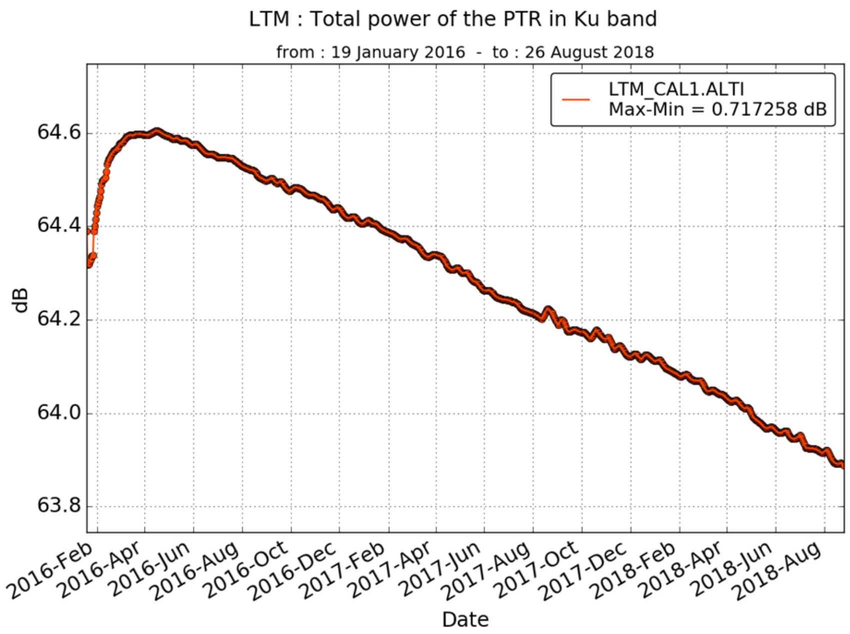
System Requirements and Performances

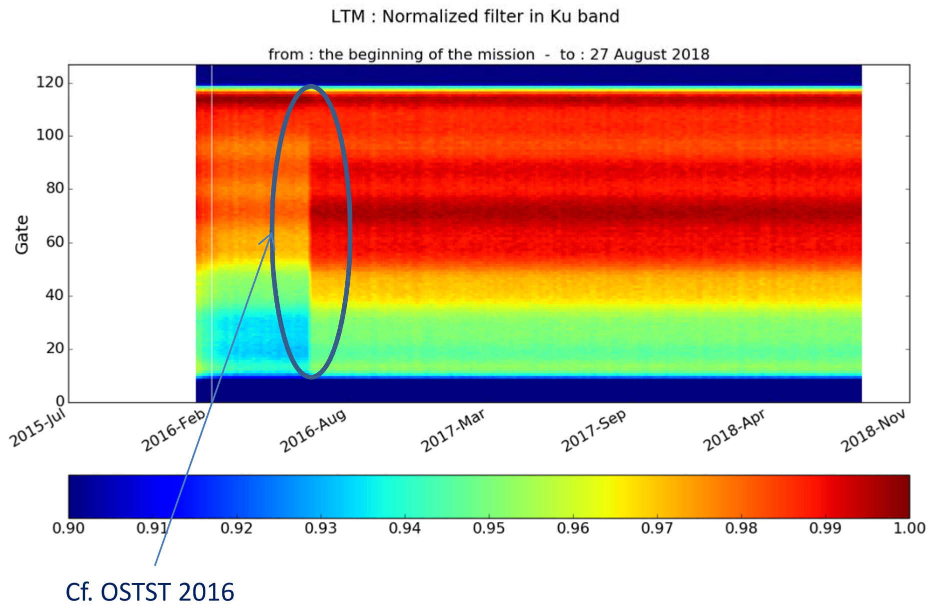
- Altimeter Antenna Pointing : **typical value below 0.001°**
  - Requirement < 0.2°
  - pointing performance stable since launch



Poseidon-3B / JASON-3

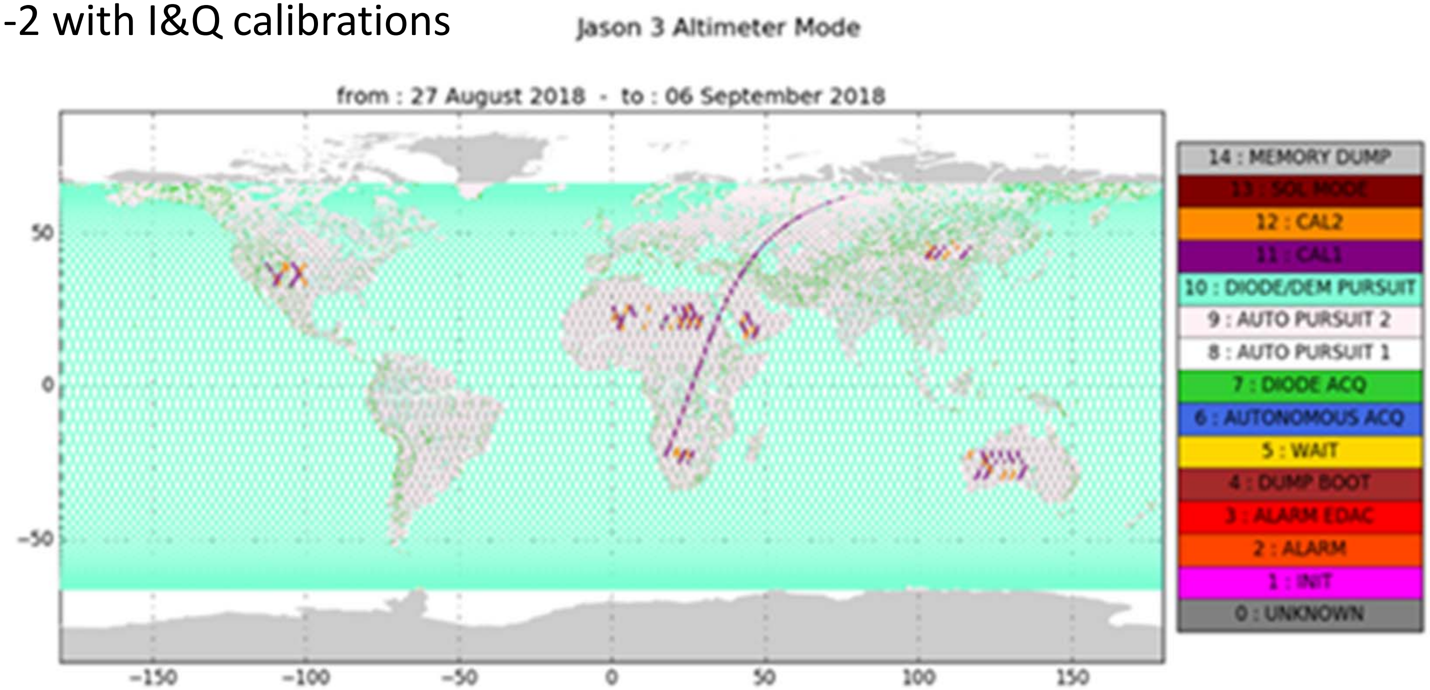
- Routine/Exceptional calibrations are OK
- Excellent Measurement Stability (short and long term)
  - CAL1 Ku-band PTR power
  - CAL2 Ku-band LPF





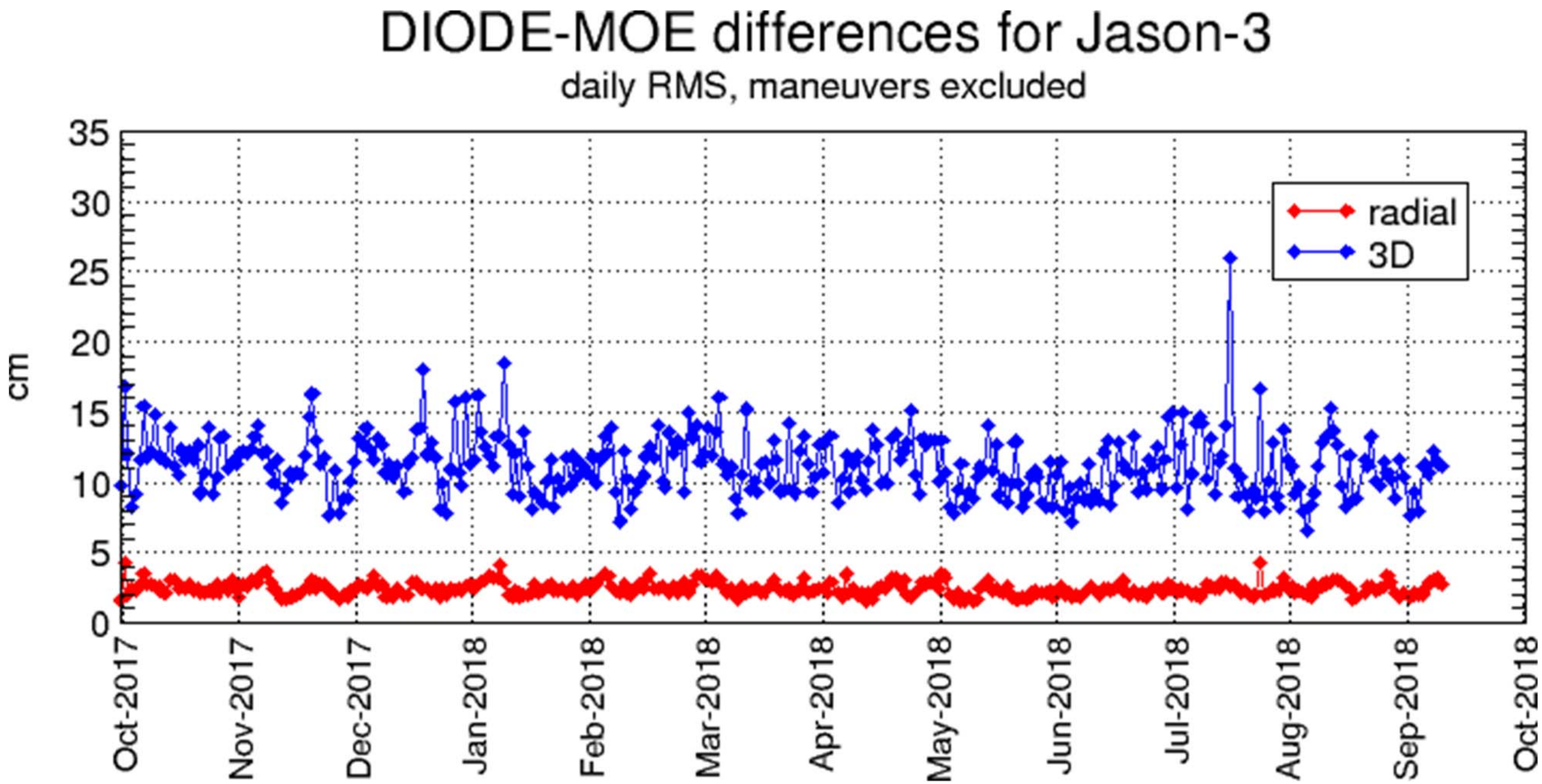
POSEIDON 3B CNG calibrations

- CNG calibration
  - Approximately every 3 months
  - Last performed and processed : 29/08/2018
  - Analysis and processing performed by CNES instrument responsible
  - Good Stability (of the order of calibration accuracy)
  - Very low trend variation in the functioning AGC range
  - Increase accuracy wrt Jason-2 with I&Q calibrations



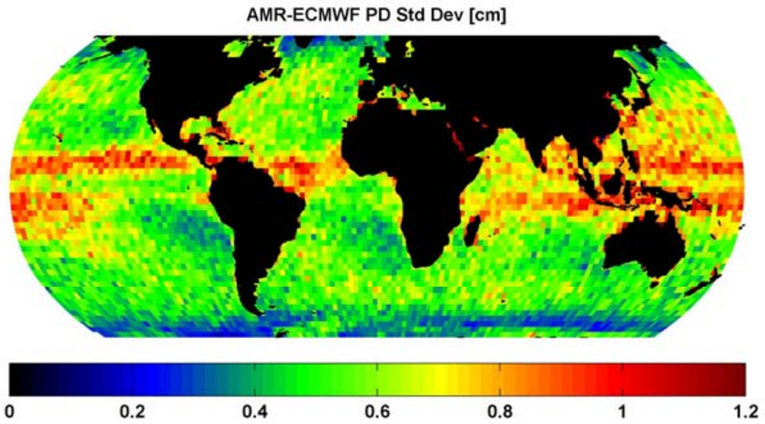
Availability = **100% over the period**

DORIS



AMR

- **Jason-3 AMR performing nominally since launch**
  - Jason-3 AMR maintains excellent performance
  - Cold sky calibrations are critical to stabilizing Jason-3 at the mm-level
  - Jason-3 AMR global average PD within ±1mm of the ECMWF model PD over 2 years

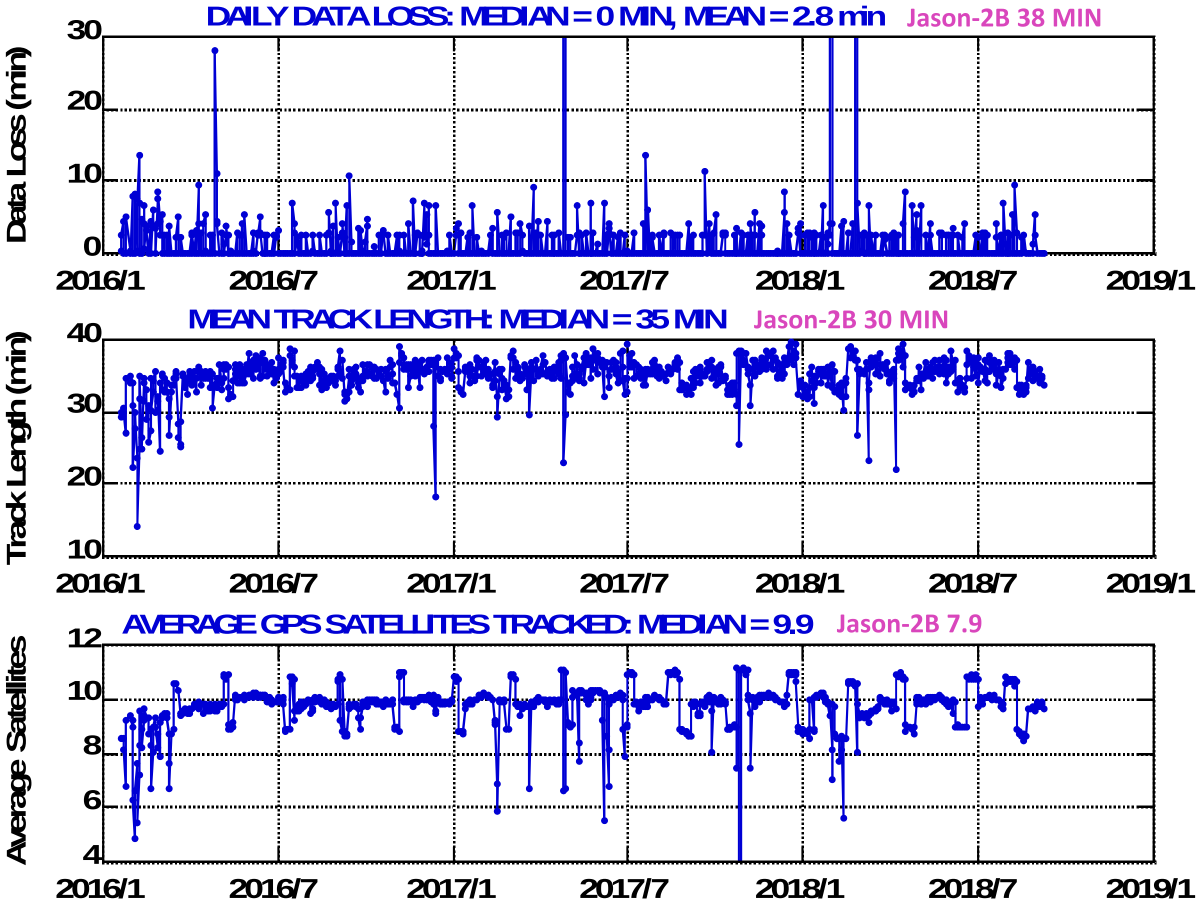


Jason-3 AMR - ECMWF ΔPD 2.5° Cycle Standard Deviation PD [cm]

Jason-3 AMR Cycle Stability Relative to ECMWF [cm]

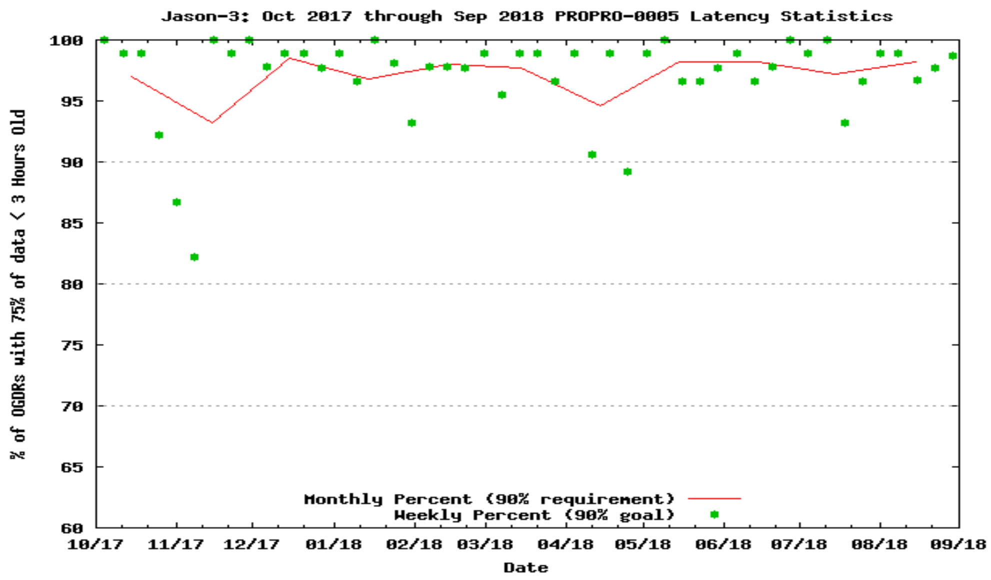
Jason-3 GPSP Receiver Performance

GPSP



OGDR products Status and performances

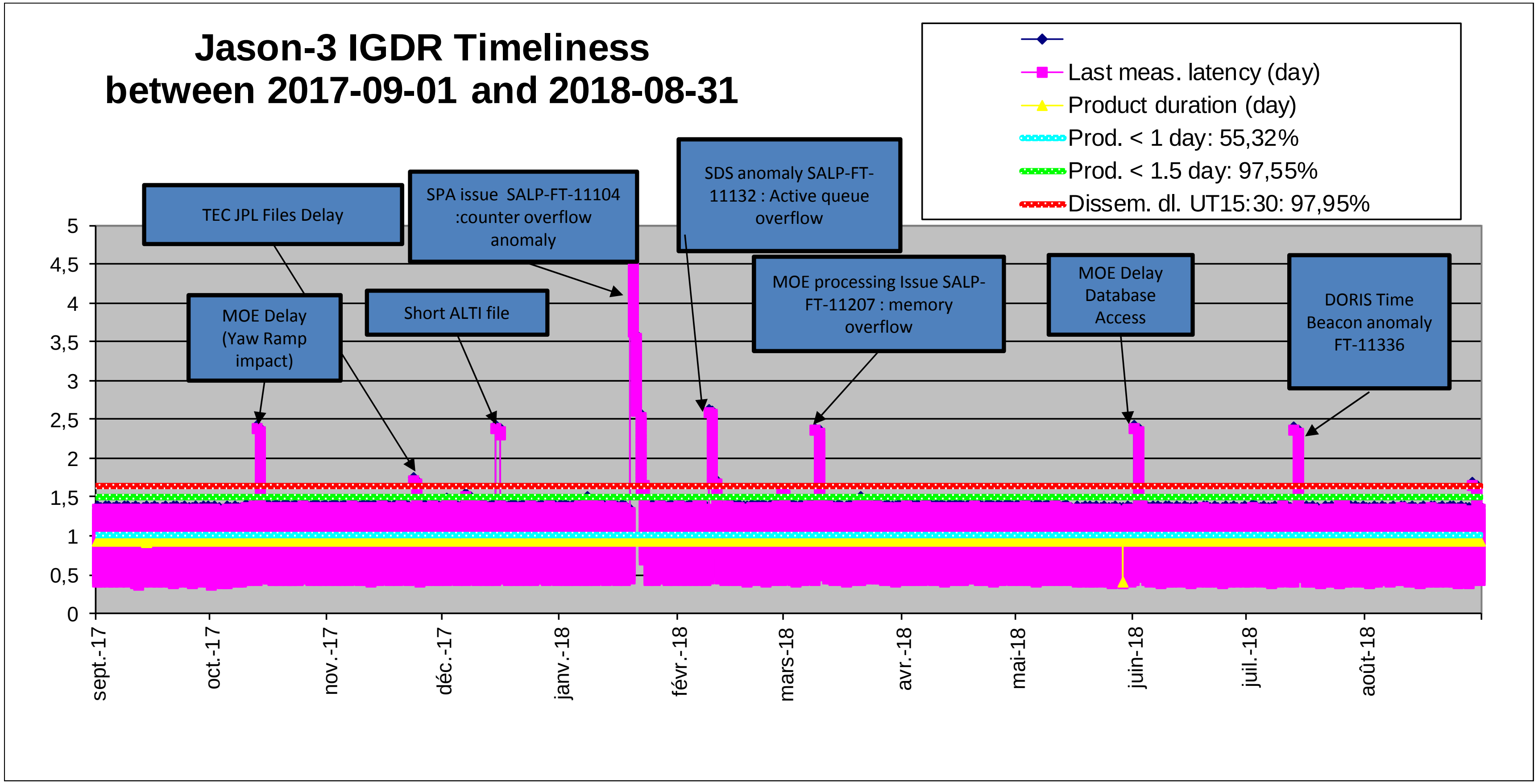
- NRT products made by **EUMETSAT** and **NOAA/ESPC** Mission Center
- No major changes in the period
  - TM-NRT : 1 patch deployed @EUM & NOAA



- EUMPC : ~100% OGDR successful for PLTM1 acquired at USG
- NOAA ESPC : ~100% OGDR successful for PLTM1 acquired at CDAs
- 100 % OGDR products archived, all disseminated via EUMETCast and via NOAA dissemination services

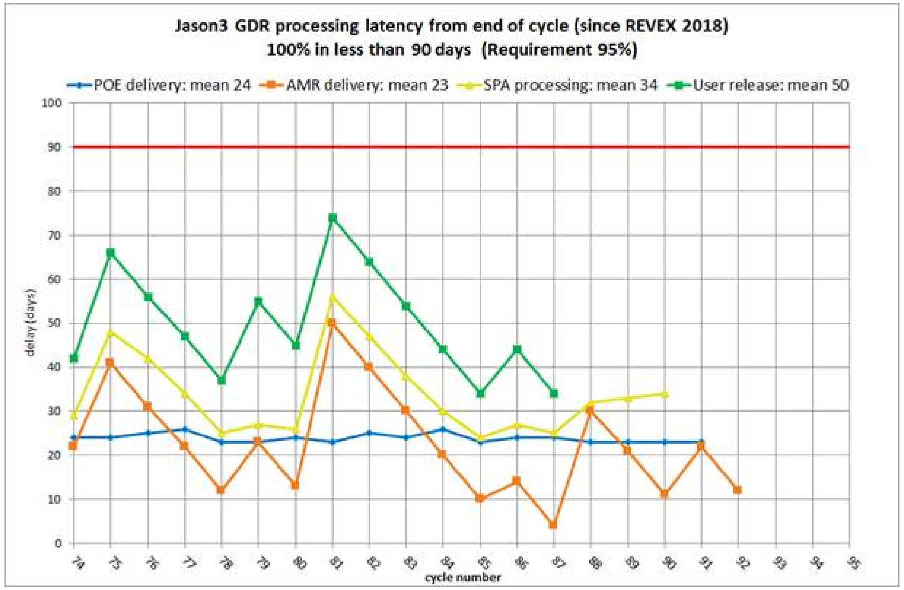
IGDR - status and performances

- Jason-3 IGDR processing is OK (CNES : 100% IGDR successful)
- 100% IGDR products archived
- All disseminated via CNES AVISO+ and NOAA dissemination services

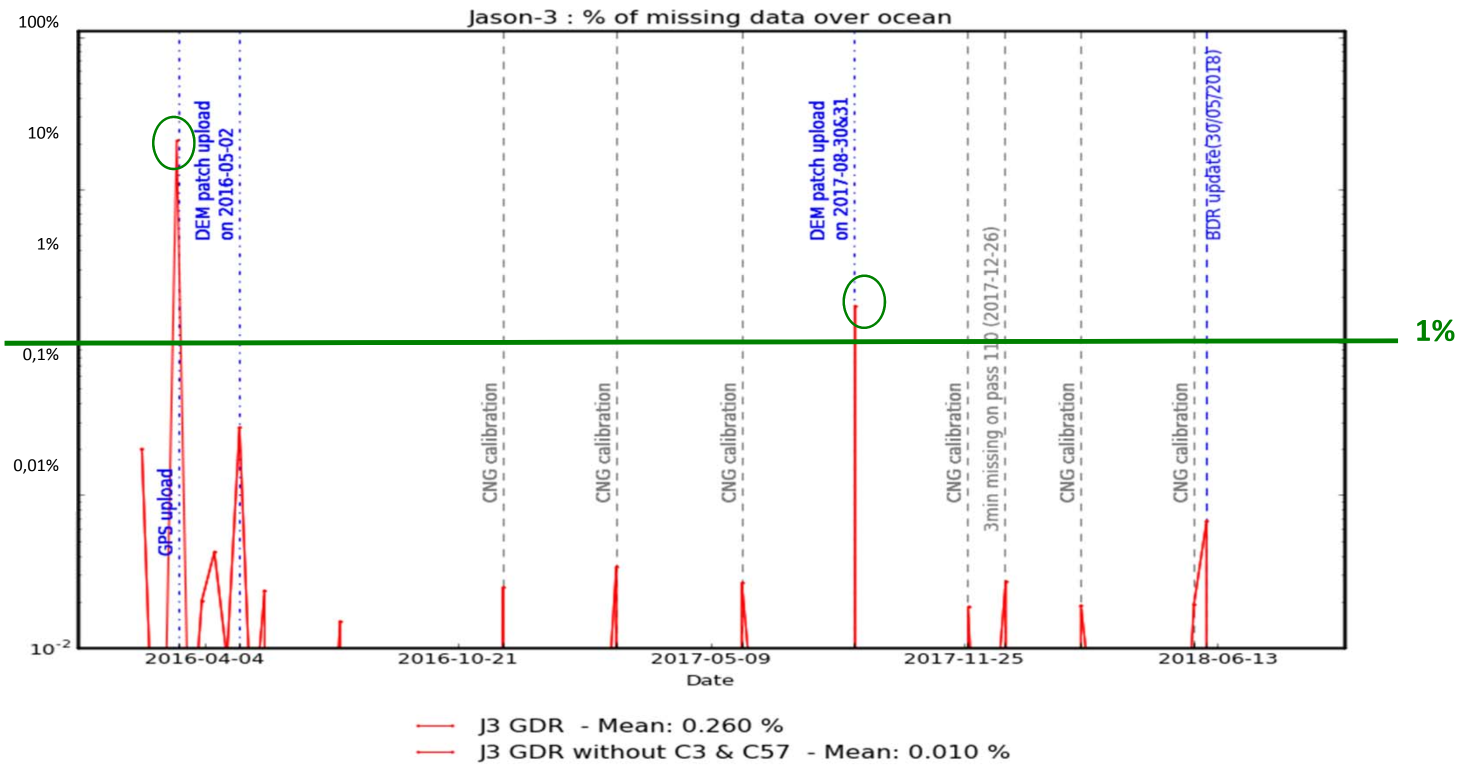


GDR - status and performances

- GDR produced by CNES/SSALTO
- Jason-3 GDR processing is OK
  - Data availability & latency OK
  - Systematic cross checked validation by CNES and JPL
  - Cycle per cycle (and yearly) validation reports available on AVISO+ http://www.aviso.altimetry.fr/en/data/calval/systematic-calval.html
- 100% GDR products archived
- All disseminated via CNES AVISO+ and NOAA dissemination services

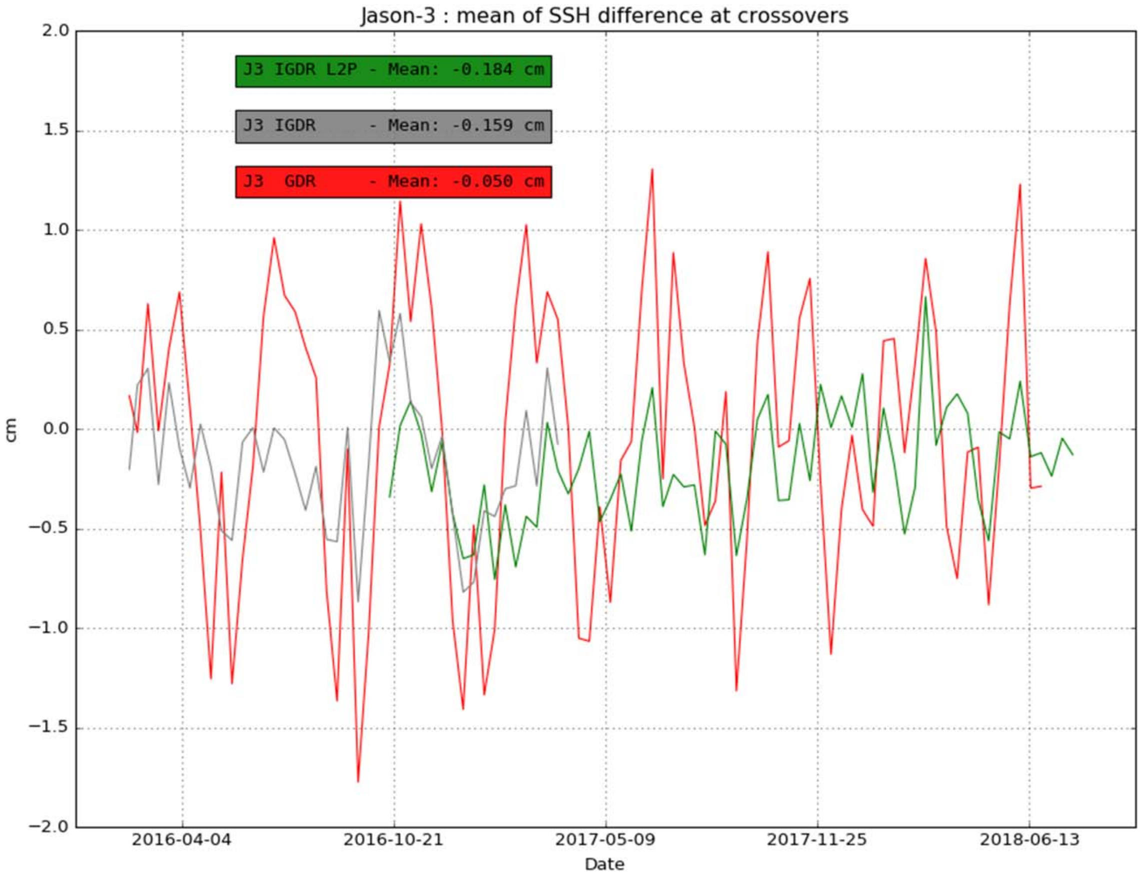


Performances – missing measurements



Performances – Xover

SSH error is deduced from crossovers analyses using radiometer data
->selecting |latitudes| < 50°, bathy<-1000m, oceanic variability < 20 cm



MOE/POE

- From cycle 95, MOE and POE are in « F » standard
- POE on cycle 95 will be available at the beginning of October

- See :
  - **« Jason-2/3 POD Status and First Results for Sentinel-3B » oral presentation** in POD session
  - **« Validation of POE-F standards » poster** in orbito session

- New « mixed DORIS + GPS » MOE will be available by end of 2018.

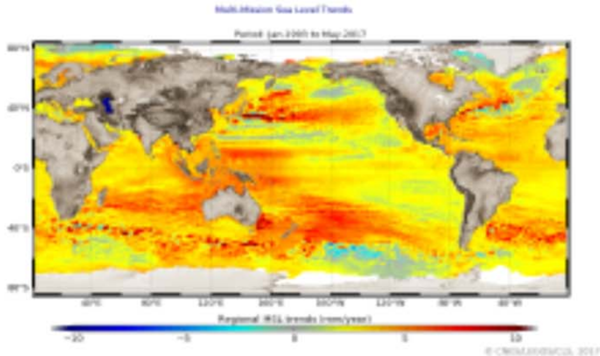
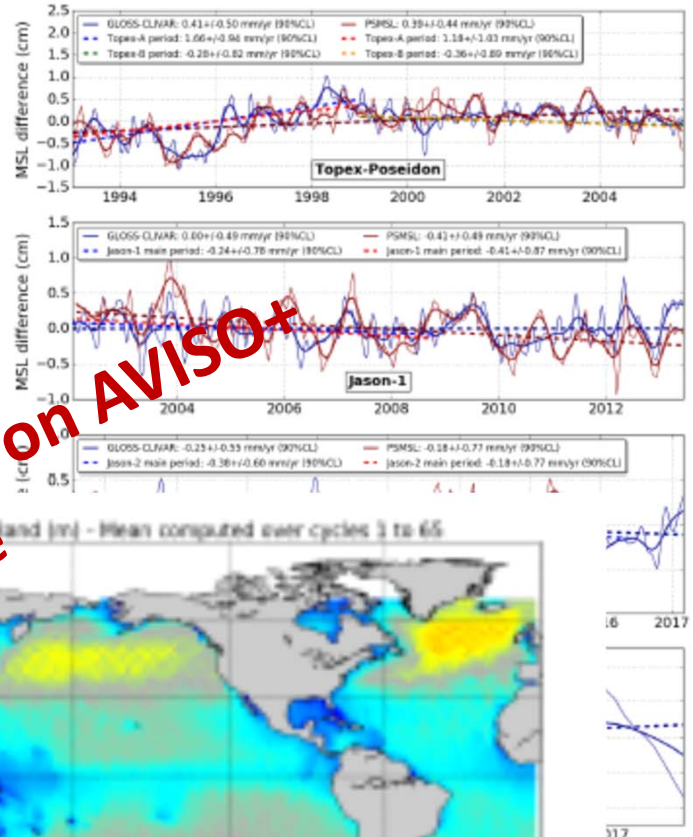


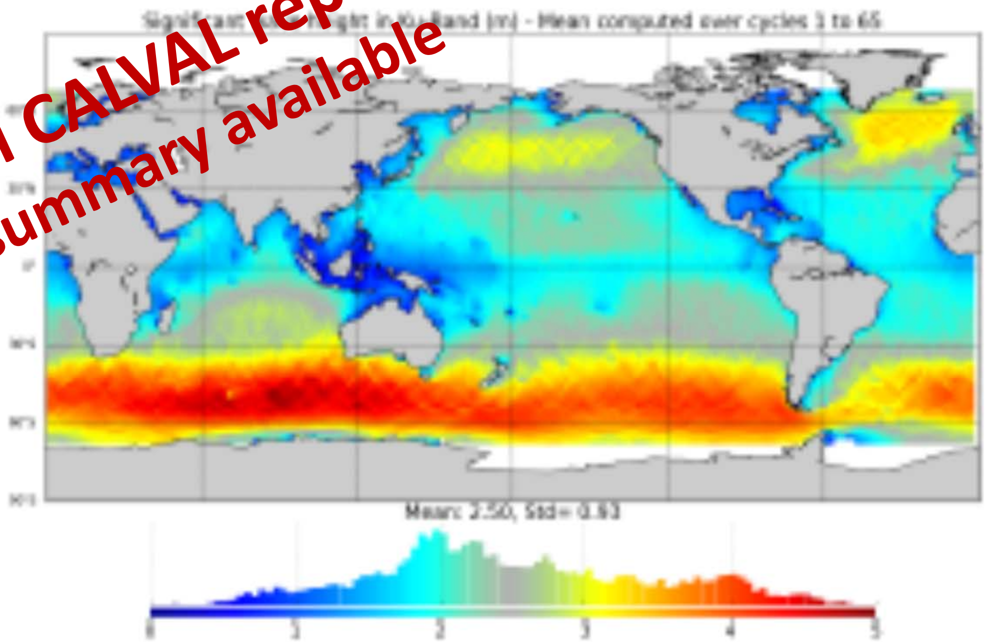
Figure 50 – Global (left) and regional (right) MSL trends from 1993 onwards.



CalVal Jason-3

Jason-3 validation and cross calibration activities (Annual report 2017)

Contract No 160182-14026/00 Lot 1.6.3



Available in the annual CALVAL report on AVISO+

Executive summary available

System Requirements and Performances

- Data availability :
  - Requirement : The GDR shall contain 95% of all p
    (acquisition and archive) during any 12 month p
- from November 2017 until October 2018

⇒ **satellite unavailability** **~0.01 %** **< 4% req**

– bus : 0% altimeter : 0.01% Doris : 0% AMR : 0.35%

...ility **~0.00 %** **< 1% req**

« Jason-3 and Jason-2 mission Performance »
poster in calval (CVL_012)

« Performance of the altimetry missions (J3, AL, S3) over coastal areas »
Oral presentation in calval

➔ **Global Jason-3 system availability : 99.99%**

Conclusion – Jason-3 at a glance

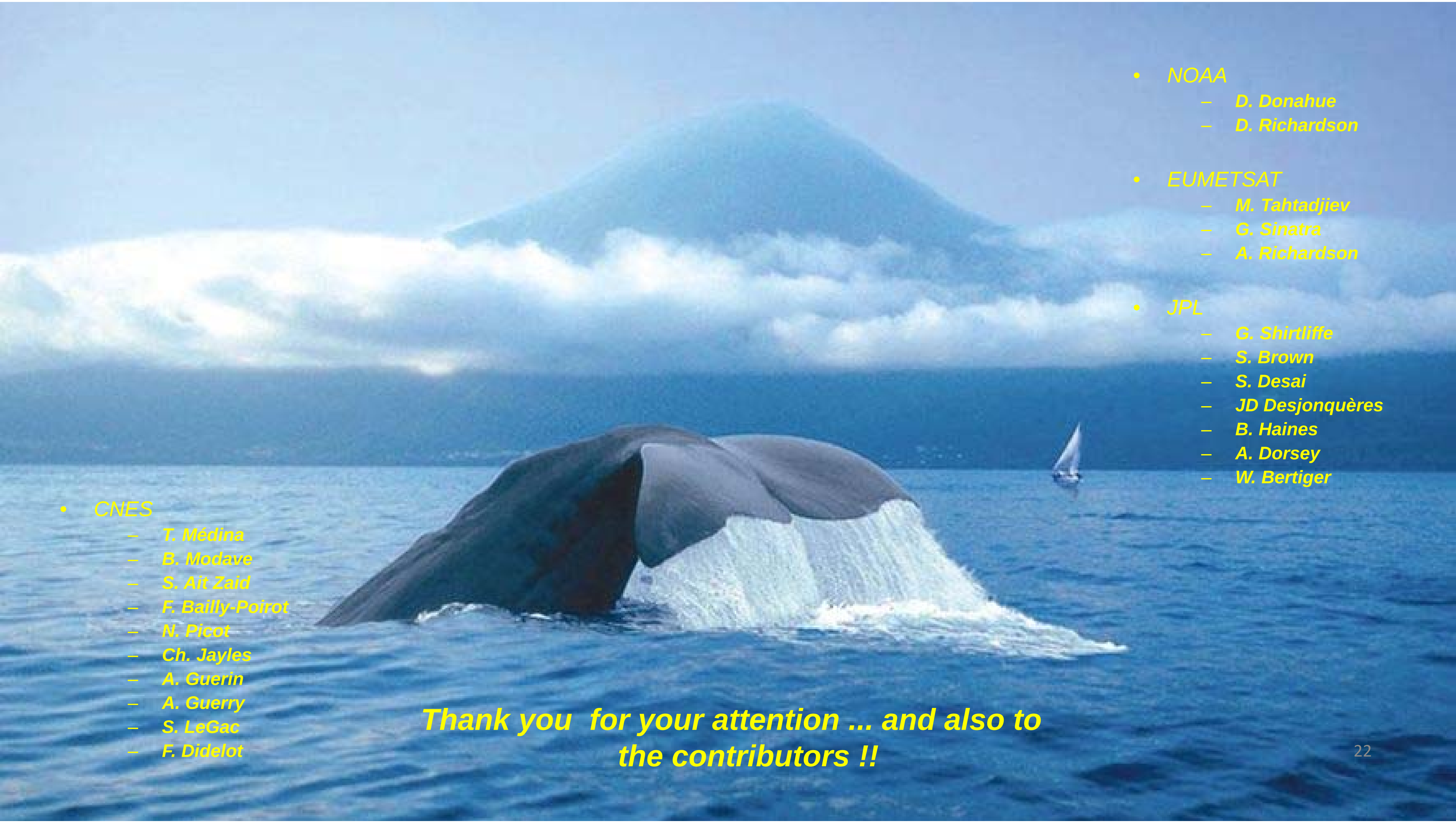
- 2nd Jason-3 Exploitation Review (REVEX) : successful in May 2018
- Platform and instrument in perfect conditions
- Mission extension until beginning of 2021 has just been agreed at Joint Steering Group.
- New MOE-POE standard (F)
- GDR-E should be implemented in 2019

Thank you to all the teams from CNES, NOAA, EUMETSAT & NASA/JPL

Items to consider

- ➔ **Jason-3 is required for Jason-CS/Sentinel-6 intercalibration**

- ➔ **What will be its mission after that ?**
  - ➔ Interleaved orbit ?
  - ➔ Geodetic ?



- NOAA
  - D. Donahue
  - D. Richardson
- EUMETSAT
  - M. Tahtadjiev
  - G. Sinatra
  - A. Richardson
- JPL
  - G. Shirtliffe
  - S. Brown
  - S. Desai
  - JD Desjonquères
  - B. Haines
  - A. Dorsey
  - W. Bertiger
- CNES
  - T. Médina
  - B. Modave
  - S. Ait Zaid
  - F. Bailly-Poirot
  - N. Picot
  - Ch. Jayles
  - A. Guerin
  - A. Guerry
  - S. LeGac
  - F. Didelot

Thank you for your attention ... and also to the contributors !!

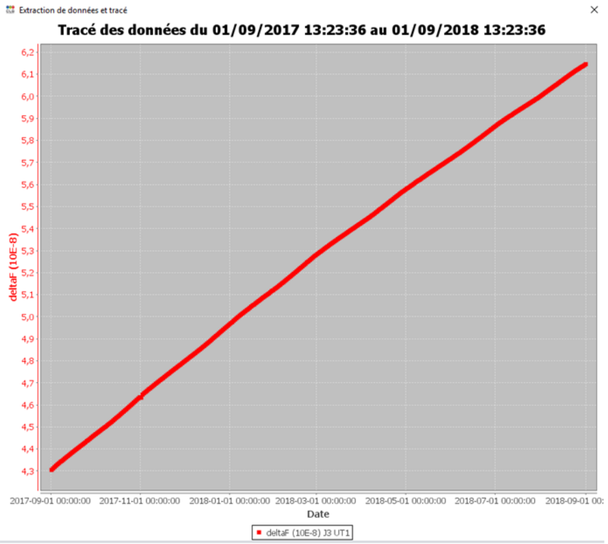
Backup slides

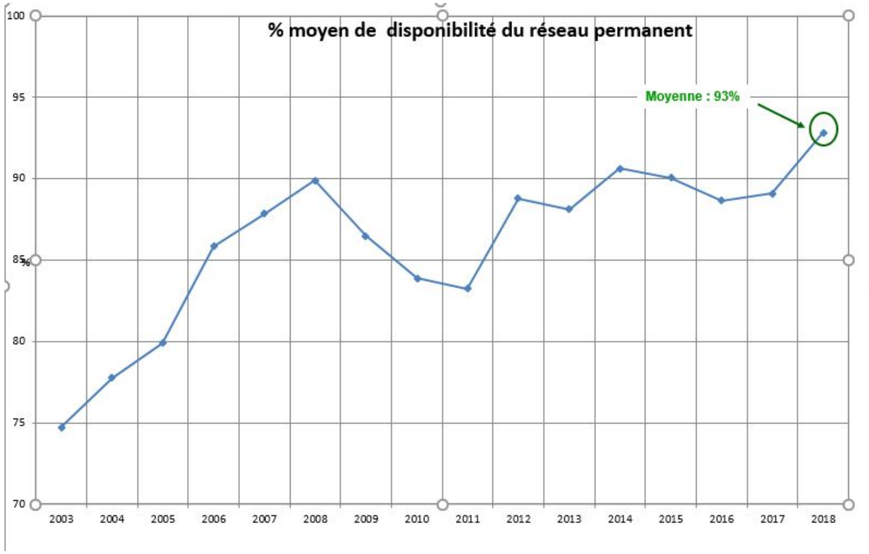
DORIS

- DORIS Availability = **100% over the period**
  - No anomaly over the period
  - Effective accuracy as compared to on-board GPS (platform) is stable :
    - 1.8 μs (OGDR & IGDR)
    - ~1.5 μs (GDR)

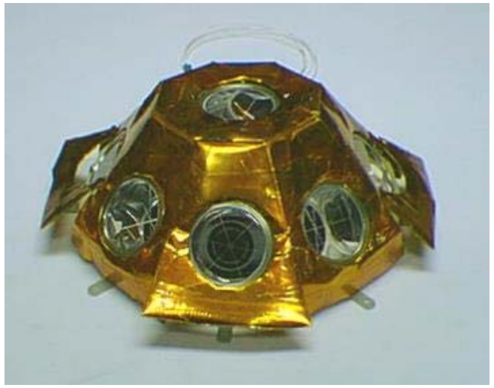
+ very good performance of the ground network (~90 %)

USO Delta-F Sept.2017-Aug..2018

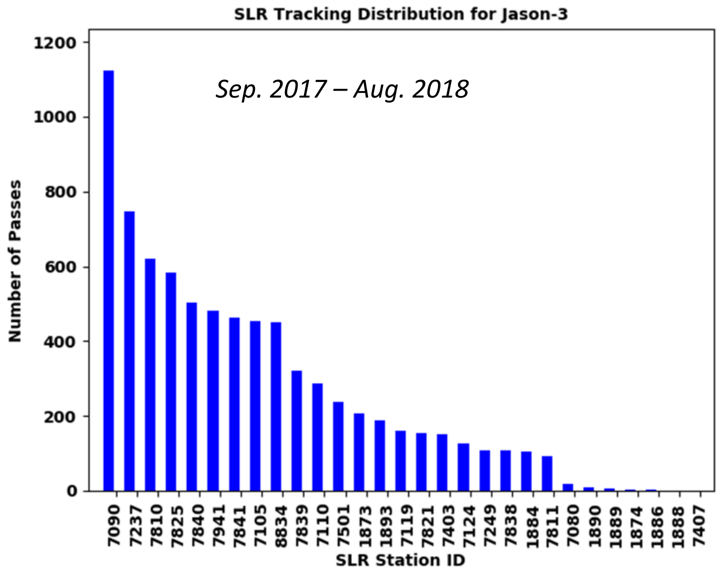




SLR/LRA



- Laser ranging array (LRA) is passive (No electronics or software)
- Copy of Jason-1 & Jason-2 LRA system, supporting cm-level ranging
- Tracking of Jason-3 and Jason-2 high priority for International Laser Ranging Service (ILRS)
- Performance of Jason-3 LRA has been <u>nominal</u>



Cumulative Passes Per Station for Jason-3

- **Top stations by pass volume from Sep. 2017 to Aug. 2018:**
  - ***Yaragadee, Changchun, Zimmerwald, Mt. Stromlo , Herstmonceux***