OSTST 2022

Virtual meeting

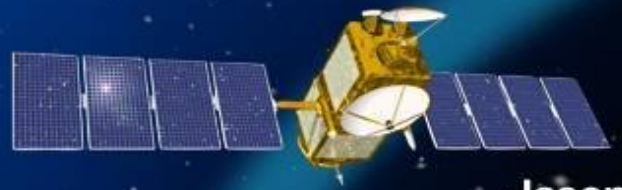
Jason-3 Project Status

Jason 3

2016

OSTM/Jason 2

2008 -- 2019



Jason 1

2001 -- 2013

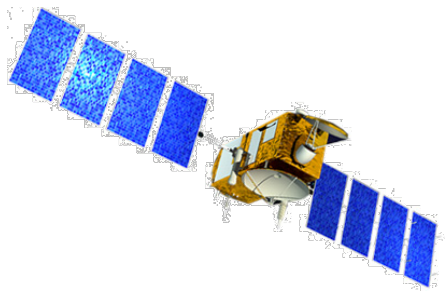
TOPEX/Poseidon

1992 -- 2006

Christophe MARECHAL, CNES

on behalf Jason-3 Project Managers

Platform status



AOCS & Propulsion

Electrical & Power

Thermal

Data handling – TT&C

No SHM occurrences since the 2020/06/15th

JASON-2 lessons learnt:

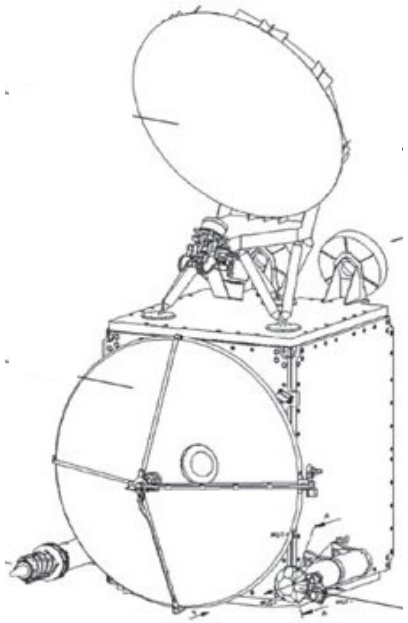
- ✓ **Patch EDAC_INVESTIGATION to monitor EDAC in RAM (currently on PMA): no recurrent error detected so far**
- ✓ **Gyro swap strategy to prevent JA2-like gyro anomalies: next swap (GYR2⇔GYR1) foreseen in March 2022**
- ✓ **PCE sections swap strategy to prevent JA2-like PCE anomalies: Next swap (S1 – S7 ⇔ S2 – S8) foreseen in January 2025**

After more than 6 years in orbit :

- **Both half satellites available**
- **all sub-systems operational with nominal performances**
- **all subsystems available**

- ✓ **No limitation of mission duration involved**

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**

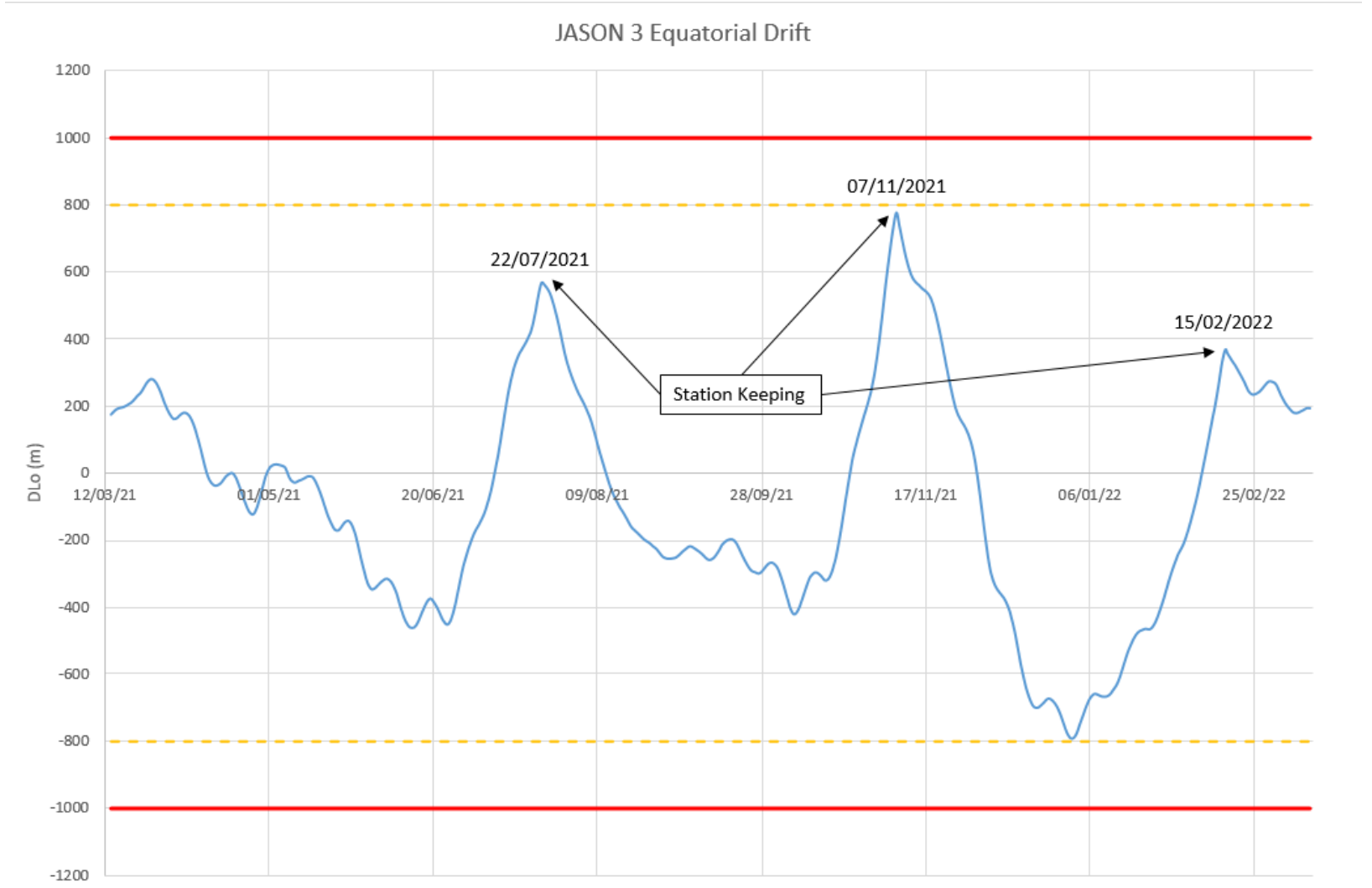
- **Exceptional activities :**
  - POS3B DEM upload September 2nd 2020 **OK**

➔ **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

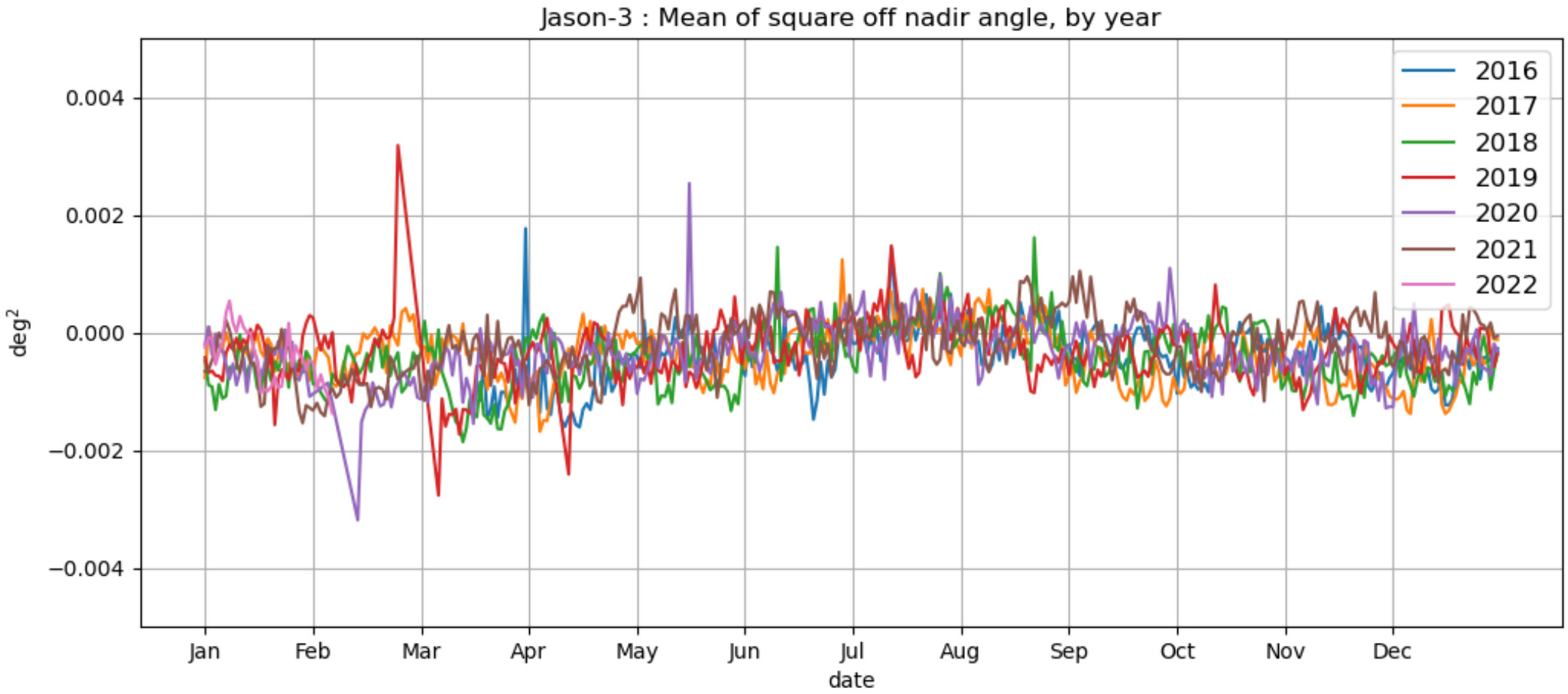


System Requirements and Performances

Altimeter Antenna Pointing : **typical value below 0.005°**

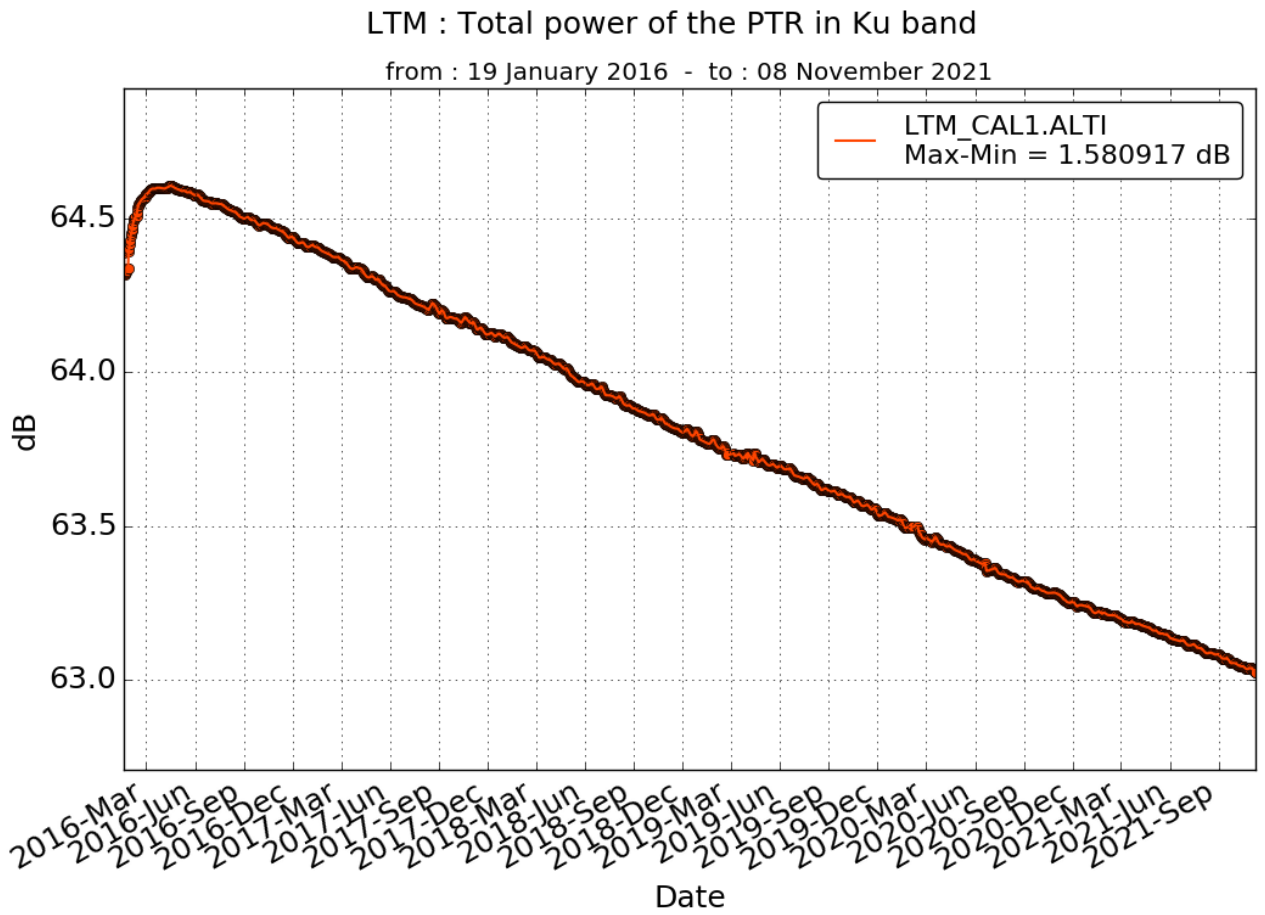
(Requirement < 0.2°)

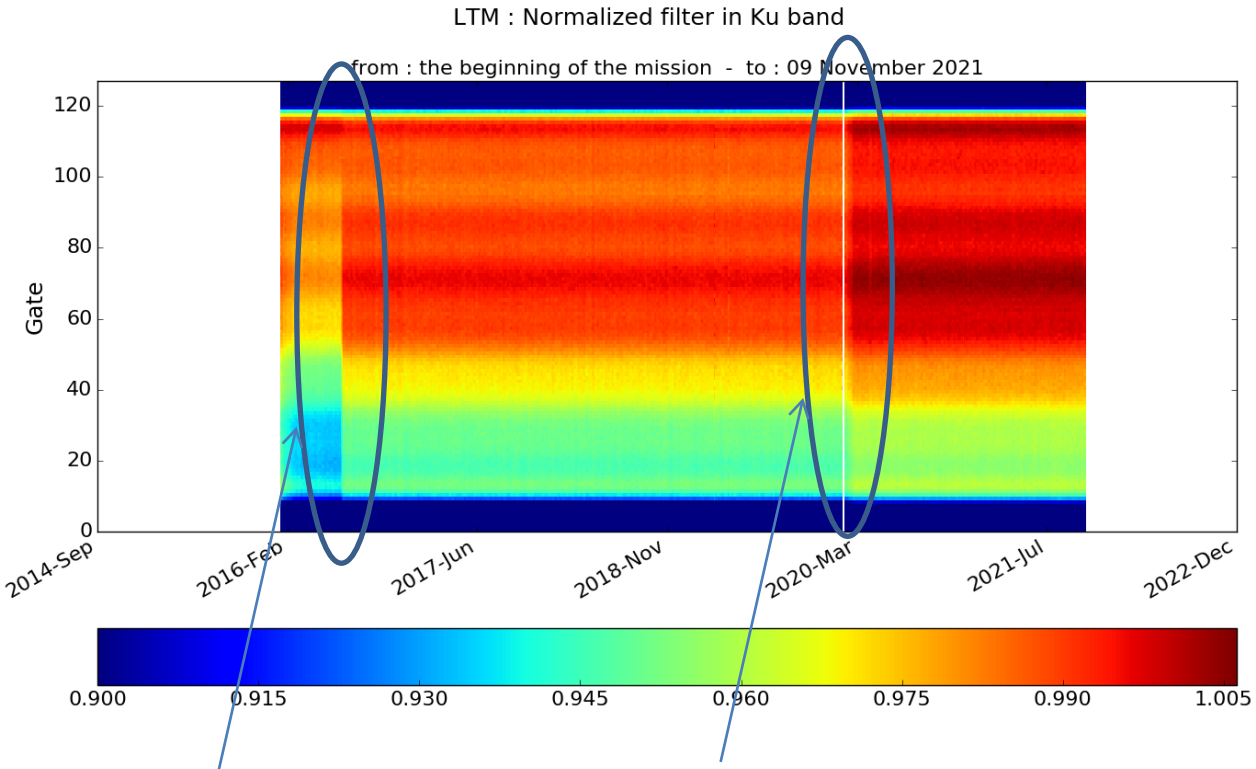
pointing performance stable



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



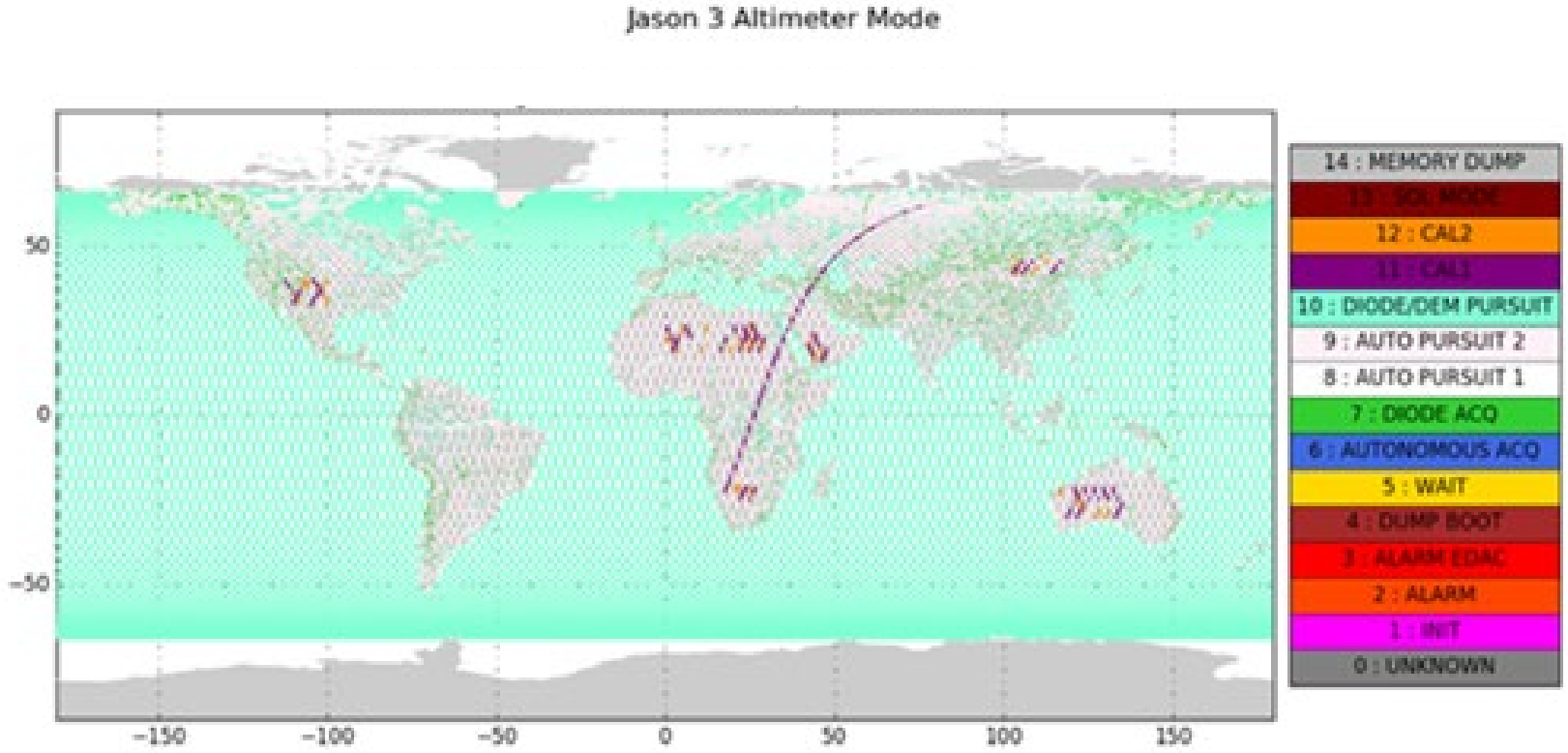


Cf. OSTST 2016

GDR-F: normalization by the mean of the LPF

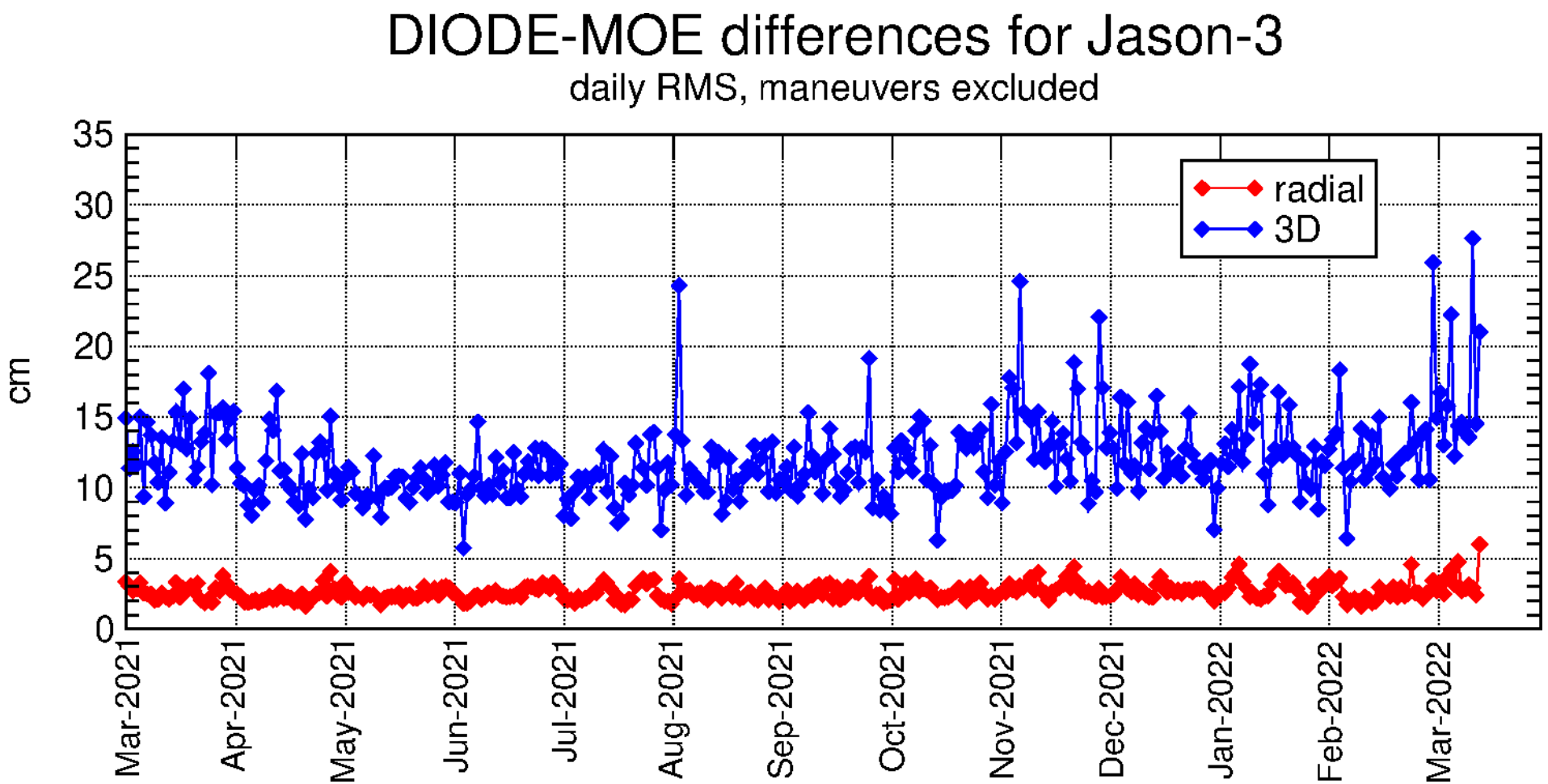
POSEIDON 3B CNG calibrations

- CNG calibration
  - Approximately every 3 months
  - 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

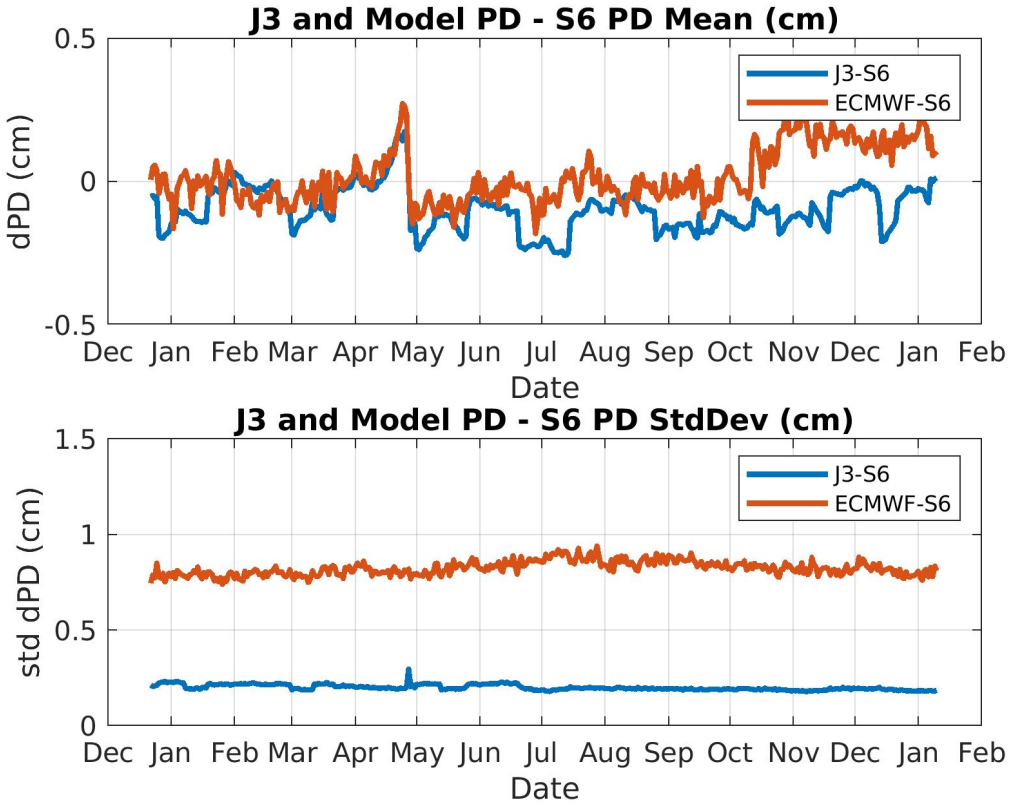


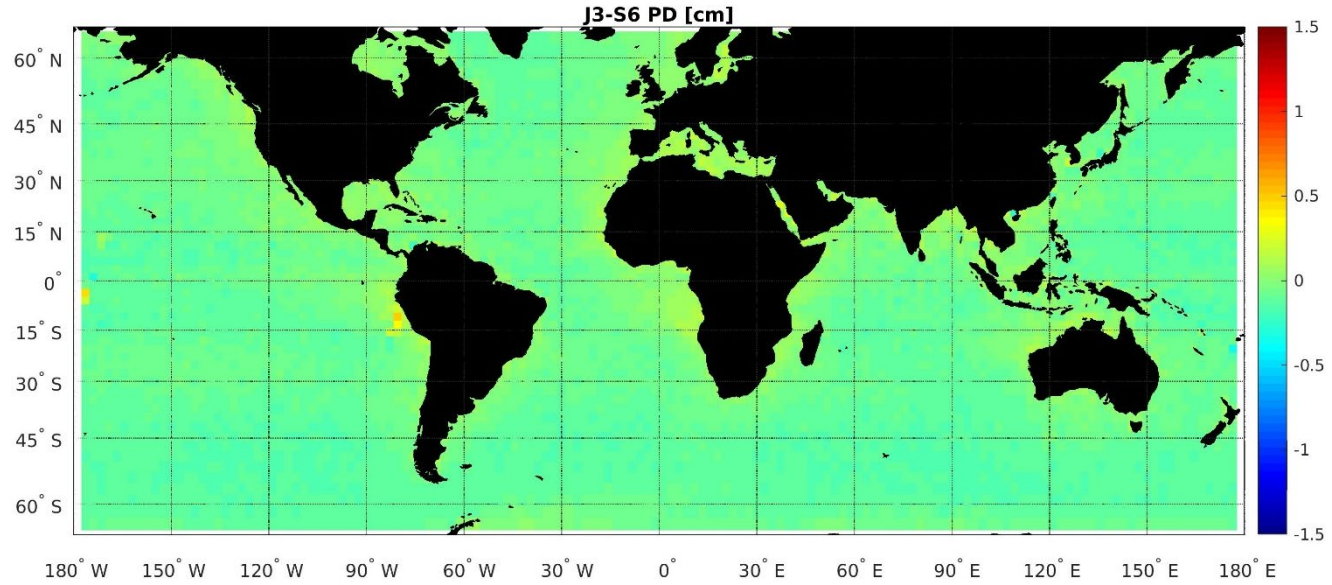
Availability = **100% over the period**

DORIS



Jason-3 AMR Performance

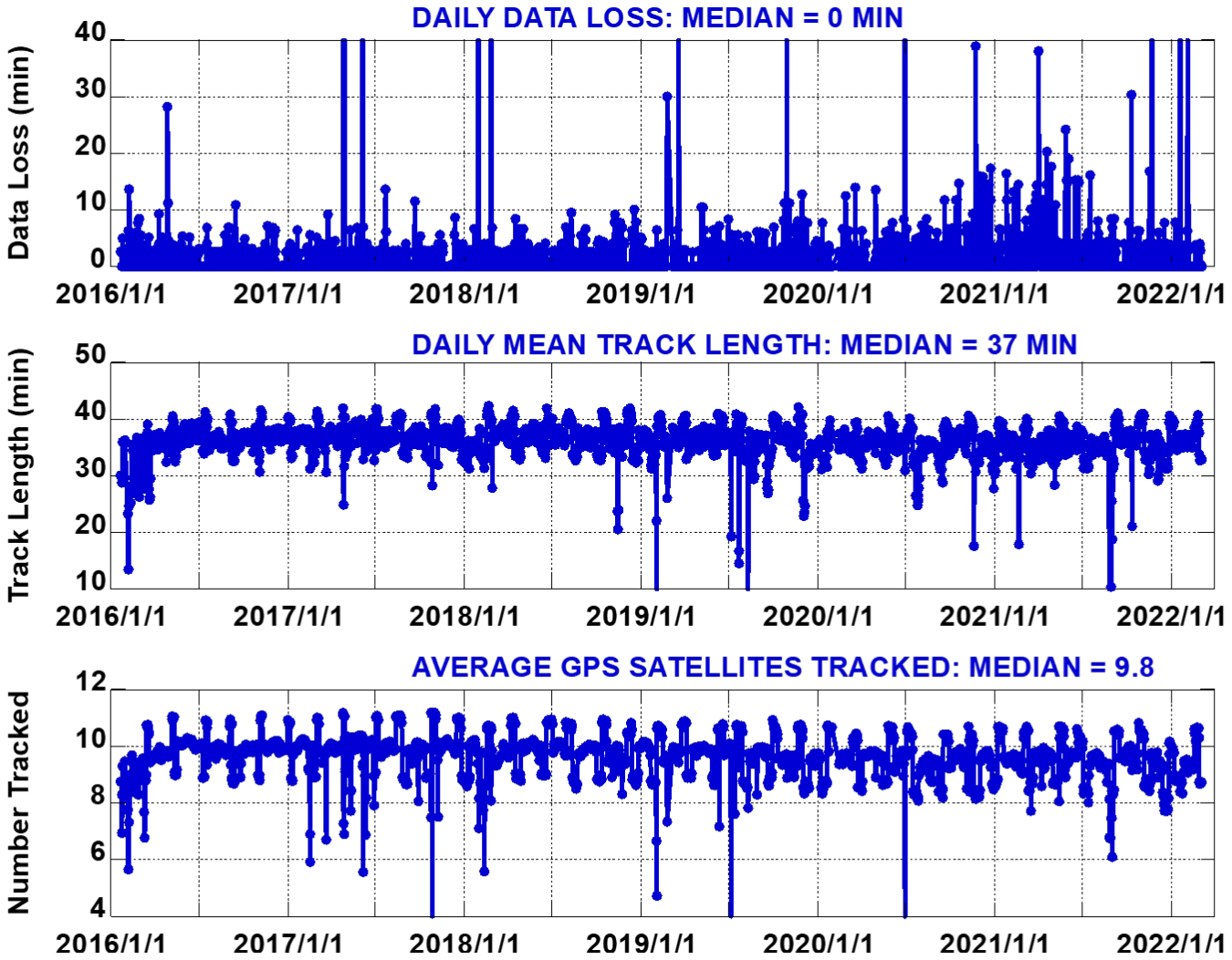




AMR performs nominally since launch

- 99.9% availability in the past year
- Overall mission calibration update delivered thru 31 January 2022
- Cold sky calibration are critical to stabilize Jason-3 at the mm-level
- Average Path Delays (PD) stable to within ~±1mm of the ECMWF model PD in the past year
- PD difference between Jason-3 and Sentinel-6 at mm-level after post-launch calibration

Jason-3 GPSP Receiver Performance



GPSP

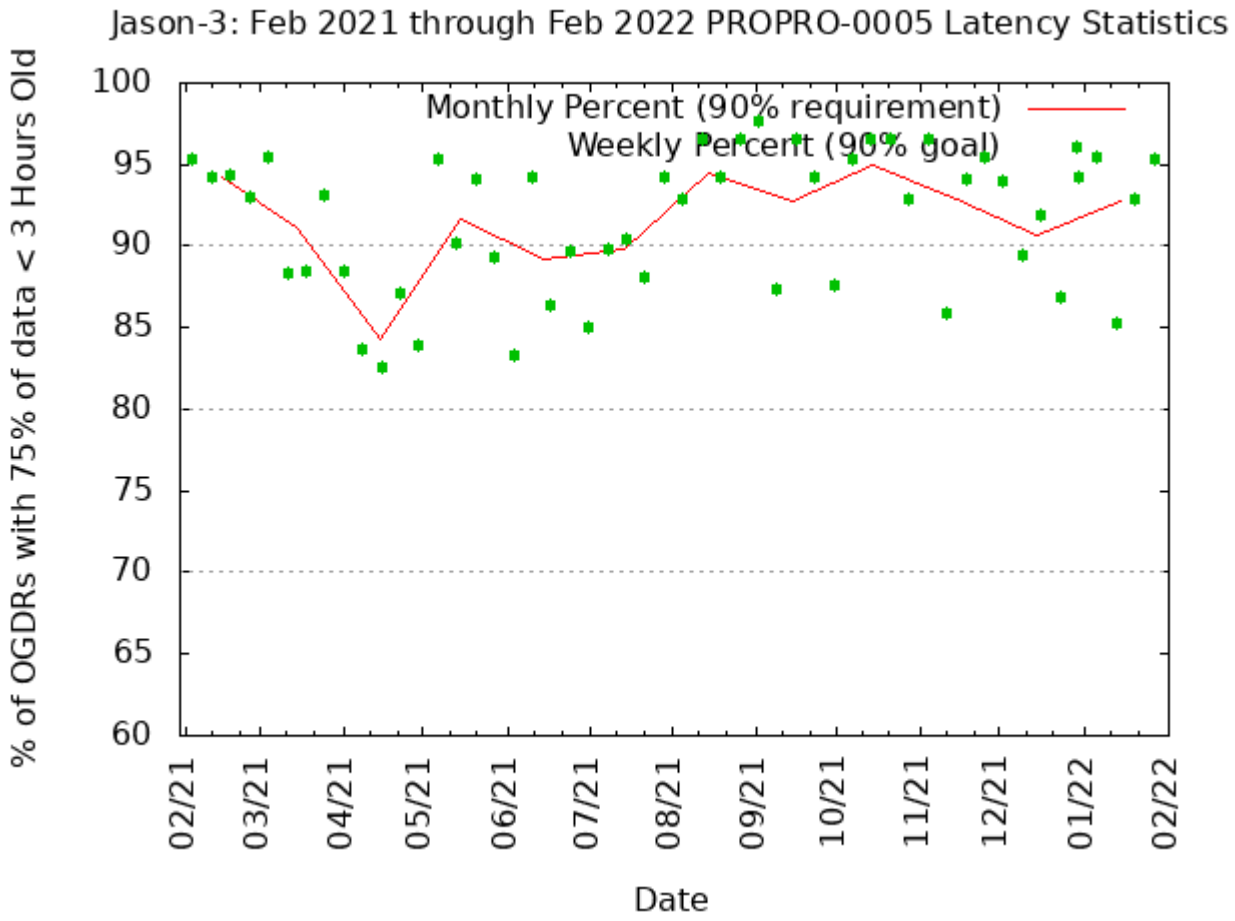
- 99.7% availability in the past year.
- Tracking metrics are consistent since launch.
  - Metrics based upon data up to 05 March 2022

OGDR products Status and performances 1/2

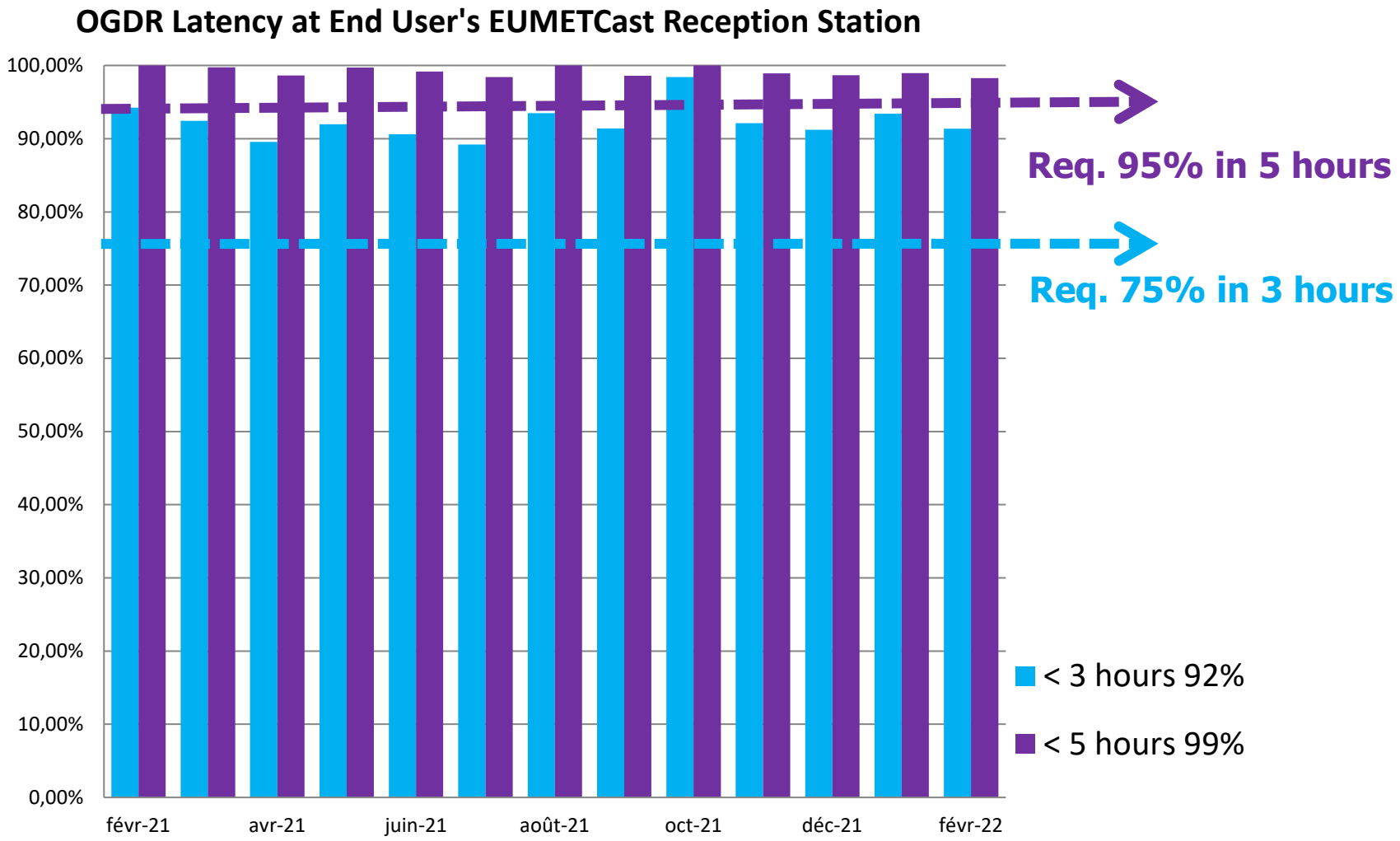
- NRT products made by **EUMETSAT** and **NOAA/ESPC** Mission Center
- No major changes in the period

- 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

NOAA

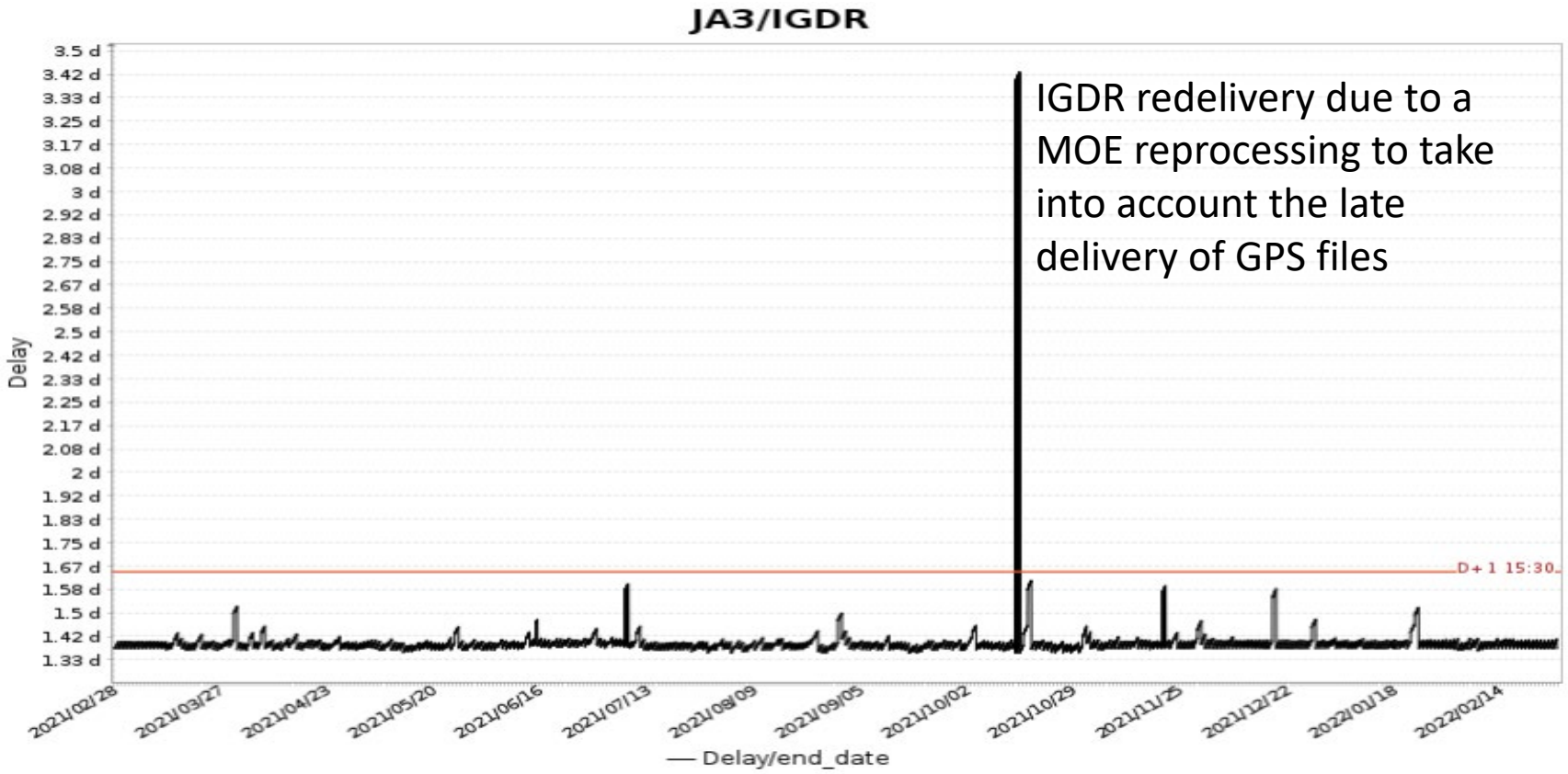


Jason-3 OGDR Latency at EUMETCast



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



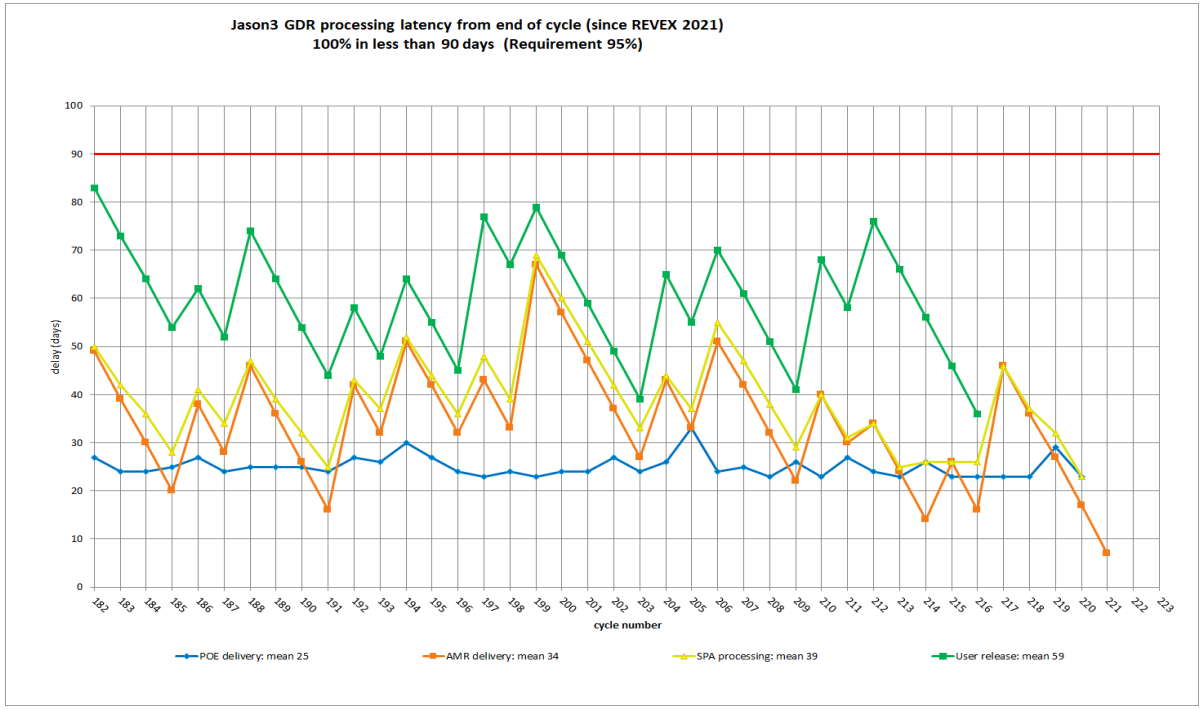
GDR - status and performances

- GDR produced by CNES/SSALTO
  - Currently GDR-F

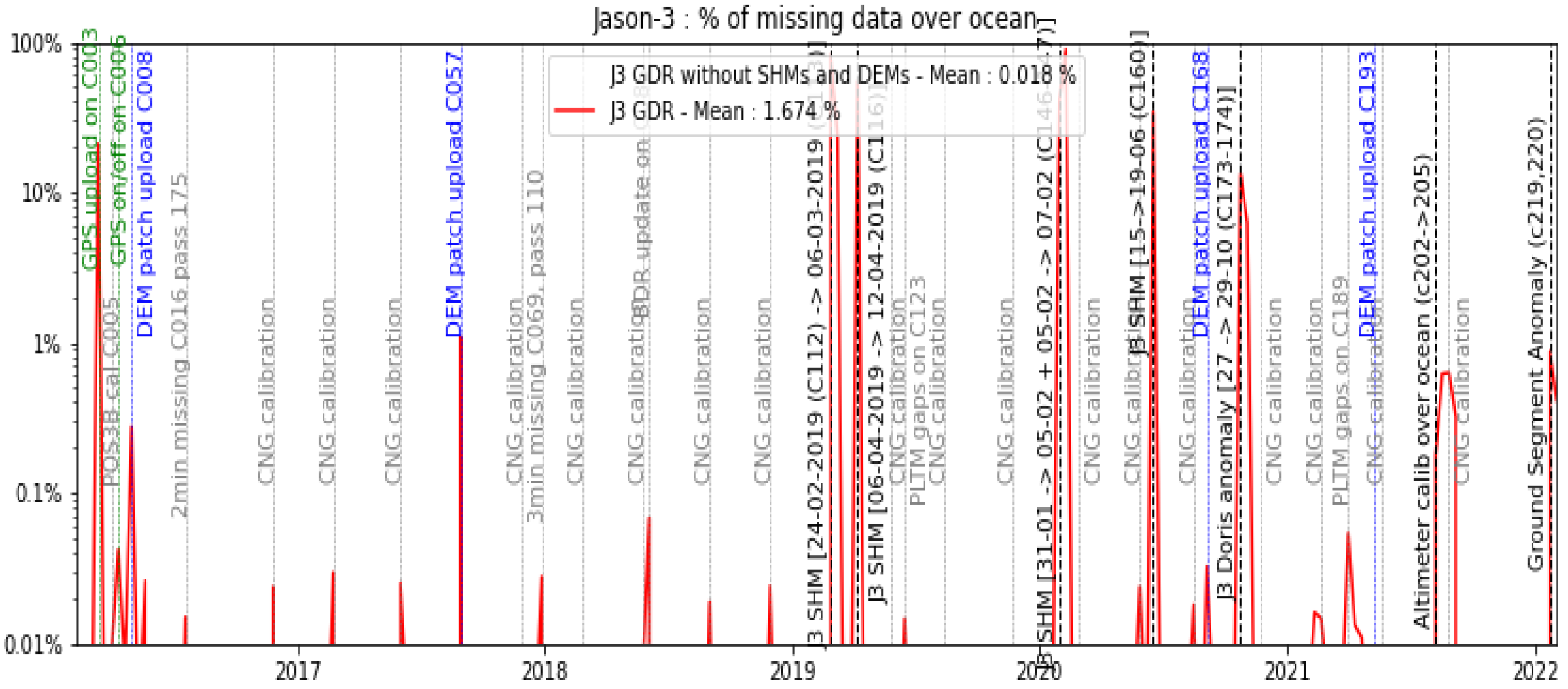
- Jason-3 GDR processing is OK
  - Cycle per cycle (and yearly) validation reports available on AVISO+ http://www.aviso.altimetry.fr/en/data/calval/systematic-calval.html
  - Systematic cross checked validation by CNES and JPL
  - Data availability & latency OK

- 100% GDR products archived

- All disseminated via CNES AVISO+ and NOAA dissemination services

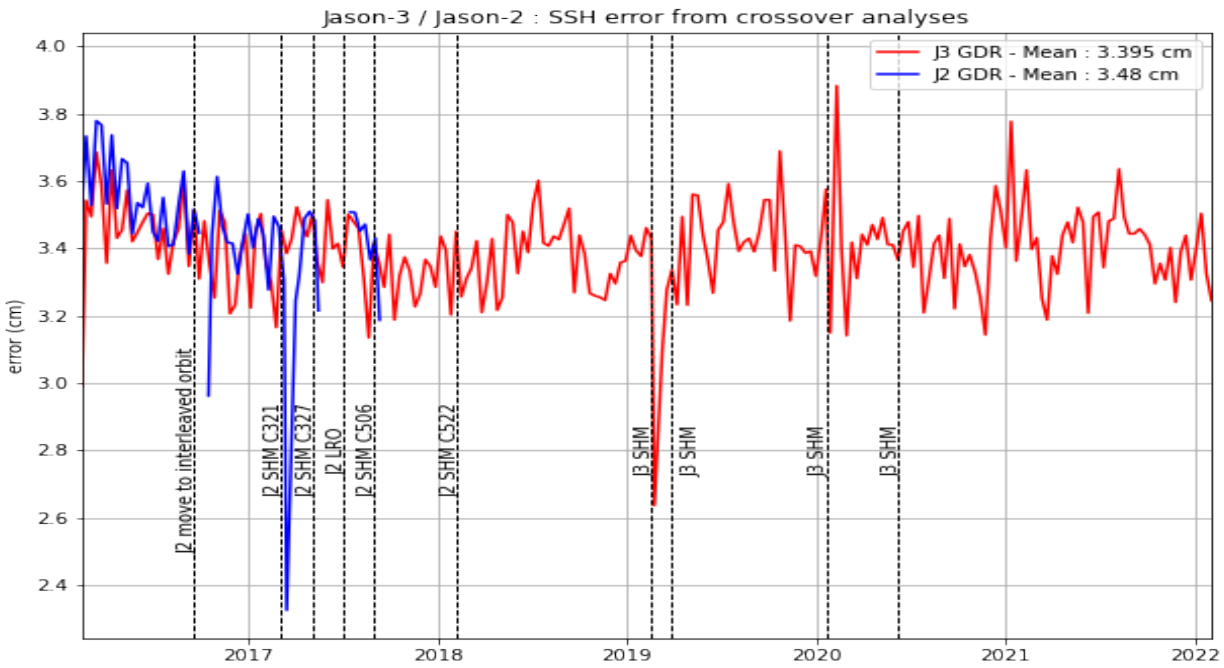


Performances – missing measurements



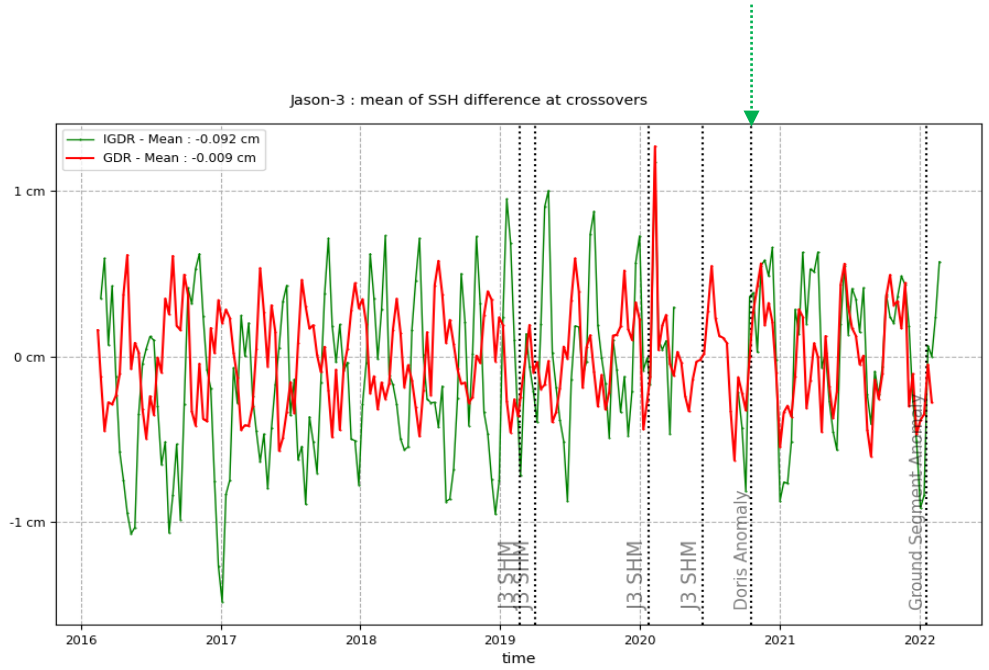
Performances – Sea Level

SSH error is deduced from crossovers analyses using radiometer data : **3,4cm**
->selecting |latitudes| < 50°, bathy<-1000m, oceanic variability < 20 cm

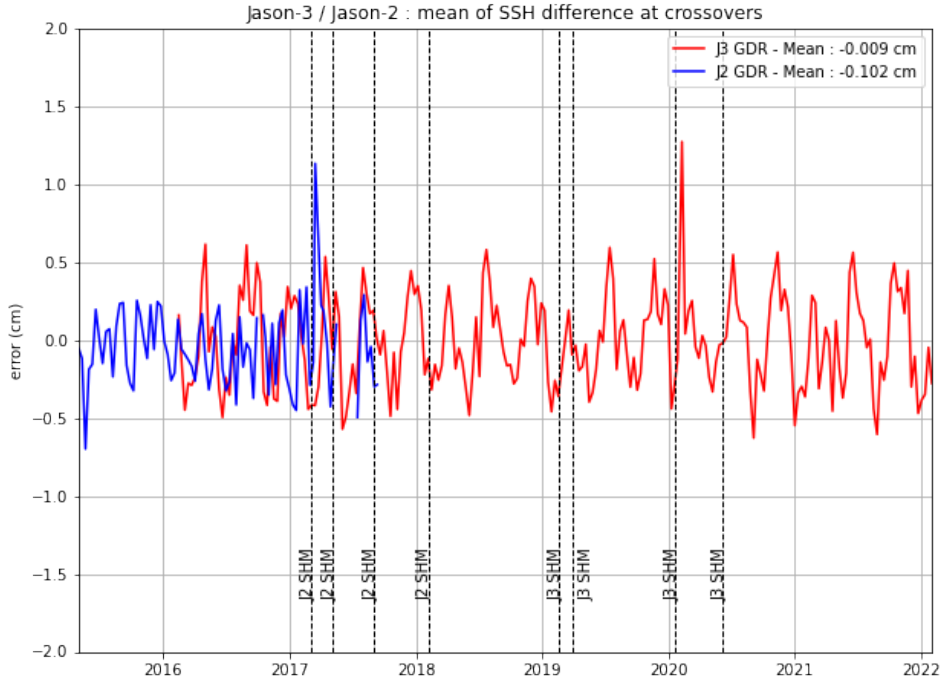


Performances – Xover

Switch to IGDR standard F



Strong reduction of the 120 days signal between POE-E and POE-F)



System Requirements and Performances

- Data availability :
  - Requirement : The GDR shall contain 95% of all possible over-ocean data (acquisition and archive) during any 12 month period, with no systematic gaps.
- from March 2021 until Februray 2022
  - no SHMs (0.0%)
  - DEM upload (0.0000001%) (23 seconds)

⇒ **satellite unavailability** **~0.12 %**

- bus : 0% altimeter : 0.02% Doris : 0% AMR : 0.1%

⇒ **ground unavailability** **~0.0003 %**

(approx. 3 hours data lost due to earth terminal issues or operational errors)

➔ **Global Jason-3 system availability : 99.9%**

Coming changes and operations (1/3)

- On **April 7th**, 2022, Jason-3 will **start its transfer maneuvers to interleaved orbit (beginning of cycle XX)**
  - Transfer operations will start under two conditions :
    - Recommendation from OSTST
    - Agreement from Jason-3 JSG by e-mail
  - Jason-3 space & ground segment are now ready

- Transfer will done as follows
  - **No data production during the transfer**
  - 2 positive maneuvers, approximately 10 days drift period, and 3 braking maneuvers
  - **Restart** of the mission on interleaved orbit **around April 25th (Cycle 300)**
  - Poseidon will stay in Closed Loop until a new OLTC (adapted to interleaved) is uploaded
    - around July – a delay is necessary to adapt the OLTC to the new ground track
  - DORIS OBSW will be updated, taking advantage of the unavailability

Coming changes and operations (2/3)

- A 2nd tandem phase with S6-MF is foreseen in a few years
  - For instruments drift calibration
  - Depending on request from S6-MF
  - Tandem duration foreseen : around 3 months

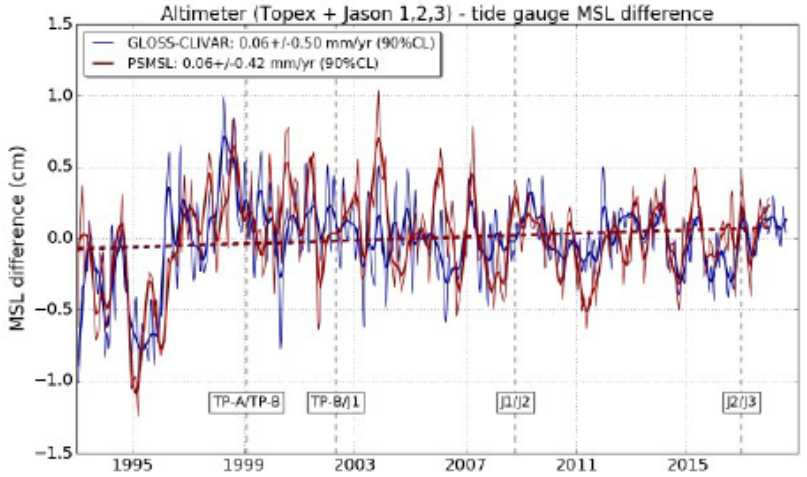
- Transfer operations will be very similar to the operations coming in a few weeks :
  - Need to go back 30 seconds behind S6 on the reference orbit
  - No data during the transfer
  - Approximately 2 weeks unavailability

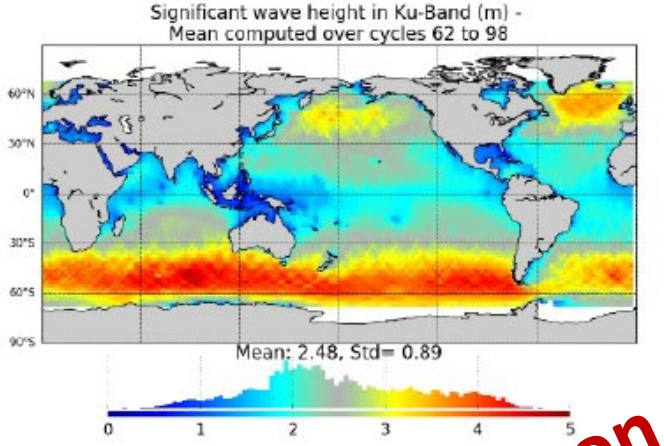
Coming changes and operations (3/3)

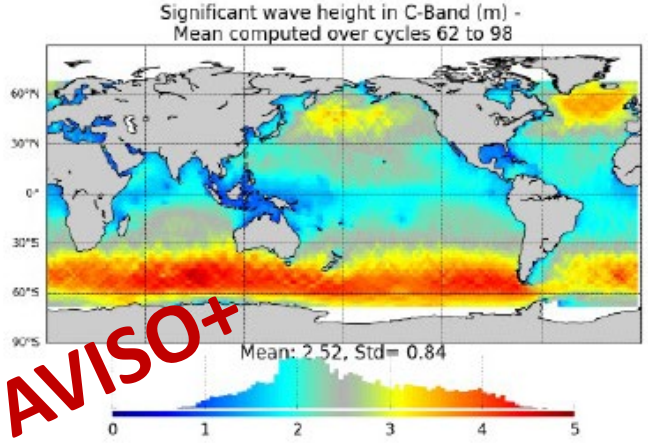
- Right after the 2nd tandem phase, Jason-3 will be transferred to the “Jason-2 LRO”
  - Altitude 1309 km / geodetic mission

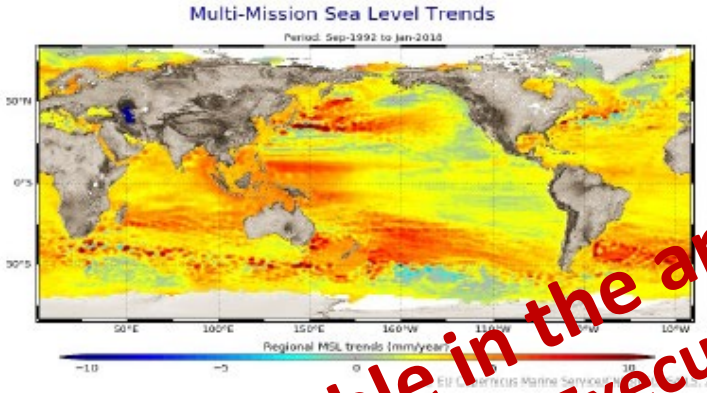
- As soon as the Jason-3 status becomes degraded (missing redundancy), Jason-3 will be transferred to a geodetic + graveyard orbit
  - Necessary due to French law on space operations.
  - Altitude still TBD, inferior to the Jason-2 LRO.
  - Currently, proposed altitude are 1282.9km, 1277.3km and 1270km

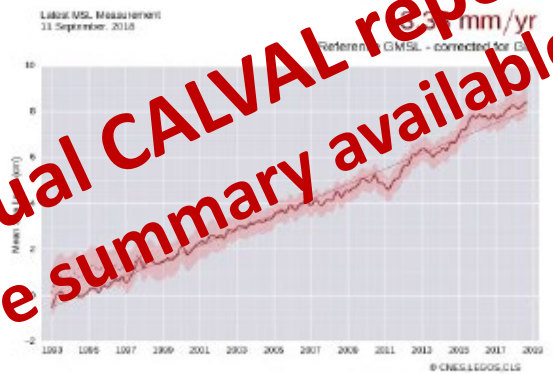
- At any time, in case of emergency, Jason-3 can be transferred to an emergency disposal orbit, 4km under the current orbit.





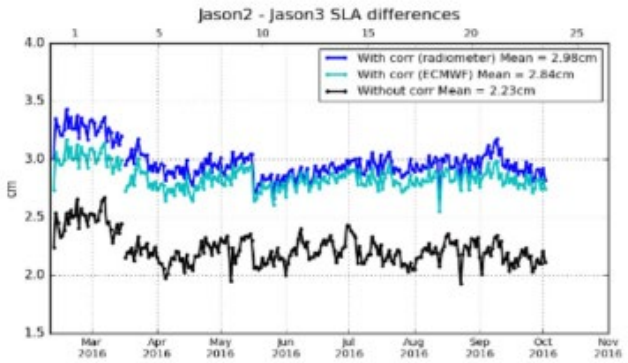


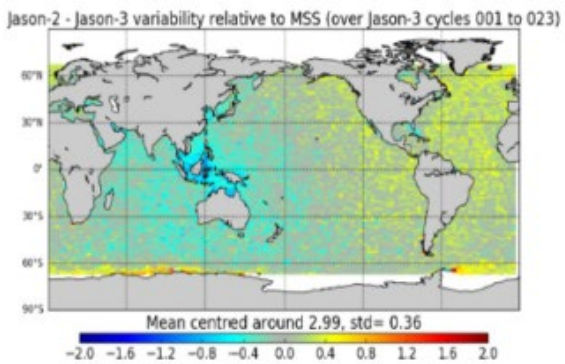




Available in the annual CALVAL report on AVISO+

Executive summary available





Conclusion – Jason-3 at a glance

- Platform and instrument in perfect conditions
- Jason-3 mission extension agreed at 4P until 2025 included
- Jason-3 is ready to be transferred to interleaved on April 7th
  - Measurements will be in closed loop for a few weeks.
- Jason-3 is ready to keep on supporting intercalibration with Sentinel-6MF when requested

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