

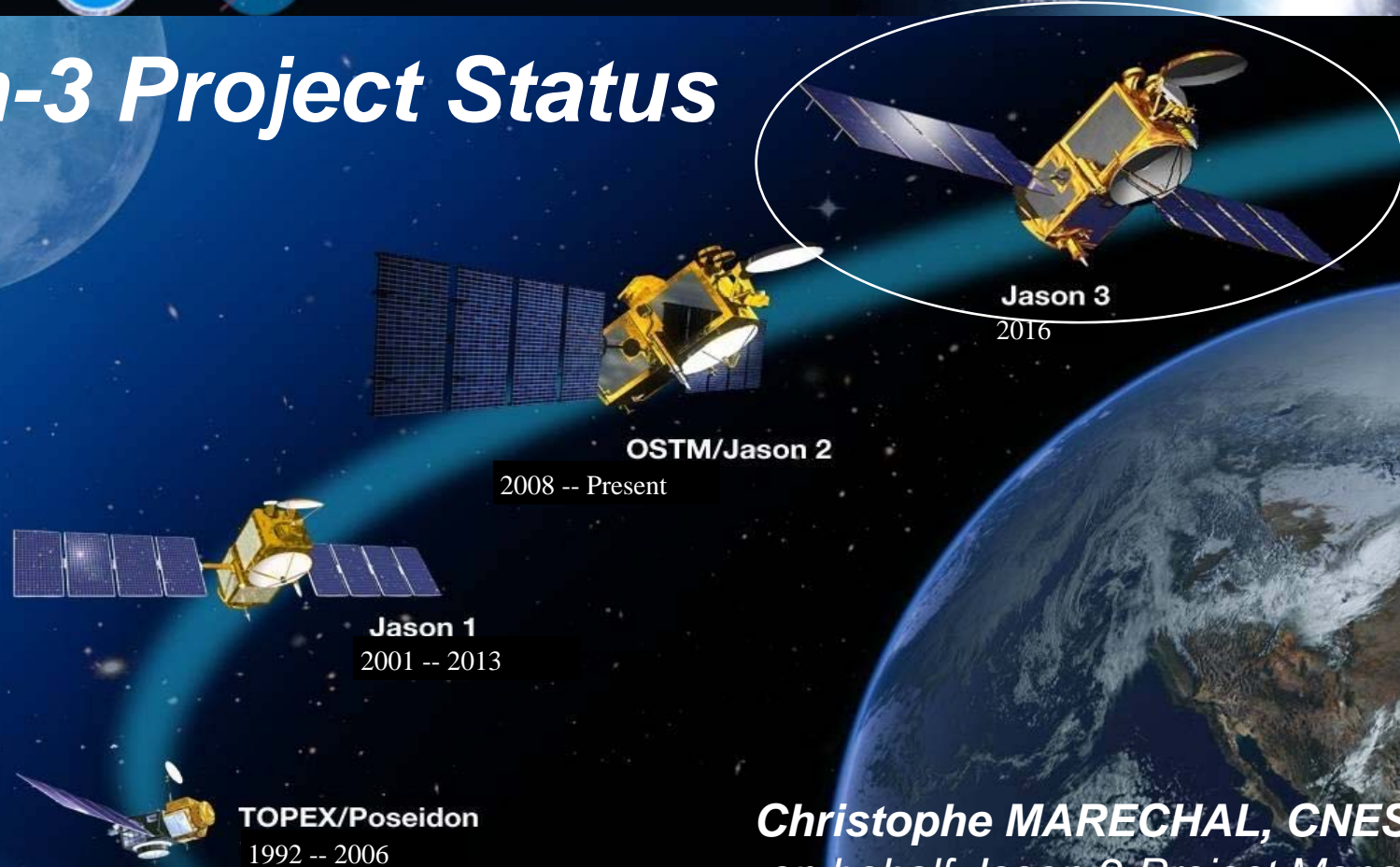
Ocean Surface Topography Science Team Meeting (OSTST)

October 23-27, 2017

“The 25th Anniversary of TOPEX/Poseidon”



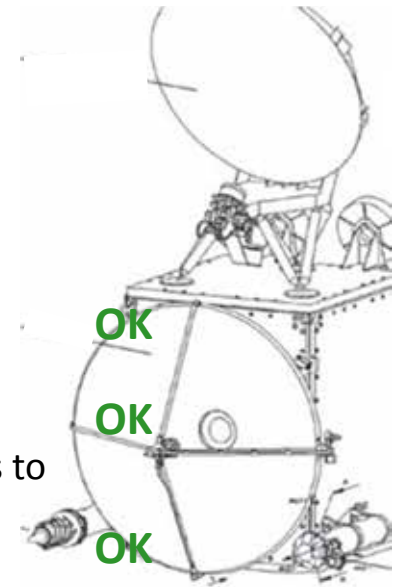
Jason-3 Project Status



Christophe MARECHAL, CNES
on behalf Jason-2 Project Managers

Platform Status

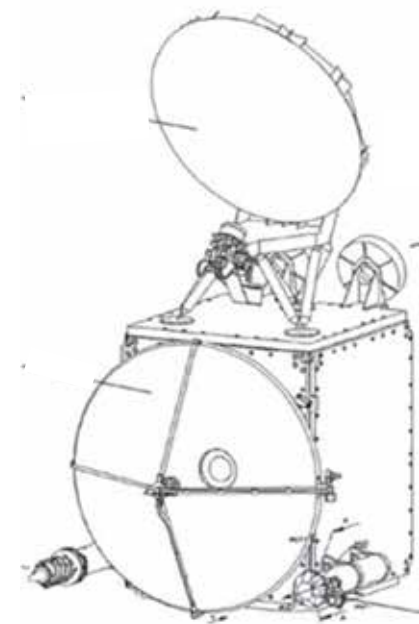
- The Jason-2 satellite bus is **OK**
 - Command / control , RF on **PMA**
 - On-Board Software, Mass Memory, Telemetry & Telecommand system
 - Thermal aspects:
 - Active thermal control works successfully and is sized with significant margins to meet further worst case conditions
 - Electrical aspects :
 - 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 (100%) 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

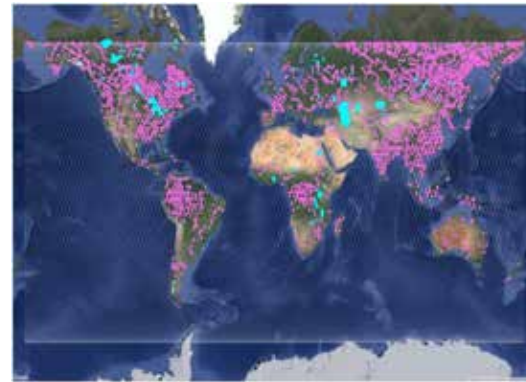
- Earth terminals :
 - Usingen – USG2, + partial USG1 shadowing **OK**
 - Wallops, Fairbanks and Barrow (CDAS) **OK**
- Control Centers :
 - JCCC CNES Control center **OK**
 - all the elements are OK
 - SOCC NOAA Control center **OK**
 - all the elements are OK
- Instrument Commanding and Monitoring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

New DEM upload

- New onboard DEM successfully uploaded on Aug. 31, 2017
- Major leap forward in the number of targets defined in the DEM : Jason-3 is now observing more than 4300 rivers and 350 lakes
- First results of the validation show very good performance of this new onboard DEM
- See S. Le Gac talk (Science IV on Wednesday)



Jason-3 DEM v2.0
(before Aug. 31, 2017)

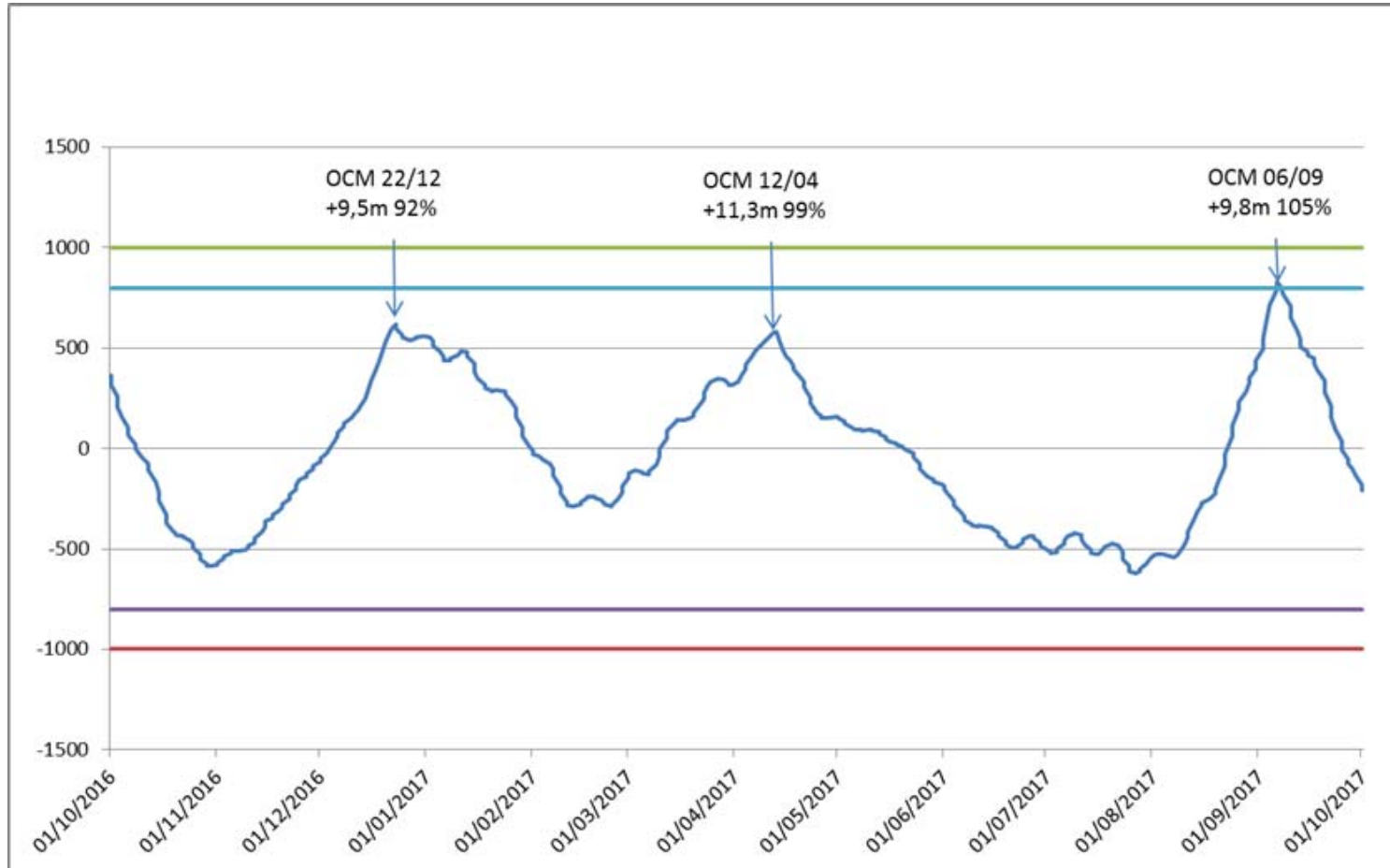


Current Jason-3 DEM v3.0
(as of Aug. 31, 2017)

Science IV
session

Routine navigation and guidance

- Very smooth operations

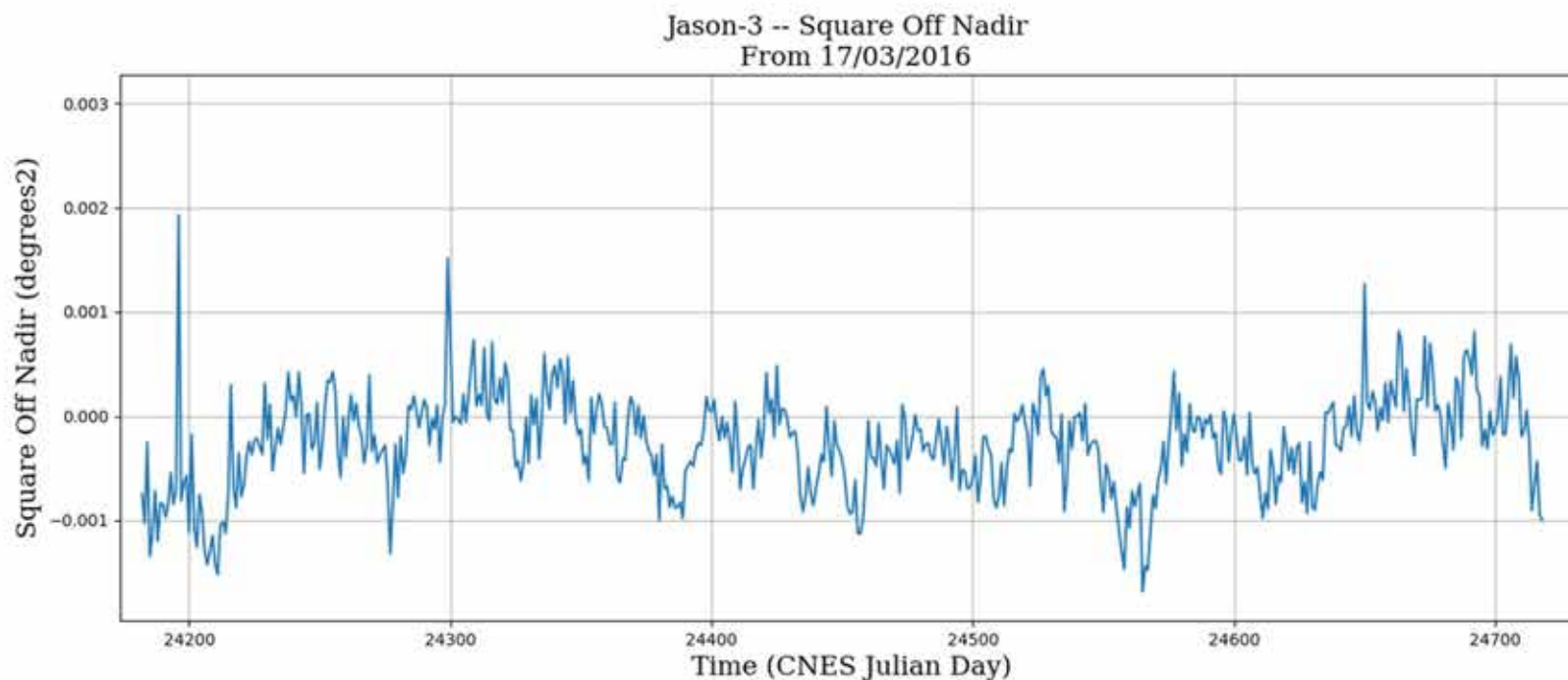


Synthesis

- JA3 reference mission since June 21st 2016
- Operations performed as planned
- Very good overall performance
- $\approx 23\text{kg}$ of hydrazine available
- New DEM operational since August 31st

System Requirements and Performances

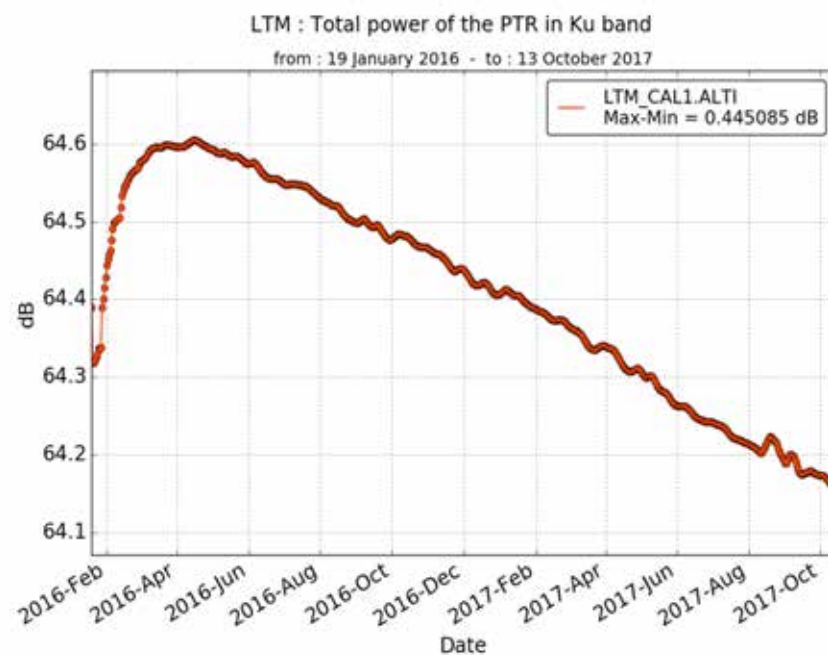
- Altimeter Antenna Pointing : **typical value below 0.001°**
 - Requirement $< 0.2^\circ$
 - pointing performance stable since launch



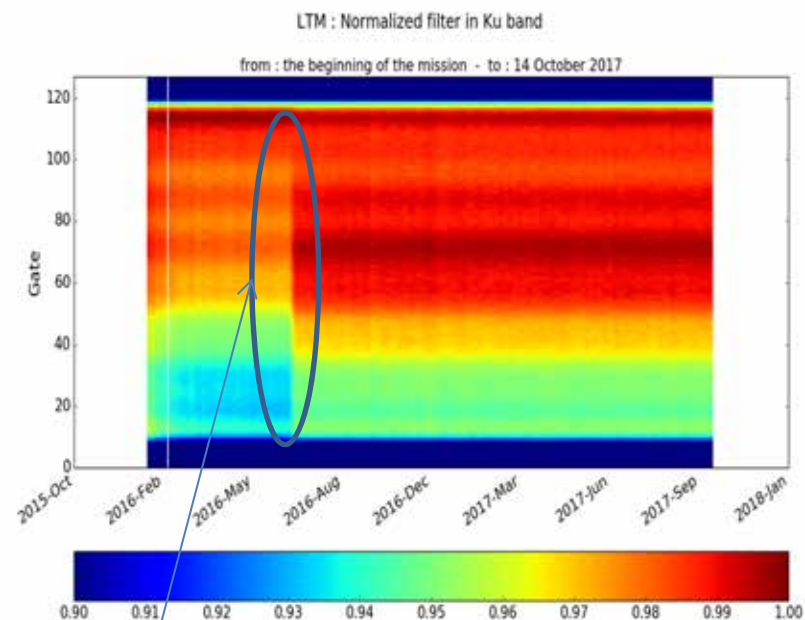
Poseidon-3B / JASON-3

- ❖ Routine/Exceptional calibrations are OK
- ❖ Excellent Measurement Stability (short and long term)

➤ CAL1 Ku-band PTR power



➤ CAL2 Ku-band LPF

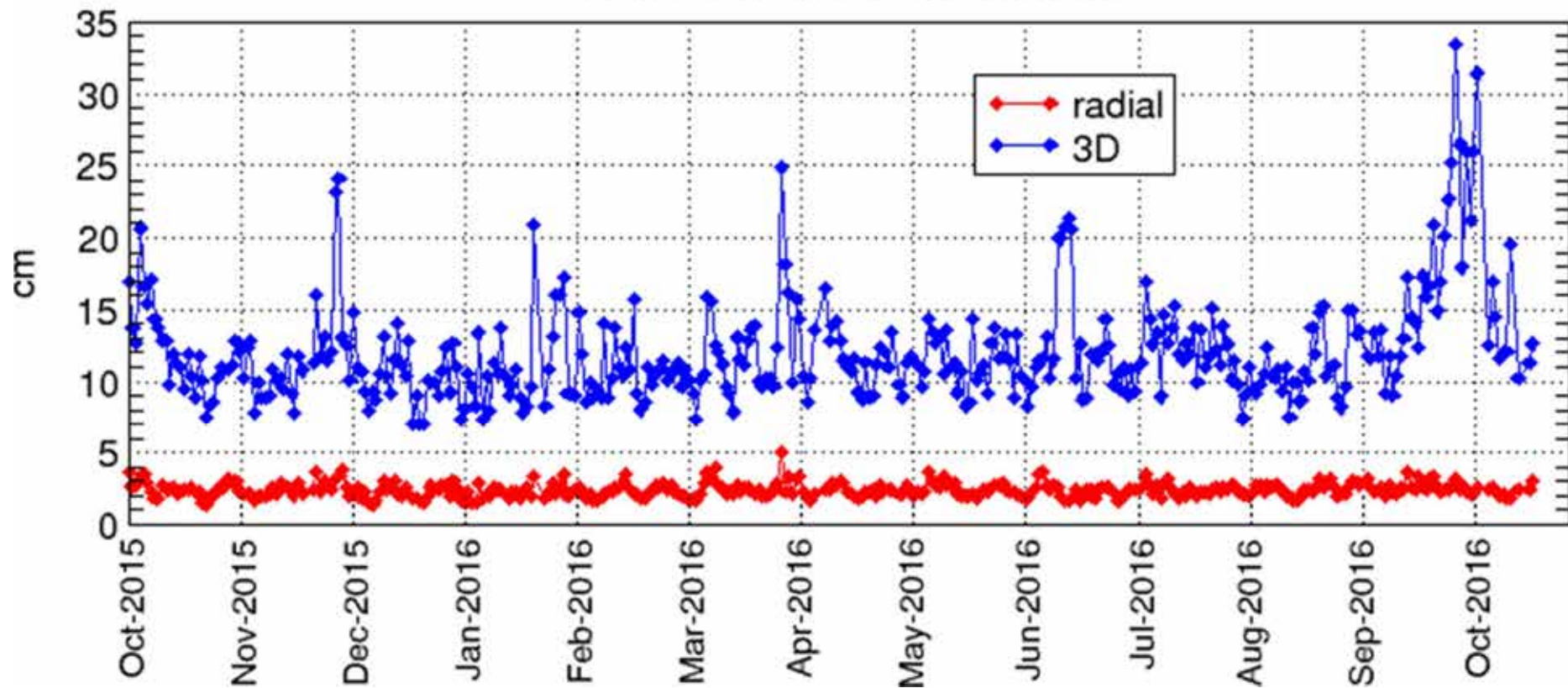


Cf. OSTST 2016

Availability = **100% over the period**

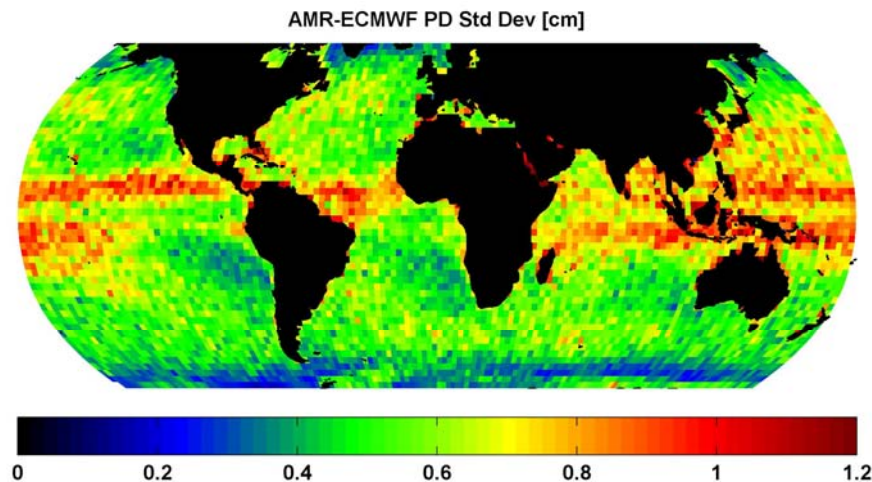
DORIS

DIODE-MOE differences for Jason-2 daily RMS, maneuvers excluded



AMR

- **Jason-3 AMR performing nominally since launch**
 - Jason-3 AMR maintains excellent performance
 - Cold sky calibrations have been used to stabilize Jason-3 to mm-level
 - Calibration schedule recently updated by CNES to reduce GDR latency
 - 20-day latency for coefficient delivery achieved at end of last fixed yaw period



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

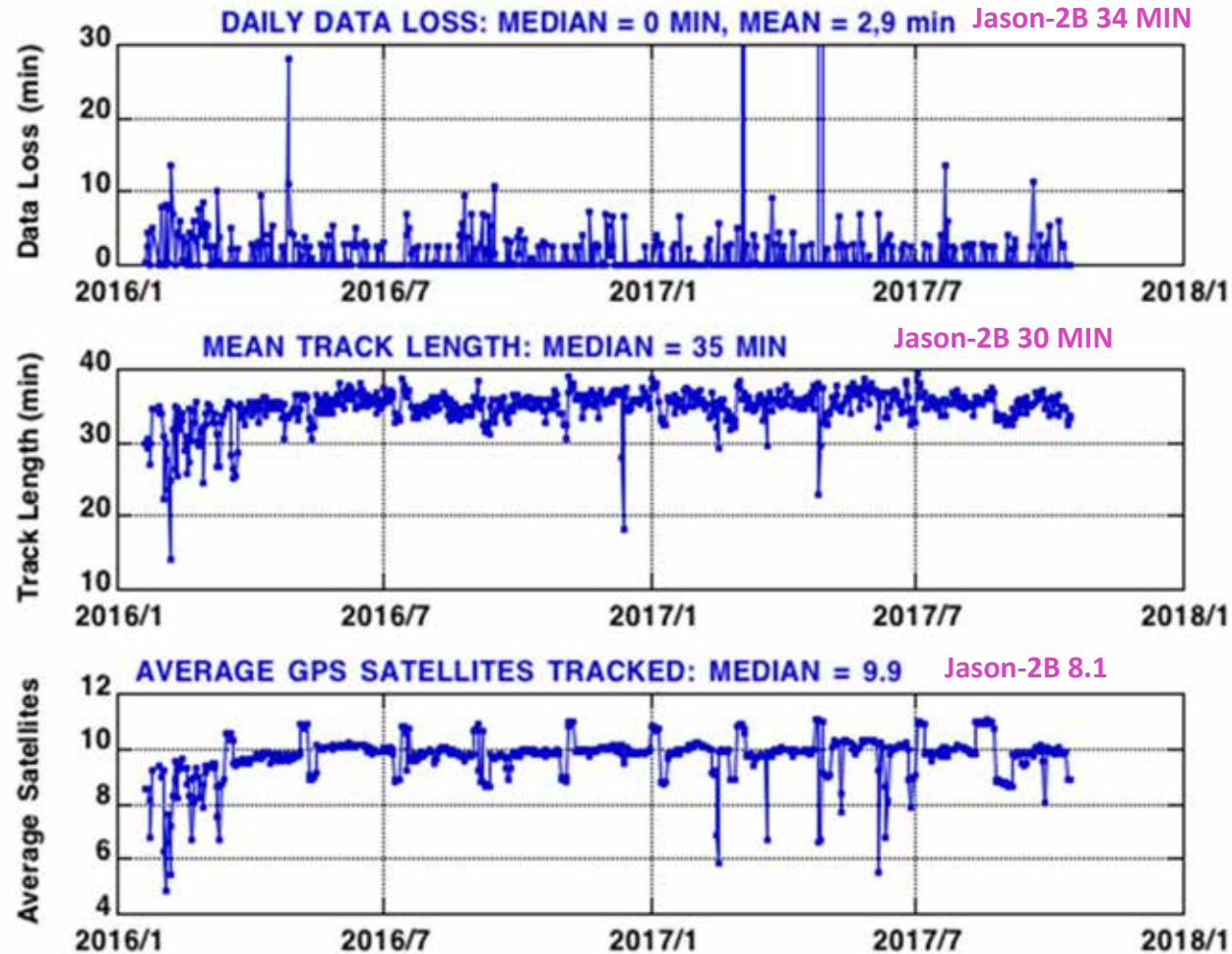


Jason-3 AMR Cycle Stability Relative to
ECMWF [cm]

*Instrument procession session
Tuesday at 14:00*

Jason-3 GPSP Receiver Performance

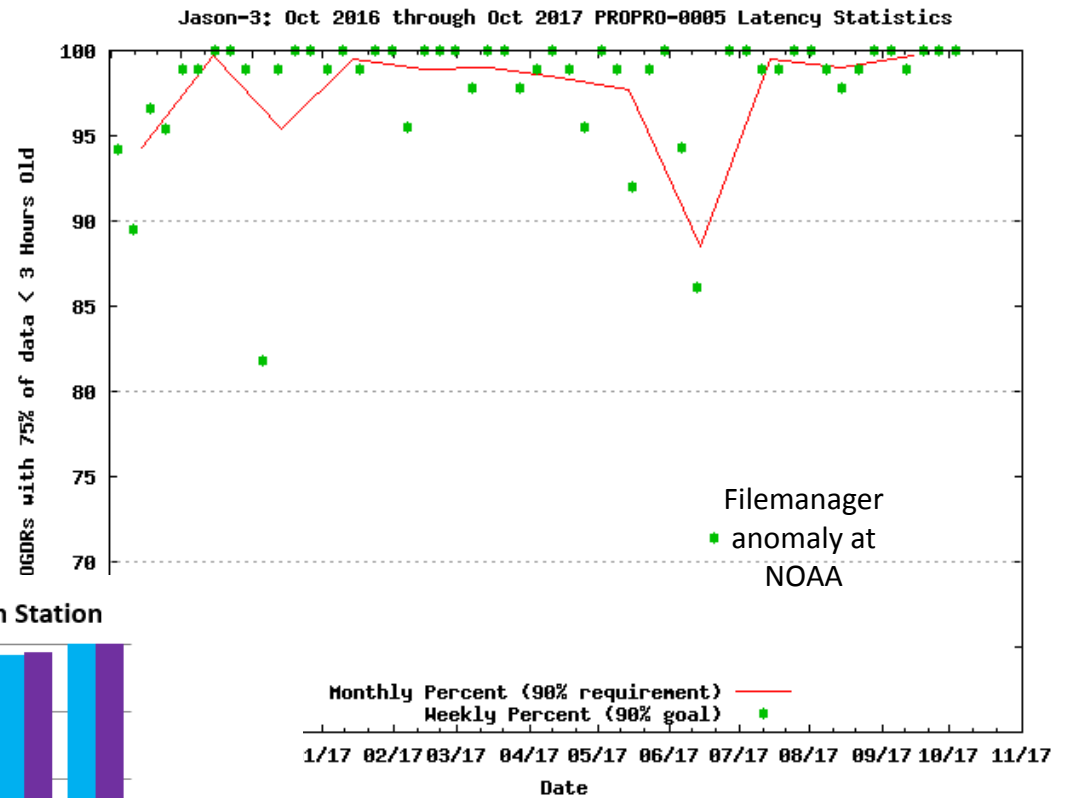
GPSP



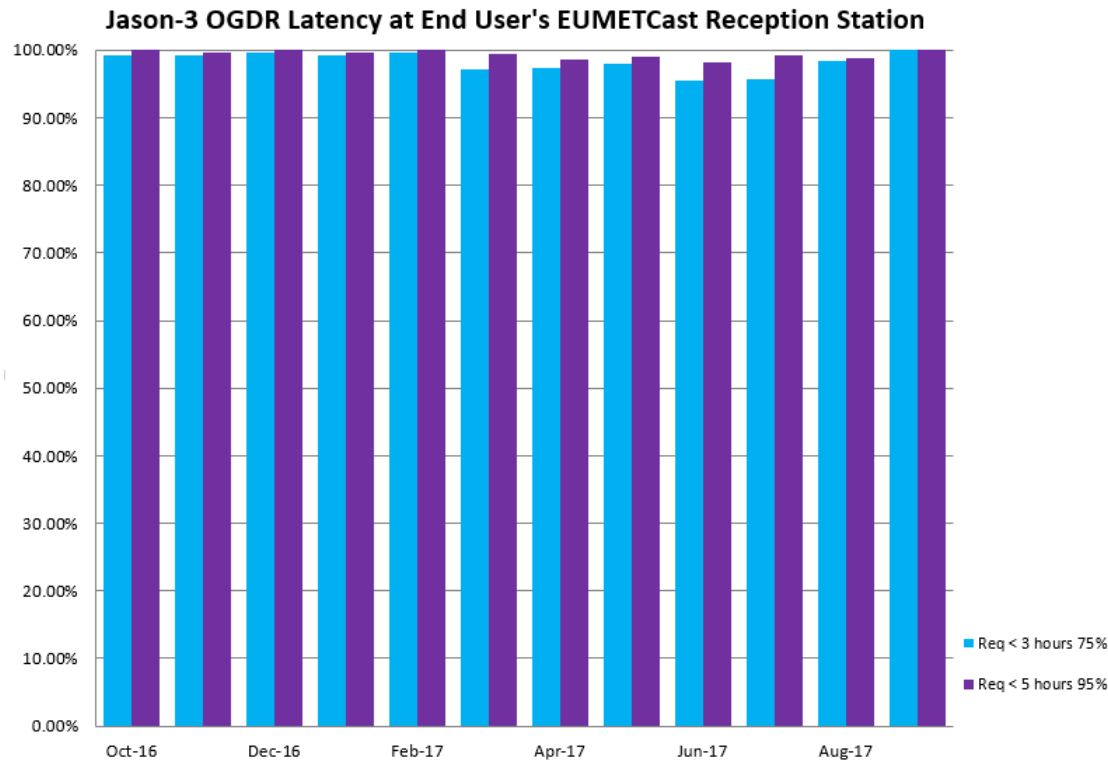
OGDR products Status and performances

- NRT products made by **EUMETSAT** and **NOAA/ESPC** Mission Center
- Major changes in the period
 - **None on the products**
 - TM-NRT : 1 version deployed @EUM & NOAA
 - Small impact of DEM upload : 2112s of data gap.
- **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**

Operational Geophysical Data Record data latency



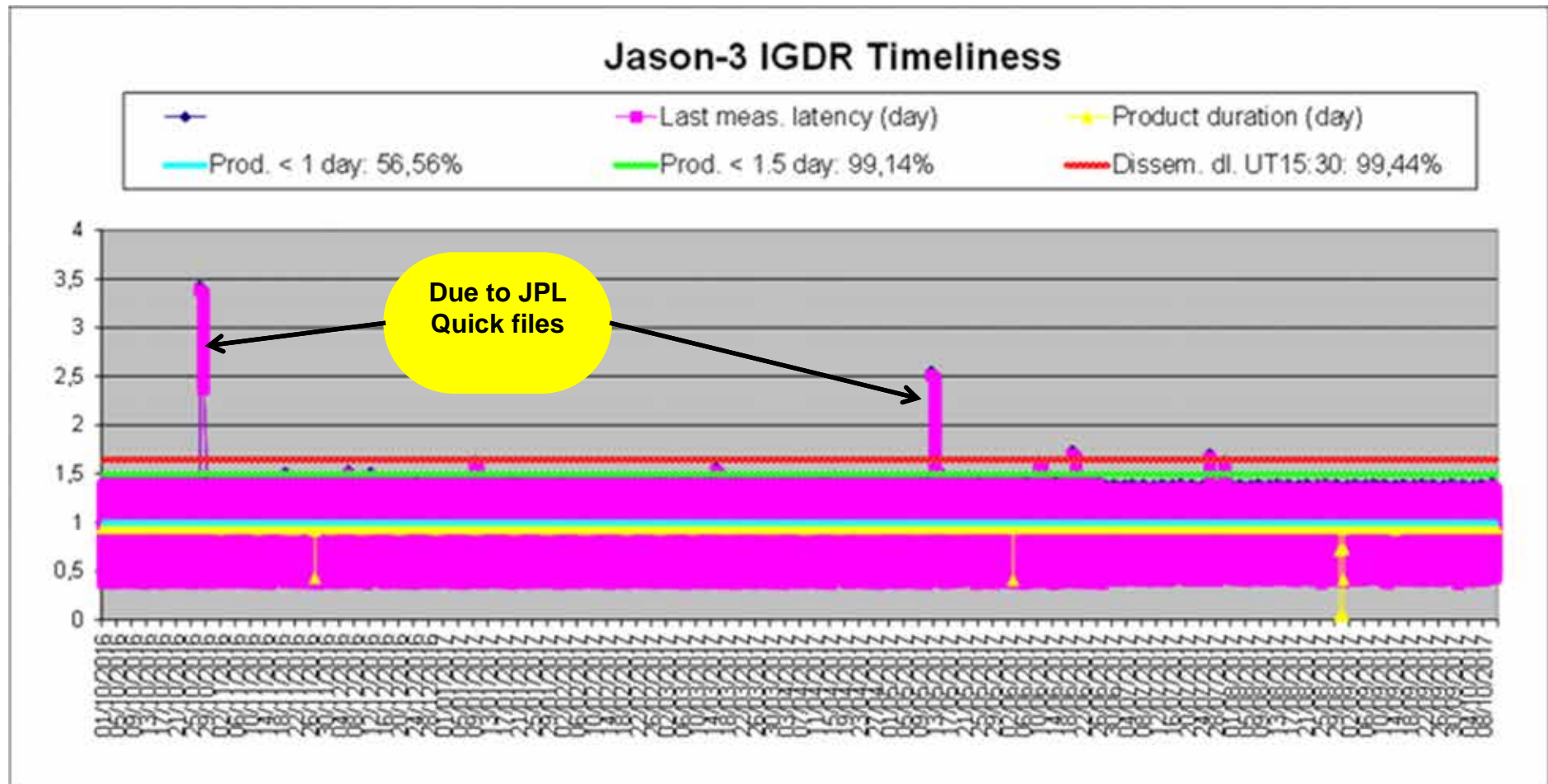
NOAA



EUMETSAT

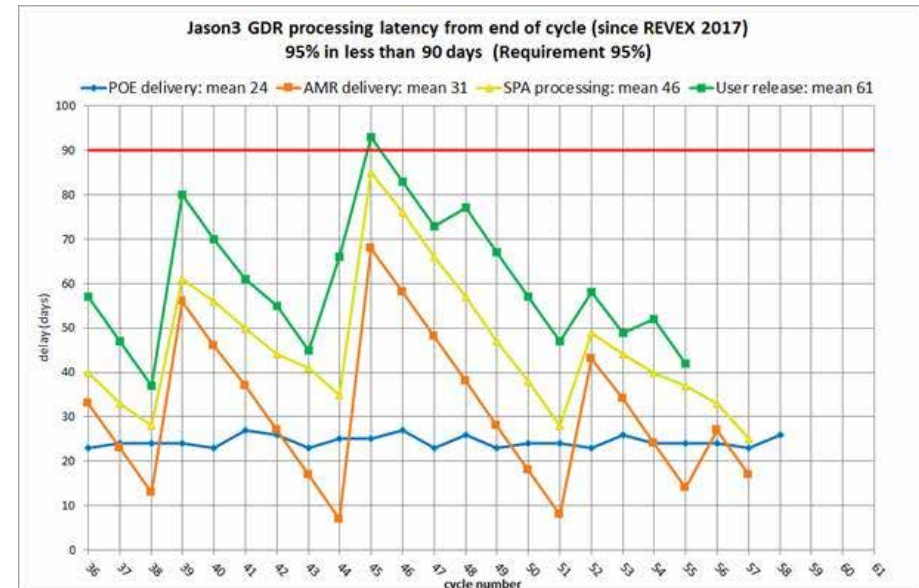
IGDR - status and performances

- Jason-2 IGDR processing is OK (CNES : 100% IGDR successful)
- Latency : 99.14% of products available in less than 1.5 day
- 100% IGDR products archived
- All disseminated via CNES AVISO+ and NOAA dissemination services

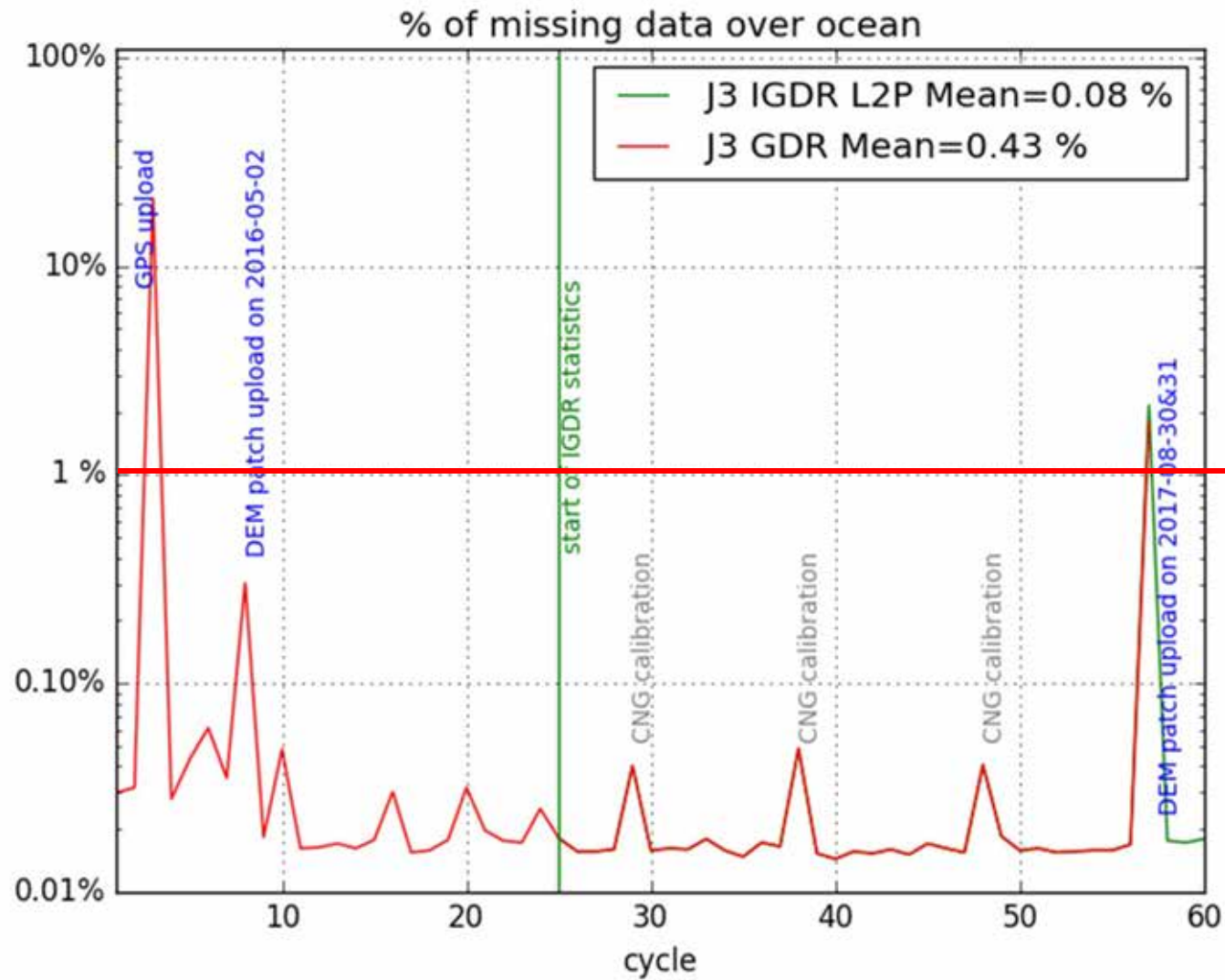


GDR - status and performances

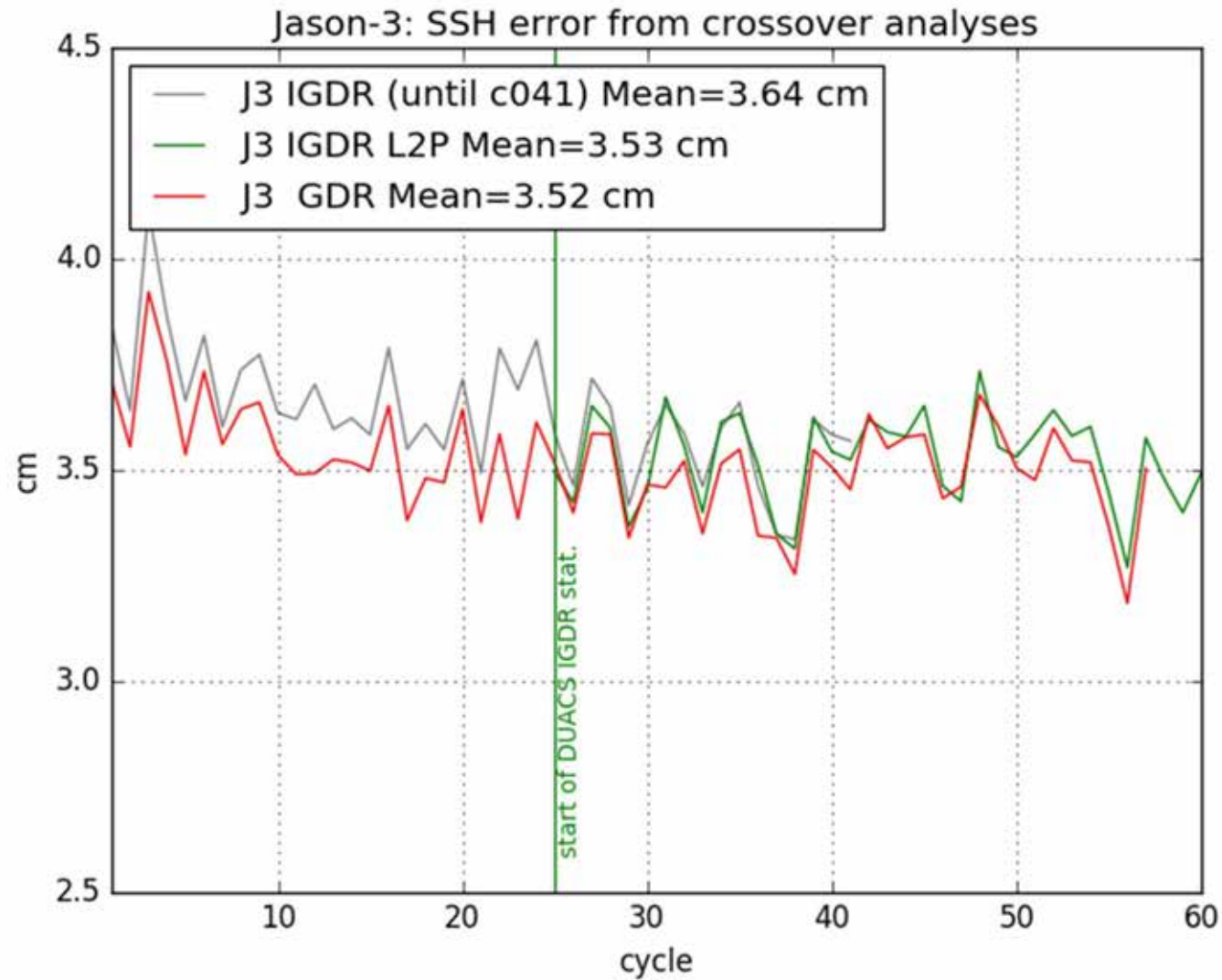
- GDR produced by CNES/SSALTO
- Jason-2 GDR processing is OK
 - Data availability & latency OK
 - Systematic cross checked validation by CNES and JPL
 - Cycle per cycle (and yearly) validation reports available on AVISO+
<http://www.aviso.altimetry.fr/en/data/calval/systematic-calval.html>
- 100% GDR products archived
- All disseminated via CNES AVISO+ and NOAA dissemination services



Performances – missing measurements



Performances – Xover



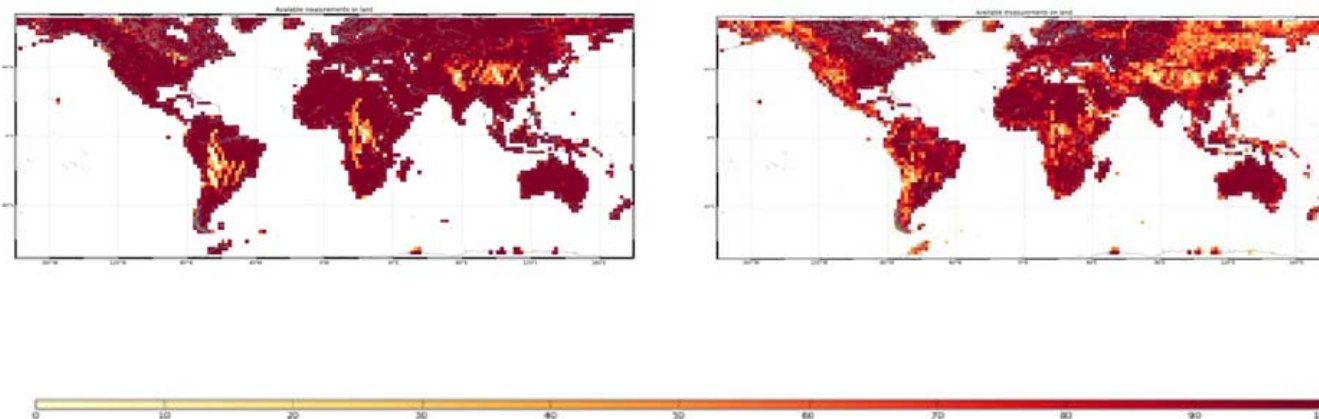


Figure 2: Data availability over land for Jason 3 cycle 4(left) and Jason 2 cycle 284(right).



CalVal

Jason 3 validation and cross-calibration activities - (Annual Report 2016)

Available in the annual CALVAL report on AVISO+
Executive summary available

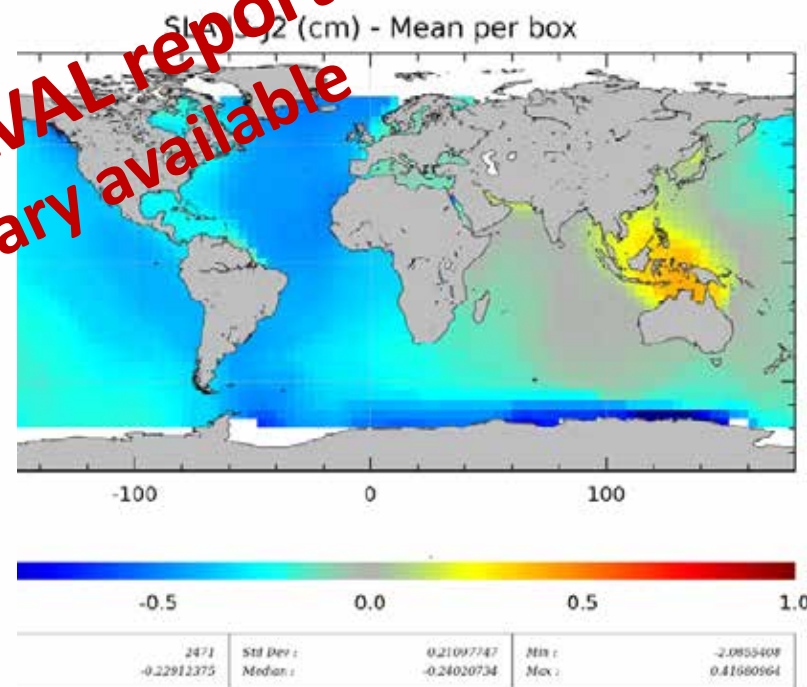


Figure 57: Regional biases between Jason 3 and Jason 2

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 November 2016 until October 2017

⇒ **satellite unavailability** ~**0.001 %** < **4% req**

– bus : 0% altimeter : 0.001% Doris : 0% AMR : 0.35%

with planned activities ~**0,007 % (DEM upload)** < **4% req**

⇒ **ground unavailability** ~**0.00 %** < **1% req**

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

Recommendations from OSTST status

- Immediate public release of the GDR products ✓
- Jason-2 long-repeat orbit to be the one at -27 km ✓
- Cold sky calibration more frequent than once every 60 days ✓
- Relaxation of the GDR latency requirement to a maximum of 90 days on Jason-3 and Jason-2 ✓
- OSTST recommends moving Jason-2 into a long-repeat (“Extension of Life” orbit) after two years in the interleaved orbit, in Oct, 2018 ✓
- All requirements on latency, accuracy and data availability be maintained as long as the satellite remains operational ✓

Conclusion – Jason-3 at a glance

- 1st Jason-3 Exploitation Review (REVEX) : successful in April 2017
- Platform and instrument are in perfect conditions
- More frequent AMR calibrations
- A very promising new POS3B DEM

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

• CNES

- T. Médina
- B. Modave
- C. Ferrier
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- F. Didelot

• NOAA

- D. Donahue
- D. Richardson

• EUMETSAT

- M. Tahtadjiev

• JPL

- G. Shirdiffe
- S. Brown
- S. Desai
- B. Haines
- A. Dorsey
- W. Bertiger

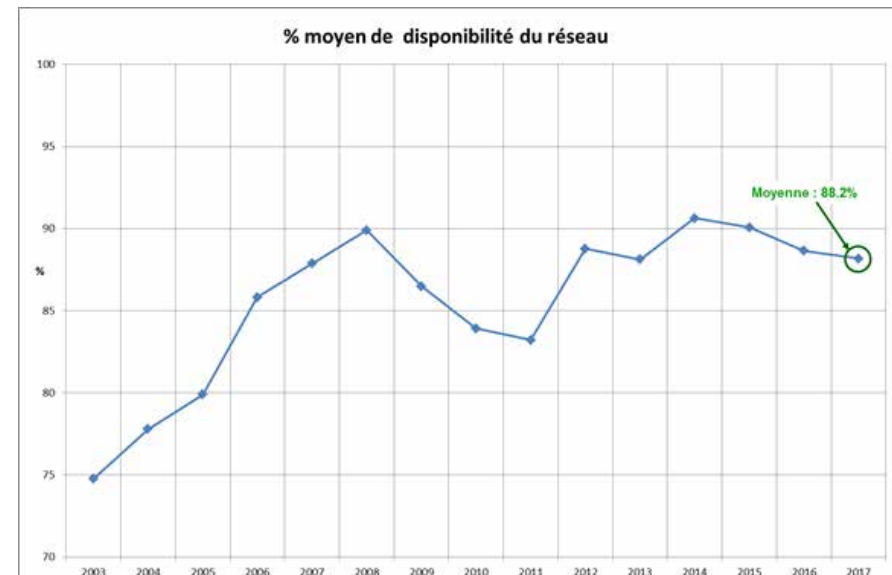
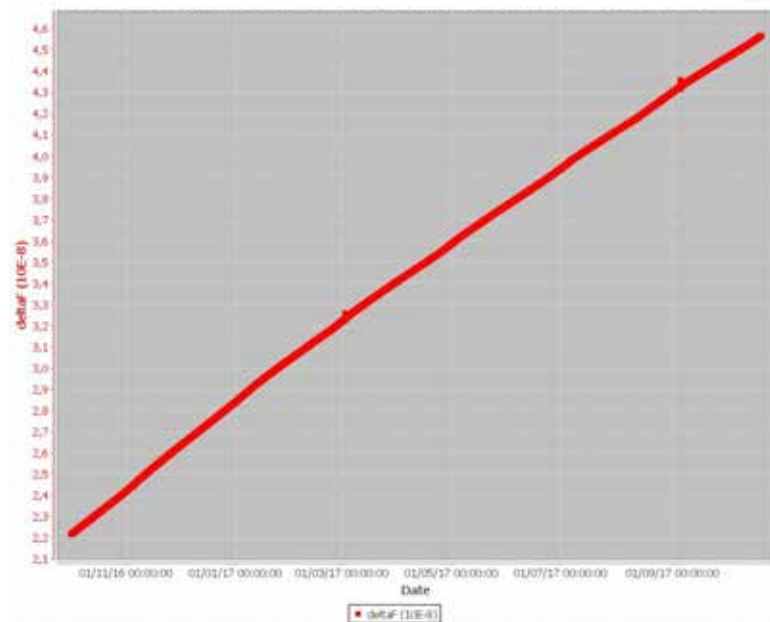
**Thank you for your attention and and
also to the contributors !!**

Backup slides

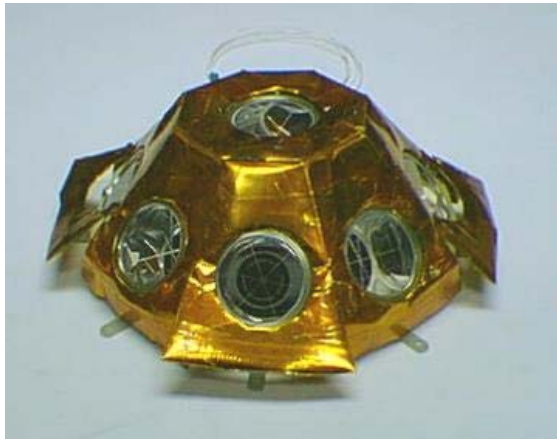
DORIS

- 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 %)

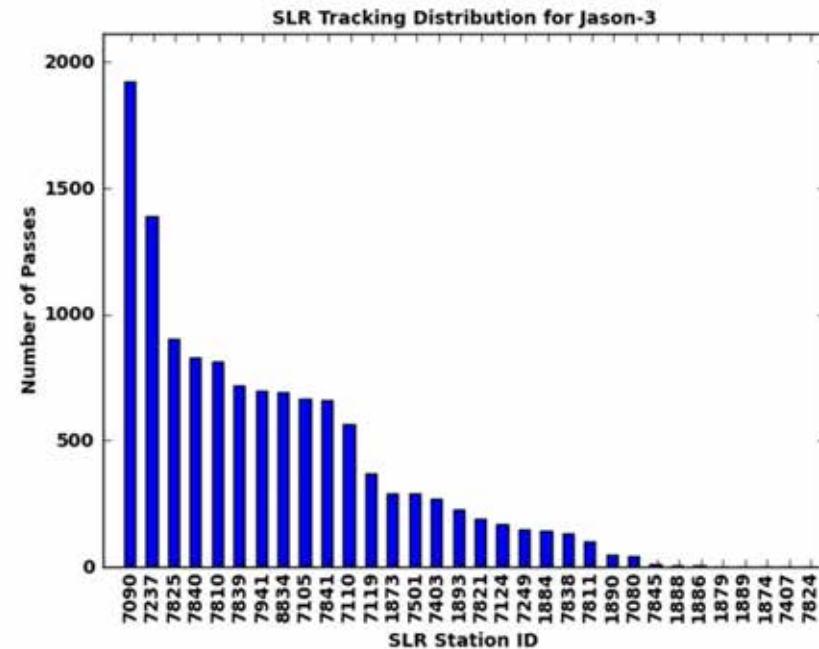
USO Delta-F Oct.2016-Octo.2017



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 nominal



Cumulative Passes Per Station for Jason-3

- Top stations by pass volume:
 - *Yaragadee, Changchun, Mt. Stromlo, Herstmonceux, Zimmerwald*

Global availability

