Jason-3 Status

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Presented by G. Zaouche (CNES)

Mission Background

Mission Summary

Science Measurements

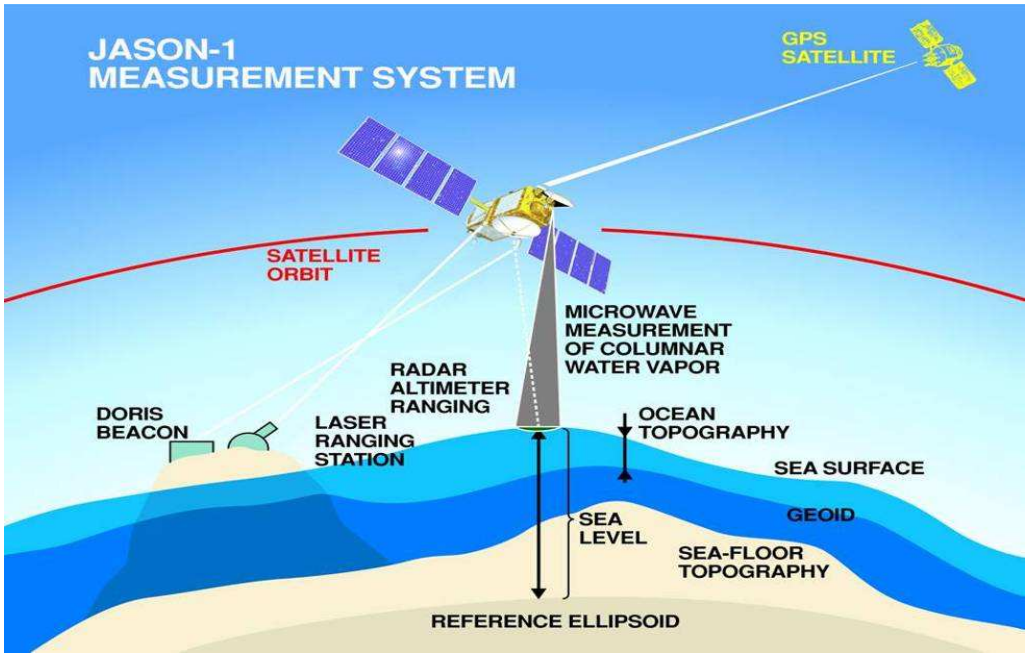
Global sea surface height to an accuracy of ≤ 4 cm every 10 days, for determining ocean circulation, climate change and sea level rise

Mission Objectives

- **Provide continuity of high precision ocean topography measurements beyond TOPEX/Poseidon , JASON-1 and JASON-2**
- **Provide a bridge to an operational mission to enable the continuation of multi-decadal ocean topography measurements**

Instruments

- **Core Mission:**
  - **Poseidon-3B Altimeter**
  - **DORIS (Precise Orbit Determination System)**
  - **Advanced Microwave Radiometer (AMR)**
  - **GPS Payload (GPSP)**
  - **Laser Retro-reflector Array (LRA)**
- **Passengers:**
  - **JRE (Carmen3 + LPT)**



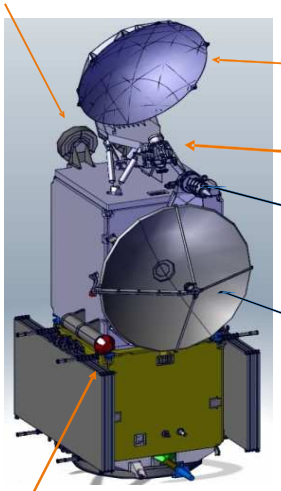
Mission Overview

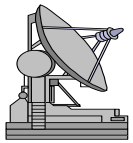
- **Launch Date: March 2015**
- **Launch Vehicle: Falcon 9 (SpaceX)**
- **Proteus Spacecraft Bus provided by CNES**
- **Mission life of 3 years (goal of 5 years)**
- **1336 km Orbit, 66º Inclination**

Jason-3 System Elements

U.S. Elements
European Elements

Dedicated Launch Vehicle : Falcon9



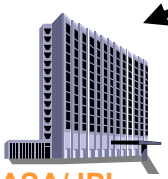


NOAA - Wallops/ Fairbanks – Barrow - USA

NOAA

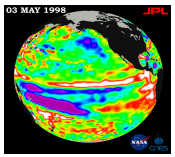
S/C Operations (Suitland, MD)

Operational product processing and Science Data archive & Distribution



NASA/JPL

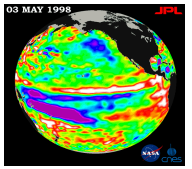
NASA Instrument Ops



EUMETSAT – Usingen, Germany

Operational product processing & Distribution

EUMETSAT

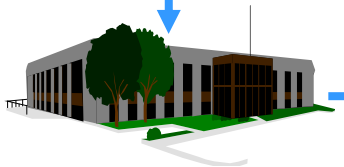


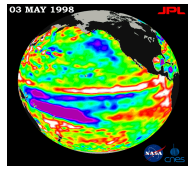
Science data processing, archive & Distribution

CNES

S/C Operations (Toulouse, France)

Passengers Ops and mission centers CNES- JAXA

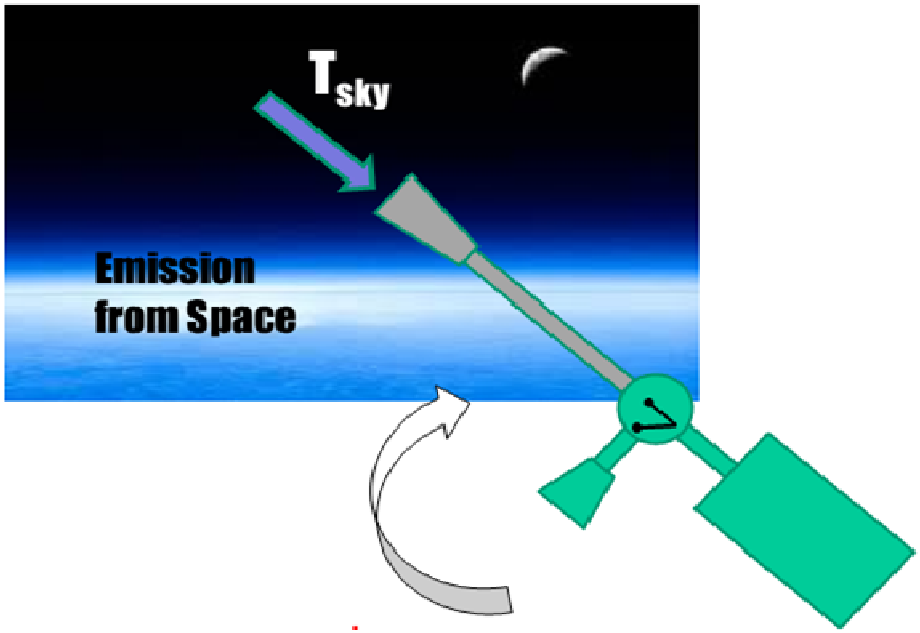




Changes and new features wrt OSTM/Jason-2 (1)

- System : AMR in-flight cold-space calibration
  - Lisbon OSTST recommendation, San Diego OSTST decision
  - Satellite pitch maneuvers (80° off nadir).

This change is completed and has been tested in 2014.



Changes and new features wrt OSTM/Jason-2 (2)

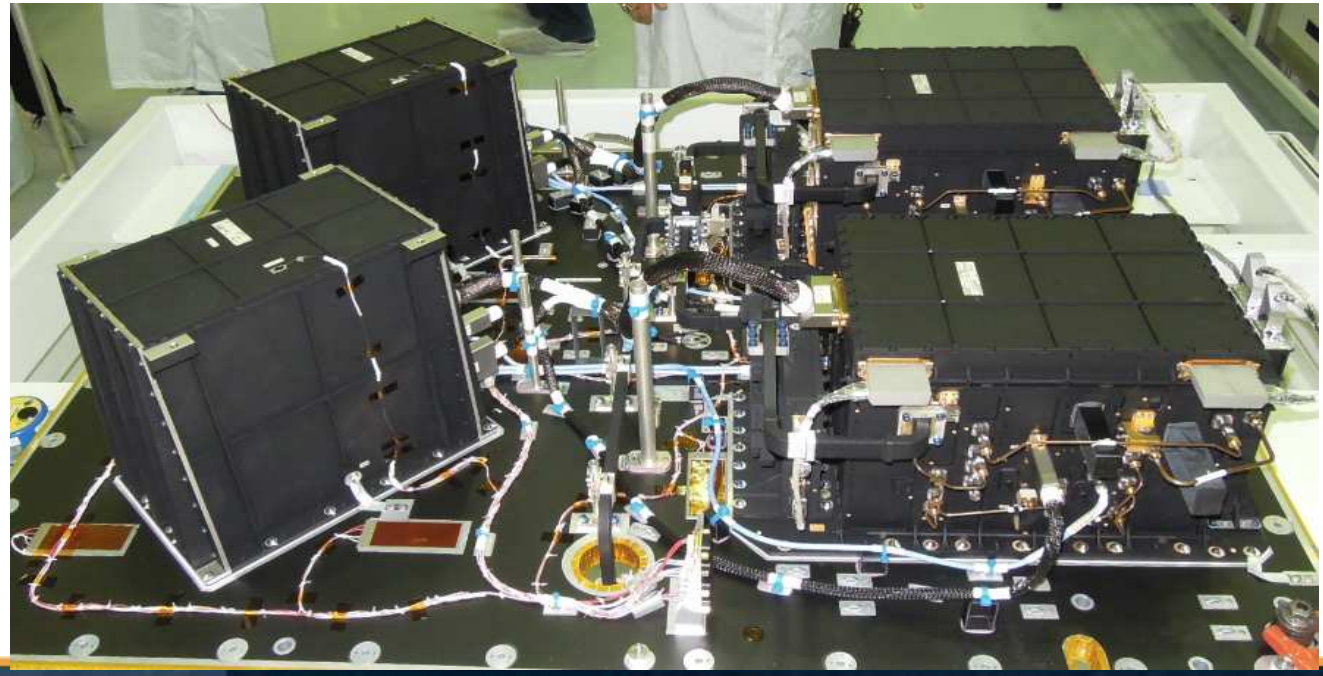
- Satellite
  - Slight modification of satellite OBSW (Tx OFF for safety improvement, EDAC robustness), PIM structure panels.

Completed and validated

Changes and new features wrt OSTM/Jason-2 (3)

- POS3B (Altimeter)
  - Implementation of a single mode with on-board automatic transitions between DIODE/DEM tracking and autonomous tracking, with respect to the satellite position.
  - POS3B DEM upload is now possible without mission interruption.

Completed



- **See J.D. Desjonqueres**
- **Poster : JA2 In-Flight Diode/DEM tracking mode results**

Changes and new features wrt OSTM/Jason-2 (4)

- DORIS
  - New generation DGXX-S taking into account lessons learned from Jason-2
  - Change of DORIS antenna location for compliance with each potential launch vehicle while waiting for the selection
  - Improvement in modeling the Solar Panels position
  - New data in TM allowing “pole product” generation

Completed

Changes and new features wrt OSTM/Jason-2 (5)

- AMR (Radiometer)
  - Mostly recurring design with improvement of the instrument thermal control and stability (lesson learned from Jason-2 experience)

Completed

Changes and new features wrt OSTM/Jason-2 (6)

- GPSP
  - Different receiver but with same basic design as on JASON-1/2
  - Not mission critical but applying further updates for radiations hardened parts and shielding

Completed

Changes and new features wrt OSTM/Jason-2 (7)

- Launch vehicle : Falcon 9 (SpaceX)
- New Payload Processing Facility (PPF) at Vandenberg : SpaceX PPF
- Environment assessment based on launcher flight data and on Mech Tests results.
  Launcher compatibility demonstrated in summer 2014 : completed
- Launch Campaign preparation in progress for a launch planned end of March 2015

Changes and new features wrt OSTM/Jason-2 (8)

- Ground System
  - Capability to operate simultaneously JA2 and JA3
    - Addition of stations for the “tandem flight” phase : Barrow (NOAA) and Usingen2 (EUM)
  - JASON-2 and JASON-3 operations “merging” considered after the launch

  Completed

- Product Processing :
  - Development of a “numerical retracking” to be used for Jason-3 OFL products (first in PEACHI) allowing to take into account the actual instrument features before launch and in-orbit and to better estimate the low sea states.

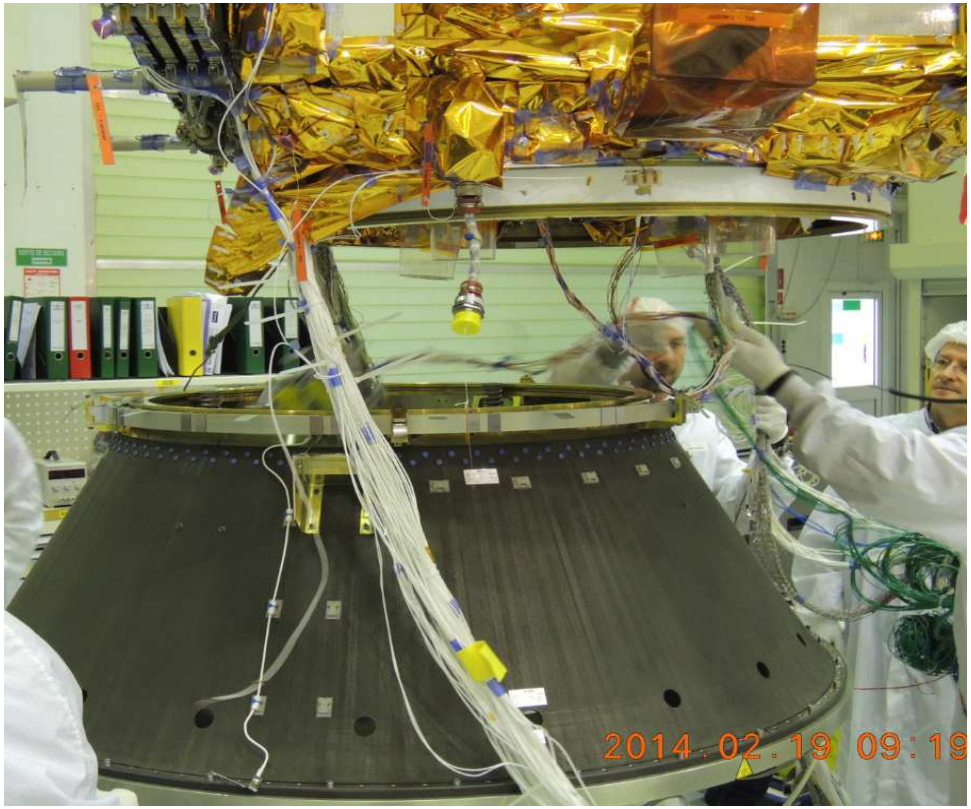
See F. Boy’s Presentation “Towards the Jason-3 waveform processing: assessment of the numerical retracking performances” (Boy et al.)

Jason-3 Project Status : Significant events since Boulder OSTST

- March – Dec 2013 : 4 partner Ground system tests for Technical Qualification completed : successful
- Mid Jan 2014 : NOAA FY2014 budget reduction
- End Feb 2014 : Launch date postponed by 1 month (contractual option exercised by NOAA). Launch date : March 31, 2015
- Feb-Mar 2014 : Sat Environmental Tests (Mech, Launcher I/F) : successful
- Jun-July 2014 : Sat Thermal Vacuum Tests : successful
- Aug 2014: Sat EMC Tests in CATR : successful
- Sept – mid Oct 2014 : Sat Final Functional Tests : successful

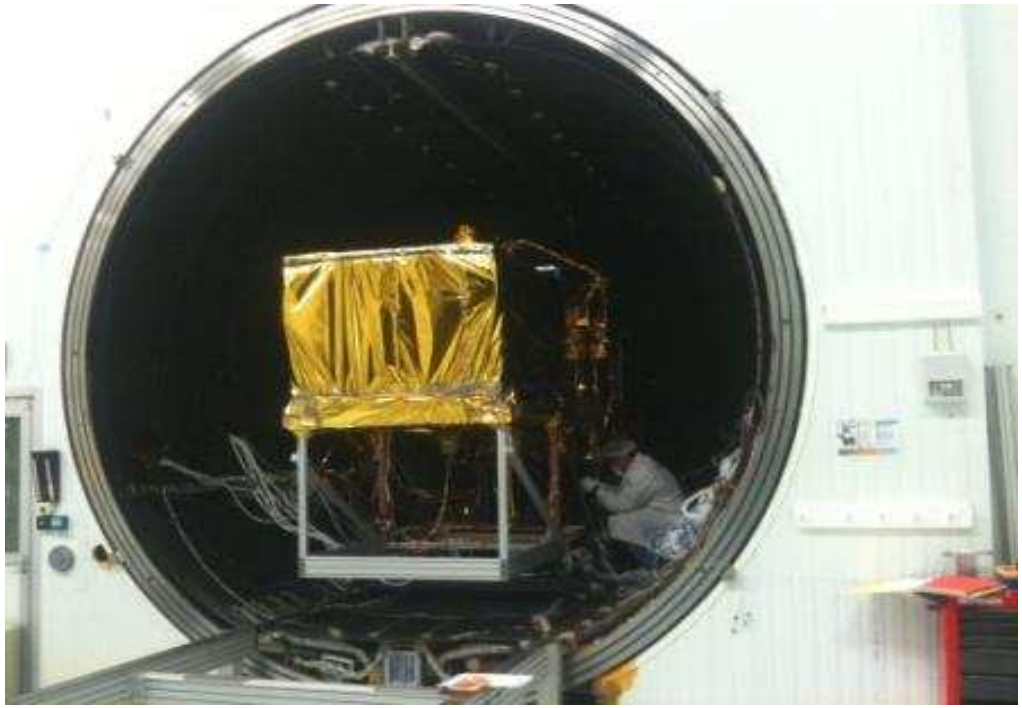
Jason-3 Satellite AIT - 1

- Satellite in Environmental Tests



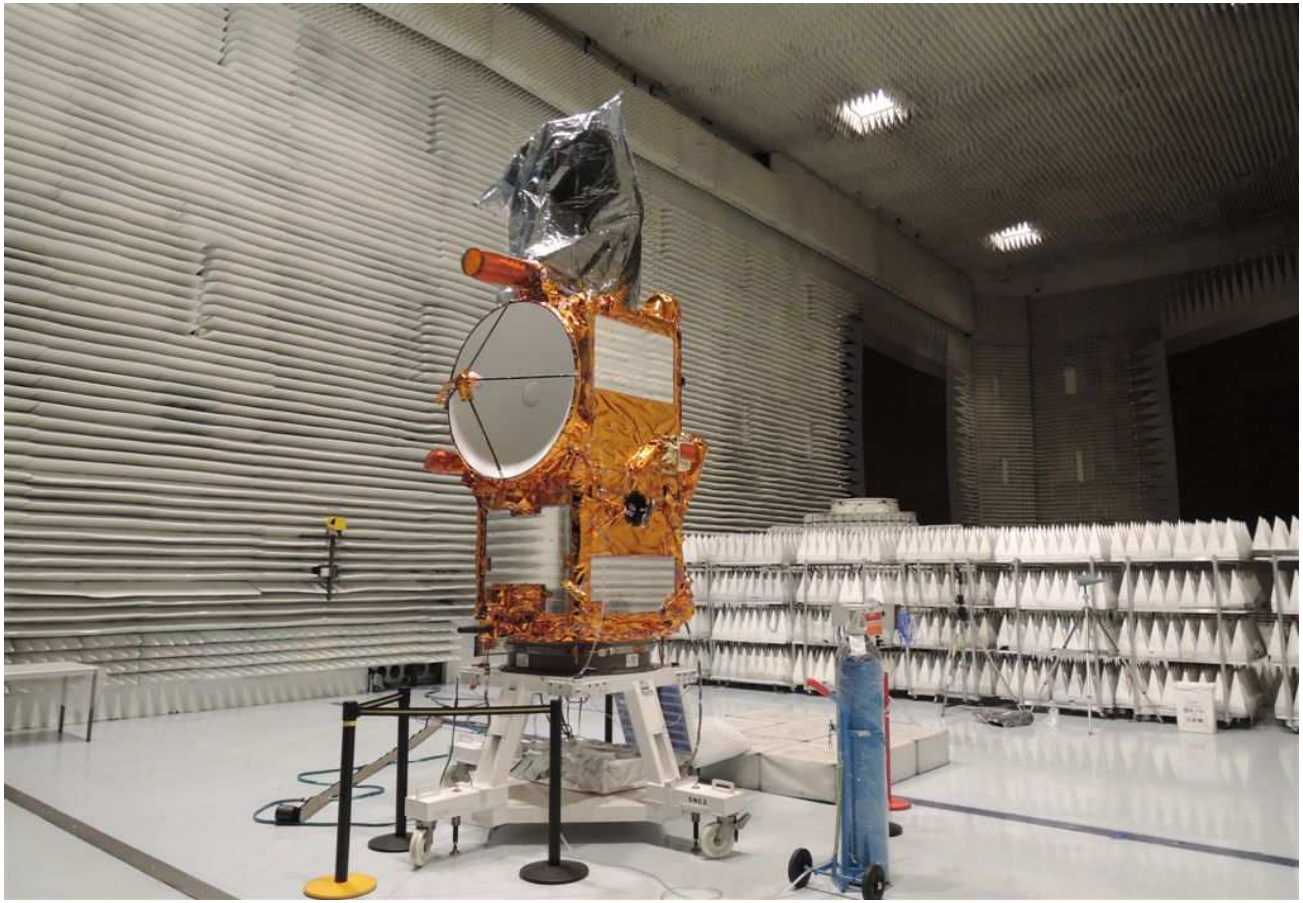
Jason-3 Satellite AIT - 2

- Satellite in Thermal Vac Chamber



Jason-3 Satellite AIT - 3

- Satellite in EMC Tests



Jason-3 Satellite AIT - 4

- Satellite AIT team

Jason-3 Ground System Status

- Ground Systems
  - CNES, EUM, NOAA, JPL : OK
    - All the 4 partner ground systems are implemented and validated
  - Preparation of operations : OK
  - Products : same as Jason-2

- 4 Partner tests
  - 4 partner “Compatibility Tests” and “Technical Qualification tests” are successfully completed
  - Operational Qualification tests run :
    - LEOP tests : successful
    - “Long Term Routine” tests : successful
    - First Dress rehearsal already exercised in Oct 2014 : successful

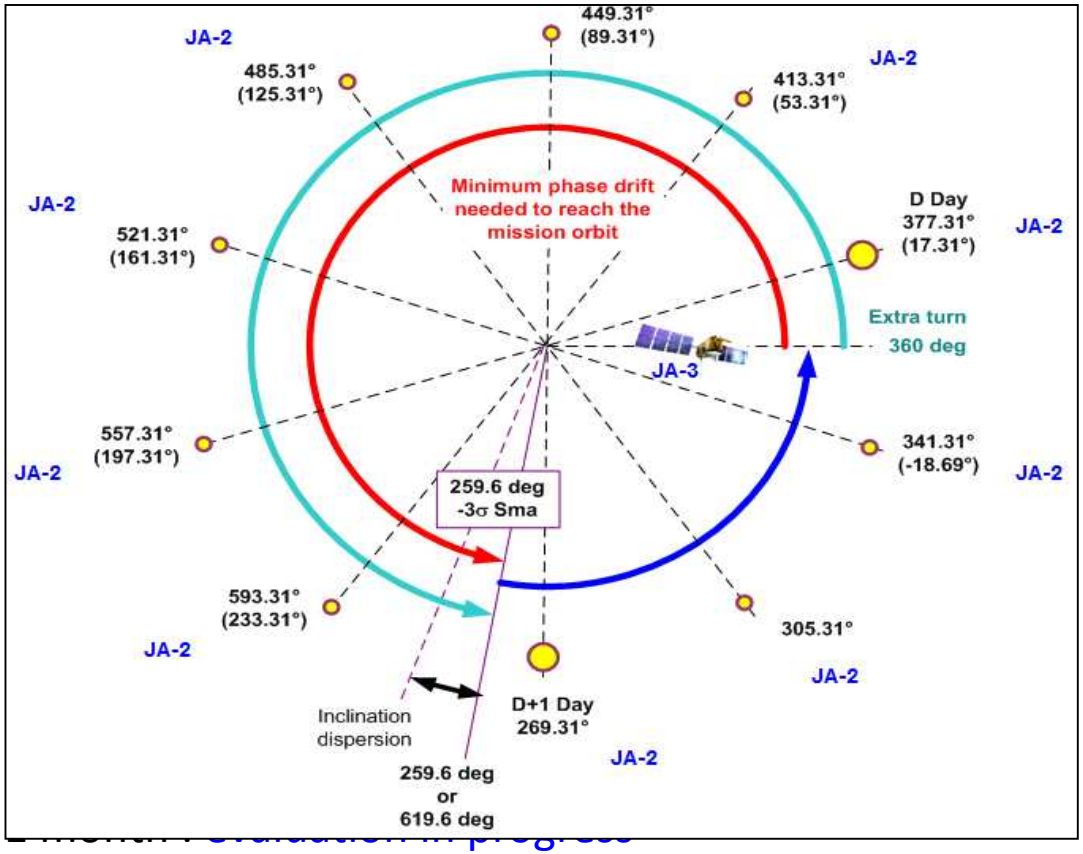
Jason-3 Project Status : Remaining activities

- Satellite activities :
  - Satellite SQR Review : 18-20 Nov 2014
  - “Satellite Final Preparation” before Satellite shipment to VAFB in Feb 2015
  - Launch Campaign : mid Feb – end March 2015
- Ground System final preparation :
  - Dress Rehearsals : between Jan 2015 and March 2015
  - 2GHz Network Rehearsals (RGR) : Feb and March 2015
- System activities :
  - JA3 Performances Assessment and CALVAL Plan KP : Dec 2, 2014
  - Mission ORR Review : end Jan 2015
- Launch and LEOP phase : end of March 2015

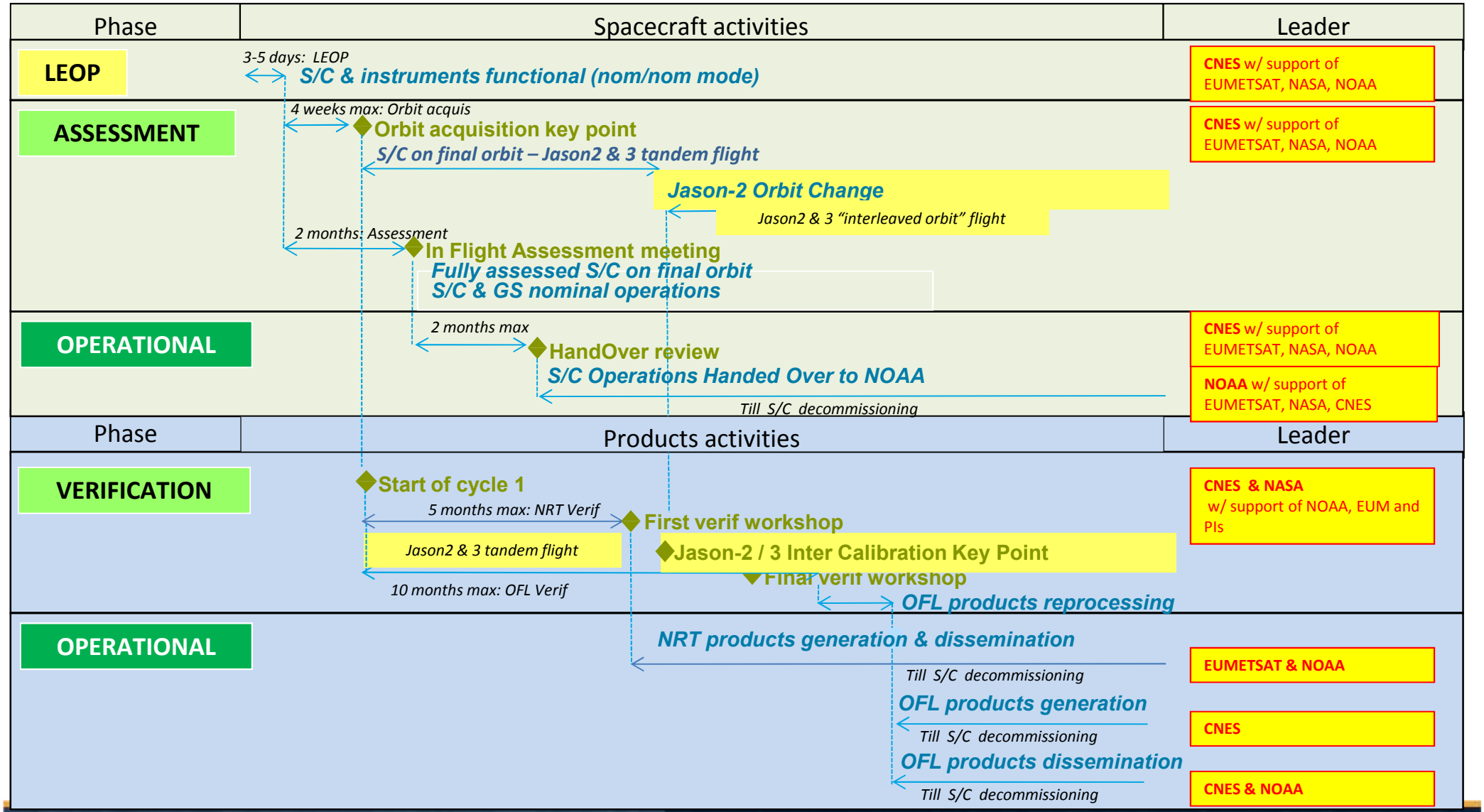
Jason-3 Orbit Acquisition Strategy

- Tandem flight with Jason-2 planned for both altimeters cross-calibration purposes
- Jason-3 final orbit characteristics :
  - same ground tracks as Jason-2
  - between 1-10 minutes ahead/behind Jason-2
- Injection orbit :
  - 25 km below the nominal Jason-3 orbit to avoid polluting the operational orbit and to avoid to cross the Jason-2 orbit (and Ja-1)
  - duration for station acquisition and number of maneuvers depends on the launch date (day number in the Jason cycle) and on the launcher dispersions

Target duration for station acquisition : max



Jason-3 Phases



Conclusion

- Jason-3 development is nominal at satellite, instruments and ground levels

- Fruitful cooperation between all the project teams (CNES, EUMETSAT, NASA, NOAA)

- **Final stretch of activities before JA3 Launch !!!!!**