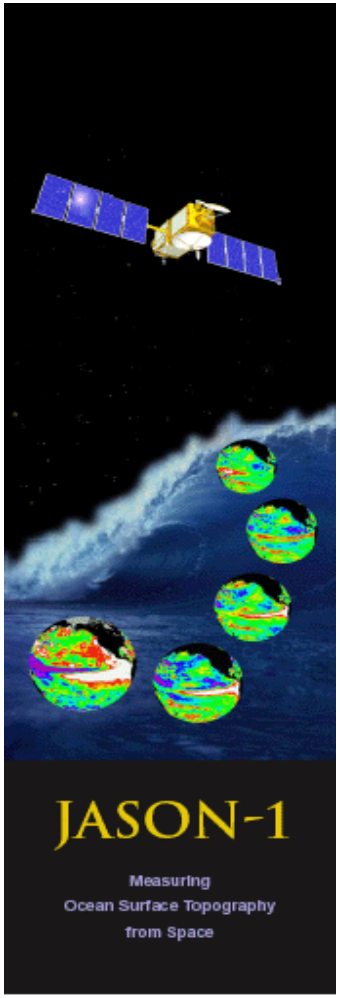
2010 Ocean Surface Topography Science Team Meeting (Lisbon)

Jason-1 Mission Overview



- The 18+ year combined data record from TOPEX/Poseidon, Jason-1 and OSTM/Jason-2 is the only climate data record that is able to address the problem of global change of sea level and ocean circulation and its relation to climate change.
- Continuation of this data record is critical to meeting NASA's Earth Science goals.
- A key objective of extending Jason-1 was to have a significant overlap with OSTM/Jason-2 and to perform cross-calibration to ensure the consistency in the data record initiated by TOPEX/Poseidon in 1992.
- The data record built by T/P, Jason-1 and OSTM/Jason-2 is the first multi-decadal global record for addressing the issue of sea level rise, which has been identified by the 2007 IPCC assessment as one of the most important consequences and indicators of global climate change.
- The OSTM/Jason-2 and Jason-3 missions will extend the global sea level data record into the decades ahead.

Mission Assessment – 1

- **Jason-1 continues to exceed all Level-1 Science Requirements, despite:**
  - Loss of reaction wheel #1 in November 2003
  - Loss of half-satellite (PMB) in September 2005 (Tx)
  - Loss of Gyro #1 in March 2010.
- **Operational Milestones:**
  - Jason-1 will begin its 10th year in December 2010.
  - Jason-1 provided science data through the end of the OSTM cross-calibration/validation campaign on 26 January 2009.
  - Jason-1 was maneuvered into an interleaved orbit in February 2009.
- **Mission Anomalies:**
  - Since the Seattle OSTST (June 2009), no science or engineering data was lost due to ground system anomalies.
  - One spacecraft safe hold 15-22 September 2009 caused by SEU (double EDAC error.)
  - Gyro #1 anomaly in April 2010 was preceded by a deterioration in pointing performance.
  - Star tracker unavailability during fixed-yaw caused several periods of off-nadir drift in May/July 2010.

Mission Assessment – 2

- **OSDR science processing has been nominal:**
  - >94% within the 3-hour latency period (L1 science requirement is 75%)
  - >99% within the 5-hour latency period (L1 science requirement is 95%)

- GDR-C reprocessing in support of OSTM/Jason-2 Cal/Val:
  - Jason-1 GDR-C data reprocessing completion coincided with the June 2009 OSTST Cal/Val Meeting in Seattle, Washington.

- **Next Operational Goal:**
  - Extend the Jason-1/OSTM interleaved mission for as long as possible. ***Hopefully, until the launch of AltiKa or Jason-3…***

- **Mission Lifetime Assessment:**
  - CNES/TAS no longer provides probabilistic assessments of Jason-1 expected lifetime.
  - Thermal, power and propulsion systems all have significant margins remaining.

September 2009 Safe Hold

- **DATE/LOCATION OF INCIDENT:** 08h37m17s UTC on 15 September 2009. In Low Earth Orbit. On descending pass traversing SAA; out of ground station visibility. (21.0°S, 51.1°W)

- **DESCRIPTION OF INCIDENT:** The Jason-1 satellite entered safe hold mode at 08:37 UTC on 15 September 2009, due to an SEU (double-EDAC error in the onboard flight software.) The safe hold was further complicated by anomalies in the mapping to the solid-state mass memory recorder.

- **RECOVERY STATUS:** A full recovery to nominal science mission operations was concluded on 25 September 2009, at 17:00 UTC. JPL reassumed control of Jason-1 and normal mission operations were restored.

- **CORRECTIVE ACTION:** CNES modified the satellite configuration and safe hold recovery procedures to alleviate conflicts between the onboard DHU computer and the mapping of the memory modules in the solid-state data recorder.

- **IMPACT ON PROJECT/EXPERIMENT AND SCHEDULE:** Science Cycles 283 and 284 were interrupted for 10 days. Normal science operations resumed prior to the start of Science Cycle 285, which began at 07:18 UTC on 26 September 2009.

- **There was no permanent impact on the Project's ability to meet all Level-1 science requirements.**

Star Tracker Performance Concern

Description

• Beginning in late-May 2010, Jason-1 experienced nadir off-pointing excursions which caused operational (OSDR) Significant Wave Heights to be set to default over the ocean up to 30% of the time.

• Again on 04-June and 19-July 2010, Jason-1 experienced significant nadir off-pointing excursions which affected the production of Near-Real Time (NRT) and operational (OSDR) Significant Wave Height data products.

- Low STR availability adversely affects the on-board attitude control loop system. When the platform attitude drifts too far away from nadir, the altimeter cannot maintain track on the echo returns and it is eventually reinitialized by the onboard failure detection software, requiring ground intervention to restart the altimeter.

Current Status

• Nadir pointing performance improved once Jason-1 returned to a yaw-steering configuration (with higher Beta angles) after 11 June and 30-July 2010, respectively.

• New autocorrection tables were successfully uploaded to the redundant STR2 on 17-June.

• CNES swapped the attitude control loop from STR1 to STR2 in September 2010.

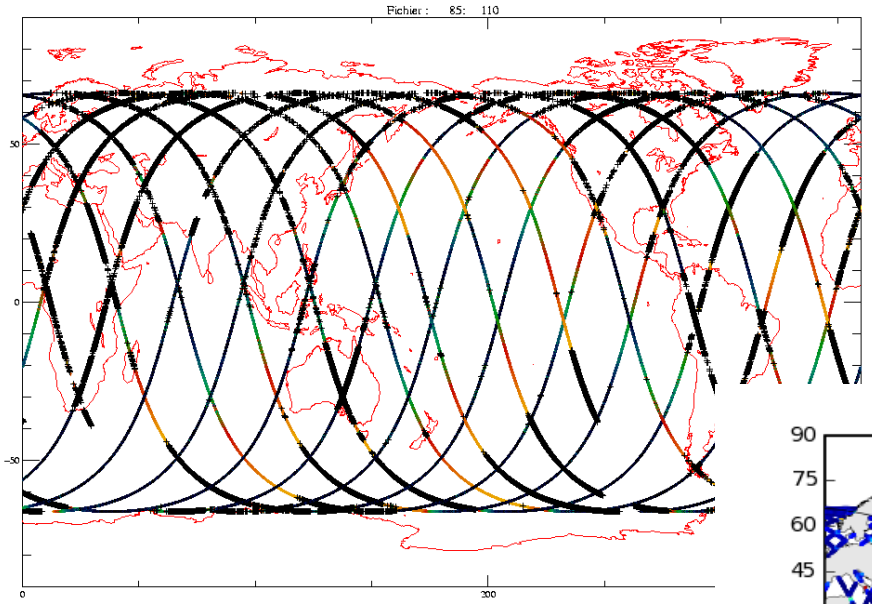
• Nadir pointing performance significantly improved after upload and swap to STR2.

Resolution/Impact

• STR1 autocorrection tables will also be updated in the future.

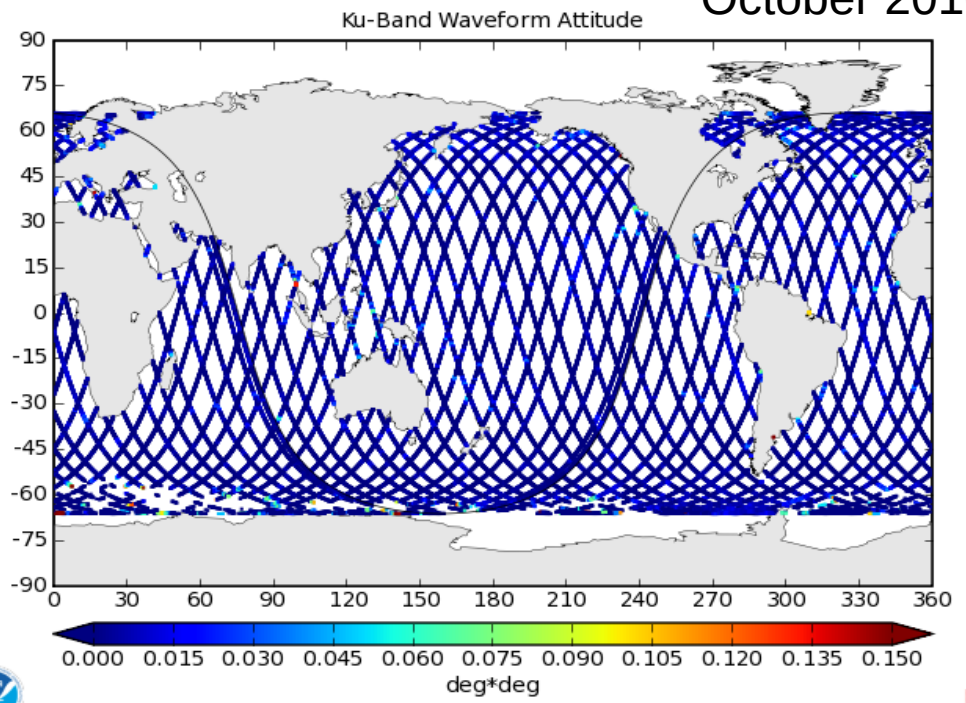
• Science data production for Cycles 310 and 315 were disrupted by the attitude control excursions of the spacecraft and resulting altimeter resets.

Jason-1 Nadir Pointing Comparison



6 April 2010

October 2010



Orbital Status Summary

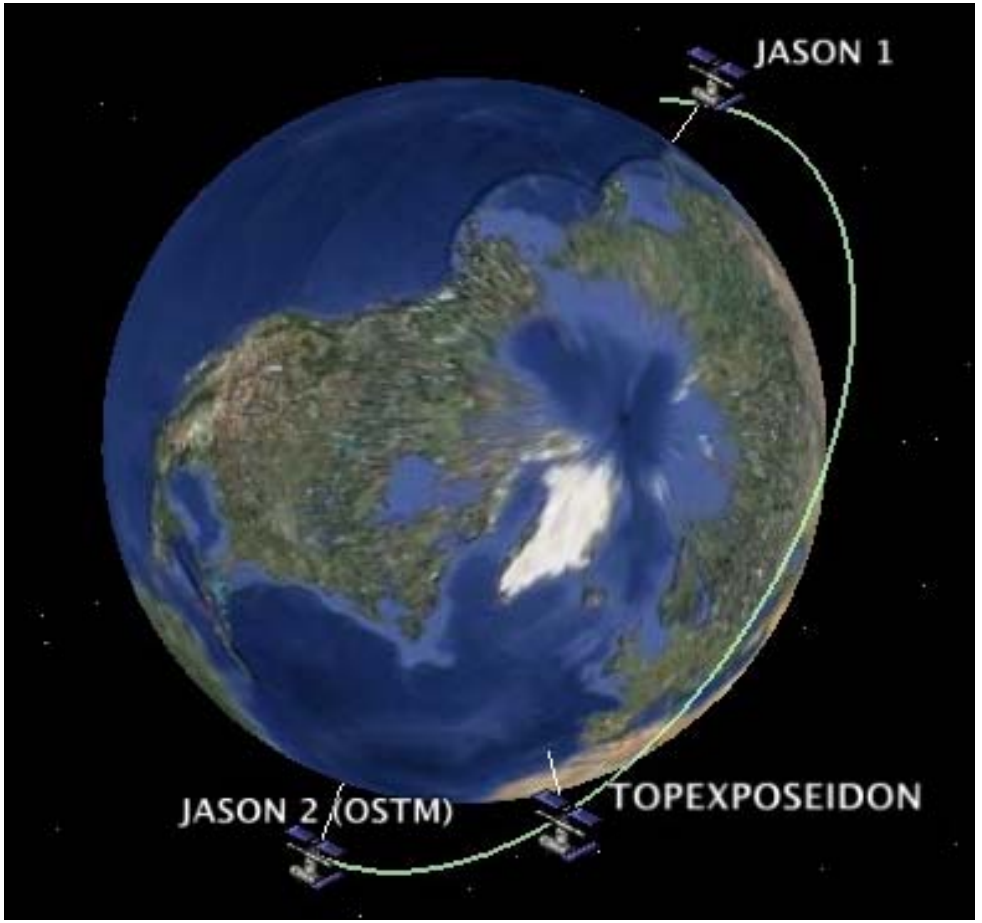
Jason-1 is in the same orbit plane as TOPEX/Poseidon (T/P) (non-operational), OSTM/Jason-2 (operational) & Jason-3 (planned).

T/P is inoperable, and has a nearly-full tank of frozen/inert hydrazine (~200kg) that cannot be depleted.

In July 2010, Jason-1 had ~22kg of hydrazine remaining onboard that could be depleted.

Jason-1 is single-string on several key component systems.

The permanent loss of one of these key components would end the mission and could possibly leave Jason-1 adrift.



Jason-1 EOL Joint Working Group

- Under joint agency direction, a End/Extension-of-Life (EOL) Joint Working Group was established in early-2010 to study future options for Jason-1.

- The JWG was tasked with studying the following:
  - Identify risk drivers
  - Assess the benefits of partial-passivation (e.g. tank depletion)
  - Assess the benefits of moving Jason-1 to an alternate orbit
  - Identify strategies that:
    1. Minimize risk to Jason-2 and Jason-3
    2. Minimize risk to neighboring satellites
    3. Prolong the science return
    4. If possible, provide an on orbit backup for OSTM until future repeat-track altimetry missions are launched
  - Develop an implementation timeline for each strategy.

NASA/CNES Joint Steering Group

A NASA/CNES Joint Steering Group (JSG) Telecon was held on 12 July 2010 to discuss Jason-1 end-of-life/extension-of-life issues and working group activities.

The following actions and strategies were approved by the JSG:

- **The JSG agreed in principle that Jason-1 should remain in its current interleaved orbit until another high-accuracy repeat-track altimeter is launched and validated. (Most likely to be SARAL/AltiKa in June 2011 + 9 months Cal/Val)**
- **The Jason-1 Project was directed to immediately begin a fuel depletion campaign to mitigate the intrinsic explosive breakup risks.**
- **The Jason-1 Project was directed to develop and implement emergency decommissioning procedures to move to graveyard orbit in the event of a sudden mission-ending failure.**

- An exact alternate science orbit for Jason-1 will be determined at the OSTST meeting in Lisbon, Portugal (October 2010), and approved at a future JSG.
- The status of SARAL/AltiKa availability and timing of the move to an alternate science orbit will be reevaluated at the next REVEX meeting in Toulouse (May 2011), and approved by a future JSG.

Jason-1 Fuel Depletion Status

Background:

- Jason-1 launched with 28 kg of hydrazine.
- Only 5 kg were used during the first 8½ years of operations.
- Future station keeping, collision avoidance, alternate orbit acquisition and decommissioning activities will only require ~7 kg of fuel.
- Therefore, 14 kg were considered to be excess to mission needs and posed an explosive risk that could be mitigated.

Summary of Fuel Depletion Activities:

- At the start of the depletion campaign, tank pressure was 13.8 bar (200 psi)
  - In July 2010, a series of inclination change maneuvers were performed.
  - This campaign was suspended after underperformance of thruster #4.
- At suspension, tank pressure was 9.75 bar (140 psi)
- The fuel depletion goal was 7-8 bar (100-120 psi)
- **~70% of the desired depletion goal has been achieved.**
- After final decommissioning, the tank pressure goal is ~5 bar (70 psi)

Significant Jason-1 Data Outages

- September 2009 Safe Hold: Science Cycles 283 and 284 were interrupted for 10 days.
  - The September 2009 safe hold did not cause any permanent damage or additional loss of functionality. No new risks were identified as a result of this safe hold.

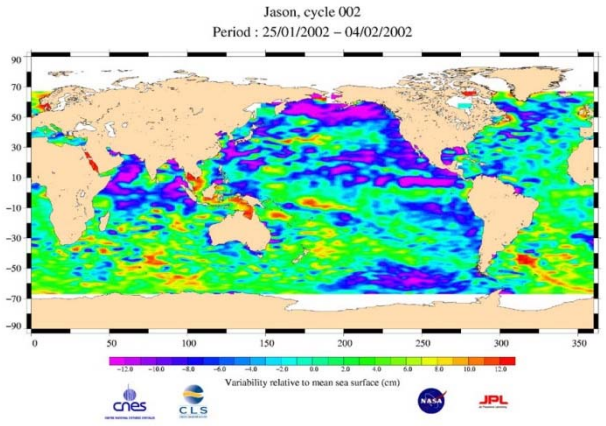
- Science Cycle 305 was adversely affected by the gyro anomaly and swap. The altimeter had nadir pointing excursions outside the nominal range during this cycle.

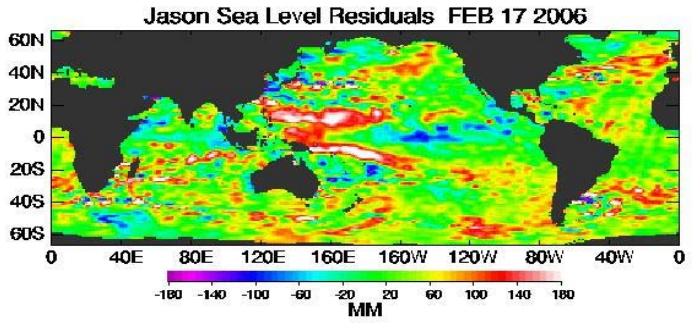
- Science Cycles 310 and 315 were disrupted by the attitude control excursions of the spacecraft and resulting altimeter resets.

- The fuel depletion campaign degraded Jason-1 science data from 20-July to 20-August 2010, affecting Science Cycles 315, 316 and 317.

Jason-1 Mission Operations: Current Status

- Joint CNES-JPL mission operations continue to proceed extremely well
  - A joint telecon is held weekly for normal mission operations and coordination
  - Regular proficiency and training tests are conducted
  - All routine and some exceptional command activities are performed by JPL
  - CNES reassumes control for major exceptional activities: SHM, Gyro swap.
- All ground systems at JPL and CNES are routinely exceeding mission objectives
- Jason entered an extended operations phase in December 2006
  - The Jason-1 mission is funded by NASA through October 2011
  - The 2009 NASA "Senior Review" provisionally extended the mission to 2013.





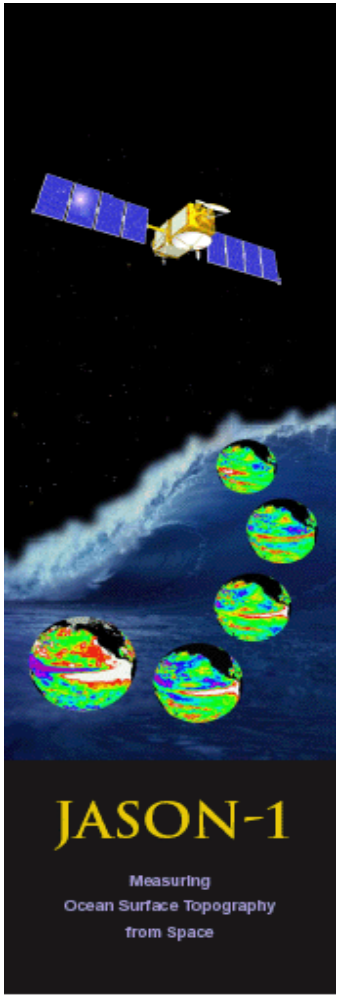
JPL Jason-1 Mission Operations

In September 2009, wildfires threatened the main JPL campus forcing the evacuation of the Jason-1 Command and Control Center and its relocation to a backup facility in East Pasadena.

This temporary evacuation had no impact on mission data availability or spacecraft monitoring.

CNES prepared contingency plans to assume operational control of Jason-1 if the wildfire situation had worsened.

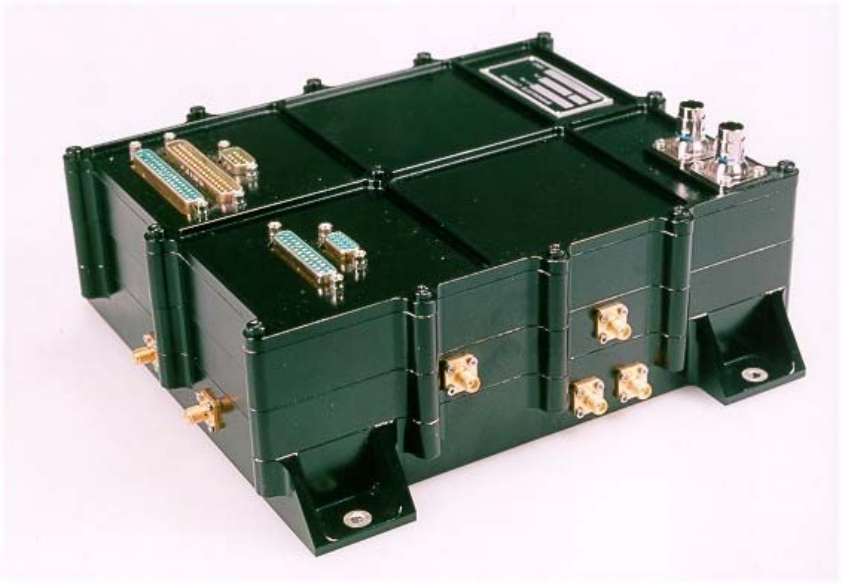
Jason-1 Instrument Status



- ***CNES provided two payload instruments for the Jason-1 Mission:***
  - Altimeter (POSEIDON2)
  - Doppler Radio-Positioning (DORIS)
- ***NASA/JPL provided three payload instruments for the Jason-1 Mission:***
  - Microwave Radiometer (JMR)
  - Laser Retroreflector Array (LRA)
  - Turbo Rogue Space Receiver (TRSR)

DORIS Status

DORIS



- **Switched from DORIS #2 to DORIS #1 on 28 June 2004 after USO instability was observed.**
- DORIS #2 is now redundant
- DORIS availability since last OSTST is 100%

DORIS IS FUNCTIONING SATISFACTORILY

POSEIDON2 Status

POSEIDON2

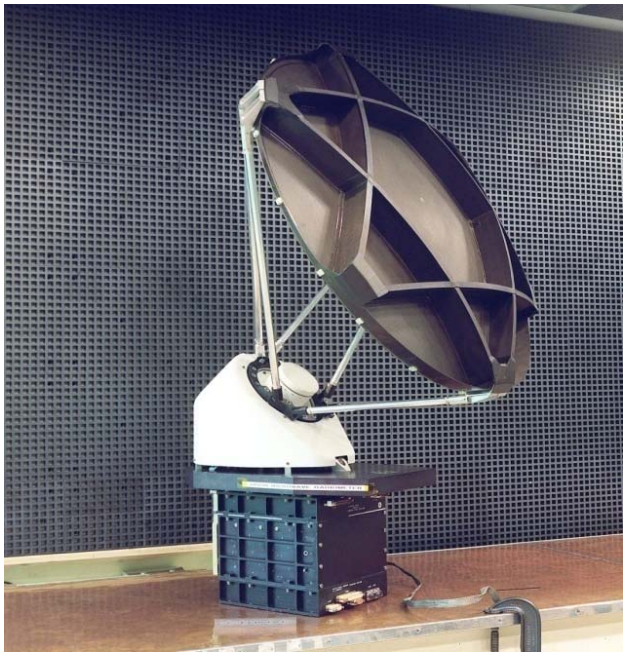
- Chain #1 was turned on 10 December 2001.
- Chain #2 is redundant and has never been used.
- POSEIDON2 performance is affected by attitude excursions.
- POSEIDON2 availability since last OSTST is >**99%**

POSEIDON2-1 ALTIMETER IS FUNCTIONING SATISFACTORILY

Jason-1 Microwave Radiometer (JMR)

Presentation contributors:

- Shannon Brown, JPL
- Shailen Desai, JPL



Summary:

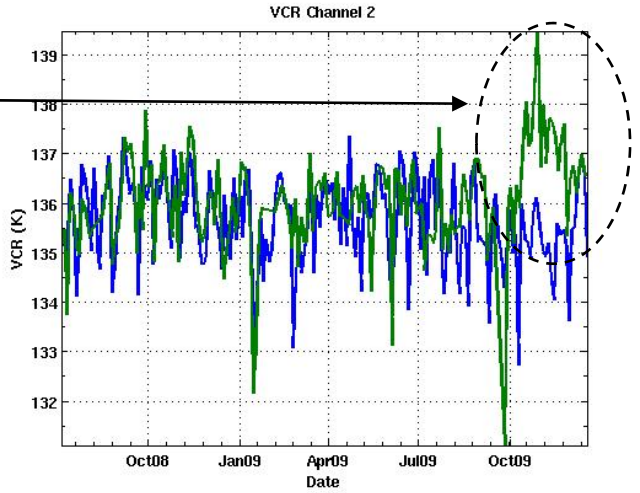
- JMR continues to operate nominally
- No Alarms
- No Commanding
- No engineering anomalies since launch
- Three confirmed science anomalies:
  - Cycle 31 and 68 anomalies was corrected in Version B GDRs
  - Cycle 136 anomaly was corrected in Version C GDRs
  - Replacement products available for Cycle 242 and Cycle 285 anomaly. Cycle 285 anomaly corrected on current GDRs.

JMR Measurements on Version C GDRs

- JMR 23.8 GHz instability observed after the September 2009 safehold event.
- Causes PD instability at the 1cm level.
- Recalibration of JMR for Cycles 285 onward completed and implemented in GDR processing.
  - S. Brown, "Jason-1 JMR September 2009 Safehold Anomaly Recalibration" JPL IOM, 8 January 2010

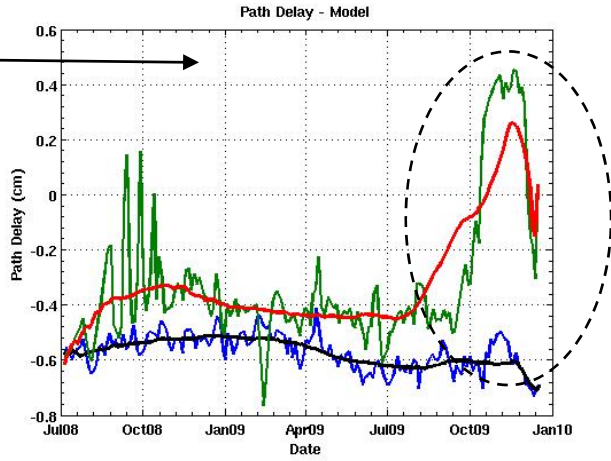
AMR and JMR Cold TBs

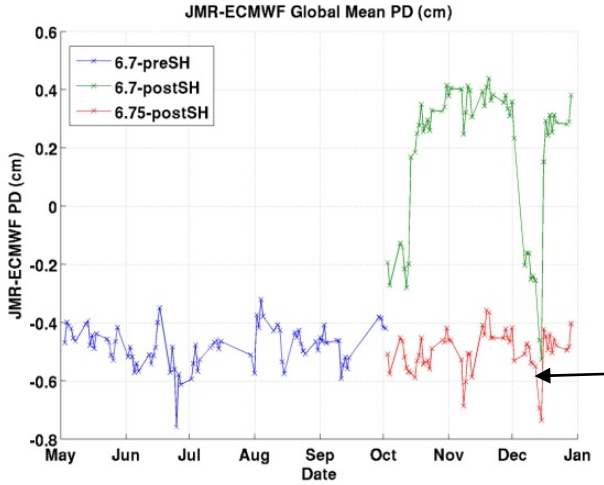
JMR 23 GHz instabilities



Rad-ECMWF PDs

10 mm PD instability





Post Cycle 285 GDR recalibration

Laser Retroreflector Array (LRA)

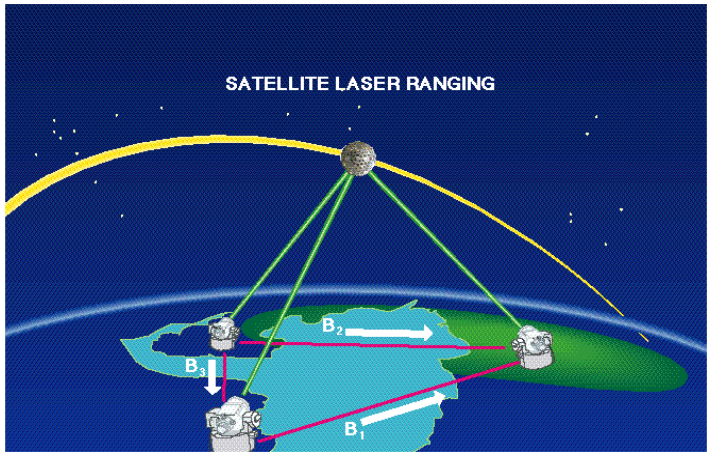
Presentation contributor:

- Glenn Shirtliffe, JPL

Summary:

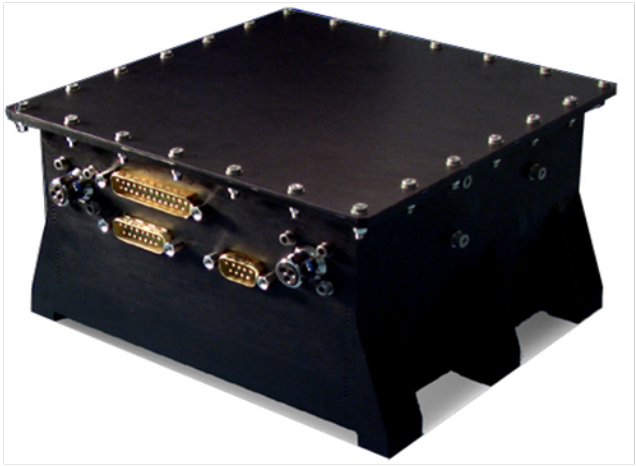
- Consists of several quartz corner cubes arrayed as a truncated cone with one in the center and the others distributed azimuthally around the cone.
- Totally passive reflector designed to reflect laser pulses back to their point of origin on earth. The assembly contains no electronics or software.
- The LRA allows the Jason-1 spacecraft to be tracked with centimeter accuracy by a network of approximately 40 satellite laser ranging stations

- **The Jason-1 LRA continues to provide returns adequate for tracking.**



Turbo Rogue Space Receiver (TRSR)

- **Presentation contributors:**
  - Tim Munson, Cognizant Engineer, JPL
  - Glenn Shirtliffe, JPL
- **Science contributors:**
  - Bruce Haines, JPL
  - Shailen Desai, JPL
  - Willy Bertiger, JPL



- **Summary:**
  - **TRSR1 (redundant receiver) experienced a critical failure during a software upload in September 2006 and will remain powered off.**
  - **TRSR2 (primary receiver) experienced a critical failure during nominal operations in April 2009 and will also remain powered off.**
  - **The TRSR instruments are NOT critical to mission success.**
  - **All Level 1 science and POD requirements can be met using DORIS and SLR for orbit determination.**

New Jason-1 Data Products

Two new data products have been released since the last OSTST:

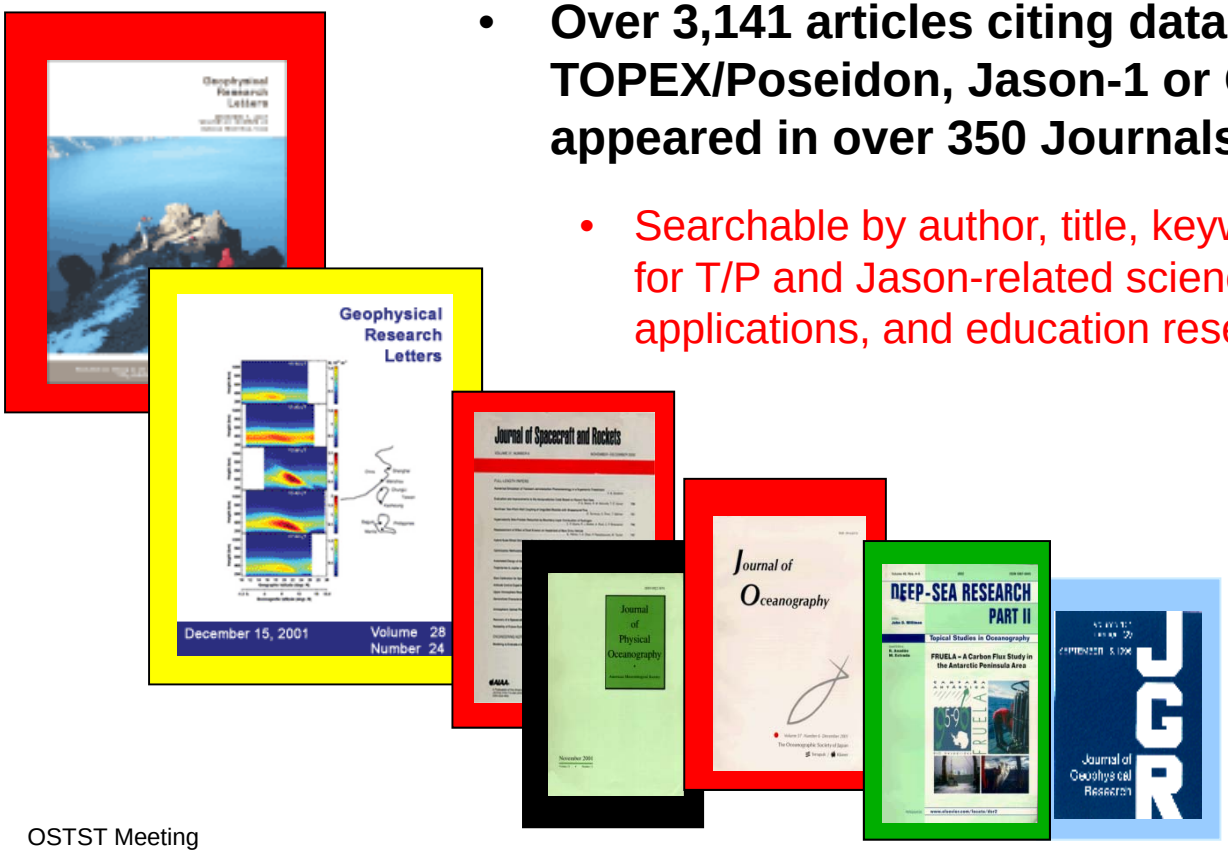
- **Operational Sensor Data Record Sea Surface Height Anomaly (OSDR-SSHA) Data Product (S. Desai/JPL)**
  The new Jason-1 OSDR-SSHA product again provides near-real-time (NRT) sea surface height anomaly (SSHA) measurements from the Jason-1 mission. The product is very similar to the NRT OSTM/Jason-2 GPS-OGDR-SSHA product. Production of the OSDR-SSHA product had been discontinued following the demise of the onboard TRSR GPS instruments in 2008.

- **Enhanced JMR Data Product (S. Brown/JPL)**
  This product is analogous to the Jason-2 AMR enhanced product and contains the same fields and retains the same netCDF data format. The product also contains enhanced wet tropospheric path delay (PD) data for the coastal region, a radiometer land flag for the enhanced PDs, and rain and ice flags derived exclusively from the radiometer.

TOPEX/Poseidon, Jason-1 and OSTM/ Jason-2 Science/Outreach Success

T/P, Jason-1 and OSTM/Jason-2 open literature database is available on-line:

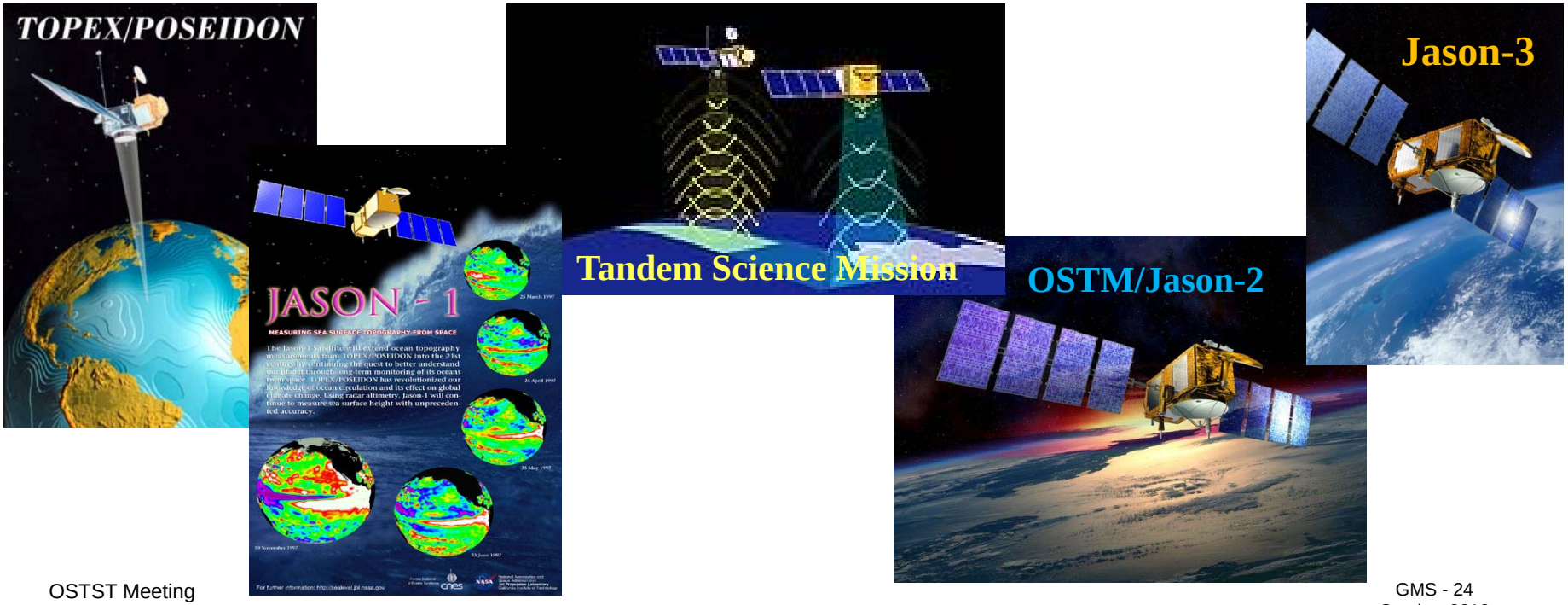
http://sealevel-lit.jpl.nasa.gov/science/search-form.cfm



- **Over 3,141 articles citing data utilization from TOPEX/Poseidon, Jason-1 or OSTM/Jason-2 have appeared in over 350 Journals or Publications**
  - Searchable by author, title, keyword, abstract, & category for T/P and Jason-related science, engineering, applications, and education research from 1990-present

TOPEX/Poseidon, Jason-1, OSTM/Jason-2 and Jason-3: Onward and Upward!

- Efforts are underway to reprocess the entire TOPEX/Poseidon dataset to GDR-C standards and data formats.
- OSTST input will be critical to ensure that a continuous validated data record is available.
- Scientists, NASA and CNES must continue joint efforts to demonstrate the applications and value of ocean science to the public.
- Societal benefits will define NASA/CNES strategy for long-term ocean observing systems.



OSTST Laurels and Accolades

- Josh Willis received the *Presidential Early Career Award for Scientists and Engineers* – the highest honor bestowed by the US Government on young professionals in the early stages of their careers.

- Josh Willis also received JPL's *Lew Allen Award for Excellence*. This award is to recognize and encourage significant individual accomplishments or leadership in scientific research or technological innovation by JPL employees during the early years of their professional careers.

- Anny Cazenave was honored by France as an *Officier de la Legion d'Honneur* one of the country's highest honors.

- John Ries, of the Center for Space Research at the University of Texas at Austin, and
- Jean-Paul Berthias, of the Centre National d'Études Spatiales (CNES), were awarded *NASA's Exceptional Technology Achievement Medal* for outstanding achievements in improving precision orbit determination in NASA's ocean altimetry missions leading to the capability of monitoring global sea level change.

More Laurels and Accolades

- Tony Lee (JPL) received the *2010 NASA Exceptional Achievement Medal* for outstanding achievements and leadership in studying ocean circulation climate variability through synergistic utilization of satellite observations.

- Lee-Lueng Fu was elected as a *JPL Fellow* which recognizes the highest level of individual contribution at the Jet Propulsion Laboratory. The honor recognizes those who have made extraordinary technical contributions to JPL over an extended period of time.

- Dudley Chelton from Oregon State University received the Scripps Institution of Oceanography 2010 *Robert L. and Bettie P. Cody Award in Ocean Sciences* for outstanding scientific achievement in oceanography, marine biology or Earth science.

- Bill Patzert (JPL) has been chosen to receive AGU's *Athelstan Spilhaus Award* in recognition of his efforts to enhance the public understanding of Earth and space sciences.

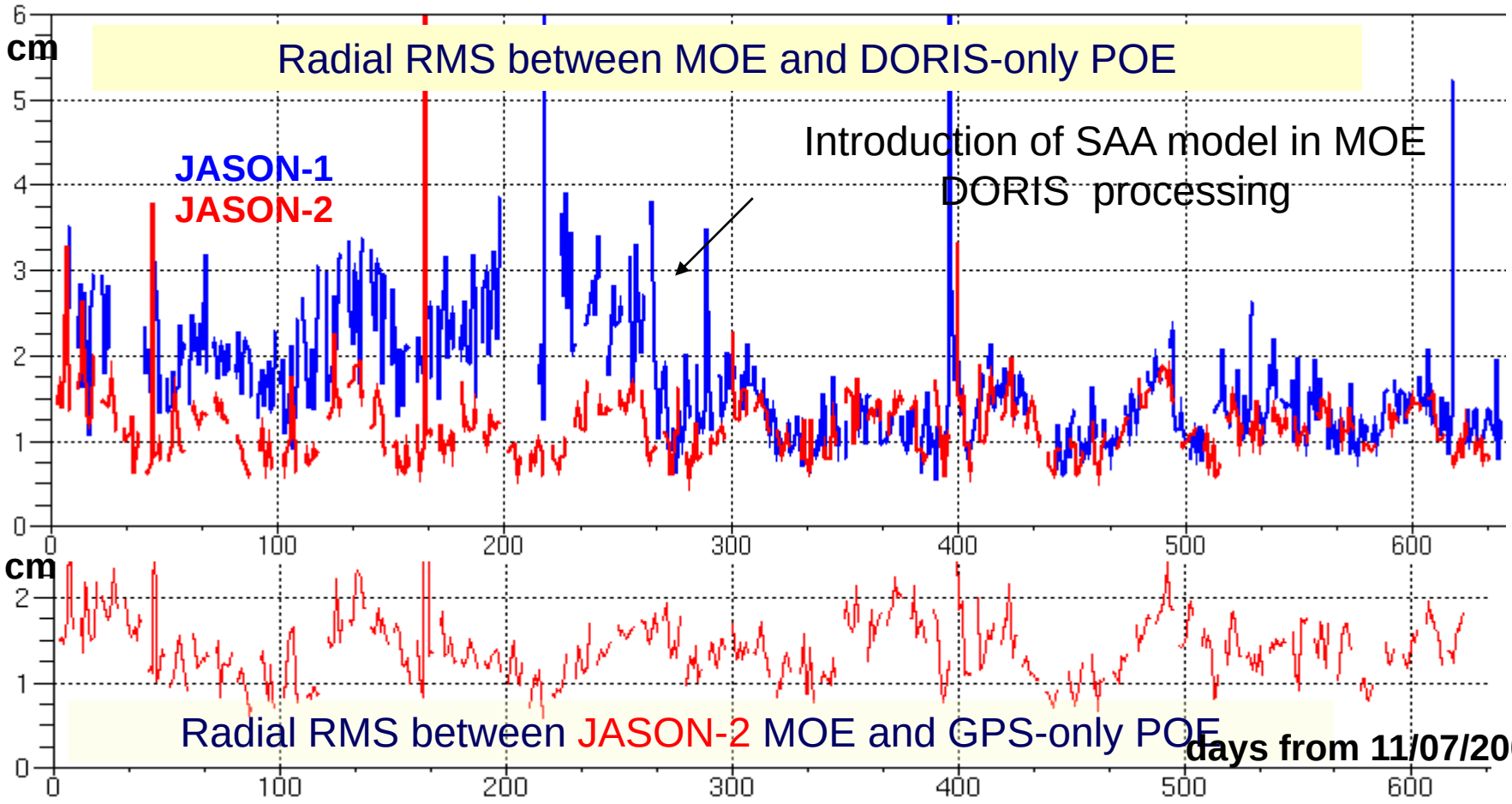
- Lee-Lueng Fu and Yves Ménard were selected to receive the *2010 Committee on Space Research (COSPAR) International Cooperation Medal.*

Jason-1 Status – Backup Slides

- DORIS MOE Performance
- DORIS Post-Fit Residuals
- POSEIDON2 Reset Events & Availability
- GYRO #1 Anomaly of March/April 2010
- SLR Post-Fit Residuals
- TRSR 1&2 Anomaly Discussion
- TRSR2 Anomaly Investigation Summary
- Jason-1 Precise Orbit Determination After Loss of TRSR
- Contingency for Potential Loss of DORIS Tracking
- New Operational Sensor Data Record Sea Surface Height Anomaly Data Product (OSDR-SSHA)
- New Enhanced JMR Data Product

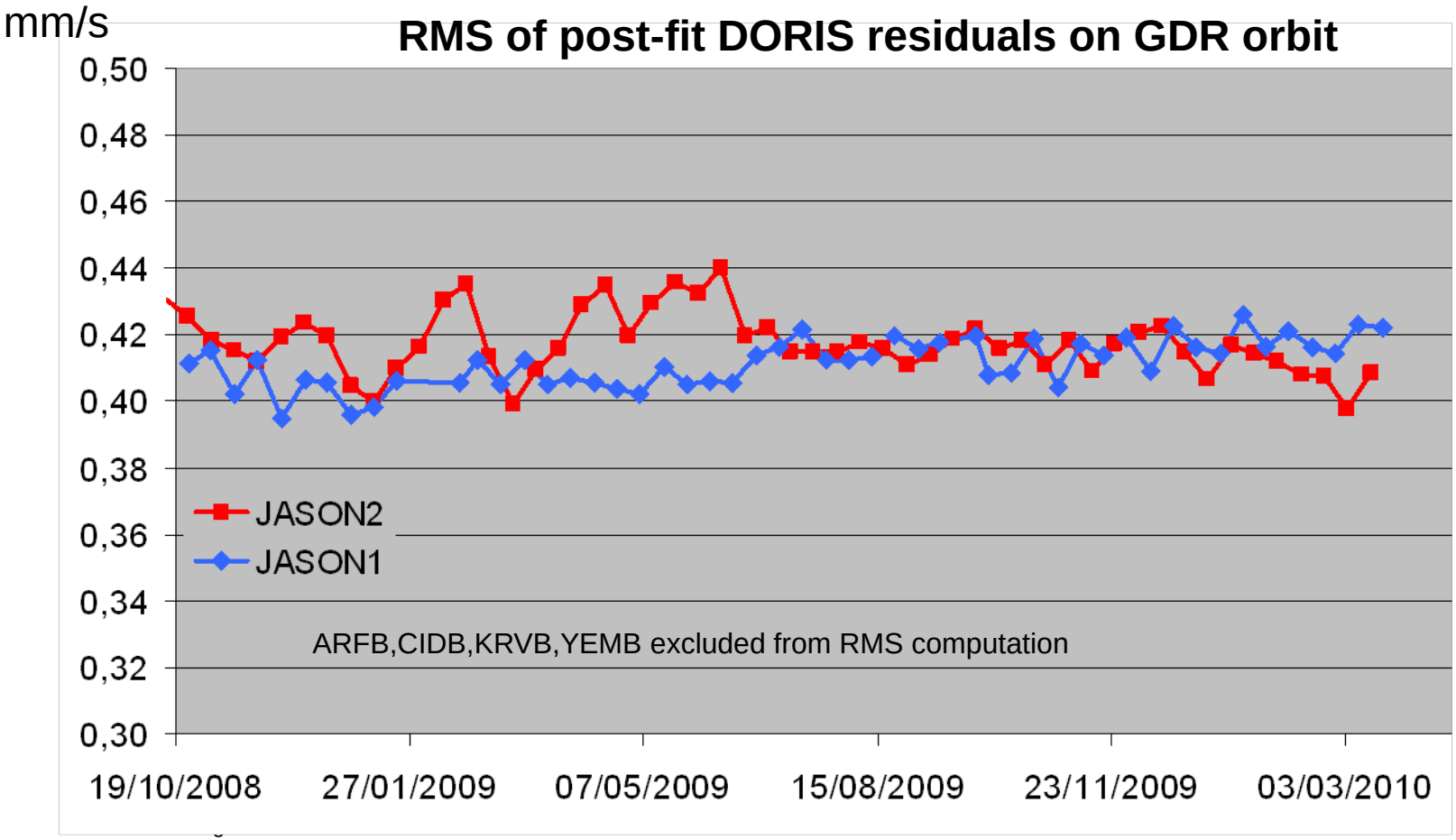
DORIS MOE Performance

Radial RMS generally below 2 cm for both satellites



DORIS Post-Fit Residuals

RMS of DORIS post-fit residuals per cycle is stable and close to 0.4 mm/s for both JASON satellites

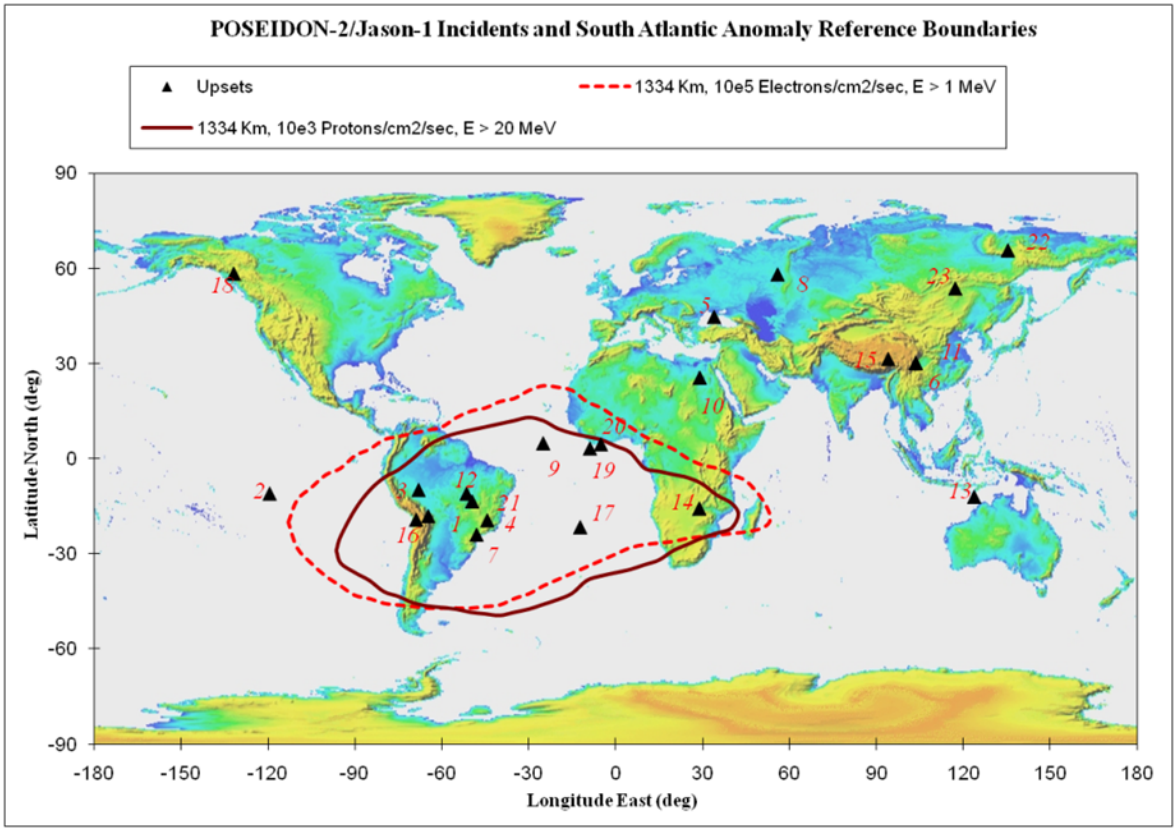


POSEIDON2 Reset Events & Availability

POSEIDON availability is **>99%** since last OSTST

3 reset incidents:

- 2009/11/11: 1h18
  2010/03/04: 2h22
  2010/04/26: 3h13
- Auto-detection of instrument incident
- Re-init detected by ground and successful restart recovery



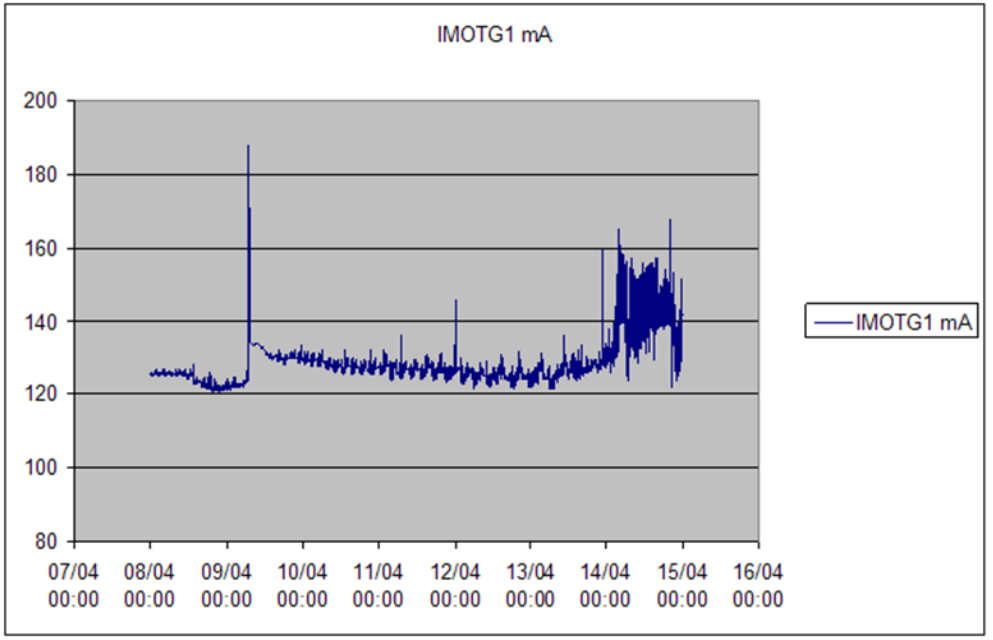
April 2010 Gyro #1 Anomaly

The Jason-1 gyros were manufactured by: Societe d'Applications des Generales d'Electricite & de Mecanique - SAGEM (Paris, France)

The "REGYS-3S" gyros used on JASON-1 are the same ones used on all subsequent PROTEUS platforms.

Only the fabrication dates differ, with slight differences on components lots:

- JASON-1 1998
- CALIPSO June 2003
- JASON-2 December 2005
- JASON-3 December 2006



The gyro qualification achieved on ground was 5 years.

On Jason-1, more than 8.5 years of continuous operation have been achieved in flight.

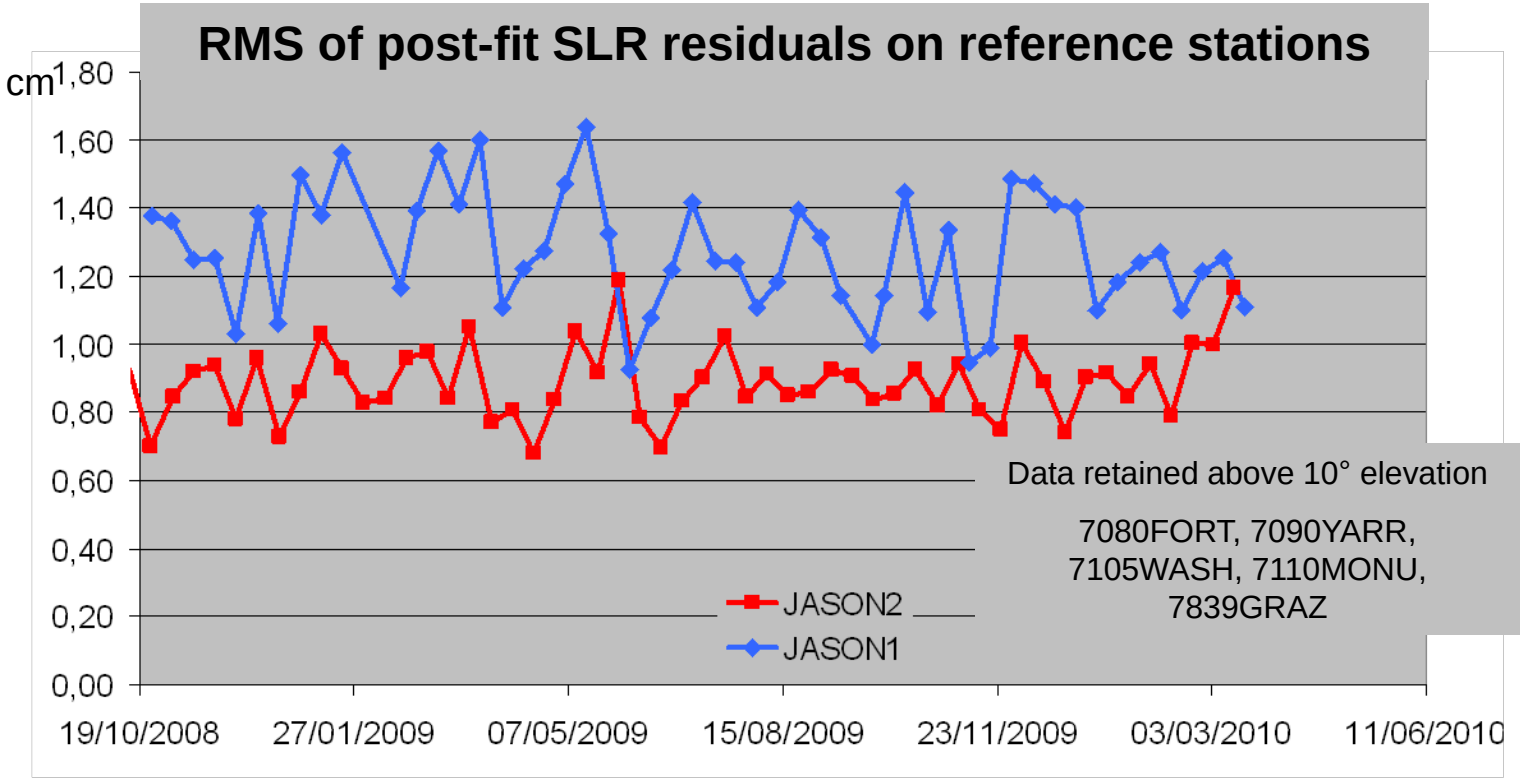
In 2007, some drift instabilities were initially noticed on GYRO1, without any indications of increased motor current draw, and they subsequently stabilized. The degradation experienced in March/April 2010 was very rapid, over a period of a few days.

Early on 9 April 2010, GYRO1 spiked and began to draw increased current through to 14-April, followed by a very sudden increase in current and temperature into 15-April that would have put Jason-1 into safe hold had CNES not intervened and swapped from a GYRO1&2 to a GYRO2&3 configuration.

There are no visible signs of any degradation or instability on GYRO2 (or the newly destocked GYRO3).

SLR Post-Fit Residuals

- RMS of SLR post-fit residuals per cycle is stable and close to 1.0 cm for both JASON satellites
- Slightly higher for JASON-1, likely due to more constrained orbit along-track (no GPS) and better Doris coverage (no SAA down-weighting)



TRSR 1&2 Anomaly Discussion

Description

- During a TRSR1 performance check on 13 September 2006, the receiver experienced a major anomaly:
  - sudden rise in receiver current, followed by a termination of instrument current/voltage draw.
  - probable electrical short.
- During nominal operations on 8 April 2009, the TRSR2 experienced a similar anomaly:
  - sudden rise in receiver current, followed by a termination of instrument current/voltage draw.

Current Status

- TRSR1 is powered off, and is in an permanently-failed state due to electrical short in internal circuitry
- TRSR2 is powered off. It was concluded that TRSR2 is also in a permanently-failed state.

Impact

- The TRSR instruments are NOT critical to mission success.
- All Level 1 science and POD requirements can be met using DORIS and SLR for orbit determination.
- Improvements were made to the GPSP monitoring and operations for OSTM/Jason-2.

TRSR2 Anomaly Investigation Summary

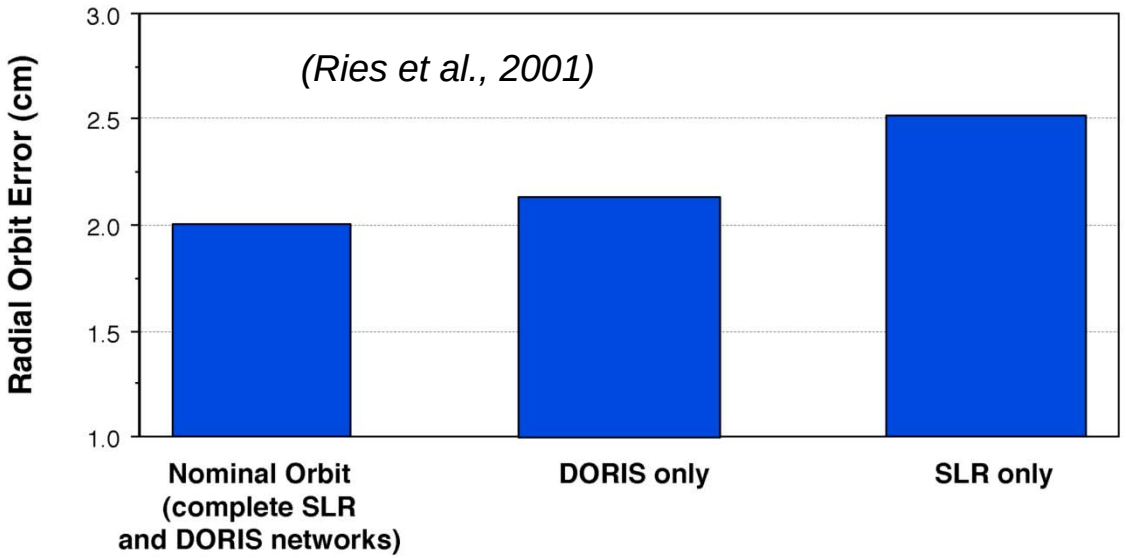
- TRSR2 is inoperable.
- An Anomaly Investigation Review Board met in February of 2010 and concluded that the “most likely” cause was a radiation damaged voltage regulator within the -15V DC-DC converter.
- The failure signature of the TRSR2 matches the failure of the TRSR1. Both failure signatures correspond to a known failure mode in the DC-DC converter design.

- **The TRSR2 instrument provided backup precise orbit determination for Jason-1 and is not mission critical.**
- **No TID radiation design requirement was placed on TRSR2 since it was not mission critical. TRSR2 had already exceeded mission life.**
- The OSTM/Jason-2 and Jason-3 Projects participated in this anomaly investigation because of similarities between their GPSP instrument and the TRSR.

Jason-1 Precise Orbit Determination after loss of TRSR Contingency for Potential Loss of DORIS Tracking

SLR alone is sufficient to meet Level 1 POD requirement (2.5 cm, radial RMS)

- Demonstrated early in mission.
- Improved POD modeling would imply even better results for contemporary applications.
- May require that Jason-1 be given higher tracking priority at laser ranging stations.
- Residual error mostly long wavelength (1 rev.), implying minimal contamination of ocean mesoscale (new Jason-1 focus).



Further improvement could be achieved using the altimeter data

- Routine POD solutions for Geosat Follow On (GFO) mission used both SLR and altimeter sea-surface height (SSH) crossover data (Lemoine et al., 2007)
- Orbiter dynamical constraints minimize contamination of orbit solution by SSH signals.
- Altimeter observations based on crossover revisits occurring within 10 days (1 repeat cycle), further minimizing potential contamination.
- Crossovers with OSTM/Jason-2 could be used to leverage off 1-cm Jason-2 POD solutions.

Operational Sensor Data Record Sea Surface Height Anomaly Dataset (OSDR-SSHA)

In December 2009, the Jason-1 Project resumed production of its most popular data product, the near-real-time (NRT) sea surface height anomaly (SSHA) measurement.

This product is of interest to the operational and near-real-time forecasting communities.

The new Jason-1 OSDR-SSHA product again provides near-real-time (NRT) sea surface height anomaly (SSHA) measurements from the Jason-1 mission. The product is very similar to the NRT OSTM/Jason-2 GPS-OGDR-SSHA product. Production of the OSDR-SSHA product had been discontinued following the demise of the onboard TRSR GPS instruments in 2008.

The new OSDR-SSHA product is available with a typical latency of 7 hours and contains two types of SSHA:

1) One parameter is “ssha_dyn”, which is based on the cross-over differences from Jason-1 and the GPS orbit of OSTM/Jason-2, with an accuracy of about 2 cm (RMS).
2) The other parameter is “ssha”, which is derived using the DORIS-DIODE orbit altitudes from the Jason-1 OSDR, with an accuracy of 10-20 cm.

The Jason-1 OSDR-SSHA product is available via FTP in NetCDF format from the Physical Oceanography Distributed Active Archive Center (PO.DAAC):
ftp://podaac.jpl.nasa.gov/pub/sea_surface_height/jason/j1_nrtssha/

The Jason-1 OSDR-SSHA product is a research-grade product that is generated on a best-efforts basis by the Orbiter and Radio Metric Systems group at JPL.
Please refer questions or comments to: Shailen Desai (Shailen.Desai@jpl.nasa.gov)

New Enhanced JMR Data Product

An enhanced radiometer product for the Jason Microwave Radiometer (JMR) has been developed.

- This dataset is a research-grade product that supplements information provided on the Jason-1 version C Geophysical Data Records (GDR-C), and Interim GDRs (IGDR).
- The product is analogous to the Jason-2 AMR enhanced product and contains the same fields and retains the same netCDF data format. The product also contains enhanced wet tropospheric path delay (PD) data for the coastal region, a radiometer land flag for the enhanced PDs, and rain and ice flags derived exclusively from the radiometer.
- The processing algorithms used to generate the products in this release are consistent with those that are used for the Jason-2 version-C GDR processing. The JMR enhanced PD is identical to the rad_wet_tropo_corr field on the GDR greater than approximately 100 km from land. Near the coast, the near land path delay algorithm originally applied to the AMR [Brown, 2010, IEEE Trans. Geosci. Rem. Sens.], is applied to the JMR to improve the JMR performance in coastal regions. The enhanced PD land flag that is included with the product is applicable only to the enhanced PD product. Correspondingly, the land flag that is on the GDR is only applicable to the rad_wet_tropo_corr on the GDR.

The files and documentation are available for download via PO.DAAC at:
ftp://podaac.jpl.nasa.gov/pub/sea_surface_height/ostm/preview/AMR/doc/

The Jason-2 AMR enhanced product is operationally available at:
ftp://podaac.jpl.nasa.gov/pub/sea_surface_height/ostm/preview/AMR/

All questions/comments/feedback about the product should be directed to Shannon Brown (Shannon.T.Brown@jpl.nasa.gov).