

# Key Points to be Discussed

1 - Assess the Jason-3 data quality: GDR notably - this *is* the Final Verification Workshop.

2 - Jason-2 EoL orbit: discussion between -27 and +35 km orbit.

3 - Jason-2 EoL time: trade-off between “soon” vs. waiting for Sentinel-3B.

4 - Cold sky calibration for Jason-2 as well as Jason-3 (frequency).

5 - Extend the 60-day requirement to 90 days for GDR latency (Jason-3 but also Jason-2) to improve the AMR stability thanks to the cold sky calibration.

6 - AMR on Jason-CS: there is a small probability that the external calibrator can fail in a position that renders the AMR unusable for the remainder of the mission.

Should we accept this risk and keep the strong requirement on wet tropospheric correction drift that is very important for the climate data record?

7 - Full-time open-loop (DIODE/DEM) tracking mode for Jason-2 (already done for J-3).

**Round tables** for each splinter are organized **Thursday the 3rd from 14:00 to 15:45.**  
**Plenary discussion and recommendations will take place on Friday morning.**

# Jason-2 Extension of Life Orbit: -27 or +35 km ?

Jason-2 EoL options				A	B	C	D		
Altitude (km)	Delta Altitude (km)	Number of Revs per day	Sub-cycles (days, negative is westward)	Mesoscale sampling uniformity (Jason-2 EoL + Jason-3)	Geodetic sampling uniformity (Jason 2 EoL + Jason1 GM)	Overlap event uniformity	Satellite debris (collision risk)	Tentative Priority	
1380	40	12+239/407							
1360	20	12+247/401							
1340	0	TOPEX							
1320	-20	Jason-1 GM							
1300	-40	12+284/371							
1280	-60	12+310/373							
1260	-80	12+353/409							
1383.0	46.7	12+239/407	-2, 5, -17, -63, -172, 407	Excellent	Good	Very Good	Medium	3	
1371.0	34.7	12+247/401	3, -5, 13, 138, 401	Very Good	Good	Excellent	Good	2	
1309.5	-26.8	12+284/371	-4, 17, 81, 145, 371	Excellent	Very Good	Very Good	Very Good	1	
1282.9	-53.4	12+310/373	-6, -77, -148, 373	Good	Very Good	Very Good	Very Good	2	
1277.3	-59.0	12+322/381	-6, 13, -71, 155, 381	Good	Very Good	Very Good	Very Good	2	
1270.0	-66.3	12+353/409	-7, 22, -73, 168, 409	Very Good	Medium	Excellent	Very Good	3	

G. Dibarboure and R. Morrow, 2016: Value of the Jason-1 Geodetic Phase to Study Rapid Oceanic Changes and Importance for Defining a Jason-2 Geodetic Orbit. *J. Atmos. Oceanic Technol.*, 33, 1913–1930, doi: 10.1175/JTECH-D-16-0015.1.

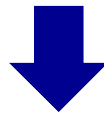
The **best option** in this list is arguably 12+284/371 at 1309 km (-27 km):

1. It has a **17-day sub-cycle** that is good for mesoscale monitoring because it blends well with the 10-day cycle of Jason-3.
2. It has a **145-day sub-cycle** and a **371-day repeat cycle** that are good for geodesy: the final grid is close to the Jason-1 GM grid. If Jason-2 EoL was to die after only half the repeat cycle, it would still provide a coarser but globally homogeneous dataset for geodetic users.
3. It has a **4-day sub-cycle** that is favorable for sea state applications (e.g. assimilation in **operational wave models**) and that blends well with Jason-3's 3-day sub-cycle.
4. It generates **overlap events with Jason-3 that are well distributed at all time scales**. There are no empty bins for the 10-day criterion, and only 3 empty bins for the 1-day criterion. This orbit yields a high probability of collecting an overlap sample in any region, season, and for any time difference.
5. It is **far from the uncontrolled TOPEX and Jason-1 platforms** and from the debris orbiting near 1400 km.

# Jason-2 Extension of Life: Timing of Start

## Presented at the May 2016 J2/J3 REVEX:

- Assuming a Jason-2 Lifetime of 13 years: June, 2021
- Assuming SWOT & Jason-CS/S-6A launch mid-2021
- Begin the GM after S-3B launch: no earlier than 2018
- Compromise Interleaved & GM phases at ~50/50%



- Proposed partitioning of Jason-2 lifetime:
  - *Interleaved Orbit: Oct, 2016 to Feb, 2019 (2y 4m)*
  - *Geodetic Mission: Feb, 2019 to June, 2021 (2y 4m > 800d)*



## Considerations:

- Better sampling than at the time of Jason-1 EoL (Sentinel-3A and soon Sentinel-3B)
- Even if Jason-2 is in good health, nobody knows what could happen so need to secure reference orbit
- The sooner the better to ensure 2 GM cycles if possible (consequences for operational altimetry?)

# Jason-2 Extension of Life: Timing of Start

## When should Jason-2 be moved to a geodetic orbit?

Jason-2 has been moved to an interleaved configuration in October 2016, following the recommendations from the 2015 OSTST meeting. The **Jason-2 EoL group must recommend a scenario/timing for Jason-2** to leave this orbit and to go to a geodetic orbit.

For Jason-1, the weak altimeter constellation prompted the Agencies to secure the operational oceanography dataset and they agreed to delay the Jason-1 GM phase from Fall 2010 to Winter 2012. **For Jason-2, the context is very different: better satellite status, better altimeter constellation status, better geodetic products and models.** To that extent, the Jason-2 timeline is more flexible and it is possible to adjust the timeline to maximize science return.

We argue that there are scientific merits to **move Jason-2 to a geodetic orbit no later than Fall 2017, and maybe as early as Spring 2017** if AltiKa or Cryosat-2 is decommissioned.

## Jason-2 EoL: Another possible orbit and timing to go to the EoL orbit

1. **Use of MSS to extract Sea Level Anomalies still adds systematic errors.** Errors are small but cannot be neglected for ocean variability studies. More needs to be done on the characterization of residual MSS errors at regional/local scales.
2. Systematic errors are not handled well in data assimilation systems, and an altimeter in a non-repeat orbit must be used with caution. We now have two altimeter missions in non-repeat orbits (AltiKa and CryoSat-2). Sentinel-3A is on a new repeat orbit so we need time to build a precise mean profile. This means that **for at least the year to come, only Jason-3 and interleaved Jason-2 will be optimized for oceanography.**
3. There is some doubt that a new MSS will be precise enough at wavelengths below 100 km to allow the observation of meso-submesoscale variability in the SWOT swath. Only SWOT data will allow a precise MSS and sea level anomaly. **Jason-2 in a repeat orbit will likely reduce the time needed to estimate an accurate mean profile for Sentinel-3A.**

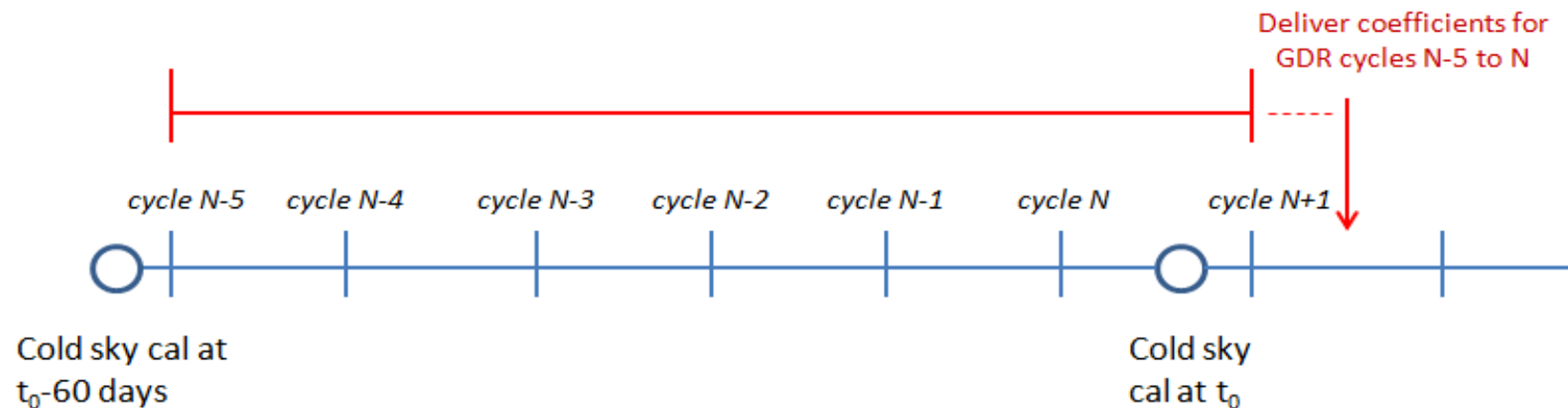
We should **keep Jason-2 in its interleaved orbit for at least one year and ideally up to the end of the commissioning of Sentinel-3B.**

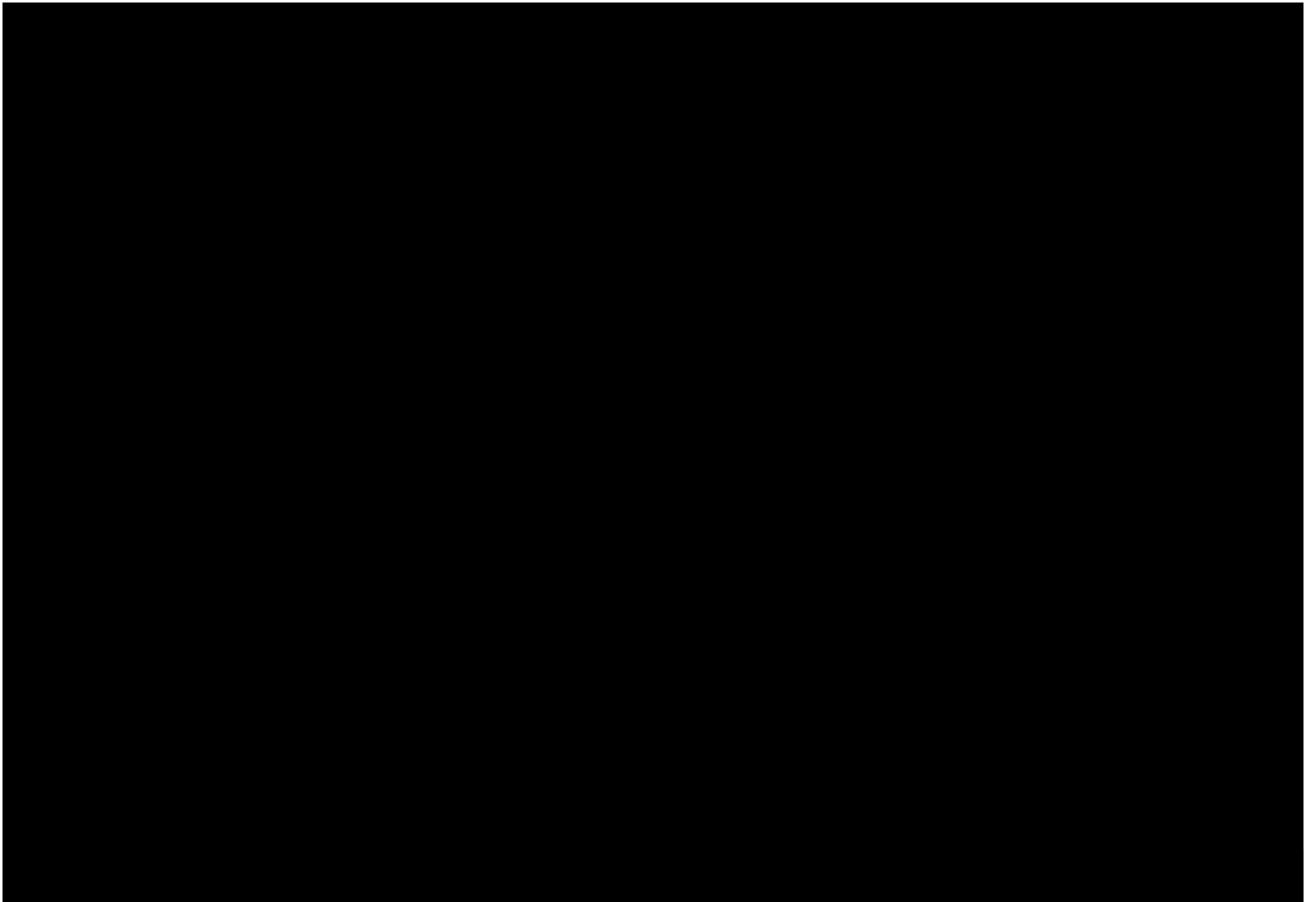
## OSTST Recommendation:

Keep Jason-2 in its current, interleaved, orbit for [0.5, 1, 1.5, 2] year(s), then move it to its final [-27,+35] EoL orbit.

# AMR Cold-Sky Calibration

- AMR Cold Sky calibration & GDR Latency: 60→90 days?
  - For Jason-3 (and now Jason-2), this calibration process is supplemented by periodic spacecraft pitch maneuvers to point the radiometer to cold sky, offering a high-precision 1-point calibration every 60 days.
  - To enable maximum use of the high-precision cold sky calibrations for the operational GDR production, a coefficient delivery schedule (and hence GDR production schedule) based on the cold sky maneuver timing is required.







So long and thanks for all the fish!