Cold Sky Maneuver and GDR Data Latency

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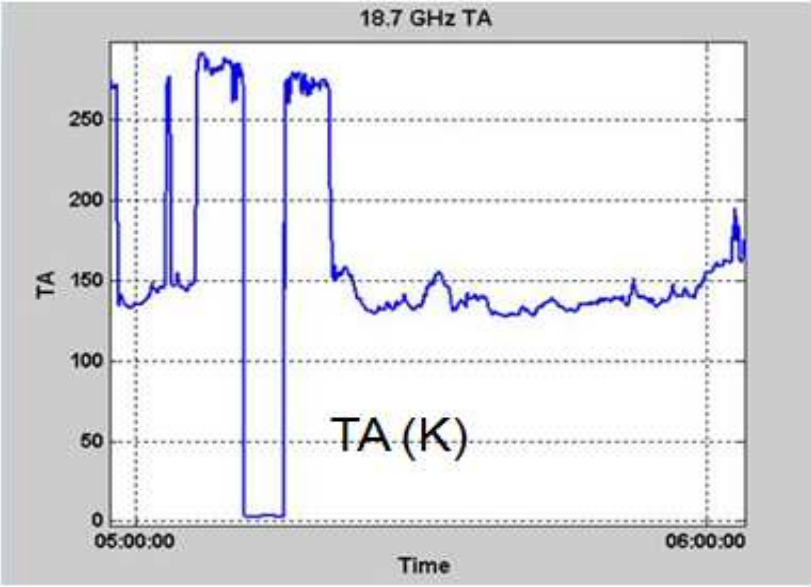
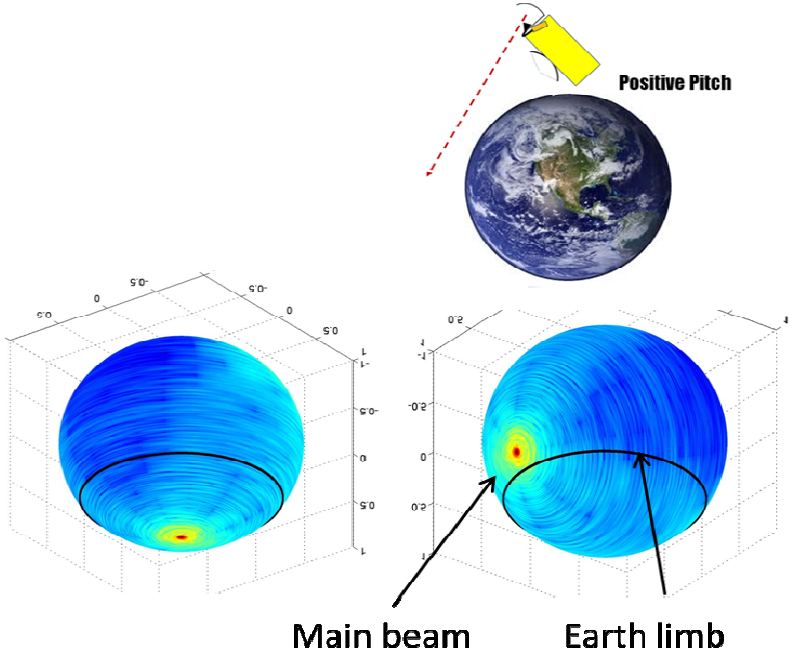
Jason Radiometer Calibration

- Jason series radiometer requires calibration to external stable sources to stabilize record to mm/yr levels
  - Calibration monitored and updated in “real-time” prior to production of each GDR
  - Previously, only on-Earth references used – susceptible to climate variability

- Jason-3 and now Jason-2 has implemented periodic S/C calibration pitch maneuvers to track radiometer calibration to reduce uncertainty in the long-term record
  - Presents **stable, independent** 1-point calibration to the radiometer roughly every 60 days
  - 2-stable points required for complete calibration, therefore cold sky maneuver supplemented by on-Earth references





Calibration Sources and Uncertainty

- To stabilize PD to 1 mm/yr, requires stabilizing brightness temperature (TB) to 0.1 K/yr

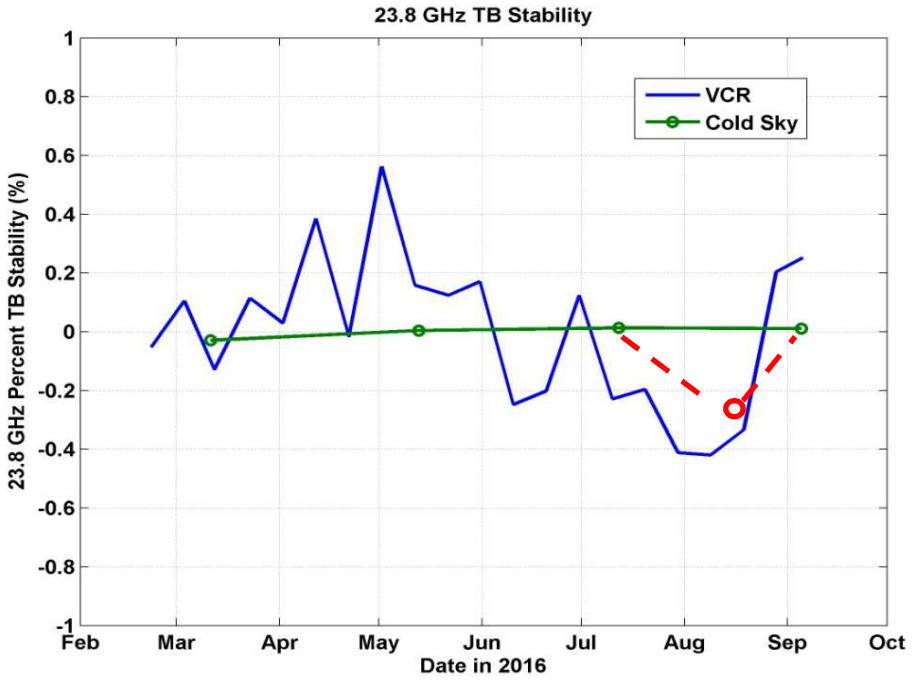
- Path delay stability resulting from use of cold sky data will far exceed that on on-Earth references alone

Reference	Uncertainty (per cycle)	Comments
Cold sky	0.1K	Absolutely stable, only error source is antenna backlobes on Earth
Ocean reference	0.5 K	Susceptible to variability in water vapor and SST
Amazon rainforest	2 K	Susceptible to deforestation and canopy temperature uncertainties

AMR Calibration for GDR

- AMR calibration is checked and updated if needed prior to each GDR (ARCS)
- To date, this has been based on a fixed schedule to maintain ~60 day latency on the GDR
- Due to operational constraints, cold sky maneuver is performed roughly every 60 days
- Therefore, some cycles will benefit from the high-precision cold sky calibration, but others will use an extrapolation from the last cold sky calibration constrained by the on-Earth references

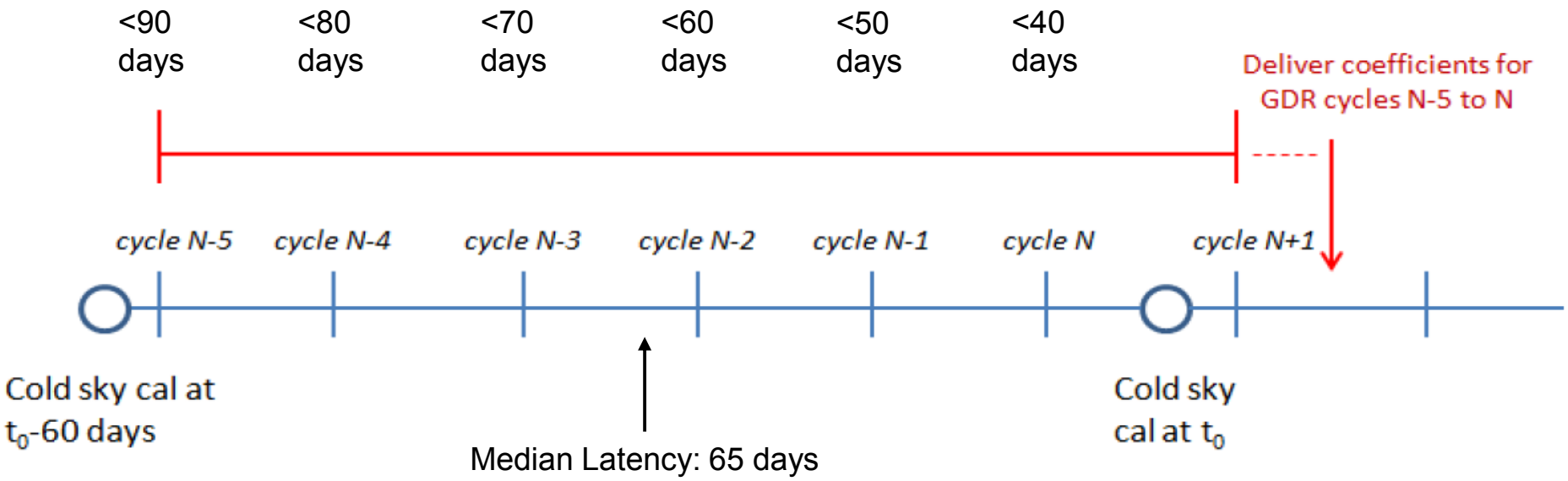
Ocean reference
Cold sky



Cold Sky Based Processing Schedule

- 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
  - Each GDR in “realtime” would be bounded on either end by cold sky data (e.g. no extrapolation)

- If this approach is adopted, coefficients for the 60-day period between cold sky calibrations would be delivered just after each cold sky maneuver
  - Some cycles near the previous cold sky calibration would exceed 60-day latency



OSTST Input

- Currently project abides by a 60-day latency requirement for GDR production
- If maximum GDR latency is increased to 90-days, it will permit a cold sky based processing schedule
  - Note, median latency will be ~65 days

- OSTST recommendation for comment:
  - **Project may allow for up to 90 day GDR latency to accommodate cold sky information into GDR record**

  - *Note: Only applies to Jason-2/3, Sentinel-6 (Jason-CS) radiometer has climate quality on-board calibration system to meet PD stability requirement with no latency*