

DORIS / DIODE : Recent improvement

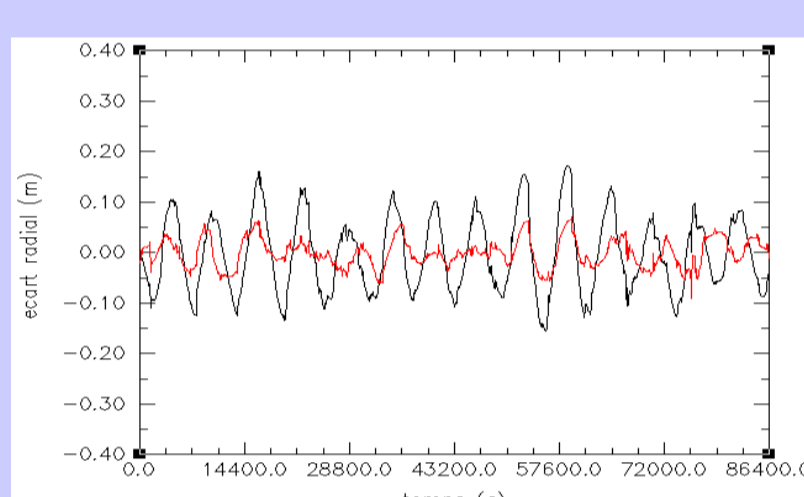
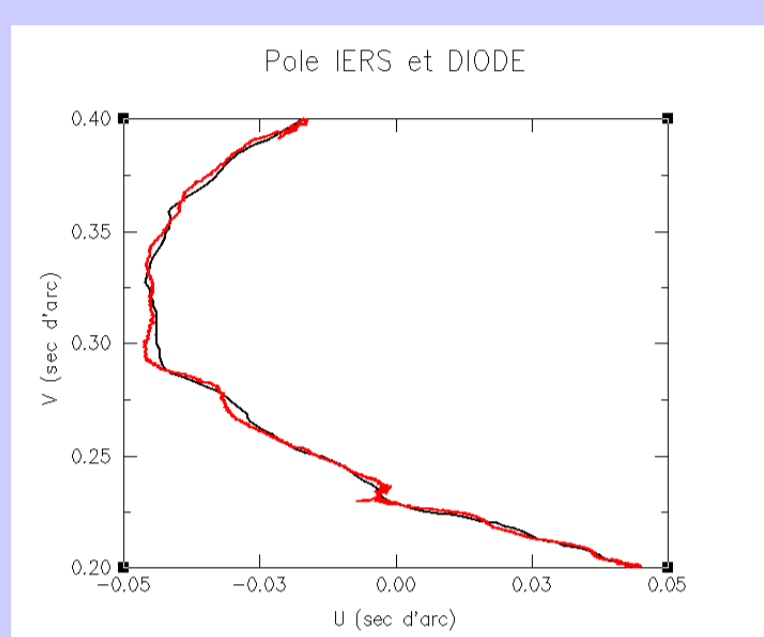


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Current model improvements (suggested by comparisons with POE) are being integrated in future DGXX-S DORIS versions (Jason-3, Sentinel-3, ...):

- albedo & infra-red pressure,
- ITRF 2008,
- pole prediction,
- Hill Along-Track empirical acceleration,
- on-board USO frequency prediction,
- ...



... allow a more and more accurate DIODE Navigation Tool

- J2000 position and velocities delivered to the AOCS (CryoSat-2), as well as TAI time-tagging of platform Tops
- On Jason-2, the expected accuracy was “below 10 cm RMS on the Radial component “ when compared to the Precise Orbit Ephemeris (POE) : 3.3 cm achieved.
- The real-time DIODE orbits are available for NRT products
- More than 99.9% availability, even during large manoeuvres = a very robust function

... plus a dense and active DORIS beacon network ...



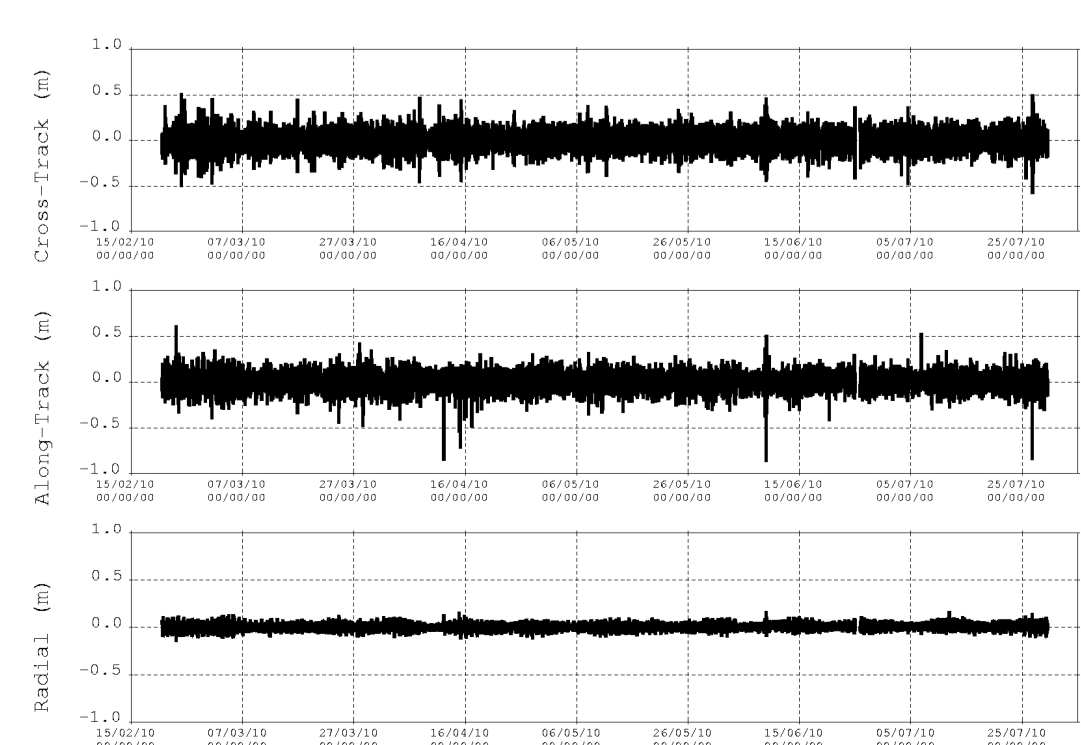
Daily monitoring by the DORIS INTEGRITY TEAM



Current development version has an accuracy of 2.55 cm (RAD RMS over six months) (6.44cm A-T, 6.06cm C-T, 9.2cm 3D)

- DORIS participation to precise Near Real-Time Altimetry.
- On-board Jason-2, OGDR Altitude is between 2 and 4 cms RAD RMS today. On-board CryoSat-2, a new version is going to be uploaded, giving the same order of magnitude.

Jason-2 on-board ITRF positions compared with DORIS P.O.E.



STATISTICS

RMS = 0.092 m
MAX = 0.583m
RMS = 0.078 m
MAX = 0.868 m
RMS = 0.033 m
MAX = 0.171 m

A new **DORIS / DIODE** version for Jason-2 **OGDR** real-time products



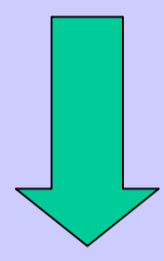
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Results of the current on-board version are already much better than requirements

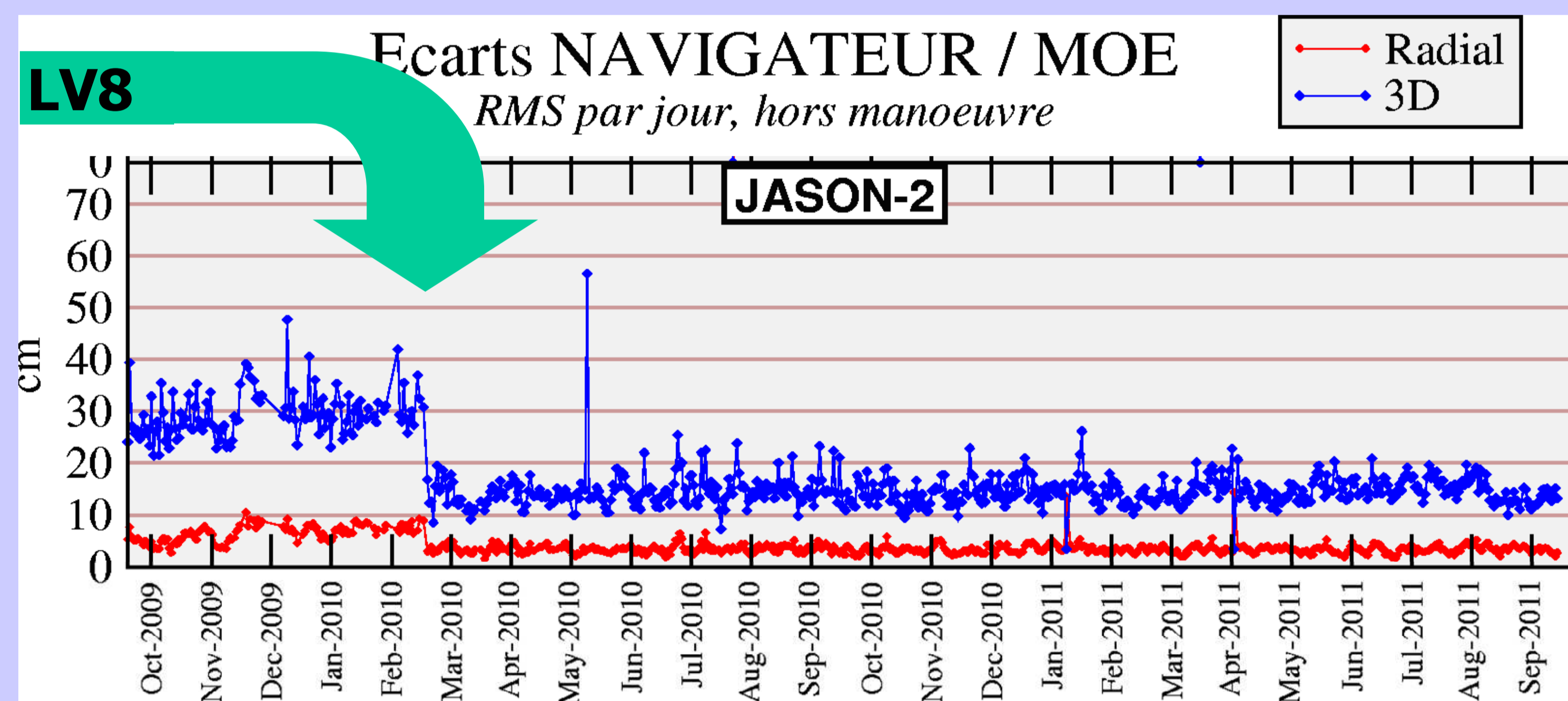
- No functional anomaly since Feb. 2010 (LV 8.0 upload)
- Accuracy similar to ground tests results before upload
- Radial RMS \approx 3.3 cm

In the meantime, our POD colleagues suggested implementation of an additional Hill Along-Track acceleration, in order to reduce (radiation pressure) mismodeling



DIODE development completed in July 2011, integration in DORIS LV11.0 is underway

DIODE / Jason-2 current on-board results (issue LV 8.0)



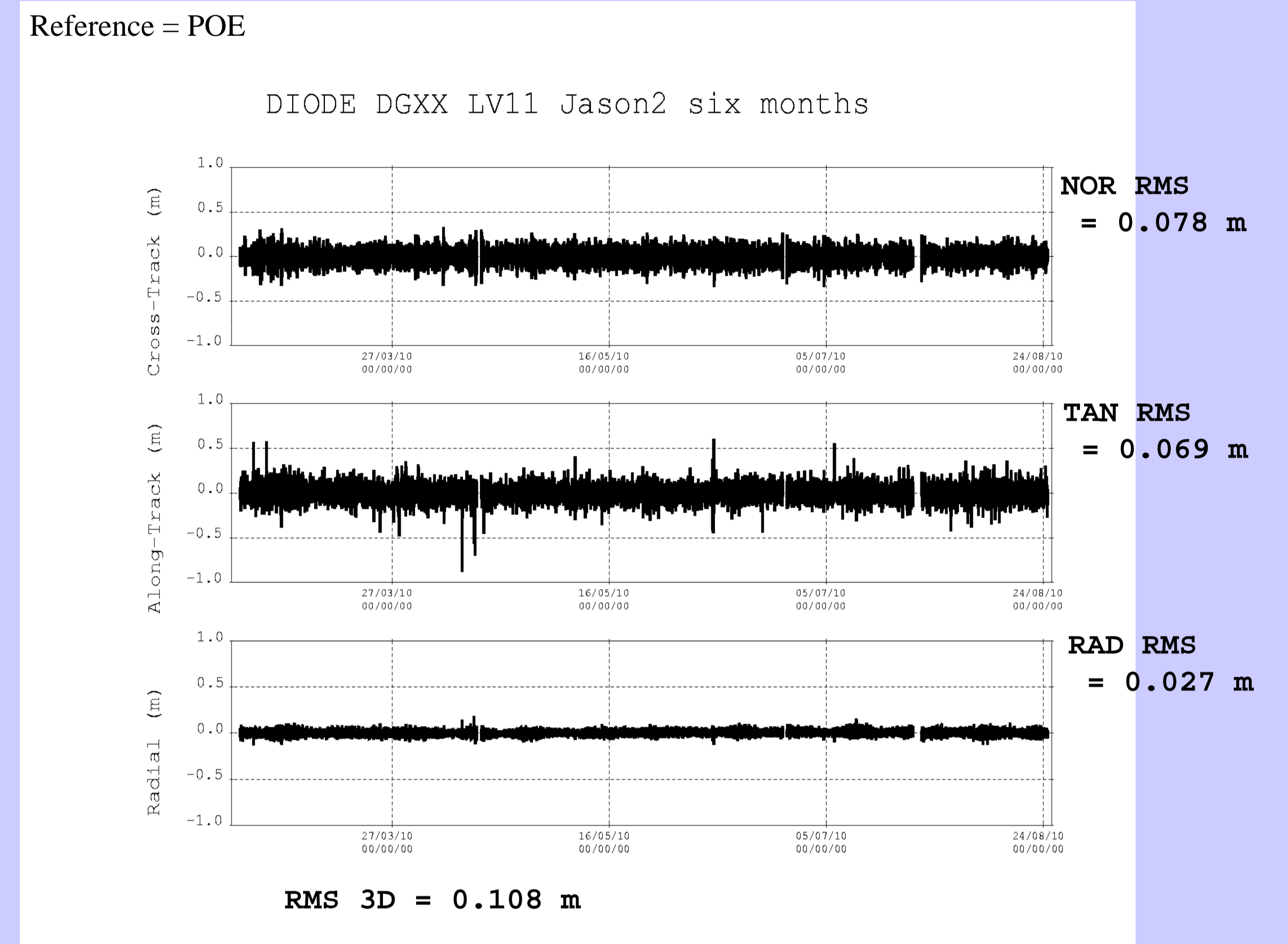
Main evolutions between LV8.0 and LV 11.0

- « auto-correction TAI » CryoSat-2/Yellowknife event fixed
- Add PAPEETE in the Master Beacons characteristics
- CRYOSAT2 mass and CoG correction (not used on J2)
- Sentinel3 et Jason3 idents added (not used on J2)
- Hill along-track acceleration added
- OAP formula changed
- Altitude variation / ellipsoid (not used on J2)
- ...
- This issue has been activated daily, with Jason-2 and CryoSat-2 measurements : algorithms are ground validated over very long periods (6 months)

LV11 is going to be uploaded on-board AltiKa and proposed for CryoSat-2

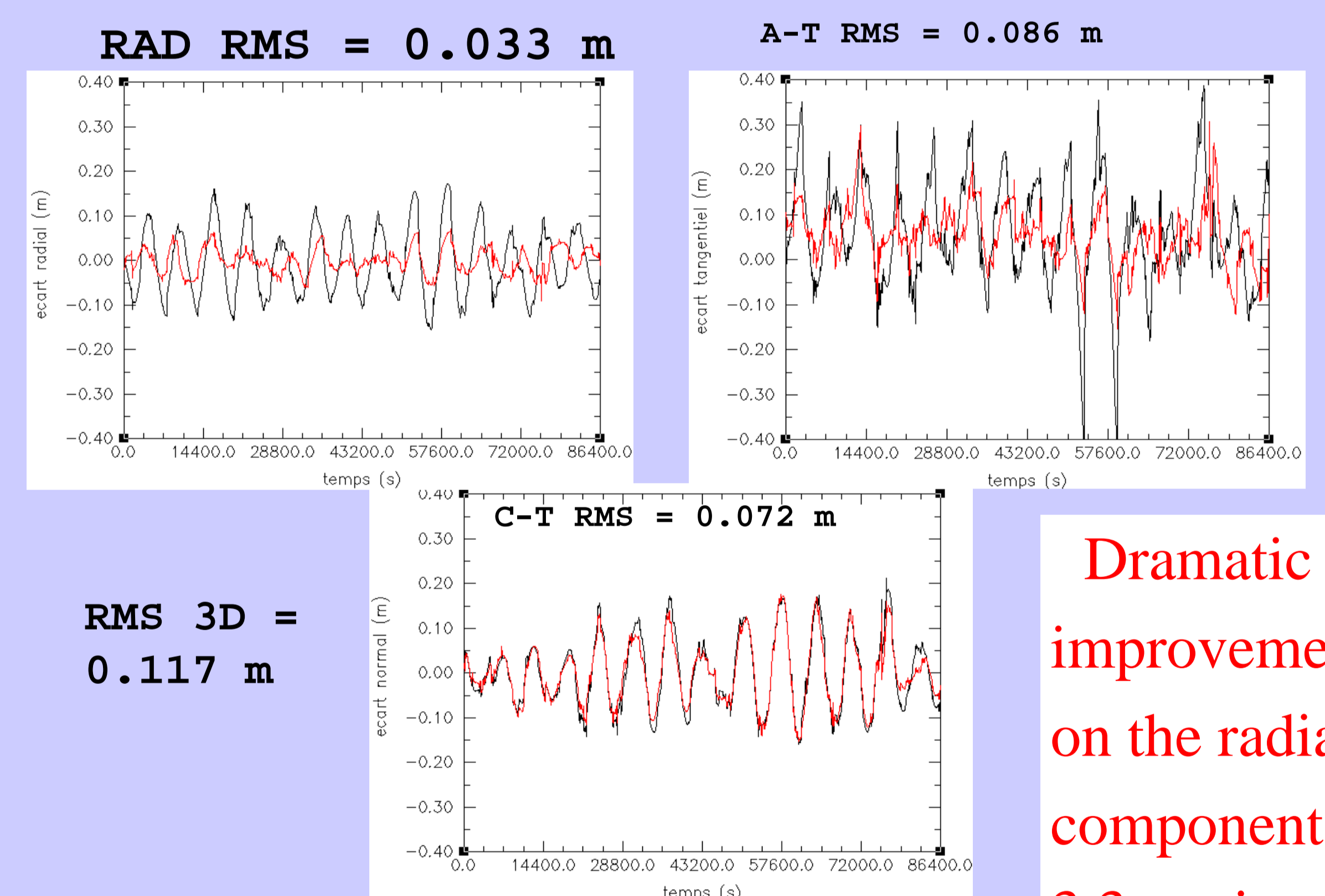
LV11 : Jason-2 ground results

18% improvement : 2.7 cm instead of 3.3 cm



LV11 : CryoSat-2 ground results

Reference = POE, with (red) and without (black) Hill A-T force



RMS 3D = 0.117 m

Dramatic improvement on the radial component : 3.3 cm instead of 7.6 cm

A new DORIS/DIODE version (LV11) is proposed for upload on-board Jason-2

Real-time orbit accuracy (OGDR) would drop from 3.3 cm RAD RMS down to 2.7 cm => 18% improvement

Robustness and time consumption verified

No change in ground segments (TRIODE is OK)

Validation will be complete in December 2011

