**Introduction**

EUMETSAT is responsible for processing, jointly with NOAA, the Operational Geophysical Data Records (OGDR) of the OSTM/Jason-2 mission and distributing them in Near Real Time (NRT) to European users. The OGDR is the fastest product delivered to the users, with a short delay of 3 to 5 hours, and currently achieving a radial orbit accuracy of 3 cm RMS. The product takes advantage of the precise orbit computed on board by the DORIS navigator DIODE (DORIS Immediate Orbit on-board Determination).

EUMETSAT has started generating experimentally GPS based OGDR products, which make use of the GNSS Receiver for Atmospheric Sounding Ground Support Network (GRAS GSN) data and the GPS data from the OSTM/Jason-2, to compute a GPS-based orbit in NRT. This allows a NRT monitoring and validation of the OGDR orbit computed on-board by the DIODE. The product is derived by adding new fields to the official OGDR (GPS orbit altitude and GPS-based sea surface height anomaly) in a similar way to the JPL produced GPS ODGR products [1]. These NRT products are monitored using the NRTAVS (Near Real Time Altimeter Validation System) [2].

The GRAS GSN is a system operated by ESA’s European Space Operation Centre (ESOC) to deliver supporting data to EUMETSAT for the processing of the GRAS instrument data and for METOP precise orbit determination (POD) [3], operationally. The system is subject to very stringent requirements in terms of availability (99% asymptotic availability), reliability (6 hours maximal interruption, less than 3 interruptions of service per 30 days period) and accuracy (1m for position and 1ns for clock bias, both 2-sigma). The relevant auxiliary data for Low Earth Orbit (LEO) POD include:

- NRT GPS estimated orbits, including 3rd of prediction; update frequency of 1 hour and available 45 min. after sensing time
- NRT GPS estimated clocks at 0.2Hz; update frequency of 15min and available 45 min. after sensing time
- NRT Earth Orientation parameters

Two types of product are being produced:

- The first one has a similar latency to the official OGDR but usually a more accurate orbit (EUM_OGDR_LAT)
- The second one has approx. two hours larger latency (one orbit due to issues with the onboard GPS receiver)

The generation of both products is triggered by the arrival of a new RINEX file covering the data since the last data dump. Fig. 3 depicts the timeline of both processes.

**Example / Conclusions**

On ground POD processing permits handling manoeuvres and therefore improves significantly the radial accuracy during such events. Fig. 7 and 8 show the difference in sea surface height anomaly estimation during the manoeuvre (generated with NRTAVS), while Fig. 9 shows the radial difference of the different NRT products, during the event.

Different independent computation of POD in NRT may enable a better quality control and improve the flagging of the products in case of degradation, e.g. starting in August 2012 a degradation occurred due to the use of a wrong TAI-UTC auxiliary file which was identified thanks to these NRT products [2].

**Future Improvements**

- Adding the real satellite altitude in NRT from the available telemetry improves the accuracy [4]
- Adding the real solar panel angle, might also further improve results [8]
- Adding some missing models implemented in GDR-D standard might also provide improvements.

The method described in this poster is generic and may be applied to compute operational NRT GPS-based orbits for similar LEO Earth Observation missions like Sentinel-3, Jason-3, Jason-CS, etc.

**References**


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