

Copernicus POD Service: S6B operational status and first performance assessment

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Sentinel-6B has been successfully integrated into the Copernicus Precise Orbit Determination (CPOD) Service since the start of its commissioning phase. All operational processing chains, including orbit determination and GNSS observation product generation, are performing nominally and delivering products with the required timeliness. Initial assessments show that the achieved orbit accuracy is fully consistent with that of Sentinel-6 Michael Freilich, ensuring continuity of altimetry-quality orbit solutions. Beyond routine operations, CPOD actively supports EUMETSAT commissioning activities through detailed performance monitoring and orbit quality analyses. This includes the investigation of temporary orbit accuracy excursions observed after launch, which are analysed in detail in this contribution. These efforts contribute to the continued improvement and validation of Sentinel-6B orbit products and overall mission performance.

CPOD SERVICE FOR S6B

CPOD⁽¹⁾, a consortium of POD experts led by GMV, is responsible for the operational generation of precise orbital and auxiliary products for the Copernicus Sentinel missions.

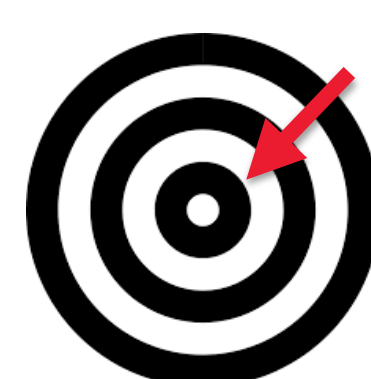
For Sentinel-6B, we generate operationally:

- ROE: Near-Real Time (NRT) Restituted orbits
- GNSS Hourly and Daily Observation RINEX files

Requirements



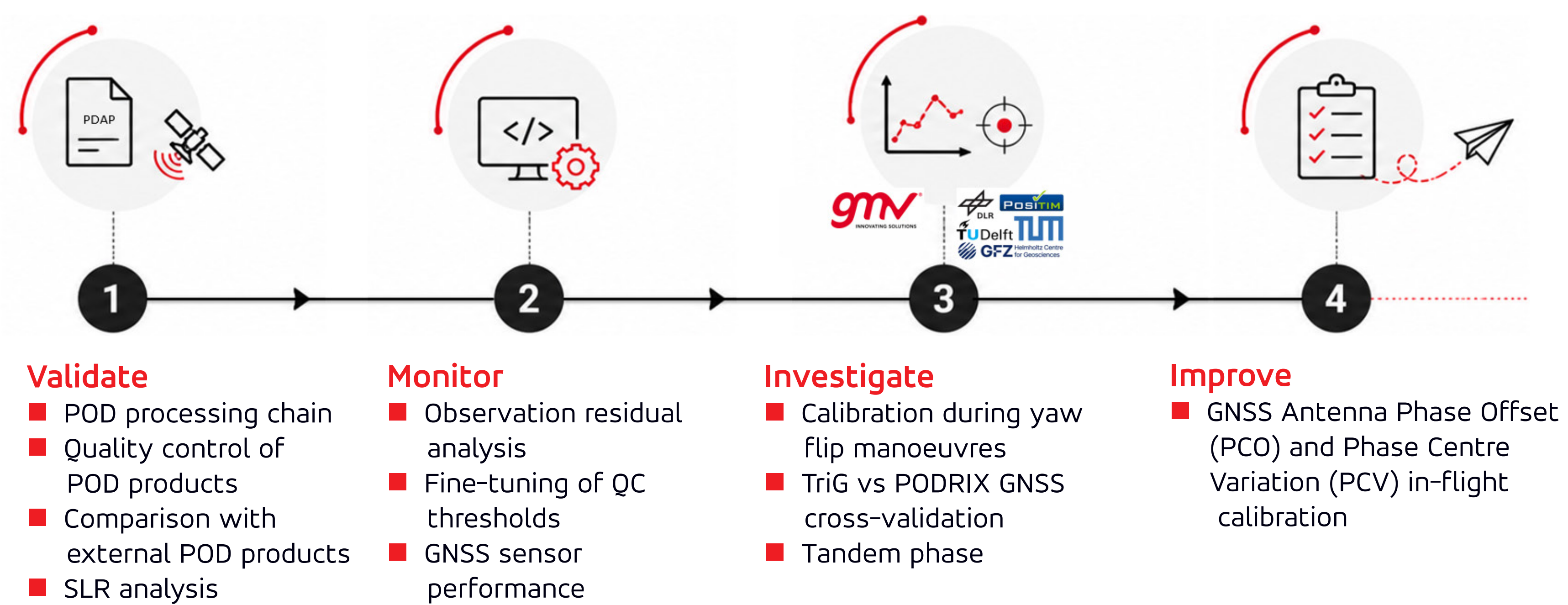
< 10 min
Target: < 5 min



< 5 cm in Rad RMS
Target: < 3 cm

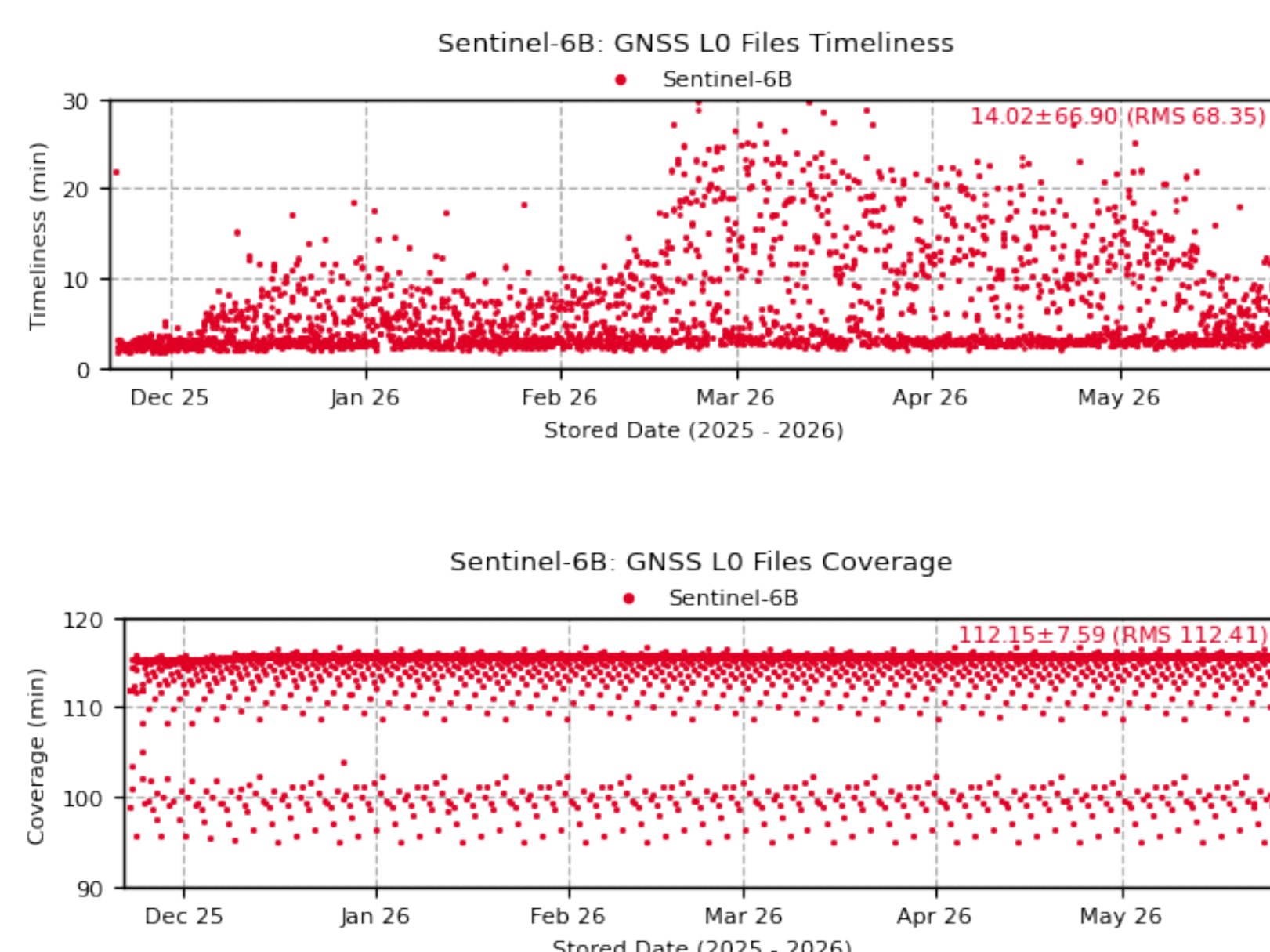
For validation purposes, Short-Time Critical (STC) and Non-Time Critical (NTC) solutions are also generated.

IN-ORBIT COMMISSIONING CPOD ACTIVITIES – OVERVIEW



POD PERFORMANCE: INPUTS

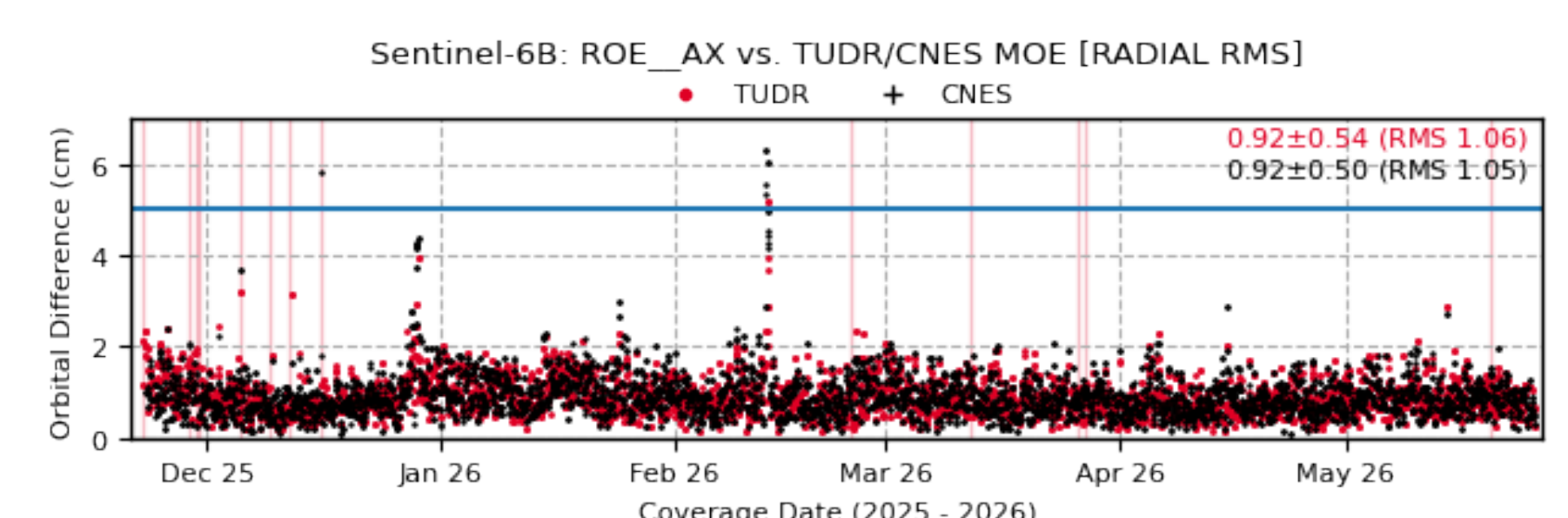
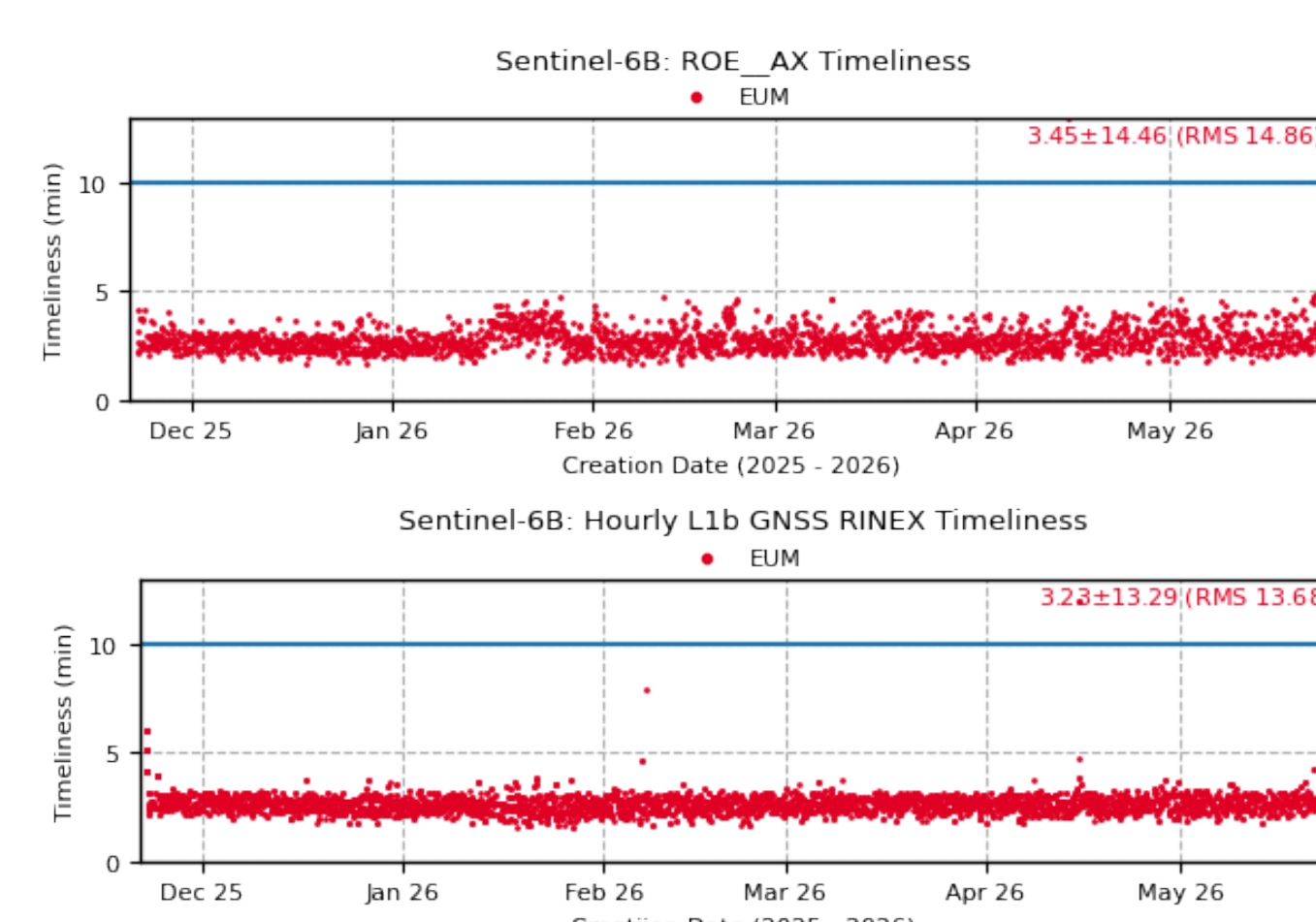
Nominal input reception: GNSS L0 timeliness and coverage within expectations, with very few gaps (<0.2 % since first GNSS) and good latency, despite known differences w.r.t. S-6 MF. Similar statistics for DORNAV L0 and NAVATT L0.



POD PERFORMANCE: PRODUCTS

Nominal POD output generation:

- Operational interfaces exercised automatically since 22/11/2025, with first GNSS L0 data reception ☺
- Nominal POD generation (both for ROE & GNSS RINEX files) in terms of timeliness and accuracy
- Participation in S6B Operations Coordination Group (OCG) meetings to report on initial status and identified anomalies in this period



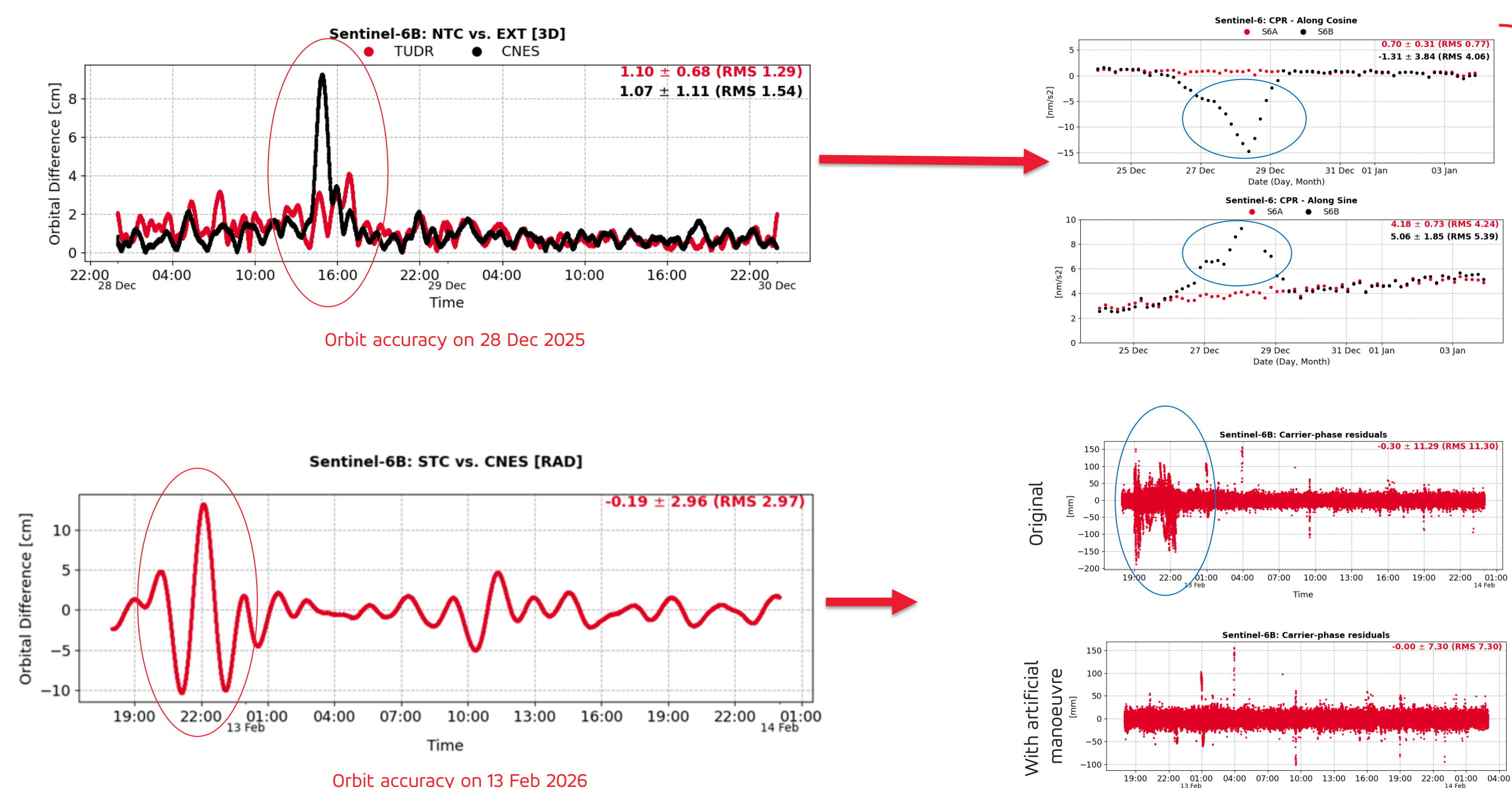
Nominal CPOD accuracy except for 2 anomalous points... see analysis below!

POD ANOMALIES: POSSIBLE OUTGASSING EVENTS?

There have been 2 periods of anomalous behaviour in terms of POD:

- EUM/JasonCS/AR/3363: Orbit Degradation between 27 and 29 Dec 2025
- EUM/JasonCS/AR/3355: Orbit Degradation on 13 Feb 2026

These orbit excursions (diff > 10 cm) are confirmed by other POD groups and were also visible in S-6MF at the beginning of mission.



POD accuracy recovery by adding artificial manoeuvres around the events, or by increasing the number of empirical accelerations estimated → GNSS observations are fine, it's the dynamics that can't follow

CONCLUSION & NEXT STEPS

In conclusion:

- CPOD Performance fully nominal for Sentinel-6B ever since first GNSS L0 data was received
- Active support in anomaly investigation, with a focus on the likely outgassing events

Next steps:

- Perform GNSS Antenna Phase Centre Offset (PCO) and Phase Centre Variation (PCV) calibration → expected to reduce Carrier Phase residuals by ~2 mm, bringing more stable accuracy results
- Analyse and exploit tandem phase data, focusing on inter-leaved SLR residuals and comparison of dynamic parameters estimates
- Cross-validate TriG data and PODRIX GNSS data for POD
- Analyse impact of yaw-flip manoeuvres

Likely outgassing events which may be correlated with the number of days since launch; in Sentinel-6 MF these punctual events disappeared after some months in orbit

Acknowledgements

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