FocusPOD USE CASE:
COPERNICUS POD SERVICE

PRECISE ORBIT DETERMINATION OF COPERNICUS SENTINEL-1, -2, -3 AND -6.

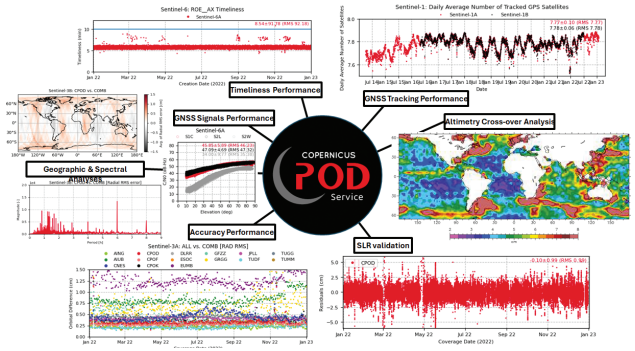
POWERED BY FocusPOD® SW

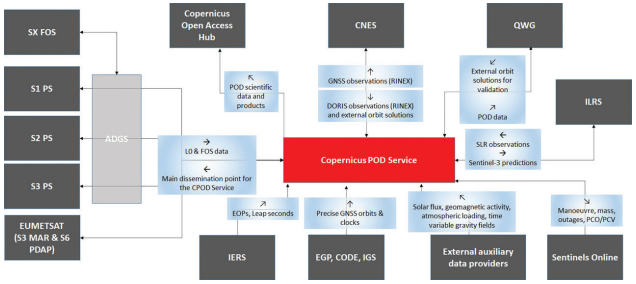
HIGH PERFORMANCE:
< 5 CM (3D RMS) IN <5 MIN
< 2 CM (3D RMS) IN ONE DAY
< 1 CM (3D RMS) IN THREE WEEKS

+100,000 ORBIT PRODUCT GENERATED YEARLY

ARCHITECTURE IN THE CLOUD

QUALITY CONTROL





FocusPOD®

A product by:

gmv® INNOVATING SOLUTIONS

Product info at:
https://www.gmv.com/en-es/products/space/focuspod

gmv.com

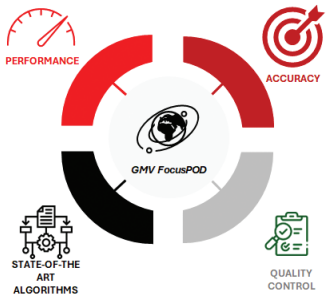
FocusPOD®

The complete solution for Precise Orbit Determination (POD) and Geodesy

gmv® INNOVATING SOLUTIONS

FocusPOD ®

FocusPOD® is a new Precise Orbit Determination (POD) and Geodesy library, written in C++ and Python3.



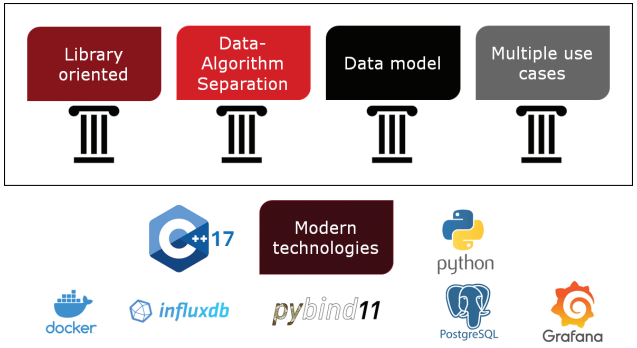
MAIN FEATURES

FocusPOD® provides:

- **GNSS, DORIS, SLR and VLBI** processing to estimate precise orbits, clocks, and other geodetic parameters as station coordinates and troposphere.
- Operational **Precise Orbit Determination (POD)** using GNSS, SLR or DORIS of LEO satellites.
- Quality Control supported by a suite of tools, including orbit, clock and attitude comparisons, residuals analysis, GNSS Sensor performance, ground-track and tube control, etc.
- Simulation capabilities, including precise orbit, clocks, attitude and all types of measurements supported.

TECHNOLOGY

FocusPOD® is designed around four key pillars implemented with modern programming languages:

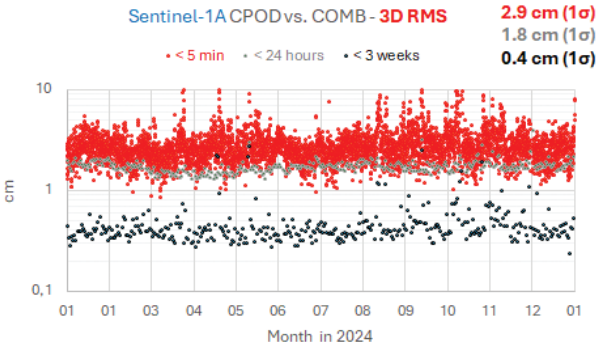


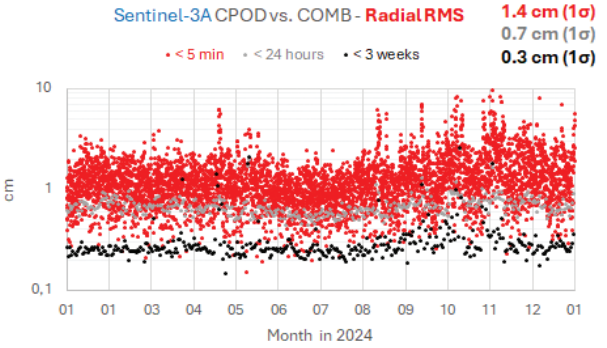
STATE OF THE ART GEOPHYSICAL MODELS AND ALGORITHMS

- IERS 96 and 2010 conventions.
- Gravity: Support different geopotentials (e.g., COST-G, EIGEN, EGM), with time-varying terms.
- Ocean tides: FES2014
- Solid tides: IERS 2010
- Atmospheric gravity: AOD1B
- Seasonal geocentre motion: ITRF20
- Third body: JPL ephemeris
- Atmospheric density: MSISE00, Jacchia-Bowman 2008
- Radiation: Solar radiation pressure (SRP), Earth´s albedo & infra-red (CERES averages), and Antenna Power Thrust
- Empirical acceleration: Constant-Per-Revolution (CPR) and ECOM/ECOM2
- Ionosphere: Nequick
- Troposphere: Mendes-Pavlis, Niell, Saastamoinen
- Satellite modelling: Fix area and macro-model. Theorical or real attitude laws, impulsive or long manoeuvres.
- Station modelling: Post-Seismic Deformations (PSD) and ITRF20 seasonal geocenter motion
- Biases: Absolute and differential signal biases
- Antenna calibration: ANTEX14
- Parameter estimation methods: Weighted least square and Extended Kalman Filtering
- Orbital parameters: satellite position and velocity, drag and solar radiation coefficients, CPRs, ECOM/2, manoeuvres.
- Geophysical parameters: station position, EOPs, tropospheric zenith delay and mapping function.
- GNSS parameters: clock biases, phase ambiguity, and inter-system bias; single receiver Integer Ambiguity Resolution
- DORIS parameters: clock biases, bias per station per pass.
- VLBI parameters: clock offset model, antenna thermal deformation, antenna axis offset, antenna cable delay & source location.
- Interfaces: Use of international standards: RINEX (GNSS obs, and nav, DORIS), SP3, SINEX (station, biases, troposphere), ORBEX, vgosDB, CRD, CPF, ANTEX, etc.

HIGH PERFORMANCE AND ACCURACY

FocusPOD® excels on performance and accuracy:





CLIENTS & PROJECTS

- Copernicus POD Service: Operation POD of Copernicus Sentinel-1, -2, -3 and -6.
- Galileo 2nd Generation System Test Bed: Simulation of GNSS, SLR and ISL measurements.
- Galileo Reference Centre: VLBI processing
- LEO-PNT: Generation of POD products for validation of the performance