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GRAS In-Orbit Verification

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GRAS In-Orbit Verification (IOV)

- **Objective**
 - To demonstrate that the Instrument, once in orbit, functions and performs as specified.
 - To hand over GRAS (as part of Metop) for EPS Validation and routine monitoring

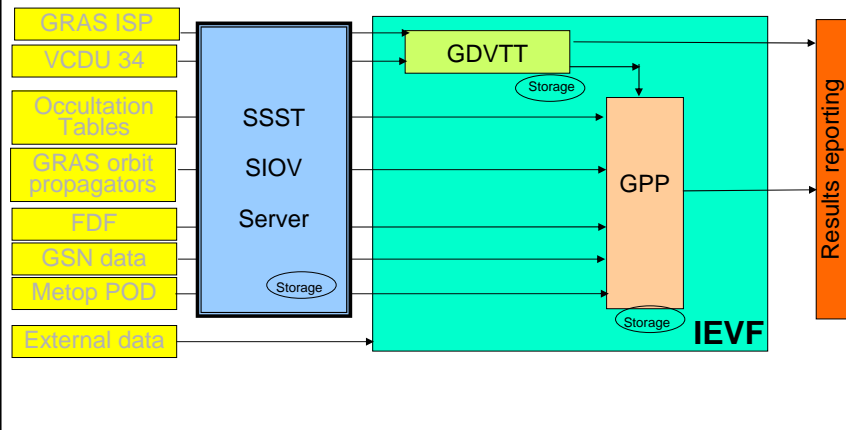
- **Approach**
 - Pre-launch preparation (tools preparation , procedures, test data, dry runs)
 - Post-launch activity (from switch on to initial geophysical verification)

GRAS In-Orbit Verification (IOV)

- **Schedule**
 - Completion of preparation before launch
 - 3 to 4 days of Launch and Early Operations Phase (LEOP)
 - Satellite In Orbit Verification (SIOV) for 6 to 8 weeks (includes GRAS IOV post-launch)

- **The In orbit Verification will be performed using an Instrument Engineering Verification Facility (IEVF)**

GRAS IEVF Configuration



GRAS IOV Timeline Phases

- Phase 1: Switch on USO Oven
- Phase 2: Standby to Navigation
- Phase 3: Navigation to Occultation
- Phase 4: Health and Functional status
- Phase 5: Mode and Instrument configuration characterisation (TTFA/TTFF, Nav msg frame dump, AGC, Set Parameter, Sample rate, GPS Ex- and Inclusion)
- Phase 6: Navigation Mode verification
- Phase 7: Occultation Mode verification
- Phase 8: Performance verification
- Phase 9: Initial geophysical verification

GRAS In-Orbit Verification (IOV)

For Performance Verification, an increasing accuracy/complexity approach is to be followed:

- A) Using GPS Ephemeris and Metop propagated orbit in ND (can be done with only GRAS data)
- B) Using GPS POD from GSN and Metop propagated orbit in ND (need some GRAS GSN data)
- C) Using GPS POD and Fiducial Station data from GSN and Metop propagated orbit in SD2 (need more GRAS GSN data)
- D) Using GPS POD from GSN and Metop POD in ND (need some GRAS GSN data)
- E) Using GPS POD and Fiducial Station data from GSN and Metop POD in SD2 (need more GRAS GSN data)

GRAS IOV with non-default parameters

Phase 5 : Mode and Instrument configuration characterisation

- During this phase different GRAS instrument parameter settings will be tested via Telecommands :
 - Navigation message frame dump
 - Analog Gain Change
 - Set parameter
 - Sampling rate
- These parameters provide more flexibility for tuning GRAS parameters (if necessary).
- Some data will be recorded with these configurations, that could be used to optimise GRAS information content for the next two Metop launches, and to further investigate Open Loop data processing.