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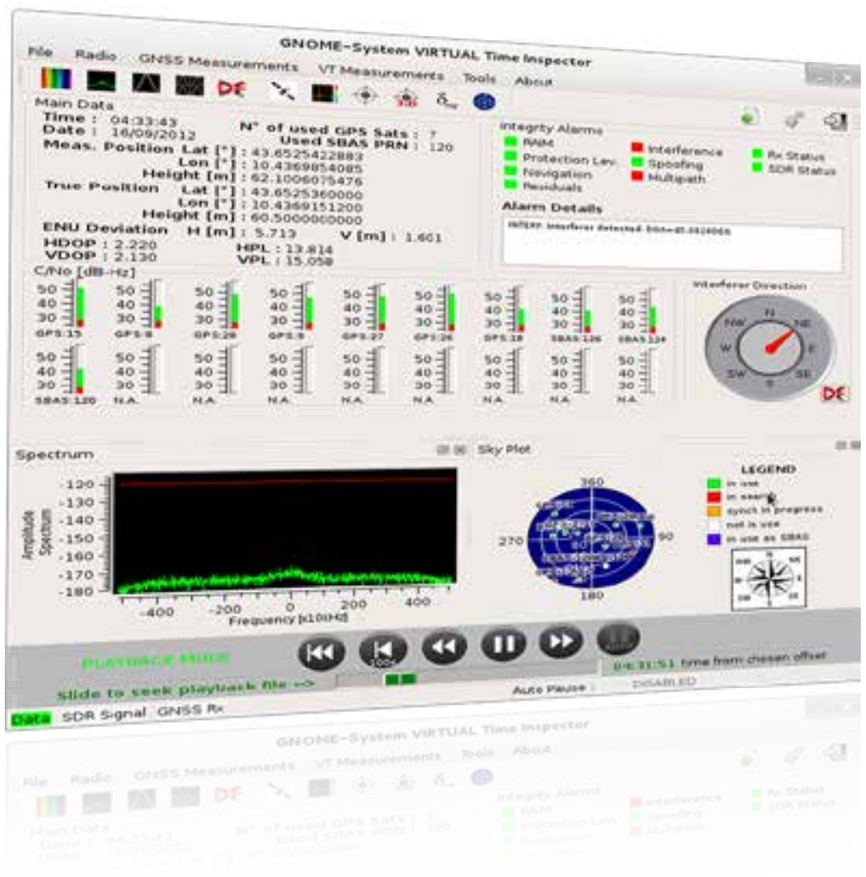
Making GNSS Signals Visible, All Through the Processing Layers

GNOME observes the full GNSS "processing" stack from the navigation domain down to the physical layer. Any possible GNSS infrastructure anomaly becomes visible wherever it may be hidden.

- Full GNSS stack integrity inspection
- Real-time spectrogram & interference detection
- Real-time waterfall plots
- Real time, per-satellite correlation functions
- Real-time multipath analysis
- Real-time positional accuracy
- Real-time Stanford diagrams
- Virtual-time re-inspection of all monitored quantities
- Long-term statistical performance analyses

Operational Modes

- GNOME RTI: The Real-Time Inspector
  Real time, remote monitoring of all GNSS status data
- GNOME VTI: The Virtual-Time Inspector
  Playback and browsing of the full GNSS Scenario
- GNOME StI: The Statistical Inspector
  Long term statistical performance analyses



GNOME

An SDR-Based Solution for GNSS Signal Integrity Assurance

GNOME

The GNOME, GNSS Operative Monitoring Equipment, system is a distributed network of remote sentinels designed to monitor the integrity, reliability and spoofing/interference immunity of GNSS signals. All sentinels report the results of their analyses to a common collector, the Central Monitoring Facility (CMF), which operates as a controller and storage as well as a user interface.

The key features of this system derive from the ICAO recommendations and standards which highly advise continuous control and legal recording of the GNSS performance and integrity, both in the signal and in the navigation domains.

Software-defined radio (SDR) technology ensures that the GNOME system has the flexibility and customizability to meet specific customer and user needs.

GNOME includes RAIM prediction capabilities for the generation of GNSS NOTAM proposals and the creation of pilot briefings which can be accessed via a web portal.

Operational requirements and international standards compliance:

The operational requirements that drove the development of GNOME come from the following regulations and guidelines related to GNSS operations:

- ICAO Annex 10, Volume I.
- ICAO Document 9849 (GNSS Manual)
- ICAO Doc 8071 Volume 2
- FAA Order 8200

Core GNOME System Applications and Capabilities

- Monitoring of GNSS system performance:
  — GPS and GLONASS
  — SBAS and GBAS augmentation systems
- Electromagnetic assessment for GNSS site suitability verification
- Post-incident / post-accident investigations
- Virtual-time playback of the full GNSS scenario
- Early warning of interference allowing rapid initiation of countermeasures
- Interferer direction finding
- Anti-spoofing & anti-meaconing surveillance
- RF signal re-injection
- Vehicular anti-spoofing/meaconing (only on the vehicle-mounted GNOME-light version)
- Signal debugging for upcoming satellite constellations (Galileo, Beidou)
- RAIM prediction capabilities for the PBN RNAV and RNP navigation specifications:
  — RAIM FD – FDE
  — Baro and non-baro aided
  Taking orography into account by using terrain models for critical scenarios
- Formatting of GNSS availability information for the generation of GNSS NOTAM proposals and the creation of pilot briefings which can be accessed via a web portal.