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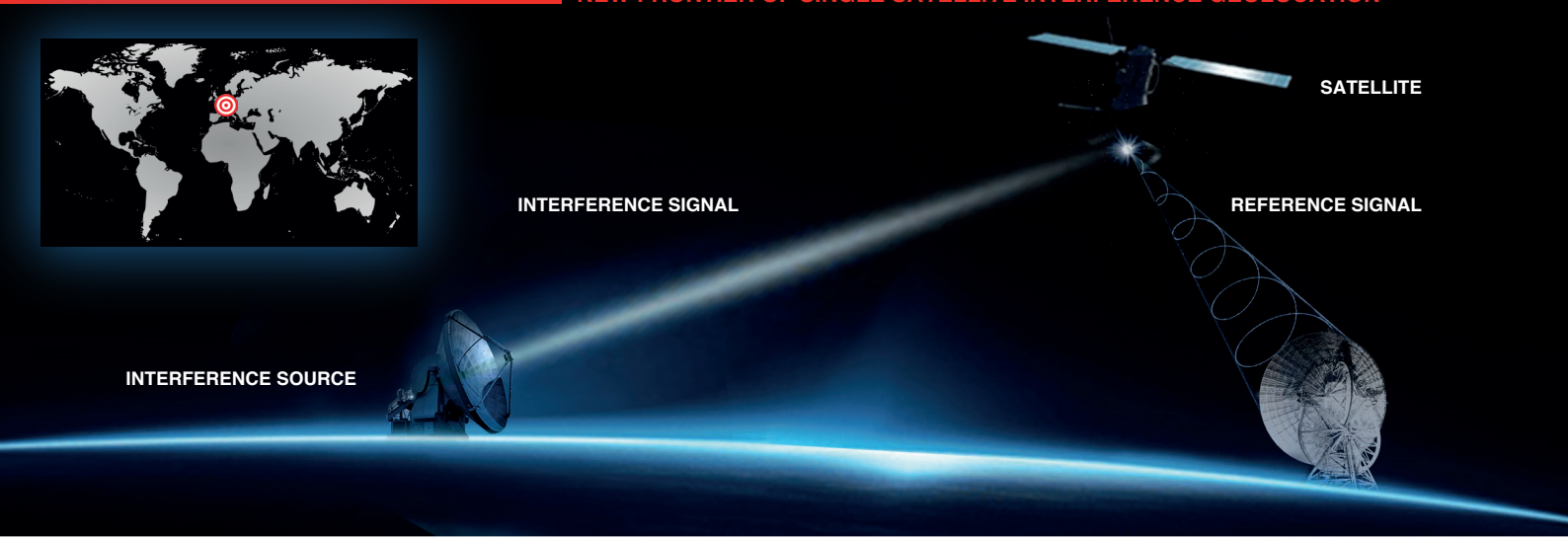
Trust is Nice, Control is Better.

GSTS
Ground-to-Space Threat Simulator

NEW FRONTIER OF SINGLE SATELLITE INTERFERENCE GEOLOCATION



GSTS is a simulation tool for the study and performance assessment of satellite-based detection, characterisation and geolocation techniques of interfering signals in realistic scenarios. The simulator is capable to generate user defined scenarios, simulate the end-to-end link from emitter to receiver, process and analyse the performance of different architectures and techniques to support the geolocation of signal sources from space. The simulator comes with a Scenario Generation Tool for a total user configuration of realistic scenarios.

OPERATION MODE
- Interference Geolocation:
  - Simulative Mode (End-to-End Simulation)
  - Analytic Mode (Statistical Errors)
- Interference Detection
- Interference Characterization
- Bit Error Rate Assessment (Reference Signals)

SATELLITE MEASUREMENTS
- Time Difference of Arrival (TDoA)
- Frequency Difference of Arrival (FDoA)
- Angle of Arrival (AoA)
- Receiver Signal Strength Difference (RSSD)

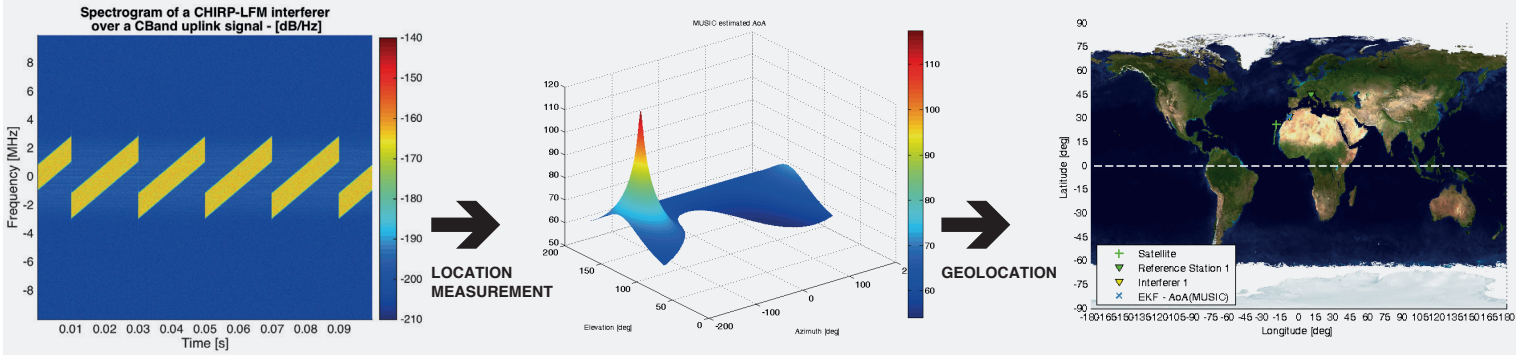
JAMMING
Fully flexible generator of jamming threats:
- FM frequency central shift with time-variation behaviour
- Bandwidth obtained with AWGN, PRN or PM sequence
- Amplitude Modulation: Period and Duty Cycle
- Agile Behaviour: random time variation of power and signal type

TELECOMMAND SIGNAL
Simulation of the most widely used satellite telecommand signals:
- Two reference bands: C-Band and S-Band
- Two different modulations: DSSS and PM

GEOLOCATION TECHNIQUES
- Taylor Series
- Extended Kalman Filter
- Multi-Hypotesis Tracking
- Particle Filter

SCENARIO GENERATION TOOL
- Fully configurable satellite orbits
- Up to 5 receiver antennas plus multiple-feeder antenna
- Vehicle, Airborne and Spaceborne interference configurations
- User-defined antenna patterns and motion dynamic
- CNES Atmospheric Propagation Model
- Operational bands: S-Band, C-Band and L-Band

SATELLITE FRONTEND
- Detailed and fully flexible frontend model
- Innovative dual-chain approach
  - Reference Signal Chain
  - Interference Signal Chain
- Filter delays modelling



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