As Controlled Reception Pattern Antennas (CRPAs) are becoming increasingly common on the market, Orolia developed GSG Wavefront, an easy to use and affordable platform dedicated to CRPA Testing.

GSG Wavefront
Designed for CRPA Testing
What is a CRPA?

As GNSS signals are increasingly becoming vulnerable to intentional or deliberate interferences, adaptive antennas, also called Controlled Reception Pattern Antennas (CRPAs), have been specifically designed to face those threats on critical PNT data by rejecting such radio frequency interferences.

The CRPA technology was initially developed for military use and therefore primarily restricted, but even though this technology remains mostly used in that sector it’s now also embedded on commercial critical infrastructures such as power grids or broadcast.

CRPAs have been replacing non-directional antennas to optimize GNSS signal-to-noise ratio in order to reduce drastically the vulnerability of the GNSS signal reception and therefore guarantee the availability of critical PNT data to the platform they are embedded on.

They have been clearly identified as an easy to use and affordable solution to face jamming and spoofing threats.

The increasing demand for CRPAs for various applications on the market had made their field testing even more critical to guarantee their efficiency to ensure GNSS signal reception reliability.

Wavefront - The Optimal CRPA Testing & Simulation Solution

Based on its GNSS simulators technology powered by Skydel, Orolia is able to provide very specific and flexible Testing and Simulation solutions dedicated to CRPA testing: GSG Anechoic and GSG Wavefront.

GSG Anechoic being specifically designed for anechoic chamber use, a wavefront simulation platform allows configuration flexibility for most of the testing and simulation processes in order to replicate very specific conditions which also makes the GSG Wavefront the most cost-effective solution.
A GNSS Simulator based technology

Being based on Skydel Simulation Engine technology, the GSG Wavefront is the perfect lab-ready solution combining high performances with flexible integration and built-in jammers and spoofers to create very complex testing scenarios.

Orolia advanced simulators being based on a software-defined platform, the Wavefront system infrastructure is very flexible and upgradable at will to fit the latest trends of the market.

Wavefront system architecture

The diagram below shows the complete architecture of an Orolia Wavefront simulator.

This architecture model is based on simulator nodes to replicate all CRPA elements. Each node can simulate both a low power GNSS and high-power signals such as jammers and spoofers and can support over 1,000 signals using processing power gained from the GPUs and CPUs.

The simulator controller monitors, coordinates, synchronizes and commands all the nodes to simulate the proper phase alignment and dynamics.

The Wavefront system will thus be able to make real-time corrections, to ensure that the phase aligns within the required specifications.
Key Features

Scalable from 2 to 16 multi frequency antenna elements
- 1 to 4 frequencies (L1, L2, L5, E6)
- GNSS and Interference combined outputs

Interference: Jamming, spoofing, and repeating
- Integrated into the software (GUI and API)
- Simultaneously simulate multiple threats
- Dynamic transmitters with user-defined waveforms

Continuous phase synchronization*
- Real-time automated synchronization procedure
- Phase coherency: < 1° (1-Sigma)
- Very fast starting time (< 30 s)

*Annual calibration recommended

Scalable from 2 to 16 Antenna Elements

8 Element Dual Frequency System

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