

BroadSim Wavefront

Software-Defined CRPA Simulation System



A Powerful and Proven Platform

Protecting your GNSS systems from jamming and spoofing is more critical now than ever before. Leveraging the same proven software-defined architecture as our BroadSim platform, Orolia Defense & Security developed BroadSim Wavefront to enable easier and more affordable CRPA receiver testing.

Why Develop a New Wavefront Simulator?

- High-end PNT systems are using AJAS - very few Wavefront simulators exist
- Wavefront simulators are expensive- standard configurations can cost millions
- Jamming/spoofing is often not a part of the solution - the user must integrate additional hardware
- Scenario creation is complicated and limited - requiring trained, expert PNT engineers



Wavefront Node, generates IQ data per each element

7-Element BroadSim Wavefront System

STATUS QUO

- Difficult calibration routine
- Physically large and not scalable
- Custom one-off solutions
- Limited or no API control
- Limited spoofing and repeating capabilities

Scalability
4 to 16 tri frequency antenna elements
4 outputs / element (Ex. GNSS L1/L2, Interference L1/L2 - enables higher dynamic range)

Software-Defined System
IQ generated in GPU not FPGA
RF generated in SDR (Software-Defined Radio)
Flexible, affordable, scalable
Rapid development cycles

Operational Features
1,000 Hz iteration rate
Simulate 600+ signals/element
Space simulation: LEO and GEO
Multipath (3 echo's/PRN/Code)
PXE (pixie) system architecture - single computer operation

Continuous phase calibration
Real-time automated calibration
Phase Offset: $\pm 1^\circ 1\sigma$

WITH BROADSIM WAVEFRONT

- Scalable and affordable
- Commercially available
- Easy to use and calibrate
- Robust API: C++, C#, and Python
- Jamming, spoofing, and repeating

Automatically Calculate	
Propagation delays	Power loss
Doppler shift due to dynamics	

GNSS Simulation – 1000 Hz	
GPS Open: L1-C/A, L1C, L1-P, L2-P, L2C, L5	
GPS Encrypted: L1-M-AES, L2-M-AES, L1-MNSA, L2-MNSA	
Galileo: E1, E5A, E5B, E5 AltBOC, E6	
BeiDou: B1, B1C, B2, B2A	GLONASS: G1 and G2
QZSS: L1-C/A, L1C, L1S, L5, L5S	
SBAS: L1 and L5	NavIC: L5
Alternative RF Navigation	

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

Choose and Control
Interference location and trajectory
Antenna locations, pattern and orientation