BroadSim
Software-Defined NAVWAR Simulator

What is BroadSim?
Orolia Defense & Security's BroadSim was developed to simplify the creation of advanced jamming and spoofing scenarios with Navigation Warfare (NAVWAR) testing in mind. BroadSim supports high dynamics, jamming, spoofing, and encrypted military codes. Powered by Orolia's Skydel GNSS simulator engine, BroadSim is able to simultaneously simulate multiple constellations including: GPS, GLONASS, Galileo, Beidou and SBAS. With high-performing hardware, a robust and innovative software engine, and an intuitive user interface; BroadSim outperforms and exceeds features offered by the competition.

Why Choose BroadSim?
BroadSim is revolutionizing the GNSS industry because of its extraordinary flexibility, low cost, upgradability, and rapid development cycles. Leveraging the Skydel navigation engine and commercial-off-the-shelf (COTS) software-defined radios (SDRs), simulation of GNSS signals can be achieved at a fraction the cost of today's industry standards. The ability to generate military and multi-constellation signals on COTS hardware maximizes scalability, value, and time to market.

Pictured to Left:
ODS BroadSim 4U Simulator with Orolia's Skydel user interface
Technical Specifications: SecureSync SAASM

### Software

- 1000 Hz simulation iteration rate
- Advanced jamming
- Live sky time synchronization
- On-the-fly scenario re-configuration
- 6 DoF receiver trajectories
- Flexible licensing & upgradability
- High-end performance (precision, resolution, ultra-high dynamic motion)
- Simulate hundreds of satellites in real-time using off-the-shelf graphics cards (GPU)
- Differential GNSS and multi-vehicle simulation (Real-Time Kinematics - RTK)
- Comprehensive and intuitive API (Python, C# and C++ open source client)
- Scalable and highly flexible architecture using software-defined radios

### Hardware

- Size: 4U
- Width: 19 in
- Depth: 17.5 in
- Height: 7 in
- Weight: 33 lbs
- Power: 850 Watts
- Intel i7-7700 processor
- 64 GB DDR3 Memory
- 10 MHz and 1 PPS inputs/outputs for synchronization
- 2x NVIDIA GPUs
- 4 RF outputs (DekTec Radios)

### SIGNAL PROPAGATION & ERRORS SIMULATION

- Multipath
- Additive pseudorange ramps
- Satellite clock error modification
- Navigation message errors
- Ionospheric and tropospheric models
- Antenna pattern models
- Relativistic effects
- Pseudorange / ephemeris errors

### CONSTELLATIONS

**GPS Open Codes:**
- L1-C/A, L1C, L1-P, L2-P, L2C, L5

**GPS Encrypted Codes:**
- L1-MNSA, L2-MNSA (COMING SOON)

**GLONASS:** G1, G2

**BeiDou:** B1, B2

**Galileo:** E1, E5a, E5b

**QZSS:** L1-C/A

**SBAS:** WAAS, EGNOS, MSAS

### SIMULATION CAPABILITIES

**Signal Dynamics:**
- Max relative velocity: 1,500,000 m/s
- Max relative acceleration: no limits
- Max relative jerk: no limits

**Receiver Trajectory Simulation:**
- Static
- Circle
- Car trajectory with integrated maps
- Import arbitrary tracks/routes from NMEA, CSV, or KML files
- Spacecraft (LEO/GEO orbits)
- Hardware-in-the-loop (HIL)

**Operating System:**
- Custom Linux for security and performance

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Advanced Jamming

- No additional hardware needed to generate jamming signals
- Unlimited # of jamming signals generated on 1 RF output
- Set power level, modulation, location for each jamming signal
- Complete jamming control through the Skydel GUI and/or API
- Specify the location and power of jamming transmitters: BroadSim calculates the jamming power at the receiver based on the location and jamming parameters.

*GPU limited*