

# SKYDEL GNSS SIMULATION SOFTWARE

High Performance,  
Unmatched Flexibility



## As your GNSS testing needs evolve, Skydel is there to meet them

Performance testing of GNSS equipment designs is crucial in today's increasingly complex RF landscape. Thorough lab testing requires simulation systems that can reproduce a range of satellite constellations, realistic conditions, and even attacks.

Designed to meet the most demanding simulation requirements, Skydel excels at recreating a broad variety of real-world scenarios in the lab. It enables a wide range of possible simulator configurations, from simple desktop setup to multi-band anechoic chambers.

And best of all, it offers superb in-field upgradability supported by Safran's team of GNSS experts.

Skydel has been designed for — and is used by — engineers and researchers in the automotive, military, space exploration, and multiple other high-tech industries.

## Benefits

- Rapid integration into your test routines and processes — stay focused on your test challenges.
- Immediate upgrades to enhanced capabilities and access to new features — update your test bench when it suits you.
- Ability to reuse hardware for other projects in the lab — quickly re-deploy components to meet changing needs.

**Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.**



## Multiple configurations. Same simulation engine.

Skydel is packed with a rich feature set — multi-constellation/ multi-frequency signal generation, remote control from user-defined scripts, and integrated interference generation.

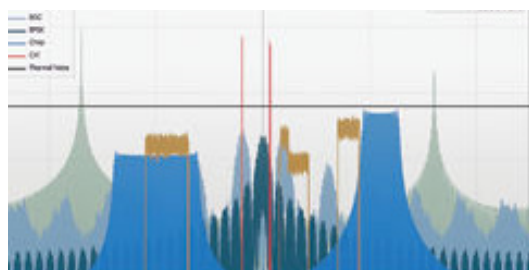
Most simulation parameters are controllable on the fly, while the simulation is running.

From building your own configuration to complete turnkey systems, Skydel adapts to all your GNSS simulation needs.

## GPU-Powered

Traditional GNSS simulators rely on custom silicon (FPGAs) and custom designed hardware, which are either too expensive or provide limited capabilities.

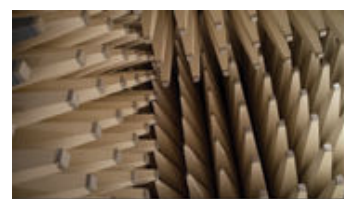
Skydel uses GPU-accelerated computing to create GNSS/RF signals digitally, and software-defined radios (SDR) to output RF-resulting in unequaled scalability and flexibility.



*Design complex signals by combining multiple modulations. Advanced interference & jamming scenarios can be created in real time using dynamics transmitters.*



*Some of its many innovations include a user-friendly interface, powerful and documented API, and intuitive automation tools.*



*From single test benches up to complex multi-antenna test systems, multiple configurations are available to adapt to your needs.*

## Key features

- Multi-constellation, multi-frequency.
- Hundreds of satellites can be simulated in real time using COTS hardware.
- Integrated dynamic interferences generation (GNSS and non-GNSS).
- User-defined waveforms (Chirp, CW, BOC, BPSK, AWGN, and pulse modulations combination and pulse modulations combination).
- 1000 Hz simulation iteration rate.
- High-end performance (precision, resolution, ultra-high dynamic motion).
- Powerful automation & intuitive API (Python, C#, C++) and LabVIEW open source client).
- Differential GNSS and RTCM message generation .
- Multi-vehicle, multi-antenna simulation.
- HIL with real-time, on-the-fly scenario re-configuration.
- 6DoF and orbital trajectories.
- Multipath support.
- Ability to import multiple file formats: CSV, KML, NMEA,etc.
- GNSS satellite orbit modification and custom fixed position.
- Unlimited pseudorange additive ramps.
- Scenario editor with integrated maps.
- Flexible licensing and unparalleled upgradability.
- Plug-in SDK to allow custom plug-in creation.
- Advanced Jamming and Spoofing Simulation.



## Technical Specifications

### Supported GNSS constellations

- GPS: L1 C/A, L1 P and L1C, L2 C and L2 P, L5
- GLONASS: L1 C/A, L2 C, L2 P L3 OC
- Galileo: E1, E5a, E5b, E5 AltBOC, E6
- BeiDou: B1I, B2I, B3I, B1C, B2a
- NavIC: L5
- QZSS: L1 C/A, L1 C and L1S, L2C, L5, L6
- SBAS: WAAS, EGNOS, MSAS, GAGAN, SDCM.
- Custom signals

### Frequency Bands

- All GNSS bands
- Possibility of more than 2 RF outputs with SDR combination
- Baseband complex (zero IF) through IQ samples logging

### Operating Systems

- Windows and Linux

### Signal Dynamics

- Maximal relative velocity: 1,500,000 m/s
- Maximal relative acceleration: no limits
- Maximal relative jerk: no limits
- 1000 Hz simulation iteration rate

### Signal Accuracy

- Pseudorange < 1mm
- Pseudorange rate < 1mm/s
- Inter-channel bias 0

