

GSG-8 Advanced Simulator Ensures Critical Space Mission Readiness

Picosecond-Level Synchronization of Two Trajectories

An Orolia customer that provides solutions for national security missions needed two perfectly synchronized GPS simulators that could simulate two synchronized trajectories in space at the same time.

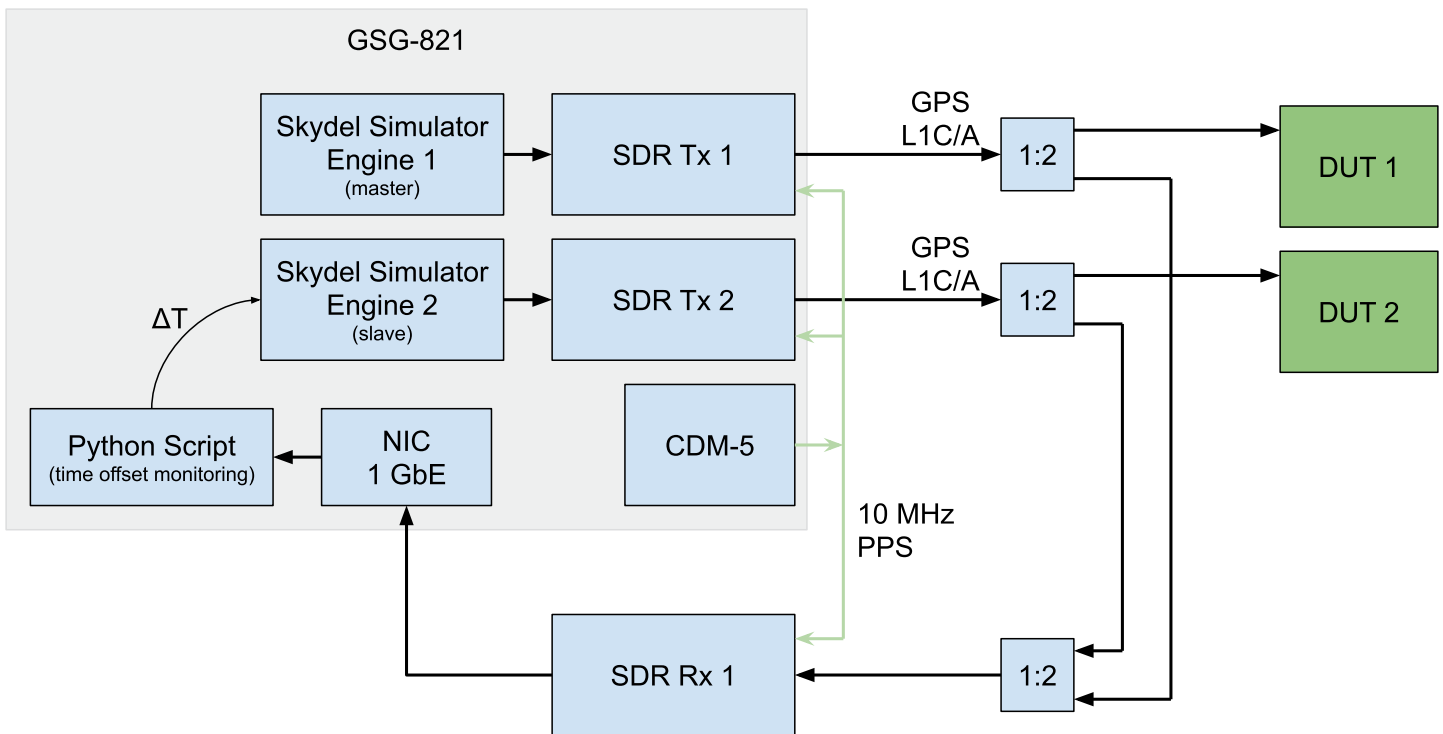
The customer required flawlessly synchronized receivers on two different Low Earth Orbits (LEO) with a time difference that could not exceed extremely tight constraints – within ± 100 picoseconds (ps).

Orolia's GSG-8 advanced simulator provided out-of-the-box time synchronization that could be easily customized to meet this extreme requirement. With simple automation using the simulator's API and a software-defined radio (SDR), Orolia was able to measure and correct the time offset before each simulation.

GSG-8, powered by the Orolia's Skydel Simulation Engine, can be equipped with up to four SDRs, with an RF output on each one. The SDRs are synchronized with a 10 MHz and PPS signal generated by Orolia's CDM-5 card. The CDM-5 can use its internal OCXO reference or an external reference if needed.

This standard GSG-8 configuration can guarantee a synchronization within $\pm 3,000$ ps between two RF outputs. We added a feedback loop and calibration software to measure the offset and compensate at the beginning of each simulation to guarantee synchronization within ± 75 ps and meet customer requirements.





Orolia’s Skydel Simulation software engine includes a rich API that allows customization without having to change the software itself. This solution runs with a standard software release and is enhanced by an external Python script and hardware to monitor a pilot signal that can measure the time offset and apply the correction.

With GSG-8 and its built-in Skydel software engine, customers can synchronize multiple antennas with better precision and accuracy than most simulators and enhance performance through simple automation. Orolia’s GSG-8 advanced simulator is ideally suited to ultra-precise missions where failure is not an option. Complex, multi-factor space initiatives are just one application where GSG-8 easily demonstrates superior capabilities, while delivering outstanding value for functionality, performance and cost.