Scintillation-Hardened GPS Receiver

Improves system reliability and flexibility

CommLargo, Inc., has developed a scintillation-hardened Global Positioning System (GPS) receiver that improves reliability for low-orbit missions and complies with NASA's Space Telecommunications Radio System (STRS) architecture standards. A software-defined radio (SDR) implementation allows a single hardware element to function as either a conventional radio or as a GPS receiver, providing backup and redundancy for platforms such as the International Space Station (ISS) and high-value remote sensing platforms.

The innovation's flexible SDR implementation reduces cost, weight, and power requirements. Scintillation hardening improves mission reliability and variability. In Phase I, CommLargo refactored an open-source GPS software package with Kalman filter–based tracking loops to improve performance during scintillation and also demonstrated improved navigation during a geomagnetic storm. In Phase II, the company generated a new field-programmable gate array (FPGA)-based GPS waveform to demonstrate on NASA's Space Communication and Navigation (SCaN) testbed.

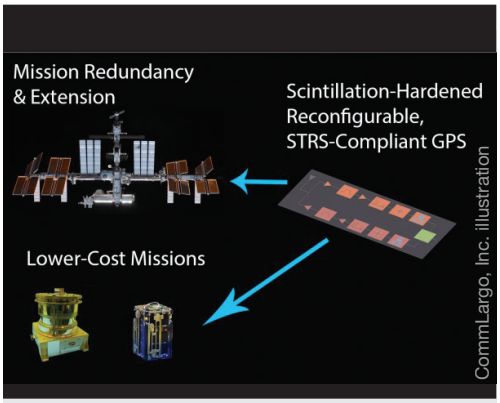
Applications

NASA

- ISS
- Television Infrared Observation Satellite (TIROS) Program
- Mini-satellites
- Cube-shaped satellites (CubeSats)
- Nanosatellites

Commercial

- Satellites
- CubeSats
- Software services



Phase II Objectives

- Develop an open-source GPS software package with scintillation-hardening
- Refactor the software package into an STRS-compliant waveform compatible with the SCaN SDR testbed on the ISS
- Perform software development, testing, and verification
- Complete an STRS toolkit to provide a radio-based implementation that is compliant yet affordable

Benefits

- Delivers a government unlimited rights waveform for the STRS waveform repository
- Allows a single hardware element to function as a conventional radio or as a GPS receiver
- Provides backup and redundancy for high-value remote-sensing platforms

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