

USING NASA'S TRIG GNSS RO INSTRUMENT FOR SPACE WEATHER, WEATHER AND CLIMATE MEASUREMENTS

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Work is underway at NASA's Jet Propulsion Laboratory to develop a new GNSS science instrument, TriG, for several upcoming radio occultation (RO) missions. This instrument is slated to first fly on the NOAA-NSPO COSMIC-II constellation of satellites scheduled for launch beginning in 2014. TriG is an advanced, space qualified receiver-processor designed to produce high-quality GNSS-RO profiles from low Earth orbit (LEO). It will produce accurate orbit data from a zenith oriented antenna with algorithms borrowed from NASA's very successful Black-Jack series of space GPS receivers. High-rate TEC and scintillation parameters will also be produced and analyzed on board for space weather forecasts.

High gain antenna arrays will be oriented along the fore and aft directions from the LEO spacecraft. These antennas capture RO profiles from rising and setting GNSS satellites at multiple frequencies. Data from these high gain antennas can be taken at high rates and processed down to lower rates via an onboard general purpose computer. TriG technology improves measurement precision over previous RO instruments due to the digital beam forming system which can direct antenna gain to multiple directions simultaneously. The TriG architecture, measurement precision, and configuration for COSMIC-II will be described.