



## **Global-scale Observations of the Limb and Disk (GOLD) Mission –Ultraviolet Imaging of Earth’s Space Environment from Geostationary Orbit**

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The GOLD Mission of Opportunity will fly a far ultraviolet (FUV), imaging spectrograph in geostationary (GEO) orbit. The mission is scheduled for launch in late January 2018 as a hosted payload on SES-14, a commercial communications satellite that will be stationed over eastern South America at 47.5 degrees west longitude. GOLD will be the first NASA science mission to fly as a hosted payload on a commercial, communications satellite. The GOLD imager has two identical channels. Each can independently scan the full disk at a 30-minute cadence, making spectral images of Earth’s FUV emission from 132 to 162 nm, as well as make a measurement on the Earth’s limb. Remote sensing techniques that have been proven on previous Low Earth Orbit (LEO) missions will be used to derive fundamental parameters for the neutral and ionized space environment. Parameters that will be derived include composition ratio (O/N<sub>2</sub>) and temperature of the neutral atmosphere on the dayside disk. On the nightside, peak electron densities will be obtained in the low latitude ionosphere. Many of the algorithms developed for the mission are extensions of ones used on previous Earth and planetary missions, with modifications for observations from geostationary orbit. All the algorithms have been tested using simulated observations based on the actual instrument performance. From geostationary orbit, GOLD can repeatedly image the same geographic locations over most of the hemisphere at a cadence comparable to that of the thermosphere-ionosphere (T-I) system (order of an hour). Such time resolution and spatial coverage will allow the GOLD mission to track the changes due to geomagnetic storms, variations in solar extreme ultraviolet radiation, and forcing from the lower atmosphere. In addition to providing a new perspective by being able to repeatedly remotely sense the same hemisphere at a high cadence, GOLD’s simultaneous measurements of not only composition but also temperatures across the disk will provide a valuable, new parameter for understanding of how the T-I system responds to forcing from both the sun and the lower atmosphere.