Observing Earth's Response to Solar Variability with the GOLD Mission

Eastes, Richard (1), Richard.Eastes@ucf.edu; W. E. McClintock (2); A. G. Burns (3); S. C. Solomon (3); D. N. Anderson (4); L. Andersson (2); M. Codrescu (5); R. E. Daniell (6); S. L. England (7); J. E. Harvey (8); A. Krywonos (1); M. Lankton (2); J. D. Lumpe (9); A. D. Richmond (3); D. W. Rusch (2); O. Siegmund (7); D. J. Strickland (9); T. N. Woods (2); A. Aksnes (10); S. A. Budzien (11); K. F. Dymond (11); F. G. Eparvier (2); H. Foroosh (1); R. S. Lieberman (12); C. R. Martinis (13); and J. Oberheide (14).
(1) University of Central Florida, Orlando, FL, USA
(2) Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO, USA
(3) National Center for Atmospheric Research (NCAR), Boulder, CO, USA
(4) Cooperative Institute for Research in Environmental Science, University of Colorado, Boulder, CO, USA
(5) National Oceanic and Atmospheric Administration (NOAA), Boulder, CO, USA
(6) Ionospheric Physics Consulting, USA
(7) Space Science Lab, University of California, Berkeley, CA, USA
(8) Photon Engineering, Tucson, AZ, USA
(9) Computation Physics, Inc. (CPI), USA
(10) University of Bergen, Norway
(11) Naval Research Laboratory, Washington, DC, USA
(12) GATS Inc., USA
(13) Boston University, Boston, MA, USA
(14) Clemson University, Clemson, SC, USA

The Global-scale Observations of the Limb and Disk (GOLD) mission of opportunity will provide unprecedented imaging of the Earth's space environment and its response to forcing from the Sun and the lower atmosphere. The mission, which NASA selected in April 2013, will fly a far ultraviolet imaging spectrograph that is scheduled for a 2017 launch into a geostationary (GEO) orbit on a commercial communications satellite. From this vantage point, most of a hemisphere will be imaged. Fundamental space weather parameters that will be derived from the images include composition (O/N_2) and temperature (simultaneously) of the thermosphere as well as nighttime ionospheric densities. These images allow changes in time to be distinguished from changes in location because the same locations will be imaged at a thirty-minute cadence, and they will provide context for other measurements from low Earth orbit or the ground. The resulting information is essential for understanding of the Sun's effects on Earth and to advancing our physical understanding of coupling between the space environment and the Earth's atmosphere. GOLD will advance our understanding of how the Earth responds to solar variability and how that variability may affect space based systems.