New Science Opportunities on COSMIC-2/FORMOSAT-7

Anthony J Mannucci¹, Stephen T Lowe¹, Chi O Ao¹, Garth Franklin¹, Thomas K Meehan¹, Feiqin Xie², Ying-Hwa (Bill) Kuo³ and William S Schreiner³

¹Jet Propulsion Laboratory, California Institute of Technology
²Texas A&M University, Corpus Christi, Texas
³University Consortium for Atmospheric Research, Bounder, CO

Corresponding email address: tony.mannucci@jpl.nasa.gov

The follow on mission to COSMIC/FORMOSAT-3 is designed in part as an operationally robust implementation of the precursor’s proof-of-concept, targeted to yield improved typhoon forecasts. COSMIC-2/FORMOSAT-7 (C-2/FS-7) promises to be more than a robust provider of data similar to its predecessor. The main mission payload is based on the NASA funded TriG radio occultation science instrument that will provide improved measurement quality in the challenging tropical atmospheric boundary layer region (altitudes 0-3 km). Combined with an expected increase of 5-10 times the data quantity reaching within 500 km of the ocean surface, C-2/FS-7 will provide significant new insights into the dynamics of tropical boundary layer moisture. New science capabilities enabled by TriG include ocean wind speed and mesoscale ocean altimetry, provided a nadir-viewing antenna is placed onboard one or more of the satellites. C-2/FS-7 also carries two “science payloads” designed specifically to measure critical properties of the ionosphere, including ion drift velocities, electron densities, temperature, density fluctuations and resulting UHF and L-band scintillations. Complementing these space science payloads, TriG for C-2/FS-7 is optimized for ionospheric radio occultation measurements, and has the potential for tracking the DORIS beacon network (UHF and L-band scintillations). C-2/FS-7 could provide the most comprehensive global data sets to probe ionospheric dynamics, global ionospheric storms, and related science. In our talk we will present the potential of C-2/FS-7 as an Earth and space science mission, and describe systems engineering considerations to maximize science return.