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COSMIC-2: A Platform for Advanced Ionospheric Observations

Abstract Text (500 word limit; No images or formulas please) The equatorial component of the COSMIC-2 program will consist of 6 satellites to be flown in a 24 degree inclination/520 km altitude orbit. In addition to the primary GNSS radio occultation (RO) payload, to be provided by JPL, the USAF plans to fly a pair of space weather sensors: a multi-frequency radio beacon and the Ion Velocity Meter (IVM) in-situ plasma sensor package. These three instruments will provide data to address key issues related to the specification and forecast of ionospheric densities and the instabilities/irregularities associated with ionospheric scintillation. The TriG GNSS receiver will provide a substantial increase in the number of daily ionospheric observations relative to COSMIC-1, both in the RO limb-viewing and overhead geometries. These data are expected to provide significantly improved data refresh and coverage for assimilative ionospheric models enabling more accurate ionospheric specifications in the important equatorial region. In addition, TriG will make routine measurements of ionospheric scintillation at L-band frequencies, as pioneered by the CORISS instrument on C/NOFS. The radio beacon, together with a network of ground receivers, will enable direct measurement of scintillation effects on trans-ionospheric signal propagation across the UHF to S-band frequency spectrum. The IVM sensor will measure the in-situ density and plasma depletions associated with scintillation-producing irregularities. Together, the beacon, TriG, and IVM will provide an unprecedented ability to map equatorial ionospheric instabilities and their effects. The IVM sensor will also provide observations of plasma drifts from which electric fields, the most important physical driver for equatorial ionospheric structure, can be inferred. This will enable advancements in ionospheric models to further improve specifications and forecasts. In addition to discussing ionospheric science and operational support aspects of the COSMIC-2 mission, this presentation also discusses high level COSMIC-2 programmatic status and plans, particular with respect to the mission sensors.