

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Ground Operations - Systems and Solutions (1)

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USE OF SPACECRAFT SIGNAL MEASUREMENTS TO BACK-INFER ANTENNA HORIZON
MASKS

Abstract

The Constellation Observing System for Meteorology, Ionosphere, and Climate-2/Formosa Satellite-7 (COSMIC-2/FORMOSAT-7) is a collaborative satellite program between the Taiwan National Space Organization (NSPO) and the US National Oceanic and Atmospheric Administration (NOAA). The mission measures profiles of the Earth's atmosphere and ionosphere for weather and space weather forecasting and consists of a six-minisat constellation with ten disparate ground stations. Efforts are consistently being made to increase the impact of COSMIC-2 data on near-real time space weather forecasts by improving latency. These improvements have been achieved by increasing total contacts scheduled. A methodology was developed that uses spacecraft signals to back-infer an optimal mission-specific horizon elevation mask in search of these additional contacts.

Using data contained within a space-to-ground architecture offers a paradigm shift from existing approaches for horizon mask measurement. This approach adds new capabilities and flexibility for mission operators as they move towards next-generation ground, especially as it pertains to increasing interest in ground stations as a service (GSaaS). The methodology can be utilized at locations inaccessible to operators, without external surveying services, and integrated into the post-launch calibration and validation of ground stations. It has shown enhancement of capabilities on COSMIC-2, reducing data latency, and can improve aspects of other missions such as, but not limited to, increased downlinkable data volume and characterization of issues at ground sites.