

STATUS AND FUTURE PLANS OF THE SPIRE SATELLITE CONSTELLATION FOR NEUTRAL AND IONOSPHERIC RADIO OCCULTATION MEASUREMENTS

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Spire Global operates one of the largest constellations of satellites in the world and is currently the largest commercial producer of satellite-based GNSS Earth observation products. It now operates an expanding constellation of over 120 satellites in low-earth-orbit, of which, more than 40 are capable of collecting signals from GNSS constellations such as GPS, GLONASS and Galileo. The Earth observations that can be derived from measurements collected by Spire's GNSS science receiver include neutral atmospheric profiles from radio occultation (RO), ionospheric estimates of total electron content and scintillation, and Earth surface characteristics using near-nadir and grazing angle reflected GNSS signals.

As of May 2022, Spire produces over 17000 quality-controlled RO profiles and millions of ionospheric observations each day with low latency. Over the past few years, Spire's RO and other Earth observation data have been evaluated by NOAA, NASA, NRL, USAF, ESA, EUMETSAT, ECMWF, and the UK Met Office, all with positive results. Due to the past and current demonstrative impact of the data, Spire's RO data are now continuously delivered to organizations such as EUMETSAT and NOAA for further processing and assimilation into operational weather forecast models.

This talk will provide an overview of the status and capabilities of the Spire satellites and describe the collection and processing of neutral RO and ionospheric measurements. Statistics obtained internally and from third-party evaluators will also be shown to demonstrate the comparable quality of Spire GNSS measurements to other satellite missions. The operational deliveries to EUMETSAT and NOAA will also be highlighted. Finally, the presentation will outline future plans for the Spire Earth observation satellite constellation.