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Poster
As low Earth orbit (LEO) becomes increasingly crowded, the risk of collision continues to grow. Effective mitigation of this risk requires more reliable and accurate predicted trajectories of resident space objects, which in turn requires improved specification and forecasting capabilities of the earth space environment via upper atmospheric models. A primary source of this chain of uncertainties is the dearth of observation of the thermospheric neutral density, in both coverage and frequency, preventing effective validation of the thermospheric density models over a variety of periods, conditions, and altitude regimes. GNSS-equipped LEO satellites are precisely tracked and can serve as “data of opportunity” to provide additional observations of the thermospheric density. This work demonstrates using the GEODYN-II precision orbit determination software along with precise science orbit ephemeris to extract high-cadence neutral density estimates along the orbit of the ICESat-2 satellite. We demonstrate the usefulness of this method to identify errors in the thermospheric density models via scaling factors and to produce the estimated neutral density observations. Results are compared against the coplanar GRACE-Follow On satellite’s accelerometer-derived densities, and plans to extend this methodology to the Spire constellation are explored.

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