The University of Southern California (USC) and the Jet Propulsion Laboratory (JPL) have jointly developed the Global Assimilative Ionospheric Model (GAIM) to monitor space weather, study storm effects, and provide ionospheric calibration for space weather applications. JPL/USC GAIM is a physics-based 3D data assimilation model that uses both 4DVAR and Kalman filter techniques to solve for the ion and electron density state and key drivers such as equatorial electrodynamics, neutral winds, and ion production terms. The various Kalman-filter versions include separate band-limited, nested grid, and real-time GAIM capabilities. JPL/USC GAIM is capable of ingesting multiple data sources, updates the 3D electron density grid every 5-12 minutes. Since the forward physics model and the adjoint model were explicitly designed for data assimilation and computational efficiency, all of this can be accomplished on a single dual-processor Unix workstation.

In the presentation, we will show first results using C/NOFS measurements, and describe how the data acquired from the low-inclination C/NOFS orbit complements COSMIC data acquired in near polar orbit. We will investigate the simultaneous assimilation of COSMIC and C/NOFS ionospheric radio occultation measurements along with the global network of ground-based GPS measurements using the GAIM Kalman filter; present validation of the GAIM electron density grid by comparisons to independent datasets. To conclude we plan to describe recent upgrades to the GAIM model including satellite and receiver bias estimation capabilities and our on-going near real-time and streaming ingest of ground-based GPS and COSMIC measurements into the near real-time JPL/USC GAIM (RTGAIM).