Ionospheric Weather Observations of FORMOSAT-7/COSMIC-2

Fu-Yuan Chang¹, Jann-Yenq Liu¹, Chi-Yen Lin¹, Shih-Ping Chen², and Charles Lin²

¹Center for Astronautical Physic and Engineering, National Central University, Taoyuan, Taiwan (tigerjyliu@gmail.com)
²Department of Geosciences, National Cheng Kung University, Tainan, Taiwan (charles@mail.ncku.edu.tw)

FORMOSAT-7/COSMIC-2 (F7/C2), with the mission orbit of 550 km altitude, 24-deg inclination, and a period of 97 minutes, was launched on June 25, 2019. Tri-GNSS Radio occultation (RO) receiver System (TGRS), Ion Velocity Meter (IVM), and RF Beacon (RFB) onboard F7/C2 six small satellites allow scientists to three-dimensionally observe the plasma structure and dynamics in the mid-latitude, low-latitude, and equatorial ionosphere. Measurements of F7/C2 RO as well as the IVM ion density, ion temperature, and ion velocity have a better understanding on mechanisms of the plasma depletion bays, non-migrating tides, and scintillations. Moreover, observations of ionospheric F7/C2 RO electron density profiles and the total electron content derived from global ground-based GNSS receivers are used to carry out ionospheric weather monitoring, nowcast, and forecast for positioning, navigation, and communication application.