Current Status of ROCSAT-3/COSMIC Project for Ionospheric Research in Taiwan

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ROCSAT-3, which is a satellite constellation system consisting of 6 small satellites being planning to deployed in the orbit at around 800 km height, is scheduled to launch in 2005. The ROCSAT-3 project is also called COSMIC (Constellation Observing System for Meteorology, Ionosphere, and Climate) project. There are three payloads mounted on each ROCSAT-3 satellite, namely, GPS receiver, tiny ionospheric photometer (TIP), and tri-band beacon transmitter. With the GPS receiver, the atmospheric refractive index can be retrieved from received GPS signals using limb sounding technique, in which the profiles of temperature and ionospheric electron density can be deduced. With TIP, the horizontal variation of ionospheric total electron density content can be observed. The ionospheric scintillation and total electron density content from the satellite to ground receiver can be measured by using tri-band beacon transmitter. By using these instruments in combination with ground-based facilities, it is an attempt to investigate the ionospheric global structures and dynamic behavior associated with solar and magnetic disturbances. An integrated project comprising 5 sub-projects is also approved by National Space Program Office in Taiwan at the end of December of 2001. Specifically, the scientific goals of the integrated project are that: retrieval and validation of COSMIC ionospheric electron density profile data, analysis of ionospheric global dynamics and study of space weather forecast, investigation of 4-dimensional ionospheric tomography, study of ionospheric irregularities and scintillation, and the measurements of horizontal variations of total electron content using TIP. The infrastructure of the integrated project will be introduced and its scientific missions and goals will be detailed in the presentation.