

LSGI Distinguished Lecture Series

“Weather, Space Weather, and Global Watch of FORMOSAT Satellites”

Overview

It was our pleasure to invite Prof. Jann-Yenq (Tiger) Liu, Institute of Space Science, National Central University, Taiwan, to deliver a seminar of the LSGI Distinguished Lecture Series on 27 April 2018.



Biographies

Jann-Yenq (Tiger) Liu received BS, Atmospheric Physics Department, National Central University, TAIWAN in 1980, and MS/PhD, Physics Department, Utah State University, USA in 1988/1990. He became Associate Professor at Institute of Space Science, as well as Center for Space and Remote Sensing Research, National Central University, TAIWAN during 1990-1997, and has been Professor since 1997. He also served as Chief Scientist of National Space Organization (NSPO) in Taiwan during 2011-2015. He conducts ionosphere studies by means of theoretical derivations, numerical simulations, and radar/satellite observations. His research areas are in ionospheric space weather (solar flare, solar eclipse, and magnetic storm, etc.), ionospheric data assimilation, ionospheric radar science, space- and ground-based GNSS geosciences applications (ionospheric total electron content, seismo-traveling ionospheric disturbance, and seismo-ionospheric precursors). His current works focus on seismo-ionospheric precursors of GNSS total electron content and satellite observations of ionospheric plasma; ionospheric-tsunami early warning; ionospheric weather assimilation/ monitoring/ forecast; and satellite payload development. He has been publishing more than 250 refereed journal papers since 1989.

Weather, Space Weather, and Global Watch of FORMOSAT Satellites

FORMOSAT-3/COSMIC (F3/C) was launched on 15 April 2006, which consists of six micro-satellites in the low-earth orbit with 72-deg inclination and 800 km altitude, is capable of monitoring the atmosphere and ionosphere by using the powerful technique of radio occultation (RO) receiving the GPS satellite signals. With more than 2500 observations of atmospheric temperature and water vapor profiles and ionospheric electron density profiles per day, it provides an excellent opportunity to monitor/forecast severe weather, such as typhoon, and three-dimensional (3D) structures and dynamics of the ionospheric plasma. The 3D global electron density allows us observing new findings on the ionospheric plasma caves and ionospheric depletion bays, understanding on the equatorial ionization anomaly, mid-latitude trough, and high-latitude Weddell Sea/Yakutsk anomaly, and studying disturbances triggered earthquakes, tsunami, volcano eruptions, solar eclipses, magnetic storms, etc. The F3/C follow-on, FORMOSAT-7/COSMIC-2, which consists of six small-satellites with low inclination of 24-deg and 550 km altitude, will be launched in the 3rd quarter of 2018 to support weather forecast and ionospheric weather monitoring.

Follow-on FORMOSAT-2, FORMOSAT-5 with a sun synchronous orbit at 720-km altitude with 98.28-degree inclination angle was launched on 25 August 2017. The primary payload, an optical Remote Sensing Instrument (RSI) consists of one PAN band with 12,000 pixels and four MS bands with 6000 pixels each, which provides 2-m resolution panchromatic (PAN, black & white) and 4-m resolution multi-spectral (MS, color) images. Meanwhile, a scientific payload, Advanced Ionospheric Probe (AIP) probing the ion density, ion temperature, ion velocities, and electron temperature to monitor ionospheric earthquake precursors and to observe the ionospheric irregularity and ionospheric weather of navigation, positioning, and communication.