



# Colloquium

## Space Science Program in Taiwan

**DR. C. Z. (FRANK) CHENG**

*Plasma and Space Science Center  
National Cheng-Kung University, Taiwan  
and National Space Organization, Taiwan*

Taiwan established the National Space Organization (NSPO) in 1991 to operate its space satellite programs. Presently NSPO operates two satellite missions. The FORMOSAT-2 satellite was launched in May, 2004 and carries the science payload of Imager of Sprite Upper Atmosphere Lightning (ISUAL) for imaging with 6-wavelength bands in the 100-900 nm range, in addition to a remote sensing instrument for Earth observation with a 2m resolution. The ISUAL observes airglow, aurora and transient luminous events (TLE) such as sprites, which are natural upward lightning discharge phenomena toward ionosphere from the tropopause. The first sprite image was obtained by ISUAL on July 4, 2004 and is the first satellite sprite observation. The ISUAL horizontal observation of aurora complements with vertical aurora imagings and should help obtain 3D structure of auroral substorm activity. On April 14, 2006, NSPO in collaboration with US partners launched six FORMOSAT-3 LEO micro-satellites that form a constellation. Each satellite carries three science payloads: a GPS receiver, a Tri-Band Beacon (TBB) transmitter, and a Tiny Ionospheric Photometer (TIP). The signals received by the GPS receivers are employed for GPS limb occultation sensing of vertical profiles of atmospheric air pressure, temperature and water vapor as well as electron density for meteorological and climate research, weather forecasting and space weather studies. The FORMOSAT-3 satellites will provide at least 2500 near-real time atmospheric and ionospheric vertical profiles per day with almost uniform global coverage. This is about three times the ~900 ground-based observations that are located mostly on land. Combining the GPS RO electron density vertical profile data with the data from TIP and ground TBB receivers, 3D ionospheric electron density distribution and scintillations can be obtained for space weather monitoring and modeling. Taiwan plans to launch the next satellite, ARGO, in 2010. ARGO will carry four scientific instruments and its science goals are to study the magnetosphere-ionosphere coupling physics for space weather monitoring. Moreover, NSPO has funded international collaboration space science program, which covers g-ray telescope, substorm physics, etc. In the future, NSPO plans to launch a series of scientific satellites during the next 15 years and will actively pursue international collaborations.

**Wednesday, February 7, 2007**

**4:15 P.M. (Refreshments at 4:00 P.M.)**

**Lyman Spitzer Building, M. B. Gottlieb Auditorium**