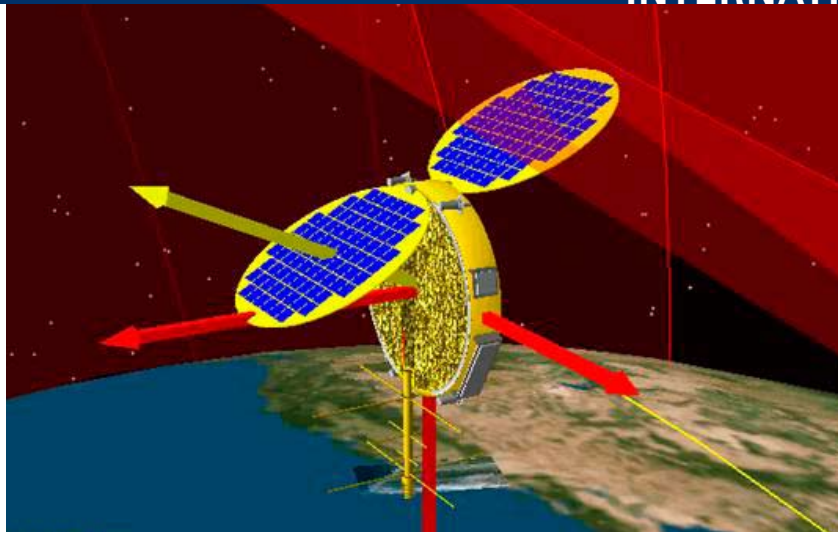


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Sensing Danger

Taiwan's FORMOSAT-2 Satellite Aids Disaster-Imaging Efforts

WHEN TAIWAN'S FORMOSAT-2 EARTH-OBSERVATION satellite (formerly known as ROCSAT-2) was launched from Vandenberg Air Force Base, CA, on May 20, 2004, one of its real-world applications was the evaluation of natural disasters. Perhaps too quickly for inhabitants of Southeast Asia, FORMOSAT-2's potential was realized. Images gleaned daily from Dec. 28, 2004, through Jan. 24, 2005, showed to the world the ravages of the tsunami that struck that region the day after Christmas. The pictures proved extremely helpful to disaster relief activities and area reform tasks. Taiwan's National Space Organization (NSPO), which manages the remote sensing satellite project, used AGI software to assist the orbit design, mission analysis, and mission simulation aspects of FORMOSAT-2, as well as its planned successor, FORMOSAT-3.

FORMOSAT-2's remote sensing instrument (RSI) can capture images of 14 worldwide territories each day. Following the tsunami, imagery from FORMOSAT-2 has supported Hurricane Katrina relief, the October 2005 Pakistani earthquake recovery, and other natural disasters.

Because FORMOSAT-2 is in a Sun-synchronous orbit, it has the unique capability of revisiting a specific area in its coverage region daily. Therefore, its imagery has also been applied to: land use, farmland, and forest planning; environmental monitoring; and scientific research and education. "The daily repetition of FORMOSAT-2 simplifies operations, scheduling, and processing," says Dr. An-Ming Wu, director of the NSPO's systems engineering division. "It is also easier for users to request images for urgent needs."

The NSPO employed many specialized STK modules to extend the core analytical functions of STK so that the following tasks would be fully supported:

Orbit Design: repeat orbit; long-term evolution; and orbit transfer;

Taiwan's National Space Organization leveraged AGI products to assist the FORMOSAT-2 Earth-observation satellite and the upcoming FORMOSAT-3 and RapidEye/Argo missions

Mission Analysis: contact and swath analyses; and groundtrack, launch window, and imaging planning;
Mission Simulation: satellite modeling; launch animation and imaging animation; constellation deployment; and radio occultation.

An STK user since 1995, Wu says the software fills many NSPO needs other technologies do not. As such, it is currently being leveraged for a number of constellation projects. "Constellations have drawn a lot of attention from the space industry lately. We are using STK to perform constellation deployment analysis for the FORMOSAT-3 mission, and to perform constellation feasibility studies for RapidEye AG, a commercial satellite-based geo-information service," says Vicky Chu, FORMOSAT-3 operations director, NSPO. "STK can also be used as a verification tool. As NSPO develops the algorithm for mission-specific analysis, we can use the available functions in STK to verify the new code."

FORMOSAT-3, also known as COSMIC (Constellation Observing Systems for Meteorology, Ionosphere, and Climate), is an international collaboration between Taiwan and the United States to deploy a constellation of six micro-satellites into six different orbits at approximately 700-800 km above the Earth. The goal is to develop advanced technology for real-time monitoring of the global climate by collecting signals transmitted by the 24 U.S. GPS satellites. The launch is planned from Vandenberg AFB in 2006.

For more on the NSPO and its current projects, visit www.nspo.org.tw. ▲