



## **Mission results from FORMOSAT-3/COSMIC constellation for global climate monitoring**

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The FORMOSAT-3/COSMIC spacecraft constellation consisting of six LEO satellites is the world first operational GPS radio occultation mission. The mission is jointly developed by Taiwan's National Space Organization (NSPO) and United States' UCAR in collaboration with NASA's Jet Propulsion Laboratory and Naval Research Laboratory. The FORMOSAT-3/COSMIC mission was launched successfully from Vandenberg on April 15, 2006 into the same orbit plane of the designated 516 km circular parking orbit altitude. The mission is for global earth weather forecast, climate monitoring, and atmospheric, ionospheric and geodesy researches by carrying three on-board payloads including GPS Occultation Receiver (GOX), Tri-Band Beacon (TBB), and Tiny Ionospheric Photometer (TIP). All six FORMOSAT-3/COSMIC satellites are maintained in the good state of health and are on their way toward the final constellation of six separate orbit planes with 30-degree separations as planned. Three out of six satellites have reached their final mission orbit of 800 km by the end of January 2007. The FORMOSAT-3/COSMIC has processed over 1500 good atmospheric sounding profiles (~900 mostly above the land mass) per day which has over the number of worldwide radiosondes launched per day. The atmospheric radio soundings data are assimilated into the Numerical Weather Prediction (NWP) models for real-time weather prediction and typhoon/hurricane forecast. The global and nation's weather prediction centers have shown significant positive impact and the forecast result will be also adapted into the nation's disaster warning and relief system once constellation deployment completed by end of year 2007. This paper describes the mission overview; the ground segment architecture; the state-of-the-art mission achievements

and results during various science campaign including aircraft dropsonde data comparison for typhoon surveillance; and the program's lessons learned for future follow-on mission. The ultimate success of a real-time operation of the FORMOSAT-3/COSMIC mission in the final constellation formation can be anticipated.