

SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)  
Integrated Applications End-to-End Solutions (2)

Author: Dr. Yingli Chang  
Shanghai Ocean University, China

Dr. Yu Liu  
Shanghai Institute of Spaceflight Control Technology, China  
Prof. Dongmei Huang  
Shanghai Ocean University, China

MICRO-SATELLITE CLUSTER FOR STORM SURGE MONITORING AND URBAN RESCUING

**Abstract**

There is 18000 km coastline in China. Storm surges to coastal cities brought great disaster to people's livelihood and the economy, which cause by typhoons during June to November each year. Storm surge is the result of the combined effect of the typhoon path and intensity, pressure, underwater terrain and coastline towards such a complex genetic mechanism, and it is difficult to accurately predict. Satellite has a natural advantage in terms of storm surge monitoring. With the development of satellite technology, we now has the commercial launch micro-satellite capability now, which is low-cost and rapid, but also makes use of micro-satellite clusters for storm surge monitoring and urban rescuing possible. We design a micro-satellite cluster for storm surge monitoring and urban rescuing. Before the storm surges come, the cluster will be launched in LEO, and provide multispectral observation data for storm surges predict. During the storm surges, the cluster will provide near-real-time imaging of urban disaster situation, and urgent communication APRS service for the city, to plan, amendment and implemented rescue works. According to the actual function of the trade-off, the system consists of 3-6 micro-satellites each 5-10kg. Because the service provided by the cluster is rapid, near-real-time and short period (5-6 months), the satellite platform and the payloads will be integrated and adopting COTS, which make the deployment cost and time of the cluster greatly reduced. As an example, in order to monitor storm surges in the summer of 2015, in Shanghai China, the detailed micro-satellite cluster design is carried out, includes cluster components scheme, the launch window and orbit design, satellite platform and payload integrated design, costs analysis and so on. The joint simulation with the Shanghai storm surge model show that the cluster is low cost, real-time, and can effectively achieve near-real-time monitoring of storm surges and emergency relief.