Paper ID: 21154
oral

21st IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Earth Observation Missions (4)

Author: Prof. Rock Jeng-Shing Chern
University of Science & Technology, Canada

Mr. Shin-Fa Lin
National Space Organization, Taiwan, China
Dr. An-Ming Wu
National Space Organization, Taiwan, China

TEN-YEAR EARTH AND TRANSIENT LUMINOUS EVENTS OBSERVATIONS OF FORMOSAT-2

Abstract

The purpose of this paper is to summarize the enormous contributions of FORMOSAT-2 in both Earth and transient luminous events (TLEs) observations in 10 years. As a small satellite operated for 10 years (20 May 2004 to 20 May 2014) in orbit, FORMOSAT-2 keeps its two unique characteristics: (1) 14 revolutions around the Earth per day with daily revisit capability, and (2) Earth observation in sunlight time and TLEs observation in eclipsed time. It carries two payloads: the remote sensing instrument (RSI) for Earth imaging in sunlight time and the imager of sprites and upper atmospheric lightning instrument (ISUAL) for scientific observations in eclipsed time. Daily revisit capability provides changes of events on Earth in either short time (several days) or long term (several years). Examples include: Indian Ocean earthquake and tsunami (December 2004), disintegration of Wilkins Ice Shelf in Antarctica region (2006 to 2014, long term), Sichuan earthquake (May 2008), Tohoku earthquake and tsunami (March 2011), polar regions (2006 to 2014, long term), etc. Major contributions of FORMOSAT-2 in Earth observation shall be summarized and presented in this paper, especially the long term observation results with evidences to show pronounced changes on Earth in the 10 years from 2004 to 2014. In the TLEs observation, ISUAL has recorded about 35,000 events in 10 years with 73.7% elves, 6.5% red sprites, 6% halos, 13.5% blue jets and 0.3% gigantic jets. Major contributions of FORMOSAT-2 in this specific scientific area are summarized and presented. In particular, global distribution and seasonal effect on TLEs are discussed. This paper also addresses briefly the health status of FORMOSAT-2 after working 10 years in orbit.