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Development Status of Optical Instruments onboard JEM-GLIMS

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In order to study the generation mechanism of Transient Luminous Events (TLEs), global occurrence rates and distributions of lightning and TLEs, and the relationship between lightning, TLEs and Terrestrial Gamma-ray Flashes (TGFs), we will carry out the lightning and TLE observation at Exposed Facility of Japanese Experiment Module (JEM-EF) of International Space Station (ISS). In this mission named JEM-GLIMS (Global Lightning and sprItE Measurements on JEM-EF) two kinds of optical instruments and two sets of radio receivers will be integrated into the Multi mission Consolidated Equipment (MCE) which is the bus system and will be installed at JEM-EF finally. The optical instruments consist of two wide FOV CMOS cameras and six wide FOV photometers, and all these optical instruments are pointed to the nadir direction. CMOS cameras named LSI (Lightning and Sprite Imager) use the STAR-250 device as a detector, which has 512x512 pixels and 25x25 um pixel size, and have 28.3x28.3 deg. FOV. One CMOS camera with a wide band filter (730-830 nm) mainly measures lightning emission, while another camera with a narrowband filter (766+/-6 nm) mainly measures TLE emission. Five of six photometers named as PH have 42.7 deg. FOV and use photomultiplier tube (PMT) as a photon detector. They equip band-pass filters (150-280 nm, 316+/-5 nm, 337+/-5 nm, 392+/-5 nm, and 762+/-5 nm) for the absolute intensity measurement of the TLE emission. One of six photometers equips a wide-band filter (600-900 nm) to detect lightning occurring within 86.8 deg. FOV. These output signals will be recorded with the sampling frequency of 20 kHz with a 12-bit resolution. JEM-GIMS will be launched in 2011. We have passed the critical design review (CDR) on January and February and have started the fabrication of the proto-flight model. We will present the development status of the JEM-GLISM optical instruments and discuss the scientific outputs derived from this mission more in detail.

Keywords: lightning, sprite, International Space Station