

## Global measurements of lightning and sprites from International Space Station: JEM-GLIMS mission

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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 nadir observation of lightning and TLEs from the exposure facility of Japanese Experiment Module (JEM) at 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 are employed and will be integrated into the common port module. The common port module will be launched by HII-B 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 look the nadir direction. CMOS cameras use the STAR-250 device as a detector, which has 512x512 pixels and 25x25 um pixel size, and have 40° FOV. One CMOS camera with a wideband 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 have 40° FOV and use photomultiplier tube (PMT) as a photon detector. They equip band-pass filters (150-280 nm, 316+/-5 nm, 337+/-5 nm, 391+/-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 87° FOV. These output signals will be recorded with the sampling frequency of 20 kHz. These data will be analyzed to estimate the electron temperature and vibration temperature of N<sub>2</sub>. A monopole antenna to detect electromagnetic waves in the VLF range excited by lightning discharges will be installed at the base plate of the common port module. The output signals from the antenna are converted into the digital signal with a resolution of 13 bit. Two sets of VHF antenna are also installed at the base plate of the common port module. Since the antenna must be exposed outside the common port module and must be compact, the shape of the antenna is a patch-type. The base line of these VLF antennas is about 1.5m. Thus, these antennas can be a VLF interferometer, which enable us to measure extension processes of the horizontal lightning currents in a thundercloud occurring within a few ms. JEM- GLIMS instruments will be launched in 2012, and we have started the fabrication of the pre-flight model. We will report the mission status and discuss the possibility of the cooperative observation with other missions such as TARANIS and ASIM.