

SPRITE-SAT

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SPRITE-SAT is now being developed and fabricated in-house by the Tohoku University team, which will be launched in 2008. The total weight of the satellite is about 50 kg, including 5 kg science mission payload. There are two scientific objectives in this micro-satellite mission: the first is to identify the generation mechanisms of sprites by investigating their horizontal structures, and the second is to identify the generation mechanisms of TGFs by investigating their location of parent lightning discharge. Lightning and Sprite Imager- 1 and 2 (LSI-1 and 2) are CMOS cameras with 512 x 512 pixels and the pixel size of 25 μm , which is directed nadir to take images of the horizontal distribution of sprite elements and area of lightning flash. In order to detect lightning emissions, we put a broadband filter between 740 and 830 nm on LSI-1. We install a rather narrow band- pass filter centered at 762 nm on LIS-2. The optics and the detector array altogether yield an effective field of view (FOV) of 35 deg, giving the pixel resolution of less than 660 m from the altitude of 660 km. Wide Field CCD imager (WFC) is a CCD camera with 659 x 494 pixels and the pixel size of 7.4 μm , which will image lightning discharge flashes associated with TGF events. WFC is looking at nadir direction and is equipped fish-eye lens to cover the whole visible disk of the earth. The outputs of all cameras are digitized by 10 bit A/D conversion. One instrumental case contains LSIs and WFC and the total weights is 630 g. In order to detect TGFs, terrestrial gamma-ray counter (TGC) which consists of CsI scintillator is installed at the satellite. TGC can detect gamma-rays in the energy range from 30keV to a few MeV. This satellite also has a VLF antenna which receives VLF radiations from lightning discharges. In the presentation, we will show the specifications of the instruments and discuss the observation strategy, considering contributions to future space missions.