

## Purpose of RISING satellite mission

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RISING project team

RISING satellite, the project name of SPRITE-SAT, was successfully launched by HIIA rocket from Tanegashima, Japan on 23 Jan and inserted into the geosynchronous (01-13h meridian) low altitude (660km) orbit. It was developed and fabricated in-house by Tohoku University team with supports by some universities and institutes. The total weight of the satellite is about 50 kg, including 5 kg science mission payloads. 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 Imagers (LSI-1 and 2) are CMOS cameras with apixel format of 512 x 512, which is directed nadir to take images of the horizontal distribution of sprite elements and area of lightning flash. In order to image lightning emissions, we put a broadband filter in the band of 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 27 deg, giving the pixel resolution of less than 620 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  $\mu\text{m}$ , 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. In order to detect TGFs, terrestrial gamma-ray counter (TGC) which consists of CsI scintillator is installed at the bottom of the spacecraft. TGC can detect gamma-rays with discrete levels of 150, 450, 1000, 2800 keV with a time resolution of 250us. This satellite also has a VLF antenna provided by Stanford University, which receives VLF radiations from lightning discharges at sampling rate of 100kHz. The purpose of RISING observation and the latest condition will be presented.