

Upward TGF observations with TARANIS XGRE

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TARANIS is a 150 kg class micro-satellite dedicated for observing Terrestrial Gamma-ray Flashes (TGFs) and Terrestrial Electron Beams (TEBs) associated with lightning discharges. The mission at the same time observes Transient Luminous Events (TLEs), as well as optical and radio emission from the lightning discharge. The satellite are planned to be launched into quasi-polar sun-synchronous orbit in the beginning of June this year. We in Japan are contributing to the calibration of the instrument for X-ray, Gamma-ray, and Relativistic Electron detector (XGRE), the main instrument to detect TGFs and TEBs. With from ~50 keV to 10 MeV band width and 425 cm² effective area averaged on a typical TGF spectrum, XGRE can detect more than 200 TGF per year. Made of fast-decaying LaBr₃ scintillator crystals combined with plastic scintillators, XGRE has a high throughput capability, and able to handle intensive gamma-ray pulse (typically < 100 us) of TGFs. As the launch date is nearing, final calibration of the detector is on-going at CNES Toulouse.

TARANIS multi-frequency and multi-particle observations will provide unprecedented information on relation between TGF and other lightning related phenomena. We also expect a strong synergy with similar multi-frequency on-ground observations of downward TGF.

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