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TARANIS Satellite: Scientific Payload and Scientific Objectives

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1. Extended Abstract

In Celtic mythology Taranis is the god of thunder. The TARANIS mission (Tool for the Analysis of RAdiation from lightNIng and Sprites), funded by CNES the French space agency, is a low altitude satellite to be launched by 2018 along a quasi-polar sun-synchronous orbit and dedicated to the study of impulsive transfers of energy between the Earth atmosphere and the space environment. Such impulsive transfers like Transient Luminous Events (TLEs) and Terrestrial Gamma-ray Flashes (TGFs) are known to occur above active thunderstorms. To answer the numerous remaining questions about the physics of these phenomena, TARANIS will provide the atmospheric electricity community with a set of unprecedented and complementary measurements: combined nadir observations of TLEs (micro-cameras and photometers) and TGFs (X-ray and Gamma-ray detector), high resolution measurements of energetic electrons, and high resolution electric and magnetic wave field measurements (see Figure 1).

In the frame of this talk the TARANIS spacecraft, the scientific objectives, the scientific payload, and the strategy adopted to maximize the scientific return of the collected data will be discussed. The status of the mission and a review of the main functionalities of the future TARANIS Data Mission Center will be presented.

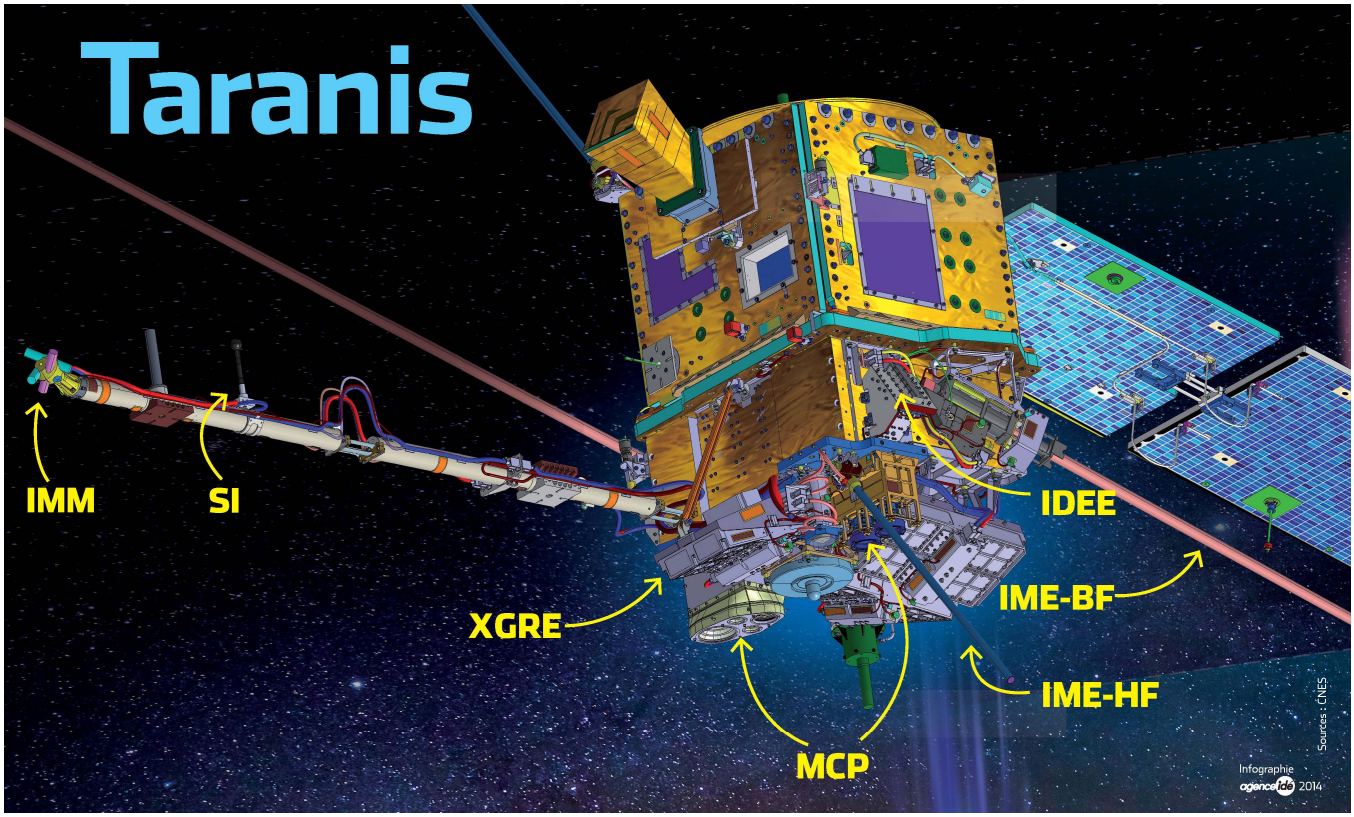

Figure 1. Scientific payload of the TARANIS satellite (copyright CNES). IMM: triaxial search coil magnetometer to measure the magnetic field (5 Hz – 1 MHz); SI: Ion Probe; XGRE: to measure X and Gamma-rays (20 keV – 10 MeV) and energetic electrons (1 MeV – 10 MeV); MCP: 2 cameras (10 frame/s) and 4 photometers for luminance measurements of high-resolution spectral bands; IDEE: Nadir and Zenith energetic electron detectors (70 keV – 4 MeV); IME-BF: antennas to measure electric fields (DC – 1 MHz); IME-HF: antennas to measure electric fields (100 kHz – 35 MHz).