

TARANIS: a satellite project for the study of transient energy transfers between atmosphere ionosphere and magnetosphere

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Sprites, jets and elves called Transient Luminous Events (TLE), observed in the middle and upper atmosphere above thunderstorms, are the manifestation of intense energy exchanges between the troposphere, stratosphere and mesosphere. Different types of luminous emissions have been identified by ground based observations, showing the complexity of these phenomena. Other, possibly related, transient emissions in the Earth atmosphere include high energy electrons, radio emissions in a broad frequency range from ELF up to VHF, luminous emissions in FUV, X-gamma ray emissions called Terrestrial Gamma-ray Flashes (TGF) with energies which could reach 100 MeV. The purpose of the satellite TARANIS (Tool for the Analysis of RAdiations from lightNINGs and Sprites) is to study simultaneously these emissions above the thunderstorm areas with complementary instruments including: micro cameras and photometers, X-ray and gamma-ray detectors, high energetic electrons spectrometers, electric and magnetic sensors. The orbit will be quasi-polar sun-synchronous at 700 km altitude. Data of "event" and "survey" modes will be stored on a mass memory of 16 Gbits and transmitted to the ground by X band telemetry link. TARANIS, presently in construction phase, is scheduled to be launched by the end of 2015. The presentation will describe the instrumentation and review the new challenges opened by the most recent observations related to these phenomena. It will also discuss the possibilities opened by the synergy with the other space missions GLIMS and ASIM.

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