

LATTES - BRAZILIAN DUAL MISSION SCIENTIFIC SATELLITE

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Abstract

The Brazilian dual mission scientific satellite LATTES is based on the Multi-Mission Platform (PMM), a modern concept of satellite architecture to provide a service module compatible with a set of scientific experiments, related to two scientific missions, namely the Equatorial Atmosphere Research Satellite (EQUARS) Mission and the X-Ray Astronomy (MIRAX) Mission. The EQUARS mission aims at the global scale monitoring of the Earth's equatorial middle and upper atmosphere – ionosphere regions. The scientific objectives of the EQUARS mission are to understand the plasma dynamics and electrodynamics, to study the effects on the upper mesospheric region caused by the coupling with the stratosphere on the lower side and the ionosphere-thermosphere system on the upper side, and to apply the data to atmospheric, space weather and climate studies. The physical parameters to be monitored are the tropospheric water vapor content, the temperature variability in the stratosphere and mesosphere, the tidal and planetary wave propagation, the ionospheric plasma irregularities and bubbles and the flux of energetic electrons from the magnetosphere. Real-time monitoring of data on the tropospheric water vapor, stratospheric temperature profile, and total electron content in the ionosphere by GPS radio occultation measurements will be applied to numerical weather and climate predictions and space weather monitoring, respectively. The main scientific objective of the MIRAX mission is to carry out deep imaging and wide-band X-ray spectroscopy of the central Galactic Plane in order to detect, localize and study in detail a large number of transient sources associated with black holes and neutron stars. MIRAX will have unprecedented coverage of the discovery space and will be able to observe in detail all phases of transient phenomena. The main topics to be investigated are the spectral changes in black hole binaries, the X-ray bursts and super bursts, the period history of accretion-powered pulsars, the X-ray jets and variability during radio outbursts of micro quasars, the fast X-ray novae, the Gamma-ray bursts and X-ray flashes and the obscured active galactic nuclei. Mission details and a brief account of the proposed scientific experiments will be presented here.