# SCIENTIFIC-METHODICAL ASPECTS OF IMPLEMENTING THE ACADEMIC "CHIBIS-M" MICROSATELLITE

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Recent decades have brought serious changes in our understanding of the lightning discharge nature, which was also connected with space explorations. New physical phenomenon called Terrestrial Gamma Flashes (TGF) was discovered at the beginning of 90s. It is characterized by exceptionally powerful gamma-ray bursts and radio-frequency pulses, which creates radio emissions in the broad frequency band. To explore new physical processes at high altitude atmospheric lightning discharges and formation mechanisms of gamma-ray bursts, infrared and ultraviolet radiation, electromagnetic radiation in a wide range of frequencies simultaneous measurements in radio, optical and gamma bands should be carried out in the ionosphere with unprecedented high (submicroseconds) time resolution.

Academic "Chibis-M" microsatellite for 2.5 years on the orbit registered several hundred events associated with short (from tens of microseconds to hundreds of milliseconds) and powerful (hundreds of joules) lightning discharges, registered in a wide electromagnetic spectrum radiation from ELF/VLF and radio, ultraviolet and infrared ranges up to x-ray and gamma-ray bursts. Experimental data has shown the need to consider the discrete, fractal properties of the distribution of charges and percolation effects of flow discharges in inhomogeneous turbulent environment in the storm clouds, which previously paid little attention in the study of atmospheric electricity and mechanisms of generation of powerful terrestrial gamma-ray bursts (THF). Data about ELF/VLF emissions in the quiet and disturbed geomagnetic conditions, characterized by a high dynamic range and high spectral resolution, highlight the specific characteristics of a number of ionospheric-magnetospheric resonances.