

## **Ionospheric research high-altitude atmospheric discharges in microsatellite "Chibis-M".**

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To explore new physical processes at high altitude atmospheric lightning discharges and formation mechanisms of gamma-ray bursts, infrared and ultraviolet radiation, as well as electromagnetic radiation in a wide range of frequencies, the simultaneous measurements in radio, optical and gamma bands should be carried out in the ionosphere with unprecedented high time resolution. Russian microsatellite (MS) "Chibis-M" was created to realize such an experiment. The MS was launched January 25, 2012 from the Russian segment of the International Space Station (RS ISS) at an independent circular orbit (altitude 513 km and inclination 52°).

The scientific payload of the "Chibis-M" includes:

- X-ray and gamma-ray detector (RGD) with a 0.02-1.0 MeV energy band;
- ultraviolet detector (DUF) of radiation with wavelengths from the UV (180-400 nm) to IR (650-800nm);
- radio frequency analyzer (RFA) in the frequency range 26 - 48 MHz;
- digital camera (CFK) with a spatial resolution of 300 m and the exposure time of 15 frames / sec;
- magnetic wave complex (MWC) in the frequency range of 1 - 40,000 Hz;
- data acquisition unit (BND).

The MS downlink uses 2.2 GHz transmitter (PRD2.2) with antenna.

Thanks to its unique instruments is able to effectively monitor electromagnetic environment of the Earth at ionosphere altitudes producing simultaneous measurements of electromagnetic emissions in a very broad frequency band from VLF and VHF to X- and gamma-rays. Special technique of trigger formation makes it possible to prevent uncontrollable expanding of the amount of data stored. Embracing the broad frequency band the experiment carried out on-board the MS may give us an insight into still mysterious processes taking place during thunderstorms like lightning discharge initiation and TGF origin.

This paper presents the first results of the research.