

Project "Chibis"

Information letter

January 2012

Space Research Institute of Russian Academy of Sciences (Moscow) in cooperation with Moscow University, FIAN of Russian Academy, Ukrainian Space Research Institute and Etvos University (Hungary) develops a new series of micro-satellites, dedicated to studies of Transient Luminous Events (TLEs) above thunderstorms (sprites, jets, elves and halos) and Terrestrial Gamma-ray Flashes (TGFs) in the upper atmosphere. The multi-instrument technique, covering nearly the whole spectrum of electromagnetic emissions, is designed for the monitoring of lightning discharges with unprecedented time resolution. The unique new feature of this project is the simultaneous measurements in radio, optical, UV, X-ray and gamma bands.

Micro-satellite "Chibis" has been brought to ISS by the transportation vehicle "Progress" on November 02, 2011. In the end of January 2012, "Progress" will disembark the ISS and will raise the microsatellite to the pre-designed orbit (circular - 480 km, inclination - 52°). After testing of all systems, in mid-March 2012 "Chibis" will start its operation on the orbit. The expected ballistic lifetime of the microsatellite is about 3 years.

Main technical characteristics

Total mass: 40 kg (scientific payload 12.5 kg).

Orientation control: star camera and GPS-GLONASS

Scientific instrument

- **X-ray & Gamma ray detector**

energy range 50-500 keV, time resolution 30 ns

- **UV detector**

emission wavelength 180 - 800 nm, time resolution 30 μ s

- **Digital photo camera**

matrix 1000x1000, 10 bit, frame duration 0.2 s (10^7 bit/s)

- **Radiofrequency Analyzer**

dipole electric aerial, frequency range 20 – 50 MHz

- **Data acquisition and transmission system:**

operative memory (5-10 cycles) 1.75 – 3.5 Gb, board-ground transfer 1.2 Mb/s, circular memory 100 Gb, information flow ~ 50 Mb/day

Chibis team is interested in the collaboration with groups conducting ground-based observations of high-altitude TLE, TGF, and electromagnetic emission from thunderstorms.

Contact information

Space Research Institute (IKI), Profsoyuznaya 84/32, 117997 Moscow, Russia

<http://chibis.cosmos.ru>

PI of the project - acad. **Lev Zeleny** (lzelenyi at iki.rssi.ru)

Scientific co-PI of the project – acad. **Alex Gurevich** (alex at lpi.ru)

Satellite design and operation - Prof. **Stanislav Klimov** (sklimov at iki.rssi.ru)

Principal Designer – Dr. **Vadim Angarov** (angarov at tarusa.ru)

Ground observation support - Prof. **Viacheslav Pilipenko** (space.soliton at gmail.com)