Paper ID: 18372
oral

43rd STUDENT CONFERENCE (E2)
Educational Pico and Nano Satellites (4)

Author: Prof. Vera Mayorova
Bauman Moscow State Technical University, Russian Federation

Mr. Nikolay Nerovny
Bauman Moscow State Technical University, Russian Federation
Mr. Alexander Popov
Bauman Moscow State Technical University, Russian Federation
Mr. Dmitry Rachkin
Bauman Moscow State Technical University, Russian Federation
Mr. Stepan Tenenbaum
Bauman Moscow State Technical University, Russian Federation

SPACE EXPERIMENT "BMSTU-SAIL"

Abstract

There are several projects in Bauman Moscow State Technical University (BMSTU) related to micro and nanosatellites: "Baumanets-2" microsatellite, "BMSTU-Tether" space experiment and "BMSTU-Sail" space experiment. The main task of BMSTU-Sail experiment is deployment of heliogyro-like solar sail by centrifugal force and verification of such solar sail dynamics model.

Solar sail prototype will be deployed from 1 kg CubeSat picosatellite during EVA near Russian segment of ISS. Experiment sequence will start shortly after separation from picosatellite orbit deployer (POD). This POD will provide special separation conditions in order to decrease parasite angular velocities.

After separation, picosatellite will start spinning caused by wheel inside it rotating in opposite direction. By reaching appropriate spinning velocity, onboard computer will start controlled solar sail deployment by centrifugal force.

In order to deploy long blades with small rotating wheel the special multistage deployment procedure will be implemented. Finally, length of each solar sail blade should be 5 m.

After finishing of deployment process, picosatellite will transmit all of experimental data (angular velocity data and images from onboard cameras) by UHF radio to amateur ground stations, that's why we would like to attract radio amateurs from different countries to help us to collect information from our picosatellite

BMSTU-Sail experiment is developing according to the "Program of applied science research" onboard of Russian segment of ISS in the "Space education" section and it is financed by Russian Federal Space Agency "Roscosmos". This experiment was introduced into Program in December 2012. This project is planned to be implemented in two years, launch is proposed to the end of 2014.

BMSTU-Sail experiment started in 2009 as a student initiative. Many students and professors from BMSTU took part in this project from 2009. We believe that our project will promote STEM education, keep space exploration going further and further, stimulate practical utilization of solar sails in future.