

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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SMALL METEOROLOGICAL ROCKET LAUNCH FOR STUDENT PROJECT PAYLOAD WITH
BIO-MATERIAL

Abstract

On 27th of July small meteorological rocket MMR-06 was launched from polygon Kapustin Yar, Astrakhan Oblast, Russia. This rocket carried the payload that was made during the student project in Moscow Polytechnic University, Moscow, Russia.

This project was implemented due to cooperation of three partners. Scientists from Space Medicine Research Institute were interested to test living cells in conditions of rocket flight: linear acceleration, angular speed up to 7 turns per second, short-time zero-g. Central Aerological Observatory has a great history of meteorological rocket launches in the latter half of the 20th century. Nowadays progress in electronics allows small-size payload, space for extra experiments was set free. Free space is cone frustum with top diameter: 100 mm; bottom diameter: 150 mm; height: 180 mm. Flight altitude in a peak is about 60 kilometers. Central Aerological Observatory share this free space with educational institutions. Payload made in Moscow Polytechnic University was the first in this program. The capsule for cells thermostatic should keep 37 C temperature during all time with biomaterial inside. There are several stages: pre-launch operations (1 hour), launch (8 min), parachute descending (1 hour), shock on the ground, search by the recovery team (2-12 hours). Telemetry data reduction was done. During the launch inertia parameters were recorded. Probes with living cells were successfully landed, temperature generally was in the range. Scientists from Space Medicine Research Institute have obtained interesting results, but for their verification they are going to launch few new rockets.

During the project students learned a lot from system engineering, project planning up to mechanical, electrical, thermal and others designs which are similar to the space ones. Tested platform allow new possibilities for cooperation of Russian and foreign partners.