MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Facilities and Operations of Microgravity Experiments (5)

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Abstract

This paper gives an overview of the next stage of development of the ILR-33 "Amber" sounding rocket. The main goal of this project is to design a highly scalable, cost effective and green platform for conducting experiments in microgravity. The article focuses on critical subsystems' tests carried out during the development. Results of main motor firings are presented. The main engine is a hybrid motor using High Test Peroxide (98%) as oxidizer and high-density polyethylene as fuel. Its mean thrust exceeds 4 000 N and the burn time is 40 s. The motor was designed and tested in the Institute of Aviation in Warsaw, Poland. Moreover, the paper shows the results of tests of the 6000 N class solid propellant boosters. Three parallel firings of two motors on the test stand were performed. Attention was paid to the ignition delay time and its variation to ensure that unsymmetrical performance of two boosters will not affect the mission sequence. Furthermore, tests of the launch tower and rocket release system were carried out. The start sequence controlled by the computer was proven. Subsequent experiments concerned recovery system reliability and performance of the on-board computer. These were verified during a drop test campaign. The payload, avionics and recovery modules were dropped from a helicopter and obtained data was analysed. The first launch of the rocket is scheduled for October 2017. Follow-on actions and technology maturation plans are presented.