

**Lithuanian Small Satellite Activities**  
**POC Presentation (2<sup>nd</sup> UNISON-Global meeting)**

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As small satellite technologies get more popular and affordable Lithuania has joined the countries operating their own satellites while launching two Cubesat's in the beginning of 2014. The satellites LituanicaSat-1 and LitSat-1 were brought to the International Space Station (ISS) together with other 32 Cubesat's by Orbital Commercial Resupply Services Mission (Orb-1) on Jan 9, 2014 and launched into the space (at an altitude of 420 km) on 28th February 2014. The service was provided Nanoracks LLC, US.

The satellites were developed by two Lithuanian Universities – LituanicaSat-1 by Vilnius University and LitSat-1 by Kaunas University of Technology as the test and demonstration platforms for future missions, to analyse the possibilities and ways of constructing, launching and controlling CubeSats. Both satellites were 1U Cubesat type, had ARM Cortex M4 On Board Computer, passive magnetic attitude control and telecommunication modules in VHF and UHF bands. Locally manufactured Silicon and GaAs solar panels were tested in the flight. Additionally LituanicaSat-1 had photo camera and radio amateur repeater on-board and Litsat-1 performed the tests of space qualified GPS receiver and radio amateur linear transponder.

Both teams have successfully reached all the goals of orbital experimental works, collected the trajectory data and broadcasted welcome message in Lithuanian language from outer space. The operational time of LituanicaSat-1 in the orbit was 5 months, and Litsat-1 faced an extremely rapid (both in time and compared to other satellites launched at the same time) orbital decay with orbital life of only 83 days. The mission data are processed to evaluate the influence of different deceleration reasons now. According to the comparison of theoretical (computational) and experimental data it was determined that besides aerodynamic drag the damping of the magnetic hysteresis could have considerable influence on the dissipation of the kinetic energy.

The team of Vilnius University works on the design of Cubesat thruster and Kaunas University of Technology develops piezoelectric suspension of the precise Attitude Control System now. The students are involved in the Research and Development works. The components are planned to be tested in the next missions in 2016.

After the participation of Lithuanian representative in the CanSat Leader Training Program (CLTP) in 2012 Lithuanian Space Association organised the first Lithuanian Cansat (CS) and Unmanned Aerial (UAV) competition in 2013. Ten Lithuanian and one Ukrainian team participated in the event. The Cansat launch was provided by Space Science and Technology Institute (Lithuania) using Cesaroni Pro-38 rocket motors. The rocket lifted two standard 350 g Cansats into the altitude of 1 kilometre. Additionally the participants attended in the Open class of Cansat's competition (up to 700 g) for the safe landing of the "Eggsat". The second Lithuanian CS and UAV competition is organised in 2014. In the Open class the teams compete supplementary for the precise landing of the Cansat within the radius between 3 and 100 m.