SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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Author: Mr. Zaynulla Zhumaev
SPUTNIX, Russian Federation

Mr. Igor Zharenov
SPUTNIX, Russian Federation
Mr. Stanislav Karpenko
SPUTNIX, Russian Federation
Mr. Roman Zharkih
SPUTNIX, Russian Federation
Ms. Antonina Gromyko
SPUTNIX, Russian Federation
Mr. Anton Vlaskin
SPUTNIX, Russian Federation

SPUTNIX EDUCATION: FROM SATELLITE MOCKUP TO CUBESAT LAUNCH

Abstract

SPUTNIX is a private Russian space company founded in 2011, which launched the first Russian privately funded satellite TabletSat-Aurora in 2014. Since 2014, the company developed a line of educational products used for aerospace education from primary schools to universities. Following the basic principles of STEM education and project education, the main purpose of SPUTNIX educational equipment is to give young people the hands-on experience of designing, constructing, testing and operating real satellite systems.

Thus, SPUTNIX developed a number of satellite mock ups, starting from a basic functional satellite mockup "TabletSat kit" to a professional microsatellite platform – "TabletSat-Aurora". All the satellite kits a prepared to be used with the testing laboratory equipment – from the simplest versions ("TabletSat-Terra") for demonstrating the basic algorithms using sun sensors and reaction wheels to semi-professional testing facilities – "Attitude Determination and Control System lab" and "Testbed for joint motion research". The latter are designed for multiple complex tasks such as ADCS testing during formation flight, development of onboard software, mathematical and computer modelling of onboard subsystems, calibration of satellite subsystems sensors and actuators and other.

The most advanced task for students at all levels is to design their own satellite using SPUTNIX cubesat kit "Orbisat". To make space more affordable for students, the kit is based on Raspberry-Pi computer. Another feature is "SPUTNIX Cubesat API" - a software library for Raspberry-pi. The library dramatically saves on-board software development time, allowing users to focus on high-level algorithms and mission goal rather than solving tasks on low-level programming. "Orbicraft" Cubesat product line is available in 2 options: 1U Cubesat with coarse magnetic stabilization system and 3U Cubesat with 3-axis ADCS. Each of the options is suitable for a variety of educational and applied tasks, including: design of nanosatellite, systems engineering, structure design, space missions planning, satellite mission control and telemetry processing, on-board software development, nanosatellite assembling, engineering tests, payload integration and its maintenance in laboratory and on orbit.

SPUTNIX developed a number of educational formats to introduce the young people into the modern space tasks and technologies. The testing equipment and satellite kits can be found all over Russia at

the most advanced centers and in the best engineering educational programs: Educational center Sirius (Sochi), Quantorium children technoparks (Moscow, Tula, Nefteyugansk, Khanty-Masiysk, Korolev), corporate engineering schools (Innopraktika, AFK Sistema), National Technology Initiative Olympiad etc.