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The evolvement of the university orbital constellation of small satellites series AIST for scientific, educational and applied tasks in the field of remote sensing

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Launched on orbit in 2013 satellite constellation, consisting of two small spacecraft AIST is the result of joint work of students, postgraduates and young scientists of the Samara University and young professionals of Space Rocket Center Progress (Samara, Russia). Nowadays the satellites control, receiving and processing telemetry and scientific information are provided by young specialists of the university center for receiving and processing information. During three years of orbital working the unique information about the magnetic field of the earth and micrometeorite situation on two different orbits in which satellites operate were received. In addition, experience in the design, creation and operation of these satellites allowed significantly upgrading the educational process in Samara University. On 28th April 2016 during the first launch from Vostochny Cosmodrome, the new satellite of AIST constellation–Aist-2D was launched. The primary goal of Aist-2D is remote sensing with high resolution from an orbital altitude of 490 km; it provides resolution of 1.48 m in panchromatic mode and 4.5 m in multispectral mode in a 39.6 km-width band. The IR-range thermal equipment of Aist-2D which was the first to use micro-bolometric photo detectors without cooling, will not only produce night photographs, but also develop the technology for small fire foci detection. The special-purpose equipment includes an innovative radar set developed for passive earth location in a new R-range of frequencies (432-438 MHz). The scientists plan to use it for possible space observation not only of visible surfaces, but also sub-surfaces. The satellite holds six sets of scientific equipment created by scientists, students and post-graduate students of the Samara University. The article gives the first results of AIST-2D functioning and an analysis of space images and data from scientific equipment received from the satellite. Some variants of constellation evolvement are discussed also in the report.

Biography

Ivan S Tkachenko is currently an Assistant Professor in Space Engineering department at Samara University (Russia). He received his PhD at Samara University in 2011. In 2006, he organized the youth scientific-innovation center which is the main project of creation of small satellite "AIST". In 2013, he became a Project Manager of AIST-2D satellite at Samara University. His research interests include "Space missions analysis, dynamics of flight of spacecraft with electric propulsion, methods of processing the telemetry data received from the satellites". He has published over 50 papers.

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