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EXPERIMENT POTENTIAL ONBOARD SICH-2 MICROSATELLITE – FIRST RESULTS

Abstract

Remote sensing SICH-2 microsatellite (MS) was launched August, 17, 2011 at sun-synchronous orbit 670 km high. Main MS task is Earth's surface satellite survey with 8 meters resolution. This main task is fulfilled with excellent quality. Besides, the scientific and technological payload named POTENTIAL is also installed onboard. It comprises high-productive data collection and processing system (DCPS), electric potential (EP) meter and sensors of neutral and charged particles concentration (DN-DE). Main task of this experiment was first of all to run in space for the first time the modern technology - DCPS and DN-DE sensors. Next goal was to monitor MS surface potential in order to study electromagnetic environment state changes at MS operation. Last but not least, the availability of high-class flux-gate magnetometer for MS attitude control allowed us to study the possibility to use this rather rough onboard service magnetometer for scientific goal, e.g., for IGRF model improvement. First year of scientific payload operation showed that DCPS excellently fulfilled all its tasks and reliably collected and transmitted data through telemetry even in multiple glitches conditions. Now the collected data is stored in the data server of Space Research Institute of National academy of sciences and is processed to suit into POP-DAT web server format developed in frames of FP7 "Problem-oriented Processing and Data Base Creation for Ionosphere Exploration" contract. The DCPS technical parameters are presented and further way to adapt it for the next space mission is discussed. This system is destined for the next scientific MS satellite mission – IONOSAT-MICRO (tentative launch date 2013). The measured and theoretically derived values of neutral and charged particles concentrations are compared and good coincidence of these values is demonstrated what proves the efficiency of newly proposed instrument DN-DE. The study results of onboard electromagnetic environment of MS are presented and the ways to improve the measurement conditions for electromagnetic sensors in the future mission are discussed. The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013), under grant agreement n 263240. The work has been also supported by SSAU contract N 1-05/08.