

SPACE DEBRIS SYMPOSIUM (A6)
Operations in Space Debris Environment, Situational Awareness (7)

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THE ROLE, PLACE AND DEVELOPMENT PROSPECTS OF THE RUSSIAN HAZARD ALARM
SYSTEM IN THE INTEGRATION OF INTERNATIONAL EFFORTS TO PROVIDE SAFE SPACE
ACTIVITIES

Abstract

The planned large-scale expansion of satellite constellations with the steady growth of space debris in the near-earth space will probably demand problem solution to provide safe flight control and life activities on Earth. The whole range of safety measures is being implemented by the world community to provide safe space activities. One of the main aspects to provide safe space activities is the whole new level of on-line monitoring and forecasting of space debris situation in the near space. The works were started up in the Russian Federation to create and develop an automated hazard alarm system in near-Earth space with the leading role of Mission Control Centre of the Federal Unitary State Enterprise Central scientific research institute of machine building and with the participation of Keldysh institute of applied mathematics (of the Russian Academy of science), Institute of Earth magnetism, ionosphere and radiowaves propagation (IZMIRAN), Joint Stock Company "MAC "Vympel". The system is designed for detection and forecasting of hazardous situations in the near space and consumers informing. It consists of the main information-analytical centre (the central core), monitoring segments of hazardous situations in different areas of near space, calculation of solar and geomagnetic activity, analysis of non-coordinate information about space objects. Currently the system provides detection and warning of dangerous encounters of space debris with more than sixty five space vehicles, such as: International Space Station (ISS), "Resurs-DK", "Kanopus-V", "Electro-L", "Luch-5A", "5B" satellites, GLONASS satellites, "Express", "Yamal" and others. Supporting works are conducted on de-orbiting risk space objects with definition of time and area of their fall. The most significant operating results within the framework of international cooperation are as follows: -ballistic and navigation support of the "Phobos-Grunt" final flight phase; -deorbiting of satellite "Express-AM4" and its submersion in the Pacific Ocean; -detection and identification of space debris fragments generated after "Briz-M" upper stage destruction and others. The prospective lines of system evolution are as follows: -enhancement of international cooperation concerning spacecraft flight safety, information and ballistic support of operators of satellite payload data for the detection of hazardous encounters with space debris; -elaboration of auxiliary means for observation of space debris including the space-based ones; -open access to the information of catalogued space objects

system. The safety level of space activities in the XXI century will be considerably increased subject to realization of all the above-mentioned development lines of the system.