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Results and prospects of fundamental space research on microsatellite realizable in the ISS infrastructure

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Microsatellite (Kolibri-2000) (weight 20.5 kg) was designed and manufactured in IKI RAS. Its delivery to the orbit has been performed using the infrastructure of ISS in 2002, which was the first step of the program on using of microsatellite for fundamental space research. Despite its small size the microsatellite (MS) was carrying 3.6 kilograms of scientific payload which was used for the realization of wide range of scientific research in the field of (classical) cosmophysics. Also the study was made of space weather, atmospheric and ionospheric processes supposedly associated with thunderstorm activity manifested in the detection of electrons near the equator. Due attention was paid to solve the problems of space education. For transportation and direct launch to the orbit in autonomous flight of both MS (Kolibri-2000) and (Chibis-M) the transport and launch container (TPC) was designed and manufactured in IKI. The monitoring of the environment dynamics carried out on (Chibis-M) MS proved to be extremely effective. The volume and quality of received information from its scientific payload (Groza) focused on the study of discharges at high altitudes confirmed the uniqueness of the project as to the number and speed of the simultaneously measured parameters. Experience of successful implementation of such projects as (Kolibri-2000) and (Chibis-M) shows:

1. The full cycle of design, manufacture and ground tests of microsatellite platforms for fundamental space research was worked out.
2. Unique scientific equipment adapted to the microsatellite platform was created.
3. The scheme of microsatellite launch to the orbit using the infrastructure of the Russian ISS segment to the altitude of ~ 500 km has been worked out.
4. Lifetime of microsatellite platforms in the orbit without using of «military» component can significantly exceed the guaranteed service life.
5. The ground segment of project created in IKI in particular for the project (Chibis-M) fully provides the operation of microsatellite on orbit for the implementation of scientific program, for receiving and processing of a large volume of scientific data (tens of gigabytes) and for the transfer of scientific information to participants including international ones.

At present the development of new space experiments (Chibis-AI) and (Trabant) based on (Chibis) platform has been started and these projects are included in the Long-term program of scientific and applied research and experiments on the Russian ISS segment.

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