

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Generic Technologies for Small/Micro Platforms (6A)

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SMALL SATELLITE PLATFORM

Abstract

Yuzhnoye State Design Office has developed MS-2 platform to design spacecraft (SC), lighter than 180 kg, of applied and scientific purposes for operation on near-earth orbits.

The MS-2 platform key characteristics: • Orbit – sun synchronous near-circular, altitude from 600 to 800 km and local solar time in the node from 10 to 14 hours; • Orientation – three-axis, Earth-oriented, orientation error not worse than 5 deg (3), angular stabilization velocity not worse than 0.01 deg/sec (3); • Control, telemetry, and payload data transfer at a rate of 32 Kbit/sec – via S-band radio line; • Active life time – not less than 5 years; • Platform weight – less than 100 kg. Payload with the following characteristics can be installed on the platform: • Weight under 80 kg, volumes outside the body – 2 sites of up to 50 l, inside the body – 3 sites of up to 70 l; • Average daily power capacity – up to 15 W (up to 300 W during 15 minutes); • Number of relay control commands (single and program) – up to 69, and interface control commands (single and program) – up to 143; • Data exchange interface – “current loop” (3 channels); • Number of telemetered parameters: analog – up to 20, signal – up to 52, temperature and potentiometer – up to 28.

The MS-2 platform consists of the platform data subsystem that includes a flight digital computer complex and telemetry unit; attitude sensing and control subsystem; S-band equipment; GPS-receiver; electric power supply subsystem; thermal control subsystem of harnesses and structure. The MS-2 platform is designed unpressurized, applying a technology of instrument frame modules and light-weight three-layer honeycomb structures. Arrangement of devices of payload and attitude subsystem on a single base – basic block – allows providing stability of their mutual angular position on the orbit of not more than 3 angular minutes.

The MS-2 platform is the base for the Earth remote sensing satellite Egyptsat-1, which has been operated by the Arab Republic of Egypt from April 17, 2007, and the Ukrainian Earth remote sensing SC Sich-2 (MS-2-8), which has been manufactured and ground tested, as well as Microsat SC of scientific and technological applications has been developed.