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

Author: Dr. Alexander Makarov
Yuzhnoye State Design Office, Ukraine

Mr. Sergii Moskalov
Yuzhnoye State Design Office, Ukraine
Mr. Yuriy Shovkoplyas
Yuzhnoye State Design Office, Ukraine

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.