

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Future Space Transportation Systems Technologies (5)

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ORBITING AND DEORBITING OF THE SATELLITE BY AEROSPACE PLANE

**Abstract**

The project of the Ukrainian unmanned two-stage aerospace plane (ASP) Sura provides for the opportunity of putting into an orbit the returnable and reusable satellite. It is necessary for creation of orbital groups of satellites, their maintenance and servicing and for forming and arranging them during their flight in an orbit, including their quantitative changes in the group. The ASP returns back to the Earth the satellites, previously put by it into an orbit with the purpose of reducing a bulk of space debris in the near-earth outer space. The scheme of transportation of the microsatellite-transformer, which has the spherical form while being transported, by the orbital plane (OP) of the ASP, has been considered in the report. Before the satellite separation, OP is being oriented in the outer space. Separation of the satellite inside the cargo compartment is carried out without disturbance. Therefore there is no need for an additional satellite orientation in an orbit for creation of conditions for its functioning. Satellite's construction is simplified due to co-ordination of the OP construction, to possibility of transforming the satellite after its separation from the OP and to combination of satellite moving-off system with the system of its string gravitational orientation. The satellite is being separated and moves away self-acting. For the satellite separation and moving away from the OP it is used solid-propellant jet engine, which, after ending its function, is used as a counterbalance in the line system of the gravitational string stabilization. There is being considered in the report the principle scheme and constructive solutions for taking away the satellite-transformer from an orbit for returning it back to the Earth. The satellite-transformer can be sent repeatedly to the space and back to the Earth by the aerospace plane Sura. The main constructional particular features of ASP Sura have been presented in the report.