SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems Concepts (1)

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CONCEPT FOR SPACE SYSTEM PROJECT BASED ON SATELLITE CLUSTER FOR MULTI-POSITIONAL MEASUREMENTS OF IONOSPHERE PARAMETERS

Abstract

The project consolidates the current experience gained by the Ukrainian organizations of the space sector and National Academy of Sciences of Ukraine for development of the state-of-the art ionospheric satellite project. The essence of the project consists in development and orbiting of a series of clusters composed of 3 scientific satellites for global monitoring of the parameters of ionosphere. The satellites are developed based upon subsystems and engineering decisions flight tested in outer space for lessening of outlay on project development and creation of a unified space platform for the global space monitoring system. The project is open for international collaboration and may mature with attraction of foreign investments. The method of multi-positional measurements utilizing 3 closely deployed satellites (satellite cluster) makes it feasible, as opposed to the single-shot measurements on one satellite, to define spacial and time variations for the measured values. Accommodation of scientific equipment onboard the cluster satellites assures accomplishment of a number of new experiments essential for understanding of physical processes with the maximal possible level of electromagnetic cleanliness and better accuracy of measurements. Taking into consideration the worldwide trends in research studies of the ionosphere, there is proposed to solve the following scientific problems: registration of ionospheric phe-nomena, analysis of large-scale electric field, fine variations of magnetic fields, energy-angular distributions of energetic charged particles, characteristics of heat and superheat plasma in the ionosphere. The initial phase in development of the space system will be accomplished based on the orbital constellation of 3 satellites (one satellite cluster) positioned in one plane, which will be injected into orbit by one launch vehicle. In a perspective, there may be deployed a satellite constellation for global monitoring composed of 6-8 satellite clusters (18-24 satel-lites). The number of planes will be eventually determined per results received after accomplishment of an experimental phase in development of the space system. The work activities trends for international collaboration were: investments in project development, development of an interstate project, participation in generation of the project scientific domain, processing of the results obtained, project ground support, development of instrumentation for accomplishment of space experiments, reception and use of information from the onboard scientific complex, participation in deployment of the satellite constellation for global monitoring.