

# NAVIGATION SATELLITE SYSTEMS

## CONCEPT FOR THE CREATION AND DEVELOPMENT OF THE SUBSYSTEM OF SATELLITE RADIO NAVIGATION SUPPORT WITHIN THE FRAMEWORK OF A SINGLE SATELLITE DATA TRANSMISSION SYSTEM

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**The paper presents basic concepts for the creation and development of the satellite radio navigation support subsystem as a component of the unified satellite data transmission system of Ukraine.**

The satellite radio navigation systems NAVSTAR (USA) and GLONASS (Russia) are the most accurate global systems of coordinate-and-time navigation data support. These systems that were put into operation in 1993–1995, have radically changed the situation in the field of providing the navigation services to practically all countries. In addition, they facilitated the analysis of solutions to create the international global civil satellite systems (GNSS-1, GNSS-2). Global satellite radio navigation systems (GSRNS) supplemented with special earth hardware and software-algorithmic facilities enable any country to ensure the safe and reliable navigation of mobile entities over its territory and carry out actions requiring the coordinate-and-time support.

The navigation support is a sphere of national interests of Ukraine owing to its geopolitical position, advanced transport network, scientific-and-technical potential and economic gains resulting from the application of high technology of satellite positioning to numerous branches of economy. The subsystem of satellite radio navigation support (SSRNS) of the Single Satellite Data Transmission System (SSDTS) [1] is defined as a set of earth hardware and software-algorithmic support enabling us through the effective use of functional and technical capabilities of SSDTS to extend navigation fields of global radio navigation systems, form the integral navigation field, satisfying the needs of customers and guarantee the required level of integrity, reliability, and accessibility of navigation information.

Therefore, the development of scientifically established approaches for introducing the high technology of satellite radio navigation orientation supplemented by earth hardware and software-algorithmic facilities to global satellite radio navigation systems is an important task for Ukraine. The tasks of SSRNS include: generation, monitoring, and support of the radio navigation field while using radio navigation satellite systems NAVSTAR, GLONASS, GNSS-1, GNSS-2 and the national satellite additions; supply of validated data on integrity, accessibility, and reliability of satellite radio navigation systems to users of the satellite radio navigation information; determination of corrections and their supply to users ensuring the enhanced accuracy and veracity of positioning within the limits of the SSRNS service area, interaction with centers of monitoring and maintenance of the integrity of radio navigation field, centers for receiving the telemetric and other service information, as well as centers of orbitography through the data SSDTS transmission system.

The following steps are scheduled: the effective use of functional and technical capabilities of SSDTS to integrate the radio navigation fields of GSRNS and the earth hardware and software-algorithmic support formed by SSRNS; the creation of the network of monitoring-and-correction stations (MCS) and coordinate-and-calculation center ensuring the required

REFERENCES

1. K. S. Sunduchkov, A. A. Makarov, A. A. Negoda, V. G. Komarov, M. E. Ilchenko, and A. G. Nezhurenko, *Radioelektronika*, vol. 42, no. 11, pp. 14-23, 1999.

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