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THE SPACE SYSTEM FOR INTEGRATED MONITORING OF EMERGENCY SITUATIONS ON THE  
BASIS OF THE "GRAVISAT" SPACECRAFT.

**Abstract**

PJSC "RPC"KURS", under a contract with the National Space Agency of Ukraine on the topic "Navigation-RNIS", has been creating a navigation RTK network since 2016. In 2019, in the framework of research work with the National Space Agency of Ukraine on the topic "Navigation-Gravica", a comparative analysis of the results of measurements of gravitational acceleration measured using radiophysical gravimeter and the facts of earthquakes that occurred at that time. The fact of anomalous change in the value of the acceleration of gravity two days before the earthquake was experimentally confirmed an amplitude of about 200 Gal at a distance of 600-800 km to the earthquake site. It should be noted that the magnitude of the amplitude varies depending on the distance between the measurement point and the site of the earthquake. If the distance exceeds 2000 km, then the change in the acceleration value is not significant. This result was made possible thanks to the features of the functioning of the gravimeter, which allow continuous measurement of the absolute and relative values of gravitational acceleration with an error of not more than 40 Gal with averaging over an interval of not more than 1000 s.

Positive research results allowed us to develop a space-based system for monitoring seismic activity using a gravimeter based on the original Gravisat spacecraft. The structural layout of the "Gravisat" spacecraft was developed by S. Matvienko and is protected by two patents of Ukraine. A distinctive feature of the spacecraft is its passive gravitational orientation, which allows you to abandon the use of gyroscopes and maintain vertical orientation in the orbital coordinate system without consuming energy with an error not worse than 1.

In addition, it should be noted that the high-precision differential phase-amplitude method implemented in the gravimeter allows measuring the change in the frequency of the electromagnetic navigation signal, which makes it possible to measure the phase difference on the basis of no more than 1 m of the arrival of the electromagnetic signal from the radiation source that is located on the Earth. Thus, we can solve the inverse navigation problem and determine the coordinates of the distressed object.

The results of scientific and technical studies allow us to conclude that it is possible to create a space system for integrated monitoring of emergency situations, which includes a forecast of seismic activity and determination of the coordinates of objects and people in distress.