

EARTH OBSERVATION SYMPOSIUM (B1)  
Interactive Presentations (IP)

Author: Dr. Ekaterina Tverdokhlebova  
TSNIIMASH, Russian Federation

Dr. Feodor Lyubchenko  
Russian Federation

Dr. Fedor Dedus  
TSNIIMASH, Russian Federation

Mr. Evgenie Nikitin  
Russian Federation

Dr. Alexander Karelin  
TSNIIMASH, Russian Federation

STATE OF THE ART AND PERSPECTIVES OF ORBITAL CONSTELLATION IN RUSSIA TO  
EMERGENCY MONITORING

**Abstract**

The modern space system of Earth observation should solve fast enough and effectively the different tasks of emergency monitoring. The Russian orbital constellation includes at the present time 8 spacecrafts: nature management high resolution SC Resurs-DK1, Resurs-P 1 Resurs-P 2; monitoring emergencies SC Canopus-V and belorussian SC BKA; hydrometeorological SC – Electro-L 1, 2 SC on sun-synchronous orbit Meteor-M 1 Meteor-M 2. Tasks for emergency observation are the next: — floods; — early fire detection; — monitoring of the atmosphere, detection of natural phenomena, rapid changes of weather and environmental pollution; — monitoring of radioactive pollution; — prediction of earthquakes. The paper presents the some solutions of problems of monitoring in real time: — creation of emergency spacecraft, equipped (in addition to traditional multizone scanners with high, middle and low resolution) with specialized equipment; — use of microwave temperature-humidity sensing system to estimate variation of chemical potential of water vapor in ground layer, measurement of humidity in clouds, determination of temperature and relative humidity in hurricanes; — developing IR-band multispectral (hyperspectral) radiometers for determination heat emission, emitted by the boundary atmospheric layer (with resolution at least 20 m); — developing and usage of UV-hyperspectrometer with resolution at least 10 m for detection and identification of trace gas; — creation and usage of IR-lidar for detection and identification of greenhouse gas concentration; — usage of lightning detector to estimate power of energy deposition of lightning strikes in the atmosphere; — creation of electro- optic- high- resolution equipment(at least 10m) in vision spectrum for GEO spacecraft; — creation and usage of ionozondes for monitoring of discriminating variation of local electron content regarding to total electron content. Creation of multi-satellite space system of radiating monitoring, which can be basis for both the creation universal system of super national control of extension and prevention of radioactive pollution and the analysis of ionized atmosphere.