

Space Technologies of the EMERCOM of Russia: from Research and Development Projects to Departmental System

Over the last years, EMERCOM of Russia considerably enlarged the application of satellite data for the solution of tasks imposed on the Ministry. Today the Departmental space monitoring system is not just functioning but it continues to improve. Mr. **Epikhin A. V.**, Head of Department - National Crisis Management Centre Deputy Director, dwelled on details of space imagery application for emergency situations prediction, monitoring, and risk management and mitigation. He also expressed his opinion on the necessity to develop public private partnership in the sphere of space technologies in Russia and enlargement of ERS data application in the functioning of authorities at different levels.



UniScan hardware and software complex installed at National Centre for Crisis Management

— **Alexander, when did it become necessary to implement space technologies into EMERCOM of Russia operations?**

— In the mid 90s of the XX century there appeared a necessity for EMERCOM of Russia to receive real time and impartial information from the RF constituents. It is related to the fact that regional authorities quite often tried to conceal the real scale of emergency situations in their territory or, on the contrary, tried to overestimate the damage in order to receive a bigger financial help from central authorities. In such a situation All-Russia Research Institute for Civil Defense and Emergency Situations, the research and scientific institution with the Ministry of Emergency Situations, has undertaken a number of research projects related to application of space information for the solution of a number of tasks imposed on the Ministry of Emergency Situations.

Application of satellite data being received directly at reception stations from space vehicle in real time mode for the monitoring of emergency situations premonitory symptoms, reasons of an emergency, emergency situations scale assessment and situation trends was one of the topics of these projects. For that purpose, a reception station of ScanEx production was mounted on top of All-Russia Research Institute for Civil Defense and Emergency Situations building. ScanEx also handed over technologies for reception and processing of information from space-borne assets for Earth remote sensing. The results of the projects were presented to Mr. Shoigu, Minister for Emergency Situations. He approved the results and ordered to develop this trend and proactively implement space information into everyday operations of the Ministry. In 1997 Programme for Application of Information Received from Space-borne Earth Remote Sensing Assets in Activities of EMERCOM of Russia was developed and approved. One of the results of Programme implementation was the establishment of the Space Data Reception and Processing Centre in Moscow on the basis of All-Russia Research Institute for Civil Defense and Emergency Situations.

Other joint with ScanEx projects were to set up and equip satellite data reception and processing stations in Krasnoyarsk, Vladivostok, Vologda.

— Currently the National Centre for Crisis Management considerably increased the application of space technologies in sphere of satellite imagery. Is the application of space technologies worth it?

— By 2008 EMERCOM of Russia created and put into operation an Emergency Situations Space Monitoring System. Its everyday operations were based on All-Russia Research Institute for Civil Defense and Emergency Situations, which would not let a full scale use of its capabilities for timely provision of required information to EMERCOM of Russia control bodies at the federal and regional levels. There was no “feedback” from the information users (justification of the necessity to carry out the imaging of new emergency situations). That is why in December 2008 Minister for Emergency Situations decided to hand over the function of Emergency Situations Space Monitoring System everyday operation to the newly created National Centre for Crisis Management. Starting July 2009 branches for space information reception and processing in these cities and Department for Space Monitoring (DSM) are integral parts of National Centre for Crisis Management. The creation of DSM as part of

National Crisis Management Centre added a powerful impulse to implementation of space technologies into EMERCOM control system. A new UniScan-24 reception complex was purchased and installed on the roof of the National Centre for Crisis Management building. The complex is capable of receiving data from nine Earth remote sensing satellites. Next in line are the upgrades of reception complex in Krasnoyarsk, purchase and mount of complexes in Vladivostok and Anadyr.

A specialized geoportal on the basis of space data, which is one of the main information resources for everyday activities of Real-Time Operations Desk at National Centre for Crisis Management, has been loaded into the server of National Centre for Crisis Management. Software enabling centralized planning and Earth remote sensing data reception throughout the whole Emergency Situations Space Monitoring System was purchased and loaded. Is the application of space technologies worth it? Absolutely. One cannot even imagine full-scale and efficient operations of Real-Time Operations Desk at National Centre for Crisis Management, and EMERCOM in general, without space technologies. Ministry has no other way but to introduce all modern technologies, if they prevent emergency situations and help to save people in danger.

— Do you think that today application of Earth remote sensing data is sufficient for emergency situations monitoring and control?

— Existing possibilities of Emergency Situations Space Monitoring System allow solving a number of tasks allotted to EMERCOM of Russia. But if we look at the question from the point of view of “sufficiency”, the requirements to space information could be formulated in the following way:

- in terms of operability: reception of real time information from emergency situation areas (validity of information decreases with time). So far space monitoring system of EMERCOM is capable of receiving information in 1.5-2 days;
- in terms of spatial resolution: from very high (sub-meter resolution) to middle (hundreds of meters) resolution, as we have to assess the condition of objects in emergency situation areas;
- in terms of spectral resolution: visual, infra-red, microwave bands.

Ideally, EMERCOM of Russia must have its own satellite constellation of six satellites including two space vehicles of high resolution, two vehicles of very high resolution and two vehicles of high and very high resolution in microwave band.

— **How do you assess the scale of space imagery products application in public administration in Russia?**

— In our opinion, the application of Earth remote sensing information in federal institutions of authority and regional management structures is not sufficient enough. There are many reasons to it:

- relatively expensive space information from foreign satellite systems;
- absence of national space information in the market, which could be cheaper than foreign information;
- absence of educational establishments which could train high level specialists for this branch.

— **Is it necessary to develop public private partnership in the sphere of space technologies in Russia?**

— The mechanism of public private partnership can accelerate the development of space technologies in Russia. What should be done for it to start working? Firstly, distinct and clear legal base, which does not exist currently. Secondly, desire of state structures to participate in such partnership. Thirdly, organization of “transparent” tenders for the selection of companies eligible for participation in public private partnership. I think that currently business is ready for such cooperation.