

EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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PROSPECTS OF A SATELLITE CONSTELLATION BASED ON CANOPUS-B DECK

Abstract

During 2012, two small remote sensing spacecrafts based on unified universal deck, Canopus-B No.1 and Byelorussian spacecraft BKA were launched. The spacecrafts were designed by VNIIEM Corporation OJSC. The small spacecraft Canopus-B No. 1 is the first Russian satellite of new generation for highly detailed sensing of the Earth.

At the present time, four more crafts of the same class and one craft with additional IR equipment have been developed. This way, an orbit group of 6 small spacecrafts of Canopus-B type will be created. The main tasks that may be solved with help of such crafts are: monitoring of man-made and natural emergencies, monitoring of agricultural activity and land use, monitoring of forest fires, mapping, etc.

One of prospective use of such spacecraft group is monitoring of radioactive contamination. The problem appears and remains actual since the second half of the XX century due to industrial use of nuclear energy, growing number of potentially dangerous nuclear objects and some large accidents at nuclear power plants. The last serious accident in Japan in March 2011 emphasized the need of serious revision of safety issues at active plants and development of new effective methods of remote detection and remote control over radioactive contamination of environment.

Currently, there are some methods of space monitoring over the lowest atmosphere layer, oceanic and land surface, and also indirect methods for evaluation of radioactive contamination by response of environment to ionising radiation. The main influence of fission products on environment is ionisation, and as a consequence, various biological and physical processes that are stimulated by ions causing some effects that may be detected. Presence of an ionisation source in an area under study may cause significant changes of absolute humidity, and – that is most prominent – changes of the chemical potentials of atmosphere vapours indicating presence of charged condensation centres. Such effects may cause anomalies in IR radiation emitting from the Earth surface and spikes of chemical potential of water vapour that may be detected by means of satellite remote sensing of the Earth and specialized equipment (works by Dimitar Ouzounov, Sergey Pulinets, e.a.).

Implementation of such monitoring will give the principal possibility of independent control over spreading of radioactive contamination with the territory of the country and worldwide, that in its turn will help to take effective measures in cases of emergency.