

A firmware complex for satellite monitoring of forest fires in the areas around particularly dangerous objects

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In the framework of creation of Federal system of critically important objects and particularly dangerous freights a firmware complex for operational forest fire control around a series of industrial objects in Russia has been developed. The complex controls over 50 objects situated in forested areas whose malfunction may cause increased danger for the environment and population. These objects include nuclear power plants, other objects of nuclear industry, cosmodromes, chemical, oil and gas enterprises. As the satellite data source the American satellites NOAA, TERRA and AQUA as well as Russian spectrometer MSU-E on board of METEOR-3M satellite are used. The information about ignition, fire center coordinates, fire area, distance and azimuth from object to fire is extracted from multi-spectral imagery by means of specialized algorithms in cloudless conditions. Satellite data from specialized receiving stations and data centers come to the input of firmware complex. The raw and processed images are spatially filtered in order to cut $4^\circ \times 4^\circ$ fragments around the dangerous object and then go to the specialized database for storage and analysis. The remote access to the data is performed via Internet channel. The developed web-interface allows browsing the current status of objects under monitoring, getting up to 7 days history of object status as well as accessing to the satellite data archive for more detailed image analysis. In the case of ignition detection a sound signal is generated and the table element corresponding to the object status is marked by different color depending on the distance from fire (3 levels). Every 8 hours the system generates the exchange text file containing the occurred ignitions characteristics. The archived exchange file may be sent by FTP or SMTP protocol the user or user group.