

Division 2

RESEARCH OF THE EARTH'S UPPER ATMOSPHERE BY THE OPTICAL AND MILLIMETER-WAVE TECHNIQUE («Inframon» project)

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Introduction. The project deals with continuous and long-term monitoring of the events occurring on the Earth's surface, in the atmosphere and in the near-Earth space. The apparatus proposed by the authors can be incorporated into a common measuring complex allowing research to be com-

pleted simultaneously in the high-frequency range of the electromagnetic wave spectrum. Moreover, an integrated method of the passive control (without any influence on the studied object) is used, namely the radiometry of thermal radiation.

«BIT» Experiment

ON-BOARD INFRARED TELESCOPE

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The principal idea of the «BIT» experiment is to determine the temperature distribution over the field of view with the spatial and temperature resolution that is good enough to localise the sources of any toxic or harmful outbursts (such as smokes and hot gases), and to study their vertical distribution and global migration. Taking into consideration the absence of precise stabilisation of the ISS, the instrumentation of the on-Board Infrared Telescope (BIT) is based on a highly sensitive matrix image sensor that, in contrast to any scanner, is able to produce an image with a short enough exposition to avoid the blurring caused by space instability of the ISS. Both the temperature and the emission

distribution within the field of view can be calculated, if a possibility is provided to compare two images obtained almost simultaneously in the different spectral ranges.

The main objective is to monitor the terrestrial atmosphere and near space. The monitoring should be carried out with a set of instrumentation attached to an on-board infrared telescope for imaging in one or more spectral bands in the range from 1 to 5 μm . The experiment is oriented to the problems of ecology and investigation of the Earth's atmosphere, in order to detect the effects of industrial and natural factors on the environment and climate.