

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Utilization & Exploitation of Human Spaceflight Systems (3)

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M.Y. BELYAEV, M.V.CHEREMISIN INTEGRATED MONITORING OF EARTH SURFACE FROM
ONBOARD ISS RS

Abstract

Observations of Earth from onboard the Russian Segment of the International Space Station (ISS RS) are performed both by the crew using hand-held devices (visual instrumented observation), and with the use of Earth Remote Sensing (ERS) equipment operating in automatic mode. This makes possible an efficient use of capabilities of manned space complexes for observation of Earth surface in a broad range of wavelengths and with various spatial resolutions. The existing constraints on space station attitude are compensated for by algorithms developed for ortho-rectification in the imaging data processing software, or by hardware using special brackets and movable equipment pointing platforms. For example, currently entering service onboard the ISS RS is the System for Orientation of Videospectral Apparatus (SOVA) which is designed for installing on portholes various video-, photo- and spectrometry equipment so that it could point and shoot per a program specified by an operator or fully automatically. In addition to this, the SOVA equipment is designed to compensate for motion of the photographed scene during exposure. The paper analyses the principal methods of carrying out an integrated monitoring of Earth surface from onboard the ISS RS using observation hardware operating in hand-held and automatic modes in various ranges of electromagnetic spectrum and placed inside and on the outer surface of the station. It describes the ERS hardware used onboard the station and the equipment that is being developed for installation onboard the ISS RS (hyper-spectrometer, high-resolution infrared radiometer). It discusses the principles of integrated analysis of different types of ERS data, identifies the most efficient methods of their processing and interpretation. The obtained results enable efficient integration into a manned space complex of any types of advanced ERS onboard hardware to provide valuable information for Earth surface study.