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# A DECISION SUPPORT SYSTEM (DSS) FOR RESEARCH PROGRAM SCHEDULING ON THE RUSSIAN SEGMENT OF THE ISS

**Abstract**

Computerized Decision Support System (DSS) for space experiments selection and optimal scheduling of the medium-term research program on the Russian segment of the International Space Station (ISS) has been developed. Currently, due to expansion of the number of proposals concerning new space experiments there is a need to increase the efficiency of expert procedures to identify priorities and develop programs of scientific and applied research on the Russian segment of the ISS. To solve this problem the DSS-ISS software was developed. This system meets all requirements to an advisory system for solving wide range of semistructured and unstructured multicriteria choice problems of high dimensionality. The DSS-ISS employs the methodology of decision support systems invariant to the application environment. At first stage one should expertize scientific and applied significance of proposed space experiments by vector criterion based on a customer value system. The output of this stage is priorities among space experiments. Planning and forming of an experimental program proceeds next. Scheduling of space experiments is determined by the priority calculated at first stage and resource requirements: - weight and dimensions of scientific payloads; - weight and dimensions of recoverable components and consumables; - payload power consumption; - time outlays; - information traffic; - special circumstance for space experiments; - funding. Some of these resources are renewable. However they are insufficient to meet all demands of space experiments developers. So there is a need for a reasonable plan of the research program. This task belongs to the class of combinatorial integer programming. The developed DSS-ISS can be customized and allows to employ various methods to solve such tasks in accordance with the individual preferences of a decision maker. This circumstance becomes especially important with respect to use of universal DSS in various subject research areas on the ISS. The proposed system is expected to ensure more efficient use of ISS resources.