

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
How Can We Best Apply Our Experience to Future Human Missions? (2)

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DESIGNING OF THE CONTROL SYSTEM FOR THE NEW RUSSIAN MANNED
TRANSPORTATION SYSTEM

Abstract

The Advanced Manned Transportation System is being designed presently at S.P.Korolev Rocket and Space Corporation "Energia".

The main task of the creating system is the realization of missions outside of near-earth orbit, including flights to the Moon. The complex includes Manned Transportation Spacecraft and Descent Module providing safety for the returning crew.

In accordance with the conception of control systems design for manned spacecrafts, such as International Space Station Russian Segment modules, manned and transport vehicles Soyuz and Progress, the Onboard Control Complex for the Manned Transportation System includes Onboard Computer System, Guidance, Navigation Control System, Onboard Equipment Control System, Onboard Telemetry System and Onboard Radio Link System.

The basic system of the Onboard Control Complex is Computer System. It consists of two different Onboard Computers - the main one and the redundant one with different levels of redundancy. The first one is four-lane redundant computer and the second one is one-lane redundant. These computers are implemented on the different components and electronic parts. Each computer utilizes different software. It will provide not only redundancy of equipment but also functional reliability. In case of need the redundant computer will take the execution of the main operations of transport vehicle.

Control system of the Advanced Manned Transportation Vehicle provides:

- Orbital flight on circumlunar (or near-earth) orbit in manned and unmanned modes;
- Transition from near-earth to circumlunar orbit;
- Proximity operation and docking of Manned Transportation Vehicle on circumlunar (or near-earth) orbit with the elements of lunar (or near-earth) orbital infrastructure;
- Transition from circumlunar orbit to the trajectory to Earth;
- Descent and nominal landing of reentry vehicle, providing crew safety, landing accuracy, and safety of reusable elements of reentry vehicle for future usage.

The paper will describe the main tasks, goals, design and structure of the Onboard Control Complex for the Advanced Manned Transportation System.