

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
New Technologies, Processes and Operating Modes Enabling Future Human Missions (7)

Author: Ms. Maria Komarova
S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, ich903585@yandex.ru

THERMAL CONTROL SYSTEM DESIGN OF INTERNATIONAL SPACE STATION NODE MODULE

Abstract

The Node Module (NM) will be a new element of Russian Segment (RS) of the International Space Station (ISS). It is targeted for launch in 2014. This spherical-shaped module (D 3.3 m) is equipped with six docking ports and will be attached to the nadir port of Multipurpose Laboratory Module (MLM), providing its five free ports for other modules and transportation vehicles docking to the ISS.

NM will be also equipped with a Thermal Control System (TCS) of new generation that should support its functioning within 30-year lifetime period. The TCS should provide nominal (in accordance with specifications) temperature conditions for NM structure, for onboard systems functioning, and to maintain a temperature range of inner gas environment.

Due to some structure features of NM and low level of heat dissipation from the equipment installed, it is possible to consider a TCS of passive type with heat pipes. This paper analyses some results of TCS simulation, provides a comparison between suggested TCS and a traditional system, and also shows advantages of a selected method for NM structure thermal conditioning.

In the paper a new in essence thermal conditioning method of manned spacecraft structure is described. This lightweight TCS is to be highly reliable with low level of power consumption.