

THERMAL ANALYSIS OF ISS SERVICE MODULE ACTIVE TCS

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INTRODUCTION

ISS Service Module mission must begin in July 2000. The verification of design thermal requirements is mostly due to thermal analysis. The thermal analysis is enough difficult problem because of large number of ISS configurations that had to be investigated and various orbital environments. Besides the ISS structure has articulating parts such as solar arrays and radiators. The presence of articulating parts greatly increases computation times and requires accurate approach to organization of calculations. The varying geometry needs us to calculate the view factors several times during the orbit, while in static geometry case we need do it only once. In this paper we consider the thermal mathematical model of SM that includes the TCS and construction thermal models and discuss the results of calculations for ISS configurations 1R and 9A1. The analysis is based on solving the nodal heat balance equations for ISS structure by Kutta-Merson method and analytical solutions of heat transfer equations for TCS units. The computations were performed using thermal software TERM [1,2] that will be briefly described below.