ASTRODYNAMICS SYMPOSIUM (C1)
Guidance, Navigation and Control - Part 3 (9)

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GUIDANCE, NAVIGATION, AND CONTROL SYSTEM DESIGN OF HTV AND EVALUATION OF
ON-ORBIT RESULTS

Abstract

Japan Aerospace Exploration Agency (JAXA) has developed the H-II Transfer Vehicle (HTV) "KOUNO-TORI." HTV is automated, unmanned logistic transport system, which supplies payloads to the International Space Station (ISS). HTV1 was launched on September 11, 2009 and re-entered the atmosphere on November 2, 2009 after the completion of all mission objectives successfully. HTV2 was launched on January 22, 2011 and successfully berthed with the ISS. HTV Guidance, Navigation and Control (GNC) system consists of navigation sensors, the guidance control computer / abort control unit including the rendezvous flight software, and thruster valve drive electronics. HTV controls its rotation and translation using RCS thrusters and main engines. HTV uses the navigation sensors and a set of control logics properly selected according to the relative distance to the ISS. For example, the translation control is applied, based on Rendezvous Sensor (RVS) measurement data during the final approach to the ISS. This paper introduces an overview of HTV GNC system design, its implementation, and its verification. The evaluations of on-orbit results are also presented.