

SPACE PROPULSION SYMPOSIUM (C4)
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Author: Dr. song jia
Beihang University, China, eurda@126.com

Prof. Guobiao Cai
Beihang University, China, cgb@buaa.edu.cn

Dr. Xiaoqiang Qi
Beijing Institute of Mechanical and Electronic Engineering, China, jerry-xiaoqiang@126.com

DESIGN OF HYBRID ROCKET CONTROL SYSTEM

Abstract

The main problem and question in development and application of hybrid rocket motor is ignition reliability, burning perfectibility and stability. In order to guarantee the controllability and security of hybrid rocket, a hybrid rocket control system with distributed construction is proposed. The hybrid rocket control system is mainly made of the ground test launch and control part and the onboard monitor part, that with PLC, SCM 89C51 and STM32F103 as microcontroller. As the experiments verified, before launching, the ground test launch and control part could realize missions such as communication test, missile-borne equipment monitoring, ignition test and emergency removal. After the rocket was launched successfully, the onboard monitor part could adjust thrust and blow propellant remains to remove safe hidden danger. At the same time, the onboard monitor part would acquire real-time data of onboard devices which reflects the working condition of the hybrid motor and then transmit the data to black box for storage. The stored data will be recycled with the black box to gain the information about actual ignition performance, thrust, flowing speed of propellant and so on. What's more, the control system also has advantages in size and environment adaptability.