

SPACE PROPULSION SYMPOSIUM (C4)

Poster Session (P)

Author: Mr. Shoujun Zhao

China Academy of Launch Vehicle Technology (CALT), China, shoujunzhao@vip.sina.com

Dr. Yingxin Zhao

China Academy of Launch Vehicle Technology (CALT), China, 15801399212@163.com

Mrs. Zhang Xiaosha

China Academy of Launch Vehicle Technology (CALT), China, shili@calt.com

THE TVC SYSTEMS FOR A CHINESE LIQUID OXYGEN AND KEROSENE LAUNCH VEHICLE

Abstract

The thrust vector control (TVC) systems for a Chinese liquid oxygen and kerosene (LOK) launch vehicle are introduced, gimbaling altogether 8 LOK engines in all sub stages. The architecture selection is based upon an intended simplest interface between LOK engines and TVC systems. Its enabling technique is a kerosene motor which receives high pressure kerosene from the LOK engine and outputs high speed torque to drive a pump which is common in traditional gimbaling systems. Therefore, the internal working fluids of a LOK engine and a TVC sub system can be isolated at the same time the TVC system maintains the convenience to use the abundant fluid power inherent in the engine. The architecture is also supported by the prominent heritage of complete self-contained hydraulics and monolithic structural design in Chinese TVC systems, to minimize the number of stand-alone equipment, to maximize the ratio of power to mass, as well as to facilitate maintenance. To guarantee the reliability, dual redundancy is incorporated in hydraulic powers and triple redundancy in servo controls. Other features are briefed too. The systems experienced numerous ground tests.