Paper ID: 19159
poster

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Poster Session (P)

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STUDY ON ON-ORBIT MICRO-VIBRATION MONITORING AND ADAPTIVE CONTROL SYSTEM

Abstract

Micro-vibration is a critical factor influencing detecting precision of optical remote instrument on satellite. Moving parts like reaction wheels, Control Moment Gyros (CMG) and optical scanner are sources of micro-vibration on satellite, whose vibration responds at sensitive parts like remote detector, optical system via structure, resulting micro-vibration of these parts and the decrease of detecting precision. In order to decrease the micro-vibration of optical remote instrument, an on-orbit micro-vibration closed-loop adaptive control system has been designed, which based on on-orbit micro-vibration monitoring technology and vibration control with piezoelectric actuator. The control system involves several critical technologies such as anti-jamming amplifying for weak signal, real-time processing of huge vibration data and adaptive control algorithm, features high control precision, wide vibration suppression band and capability of adaptive control with frequency of vibration, which achieves effective suppression for micro-vibration of critical part on satellite and raising the detecting precision of optical remote instrument.