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DEVELOPMENT AND IN-ORBIT VERIFICATION OF THE COILABLE MAST MECHANICAL
SYSTEM IN APSCO SSS-1 SATELLITE MISSION**Abstract**

The coilable mast mechanical system is the critical test payload of the APSCO SSS-1 satellite. This system consists of two parts, one is a two-meter coilable mast and another is a lock release mechanism. The coilable mast is used to make the satellite form a stable configuration by gravity gradient. Firstly, a design of the coilable mast mechanical system is proposed in this paper that meets all the function and performance requirements as well as the mass, volume and power consumption constraints of APSCO SSS-1 satellite mission. The coilable mast is designed and simulated in detail, and the lock release mechanism is designed and selected (including pin-puller, encoder and damper) too. Then, a series of single device tests and desktop joint tests are carried out on the flight modules of the coilable mast mechanical system. The test result shows that the coilable mast can be reliably locked and released in the coiled state, and can be deployed to a linear steady state under the action of damping force. Also, the deployment length can be monitored in real time during deployment. Finally, the in-orbit deployment verification of the coilable mast is introduced. The real satellite telemetry data proves that the coilable mast is successfully deployed in orbit. It verifies the availability of the coilable mast mechanical system proposed in this paper.