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

The coilable mast mechanical system is the mechanical subsystem and critical test payload of the SSS-1 satellite. This system is used in SSS-1 satellite mission to make the satellite form a stable configuration by gravity gradient. And the system consists of two parts, one is a two-meter coilable mast and another is lock release mechanism. This paper proposes a design of the coilable mast mechanical system that meets all the function and performance requirements as well as the mass, volume and power consumption constraints of the SSS-1 satellite mission. The coilable mast is designed and simulated in detail, and the lock release mechanism are designed and selected (including pin-puller, encoder and damper) in this paper. Then a series of single device tests are carried out to verify the function and performance of each part of lock release mechanism. A desktop joint test is carried out finally on the flight modules of the coilable mast mechanical system to verify the availability of the system. The pin-puller is used to lock and release the coilable mast in the test, while the encoder monitor the length of the coilable mast in real time during deployment. 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. More importantly, the test result shows that the entire system meets the requirements of SSS-1 satellite mission.