THE RECOVERY OF IN-SPACE CUBESAT EXPERIMENTS (RICE) NANOSATELLITE (IPPW-7)

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ABSTRACT

Recovering biological science payloads from low earth orbit for valuable science data return at an inexpensive end cost is the primary objective of RICE. A CubeSat-sized science payload will be launched within the RICE entry capsule and be accommodated by the nanosatellite for approximately one month. The RICE nanosatellite will then perform a de-orbit maneuver via ground command. Within hours of entry, the science payload will be delivered to scientists for post flight inspection and experimentation. RICE capability and design will be further developed through contributions from university facilities, faculty advisors, university students, aerospace experts, and a dedicated RICE science advisory panel. Commercial-off-the-shelf components will be used on RICE subsystems to minimize cost and increase flight readiness. Subsystem design and component trades will be discussed. Contingent on sufficient funding and resources, the first of many flight-ready nanosatellites will be designed by Georgia Tech Space Systems Design Laboratory and built, integrated, and tested at Georgia Tech Center for Space Systems within two years. Although the main purpose of RICE is science data return, an alternate application will serve as a low-cost technology demonstration platform. A landing and recovery architecture will be down-selected from two primary options: the implementation of an impact sphere to surround the science payload for ground impact force absorption, or the design of a subsonic parachute deployment with possible helicopter snatch retrieval.