

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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THE DESIGN AND DEVELOPMENT OF A 100 KM TWO-STAGE ELECTROMECHANICAL
PARACHUTE RECOVERY SYSTEM**Abstract**

Recovery systems for amateur and university-class rocket projects are notoriously unreliable and tend to be ad-hoc systems without much engineering analysis. In this paper we illustrate the design, development, and testing of an electromechanical recovery system for a 100 km capable university-class amateur rocket. We studied traditional recovery concepts such as pyrotechnics and gas cartridges, as well as recent innovations such as shape memory alloy wire, in an effort to create a repeatable, robust, and testable high-altitude rocket recovery system. We will discuss the initial research, engineering analysis, design decisions, prototype development, and validation testing of the system. Validation testing includes reliability metrics gathered from extensive ground testing, a complete system test deployed from a helicopter, and finally the system's use on a roughly half-scale rocket.