

Design, Fabrication, Packing and Testing of the ARIM-1 Sounding Rocket Recovery System

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Figure 1: (LEFT) - Parachute system flight qualified by drop testing from C-130 aircraft. (MIDDLE) - Parachute system successfully flown to space and back on NASA/Orion rocket launched from Poker Flats, Research Range, Alaska. (RIGHT) - Top: Packed parachute system, Middle: Fully deployed parachute recovery system, Bottom: Recovered Rocket payload.

Abstract:

The engineering analysis required to design, fabricate, pack and successfully deploy a prototype, sounding rocket ballistic parachute recovery system is presented. The recovery system consists of a 6 feet diameter ribless guide surface drogue parachute and a 33 feet diameter main cross parachute. An operational drop test from a C-130 aircraft qualified the recovery system as flight worthy system. An onboard accelerometer measured parachute opening loads. An externally mounted 8mm video camera quantified the deployment system characteristics. This recovery system is modified from the NASA Black Brant system at half the weight. This paper describes the original configuration of this parachute system on a modified Apache sounding rocket.

The parachute system was reconfigured for use on an Orion sounding rocket. This parachute recovery system was successfully flown to space and back on the NASA/Orion 30.047UP mission launched from Poker Flats Research Range, Alaska. This parachute system has the distinction of achieving the fastest successful parachute deployment ever achieved (Mach 2.5) on a NASA sounding rocket, and is a fully flight qualified sounding rocket parachute system.