The NASA MLAS Flight Demonstration – A Review of a Highly Successful Test

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NASA has tested the Max Launch Abort System (MLAS) as a risk-mitigation design should problems arise with the baseline Orion spacecraft launch abort design. The Max in MLAS is not Maximum, but rather dedicated to Max Faget, The renowned NASA Spacecraft designer. In the fall of 2009, the mission was flow, with great success, from the NASA Wallops Flight Facility.

The MLAS flight test vehicle prototype consists of a boost ring, coast ring, and the MLAS fairing itself, which houses an Orion Command Module (CM) boilerplate. The objective of the MLAS flight test is to reorient the fairing with the CM, weighing approximately 29,000 lbs and traveling 290 fps, 180 degrees to an orientation suitable for the release of the CM during a pad abort and low altitude abort. Although multiple parachute deployments are used in the MLAS flight test vehicle to complete its objective, there are only two parachute types employed in the flight test. Five of the nine parachutes used for MLAS are 27.6 ft D_O ribbon parachutes, and the remaining four are standard G-12 cargo parachutes.

This paper presents an overview of the 27.6 ft D_O ribbon parachute system employed on the MLAS flight test vehicle for coast ring separation, fairing reorientation, and as drogue parachutes for the CM after separation from the fairing. Discussion will include: the process used to select this design, previously proven as a spin/stall recovery parachute; descriptions of all components of the parachute system; the minor modifications necessary to adapt the parachute to the MLAS program; the techniques used to analyze the parachute for the multiple roles it performs; a discussion of the rigging techniques used to interface the parachute system to the vehicle; a brief description of how the evolution of the program affected parachute usage and analysis; and a summary of the results of the flight test, including video of the flight test and subsequent summary analysis. .

The presentation will also contrast the MLAS system to the Baseline Orion Recovery System, thus providing background on the basic Orion design.

A discussion of the flight test – which was highly successful – as well as the flight test observations will be a significant portion of the review.