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FAA PUBLIC RISKS AND INSURANCE REQUIREMENTS FOR ORION'S FIRST ENTRY FLIGHT TEST

Abstract

The first Entry Flight Test (EFT-1) mission of the Orion Multi-Purpose Crew Vehicle (MPCV) is a complex from both technical and regulatory standpoints.

Lockheed Martin (LM) entered into a contract with NASA that includes the first orbital flight test mission of the NASA Orion MPCV Program. LM contracted the United Launch Alliance (ULA) to provide launch services for the mission using the largest launch vehicle available: the Delta IV Heavy launch vehicle, which consists of a Common Booster Core (CBC) as the first stage with two additional strap-on CBCs and a Delta IV Cryogenic Second Stage (DCSS). The first burn of the DCSS places the Orion and DCSS in a low Earth orbit, and a second DCSS burn places both vehicles into a highly elliptical, negative-perigee trajectory, to simulate the thermal and dynamic conditions of a high speed re-entry that the MPCV would experience from mission Beyond Earth Orbit (BEO).

The EFT-1 crew module (CM) represents an un-crewed, limited capability configuration and serves as a stepping stone to the eventual crew-capable MPCV that will enable human exploration missions by NASA to go BEO. After orbital insertion, the "launch" (per the FAA's regulatory definition) includes a second burn of the upper stage that propels the CM which then separates from the upper stage for a targeted reentry. After separation of the CM from the upper stage, a third burn orients the upper stage for a targeted reentry into the Pacific Ocean. The "reentry" of the CM begins (per the FAA's regulatory definition) after its separation from the upper stage.

The FAA granted separate licenses to authorize the EFT-1 mission: (1) for launch of the Delta IV Heavy conducted by the ULA, and (2) for the reentry of Orion for its first orbital flight test mission conducted by LM. This paper describes the regulatory approach applied to the EFT-1 mission, as well the FAA's assessment of the public risks and third party insurance needed for EFT-1. Specifically, this paper will explain why two separate licenses were deemed necessary, and what requirements were addressed by each license application. Furthermore, this paper will describe the methods and results associated with the FAA's assessment of the public risks and third party insurance levels.