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Author: Mr. Benjamin Donahue The Boeing Company, United States, benjamin.b.donahue@boeing.com

EVOLVED SLS PERFORMANCE CAPABILITY FOR ADVANCED EXPLORATION MISSIONS

Abstract

Human exploration beyond low earth orbit (BEO) has been a long-term goal of the United States and the international community since the end of the Apollo program. The current administration has further emphasized the BEO mission with Space Policy Directive 1 directing NASA to return to the Moon followed by crewed missions to Mars. To achieve this goal, NASA has been developing the Orion crew capsule and Space Launch System (SLS) as key elements in the architecture designed to advance human spaceflight from our current capability in low earth orbit to eventually landing humans on Mars.

The SLS Block 1B vehicle consists of a liquid oxygen/liquid hydrogen powered core with two strapon solid rocket boosters, and a liquid oxygen/liquid hydrogen powered Exploration Upper Stage (EUS), designed and built by Boeing. Evolutions in the design of those components will further increase the capability of SLS to complete its defined missions.

The SLS Block 1B vehicle, along with the aforementioned evolutions, mean added capability, both for crewed missions to the moon and Mars as well as science missions to the outer planets. This paper will discuss the changes to performance and what those changes could mean for various missions.