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ARTEMIS I TEST FLIGHT RESULTS FROM NASA'S SPACE LAUNCH SYSTEM

Abstract

NASA is in the final stages of preparing for the first launch of the Space Launch System (SLS) rocket, the first rocket designed for human deep space exploration since the Saturn V. SLS is a super heavy-lift vehicle to send large, strategic payloads to the Moon, Mars, and beyond. It is the backbone of the Artemis human lunar exploration program. With current preparations for wet dress rehearsal (WDR) underway at the time of writing, we expect to have flown the Artemis I test flight and report on objectives met. A successful year in 2021 resulted in the completed stacking of SLS and the Orion spacecraft for the Artemis I mission at NASA's Kennedy Space Center (KSC). Multiple test programs were completed in advance of the first mission that will send an uncrewed capsule to distant retrograde orbit about the Moon before returning to Earth. WDR practices loading the rocket with its cryogenic propellants in loop with the ground teams that will launch and fly the mission. Important dynamics data are also collected during rollout, time on the launch pad, and rollback that help engineers further understand the vehicle in pre-launch environments. Following WDR, the vehicle is rolled back to the Vehicle Assembly Building (VAB) at KSC for final closeouts before a targeted launch in spring 2022. Teams also conducted multiple launch and mission simulations to prepare for the launch, including off nominal situations. This paper will detail the progress made in 2021 and 2022 and will report the performance of the launch vehicle through WDR and launch operations.