SLS PDR
PRELIMINARY DESIGN REVIEW

SYSTEMS ENGINEERING & INTEGRATION

Space Launch System

WHERE WE ARE

- Focused on first flight in 2017.

- Completed Design Analysis Cycle 2 (DAC-2), began DAC-3, and preparing for Critical Design Review (CDR).

- Resynchronized System-level analyses with Element-level analyses.

- Solved T-0 stabilization inclusion in collaboration with Ground Systems Development and Operations Program.

- Maintained mission margin for Exploration Mission 1 (EM-1) and EM-2 in coordination with Orion Multi-Purpose Crew Vehicle through efforts such as Interim Cryogenic Propulsion Stage (ICPS) tank stretch.

- Developed Program Agreement Document, capturing Element-level dependencies and agreements, and matured System Specification and Systems Engineering Management Plan at an appropriate level of fidelity.

MAJOR ACCOMPLISHMENTS

Design Maturation
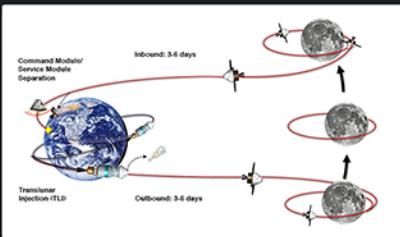
- Solved challenges related to legacy hardware being used in new environments.

- Completed ICPS tank-stretch trade study for appropriate fuel capacity for trans-lunar injection (TLI) and safe disposal.

- Resolved TLI insertion target and post-TLI heliocentric disposal trade studies.

- Resolved questions on model-based versus specification-based requirements to finalize contract requirements and scope, including delegation of responsibility for analyses and mass allocations.

Integrated Avionics & Software Design
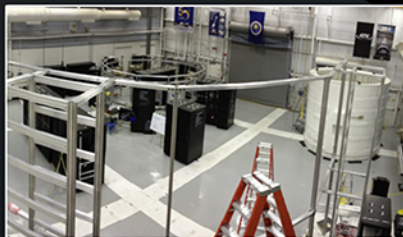
- Began flight software development using Core Stage flight computer engineering development units.

- Performed early integration of developmental hardware and software.

- Began construction of Core Stage System Integration Test Facility in preparation for integration of developmental avionics hardware, July 2013.

- Entered PDR with a well-defined architecture based on completed PDRs for all avionics components, most having completed CDR.

Significant Testing & Analysis

- Delivered both detailed and comprehensive analyses to inform design decisions.

- Conducted over 20 Vehicle-level analyses.

- Conducted numerous Element-level analyses, including Core Stage and ICPS POGO stability; Core Stage Engine-out and stuck-throttle; and Booster separation.

- Conducted Core Stage Engine scale-model acoustic testing and over 4,000 runs in the Transonic Dynamics (LaRC), Trisonic (MSFC), Polysonic (Boeing), and Unitary Plan (LaRC) wind tunnels.