National Aeronautics and Space Administration

NASA

Marshall Space Flight Center

SPACE LAUNCH SYSTEM

Marshall Space Flight Center manages the Space Launch System (SLS), an integrated super heavy lift launch platform enabling a new era of science and human exploration beyond Earth orbit.

SPACE LAUNCH SYSTEM

Marshall Space Flight Center manages the Space Launch System (SLS), an integrated super heavy lift launch platform enabling a new era of science and human exploration beyond Earth orbit.

Advanced Manufacturing

Advancing 3D printing processes for complex liquid propulsion systems to reduce cost and increase performance

Development of friction stir welding processes to manufacture large lightweight metallic spacecraft structures

Development and manufacturing of composite payload adapters for SLS payloads

Vehicle Design and Analysis

MSFC offers a full suite of vehicle design and analysis capabilities ranging from spacecraft structural design, structural dynamics, aerodynamics, thermal analysis and control, terrestrial and space environments analysis, and guidance, navigation, and control analysis

Systems Engineering and Integration

MSFC provides SLS with systems engineering and integration expertise that supports risk management, technical performance management, certification of flight/mission readiness, andoperations/supportability/ sustaining engineering

Provides vehicle-level requirements and verification support along with system interface definition and integration

Provides systems analysis capabilities including mass properties, human factors, physical mockups, and virtual environments

Secondary Payloads

Integration of secondary payloads

Mission operations support

Structural Strength and Dynamics Testing

Multiple facilities provide proof, limit, failure, development, qualification, and flight acceptance testing

Decades of experience developing instrumentation for structural and propulsion-related test articles to maximize data return using high-speed data acquisition, visible and thermal imaging, and high-definition audio-visual capture systems

Flight Software Development and Hardware-in-the-Loop Testing

State-of-the-art facilities for flight software development, testing, and formal verification

Real-time hardware-in-the-loop capabilities enable launch vehicle integrated software and avionics hardware systems to be modeled, simulated, and tested early, before finalizing designs

Space Flight Imaging Systems and Sensors

Flight Imaging Launch Monitoring Real-time System camera and controller provide comprehensive views of Artemis launch vehicle from liftoff to the upper atmosphere

Concept and Trade Study to Support Future SLS Evolvability and Missions

Rapid development and analysis of physics-based models to yield an end-to-end design capability for preliminary concepts

National Aeronautics and Space Administration

Marshall Space Flight Center
Huntsville, AL 35812
www.nasa.gov/centers/marshall

www.nasa.gov

MSFC-04-2025-G-701375