National Aeronautics and Space Administration

Moon to Mars Safety and Mission Assurance

Nathan Vassberg
M2M SMA Director
June 2024

ARTEMIS

ARTEMIS ACCORDS

- Angola
- Argentina
- Australia
- Bahrain
- Belgium
- Brazil
- Bulgaria
- Canada
- Colombia
- Czech Republic
- Ecuador
- France
- Germany
- Greece
- Iceland
- India
- Israel
- Italy
- Japan
- Luxembourg
- Mexico
- Netherlands
- New Zealand
- Nigeria
- Poland
- Republic of Korea
- Romania
- Rwanda
- Saudi Arabia
- Singapore
- Spain
- Ukraine
- United Arab Emirates
- United Kingdom
- United States of America
- Uruguay

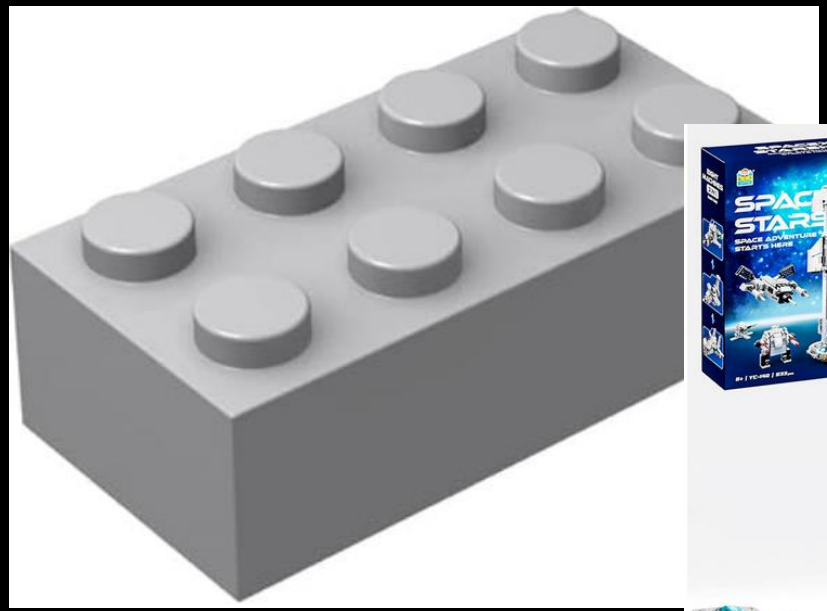
United for Peaceful Exploration of Deep Space

AA–04.30.48

Artemis - SUCCESS and PREPARATION

Play Video Here

Exercise in Integration



Artemis: A Foundation for Deep Space Exploration


Space Launch System


Orion Spacecraft

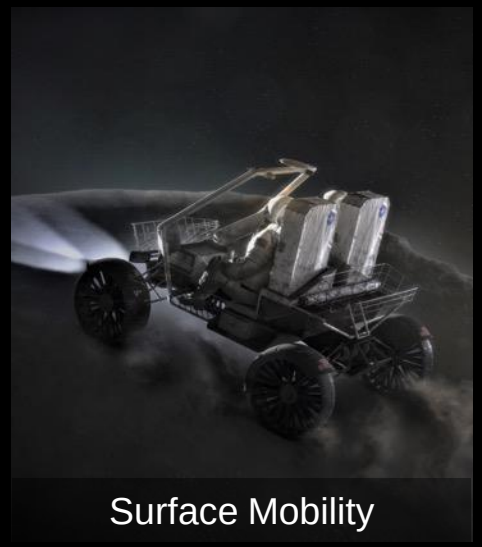

Human Landing System


Surface Operations


Gateway


Exploration Ground Systems


Space Communications & Navigation


Surface Mobility


Spacesuits


Surface Infrastructure

ARTEMIS I

First mission
(uncrewed flight test)

COMPLETED

Space Launch System rocket, Orion crew spacecraft, Exploration Ground Systems

ARTEMIS II

First crew

Crew

ARTEMIS III

First human
surface landing

Human landing system, spacesuits

ARTEMIS IV

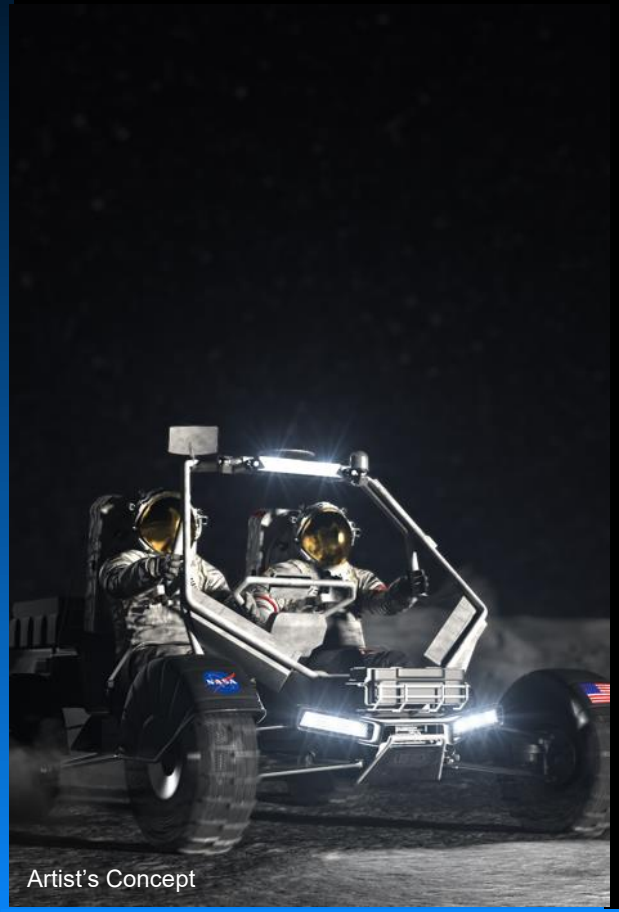
First lunar space station
assembly mission

Gateway

Conducting science and demonstrating technology and operations

ARTEMIS V

First unpressurized rover



Lunar terrain vehicle; Gateway refueling and robotics

ARTEMIS VI

Gateway assembly complete

Gateway airlock module

ARTEMIS VII AND BEYOND

Longer missions = preparation for human Mars missions
Access to more of the Moon = new scientific discoveries

Pressurized rover, surface habitat, and other new elements

Crew conducting science and demonstrating technology in orbit and on the surface;
Space Launch System rocket; Orion crew spacecraft; Exploration Ground Systems; Gateway space station

Artist's Concept

Artemis II

ARTEMIS FIRSTS:

- Crewed integrated flight test of the Space Launch System (SLS) rocket, Orion spacecraft, and Exploration Ground Systems (EGS) at KSC
- Active Orion Launch Abort System (LAS)
- Demonstration of Orion life support systems
- Proximity operations demonstrations
- Human data collection in transit to and from the Moon, in lunar orbit, and through reentry and splashdown
- Conducting new science and technology demonstrations in orbit

NEW ELEMENTS:

- Orion life support systems
- Launch Complex 39B emergency egress system for crew and new liquid hydrogen system

COMMON ELEMENTS:

- SLS rocket Block 1 configuration
- Orion crew spacecraft
- Mobile Launcher 1

ENSURING CREW SAFETY IS OUR TOP PRIORITY!

THE ARTEMIS II CREW

The Artemis II crew represents thousands of people working tirelessly to bring us to the stars. This is their crew. This is our crew. This is humanity's crew.

Jeremy Hansen
Mission Specialist
Canadian Space Agency Astronaut

Reid Wiseman
Commander
NASA Astronaut

Victor Glover
Pilot
NASA Astronaut

Christina Hammock Koch
Mission Specialist
NASA Astronaut

Artemis II Progress

NASA Artemis Launch Director Charlie Blackwell-Thompson monitors activities during the Artemis II terminal countdown simulation

The first Artemis II launch simulation inside the Firing Room at the Launch Control Center at NASA's Kennedy Space Center. The team rehearses the steps to launch Artemis II mission

Artemis II crew members Reid Wiseman (foreground) and Jeremy Hansen participate in training in the Orion simulator

Artemis II crew during URT-10 Navy Diver Training at the Neutral Buoyancy Lab

U.S. Navy personnel grab onto a mockup of the Orion spacecraft during a practice procedure of the Underway Recovery Test 11 (URT-11)

NASA Artemis II crew members are assisted by U.S. Navy personnel as they exit a mockup of the Orion spacecraft in the Pacific Ocean during URT-11

The four Artemis II astronauts practiced procedures to exit the Orion spacecraft in an emergency

Orion test article delivered to NASA's Armstrong Flight Research Center

Artemis III

ARTEMIS FIRSTS:

- Human landing in South Pole region and return
- Orion to human landing system direct mission including crew docking activity
- Use of Near Rectilinear Halo Orbit (NRHO)
- Four astronauts to lunar orbit
- Two astronauts to lunar surface to collect scientific samples and data
- Conducting new science and technology demonstrations

NEW ELEMENTS:

- Orion full up rendezvous, proximity operations, and docking systems
- Starship human landing system
- Advanced spacesuits and tools to explore the surface and collect samples

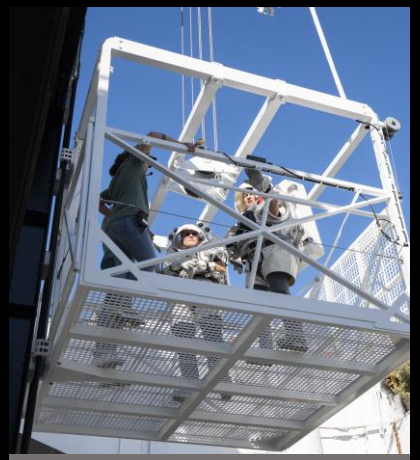
COMMON ELEMENTS:

- SLS rocket Block 1 configuration
- Orion crew spacecraft
- Mobile Launcher 1

Artist's Concept

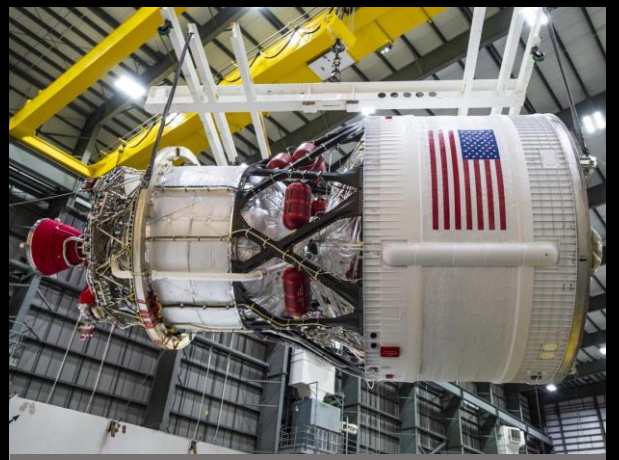
Artemis III Progress

Starship second integrated flight test



Starship Human Landing System elevator astronaut testing

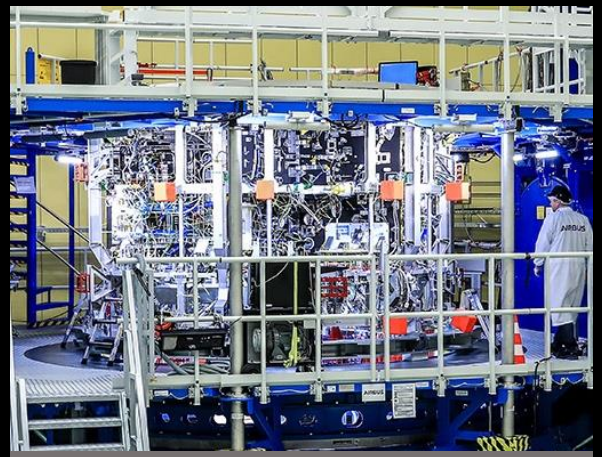
Frangible joint assembly installed onto the Launch Vehicle Stage Adapter



Artemis III Interim Cryogenic Propulsion Stage being processed

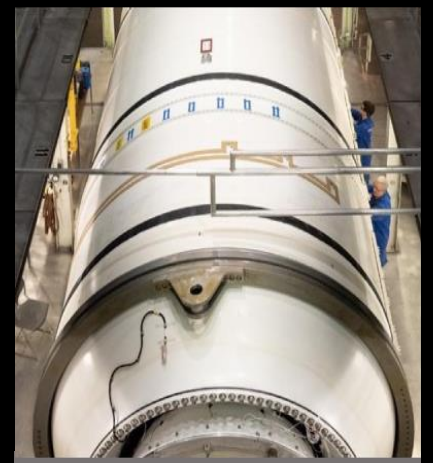
Artemis III Space Launch System Core Stage Liquid Oxygen Aft Dome

Starship Human Landing System docking system



European Service Module-3 integration in Bremen cleanroom

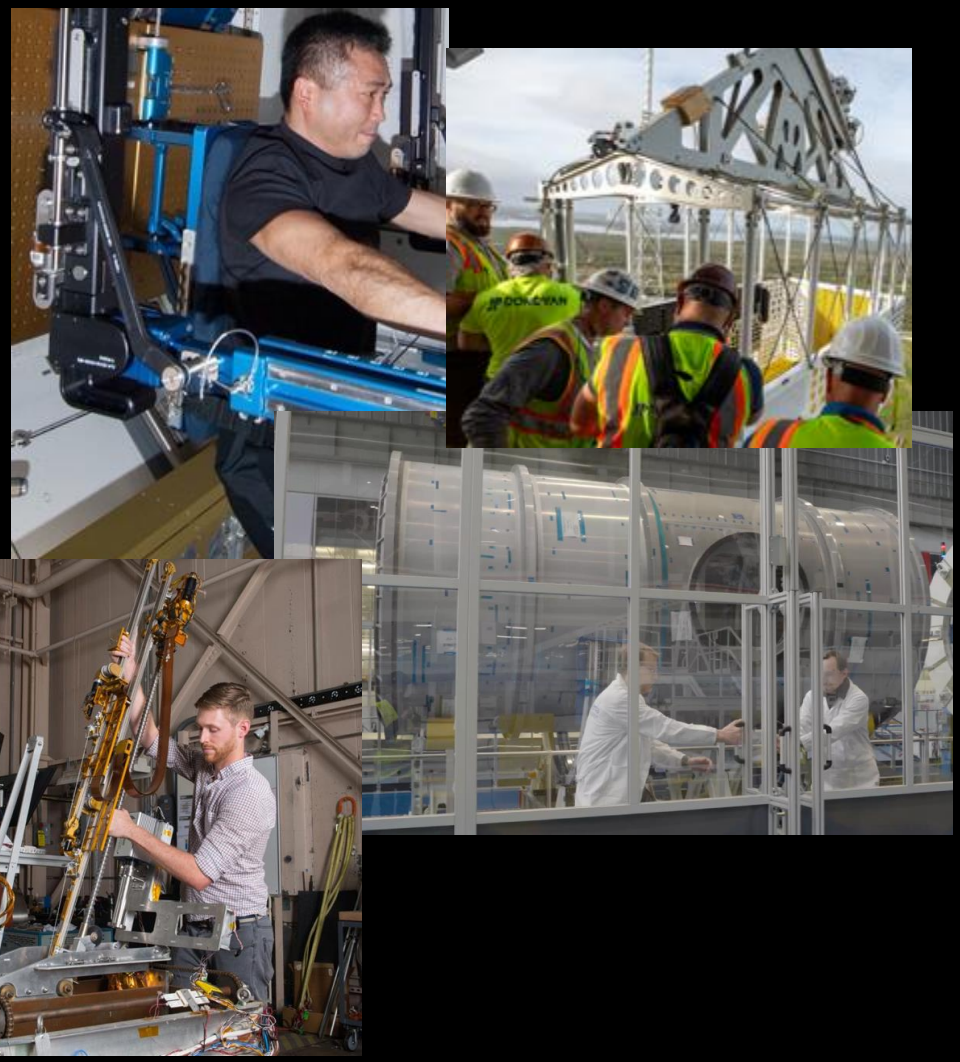
Crew Module-3 integration



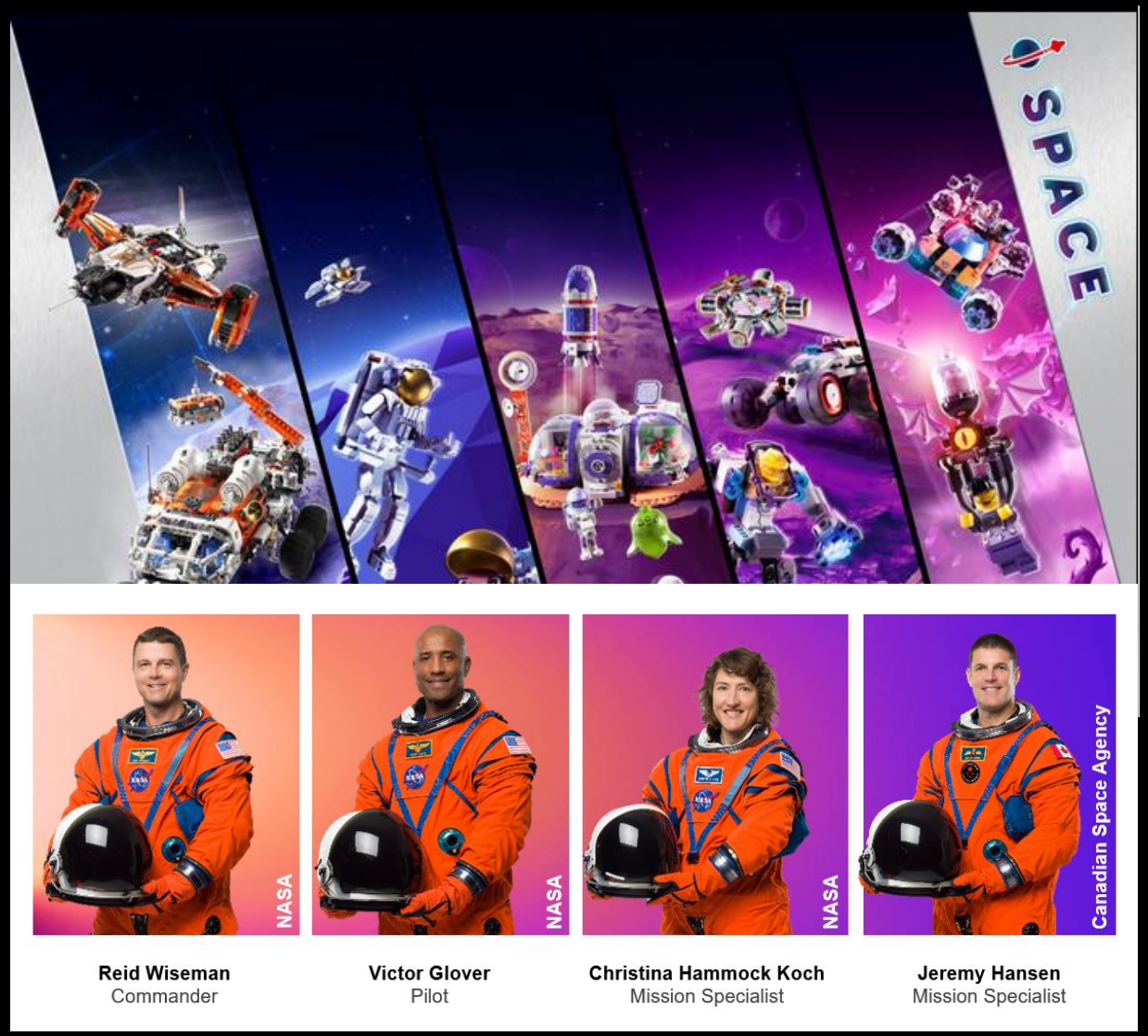
Artemis III booster segments

M2M SMA – What is Important?

- Culture
- Integration
- Governance
- SMA Products
- Cross-Program SMA Products
- Communication
- Risk Leadership/Management



Summary/Conclusions



- "Thanks to our NASA Team, our Industry Partners, our International Partners…" Reid Wiseman
- "We are going to the Moon TOGETHER," Jeremy Hansen
- "It is the next step on the journey that gets humanity to Mars," Victor Glover
- "Am I excited, ABSOLUTELY YES!" Christina Koch
- M2M is about great people doing the amazing things
- Like Legos – just have to follow instructions and put the pieces together one at a time