

EXPLORATION SYSTEMS DEVELOPMENT MISSION DIRECTORATE



Grants and Cooperative Agreements Profile

OVERVIEW

The Exploration Systems Development Mission Directorate (ESDMD) defines and manages systems development for programs critical to the NASA's Artemis Campaign and planning for NASA's Moon and Mars exploration approach in an integrated manner. ESDMD manages the human exploration system development for lunar orbital, lunar surface, and Mars exploration. ESDMD leads the human aspects of the Artemis activities as well as the integration of science into the human system elements. ESDMD is responsible for development of the lunar and Mars architectures. Programs in the mission directorate include Orion, Space Launch System, Exploration Ground Systems, Gateway, Human Landing System, and Extravehicular Activity (xEVA) and Human Surface Mobility.

NASA's Common Exploration Systems Development (CESD) programs are working together to build the space transportation system made up of the Orion crew vehicle, the Space Launch System (SLS) rocket, and the Exploration Ground Systems (EGS). This system will enable the Agency's Artemis missions, extending human presence into the solar system by transporting crews to the Gateway or to the Moon's surface in the Human Landing System for long-term exploration and in preparation for future missions to Mar

The overarching goal of the Artemis Campaign Development (ACD) programs is to develop the systems that will be used to land humans on the Moon, explore the lunar surface, and prepare for Mars exploration. ACD comprises three programs: Gateway, Advanced Cislunar and Surface Capabilities (ACSC), and the Human Landing System (HLS). For FY 2023 It also includes a newly formed program: Exploration Extravehicular Activity (xEVA) and Human Surface Mobility. ACD's work will create the necessary exploration infrastructure in lunar orbit and on the lunar surface that astronauts will use during Artemis missions. ACD is responsible for developing and testing prototype systems, as well as planning and developing flight missions to lunar orbit and the lunar surface. In addition to expanding our Lunar capabilities, these efforts will also inform and enable future missions to Mars. These program objectives support the National Space Policy of 2020 and the 2021 Space Priorities Framework, as well as the Agency's Strategic Goal 2, which seeks to extend human presence to the Moon and onto Mars for sustainable, long-term exploration, development, and utilization

EXPLORATION SYSTEMS DEVELOPMENT MISSION DIRECTORATE PROGRAM AREAS:

- **CESD ORION** - NASA's Orion spacecraft is designed to support human exploration missions to deep space, with a crew of four, with habitation and life support on-board for missions up to 21 days. Building upon more than 50 years of spaceflight research and development, Orion's versatile design will not only carry crew to space, but also provide emergency abort capability, sustain crew during space travel, and provide safe reentry at deep space return velocities. The Orion systems are designed to operate in a contingency mode to augment life support systems in other space transport systems.
- **CESD Space Launch System (SLS)**-The SLS rocket is a heavy-lift launch vehicle that will launch astronauts in the Orion spacecraft on missions to cislunar space so they can return to the surface of the Moon and visit other destinations. The Block 1 configuration, which is the configuration for Artemis I, stands at 322 feet and features a lift capability of 95 metric tons to low-Earth orbit (LEO), and over 27 metric tons to translunar injection for Moon missions with 8.8 million pounds of maximum thrust. The evolution of the architecture, currently planned for first use on Artemis IV, will include an Exploration Upper Stage (EUS), associated Universal Stage Adapter, and Payload Adapter which provides space for co-manifested payloads. This Block 1B configuration will be capable of delivering at least 37.3 metric tons of net payloads to Trans-Lunar Injection on crewed missions. The 37.3 metric ton total includes Orion, which weighs 27 metric tons.
- **CESD Exploration Ground Systems (EGS)**- The objective of EGS is to enable Kennedy Space Center (KSC) to process and launch Orion and SLS in support of the Artemis missions. To achieve this transformation, NASA is developing new ground systems while refurbishing and upgrading infrastructure and facilities to meet tomorrow's demands
- **ACD Gateway** - The Gateway will be a small way station that will orbit the Moon and support human and robotic missions to the lunar surface. Initial elements of the Gateway outpost will be launched together into orbit around the Moon, where they will provide critical infrastructure to enable fully reusable lunar landers. The Gateway will be capable of supporting early

human-rated lander deployments and operations enabling lunar surface capability

- **ACD Human Landing System (HLS)** - Through commercial partnerships, HLS will support the development and deployment of the integrated system that will land the first woman and first person of color on the surface of the Moon. The demonstration of an integrated lander is the first step to enable more permanent human access to the lunar surface.
- **Extravehicular (xEVA) and Human Surface Mobility-** The program is formulating the systems that NASA will use to explore the surface of the Moon. These surface systems, including the Lunar Terrain Vehicle, the Habitable Mobility Platform, and xEVA surface suits, will provide capabilities and result in lessons learned expertise that will support future Mars missions.

Fast Facts:

Assistance Listing Number:

43.003

Authorizing Statute:

- National Aeronautics and Space Act of 1958

Average Number of Active Awards:

172

Average Funding Per Award:

\$402,224

Applicant Eligibility:

- ❖ **Institutions of Higher Education**
- ❖ **Non-Profit Organizations**
- ❖ **For-Profit Organizations**

IMPORTANT LINKS & RESOURCES

ESDMD Funding Opportunities

www.grants.gov

<https://nspires.nasaprs.com/external/>

Exploration Systems Development

[Exploration Systems Development Mission Directorate |](#)

[NASA](#)

NASA Shared Services Center (NSSC)

<https://www.nasa.gov/centers/nssc/grants>

NASA Grants Policy and Compliance

<https://www.nasa.gov/offices/ocfo/gpc>

[NASA Proposer's Guidebook](#)

[NASA Grant & Cooperative Agreement Manual](#)

TOTAL AWARD OBLIGATIONS PER FISCAL YEAR

