Canceled Project (2011 - 2014)

Multi-Mission Space Exploration Vehicle Project

Advanced Exploration Systems Program | Human Exploration And Operations Mission Directorate (HEOMD)

ABSTRACT

Develop a manned vehicle allowing brief sorties to items of interest during multiple types of exploration missions. The vehicle consists of a core cabin that is optimized for observations, has a robotics platform, and quick access EVA through the use of suitports. Core cabin can be utilized with chassis as planetary rover, or in space with RCS sled.

ANTICIPATED BENEFITS

To NASA funded missions:

Allows single baseline MMSEV that can provide an exploration platform for multiple mission applications. Examples of these applications are the exploration of planetary surfaces, near earth asteroids, and in-space points of interest.

To NASA unfunded & planned missions:

Allows single baseline MMSEV that can provide an exploration platform for multiple mission applications. Examples of these applications are the exploration of planetary surfaces, near earth asteroids, and in-space points of interest.

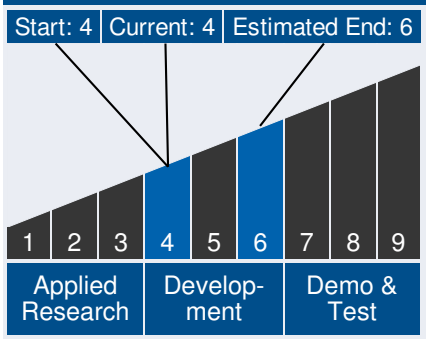
DETAILED DESCRIPTION

The Multi--Mission Space Exploration Vehicle (MMSEV) consists of a core cabin with suit ports that is optimized for exploration observations, low overhead EVA and Robotics support, low volume habitation, and Solar Particle Event (SPE) radiation protection. The cabin can be configured with modular mobility systems, and modular forward and aft mounted work packages to address multiple mission destinations and applications. This Advanced Exploration Systems (AES) project covers the MMSEV cabin, MMSEV mobility systems (in--space and planetary mobility modules) and Portable Utility Pallet (PUP). The suit port and suit port compatible exploration suits are included in the AES EVA Suit Port and AES

Multi-Mission Space Exploration Vehicle (MMSEV)

Table of Contents

Technology Maturity



Management Team

Program Director:

- Jason Crusan

Program Executive:

- Mark Lee

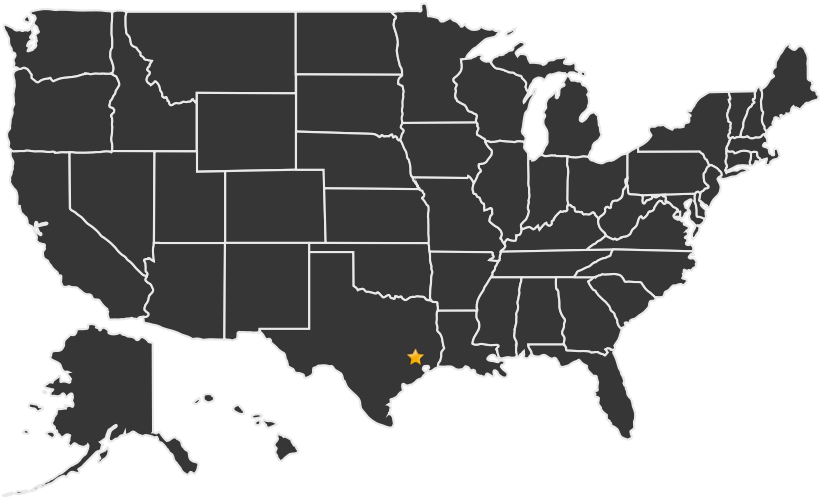
Continued on following page.

Multi-Mission Space Exploration Vehicle Project

Advanced Exploration Systems Program | Human Exploration And Operations Mission Directorate (HEOMD)

EVA Suit projects, respectively. Development and testing of MMSEV--specific ECLSS components, specifically the fusible heat sink, is included in this plan but collaboration with the AES Life Support Systems project will enable bench testing of other components of the MMSEV Environmental Control and Life Support System (ECLSS) that are not unique to the MMSEV. Manipulator work packages will be provided through the Office of the Chief Technologist (OCT) Human Robotic Systems program. These related projects will use the MMSEV as the focusing element and an overall integrated work breakdown structure will be created by the MMSEV project that includes all of the MMSV's systems.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Johnson Space Center

Other Organizations Performing Work:

- Jacobs Technology
- Oceaneering Space Systems
- Wyle

Management Team *(cont.)*

Program Manager:
- Jason Crusan

Project Manager:
- Michael Gernhardt

Principal Investigator:
- Michael Gernhardt

Technology Areas

Primary Technology Area:
Human Exploration Destination Systems (TA 7)
└ Habitat Systems (TA 7.4)

Secondary Technology Area:
Robotics and Autonomous Systems (TA 4)

Additional Technology Areas:
In-Space Propulsion Technologies (TA 2)

Space Power and Energy Storage (TA 3)

Human Health, Life Support, and Habitation Systems (TA 6)

Thermal Management Systems (TA 14)

DETAILS FOR TECHNOLOGY 1

Technology Title

Multi-Mission Space Exploration Vehicle (MMSEV)

Technology Description

This technology is categorized as a hardware system for manned spaceflight

The Multi--Mission Space Exploration Vehicle (MMSEV) consists of a core cabin with suit ports that is optimized for exploration observations, low overhead EVA and Robotics support, low volume habitation, and Solar Particle Event (SPE) radiation protection. The cabin can be configured with modular mobility systems, and modular forward and aft mounted work packages to address multiple mission destinations and applications. This Advanced Exploration Systems (AES) project covers the MMSEV cabin, MMSEV mobility systems (in--space and planetary mobility modules) and Portable Utility Pallet (PUP). The suit port and suit port compatible exploration suits are included in the AES EVA Suit Port and AES EVA Suit projects, respectively. Development and testing of MMSEV--specific ECLSS components, specifically the fusible heat sink, is included in this plan but collaboration with the AES Life Support Systems project will enable bench testing of other components of the MMSEV Environmental Control and Life Support System (ECLSS) that are not unique to the MMSEV. Manipulator work packages will be provided through the Office of the Chief Technologist (OCT) Human Robotic Systems program. These related projects will use the MMSEV as the focusing element and an overall integrated work breakdown structure will be created by the MMSEV project that includes all of the MMSV's systems.

Capabilities Provided

Core cabin with reconfigurable ports optimized for exploration observations, low overhead EVA and Robotics support, low volume habitation, and Solar Particle Event (SPE) radiation protection. The cabin can be configured with modular mobility systems for both planetary and in-space, and modular forward and aft mounted work packages to address multiple mission destinations and applications.

Potential Applications

Provides a lunar, Asteroid, Mars moon and Mars surface core cabin with reconfigurable ports optimized for exploration observations, low overhead EVA and Robotics support, low volume habitation, and Solar Particle Event (SPE) radiation protection. The cabin can be configured with modular mobility systems for both planetary and in-space, and modular forward and aft mounted

work packages to address multiple mission destinations and applications.

Performance Metrics

Metric	Unit	Quantity
Design, build, and vacuum chamber test a 1/3 scale MMSEV Fusible Heat Sink with fluid loop.	Completion	1
Conduct a series of integrated tests of the Gen 2A Cabin on flat floor with cold gas sled.	Completion	1
Complete Gen 1 RCS sled flight design and build form and fit mockup; integrate to Gen 2A cabin.	Completion	1
		1