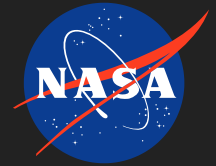


NextSTEP-2 Habitation

Active Technology Project (2016 - 2021)



Project Introduction

Through the public-private partnerships enabled by the Next Space Technologies for Exploration Partnerships - 2 (NextSTEP-2) Broad Agency Announcement, NASA has selected six U.S. companies to help advance the Journey to Mars by developing ground prototypes and concepts for a deep space habitat around the Moon. These companies are:

- Bigelow Aerospace of Las Vegas, NV
- Boeing of Pasadena, TX
- Lockheed Martin of Denver, CO
- Northrop Grumman of Dulles, VA
- Sierra Nevada Corporation's Space Systems of Louisville, CO
- NanoRacks of Webster, TX

This round of NextSTEP selections are part of a phased approach that will catalyze commercial investment in low-Earth orbit and lead to an operational deep space habitation capability for missions in the area of space near the moon, which will serve as the staging point for human lunar surface missions as well as a proving ground for Mars during the 2020s. These missions will demonstrate human, robotic and spacecraft operations in a true deep space environment that's still relatively close to Earth and validate technologies for the longer journey to Mars.

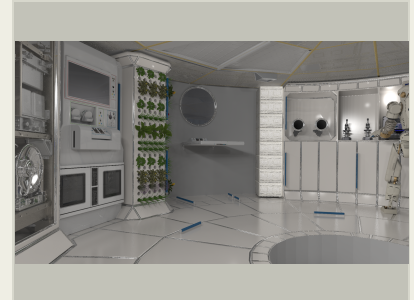
The ground prototypes will be used for three primary purposes: supporting integrated systems testing, human factors and operations testing, and to help define overall system functionality. These are important activities as they help define the design standards, common interfaces, and requirements while reducing risks for the final flight systems that will come after this phase. Additionally, each of the contractors shall identify and implement risk reduction activities associated with their concepts.

Rather than a ground demonstration, the NanoRacks contract included a feasibility study of using robots in space to transform an upper stage rocket into a habitable volume.

Following that study, the company is now planning and executing a small attached payload in space to perform a technology demonstrate to robotically cut metal in space. This effort can help NASA and industry create a key capability that may be needed for launch vehicle transformation.

Northrop Grumman's concept for their small habitat was selected to be the first habitable element of the Gateway and is currently under a new contract being managed by the Gateway Program Office at JSC.

Boeing, Bigelow, Lockheed Martin and Sierra Nevada have continued to refine their habitation concepts and have also assessed the changes required to provide habitation on the lunar surface as well as providing habitation for a 2-3 year mission to Mars.



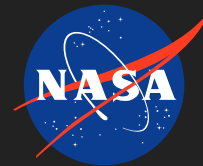
Habitation Interior Concept

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NextSTEP-2 Habitation

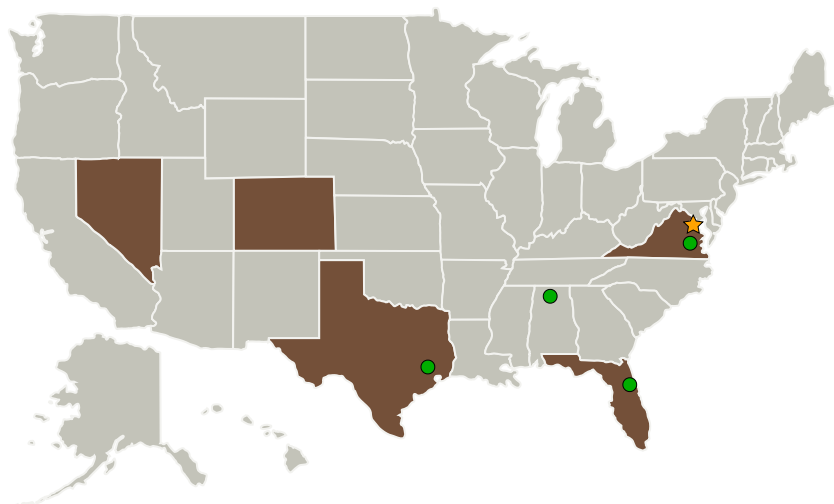
Active Technology Project (2016 - 2021)



Anticipated Benefits

The activities of these NextSTEP awards will inform the acquisition and deployment approach for the next phase of flight systems for deep space including important aspects, such as standards and interfaces, module configurations, and options for deployment using SLS, Orion, and commercial vehicles.

Primary U.S. Work Locations and Key Partners



Organizational Responsibility

Responsible Mission Directorate:

Human Exploration and Operations Mission Directorate (HEOMD)

Lead Center / Facility:

NASA Headquarters (HQ)

Responsible Program:

Advanced Exploration Systems Division

Project Management

Program Director:

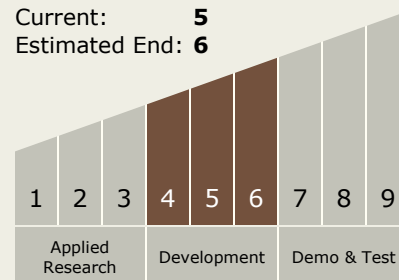
Christopher L Moore

Project Manager:

Douglas A Craig

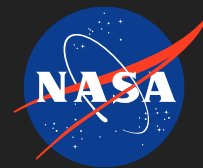
Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 6



NextSTEP-2 Habitation

Active Technology Project (2016 - 2021)



Organizations Performing Work	Role	Type	Location
★ NASA Headquarters(HQ)	Lead Organization	NASA Center	Washington, DC
Bigelow Aerospace(BA)	Supporting Organization	Industry	
Boeing	Supporting Organization	Industry	Chicago, IL
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, TX
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, FL
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, VA
Lockheed Martin Space Systems	Supporting Organization	Industry	Palo Alto, CA
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, AL
Nanoracks, LLC	Supporting Organization	Industry	Alexandria, VA
Northrop Grumman Innovation Systems	Supporting Organization	Industry	Dulles, VA
Sierra Nevada Corporation(SNC)	Supporting Organization	Industry	Sparks, NV

Primary U.S. Work Locations

Colorado

District of Columbia

Continued on following page.

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.2 Mission Infrastructure, Sustainability, and Supportability
 - └ TX07.2.1 Logistics Management

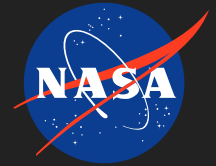
Target Destinations

Earth, The Moon, Mars

Supported Mission

Type

Projected Mission (Pull)



Primary U.S. Work Locations (cont.)

Florida	Nevada
Texas	Virginia

Images



A - Interior Concept

Habitation Interior Concept
(<https://techport.nasa.gov/image/41020>)



Bigelow Concept

Concept image Bigelow's Gateway concept featuring their habitat design
(<https://techport.nasa.gov/image/40986>)



Boeing Concept

Concept image Boeing's Gateway concept featuring their habitat design
(<https://techport.nasa.gov/image/40989>)



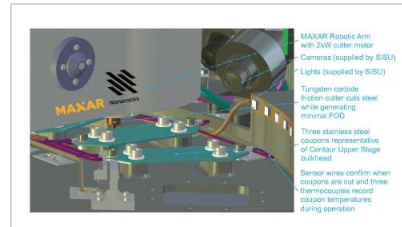
Lockheed Martin Concept

Concept image of Lockheed Martin's Gateway concept featuring their habitat design
(<https://techport.nasa.gov/image/40987>)



NanoRacks Concept

Concept image of NanoRack's habitat concept docked to the International Space Station
(<https://techport.nasa.gov/image/40991>)

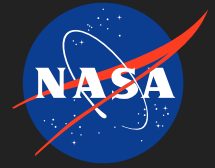


Nanoracks robotically controlled cutting tool

Depiction of Nanoracks robotically operated cutting tool to be tested in space.
(<https://techport.nasa.gov/image/40968>)

NextSTEP-2 Habitation

Active Technology Project (2016 - 2021)



Northrop Grumman

Concept image of Northrop Grumman's Gateway concept featuring their habitat design (<https://techport.nasa.gov/image/40988>)



Sierra Nevada Concept

Concept image of Sierra Nevada's Gateway concept featuring their habitat design (<https://techport.nasa.gov/image/40990>)