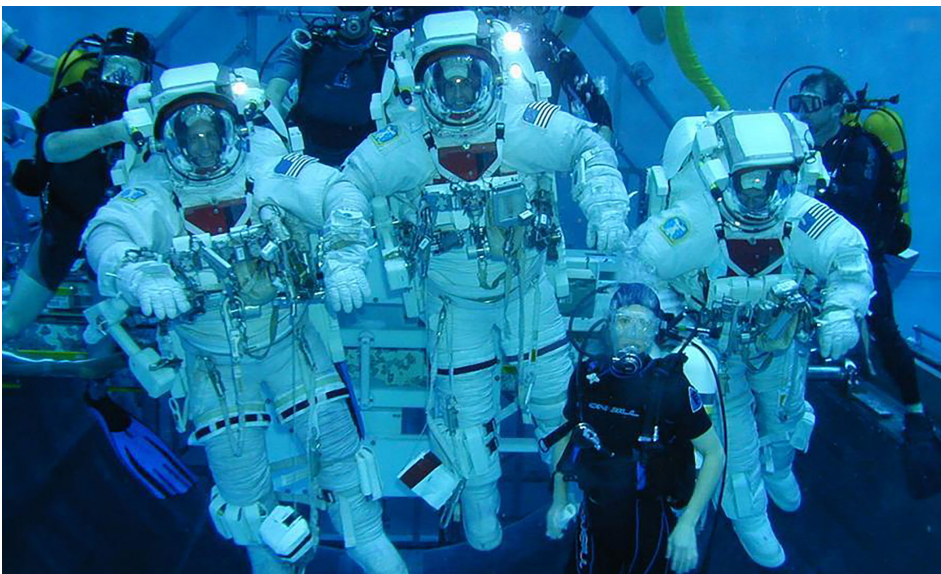




The NASA EVA Management Office at JSC is planning for up to 20 spacewalks from the International Space Station (ISS) in 2019, an amount of Extravehicular Activity (EVA) activity that has not occurred since the peak of the ISS assembly. These EVA missions encompass a great diversity of repair and replacement tasks, including a very complex repair of the Alpha Magnetic Spectrometer (AMS) payload that requires tools and operations new to EVA. NASA must also be prepared for contingency spacewalks should the ISS encounter an emergency. Aerospace personnel provide a wide variety of support to the NASA EVA effort, including the planning, integration, and execution of EVA's, maintenance of the current spacesuit, the Extravehicular Mobility Unit (EMU), and management of tools and crew aids needed to perform EVA's on the ISS.

Aerospace works with the Johnson Space Center EVA office to

- › Maintain the current space suits used on board the International Space Station
- › Develop tools and aids for astronauts
- › Work on design requirements, systems engineering and integration, and operational concepts for the next generation of EVAs



Aerospace assists in developing future EVA equipment by evaluating new concepts in relevant space environments such as the Neutral Buoyancy Lab, the world's largest pool. Image credit: NASA



## New Missions, New Requirements

NASA's EMU has been in service since 1981 for the Space Shuttle Program and has undergone relatively minimal upgrades since that time. It was originally designed only for use in low Earth orbit (LEO), and has undergone relatively minimal upgrades over its service life. With NASA's new exploration initiative, U.S. astronauts will need a new suit for the Moon (and eventually Mars). The exploration destinations have additional demands for a spacesuit, such as dust tolerance and walking in partial gravity – two key differences found on the lunar surface – as well as increased radiation tolerance. The new suits will also need to be designed for longer life than the previous lunar (Apollo) spacesuits. A cadre of Aerospace personnel at JSC are dedicated to establishing requirements for the new exploration suit, or xEMU, as well as its vehicle and airlock interfaces. Aerospace support is expected to continue for design, development, and acquisition of the overall exploration EVA system.

Aerospace is responding to the needs of our NASA customer by providing technical specialists involved in all facets of EVA activity, including design, planning, execution, certification of space suits, tools and crew aids, engaging with ISS international partners, verifying EVA and launch readiness, and performing real-time operations – for both the present and future of EVA.



Mobility and fit of a pressurized suit are extremely important in keeping astronauts productive. The Z-2 suit is a technology demonstrator for a planetary surface suit designed for maximum astronaut productivity on a planetary surface – exploring, collecting samples, and maneuvering in and out of habitats and rovers and it uses advanced composites to achieve a light-weight, high-durability suit that can withstand long-duration missions in the harsh environments found on Mars. Image credit: NASA

## The Aerospace Corporation

The Aerospace Corporation is a national nonprofit corporation that operates a federally funded research and development center (FFRDC) and has approximately 4,000 employees. The Aerospace FFRDC is aligned to support the most critical programs of the Department of Defense and the nation, and to serve as its customers' innovation partner across the space enterprise. Consistent with the competencies outlined in our sponsoring agreement, Aerospace provides strategic value through independent, intellectually rigorous, relevant, and timely products and services. With three major locations in El Segundo, Calif.; Colorado Springs, Colo.; and Washington, D.C., Aerospace addresses complex problems across the space enterprise and other areas of national significance.