

National Aeronautics and  
Space Administration



# THE EVOLUTION OF A MARTIAN

## NASA Langley Researchers and Engineers Are...

- Playing key roles in the development of both the Space Launch System and the Orion crew capsule, which will carry astronauts beyond the moon to an asteroid, and eventually to the dusty surface of the Red Planet.
- Leading the aerodynamic design of the Space Launch System by doing analysis and extensive testing in facilities such as the Unitary Plan Wind Tunnel and Transonic Dynamics Tunnel.
- Performing water impact testing and doing critical aerosciences and structural analyses for the Orion crew capsule. We also assist in analyzing and practicing recovery operations for Orion.
- Developing Orion's Launch Abort System, or LAS, which is designed to protect astronauts in the unlikely event a problem arises during launch.
- Spearheading work on advanced entry, descent, and landing (EDL) systems for planetary robotic missions and eventual human-scale missions to the surface of Mars. Understanding the aerodynamics and heating of atmospheric entry will enable more precise landing missions, while testing of new technologies will enable much larger missions to reach the Martian surface.
- Developing safe and reliable autonomous systems to supplement human operations, including mechanisms that can work in deep space to maneuver, assemble and service structures. In the 2020s, NASA plans to use this kind of technology to retrieve an asteroid.
- Leading the development of materials and structures for lightweight and affordable space transportation and habitation systems.
- Solving the problems of deep space radiation protection, including leadership of the Human Research Program to develop a better understanding of space radiation on crew health and safety. Langley is also building prototype designs for habitats and storm shelters for use in space.
- Working on sensor systems, known as Autonomous Landing Hazard Avoidance Technology (ALHAT), that will equip future planetary landers with the ability to assess landing hazards and land safely and precisely on many different planetary surfaces, including the moon, Mars and other planetary bodies.
- Developing the Hypersonic Inflatable Aerodynamic Decelerator, or HIAD, a device that could some day help cargo, or even people, land on another planet. HIAD could give NASA more options for future planetary missions, because it could allow spacecraft to carry larger, heavier scientific instruments and other tools for exploration.

# #JourneyToMars