

# Morpheus prototype uses hazard detection system to land safely in dark (w/ Video)

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Credit: NASA/Mike Chambers

NASA demonstrated that it can land an unmanned spacecraft on a rugged planetary surface in the pitch dark in a May 28, 2014 free-flight test of the Morpheus prototype lander and Autonomous Landing Hazard Avoidance Technology, or ALHAT.

The 98-second test began at 10:02 p.m. EDT, with the Morpheus lander launching from the ground over a flame trench and ascending more than 800 feet (244 m) into the dark Florida sky at Kennedy Space Center

using only ALHAT's Hazard Detection System for guidance.

The Hazard Detection System, assisted by three light detection and ranging (lidar) sensors, located obstacles—such as rocks and craters—and safely landed on the lunar-like hazard field a quarter mile away from the NASA Center.

Project Morpheus tests NASA's ALHAT and an engine that runs on liquid oxygen and methane, which are green propellants. These new capabilities could be used in future efforts to deliver cargo to planetary surfaces. The landing facility provides the lander with the kind of field necessary for realistic testing, complete with rocks, craters and hazards to avoid. Morpheus' ALHAT payload allows it to navigate to clear landing sites amidst rocks, craters and other hazards during its descent.

Project Morpheus is being managed under the Advanced Exploration Systems, or AES, Division in NASA's Human Exploration and Operations Mission Directorate. The efforts in AES pioneer new approaches for rapidly developing prototype systems, demonstrating key capabilities and validating operational concepts for future human missions beyond Earth orbit.

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