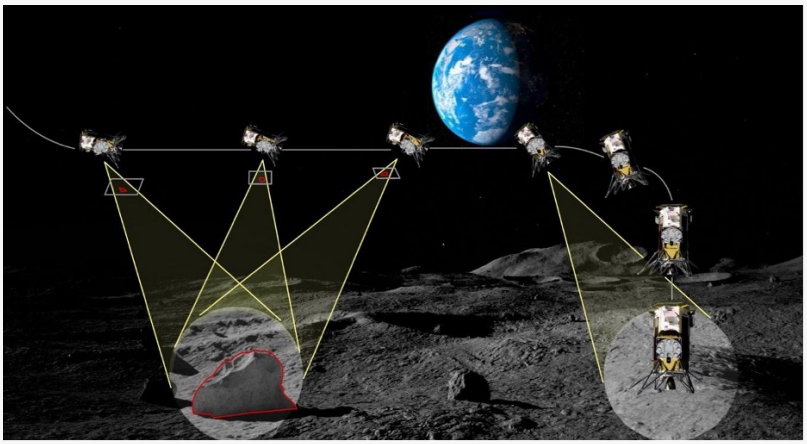
Rhea Space Activity Developing Advanced Hazard Detection Technology for NASA's Planetary Exploration Missions

The innovative LED-based solution significantly reduces barriers to entry for commercial space companies.



Artist rendition of LITPHAM used by a small class Lunar lander during its descent phases. In low illumination conditions, LITPHAM shines LED light while generating Digital Elevation Maps (DEMs) via Structure from Motion (SfM) to identify and avoid hazards during landing

WASHINGTON, DC, UNITED STATES, September 25, 2024 / EINPresswire.com/ -- NASA has awarded Rhea Space Activity, Inc. (RSA) a contract to develop advanced hazard detection technology for planetary exploration. The Low Illumination Planetary Hazard Avoidance and Mapping (LITPHAM) project will bridge the size, weight, power, and cost gap for commercial planetary exploration missions that require onboard hazard detection technology.

"LITPHAM is set to revolutionize planetary exploration," said Shawn Usman, astrophysicist and CEO of RSA. "LITPHAM is a versatile 3D terrain imaging sensor capable of mapping the surfaces of solid solar system bodies, identifying hazards and guiding safe landings by generating high-accuracy digital elevation maps (DEMs) through advanced photogrammetry methods."

The project will investigate and prototype real-time bundle adjustment algorithms and other structure from motion-based (SfM) methods which infer 3D terrain information from 2D images and motion along the lander's descent profile. In the case of a dark landing when there is insufficient illumination, LITPHAM uses a low-cost LED light array to ensure reliable imaging and DEM generation.

"Onboard hazard detection is critical for planetary missions because it ensures the safety and success of landers and rovers when navigating and landing on extraterrestrial surfaces," said Cameo Lance, physicist and COO of RSA. "Planetary bodies like the Moon, Mars, and asteroids have terrains that are largely unknown and can be extremely hazardous. Space missions are

costly, and the loss of a lander or rover due to a crash or malfunction caused by an unexpected surface hazard can jeopardize the entire mission. Onboard hazard detection helps protect these valuable assets by ensuring a safe and controlled descent."

LITPHAM leverages a wide-field-of-view camera and SfM algorithms to create a navigation system that can handle changing vehicle movements and work effectively from heights of 250 meters or more.

RSA is partnered with the Center for Advanced Spatial Technologies (CAST) at the University of Arkansas on the project.

The partnership between RSA and CAST exemplifies the innovative spirit needed to advance planetary exploration technologies," said Professor Jackson Cothren, Director of CAST and Professor in the UofA Department of Geosciences. "Our research into high-accuracy reconstruction of the 3D surface in low-light conditions is providing a crucial tool for safe and effective landings on a wide range of planetary bodies."

LITPHAM lowers barriers to entry for commercial planetary exploration.

"State-of-the-art precision landing and hazard avoidance systems are typically based on costly LIDAR technology, tailored to specific missions," said Kevin Hause, Chief of Strategy at RSA. "LITPHAM's innovative optical and LED-based solution significantly reduces costs while maintaining high accuracy, making planetary exploration more accessible for commercial companies."

The FAA projects that by 2028, U.S. commercial space launches could reach 338 annually, nearly tripling from fiscal year 2023. Technologies like LITPHAM are crucial for enhancing the safety, accuracy, and success of these missions.

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About Rhea Space Activity, Inc.
Rhea Space Activity, Inc. (RSA) is a team of brilliant minds applying advanced and disruptive tech to solve the world's security challenges. RSA specializes in innovative solutions for secure communication and reliable navigation in challenging environments. The company is headquartered in Washington, DC, with subsidiaries in the United Kingdom and Australia.

For more information, please visit www.rheaspaceactivity.com.

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