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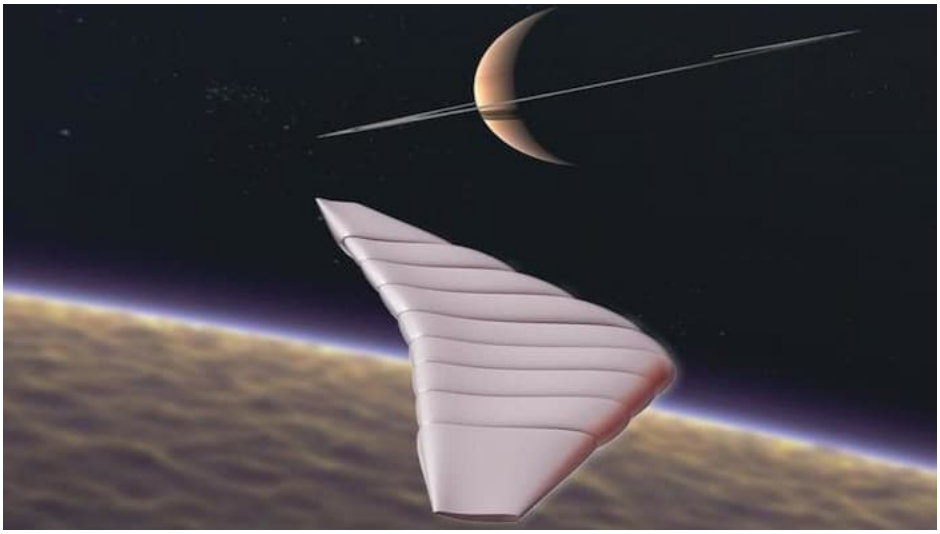
SPACE

Hybrid balloon/glider designed to wing its way through Titan's atmosphere

Michael Irving | July 8, 2016



The Titan Winged Aerobot is a hybrid balloon/glider that could one day be exploring the skies of Saturn's moon, Titan (Credit: GAC/NGAS)

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With a suspected subterranean sea of liquid water, oceans of methane on the surface and an atmosphere that could give rise to non-water-based life, it's no surprise that scientists are keen to learn more about Saturn's moon Titan. To that end, a new joint project between the Global Aerospace Corporation (GAC) and Northrop Grumman Aerospace Systems (NGAS) is developing a new exploration vehicle designed to soar through the skies of that mysterious moon.

The proposed Titan Winged Aerobot (TWA) is inspired by Northrop Grumman's T-LEAF (Lifting Entry Atmospheric Flight) class of vehicles, which would allow the craft to gently enter the atmosphere before transitioning into flight mode. Once there, the TWA would operate like a hybrid balloon and glider, utilizing a unique buoyancy system to allow it to ascend and descend without the use of propulsion systems or flight control surfaces. Minimal moving parts means it could squeeze more juice out of a single radioisotope power source.

"Titan is a cold, harsh environment that poses many technical challenges for any lighter-than-air exploration platform," says Benjamin Goldman of GAC. "But TWA has the potential to overcome these challenges with simple yet innovative engineering approaches to pressure management, lift generation, and maneuverability."

The vehicle itself needs to be a versatile platform to enable the study of Titan, so the TWA is designed as a means to a range of possible scientific ends. Once it enters the atmosphere, the craft needs to be able to swoop low to, for example, snap high-resolution photos and infrared images of the moon's surface and conduct subsurface radar sounding to study the makeup of the crust.

Targeted delivery of surface probes is an option, as is the ability to study the atmospheric composition and weather patterns, to potentially unlock answers about whether prebiotic life could arise under the extreme conditions.

Though Titan is the specific focus of the project, the technologies involved could have wider applications back here on Earth, or any planet or moon with an atmosphere. Similar craft could eventually be exploring Mars, studying our own atmosphere at high altitudes or helping bring payloads back from the ISS.

The project will be conducted under a 2016 Phase I NASA Small Business Innovation Research (SBIR) contract, with the GAC-NGAS team to develop the TWA concept and build a proof-of-concept prototype for testing on Earth.

If the TWA does make it to Titan, it might not be alone. If another proposed project gets off the ground, it could have a submarine buddy investigating the methane oceans on the surface.

Source: Global Aerospace Corporation via Phys.org, Northrop Grumman


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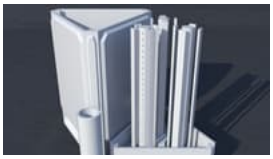
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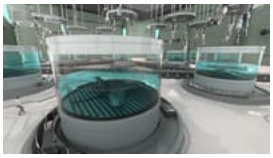
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