
EAPS Planetary Lunch Colloquium Series (PICS)

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12:30pm

54-517

Dragonfly: Exploring Titan's Prebiotic Organic Chemistry and Habitability

Titan's abundant complex carbon-rich chemistry, interior ocean, and past presence of liquid water on the surface make it an ideal destination to study prebiotic chemical processes and to document the habitability of an extraterrestrial environment. The opportunities for organics to interact with liquid water further possible progression of organic synthesis, providing an unparalleled opportunity not only to investigate prebiotic chemistry, but also to search for signatures of potential water-based or even hydrocarbon-based life. Beyond this rich chemistry, Titan's Earth-like geology, with a methane cycle instead of water cycle, allows study of familiar processes under different conditions.

Titan's dense atmosphere and low gravity make heavier-than-air flight highly efficient, providing the means for a lander with aerial mobility to bring a sophisticated payload to multiple locations. Dragonfly is a rotorcraft-enabled lander proposed to NASA's New Frontiers Program that is designed to sample materials in a variety of geologic settings, 10s -100s of kilometers apart, to understand how far chemistry can progress in environments that provide key ingredients for life. Dragonfly would also study Titan's atmosphere, surface, and sub-surface to understand the methane cycle, current atmospheric and geologic activity, and possible mechanisms for exchange of organic material between the surface and the interior ocean. In addition, Dragonfly can perform measurements during flight, including atmospheric profiles and aerial observations of surface geology, providing context for sampled material and scouting for landing sites.



For more information, contact Jason Soderblom (jms4@mit.edu)