

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration including Ocean Worlds (5)

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THE DRAGONFLY NEW FRONTIERS MISSION TO TITAN : ENVIRONMENT DEFINITION AND
PRESENT STATUS

Abstract

Dragonfly, a rotorcraft lander to visit multiple locations on Titan, is NASA's 4th New Frontiers mission and is presently in development. Exploiting the dense atmosphere and low gravity on Titan, Dragonfly uses a set of 8 rotors to perform powered flights of several kilometers to traverse Titan's diverse and organic-rich surface.

I will review some of the many Titan environment specifications that have had to be developed to guide the engineering design. These include atmospheric properties, wind and turbulence, surface topography (slopes and obstacles) and surface mechanical properties. Some subtle aspects include: the choice of wavelength for a hazard-mapping lidar which must avoid methane absorption bands; the specification of a surface adhesion value to guide thrust margins for takeoff in the event of 'sticky' ground; different timescales for wind variations that affect powered flight and the thermal balance of the vehicle.

Dragonfly was selected in 2019 with a view to launch in 2027 and arrival by 2034. I will review the evolution of the design (the mission Preliminary Design Review took place in February 2023) and the present status of the project, which includes contributions from CNES, DLR and JAXA.