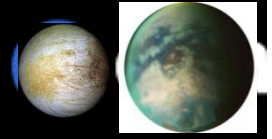




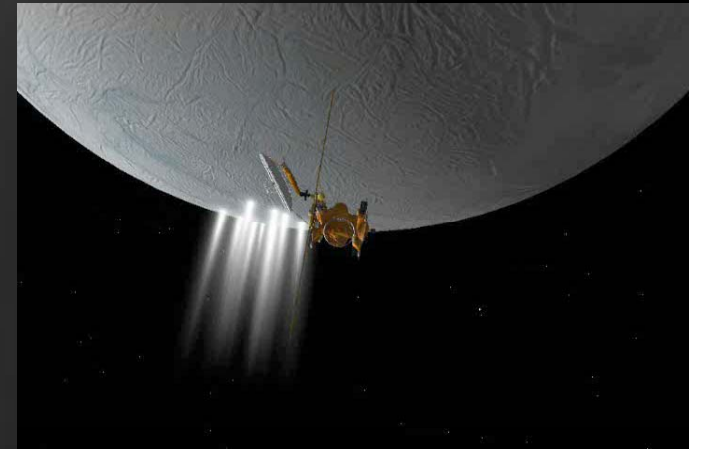
# This mission is a giant leap beyond the Cassini-Huygens mission



## First:

- exploration of Titan's atmosphere: (400-900 km)
- nested 10 meter- and 50 meter scale images across diverse terrains.
- global topographic information and subsurface sounding
- comprehensive in situ assay from upper atmosphere through to the dissolved components in the lakes
- test for intrinsic and/or induced magnetic fields
- high degree gravity mapping of Titan for interior and crustal structure
- mapping of complex polymers and detailed temperature and composition at Enceladus sulci.

Courtesy of Randy Kirk, USGS



"Perhaps the most enticing aspect of the search for life on Enceladus is that fresh samples of interest are jetting into space ready for collection. Drilling, scooping, melting, or digging may not be necessary."

*Chris McKay et al., 2008.*



# Why Titan and Enceladus



Saturnian environment

Titan

Terrestrial planet climate evolution

Active organic chemistry

Enceladus

Composition of material from which Titan formed

Sources of heating on icy worlds

Life



## NAI Executive Council Letter 9/22/08



The study commissioned by the NRC's Committee on the Origin and Evolution of Life entitled "The Limits of Organic Life in Planetary Systems"<sup>2</sup> states: "Thus the environment of Titan meets the absolute requirements for life. Titan is not at thermodynamic equilibrium. It has abundant carbon-containing molecules and heteroatoms and a fluid environment. Titan's temperature is low enough to permit a wide range of bonding, covalent and noncovalent. Titan undoubtedly offers other resources believed to be useful for catalysis necessary for life, including metals and surfaces." Clearly, exploring this hypothesis about Titan would provide key astrobiological information as well as points of reference in understanding its differences from the Earth.

In view of these considerations the NAI Executive Council reaffirms Titan to be in the list of highest priority astrobiological targets in the solar system, alongside Europa, and for a mission to Titan and the Saturn System to be in its highest-priority mission category.