

PAYLOAD OPTIONS FOR FUTURE ENTRY PROBE MISSIONS

Thomas R. Spilker⁽¹⁾

⁽¹⁾Jet Propulsion Laboratory, California Inst. of Tech., MS 301-170S, 4800 Oak Grove Drive, Pasadena, CA 91109, USA, Email: Thomas.R.Spilker@jpl.nasa.gov

Atmospheric entry probes can potentially address a wide range of science objectives that involve measurements by a wide range of instruments. Rarely is a mission budget unconstrained so science teams and mission designers can simply include every instrument that might be useful. Instead, careful investigation and instrumentation choices must be made to ensure a sufficient science return to justify a mission, while staying within finite project resource limits. Such decisions involve balancing many different resources on the spacecraft and within the project, and also the priorities of the science objectives that could be addressed. The priorities of science objectives, and thus the investigations and instrumentation needed to address them, vary greatly from destination to destination. For example, probes into the atmospheres of the giant planets place a premium on the origin of the solar system and the giant planets, with the dynamics and chemistry of such deep atmospheres at a somewhat lower priority; at Titan, there is more emphasis on current organic chemistry and the evolution of complex organic molecules, from their initial production high in the upper atmosphere to their eventual deposition on Titan's surface.

This presentation will summarize investigation options, and the instrumentation options for implementing them, at various potential atmospheric entry probe destinations in the solar system, with the exception of Titan lander and balloon instruments that another paper in this session will cover. Special attention will be devoted to destinations given high priority by the 2012 Planetary Science Decadal Survey (PSDS 2012), whose preliminary results are scheduled for release in early March 2011.