

FUTURE MULTI-PROBE MISSION TO TITAN AND ENCELADUS (IPPW-7)

Kim Reh*, John Elliott, Tom Spilker, Andre Vargas, Christian Erd, Jonathan Lunine, Jean-Pierre Lebreton, Athena Coustenis, Dennis Matson

*Jet Propulsion Laboratory, Jet Propulsion Laboratory, Jet Propulsion Laboratory,
CNES, ESA-ESTEC, University of Arizona, ESA-ESTEC, Observatoire de Meudon,
Jet Propulsion Laboratory*

*e-mail: kim.r.reh@jpl.nasa.gov, john.o.elliott@jpl.nasa.gov,
thomas.r.spilker@jpl.nasa.gov, andre.vargas@cnes.fr, cerd@rssd.esa.int,
jlunine@lpl.arizona.edu, Jean-pierre.lebreton@esa.int, athena.coustenis@obspm.fr,
Dennis.L.Matson@jpl.nasa.gov*

ABSTRACT

Recent discoveries by Cassini-Huygens about Saturn's crown jewels, Titan and Enceladus, have rocked the public and science community with glimpses of new worlds unimagined a decade before. Collaborative NASA-ESA/CNES Outer Planet Flagship Mission and Cosmic Vision studies have defined a Titan multi-probe mission that could follow-up on those discoveries. The mission concept includes flying through Enceladus' plumes and plunging deep into Titan's atmosphere with instruments tuned to find what Cassini could only hint at. Exploring Titan with a suite of vehicles; from orbit, from the surface of a great polar sea, and from the air with the first hot air balloon to ride an extraterrestrial breeze, the mission would turn our limited snapshot perspective of these worlds into an epic film.

For over a decade NASA, most recently joined by ESA, has been studying mission concepts and developing technologies and instruments to explore Titan and Enceladus that have led to the 2008 Titan Saturn System Mission (TSSM) concept. In 2007, NASA performed mission concept studies focused on four icy moon targets: Titan, Enceladus, Europa and Ganymede. Also in that year, ESA put forth its Cosmic Vision 2015–2025 call for mission concepts which resulted in selection of the *TandEM* concept focused on Titan and Enceladus. NASA and ESA study teams began working jointly in 2008 to merge their concepts and align their scientific goals through an integrated Joint Science Definition Team (JSDT). The resulting TSSM concept is described in this paper as well as the path forward to achieve readiness for such a future multi-probe mission.

Details of the TSSM concept can be found at URL <http://opfm.jpl.nasa.gov> in the public release version of the Titan Saturn System Mission Final Report.