



Recent Advancements in Titan Balloon Techniques

K. Reh (1) kim.r.reh@jpl.nasa.gov, J. Hall (1) Jeffery.L.Hall@jpl.nasa.gov, A. Vargas (2) Andre.Vargas@cnes.fr, Arnaud Deramecourt (2) Arnaud.Deramecourt@cnes.fr, T. Colonius (3) colonius@caltech.edu, Walter Dieudonne (4) walter.dieudonne@rtime.fr, Athena Coustenis (5) athena.coustenis@obspm.fr, Jonathan Lunine (6) Jonathan.Lunine@roma2.infn.it

(1) Jet Propulsion Laboratory Caltech, Pasadena California, USA, (2) CNES Toulouse, France, (3) California Institute of Technology, Pasadena California, USA, (4) Research in Technologies for Innovation in Modeling the Environment, France, (5) LESIA (Bat. 18), Observatoire de Paris-Meudon, (6) Università degli Studi di Roma "Tor Vergata", Rome Italy

Abstract

Suggestions for the use of balloons to explore Saturn's icy moon Titan have been proposed for more than 40 years. Many alternative mission concepts [1], [2], [4], [5] have been developed since that time, catalyzed by scientific discoveries resulting from the Voyager 1 flyby in 1980 and the Cassini-Huygens mission that arrived in 2004. The results from Cassini-Huygens, in particular, revealed Titan to be a complex and fascinating world with diverse topographical features and a methane-based hydrological cycle. The Huygens probe [3] demonstrated excellent visibility below a 10 km altitude with its high resolution images and measured low wind speeds at the surface (< 1-2 m/s). The motivation to return to Titan has intensified in the wake of these results and the increasing priority of related scientific questions. Because of the uniquely dense, high molecular weight atmosphere, very small diurnal temperature variations and low gravity, it is widely recognized that a buoyant vehicle could provide an unparalleled means of in situ exploration on a global scale. This poster provides a summary of recent advancements in Titan balloon techniques that someday will enable a return to Titan on a grand scale.

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References

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