

FIRST RESULTS FROM THE DESCENT IMAGER/SPECTRAL RADIOMETER (DISR) EXPERIMENT ON THE HUYGENS ENTRY PROBE OF TITAN. M. G. Tomasko¹, L. R. Doose¹, B. Rizk¹, P. Smith¹, C. See¹, M. Bushroë¹, L. McFarlane¹, S. Engel¹, A. Eibl¹, E. Karkoschka¹, M. Prout¹, L. E. Dafoe¹, K. Holso¹, R. West², L. Soderblom³, B. Archinal³, U. Keller⁴, S. Schroeder⁴, M. Kuppers⁴, B. Bezard⁵, E. Lellouch⁵, A. Coustenis⁵, C. de Bergh⁵, M. Combes⁵, B. Schmitt⁶, S. Doute⁶, N. Thomas⁷, F. Gliem⁸, and M. Lemmon⁹. ¹Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ, 85721, ²Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA, 91109, ³U. S. Geologic Survey, Geologic Div., Astrogeology Br., 2225 N. Gemini Dr., Flagstaff, AZ, 86001, ⁴Max Plank Institute for Solar System Studies, Max-Planck Str. 2, D-37191, Katlenburg-Lindau, Germany, ⁵Paris Observatory, LESIA, 5 place Janssen, 92195 Meudon cedex, France, ⁶Laboratoire de Planetologie de Grenoble Domaine Universitaire, Bat. D de physique, BP 53, 38041 Grenoble cedex, France, ⁷Physikalisches Institut, University of Bern, Sidlerstr. 5, CH-3012 Bern, Switzerland, ⁸Technische Universität Braunschweig, Institut für Datenverarbeitung, Hans-Sommer-Str. 66, D-38106, Braunschweig, Germany, ⁹Texas A & M University, Department of Atmospheric Sciences, College Station, TX 77843-3150.

Introduction: The Cassini-Huygens mission was launched on October 15, 1997, and arrived in Orbit around Saturn in July, 2004. The Huygens Probe was released from the Cassini Orbiter on December 24, 2004 and entered Titan's atmosphere on January 14, 2005. Here we give the first results from the Descent Imager/Spectral Radiometer (DISR) instrument aboard the Huygens Probe during its descent into the atmosphere of Titan. Measurements were made by several different optical systems and sensors.

Imagers: The DISR imager contained three frame imagers that made images at three different nadir angles and every 30 degrees in azimuth. These could be assembled into about 20 different panoramic mosaics at altitudes between 150 km and 3 km. In addition, several individual images were obtained between 3 km and a few hundred meters altitude. The spatial resolution in the last frames is roughly 1 meter.

Optical Spectrometers: DISR includes a visible spectrometer that looks upward and downward at wavelengths between 480 and 960 nm with a resolution of about 5 nm, and an infrared spectrometer that looks upward and downward between 850 and 1700 nm with a spectral resolution of 15 nm. A separate ultraviolet photometer uses a filter to limit its bandpass to between 350 and 480 nm. These instruments could separate the direct solar beam and diffuse skylight. The measurements can be used to determine the vertical distribution and imaginary refractive index of haze aerosols in Titan's atmosphere as well as the vertical profile of the absorption of solar energy. The spectrometers also could measure the vertical profile of methane in the atmosphere at the entry site. Finally, the downward-looking spectrometers could measure the reflection spectrum of the ground at many points on the surface.

Solar Aureole Camera: DISR contained a solar aureole camera that operated in two narrow passbands centered at 500 nm and 934 nm. Measurements were made in each channel in two orthogonal linear polarizations.

The field of view was 6 degrees in azimuth and 50 degrees in zenith angle with 1 degree pixels. Measurements were planned with this vertical strip of the sky within a few degrees of the sun as well as looking at 180 degrees azimuth from the sun. These measurements can constrain the size and shape of the haze aerosols in Titan's atmosphere.

Results: We will describe the operation of the DISR instrument during the descent, summarize the data collected, and give a brief overview of the analysis of our measurements to date.