

The Cassini/Huygens Gas Chromatograph Mass Spectrometer

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After a 7 year interplanetary journey on board the Cassini Orbiter, the Huygens Probe was released on December 25, 2004 and entered the atmosphere of Titan on January 14, 2005. The GCMS collected data from 146 km to the surface for two hours and 27 minutes. The probe and the GCMS survived the surface impact allowing data collection of gases evaporated from the surface for an additional 69 minutes. Early results confirmed nitrogen and methane to be the primary constituents. The mole fraction of methane was also obtained beginning at the stratosphere and continuing down to the surface. Rapid increase of the methane signal after landing suggests that liquid methane exists on the surface together with several higher molecular weight species. Isotope ratios of $^{12}\text{C}/^{13}\text{C}$ and $^{14}\text{N}/^{15}\text{N}$ were obtained as well as radiogenic Argon 40. Post encounter calibration of the flight spare GCMS at GSFC will enable further data refinements and may lead to new discoveries.

The design, development, fabrication, testing, assembly and calibration of the GCMS were achieved by the personal dedication and perseverance of the experiment team consisting of highly skilled government, contractor, university and industrial personnel. Personnel from Goddard's Laboratory for Atmospheres were responsible for the overall management and technical direction as well as the in-house design, development, testing, final assembly and calibration of the experiment as well as the design and fabrication of the digital flight electronics. Personnel from the University of Michigan's Space Physics Laboratory were responsible for the design and fabrication of the analog flight electronics and were key participants in the final integration and testing.

This presentation will discuss the Cassini/Huygens mission and some of the early results from the Huygens Probe. Most of the emphasis will be on the design of the Huygens GCMS and some of the operational constraints imposed by the mission design.