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Instruments

HASI : Huygens Atmosphere Structure Instrument

The Huygens Atmospheric Structure Instrument is a multi-sensor package designed to measure the physical properties of Titan's atmosphere. HASI will measure the temperature, the pressure, the turbulence, the atmospheric conductivity and will search for lightning. HASI will also address questions regarding the surface topography and dielectric properties.

The scientific objectives of the Huygens atmospheric Structure Instrument (HASI) are:

- Determine the density, pressure and temperature conditions corresponding to the higher part of the atmosphere during the entry phase. Of particular interest is the determination of the physical condition in this region where the "detached" haze, observed by Voyager, is formed.
- Measure the stratospheric density, T, P profile of the stratosphere during the descent phase and identify the composition in these layers in terms of trace constituents which condense in this part of the atmosphere. Interpret any data which may suggest the existence of clouds in the upper troposphere.
- Measure P,T in the lower troposphere and determine the existence and extent of a convective zone.
- Determine (in case of survival after impact) the nature of the surface.
- Determine the atmospheric electric conductivity and investigate ionisation processes, wave electric fields and atmospheric lightning. Detect acoustic noise due to turbulence and thunders. Characterise electric properties, conductivity and permittivity of the surface material.
- Determine the surface large scale and small scale topography, the surface dielectric properties and in particular to be able to remotely distinguish between a liquid or a solid surface before impact. If the surface is liquid, information on surface winds may be obtained. All data are measured along the ground track of the descending probe due to horizontal winds during the last 30 km.

RELATED ARTICLES

- Introduction
- Instruments in Brief
- ACP: Aerosol Collector and Pyrolyser
- DISR: Descent Imager/Spectral Radiometer
- DWE: Doppler Wind Experiment
- GCMS: Gas Chromatograph and Mass Spectrometer
- HASI: Huygens Atmosphere Structure Instrument
- SSP: Surface Science Package

RELATED LINKS

- ▶ ACP: Aerosol Collector and Pyrolyser
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- ▶ SSP: Surface Science Package

HASI Sensor Packages

Sensor package	Sensor type	Accuracy	Resolution	Measured parameter
Accelerometers (ACC)	3-axis accelerometer	1%	< 1 µg	Atmospheric deceleration, Descent monitoring, Response to impact
Pressure Profile Instrument (PPI)	Kiel probe, capacitive gauges	1%	0.01 hPa	Atmospheric pressure
Temperature Sensors (TEM)	2 dual element Pt thermometers	0.5 K	0.02 K	Atmospheric temperature

Permittivity, Wave & Altimetry (PWA)	Mutual impedance	10%	$10^{-11}(\Omega\text{m})^{-1}$	Atmospheric electric conductivity, Wave electric fields & Lightning
	AC field measurement		$2 \mu\text{Vm}^{-1}$ (threshold)	
	Relaxation probe	10%	1 min 25 ms - 2 s 1 mV (threshold)	Ion conductivity and DC electric field
	Acoustic sensor	5%	10 mPa (threshold)	Acoustic noise due to turbulence of storms
	Radar signal processing (FFT)	1.5 dB	40 m at 24 km	Radar echoes below 60 km altitude

[▶ PREVIOUS ARTICLE](#) GCMS: Gas Chromatograph and Mass Spectrometer

[▶ NEXT ARTICLE](#) SSP: Surface Science Package

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