Oxford University involvement in Saturn mission

News

1 July

Today [1 July], the Cassini-Huygens spacecraft arrives at Saturn: the climax of a seven-year, two-billion-mile mission. One of the crucial instruments for telling us about Saturn, and its rings and moons, will be the Composite Infrared Spectrometer, which has been worked on by scientists at Oxford University.

Cassini-Huygens, a joint NASAâ€“European Space Agency venture, will speed at 3.2 miles a second between two of the outer rings of Saturn on 1 July, and by firing its rocket motor will brake enough to be captured by Saturn's gravitational field. The Composite Infrared Spectrometer will make detailed measurements of the infrared spectra of Saturn, its largest moon Titan, and Saturn's rings and icy moons. These measurements will tell researchers about the composition and temperatures of the Saturnian system.

Researchers at Oxford University have built the cooler and focal plane assembly for the instrument. Once data starts coming back from 1 July, they will be analysing the atmospheric results.

Dr Pat Irwin, a member of the Oxford team, said: 'We are going to get an enormous amount of information that no-one has ever had before about the atmospheres of Saturn and Titan. We will be able to build up a detailed picture of what these worlds are like, rather than just speculating.'

On 23 December the bus-sized spacecraft will release a wardrobe-sized passenger called Huygens on a 22-day collision course to land on Saturn's largest moon, Titan. Titan is roughly half the size of the Earth and has fascinated astronomers for decades, because of its high-pressure nitrogen-based atmosphere, rich in hydrocarbons, which makes it very similar to the primordial atmosphere of the Earth, although much colder.

'There's all sorts of fascinating photochemistry happening on Titan, and photochemistry may well have played a key role in the beginning of life here on Earth,' said Dr Irwin.

Titan also seems to be the only world in our solar system, other than the Earth, which has liquid on its surface. 'It looks like it's liquid methane or ethane,' said Dr Irwin. 'There seem to be lakes or seas, and we think it may have its own "hydrological cycle" with methane rain.'

The Composite Infrared Spectrometer will allow scientists to 'see' the surface of Titan, which is obscured in the visible light range by thick muddy orange-coloured smog. It will also be able to measure the surface temperature, and the difference between the surface temperature on the day and night sides â€“ an important indicator of the presence of a liquid, since liquid dramatically lessens the difference between day and night side temperature.

The Oxford scientists will play a key role in the initial measurements of Titan's upper atmospheric temperatures. These are important for the Huygens lander, because if the temperatures are significantly different from those expected, the landing sequence may need to be modified. 'We'll basically be doing a "look before you leap" procedure,' said Dr Irwin.

For more information contact the Press Office, 01865 280532, press.office@admin.ox.ac.uk

Notes to Editors

- There is a strong Oxfordshire involvement in Cassini-Huygens: scientists at CCLRC Rutherford Appleton Laboratory near Didcot have helped to build other instruments on board Cassini-Huygens, including the instrument that will be the first man-made object to touch Titan. See www.cclrc.ac.uk for more information, including their own press release.
- For more information on the Cassini-Huygens project see http://saturn.jpl.nasa.gov/home
- Saturn is a giant ball of gas that may have a rocky core, or even have a heart of fluid metallic hydrogen â€“ no one yet knows. Winds at the equator reach two-thirds the speed of sound, and the planet mysteriously radiates 80% more light than it receives from the Sun. Its rings, too, are a puzzle: some predict that such large rings should evaporate after about 100 million years, but the solar system is at least 4.5 billion years old.

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