

CSIRO telescopes help rescue Titan experiment

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CSIRO's radio telescopes and others in Australia, China, Japan and the USA have revealed how the wind speeds on Saturn's moon Titan vary with altitude-and have turned a disappointment into a triumph.

As the Huygens probe plummeted through Titan's atmosphere on 14 January it transmitted a stream of data to its parent Cassini spacecraft. The ground-based radio telescopes 'eavesdropped' on the probe's signal. As the probe was buffeted by Titan's winds, its radio signal was shifted in frequency. These 'Doppler shifts' have been used to measure the wind speeds.

Another experiment to determine the Doppler shifts, the Cassini/Huygens Doppler Wind Experiment, was going to rely on data transmitted from the probe to Cassini. But the transmitted data was lost because because one of the receivers on Cassini was not properly configured. The data from the telescopes has plugged that gap.

The largest telescopes involved were the NRAO Robert C. Byrd Green Bank Telescope in the USA and CSIRO's Parkes Radio Telescope in Australia. Thanks to special instruments borrowed from NASA, these telescopes were the first to directly 'see' the probe's signal.

The wind on Titan has been found to flow in the direction of Titan's rotation-west to east-at nearly all altitudes. The winds are weak near the surface and increase slowly with altitude up to about 60 km. The maximum speed of about 430 km/hour was found at an altitude of 120

km. Above 60 km there are large variations in the Doppler measurements, which scientists think were caused by vertical wind shear.

The radio telescope network was coordinated by the Joint Institute for VLBI in Europe, JIVE, and NASA's Jet Propulsion Laboratory, JPL. JPL and JIVE also made and processed the ground-based Doppler measurements, working with the Doppler Wind Experiment team.

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