Canberra Space Centre

FACT SHEET

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Operated by the CSIRO and Raytheon Australia, on behalf of NASA and the Jet Propulsion Laboratory

Deep Space Station 43

30 years of listening and discovery

Deep Space Station 43

The key part of NASA's Deep Space Network is the series of large antennas set around the world. These antennas enable scientists to communicate with and receive signals from distant spacecraft exploring our Solar System.

Largest among these antennas are the giant 70-metre radio telescopes such as Deep Space Station 43 (DSS-43) here at Tidbinbilla.

Its role as a very sensitive 'ear', listening for data transmissions from unmanned, robotic spaceprobes, places this antenna and others here at the Tidbinbilla Complex, at the forefront of NASA's exploration of deep space.

DSS-43 was originally constructed by the Collins Radio company between 1969 and 1972 as a 64-metre antenna. It was upgraded in 1987 to 70-metres in diameter, in time for the Voyager encounter with Neptune in 1989.

The height of the antenna is 70 metres, similar to that of a 20 story building. The footings for the antenna are buried 11 metres underground for added stability.

Currently, DSS-43 is the largest steerable parabolic antenna in the Southern Hemisphere.

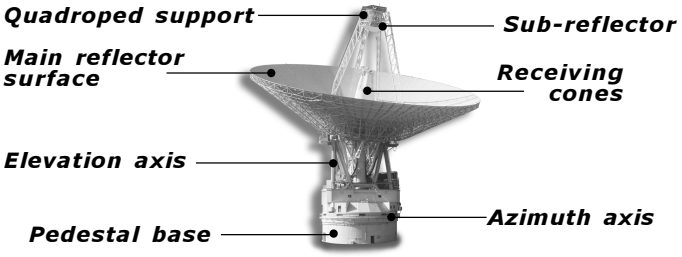
A typical communications day for DSS-43 involves receiving data from any number of spacecraft. In recent years it has monitored data from missions such as the 1997 Mars Pathfinder and Sojourner rover, the Galileo spacecraft in orbit around Jupiter, the Mars Global Surveyor and Mars Odyssey probes, and the ongoing missions of Voyagers 1 and 2 (now both well outside our Solar System).

DSS-43 can also transmit information to these spacecraft. New commands or mission activities can be uploaded if required.

The antenna design and movement is of an Azimuth-Elevation configuration. The moving part of the antenna weighs approximately 3000 tonnes. The total weight of the antenna structure is 10 million kilograms.

The rotating structure (azimuth) moves on a hydrostatic bearing, comprising a film of oil 0.1mm thick, which allows the massive structure to move smoothly and precisely. This bearing is basically a circular steel runner upon which three huge pads (weighing 7 tonnes each) rest. These pads have oil forced through them to lift them off the runner so they 'float' on the oil.

Elevation is determined by a bullgear system with 22 segments, 25.3 metres in diameter.



The pointing accuracy of this antenna is 0.005 degrees which allows accurate communication with spacecraft millions of kilometres away. The antenna can receive signals at L-band, S-band, X-band, and K-band, and transmit at S-band and X-band frequencies.

The dish has 1,272 panels constructed from aluminum with a total surface area of 4,180 square metres.

The antenna can track in winds of up to 64 kilometers per hour and has a maximum survivable wind speed of 160 kms per hour.

More information on our website:
http://www.cdscc.nasa.gov

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