

# Yatharagga: Satellite Laser Ranging (SLR) Station

This space station has had two names - **Yarragadee** and **Yatharagga** - and two functions - astronaut voice communications' and 'satellite laser ranging'.

In both manifestations it was part of NASA's **Satellite and Data Tracking Network (STDN)** operating as a sub-station from Orroral Valley Tracking Station, Canberra, until that closed in 1985. It now operates as part of the **International Laser Ranging Service (ILRS)**.

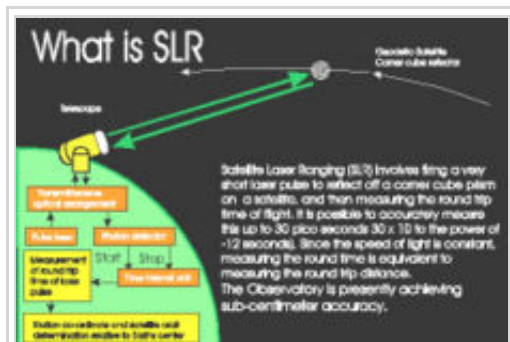
Its first name was Yarragadee space station on Yarragadee pastoral property, but when the property was divided into two parts – Yarragadee and Yatharagga – the space station ended up on the Yatharagga property. NASA however still calls the space station by its old name. The best way to describe it would be as 'the Yarragadee SLR Station on the Yatharagga property'.



Moblas 5 site: *Photo - NASA*

The Yarragadee space station was opened in 1975 as an out-station of the Orroral Valley Tracking station to provide a VHF astronaut voice link to support the Apollo-Soyuz mission in July 1975; filling the hole left by closure of the Carnarvon Tracking Station. A VHF quad-helix array fixed to a relocated Carnarvon AcqAid tower and antenna mount provided the link. It continued to be used for NASA's Shuttle missions beyond the closure of Orroral Valley Tracking Station until the **Tracking and Data Relay Satellite System (TDRSS)** was in full operation and made the link obsolete.

Yarragadee was expanded to include **Moblas 5**, a mobile **Satellite Laser Ranging (SLR)** facility in mid 1978.



The SLR method:  
*Image – Geoscience Australia*

**Moblas** is a NASA system using laser ranging to establish the relative position and velocity of a satellite and the tracking station to an accuracy of better than 1 cm with a single laser shot. A pulsed laser light source is fired at a reflecting satellite, 'echoed' by a corner reflector and then received by a powerful optical telescope fitted with low level light sensors. The prime satellite supported is **Lageos** (Laser Geodynamic Satellite) launched on 4 May 1976 and expected to stay in orbit for 8 million years. It is encrusted with 426 highly precise corner reflectors.



The Mobile Laser:  
*Image – NASA*

The station also housed a **Laser Protection Surveillance Radar** to ensure that no aircraft were in the vicinity when the laser transmitter was fired. The 'radar log' shows the radar as operational in July 1978 but indicates that laser tracking may not have started until December '78.

The Yarragadee site remains important because of the relative paucity of locations in the Southern Hemisphere. The primary purpose of its measurements are to help define a geo-potential field model of the Earth, the centre of its mass, and the northwards drift and stability of the Australian continental plate. The process has been described as 'satellite positioning of Earth' rather than 'Earth positioning of a satellite'.

The site facilities also include **DORIS**, a European Space Agency (ESA) Doppler satellite tracking system,

**GLONASS** a Russian Federation Global Positioning system, and a **GPS** facility.

For more information see:

<http://envisat.esa.int/instruments/doris/> for the **DORIS** system; and

<http://www.ga.gov.au/geodesy/gps/gpsoverview.jsp> for **GPS** and **GLONASS** systems.

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**Return** to WA in Space

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