

# Hobart, Mt. Pleasant, Station Report for 2007

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## Abstract

This is a brief report on the activities carried out at the Mt. Pleasant Radio Astronomy Observatory at Hobart, Tasmania. During 2007, the observatory participated in 61 24-hour IVS VLBI observing sessions, and funding commenced for the AuScope VLBI array which will see three new antennas installed across Australia for geodesy.

## 1. Introduction

The Mt. Pleasant Observatory is located about 15 km north east of Hobart at longitude 147.5 degrees East and latitude 43 degrees South. Hobart is the capital city of Tasmania, the island state of Australia located to the south of the mainland. The station is operated by the School of Mathematics and Physics at the University of Tasmania. The station has a co-located GPS receiver and a site which is used for absolute gravity measurements.

## 2. Brief Description of VLBI Facilities

The antenna is a 26 m prime focus instrument with an X-Y mount. The focus cabin has a feed translator with provision for four different receiver packages, which enables rapid changeover between geodetic and astronomical requirements. Standard receiver packages provide for operation at L band and S, C, X, and K bands. There is also the dual frequency S/X geodetic receiver. All of these receivers are cryogenically cooled. The antenna has a maximum slew rate of 40 degrees per minute about each axis. The station is equipped with a Mark IV electronics rack and a Mark 5 VLBI recording system. There is another disk based recording system used by other Australian VLBI antennas.

## 3. Staff

Staff at the observatory consisted of academics, Prof. John Dickey (director), Dr. Simon Ellingsen, Dr. Melanie Johnston Hollitt, and Prof. Peter McCulloch, who has had a large input into the receiver design and implementation. Dr. Aidan Hotan and Dr. Jamie Stevens are research fellows and have had input into the Linux systems at the observatory. Mr. Brett Reid is the Observatory Manager whose position is funded by the university. In addition we have an electronics technical officer, Mr. Eric Baynes, and we had a half time mechanical technical officer, Mr. Geoff Tonta. For operation of the observatory during geodetic observations we rely heavily on support from astronomy Ph. D. and post-graduate students. In 2007 Dr. Jim Lovell was appointed as Project Scientist for the AuScope VLBI project (see *Future Plans* below).

## 4. Geodetic VLBI Observations

Hobart participated in 61 geodetic VLBI experiments during 2007. These were divided between the APSG, CRDS, CRF, OHIG, R1, R4, R&D, and T2 programs. All experiments were recorded



Figure 1. The Mt. Pleasant 26m antenna.

using Mark 5A. In 2007, Hobart increased its support of IVS by committing to participate in 60 24-hour experiments, an increase of 36% above those performed in 2006. The ARC LIEF (Large Infrastructure and Equipment Funding) funded 10 Gb/s fiber optic link between the Mt. Pleasant VLBI site and the university campus was completed during 2007. Links out of Tasmania are currently limited to  $2 \times 155$  Mbps, which will be upgraded to Gbps rates by the end of 2008.

In 2007 the University completed work on a visitors center and museum at the observatory, funded from the estate of Grote Reber, the world's first radio astronomer. The museum includes a display on the contribution the Mt. Pleasant 26 m antenna makes to geodesy through the IVS.

## 5. Future Plans

2008 will see the construction of a new 12 m antenna at Mt. Pleasant for geodesy as part of the AuScope VLBI project. AuScope is part of the Australian government's National Collaborative Research Infrastructure Strategy (NCRIS). It encompasses NCRIS Capability 5.13: "Structure and Evolution of the Australian Continent". An important part of this is the acquisition of three new radio telescopes and a data processing facility for geodesy. Construction of the other two telescopes will take place in 2009 in Western Australia and Northern Territory. It is anticipated that these antennas will be dedicated to IVS observations for approximately 50% of the time. This five year project, for which funding started in 2007, will vastly improve the capabilities of the IVS in the southern hemisphere. The array will be operated for AuScope by the University of Tasmania with data correlation supported by Curtin University of Technology. The construction and operation of the array is being managed for AuScope by the University of Tasmania.