

Yellowknife Observatory

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Abstract

This report gives an overview of the activities at the Yellowknife Observatory. It also summarizes the technical parameters and presents the Yellowknife VLBI team.



Figure 1. Yellowknife Geophysical Observatory 9 m VLBI Antenna

1. Overview

The Yellowknife VLBI antenna is a 9 meter diameter antenna which has had a very storied past. Formerly the “MV-1” mobile antenna, it was used as a proof of concept for mobile VLBI under the ARIES (Astronomical Radio Interferometric Earth Surveying) program. Following the successful proof of concept, the MV-2 and MV-3 mobile antennas were built and used extensively during NASA’s Crustal Dynamics project. The MV-1 antenna was then stationed at Vandenberg Air Force Base. In 1991 NASA and NOAA offered the system to Energy, Mines and Resources, Canada, for use at Yellowknife. With support of the Crustal Dynamics Project the Yellowknife VLBI observatory came on the air in the summer of 1991.

The antenna is located at the Yellowknife Geophysical Observatory and is operated by the Geodetic Survey Division, Natural Resources Canada. The Yellowknife Geophysical Observatory is operated by the Geological Survey of Canada, Pacific Division, Natural Resources Canada.

2. General Specifications

- Latitude : 62.48 North
- Longitude : 114.48 West
- Reflector : 9 m
- Receiver : S and X cryogenic
- Azimuth speed : 40 degrees per minute
- Elevation speed : 40 degrees per minute
- PCFS version : 9.3.23
- VLBI equipment : Mark III and thick tape drive
- Time standard : NR Maser
- GPS receiver : Rogue

3. Antenna Improvements

Since being installed in Yellowknife, the MV-1 has not required any major upgrades. The antenna is parked every winter because the antenna is unable to operate in low temperatures (December till March). Once spring arrives, the Yellowknife team prepares the antenna for the upcoming season.

Last summer there were difficulties with the antenna brakes getting stuck moments before the beginning of an experiment. This problem was addressed, and in the near future the Algonquin team will be travelling to Yellowknife to perform a complete check up of the antenna and the VLBI equipment. In addition, the old antenna control unit will be replaced with one similar to that at Algonquin.

4. Antenna Survey

The Yellowknife antenna is surrounded by a high precision survey network which has been measured three times since 1990. This network has been precisely measured to obtain the geodetic tie between the VLBI, the GPS and the DORIS reference points with a precision of a few mm.

A repeat survey is planned to be conducted this year.

5. Yellowknife VLBI Team

The VLBI team in Yellowknife are working for the Geophysical Observatory of the Geological Survey of Canada. Their main work is to operate and maintain the seismic array. For the last few years, the VLBI team has included only two people to take care of the equipment and perform the experiments.

- George Jensen : (25%) electronics equipment
- William Outhwaite : (25%) VLBI logistics, site survey.

6. Operations 1998-1999

Last year Yellowknife was involved in five CORE-B experiments.