Canadian VLBI Technology Development Center

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Abstract

The Canadian VLBI Technology Development Center (TDC) is actively involved in theoretical studies to define recommendations for the VLBI2010 system. In addition, two development programs at the Dominion Radio Astrophysical Observatory (DRAO) are of potential interest to VLBI2010. Composite antennas that are light, stiff, and cost effective are being developed, and a state-of-the-art correlator is being developed for the EVLA.

1. Introduction

The Canadian TDC is a collaborative effort of the National partners interested in the advancement of VLBI technology, namely the Geodetic Survey Division of Natural Resources Canada (GSD/NRCan) and the Dominion Radio Astrophysical Observatory (DRAO) of the Herzberg Institute for Astrophysics of the National Research Council of Canada, (DRAO/HIA/NRC).

2. VLBI2010 Committee

Activity within the Canadian TDC is now focussed primarily on supporting recommendations for IVS' VLBI2010. This is being done through Bill Petrachenko's participation as chairman of the V2C. In the past year, activity has mainly focused on consolidating the current conception of the project through the production of a VLBI2010 Progress Report. The report is about to be released. Detailed definition of VLBI2010 sub-systems is the major focus for the future.

3. DRAO Activities

DRAO has a long history of participation in VLBI beginning with the first ever successful fringes in 1967. Expertise exists in a number of relevant disciplines from innovative antenna/feed/receiver design to the design and implementation of large complex digital systems.

Of particular interest to VLBI2010 are the composite antennas being designed for radio astronomy. These are 10 m diameter antennas based on composite materials that are light, stiff, and cost effective. Under the leadership of Dean Chalmers and Gordon Lacy, a second prototype antenna (10 m) was produced in the summer of 2008 with significantly improved surface accuracy.

In addition to the antenna development effort, DRAO, under the leadership of Brent Carlson and Dave Fort, is producing the correlator for the EVLA project. It is one of the most ambitious radio interferometry correlators ever designed, handling, in real time, 32 stations at a maximum data rate of 96 Gbps per antenna. Although primarily intended for connected element interferometry, it is also designed to be VLBI-capable. In the past year, the first fringes were detected with a scaled down version of the correlator, with expansion to the full EVLA configuration about to begin.

Figure 1. Second prototype 10 m composite antenna at DRAO being used to test focal plane array.