



NRC Publications Archive Archives des publications du CNRC

Made in Canada
Tapping, Ken

This publication could be one of several versions: author's original, accepted manuscript or the publisher's version. / La version de cette publication peut être l'une des suivantes : la version prépublication de l'auteur, la version acceptée du manuscrit ou la version de l'éditeur.
For the publisher's version, please access the DOI link below. / Pour consulter la version de l'éditeur, utilisez le lien DOI ci-dessous.

Publisher's version / Version de l'éditeur:

<https://doi.org/10.4224/23000108>

Skygazing: Astronomy through the seasons, 2014-02-14

NRC Publications Record / Notice d'Archives des publications de CNRC:

<https://nrc-publications.canada.ca/eng/view/object/?id=3e2df23c-cb50-4911-aeb1-e3a4aa544e06>

<https://publications-cnrc.canada.ca/fra/voir/objet/?id=3e2df23c-cb50-4911-aeb1-e3a4aa544e06>

Access and use of this website and the material on it are subject to the Terms and Conditions set forth at

<https://nrc-publications.canada.ca/eng/copyright>

READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE.

L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site

<https://publications-cnrc.canada.ca/fra/droits>

LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB.

Questions? Contact the NRC Publications Archive team at

PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information.

Vous avez des questions? Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca.



MADE IN CANADA

Ken Tapping, 4th February, 2014

When the USA built the Very Large Array radio telescope (VLA) about forty years ago it was the biggest and most sensitive radio telescope in the world. It consisted of twenty-seven 25-m dish antennas which can be moved into different groupings. The VLA revolutionized radio astronomy, and it remained one of the world's most important radio telescopes for more than 30 years, before inevitably starting to show its age.

When the instrument entered the 21st Century, the antennas and other major hardware were fine, but the 1970's era receivers and other electronics needed to be replaced with far more capable modern equipment. This upgrade would increase the data collecting capability of the radio telescope by a factor of nearly 10,000 times, and make the VLA a world leader once again.

However, there was a problem; the flood of data coming out of the original VLA would now become a tsunami. If the new instrument was to be operated all day, every day, storing data to process later was not an option. The rate the data is processed would have to keep up with the rate it is produced. In the early years of the 21st Century the technology to do that did not exist. This gave Canada an opportunity to contribute to the project.

Our observatory, which is part of the National Research Council, has some of the best experts on high-speed astronomical signal processing in the world, and they came up with a rather innovative idea that would solve the VLA's information flow problem. So Canada proposed to the US that in return for a share in the upgraded instrument and as part of Canada's contribution to another major instrument, this country would supply the required number cruncher.

The offer was accepted, and development started. Even simulating the new machine required a more powerful computer than we had here at the time. The work began with the design of custom microchips. These were incorporated into large

signal processing circuit boards. Hundreds of these were in turn installed in large racks. It was only possible to test the final instrument a bit at a time because it needed more electricity than the power lines into the observatory could provide.

The number cruncher, called WIDAR, is now delivered, installed and running, with final, minor bugs now being chased down. The upgraded VLA, now called the Karl G. Jansky Very Large Array after the pioneer astronomer, is now in operation: observing and producing new science.

This upgrade project has been one of the largest astronomical upgrades ever undertaken, and the USA has produced a very nice video about the instrument, its history, the upgrade and what has been achieved. It is narrated by Jodie Foster. About 12 minutes into the video we see the Canadian contribution, a room filled with racks of equipment. There are close-ups of the number crunching modules in action, with the lights flashing, and bearing our NRC-CNRC logo. You can see this video on the web. The links are https://www.youtube.com/watch?v=RqX9vLj3_7w, <https://vimeo.com/70554007>, and <https://public.nrao.edu/news/announcements/jodie-foster-narrates-new-vla-visitor-film>.

Over coffee recently I commented to one of the engineers responsible for WIDAR what an achievement it was. He replied that now Canada is involved in the Square Kilometre Array radio telescope and we are going to need a number cruncher much larger and more capable than WIDAR. The new ideas are still coming!

Venus rises about 6am. Jupiter dominates the sky; Mars rises around midnight and Saturn at 2am. The Moon will reach First Quarter on the 6th.

Ken Tapping is an astronomer with the National Research Council's Dominion Radio Astrophysical Observatory, Penticton, BC, V2A 6J9.

Tel (250) 497-2300, Fax (250) 497-2355

E-mail: ken.tapping@nrc-cnrc.gc.ca

