CMC MICROSYSTEMS IMPACT

Helping the World's Greatest Telescopes to See the Universe More Clearly

Physicists at the University of Lethbridge are working with CMC Microsystems to build a next-generation device that will improve the most powerful radio and infrared telescopes in the world

"We are working with CMC Microsystems to develop a system-on-a-chip control system to improve the radiometer's reliability and compactness, bringing together three separate embedded controllers into a single unit. This will enable us to develop a device that is smaller, uses less power and is closer to a commercial prototype."

Dr. David Naylor
Principal Investigator
Infrared Radiometer for Millimetre Astronomy (IRMA) Project
Professor, Physics
University of Lethbridge

Dr. Robin Phillips, (right) and Greg Tompkins (left), of the University of Lethbridge, pictured with the IRMA device that has since been installed at the Las Campanas Observatory in Chile.

It is a Canadian innovation that promises to help astronomers see deeper into space than ever before. It could also become Canada's contribution to the billion-dollar, multinational Atacama Large Millimeter Array (ALMA) project, the largest and most expensive ground-based observatory in the history of modern astronomy.

Over the next seven years, 80 antennas will go up in the Andes Mountains in Chile in the ALMA project. Dr. Robin Phillips and his research team hope that each one will be equipped with a Canadian-made device that will help these high-power telescopes to "see" the universe more clearly.

IRMA at work at the Gemini Observatory in Chile. The next generation of IRMA will have 'CMC inside'.
PHOTOS: Robin Phillips

Researchers have deployed three generations of the Infrared Radiometer for Millimetre Astronomy (IRMA) on telescopes in Hawaii and Chile. Today, a University of Lethbridge research team is working on a fourth-generation device that is even smaller and more powerful. They are aiming to address a key challenge with ground-based telescopes: water vapour in the atmosphere that distorts incoming light, disrupting the image. IRMA is able to resolve this problem by measuring the amount of water vapour several times per second above each telescope.

"The signal must arrive at exactly the same time at each antenna for the telescope to work; water vapour causes delays in signal transmission," says Dr. Phillips, IRMA Project Manager. "With IRMA, we can determine what the delay is, enter these data into the computer system and effectively reduce the distortion and blur in the images."

The research team values access to the System-on-Chip Research Network, managed by CMC. By using the System-Level Prototyping Station for embedded systems, the group aims to increase the productivity and efficiency of IRMA by shrinking the size of its electronics, reducing its power consumption and moving it closer to the commercial prototype stage. The team will install the first of these devices at the Las Campanas Observatory in Chile in late 2005. *cmc*

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