University of Lethbridge News Release

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U of L played a role in siting the world's largest telescope

Astronomers will be able to peer farther back in time with the Thirty Meter Telescope (TMT), an international astronomy project that has involved the utilization of University of Lethbridge technology.

Canada recently announced it will provide almost $250 million in funding over the next 10 years to help build the telescope. The United States, Japan, India and China have already committed funds toward the construction of the world's largest telescope at the top of Mauna Kea volcano in Hawaii, and U of L Infrared Radiometer for Millimetre Astronomy (IRMA) technology played a key role in site selection.

"We are very pleased that the IRMA technology developed at the U of L was used at each of the five proposed sites for TMT," says Dr. David Naylor, U of L astronomy professor. "As with any real estate, location is key. When you are committing $1.5 billion, one has to be confident one has picked the right site."

Over the last decade, the Astronomical Instrumentation Group (AIG) at the U of L, led by Naylor, developed IRMA to determine the best site for locating the TMT. Several IRMA units were built by Naylor's team and deployed at various mountaintops in North and South America during site testing for TMT. Naylor and six graduate students worked on the project.

Since most of the infrared spectrum emitted by stars and galaxies is absorbed by atmospheric water vapour, telescopes are situated in high, dry places to obtain the best possible astronomical measurements. IRMA itself is a compact, lightweight radiometer that can operate autonomously or be controlled directly from the U of L. Being located atop a high altitude mountain was not fundamentally different from being a space borne instrument.

"It had to be designed with risk mitigation in mind and be able to recover from such things as cosmic ray impacts which could trigger failures in the on-board code," says Naylor, adding the mountaintop environment was more hostile than space on one occasion. "One of our IRMAs was struck by lightning and the damage was really quite impressive. We keep that IRMA as a reminder of the force of nature."

TMT is expected to be operational by 2024. Canada's funding contribution will be spent at home to construct and assemble the telescope. A British Columbia-based company, Dynamic Structures, designed the TMT and will also build it. The federal government's funding will also insure Canadian researchers get a viewing share of the telescope.

"For IRMA to be used in site testing indicates our technology is among the best in the world," he says. "Reliable measurements of atmospheric conditions, including water vapour, are absolutely essential in a project of this magnitude."

The survey results were released in 2010 and more information about the water vapour testing was published by The Astronomical Society of the Pacific. The six graduate students involved in the project have since gone on to be employed in a variety of positions around the world, from monitoring the atmosphere in what's considered to be the cleanest place on earth to protecting Canada's coastline from illegal immigrants.

The TMT, with its 30-metre segmented mirror, will be able to provide a resolution 12 times better than that possible using the Hubble Space Telescope, allowing astronomers to study the origins of the planets, stars, galaxies and black holes.

Naylor is available for interviews after 2 p.m. Tuesday and most of Wednesday.

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