Odin is a millimetre to sub-millimetre wave astronomy/aeronomy mission with Sweden, Canada, France, and Finland as partners. Canada has a 20% share in both aspects of the mission with support provided by the Canadian Space Agency and NSERC. The major scientific goal of the mission is to study the interstellar chemistry of oxygen and water by observing the rotational transitions of those molecules. Since Odin is the first submillimetre-wave astronomy satellite to have tunable receivers, many other molecular and atomic lines of astronomical interest will be accessible for the first time. The members of the Space Astronomy Laboratory at the University of Calgary participated in the design and construction of Odin, and we continue to play an active role in the operation of the satellite. Odin's payload consists of 4 submillimetre (495, 548, 555 and 571GHz) receivers, 1 millimetre (119 GHz) receiver, and three separate spectrometers; the acousto-optical spectrometer (AGS) and two digital auto-correlators. The spatial resolution is ~2 arc min at 119GHz. Odin was successfully launched on February 20, 2001 by a Russian START-1 rocket, and is now in its second year of operations.

The Canadian support of the radiometer instrument also includes the testing, trouble shooting, and integration of the system. In particular, the integration and test of the mechanical design associated with the support of optical elements. An example of a novel design for a lens is shown in Figure 4.

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Recent Results

Odin Millimetre/Submillimetre Radiometer Design, Integration, and Testing

Canadian hardware contributions include the design, integration and test of the millimetre/submillimetre radiometer. This was done through a close collaboration with Chalmers University of Technology. The radiometer optical design was carried out using Quasi-Optical ray tracing and CAD software developed for this purpose, but the software can also be used for general applications. All mirror surface specifications, and lens designs were part of the Canadian contribution, as well as much of the mechanical design associated with the support of optical elements. An example of a novel design for a lens is shown in Figure 4.

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