

## *Team Achievement Award*

### *Magellan Aerospace - CASSIOPE Spacecraft Bus Design, Manufacture and Delivery*



The Magellan CASSIOPE Spacecraft Bus was designed, built and tested by a dedicated team of about 30-40 engineers and 12 technical staff, right here in Winnipeg.

The team was dedicated to this project for a 5 year period and was involved in all phases of the project for efficient and effective project delivery. The CASSIOPE Spacecraft Bus satellite is tentatively scheduled to be launched into space in June 2013.

The project is groundbreaking in that it is Canada's first, fully redundant, scientific small satellite, and likely one of the most capable fully-redundant small satellites in the world. The project pushed the boundaries of what was thought to be possible in a small satellite and has dawned a new era in spacecraft performance and reliability in a small spacecraft package for Canada. The small satellite, which is 1.2m in diameter, supports 9 instruments in a very small package, where normally there would be 2 or 3 instruments. The number of instruments represents tremendous value to the client, gathering first-class scientific data at a fraction of the cost of traditional large satellites. The project was delivered on-time and on-budget to their client MacDonald, Dettwiler and Associates of Richmond, BC. In short, this project is a Winnipeg success story.

The project was technically challenging and innovative. Some of the key challenges include:

- Innovating new methodologies for space systems, control, thermal, electrical, software and mechanical engineering to realize high performance space science from small satellites.
- Every aspect of the spacecraft design from the hardware to the software and especially the on-board spacecraft computer subsystem, was tailored to keep the size, mass and cost within requirements.
- Each instrument had its own field of view, pointing requirements and power demands, which had to be compatible with other payloads and bus systems.
- Many of the payloads require deployment sequences which change the spacecraft mass properties, thus complicating the attitude control modes.
- Any one of CASSIOPE's nine instruments would have been a challenge for a single small satellite bus to accommodate. Magellan's ability to accommodate all nine on a single, fully redundant spacecraft is a significant achievement.