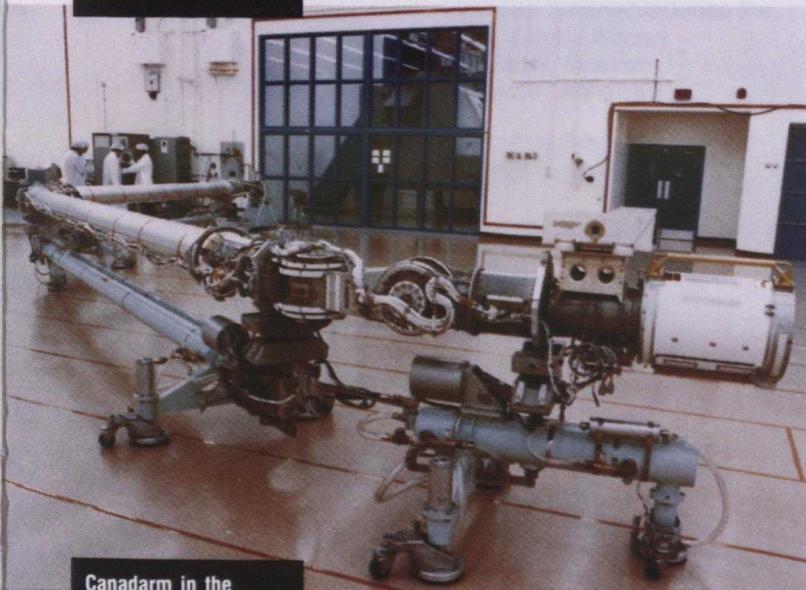


## Space



Construction of a satellite in the powerful Anik C series.



Canadarm in the making.

Canada became the third nation in space with the launch of *Alouette 1* in 1962 — and the third to design and build satellites. Several more followed and, in 1972, the first of a series of *Anik* communications satellites launched into geostationary orbit provided a Canada-wide communications network. The *Hermes* satellite, launched in 1976 into geostationary orbit above the equator, was used to test supra high frequency signal transmissions and reception, which are fundamental to the development of direct broadcasting, as well as to the development of telehealth, where satellites are used to extend health services to remote communities; teleconferencing; and tele-education, where students and teachers thousands of kilometres apart communicate via satellite.

*SARSAT*, a satellite system developed by Canada, the United States and France, has been in service since 1982, and is especially important in Canada, where search and rescue operations are difficult and expensive because of the vast size of the country.

The space shuttle program is known throughout the world. For Spar Aerospace Limited, and CAE Electronics Ltd., it was an opportunity to put Canadian space and robotics technology to work in developing a computer-controlled remote manipulator arm called *Canadarm*. Deployed during the second flight of the space shuttle *Columbia*, *Canadarm* operates much like a human arm with six rotating joints, two at the shoulder, one at the elbow and three at the wrist. An on-board computer can guide *Canadarm* through 20 movements. Delicate and fragile on the ground, *Canadarm* cannot support its own weight unassisted. But in outer space, in the absence of gravity, it can grapple payloads as big as a satellite that may weigh as much as three tonnes.

New developments, such as *Smartarm*, will allow *Canadarm* to “see” as well as touch.

Spar Aerospace is also adapting its remote manipulator systems to other industrial applications, such as underwater or nuclear reactor work. And in the field of space travel, CAE Electronics Ltd. is building specialized manned manoeuvring units that allow astronauts greater freedom when moving outside their space vehicles.

More details of Canada's involvement with space can be found in *Satellites: The Canadian Experience*, another publication in this series.