

## Arm ready for space shot

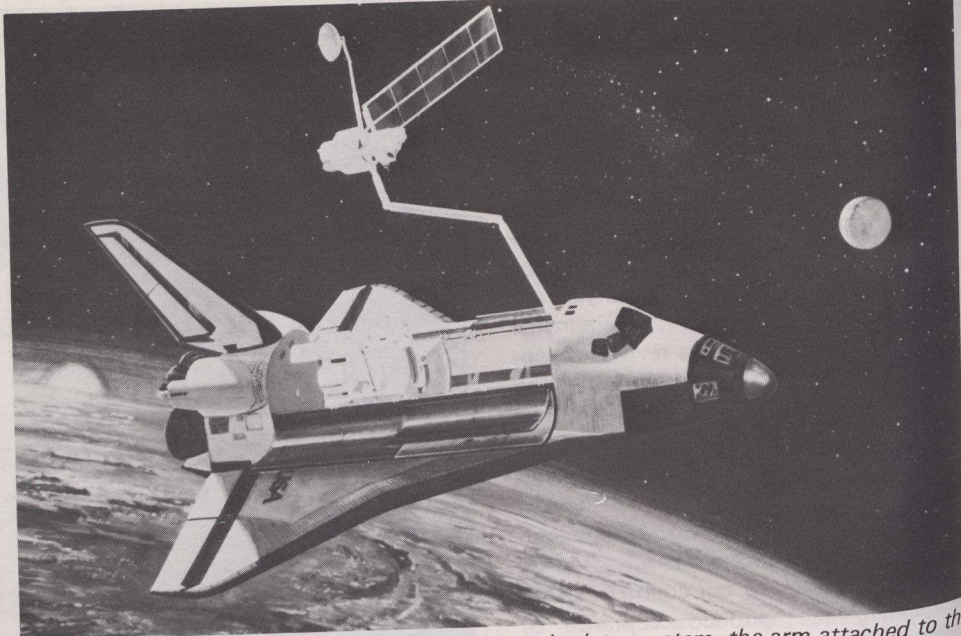
Canada's contribution to the United States' space shuttle program, the remote manipulator arm, is installed and ready for its mission on September 30.

"Things went very well," said Art Hunter, a spokesman for the National Research Council of Canada, which designed the arm. He and officials of Spar Aerospace of Downsview, Ontario, which built the mechanism, watched every step since installation began at the Kennedy Space Centre, Florida, in May. "I was totally amazed, we expected problems and didn't get them," said Mr. Hunter.

Testing the arm, which will lift satellites out of *Columbia's* cargo bay and drop them off in space, is a major part of the second shuttle flight, which will last five days.

The arm, which did not fly on the initial shuttle test flight, resembles a human arm in that it has a shoulder and elbow joint connected by long cylindrical arm segments each about 8 metres (25 feet) long. A mechanism on the end can grasp an object much like a hand.

The first arm was a gift from Canada; subsequent versions will be purchased to outfit *Columbia's* sister ships, *Challenger*, *Discovery* and *Atlantis*, which Spar Aerospace has a \$74-million contract to



Canadian technology produced the remote manipulator system, the arm attached to the United States' space shuttle (above) which astronauts will use to deploy satellites into space from the shuttle's cargo bay and retrieve orbiting satellites for servicing or return to earth. An advanced manipulator could be used on an underwater vehicle possibly to perform such tasks as repairing pipelines on the ocean floor.

provide.

"The arm was lifted over the edge of the cargo bay by a crane. It was slung from an I-beam, because it is not rigid enough to support itself on earth," Mr. Hunter said. In the weightlessness of space, the arm will not be bent by lifting

heavy objects and thus it does not need to be made of heavy materials.

When the arm is used, there will be no question who made it. "The last design change was to paint the name Canada and a Canadian flag on the arm," Mr. Hunter said.

## Universities and world food

Canadian universities should be concerned about the global food problem, they should be deeply involved in food-system development assistance, and they should establish clear priorities to ensure that such assistance will continue in spite of the heavy demands on the limited resources of the university, reports Bob Stanley in a recent edition of *IDRC Reports*.

To make the best use of their scarce resources, faculties and colleges of agriculture and veterinary medicine should also consider forming a consortium to co-ordinate their development-related activities, and establishing networks in specialized areas based on present links, such as those between the University of Alberta and International Development Research Centre (IDRC) in the post-production sector.

These are some of the recommendations contained in a recent study published by the Science Council of Canada, *Partnership in Development: Canadian*

*Universities and World Food*. Prepared for the Council by William Tossell, professor of crop science and dean of research at the University of Guelph, the report assesses the contribution of Canada's universities over the past decade, examines the roles of other institutions involved, and maps out a strategy for the next decade.

### Students trained

The most direct form of involvement of the universities in development is in the training of students from Third World countries — about half the foreign students in Canadian universities in 1978 were from developing countries, and about half of these were from the low-income countries, the report states.

But Dr. Tossell does not recommend increasing such programs. It is more appropriate for students to learn in their own regions, he says, than to spend up to eight years studying in a developed country, with the inevitable problems of readjustment upon return to the home country.

"If a developing country does not have suitable university undergraduate programs available locally or regionally, the resources of the Canadian universities would generally be better used to assist in building this local or regional capability than in training the undergraduates in Canadian universities," he writes.

But the report adds that there are some situations in which undergraduate training in Canada is appropriate. It cites an arrangement between IDRC, the National Agricultural Research Centre in Bambey, Senegal and Laval University in Canada, under which Masters level students from six Sahelian countries were able to do course work at Laval and thesis research at Bambey.

Outlining the involvement of 33 Canadian universities in development project activities between 1968 and 1978, the report shows faculty members participated in 364 separate projects, either directly or as advisers.

There was a fivefold increase in such development activities by universities during the 1970s.