

sensing or astronomy; in docking the space shuttle; in moving equipment and supplies around on Space Station; in supporting astronauts with their extra-vehicular operations; and in forming part of the emergency evacuation system for the manned modules.

The Space Station is planned to include several free-flying unmanned platforms. The U.S. and ESA will each have a co-orbiting platform and a platform in polar orbit. The platforms will be used for a variety of tasks such as experiments in space science, earth observations and materials processing.

The Canadian Mobile Servicing System clearly will be a critical component of the Space Station, both during construction and later during operation of the Station. The MSC is building on our CANADARM technology. It will be more flexible than CANADARM, with the addition of a seventh joint at the shoulder. It will also be five times as strong as the first-generation arm, so that it can handle heavier payloads such as the orbital maneuvering vehicle (OMV) which weighs 150,000 kilograms. A Space Vision System (SVS) will be added to permit accurate judgment of speed and distance in space where reference points are missing.

The MSC will be built in modular form and will likely require five shuttle flights to complete. If the Space Station Program is able to surmount its various problems, including questions of military use and inflating costs, it is now tentatively scheduled to have the first part of the MSC on the second or third Space Station flight of the shuttle, some time in the mid-1990s.

Development of the MSS is a Major Crown Project, to be managed by NRC. The prime contractor for the project is Spar Aerospace Limited. The other industrial team members are CAE Limited (Montreal), SED Systems Inc. (Saskatoon), and Canadian Astronautics Limited (Ottawa). The Federal Government has estimated the total cost of the development of the MSS at \$697 million (1986 \$) over 15 years, to fiscal year 2000/01. The estimated cost over five years (to FY 1990/91) is \$169 million. The User Development Program has been estimated at \$50 million over five years and \$100 million over 15 years.<sup>4</sup>

## B. MSAT

The Federal Government retains a significant interest in the development of satellite-communications technology. The Mobile Satellite, MSAT, will be owned and operated by Telesat Canada. The Federal Government's involvement includes market and technology development, and guaranteed lease of services once the system is operating in space. MSAT will provide voice and data services to mobile terminals in motor vehicles, trains, ships and aircraft operating in rural, offshore, and remote areas of Canada. Market studies have identified 60,000 to 100,000 potential Canadian users. The MSAT system is designed to complement, not compete with, the mobile cellular telephone system which serves principally urban centres.

MSAT was originally developed as a government demonstration project in mobile communications but its intrinsic economic value has converted it to a commercial enterprise

<sup>(4)</sup> Ministry of State for Science and Technology, *The Canadian Space Program: New Initiatives*, Ottawa, May 1986, p. 2.