

Satellites now provide Canadians with many important daily services, but one of their most dramatic and exciting roles has been in helping to rescue accident victims. The SARSAT program is literally saving lives.

SARSAT is a satellite system developed by Canada, the United States and France to improve marine and aviation search and rescue operations. SARSAT is a unique international joint space venture because it works in cooperation with a similar and technologically compatible Soviet system, COSPAS. The result is an excellent example of how well satellite technology can be applied for peaceful purposes: in the first 13 months of its demonstration phase (September 1, 1982—October 1, 1983), COSPAS/SARSAT contributed to the rescue of 87 people.

The COSPAS/SARSAT system uses polar-orbiting satellites that provide world coverage every few hours. The satellites, acting as communications relays, receive radio distress signals from Emergency Locator Transmitters (ELTs) in aircraft and Emergency Position Indicating Radio Beacons (EPIRBs) in ships and retransmit them to ground stations. (In the event of an accident, the ELT or EPIRB is activated automatically and can also be switched on manually.) Ground stations detect the distress signals, determine the location of each to within a 20-kilometre radius and notify a rescue co-ordination centre—all within 20 minutes after a satellite pass.

This kind of service is particularly important in Canada, where search and rescue operations have always been difficult and expensive because of the vast size of the country. Before COSPAS/SARSAT, several days might elapse before a rescue centre would even be aware that a ship or aircraft was missing.

There are now in orbit two Soviet COSPAS satellites and an American one carrying SARSAT equipment. With these three satellites, the signal pick-up delay from an ELT or EPIRB anywhere in the world is four hours or less; when a second US satellite goes into service, the delay will be no more than three hours. The fourth SARSAT-COSPAS satellite (SARSAT 2) will be launched after the demonstration period is over (June 1984). When it is launched, perhaps as early as October 1984, there always will be two COSPAS and two SARSAT satellites in orbit at the same time.

Canada has been involved with SARSAT since 1973, when the first feasibility studies were conducted. Since then, the federal Department

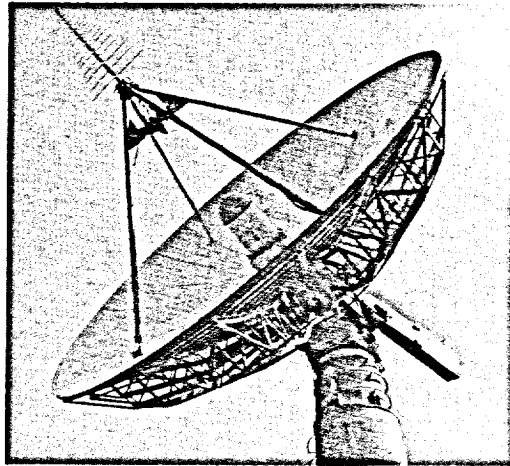
of Communications and Canadian contractors have made major technological contributions, specifically:

- development of 406 MHz ELTs and other emergency beacons operating at that frequency (Bristol Aerospace Limited);
- ground station software to operate at all three international distress frequencies: 121.5 MHz (commercial), 243 MHz (military) and 406 MHz, the band reserved for satellite-aided search and rescue (Canadian Astronautics Limited);
- spaceborne repeaters for the US satellites to accommodate the three frequencies (Spar Aerospace Limited);
- mission control centre (SED Systems Inc.).

To date, Canada has spent about \$14 million on SARSAT.

The ground stations are fully automated units that can receive and process data at all three frequencies from all SARSAT and COSPAS satellites. A computer-controlled, three-metre

Four SARSAT ground stations have been sold to the US and one to France. Further sales are expected.



tracking antenna follows each satellite pass. During the demonstration phase, one unit is operating in Canada; three will be needed to cover the whole country once the system is fully operational. Four ground stations have been sold to the United States and one to France. Further sales to other countries thinking of joining SARSAT are expected.

COSPAS/SARSAT has already played a major role in 36 rescues in its first year of testing. Accident victims have been saved not only in Canadian and American territory and waters, but also in the Alps, the Canary Islands and at the North Pole.