Space Age SOS

Search and rescue by satellite

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On September 9, 1982, a small aircraft carrying three people crashed in a forest in north-eastern British Columbia. Although the pilot and his passengers had been injured, they were able to repair the antenna of their radio transmitter, damaged by the impact, and send out a distress signal. As a result of a Soviet satellite relaying the distress signal, they were found less than 28 hours after the accident!

The satellite, called COSPAS 1, is the first link in a new international network to locate distressed ships and aircraft. It has been tested since September 1982 by Canada, the United States, France, and the Soviet Union, and is expected to save many lives in the years to come, as well as tens of millions of dollars in rescue costs. It could also open up new markets for a Canadian company which makes one of the key components, namely the ground station that receives the distress signals relayed by satellite.

When an aircraft crashes in a remote area of Canada, the High Arctic for example, the Department of National Defense must launch expensive search and rescue operations, requiring several aircraft and dozens of people. Locating a downed aircraft may take several days, and yet the survival of injured people may hinge on being rescued only a few short hours after the crash. The time lost because distress signals from ships or aircraft are not immediately picked up, as well as the delay in organizing a rescue operation, underscore the need to quickly pinpoint the origin of such signals.

Since the early 1970s, most commercial and non-commercial aircraft have been equipped with beacons (radio transmitters) which send out distress signals. The concept, developed by Canada's Department of Communications, relies on the beacon surviving when a plane crashes (see box). Unfortunately, the efficiency of these beacons is limited by their low signal power (less than one tenth of a watt); normally, their signals can be picked up only within a range of 50 to 70 km. Too, mountains may block the signal transmission, reducing its range even more.

The satellite relays the distress signal to the ground station located near Ottawa and the coordinates of the accident site are transmitted automatically to the Canadian Mission Control Centre located in Trenton, Ontario. The Centre then contacts the Canadian Forces Rescue Coordination Centre closest to the site, and a rescue mission is sent to find the distressed aircraft.