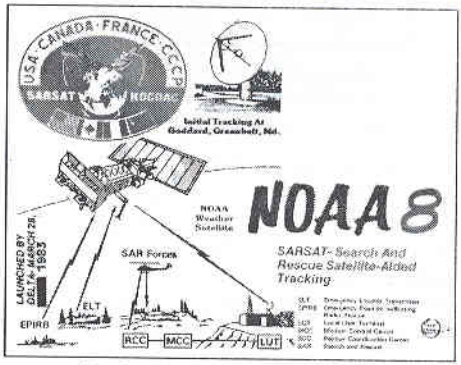
The COSPAS/SARSAT Program

Saving Lives With Satellites

Don Hillger and Garry Toth

One of the most direct benefits of the Earth's artificial satellites is their ability to save lives through the location of distress signals sent by downed aircraft or ships in trouble. This is the goal of the satellite-based COSPAS/SARSAT system. Since 1982 it has led worldwide to the rescue of over 20,000 persons.

SARSAT is the acronym for Search and Rescue Satellite-Aided Tracking. The Russian-equivalent acronym COSPAS is *Cosmicheskaya Sistyema Poiska Avariynich Sudov* (Space System for the Search of Vessels in Distress). An early version of the SARSAT/COSPAS logo can be found on launch covers for *NOAA-8*, the first U.S. satellite to carry SARSAT. It was launched March 28, 1983. NOAA satellites continue as part of SARSAT, helping in the rescue of 272 people in 2006 from emergencies throughout the U.S. and its surrounding waters. Most of the rescues each year take place at sea.



Cachet For *NOAA-8* Satellite Launched March 28, 1983, With Tracking At Goddard, Greenbelt, Maryland Identifies Emergency Locator Transmitter And SARSAT Search And Rescue Forces

The beginnings of SARSAT date back to 1970 when a plane carrying two U.S. Congressmen crashed in a remote region of Alaska. No trace of the wreckage was ever found despite the massive search and rescue effort that was undertaken. As a consequence of this tragedy, Congress mandated that every aircraft in the U.S. carry an Emergency Locator Transmitter (ELT), a device designed to activate automatically after a crash and transmit a homing signal for rescuers to use in search and rescue missions.

The system has improved greatly over the years with the addition of new transmitter frequencies better adapted to satellite reception. More recently it has added GPS technology that allows more precise location of aircraft, ships, and even people carrying Personal Locator Beacons (PLBs). The COSPAS/SARSAT system is designed to detect from space the signals transmitted by such emergency beacons and transmitters.

The SARSAT satellite system is operated by Canada, France, and the U.S.A., while the COSPAS system is operated by Russia. Thirty-two other nations also participate in the program. The SARSAT and COSPAS satellite systems work together receiving signals from emergency radio beacons and relaying them to ground stations which process the signals and calculate the locations of the beacons. This allows search and rescue authorities to send rescue missions to those locations. There are approximately 2,000 alerts every year. Some are false alarms, but others result in the rescue of people and the saving of lives.

COSPAS/SARSAT receivers have been placed aboard various satellites. They include the U.S. *NOAA* (National Oceanic and Atmospheric Administration) weather satellites and several different geostationary weather satellites, as well as Russian *Nadezhda* navigation satellites. The COSPAS/SARSAT logo shows both a NOAA weather satellite and a Nadezhda navigation satellite; these are the two main satellite series that carry the system.

The first COSPAS-equipped Russian

***Kosmos-381* Lacks Antenna**
Czechoslovakia (*Scott* 1875)

satellite, *Kosmos-1383*, was launched in June 1982. Amazingly, the first rescue using COSPAS took place only a few days after the launch. In that situation, a pilot and two passengers were rescued from a plane crash near Dawson Creek, British Columbia, Canada. Two further *Kosmos* satellites carrying the COSPAS system were launched in 1989, and the Russian series of satellites continues today.

Russian satellites have omni-directional antennas that receive COSPAS signals and determine the source of the signal via the Doppler effect as the satellite moves in its orbit. The earliest satellites, such as *Kosmos-318* or *Kosmos-381* seen on a 1973 stamp issued by Czechoslovakia (*Scott* 1875), lack the omni-directional antenna for COSPAS/SARSAT. However, a good depiction of a conical/omni-directional antenna can be seen on a Russian *Venera* satellite appearing on a 1978 stamp issued by Togo (*Scott* C344).

The first SARSAT-equipped U.S. satellite was the *NOAA-8* weather satellite, launched March 28, 1983. It was the first of the current generation of polar-orbiting weather satellites called the Advanced *TIROSN/NOAA* series. TIROS is the long-used acronym for **T**elevision and **I**nfra **R**ed **O**bservation **S**atellite, the name of the first U.S. weather satellite launched in 1960. SARSAT continues to be carried on

Russian *Venera* Satellite
Togo (*Scott* C344)

NOAA satellites; the latest, *NOAA-18*, was launched in 2005.

Although both the NOAA and Russian satellites have been shown on quite a number of postage stamps, the COSPAS/SARSAT system itself has been noted on relatively few postal items. The first postage stamps to feature COSPAS were issued by both Cambodia and Russia. The Cambodian items include a 1987 stamp (*Scott* 782) and a 1988 souvenir sheet (*Scott* 875), both of which show the *Nadezhda* satellite and the COSPAS acronym. The Russian postal contribution was a souvenir sheet (*Scott* 5603) featuring both the *NOAA* and *Nadezhda* satellites and both the SARSAT and COSPAS acronyms. Russia also issued a stamped envelope in 1987 with the cachet featuring the COSPAS acronym in one panel of the graphic.

In 1991, Tonga issued a strip of three stamps (*Scott* 785a-c) showing a NOAA satellite, images of an airplane with an activated ELT beacon, officials at a SARSAT Rescue Coordination Center, and the rescue of passengers from a sink-

(A) Seaman On Sinking Ship Broadcasts SOS. (B) Man On Telephone At Satellite Station. (C) Rescue Mission. Tonga (*Scott* 785a-c)

Canada (*Scott* 2111) Depicts Both The *NOAA* and *Nadezhda* Satellites And Various Search And Rescue Activities

ing ship. In the U.S., Rescue Coordination Centers are operated by the Air Force for land rescues or by the Coast Guard for water rescues.

The latest postal contribution in this area was the prominent feature of SARSAT on a 2005 souvenir sheet of eight stamps issued by Canada (*Scott* 2111). The sheet includes stamps in four different designs, and the surrounding margin shows both the *NOAA* and *Nadezhda* satellites along with various search and rescue activities.

The advent of SARSAT from geostationary orbit began with an experimental system on *GOES-7* (**G**eostationary **O**perational **E**nvironmental **S**atellite) launched in 1987. The system became operational on subsequent GOES weather satellites. Other SARSAT-equipped geostationary satellites currently include the European *MSG* (**M**eteosat **S**econd **G**eneration) series and later satellites in the *Insat* (Indian National Satellite) series. The second Russian *Elektro/GOMS* satellite, when launched, will be the first Russian geostationary satellite to participate in the COSPAS program.

First To Show Russian COSPAS Cambodia (*Scott* 782)

As a well-established and highly-effective program, COSPAS/SARSAT will continue to be supported by the major satellite-launching nations, as well as many other nations that participate in the system. Citizens of all nations can benefit from the COSPAS/SARSAT program.

For a checklist of postal items identified as showing either the SARSAT or the COSPAS system, see the Website developed by the authors at *<http://www.cira.colostate.edu/ramm/hillger/SARSAT.htm>*. The Website reference for the COSPAS/SARSAT program itself is *<http://www.sarsat.noaa.gov>*.•

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