

Respect for human life and solidarity between people when someone needs help

# Cospas Sarsat

– for the rescue service a quarter of a century

A quickly responding rescue service is always important, but especially important for the northern areas, where extreme weather and temperatures mean limited time for the rescue service to find the distressed, organise a rescue action and bring the distressed safely back. New and better methods for global and continual monitoring arose with the first satellites, something which is used very actively for the countries situated around the North Pole.



## Canada recognizes the need

In a country with extreme cold vast stretches of wilderness, and freezing waters, a quick search-and-rescue response can mean the difference between life and death. This is what spurred Canada to become a leading partner in Sarsat using low-Earth-orbit satellites. The four original partner nations, Canada, USA, France and the Soviet Union, have later been joined by 23 others who provide ground stations, and have rescue service based on monitoring by satellites.

In 1982, a few days after the first satellite was launched and the tracking system began operating, the first rescue took place. Three people in a plane crashed near Dawson Creek, but everybody was rescued due to a Canadian-designed and -built ground station received the signal. Since then, at least 18,000 lives have been saved throughout the world—1,000 in Canada. Many hikers, northern explorers, plane-crash survivors, sailors, and fishermen owe their lives to the rescue crews alerted by Sarsat.

After nearly 25 years in service, Sarsat, or Search and Rescue Satellite-Aided Tracking, is still saving lives—over 1,000 every year worldwide. Sarsat was developed by Canada, France, the U.S., and the Soviet Union in 1979. It is the “grand old man” of applied satellite technology and an excellent example of peaceful use of space. The success of Sarsat has inspired decades of wireless communication innovation.

*When you are in need of help.*

*Picture credit: NSSR*

## Earth to space and back: this signal saves lives

Every Personal Locator Beacon or Emergency Locator Transmitter is registered, enabling Mission Control Centres to easily identify the user. When a transponder signal is activated in an emergency, rescue services are alerted and the location is pinpointed so that search and rescue teams can be dispatched.

Canada is a major supplier of the ground receiving stations installed around the world and Canadian industry has built 13 satellite payloads, called SAR repeaters.

The basic Cospas-Sarsat concept is composed of:

- distress radio beacons (ELTs for aviation use, EPIRBs for maritime use, and PLBs for personal use) which transmit signals during distress situations;
- instruments on board satellites in geostationary and low-altitude Earth orbits which detect the signals transmitted by distress radio beacons;
- ground receiving stations, referred to as Local Users Terminals (LUTs), which receive and process the satellite downlink signal to generate distress alerts; and
- Mission Control Centres (MCCs) which receive alerts produced by LUTs and forward them to Rescue Coordination Centres (RCCs), Search and Rescue Points Of Contacts (SPOCs) or other MCCs.

The Cospas-Sarsat System includes two types of satellites:

**Satellites in low-altitude Earth orbit (LEO) which form the LEOSAR System**

The nominal system configuration is four satellites, two Cospas and two Sarsat. Russia supplies two Cospas satellites placed in near-polar orbits at 1000 km altitude and equipped with SAR instrumentation at 121.5 MHz and 406 MHz. USA supplies two NOAA meteorological satellites placed in sun-synchronous, near-polar orbits at about 850 km altitude, and equipped with SAR instrumentation at 121.5 MHz and 406 MHz supplied by Canada and France.

Each satellite makes a complete orbit of the Earth around the poles in about 100 minutes, travelling at a velocity of 7 km per second. The satellite views a “swath” of the Earth of approximately 6000 km wide as it circles the globe, giving an instantaneous “field of view” about the size of a continent. When viewed from the Earth, the satellite crosses the sky in about 15 minutes, depending on the maximum elevation angle of the particular pass.

**Satellites in geostationary Earth orbit (GEO) which form the GEOSAR System**

The GEOSAR constellation is comprised of satellites provided by the USA (GOES series), India (INSAT series) and EUMETSAT (MSG series).



Norway is one of the many countries later to join this Sar-sat Cospas service after its establishment. While Canada has very large sparsely populated land areas with the obvious need for an effective rescue service, Norway has large oceans and a large fishing and merchant fleet, with the same needs. It goes without saying that Norway thus needs the same type of quick rescue services to save lives.

The Norwegian Rescue Service was based on private initiatives well into the 20th century. Voluntary work, solidarity and neighbourly help formed the core of the rescue service both at sea and on land.

The first organised rescue service in Norway was also based on a private initiative; it led to the establishment of the Norwegian Society for Sea Rescue in 1891. Gradually their activities widened to cover the whole coast. The government initiatives also grew in various areas, and in the 1950s it was apparent that the government agencies, voluntary organisations and private societies that participated in the rescue service were dogged by unclear lines of responsibility and a lack of coordination. Cooperation was more or less improvised.

**Why do we need an efficient rescue service?**

Norway is situated far to the north, and its boundaries encompass vast distances. The topography varies greatly and can be quite dramatic. Weather conditions are often rough, with strong winds, heavy rainfall, snow and ice. The temperature may go as high as 35° C in the summer and fall to -50° C in the winter. The Norwegian coast looks out on some of the most inhospitable waters in the world - often stormy, freezing cold and full of fog and rain or snow.

Norwegian waters have extensive maritime activities, considerable fisheries as well as offshore activities with many oil and gas installations. This may lead to serious accidents which require an efficient rescue service.