

UN/USA Training Course on Satellite Aided Search and Rescue

Miami, Florida

19 – 23 January 2009

COSPAS-SARSAT System Overview

Cheryl Bertoia

Cospas-Sarsat Secretariat

Montreal, Canada





Cospas-Sarsat History

Aircraft ELTs: C/S Heritage

- 121.5/243 MHz Emergency Locator Transmitters (ELTs) installed first on military aircraft, then on civilian light aircraft in USA/Canada (from 1970)
- No identification of aircraft/beacon
- Designed for audio detection by over-flying aircraft
- No means of accurately locating ELTs



Chance of survival in the event of a distress decreases significantly with time

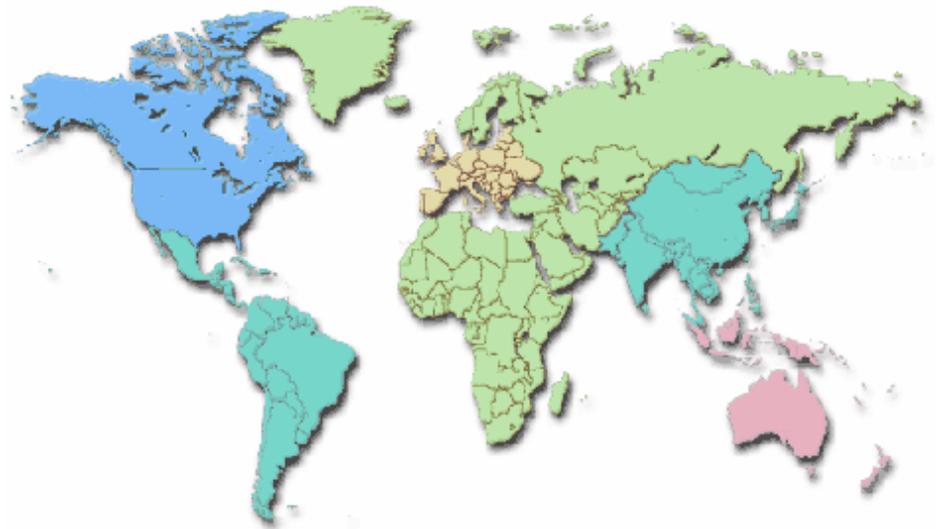
Cost of rescue increases significantly with increasing search area



Cospas-Sarsat History

International Cooperation

- 1978: Canada, France and the USA agree to co-operate on the development of the SARSAT low-altitude polar orbiting system to:
 - Locate existing 121.5 MHz beacons
 - Develop new 406 MHz technology for improved performance
- Russia declares its interest in co-operating with the objective of ensuring inter-operability of their COSPAS system with SARSAT



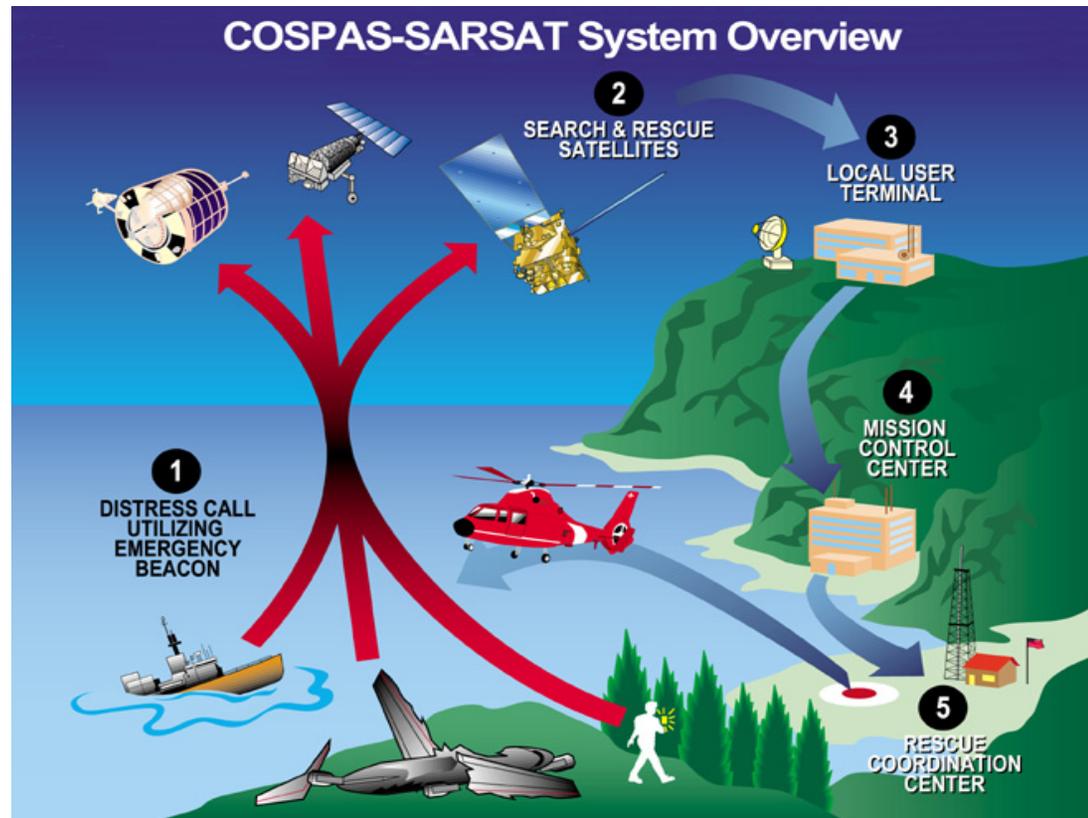


Cospas-Sarsat

What's in a name?

COSPAS = Cosmicheskaya Sistyema Poiska Avariynyich Sudov

SARSAT = Search And Rescue Satellite Aided Tracking

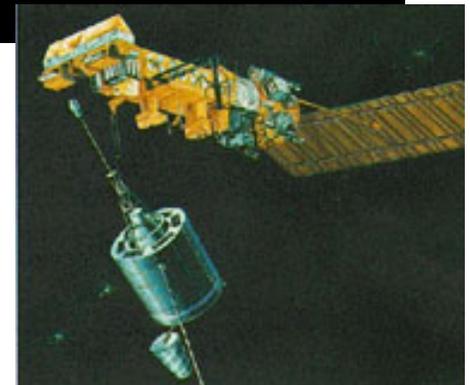
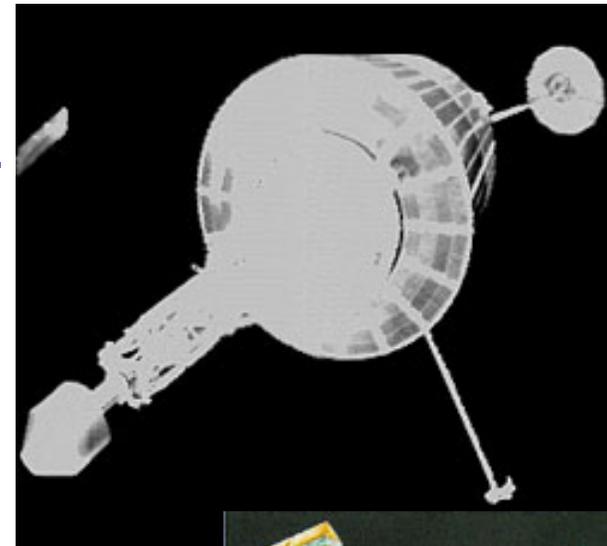




Cospas-Sarsat History

The First Satellites

- 1982: First Cospas satellite
 - Cospas-1 (USSR) launched in June 1982.
 - First rescue in September 1982
- 1983: Second Cospas and First Sarsat satellites
 - NOAA-8 satellite (USA) with Canadian and French SAR instruments
- 1985: System declared operational
 - New MOU between four parties





International Organization

- Initially developed under interagency Memorandum of Understanding signed in 1979 (USSR, USA, Canada, France)
- System declared operational in 1985
- 406 MHz beacons accepted by IMO for GMDSS in 1988
- International Cospas-Sarsat Programme Agreement (ICSPA) signed on July 1, 1988 among the governments of Canada, France, the former U.S.S.R and the United States
- ICSPA ensures continuity of the space system and availability to all States on a non-discriminatory basis





International Cospas-Sarsat Programme

C/S provides distress alert and location information to Rescue Coordination Centres (RCCs) for aviation, maritime and land users in distress

Services are provided **world-wide** and **free of charge** for the user in distress

Alerts are provided using satellite systems to relay and process the transmissions of distress radio-beacons operating on 121.5 or 406 MHz





Cospas-Sarsat Overview

Participating Countries in 2009



- | | |
|---------------|--------------|
| Algeria | Netherlands |
| Argentina | New Zealand |
| Australia | Nigeria |
| Brazil | Norway |
| Canada | Pakistan |
| Chile | Peru |
| China (P.R.) | Poland |
| Cyprus | Russia |
| Denmark | Saudi Arabia |
| France | Singapore |
| Germany | South Africa |
| Greece | Spain |
| Hong Kong | Sweden |
| India | Switzerland |
| Indonesia | Thailand |
| Italy | Tunisia |
| ITDC | Turkey |
| Japan | UK |
| Korea (R. of) | USA |
| Madagascar | Vietnam |

- 4** Founders: Canada, France, Russia and the USA
- 25** Ground Segment Providers
- 9** User States
- 2** Organisations



Cospas-Sarsat Programme Funding

No exchange of funds: Participants must fund their own contribution to the System

- Satellites and payloads (Space Segment Providers)
- Ground Stations, i.e. LEO / GEOLUTs (Ground Segment Providers)
- Meeting attendance, beacon register, etc. (all Participants)

Common Costs: Administrative costs of the Programme, include Secretariat, meetings etc.

- C/S Parties contribute Can\$ 190,000 annually
- Other Participants contribute Can\$ 42,000 annually
- Annual contribution as decided from time to time by Council (3 year notice for any change)





Principles of Participation

All States, including States not formally associated with Cospas-Sarsat should:

- Designate a SAR Point of Contact (SPOC) to receive alerts from Cospas-Sarsat MCC
- Decide on 406 MHz beacon coding, national beacon approval requirements
- Ensure that 406MHz beacons authorised for use have received a Cospas-Sarsat type-approval certificate
- Establish a 406MHz beacon register as required by ICAO and IMO or opt to use the international registry





Benefits of Membership

- Association with the Programme allows States to contribute to the System and participate in the management of Cospas-Sarsat



- Goals include supporting the SAR objectives of ICAO and IMO – C/S maintains a close partnership with these U.N. agencies and the ITU





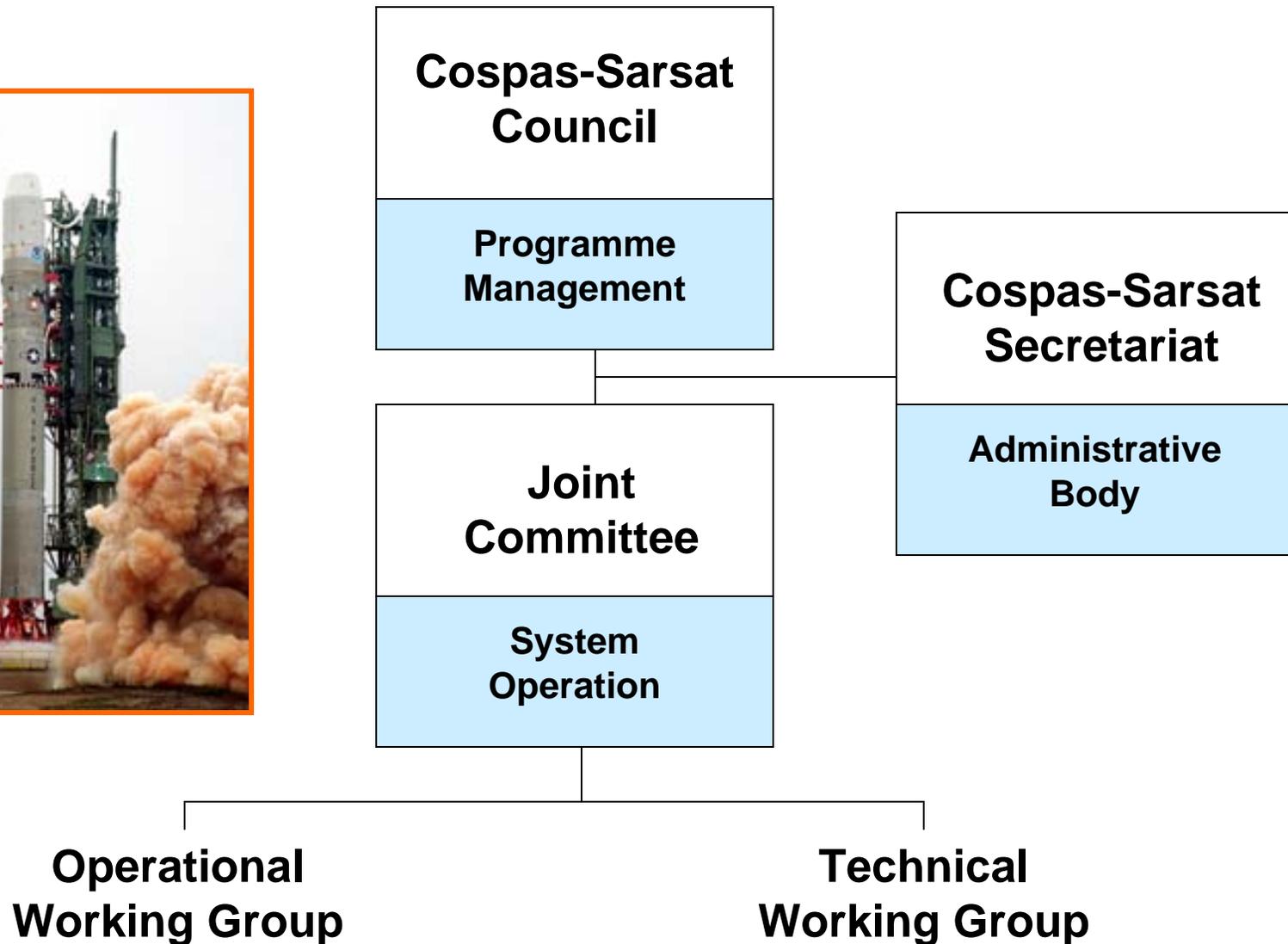
Benefits of Association: Participate in Programme Management



- Council
 - Formally: Canada, France, Russia, USA (C/S Parties)
 - Open Council: all “C/S Participants” invited to attend
 - Meets twice a year: April Closed Council, October Open Council
- Joint Committee
 - All C/S Participants + Observers (International Organisations)
 - Meets once a year in June
 - Includes: Technical WG and Operations WG
- Ad-hoc Task Groups and Experts Groups (per Council decision)
 - C/S Participants or invited experts to address specific issues



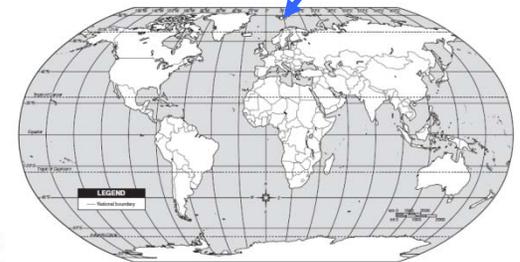
Cospas-Sarsat Organization





Svalbard, Norway

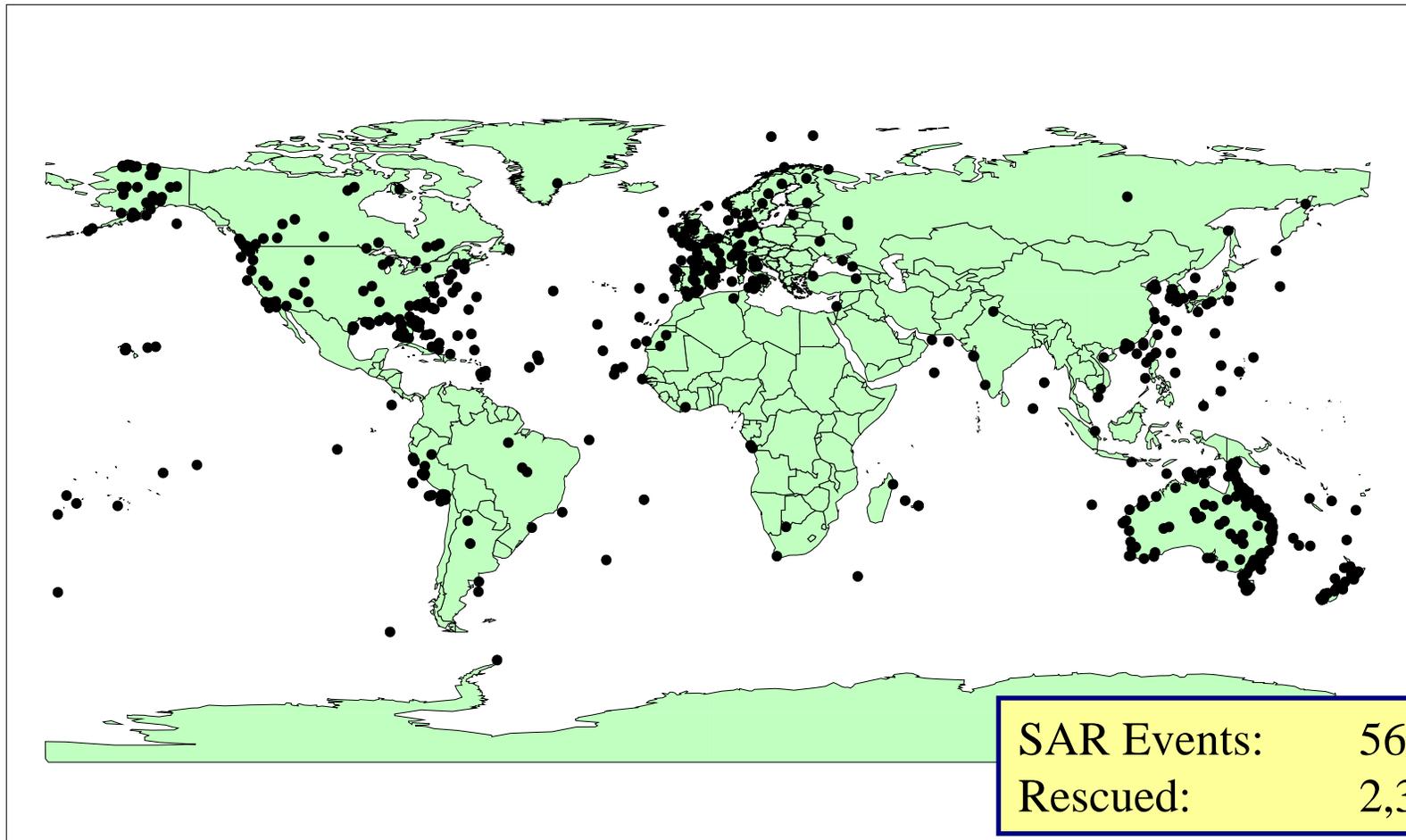
27 March 2008





Cospas-Sarsat Overview

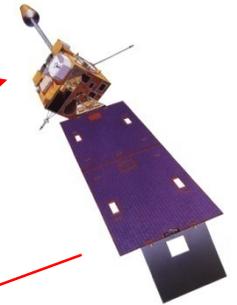
2007 - Alert Locations





Elements of the C/S System

- User
- Beacon
- Space Segment
 - LEOSAR
 - GEOSAR
- Ground Segment
 - Local User Terminal
 - Mission Control Center



Alerts relayed to RCCs





November 6, 2007





Current Space Segment

(Last Updated September 2008)

Status of Cospas-Sarsat LEOSAR Payload Instruments

Satellite	Repeater Instruments			SARP		Comments
	121.5 MHz	243 MHz	406 MHz	Global	Local	
Sarsat-7	F	NO	F	F	F	
Sarsat-8	NO	NO	F	F	F	
Sarsat-9	F	F	F	F	F	
Sarsat-10	F	F	F	F	F	
Sarsat-11	F	F	F	F	F	

5 LEO

Status of Cospas-Sarsat GEOSAR Payload Instruments

Satellite	Status	GainControl	Comments
GOES-East (75° W)	F	AGC	
GOES-West (135° W)	F	AGC	As of 7 April 2008, the SARR on GOES-West has returned to normal operations.
GOES-13 (105° W)	NO	AGC	During the period when GOES-11 is affected by the solar eclipse, GOES-13 will be turned on and will remain on for the duration of the solar eclipse season to provide partial coverage for LUTs in view of GOES-13. GOES-13 will be on from 14 August to 19 October 2008.
INSAT 3A (93.5° E)	L	TBD	System not fully commissioned, however, alerts are used operationally by SAR services.
MSG-1 (9.5° E)	F	Fixed	Reactivated on 11 August 2008.
MSG-2 (0°)	F	Fixed	

5 GEO



Cospas-Sarsat Tomorrow: MEOSAR

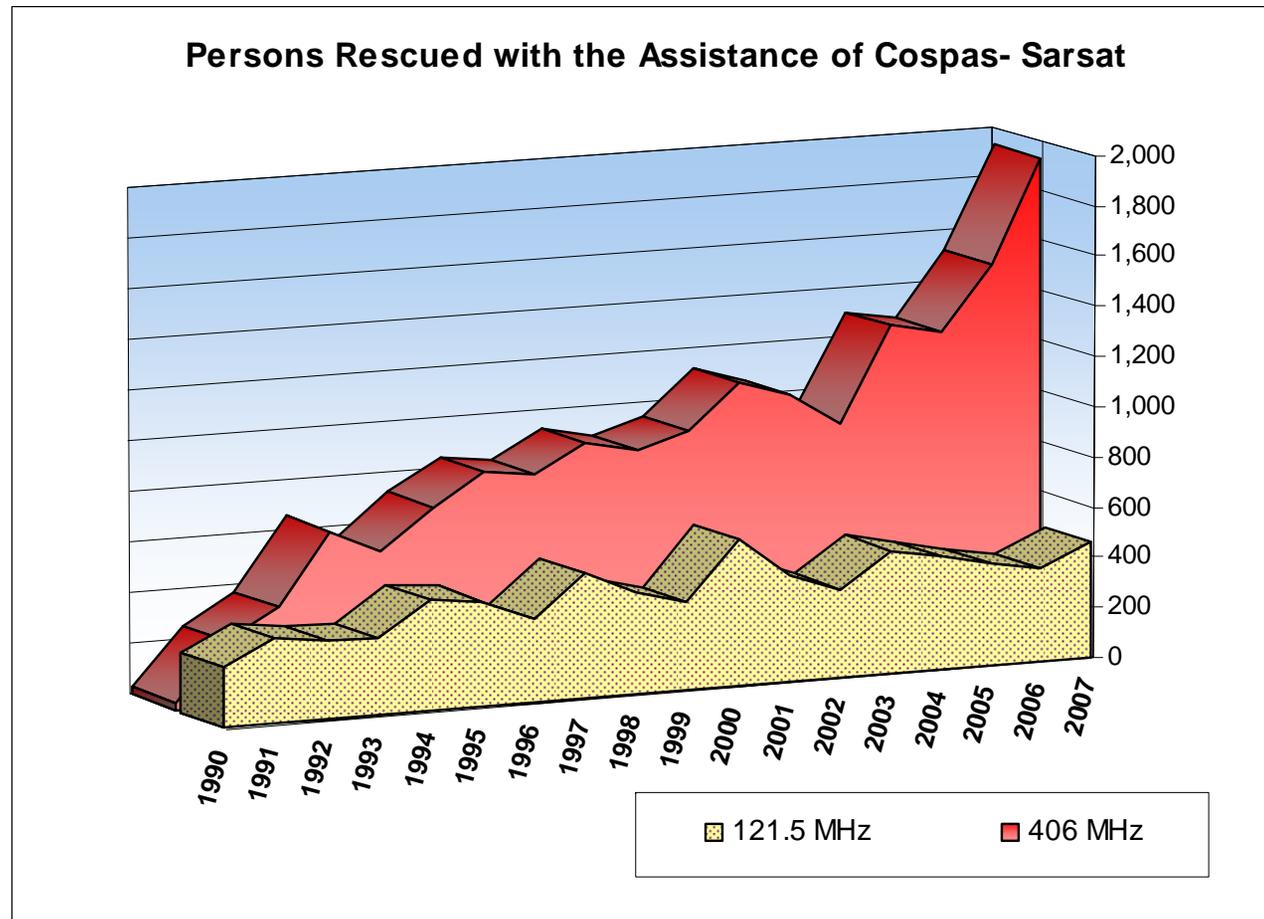
Russia (GLONASS), USA (GPS) and ESA/EC (Galileo) investigating inclusion of 406 MHz repeater instruments on future medium Earth altitude orbiting (MEO) satellite constellations

- Constellations will be fully compatible
- Coordinating with C/S on specifications and compatibility
- Operational alerts could be available in System from 2013 – 2015 time frame



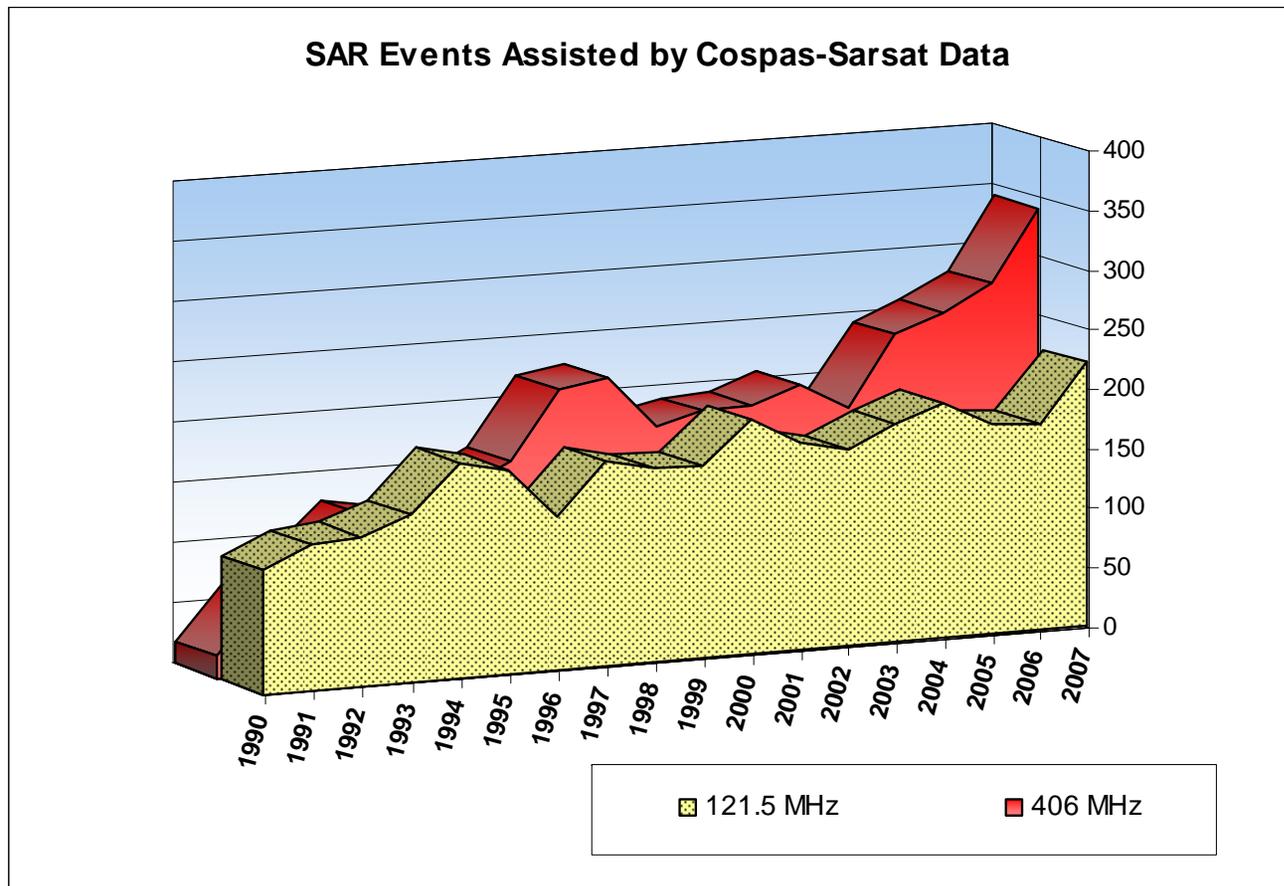


Some System Statistics



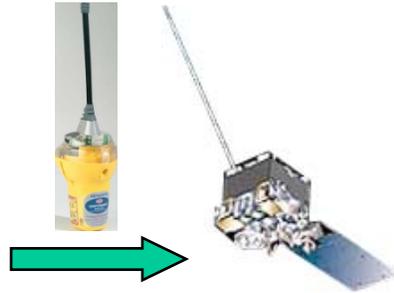


Some System Statistics



Since September 1982, the Cospas-Sarsat System has provided assistance in rescuing almost 25,000 persons in about 6,800 SAR events.

17 APRIL 2007



•LUT



•BRMCC

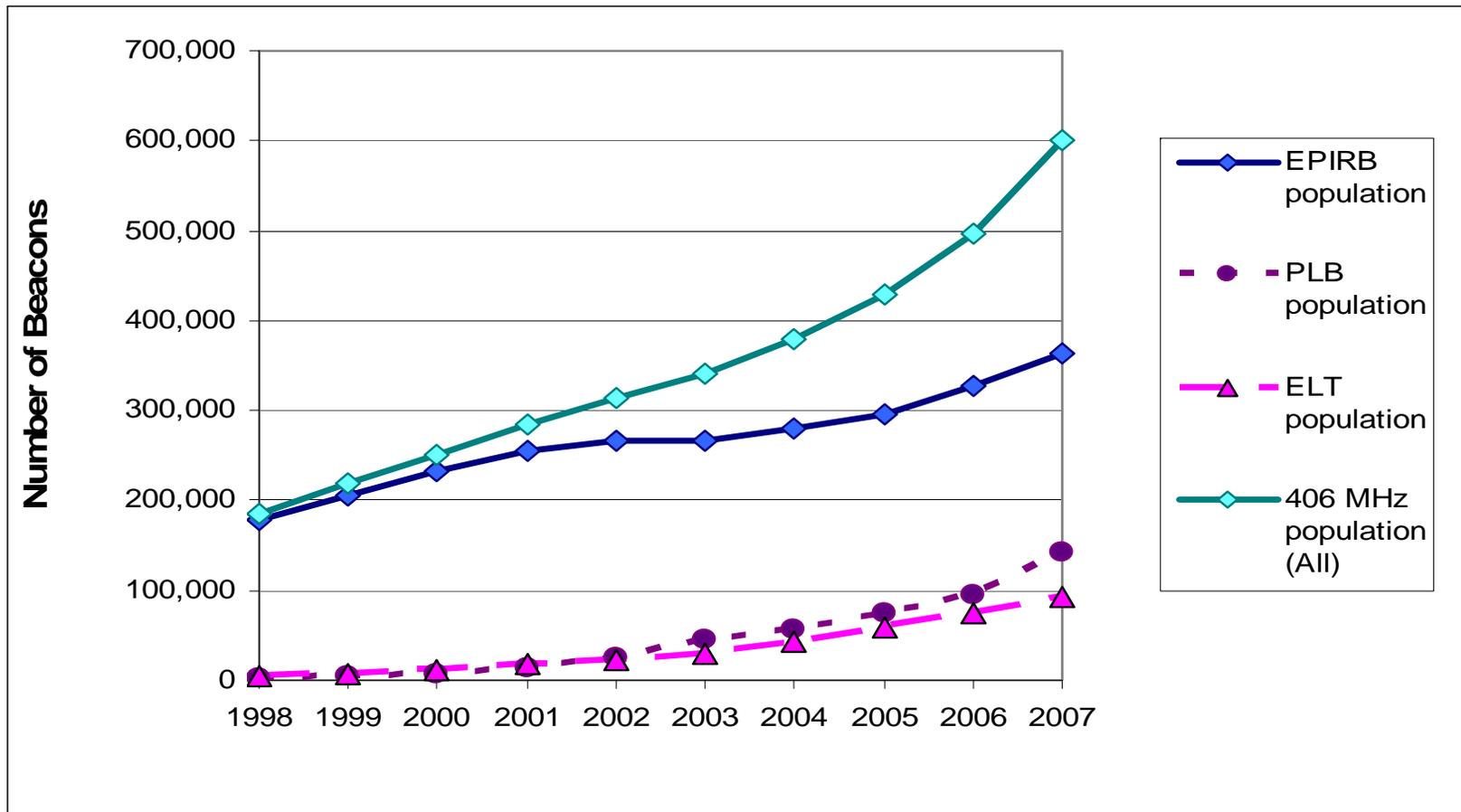


•RCC
Brasilia



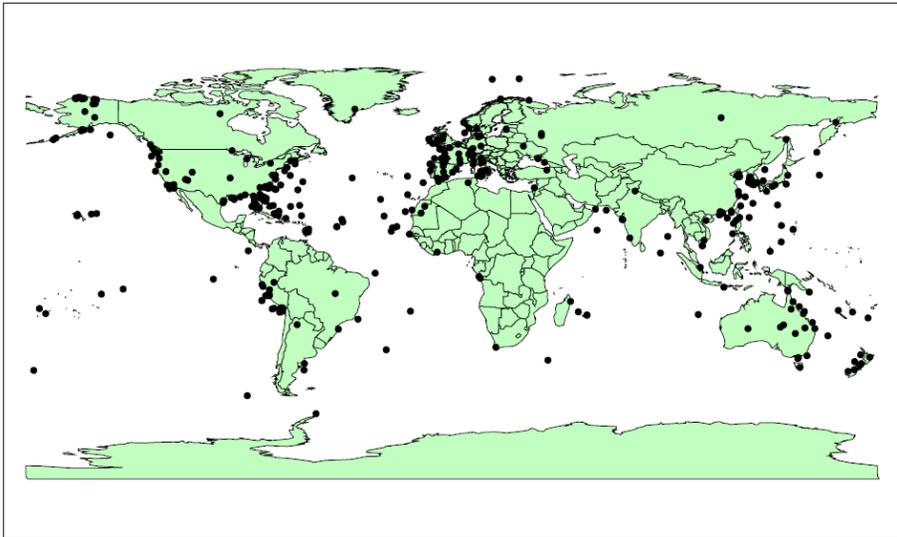
Some System Statistics

Estimated 406 MHz Beacon Population at the end of 2007

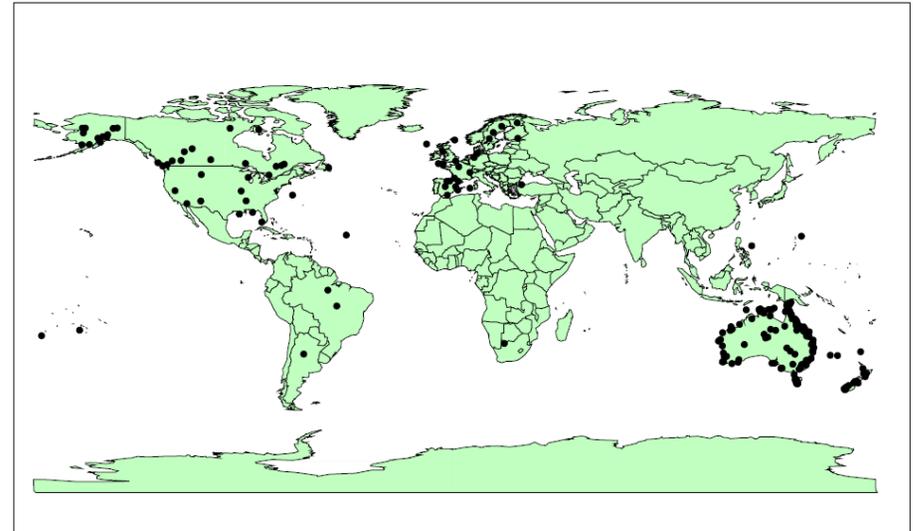




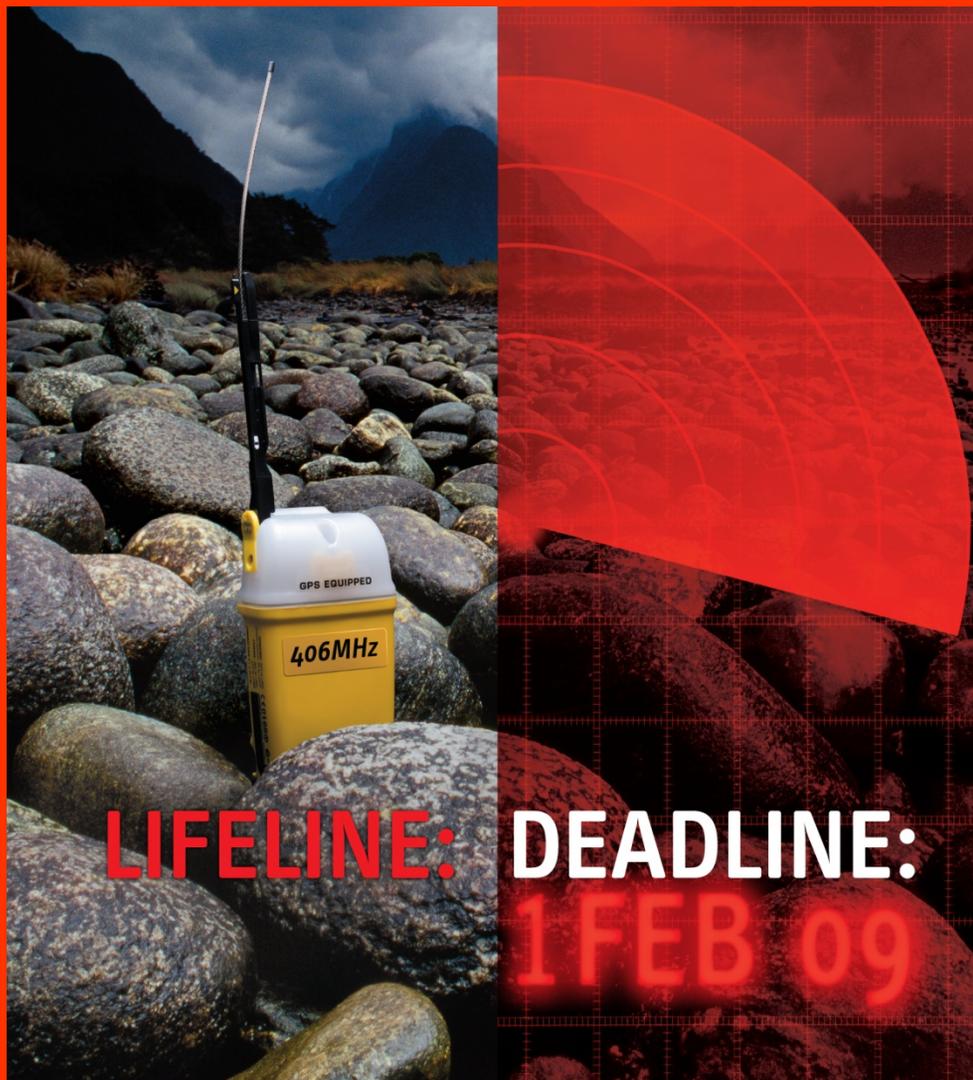
2007 Reported SAR Events



at 406 MHz...



and at 121.5 MHz



LIFELINE: DEADLINE:

1 FEB 09

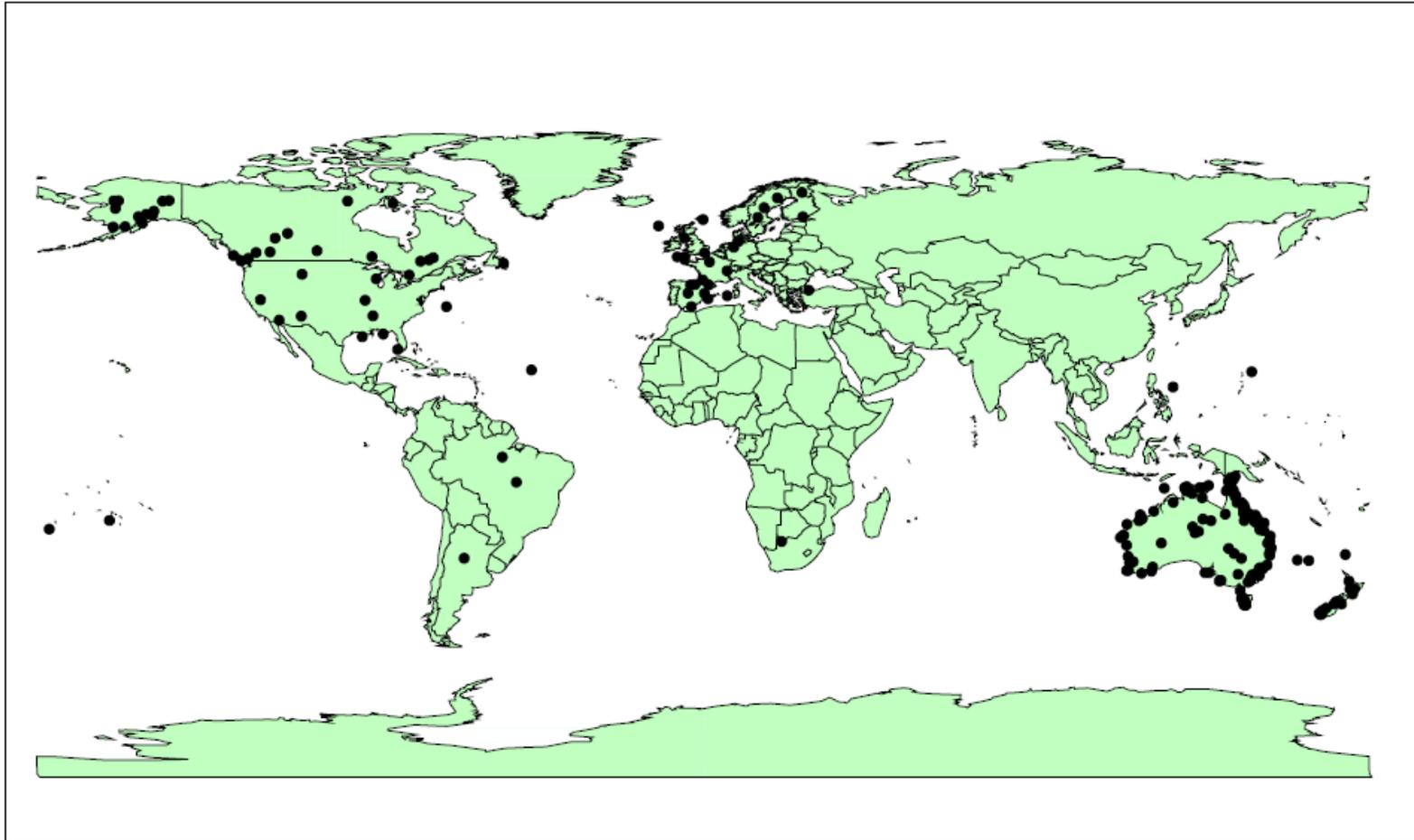
GLOBALLY, ALL DISTRESS BEACONS NEED TO CHANGE TO 406MHz BY FEBRUARY 2009. GET YOURS BEFORE IT'S TOO LATE.

SWITCH TO
406 DISTRESS
BEACONS
www.beacons.org.nz





2007 Reported SAR Events



and at 121.5 MHz



Switch to 406 !

- From **February 2009** the **Cospas-Sarsat satellite system will no longer process the 121.5 MHz frequency**
- 406 MHz beacons exhibit better performance than "old" 121.5 MHz beacons, but are more expensive - currently about US\$ 500 retail price (in the US) for simplest device
- Users could be **denied Cospas-Sarsat services** if they do not **transition to 406 MHz before February 2009**



UKMCC: 19 Dec 2003

Antarctica

-40° C



“It is an incredible system and no-one does it better... If the people who came for us did not have the proper co-ordinates they would never have found us.”

- Jennifer Murray



Cospas-Sarsat helps save lives...



... on average five lives per day



in at least one SAR incident per day!





For More Info...

International Cospas-Sarsat Programme
700 de la Gauchetière Ouest Suite 2450
Montréal, Québec H3B 5M2 CANADA

Phone: +1 514 954 6658

Fax: +1 514 954 6750

Email: mail@cospas-sarsat.int



Visit Our Website! www.cospas-sarsat.org