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MEOSAR

What is Cospas-Sarsat?

The International Cospas-Sarsat Programme is a satellite-based search and rescue (SAR) distress alert detection and information distribution system, best known for detecting and locating emergency beacons activated by aircraft, ships and backcountry hikers in distress.

The Cospas-Sarsat distress beacon detection system has assisted in the rescue of over 35,000 people over the past 30 years. The current Low-altitude Earth Orbit Search and Rescue (LEOSAR) satellites are being replaced with a new Medium-altitude Earth Orbit Search and Rescue (MEOSAR) satellite system.

The best reference for MEOSAR and the Cospas-Sarsat distress beacon detection system is the Cospas-Sarsat website: http://www.cospas-sarsat.int/en/

AMSA, the Australian Maritime Safety Authority, is responsible for Australia's participation in the international Cospas-Sarsat system.

What is MEOSAR?

MEOSAR stands for Medium-altitude Earth Orbit Search and Rescue. A satellite in a medium-altitude earth orbit has an altitude between 19,000 and 24,000km.

The MEOSAR system consists of MEOSAR satellites that detect emergency distress beacons (EPIRBs, PLBs and ELTs). The satellite sends the beacon message back to earth where it is detected by a MEOLUT (MEOSAR Local User Terminal). With sufficient information, the MEOLUT will generate a location for the distress beacon. The beacon activation information is forwarded to a Mission Control Centre (MCC) and then to the relevant Rescue Coordination Centre (RCC) which responds to the beacon activation.

Why MEOSAR for Australia?

The existing LEOSAR satellites are ageing and it is uncertain if more LEOSAR satellites will be launched by the United States and Russia.

The current LEOSAR system does not provide continuous coverage; when a beacon is activated it may take four to six hours for a satellite to pass by and detect the beacon.

Australia currently has an estimated 350,000 operational distress beacons. During 2012, 283 lives were saved due to Cospas-Sarsat distress beacon activations.

The new MEOSAR satellites will be launched by the Russian Federation, the European Union and the USA. An operational constellation is expected to be in place by 2017.

The MEOSAR system will detect beacons in almost real-time (i.e within 5 minutes). If the beacon is detected by three or more MEOSAR satellites, then the location of the beacon will be determined as well. When the full constellation of MEOSAR satellites is in operation, this will mean location will be determined within 10 minutes, 95 per cent of the time.

What are MEOSAR satellites?

The MEOSAR satellites used in the MEOSAR system are GNSS (Global Navigation Satellite System) satellites that are primarily used for positioning, navigation and timing. As a secondary mission, satellites in the USA GPS constellation, the European Galileo constellation and the Russian GLONASS constellation have Search and Rescue equipment on the satellites.

The three MEOSAR satellite constellations will use transparent repeater instruments to relay 406 MHz beacon signals, without on-board processing, data storage, or demodulation/remodulation. MEOSAR satellite providers will make their satellite downlinks available internationally for processing by MEOLUTs operated by MEOSAR ground segment participants.

What is a MEOLUT?

A MEOLUT (MEOSAR Local User Terminal) is a satellite tracking ground station. The MEOLUT has a number of antennas, each antenna tracks a different MEOSAR satellite.

If a MEOLUT receives a burst from a distress beacon from three or more satellites, it is able to calculate the location of the beacon.

If a MEOLUT is unable to calculate a location for a beacon, it still reports the beacon id (also known as the Hex ID or the UIN of the beacon). If the beacon is registered, the beacon contacts are used by search and rescue authorities which often permits search and rescue activities to commence even if MEOSAR has not determined a location for the beacon activation.

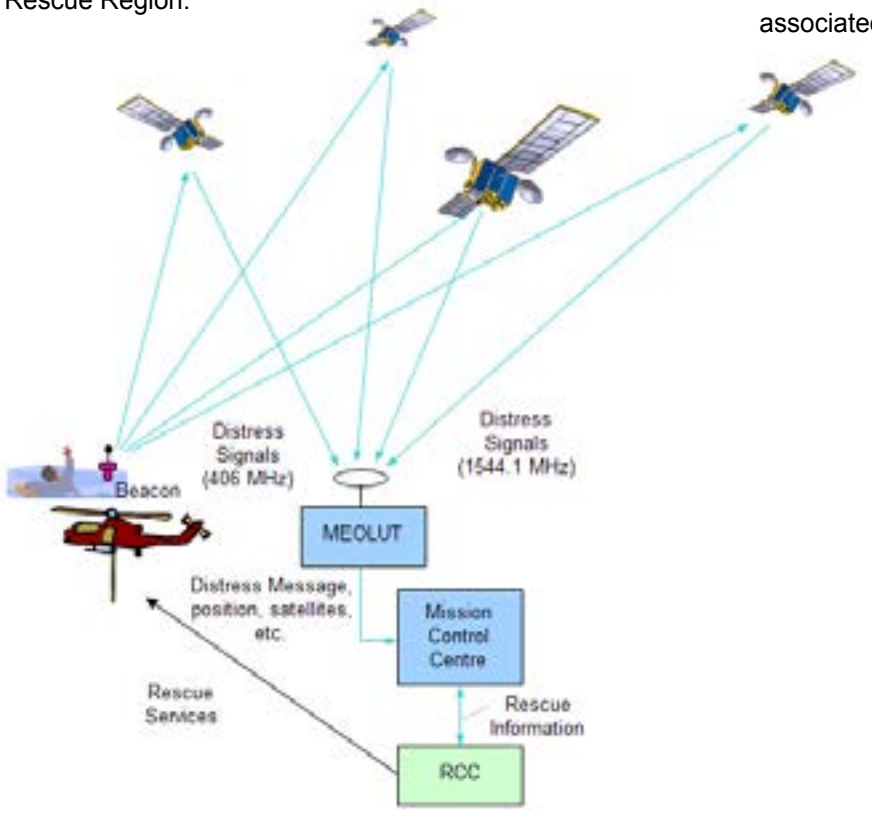
If the beacon has a GPS chip and can produce a GPS location, this GPS location will be included in the beacon information sent to rescue authorities, even if the MEOSAR system cannot generate its own location for the beacon.

What is the Australian MEOLUT?

The Australian MEOLUT will consist of six antennas. It will be built near Mingenew, Western Australia. Construction will commence in late 2014 and will be commissioned for use in 2016.

The Australian MEOLUT and the New Zealand MEOLUT will work cooperatively.

The Western Australian location was chosen as, when working cooperatively with the New Zealand MEOLUT, it provides the best coverage for the Australian Search and Rescue Region.



How does MEOSAR work?

The following diagram shows the major components of the MEOSAR system:

1. A distress beacon is activated and sends a 406MHz message. The message includes the beacon id (also known as the Hex id or UIN). If the beacon has a GPS, the message will include the GPS location.
2. Any MEOSAR satellites that detect the distress beacon relay the message back to earth on 1544.1MHz. The relayed message is detected by a MEOLUT.
3. If a MEOLUT receives sufficient information (typically, relay from three or more MEOSAR satellites) a location for the beacon can be calculated. The MEOLUT sends all information available from the beacon (the beacon id, the GPS location if it exists and the MEOSAR location if it can be calculated) to its associated Mission Control Centre (MCC).
4. The MCC forwards beacon information to the relevant Rescue Coordination Centre (RCC). If the beacon was located in New Zealand, for example, the beacon information would be forwarded to the New Zealand RCC in Wellington. If the beacon as located in Australia, the information would be forwarded to RCC Australia in Canberra.
5. The RCC then coordinates the search and rescue associated with the beacon activation.