Distress Beacons

Frequently asked questions

What is a distress beacon?

A distress beacon is an electronic device that, when activated in a life-threatening situation, assists rescue authorities in their search to locate those in distress.

Do I need a distress beacon?

If you are working or travelling in remote or particularly hazardous areas you should strongly consider purchasing a PLB. Carriage of a registered 406 MHz EPIRB in vessels sailing more than two nautical miles offshore is mandatory and many responsible mariners encourage the use of PLBs as well. Aviators increasingly carry PLBs as well as have ELTs fitted to their aircraft.

What types of distress beacons are there?

There are three types:

- **Emergency Position Indicating Radio Beacons (EPIRB)** used in ships and boats;
- **Emergency Locator Transmitters (ELT)** used in aircraft; and
- **Personal Locator Beacons (PLB)** for personal use by bushwalkers, four-wheel drivers, other adventurers on land, employees working in remote areas, crew in boats and aircrew.

EPIRBs are designed to float in the water to optimise the signal to the satellite. An EPIRB has a lanyard that is used to secure it to something that is not going to sink so that it can float free. Once activated, an EPIRB is required to operate continuously for a minimum of 48 hours.

There have been a number of incidents where vessels have sunk quickly and crew have been unable to deploy an EPIRB. In such incidents, float-free EPIRBs may have reduced response times and saved lives. Float-free EPIRBs are held in a bracket and fitted with a hydrostatic release that is water activated deploying the beacon automatically if the vessel sinks. If the vessel continues to float then the EPIRB can be manually deployed where a distress situation exists.

NOTE: Although Yachting Australia requires all crew in Category 1 and 2 ocean yacht races to carry a PLB when on deck, an EPIRB must also be carried in the yacht. Likewise, PLBs are not considered a substitute for EPIRBs when adhering to State and Territory marine regulations on the carriage of EPIRBs.

ELTs are usually fixed in the aircraft and are designed to activate on impact. ELTs are required to operate continuously for 24 hours once activated. Civil Aviation Safety Authority (CASA) regulations require most aircraft to carry an ELT. CASA regulations allow for PLBs or EPIRBs to be carried in General Aviation aircraft as an alternative to an ELT.

PLBs are designed for personal use in the aviation, land and marine environments and are becoming increasingly popular in a number of fields, both in industry and recreationally. PLBs are required to operate for a minimum of 24 hours once activated.

406 MHz beacons come in two basic types: those that provide an encoded (GPS) location and those that do not. The satellite system can calculate a beacon's location, but locating a distress site is usually much faster if the beacon signal provides a GPS location.

How does a distress beacon work?

When a distress beacon is activated, it transmits a signal that is detectable by satellites. As the satellites orbit the Earth they 'listen' for any active beacons and report their position to rescue authorities.

Beacons developed for the Cospas-Sarsat satellite system operate on 406 MHz and use digital technology that allows the beacon to transmit a unique code (HexID or UIN) to identify the beacon. These beacons also transmit on the analogue 121.5 MHz frequency to allow final stage homing. Satellite processing of 121.5 MHz signals ceased on 1 February 2009 and any old 121.5 MHz beacons should be disposed of responsibly.

What is the Cospas-Sarsat System?

The Cospas-Sarsat System is divided into:

- the space segment comprising distress beacon receivers on Polar-orbiting satellites and on satellites in geo-stationary orbit over the equator; and
- the ground segment is made up of a network of Local User Terminals (LUTs) that are the ground receiving stations for the satellite transmissions with Mission Control Centres (MCCs) that analyse and pass the distress alerts to responsible Rescue Coordination Centres.

In the Australian region there are three LUTs located at Albany (WA), Bundaberg (QLD) and Wellington (NZ); controlled by the MCC located with RCC Australia in Canberra.

Alerts from 406 MHz distress beacons may be received and processed by geo-stationary satellites and passed to RCC Australia within minutes. If the beacon has GPS capability then a highly accurate position may be transmitted with the alert. Non-GPS beacons require detection by a Polar-orbiting satellite before a position can be obtained.

Cospas-Sarsat System Overview

What is the HexID or UIN?

The HexID or Unique Identity Number (UIN) is the unique code programmed into each 406 MHz distress beacon and transmitted when the beacon is activated. When registering a distress beacon, this code must be included in the registration as it is the only code that links the individual distress beacon to the registration database. Without the HexID the beacon cannot be registered.

The HexID is 15 characters long and is made up of hexadecimal numbers (0-9) and letters (A-F). The code can be found on the label of all 406 MHz distress beacons.

USAGE

Why use a distress beacon?

Distress beacons save lives - in some cases it's the law. All vessels travelling more than two nautical miles from land must carry a registered EPIRB. Aircraft are also required under CASA regulations to carry an ELT in flight. Check your Commonwealth, State or Territory authority for the specific regulations applicable to you.

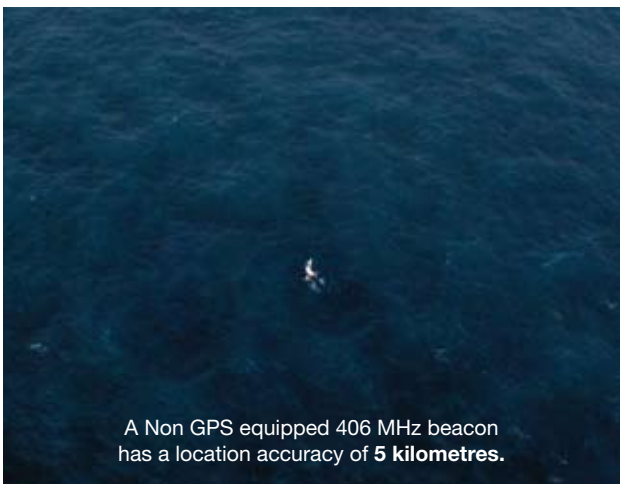
When should a distress beacon be used?

Distress beacons should only be used when there is a threat of grave and imminent danger. In the event of an emergency, communication should first be attempted with others close by using radios, phones and other signalling devices. Mobile phones can be used but should not be relied upon as they can be out of range, batteries run low or become water-damaged.

Which model? GPS vs Non – GPS

	406 MHZ DISTRESS BEACONS	
	GPS Equipped	**Non GPS**
Signal type	Digital	Digital
Coverage	The entire globe	The entire globe
Identification	406 beacons have a **unique identification code** which is part of its signal. When properly registered with the Rescue Coordination Centre, Australia, the unique code provides information about the boat or aircraft, or person carrying the beacon. This includes the owner's emergency contact and the country of registration. Allows false alarms to be **resolved** with a **radio or phone call.**	406 beacons have a **unique identification code** which is part of its signal. When properly registered with the Rescue Coordination Centre, Australia, the unique code provides information about the boat or aircraft, or person carrying the beacon. This includes the owner's emergency contact and the country of registration Allows false alarms to be **resolved** with a **radio or phone call.**
Alert time	The 406 signal may be received within seconds by Geostationary satellites. If detected by a polar orbiting satellite, detection time will be longer. The extra information provided by a 406 will in most cases help authorities locate you faster.	The 406 signal may be received within seconds by Geostationary satellites. If detected by a polar orbiting satellite, detection time will be longer. The extra information provided by a 406 will in most cases help authorities locate you faster.
Location	GPS - Has a location accuracy of **120 Metres**. Location is provided by geostationary satellites within minutes.	Orbiting satellites will calculate the position if there is no GPS capability. These orbiting satellites take 90 minutes on average to receive the signal but it may take up to 5 hours depending on the conditions. More information is needed to determine the real location. This usually means at least two satellite passes &/or independent intelligence is required to determine a location and this takes more time. **Non GPS** has an location accuracy of **5km.**
Rescue time	If the 406 beacon is registered, it will enable rescuers to know more about who you are, where you are, what your boat/plane looks like, and your emergency contact. This saves time, and therefore helps rescuers to act more quickly.	Rescuers must wait for confirmation of the beacon's position before sending a search & rescue team. This takes more time. If the 406 beacon is registered, it will enable rescuers to know more about who you are, where you are, what your boat/plane looks like, and your emergency contact. This saves time, and therefore helps rescuers to act more quickly.
Signal Power	5 Watts	5 Watts

A GPS equipped 406 MHz beacon has a location accuracy of **120 Metres.**



A Non GPS equipped 406 MHz beacon has a location accuracy of **5 kilometres.**

Where should distress beacons be stowed?

Distress beacons are stowed depending on the type. Some have mounting brackets, some are installed permanently and some are carried in pockets or life vests. It is important to keep distress beacons away from:

- items that may accidentally knock the activation switch;
- magnetic sources, such as microphones and radio speakers;
- high pressure water sprays; and
- children who may play with the beacon.

In a boat, a distress beacon should be stowed in its mounting bracket where it is visible and easy to access in an emergency or in a grab bag along with flares, a torch or strobe and other safety equipment. If possible keep it out of the weather and locked away when the vessel is not in use. An additional beacon can be stowed in any inflatable life raft carried in the vessel. When storing an EPIRB, ensure it is correctly stowed in its bracket as a number of EPIRBs have water activated switches that are armed when the EPIRB is removed from its bracket or incorrectly replaced in its bracket. Also ensure that your passengers are aware of the location of the beacon and how to activate it in an emergency.

Note: If an EPIRB is to be stowed in a grab bag or out of its bracket you should choose a manually operated EPIRB. Water activated EPIRBs should always be stowed correctly in their brackets when not in use, to avoid inadvertent activation even if stowed below.

In an aircraft, ELTs are usually hard-wired into the aircraft and mounted in a rack. CASA regulations allow pilots flying General Aviation aircraft to carry a PLB as an alternative to an ELT. These should be carried on the pilot's person so that if involved in a crash, the PLB is within easy reach even if they are thrown clear of the aircraft. Pilots should listen on 121.5 MHz before shutting down in case their ELT has been activated during the landing. If activated, the ELT should be switched off and the Rescue Coordination Centre (RCC Australia) immediately notified by calling 1800 815 257. There is no penalty for inadvertent activations.

On land, PLBs are to be physically carried on the body or within easy reach or, if in a vehicle, stowed in a glove box or other safe and accessible compartment.

What if 121.5 MHz distress beacons are used after 1 February 2009?

With the satellite system no longer receiving alerts from 121.5 MHz from 1 February 2009, over-flying aircraft are the only means of detecting activated analogue beacons. In some areas within the Australian search and rescue region, this could amount to days rather than hours before a 121.5 MHz beacon could be heard and in some circumstances, the 121.5 MHz beacon may not be detected at all.

Not all aircraft 'listen' to the 121.5 MHz frequency and those that do are generally very high flyers. As a consequence, the search area resulting from these detections could be very large and it would take rescue authorities considerable time and resources to localise the distress signal. This would also apply to distress beacons activated directly under a well used flight path.

From 1 February 2010, 121.5 MHz EPIRBs are no longer licensed for use. Any person found activating a 121.5 MHz EPIRB may find themselves liable for a fine. 121.5 MHz fixed ELTs continue to be licensed for homing purposes.

What about other tracking and distress devices?

There are an increasing number of devices advertised as tracking beacons with an auxilliary distress function and are marketed as being similar to a PLB. Care should be taken to ensure that any distress alerting device purchased is Cospas-Sarsat compatible as many of the tracking devices available operate on mobile or satellite phone networks and are subject to the same limitations. These devices are not manufactured to the same standards as a Cospas-Sarsat device and do not meet the requirements of a registered EPIRB or ELT. Going without a registered 406 MHz beacon can expose you to serious risk in a distress situation.

REGISTRATION

Why register a distress beacon?

Registration is free and can result in a more efficient search and rescue effort.

Digital 406 MHz distress beacons transmit a unique code to identify a particular beacon when it is activated. A registered 406 MHz beacon allows the Australian Maritime Safety Authority's (AMSA) Rescue Coordination Centre to access the registration database and find initial contact details; details of registered vessels, aircraft or vehicles; and up to three nominated emergency contacts who may be called if a beacon is activated and direct contact cannot be made. These emergency contacts may be able to provide valuable information to the RCC that can help with the rescue.

Online registration

All types of Australian coded 406 MHz distress beacons can be registered online via www.amsa.gov.au/beacons

Beacon owners have protected access to their accounts and are able to update details at any time including changes to:

- ownership and emergency contact details;
- boat, aircraft or vehicle details;
- registered addresses; or
- indicate the sale or disposal of a beacon.

There is also the facility for owners to note trip itineraries so when a beacon is activated, the RCC will have access to current movements and be better placed to organise the most suitable response. **This does not replace advising a responsible person of your trip details**.

In addition to online access, registration forms and changes to details can also be provided to AMSA by fax, email or post. We prefer you register and update your information on-line to get maximum benefit from the system.

Why does AMSA issue registration stickers for EPIRBs and PLBs?

AMSA issues registration stickers to provide distress beacon owners and marine inspectors with proof of current registration. The sticker will note the HexID/UIN of the beacon, its registration expiry date (two years from date of issue) and vessel name, registration number or owner's name depending on type of beacon and use.

This registration sticker must be affixed to the beacon. If a current sticker is not found affixed to a beacon during a safety equipment inspection you may be liable to a fine.

What should be done if a distress beacon is sold, lost, stolen or destroyed?

Owners are asked to notify AMSA if they sell their distress beacon or it is lost, stolen or destroyed. If AMSA is not notified and the new owner activates the beacon, any rescue will be delayed as the last known registered owner will be contacted. Notification of sold, lost, stolen or destroyed distress beacons can be made online at www.amsa.gov.au/beacons, or by fax, phone, post or email.

Can distress beacons be registered for more than one use?

EPIRBs and PLBs are increasingly being used across all environments. AMSA's registration database will accept details for the beacons' primary use as well as for other uses.

Care must be taken when using a distress beacon for a purpose other than the specific purpose for which they were designed. For example, EPIRBs are designed to float in water and use the water plane to reflect the signal upwards to the satellite. An EPIRB activated on land or in a boat must remain vertical to ensure the signal is not greatly degraded. Similarly, PLBs although waterproof and constructed to float, are not designed to float upright

so if activating a PLB at sea it should be supported so that its antenna remains vertical and out of the water. Some life vests have pockets for PLBs sewn into the webbing up high near the shoulder allowing the PLB to be supported above the water, leaving your hands free.

Can distress beacons be used overseas or can beacons registered in a foreign country be used in Australia?

Cospas-Sarsat is a global system and distress beacon alerts are received by the satellites from anywhere on the Earth's surface. If an Australian-coded distress beacon is activated overseas, an alert will be sent to the Rescue Coordination Centre responsible for the region in which the distress incident is occurring. A second notification is then sent to RCC Australia as the registrar for the beacon.

Correspondingly, alerts from beacons registered in other countries, activated in the Australian region, will be received by RCC Australia. Australian residents who buy a distress beacon registered elsewhere must have the beacon recoded with the Australian country code by a local agent and have it registered with AMSA. Some PLBs manufactured in the USA and elsewhere are programmed to transmit a Morse Code "P" as part of their alerting signal. These beacons do not meet the Australian Standard and are unable to be registered in Australia.

ACTIVATION

How long before a distress signal is received?

A distress beacon alert is usually detected by the RCC within minutes. If your distress beacon has an encoded GPS location capability, this information will also be sent to the RCC and your position becomes known. If emergency contacts are aware of trip details or trip details have been submitted online, search operations can be commenced much sooner. If the RCC has to rely on polar-orbiting satellites to determine the location of a beacon, the time to gain an accurate position may be longer, potentially delaying search operations.

NOTE: Polar-orbiting satellites over-fly the Australian region on average every 90 minutes but passes may be anywhere from minutes to five hours apart. To improve response times, ensure distress beacons are registered and inform emergency contacts of trip details.

Even once a position is obtained, response times then depend on the time for a search and rescue (SAR) unit, such as a helicopter, aircraft or ground party to be readied and transit to the search area. The more remote the location of the distress incident, the longer the response time. In all instances, you must be prepared to survive.

What if a distress beacon is accidentally activated?

The most important thing to do is to switch off the beacon and notify RCC Australia as soon as possible by calling 1800 641 792 to ensure a search and rescue operation is not commenced. There is no penalty for inadvertent activations.

BATTERIES & DISPOSAL

When should distress beacon batteries be replaced?

Distress beacon batteries need to be replaced before the expiry date noted on the label of the beacon. This will ensure that the beacon will transmit for the minimum time required once activated. Battery life varies from model to model. Batteries should only be replaced by the manufacturer or their Australian agent.

How should unwanted distress beacons be disposed of?

Distress beacons need to be disposed of responsibly in case they accidentally activate and trigger a false alarm. Individuals are able to dispose of their unwanted beacons through *Battery World*. For disposing of commercial quantities please contact your local *Battery World* Store. Alternatively, the documentation that comes with distress beacons often contains information about how to disarm the beacon safely. If in doubt, check with the manufacturer or local agent or call the beacon advice line on 1800 406 406.

A list of most distress beacons sold in Australia, with simple instructions on disarming them, can be found at www.amsa.gov.au/beacons/disposal

NOTES: Do not dispose of your beacon in general waste as it will end up in landfill and could be activated inadvertently.

After 1 February 2010, 121.5 MHz EPRIBs and PLBs are no longer licensed for use. 406 MHz beacons that transmit on 121.5 MHz for final stage homing are unaffected by this rule.