

Disclaimer:

A beacon or SEND device are tools to support viable communication in search and rescue. As part of the survival equipment you carry a beacon provides alerting and the position of your distress, and a SEND enables the monitoring of weather conditions to ensure your skills and experience match those required for the conditions for the activity you are about to undertake.



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Preamble / Summary

The New Zealand Search and Rescue Beacons and Satellite Emergency Notification Devices (SENDs) Guideline 2022 (NZSAR Beacons and SEND Guideline) is a statement developed from the legislative requirements for Search and Rescue in the New Zealand Search and Rescue Region (NZSRR). The NZSAR Beacons and SEND Guideline interprets these requirements with respect to the use of emergency location equipment in the NZSRR.

This Guideline aims to:

- provide guidance for suppliers of beacons and devices who want their equipment to be used in the NZSRR
- provide guidance for retailers to ensure they provide the right information when providing advice to customers
- provide guidance for agency and private providers (hire, lease, pools, events) of responsibilities for the emergency location equipment being used
- educate end-users to ensure they make a well-informed and educated decision on the right safety equipment for the environment it is to be used in.

The New Zealand SAR system is facing the following issues with respect to emergency location equipment:

- Emergency Beacons are well regulated, both domestically and internationally, and are part of an international network of publicly funded responses to SAR incidents.
- With the advent of commercially provided communication devices that provide emergency notification capability, there are no parallel conventions or legislation to monitor and standardise the equipment provided.
- The boundary between providing a public service (SAR) and providing a commercial capability that relies on the public service has become blurred. This results in the abrogation of responsibilities of commercial entities charging for a communication service with an emergency notification capability that falls to a publicly funded organisation to respond to.
- Responsibilities under the Health and Safety at Work Act 2015 for event organisers, leasing entities, or corporate/agency responsibilities for remote activities or worker safety are blurred. The provision of providing a commercially provided communication capability that relies on a publicly funded organisation to provide emergency response does not absolve the organiser/entity of the responsibilities to provide this response so far as is reasonably practical.
- With the advent of more alerting equipment (notably commercially provided communication devices that provide emergency notification capability e.g., a SEND) it has been noted that they now contribute to the increasing number of inadvertent alerts received by the Rescue Coordination Centre New Zealand (RCCNZ). Of the 1,698 Category I land-based incidents in 2020-2021, 718 or 42.5% did not progress past communications or initial investigations, or were an unresolved alert with no SAR action required. Of the 974 Category II maritime based incidents, 598 or 61% did not progress past communications or initial investigations, or were an unresolved alert with no SAR action required. Most of these can be avoided.
- False alerts place an increasing strain on the SAR system (especially RCCNZ), bringing increased risk to SAR personnel, and potentially harm the credibility of alerting systems needed to inform the SAR system when help is needed.

There are many national and international communication satellite systems in existence and many devices designed to provide either or both voice and data communications over these systems. Devices designed for normal day to day communications over these satellite networks (e.g., paging services, remote monitoring) are outside of the scope of this Guideline: the NZSAR Beacons and SEND Guideline specifically addresses devices designed to provide emergency location communications in the event of a distress situation. Mobile satellite service devices that offer real-time, two-way switched voice service that is interconnected with the public switched telephone network are excluded from this Guideline, as are terrestrial cellular based devices. The use of "111" over domestic telecommunications mobile networks is also outside the scope of this Guideline.

The NZSAR Beacons and SEND Guideline is laid out in two main sections. The first section (Part 1 to 4) covers the introduction to and determining of the Guidelines for Beacons and SENDs in New Zealand. The second section (Part A to D) is designed to bring together publicly available information into a single source for use in public facing awareness and information packs.

This Guideline does not provide recommendations for specific equipment nor make recommendations for a preferred system.

Part 1: Preliminary provisions

Title

This is the NZSAR Guideline for Beacons and Satellite Emergency Notification Devices (SENDs) 2022.

Commencement

This Beacons and SENDs Guideline becomes effective on 1 September 2022

Application

This NZSAR Beacons and SEND Guideline relates to all retailers, users and owners of emergency 406MHz beacons and commercially provided communication devices that provide emergency notification capability (i.e., SENDs).

Frameworks

The NZSAR Guideline for Beacons and Satellite Emergency Notification Devices (SENDs) 2022 sits under the NZSAR Rapu Whakarauora Aotearoa Operational Framework for New Zealand's Search and Rescue Region.

The Operational Framework articulates the national framework for overall development, coordination, and improvement of search and rescue services within the New Zealand Search and Rescue Region. It sets out six guiding principles to deliver effective search and rescue services throughout the NZSRR:

- No provision of this Operational Framework or any supporting plan is to be construed as an obstruction to prompt and effective action by any agency or individual to assist persons in distress. All actions are to be in the best interest of persons in distress.
- If a distress situation appears to exist or may exist, search, rescue, or similar recovery efforts will assume that a distress situation does exist until it is known differently.
- It is essential that SAR personnel treat every distress alert as genuine until they know differently.
- Assistance will be provided to any person in distress, regardless of the nationality or status of such person, or the circumstances in which the person is found.
- Unless required for by law or by previous agreement, SAR services provided to persons in danger or distress will be without subsequent cost-recovery from the person(s) assisted.
- In accordance with customary international law, when a nation requests help from another nation to assist person(s) in danger or distress, if such help is provided it will be accomplished voluntarily; New Zealand will neither request nor pay reimbursement costs for such assistance.

The NZSAR Guideline for Beacons and Satellite Emergency Notification Devices (SENDs) 2022 supports the Rapu Whakarauora Aotearoa Operational Framework for New Zealand's Search and Rescue Region by relating how the NZ SAR system works in relation to emergency location equipment and sets out expectations for suppliers, retailers, and commercial and private entities who use this equipment.

Interpretation (glossary)

In this Policy Statement:

The **NZSRR** is the New Zealand Search and Rescue Region.

The SAR sector, the sector or New Zealand's SAR sector are all those organisations involved in search and rescue – i.e., the sector in its totality.

SAR Coordinating Authorities or just **Coordinating Authorities** are responsible for the management and coordination of the SAR operations (SAROP) in the **NZSRR**. The current responsibilities are:

- New Zealand Police: the Coordinating Authority for all **Category I** SAROPs in New Zealand;
- National Antarctic Programme: the Coordinating Authority for all **Category I** SAROPs in Antarctica; and
- The Rescue Coordination Centre New Zealand (RCCNZ): the Coordinating Authority for all **Category II** SAROPs.

SAR Category I is a SAROP coordinated at the local level. This includes all land operations, subterranean operations, river, lake and inland waterway operations, and close-to-shore marine operations

- The nature of 'close-to-shore' will vary according to the availability of local resources and the need to task national assets. Typically, such operations will be within NZ Territorial Waters (12 nautical miles).
- Category I SAR operations typically require the use of local personnel and resources and can be carried out efficiently and effectively at the local level.

SAR Category II is a SAROP coordinated at the national level including, operations associated with missing aircraft or aircraft in distress, and off-shore marine operations within the New Zealand Search and Rescue Region.

- Category II SAROP typically require the use of national or international resources and may involve coordination with other States.

SAR agencies or **SAR providers** refers those who provide services to the Coordinating Authorities.

Operational Framework refers to the NZSAR Rapu Whakarauora Aotearoa – Operational Framework for New Zealand's Search and Rescue Region throughout this document.

A **Private Emergency Co-ordinating Centre** or **PECC** is an emergency response centre for satellite communication devices that provide emergency notification capability. They are privately funded through subscriptions to a service and operate using commercial communication satellite systems.

An **International Emergency Coordination Centre** or **IECC** is an international emergency response centre for satellite communication devices that provides emergency notification capability. They are commercially operated companies providing services to SEND owners who pay a subscription fee for a variety of services using commercial satellite systems.

The International **COSPAS-SARSAT** Programme is a satellite-aided search and rescue (SAR) initiative. It is organised as a treaty-based, non-profit, intergovernmental, humanitarian cooperative currently of 45 nations and agencies, of which New Zealand is a signatory. The programme is dedicated to detecting and locating emergency locator 406 MHz radio **beacons** activated by persons, aircraft or vessels in distress, and forwarding this alert information to authorities that can take action for rescue. Distress alerts are detected, located and forwarded to over 200 countries and territories at no cost to beacon owners or the receiving government agencies.

A distress **406MHz beacon** is a dedicated digital radio transmitter that will send a signal to a **Cospas-Sarsat** dedicated international search and rescue satellite system, which then notifies the nearest ground station. The distress call is then relayed to the Rescue Coordination Centre New Zealand (RCCNZ), which then activates a search and rescue operation.

Emergency Position-Indicating Radio Beacons or **EPIRBs** are designed for use in vessels and for maritime applications and are a subset of the 406MHz beacon. The 406 MHz EPIRBs are divided into classes and all EPIRBs include a built-in strobe light and are designed to float.

Personal Locator Beacons or **PLBs** are designed to be carried by individuals or in vehicles, and only manually activated. They are another subset of the 406MHz beacon.

Emergency Locator Transmitters or **ELTs** are fitted to aircraft and can be manually activated by the pilot using a switch on the instrument panel or automatically activated by a G-switch. They are another subset of the 406MHz beacon.

A **Satellite Emergency Notification Device** or **SEND** or **device** is primarily a small portable communication device that can provide emergency notification and location information to the service provider (**PECC** or **IECC**). The PECC or IECC then passes relevant information to the RCCNZ in the case of an emergency. These devices use commercial communication satellite systems rather than the dedicated **Cospas-Sarsat** satellite system used by **406MHz beacons**.

Part 2: Objective and Outcomes

2.1 Objective

The objective of this Guideline is to ensure that:

- Emergency location equipment used in the NZSRR is fit for purpose for the environment it is being used in and the purpose for which it is being employed;
- Suppliers and retailers understand their responsibilities when marketing, providing the service and selling the equipment; and
- The public are aware of the different systems available and are able to make an educated decision of the brand and service they purchase.

2.2 Outcomes

NZSAR Council will ensure New Zealand provides effective search and rescue services for people in distress throughout New Zealand's search and rescue region to save lives.



A robust and integrated SAR system. We seek a collective, cross-sector culture of being 'one SAR body' within an integrated SAR system. Our policies, processes, procedures and documentation will be coherent, aligned and support effective, efficient and safe SAR practice. We will undertake SAR activity cooperatively and learn from our experiences within a just culture. We will continue to improve our understanding of the SAR sector, our performance, our people, our operations and external influences so that we can improve our services, strengthen our resilience and mitigate our risks. We will also promote and support SAR innovations and showcase good practice.



Efficient and sustainable SAR organisations. We seek high-performing, efficient and sustainable SAR organisations with adequate, secure funding. We will sustain an inclusive and collaborative environment that enables volunteerism. Our capabilities will be fit-for-purpose, appropriately located and adequate to address known SAR needs. We will make affordable, evidence-based investment decisions supported by good quality information. We will adapt our organisations and arrangements in response to changes in our operating environment and ensure we continue to deliver effective SAR services throughout the New Zealand search and rescue region.



Capable SAR people. We seek to maximise the potential of our SAR people. We will work to ensure our people have access to appropriate training and ensure we conduct SAR activities competently and safely. We will collectively coordinate our standards, training, exercises and documentation. Knowledge will be shared without restriction, and we will learn from each other and our experiences. We will also recognise and celebrate the dedication, courage and commitment of our people.



SAR Prevention. We seek an informed, responsible, adequately equipped and appropriately skilled public who are able to either avoid distress situations or survive them should they occur. Many organisations have a role to play with SAR prevention. Collectively, we will enhance personal responsibility through information, education, regulation, investigation and enforcement. We will collaborate with, inform, and contribute to partner organisations. When required we will enable, coordinate or lead public-focused SAR preventative strategies and actions in order to reduce the number and/or the severity of SAR incidents within the New Zealand search and rescue region.

The NZSAR Guideline for Beacons and Satellite Emergency Notification Devices (SENDs) 2022 sits under the SAR Prevention outcome.

Part 3: Guidelines

Guideline 1	Beacon Registration All Beacons are to be registered with registration maintained and updated.
Guideline 2	Retailers Retailers are enabled to provide unbiased advice to consumers on all emergency location equipment offered for sale.
Guideline 3	Informed Customer Consumers are enabled to make an informed decision of the emergency location equipment required for the environment to be used in.
Guideline 4	Responsibilities and Requirements: PECCs and SENDs Private Emergency Co-ordinating Centre (PECCs) Service Providers, agencies, entities and individual owners of SENDs are aware of their responsibilities and requirements for equipment and procedures to be used in the NZSRR.
Guideline 5	Responsibilities and Requirements: 406MHz Beacon Users Agencies, entities and individual owners of 406Mhz Beacons are aware of their responsibilities and requirements for equipment and procedures to be used in the NZSRR.
Guideline 6	Preventing False Alerts Clear and precise operating instructions, that are easy to understand, are provided with all equipment.
Guideline 7	When to Activate an Emergency Device Beacons and SEND emergency communications are to be used only in the event of an emergency, and this is understood by users
Guideline 8	Disposal All beacons are disposed of correctly.

Part 4: Specific Requirements

These requirements apply across all Guidelines in Part 4.

Health and Safety

Under the Health and Safety at Work Act 2015, the provision of emergency location equipment does not relieve the Person Conducting a Business or Undertaking (PCBU) of their 'primary duty of care'. The PCBU or Officers (as identified by the Act) retain the responsibility for knowing where their workers are and maintaining regular communications with them. PCBU and Officers should ensure that appropriate check-ins are maintained with known procedures in place for lost communications or late reporting.

PCBUs should have robust processes and procedures in place to ensure that workers are well-trained and equipped to deal with accidents and emergency situations. This includes having and maintaining emergency equipment and conducting regular training and drills with that equipment.

PCBUs and/or Officers are to ensure that any emergency location equipment is correctly registered (either with RCCNZ for beacons or through the SEND provider) and that they maintain a record of personal details, emergency contact details and known movements.

PCBUs and/or Officers should ensure all personnel who require emergency location equipment for their work are trained in the use of the equipment, when to activate the equipment, how it works, and the actions taken when the equipment is activated.

Privacy of Personal Information

Personal information is information about an identifiable, living person. Anything that identifies a person or is about someone who is identifiable could be personal information. The use, collection and storage of personal information must meet the requirements of the Privacy Act 2020.

International Private Emergency Coordination Centres (PECCs) are to ensure they meet the requirements for security of personal information in New Zealand. At a minimum, PECCs are to collect as a minimum the same information as required for Beacon Registration in New Zealand, although this does not prevent collection of further information that supports the operation of the device and the SEND service provided.

PECCs are responsible for ensuring that users are aware this information will be shared with RCCNZ and Police only in the event of an emergency. PECCs are not permitted to retain personal information when devices change hands, are on loan or hired. It is the responsibility of the owner of the device to ensure that personal information is only retained for the device while it is in use.

Equipment

406MHz Beacons

406MHz Beacons are manufactured to strict international guidelines that New Zealand is a signatory to and operate over the dedicated Cospas-Sarsat 406MHz satellite system. Beacons fitted with Global Positioning System (GPS) are preferred for use in the NZSRR. Beacons purchased in New Zealand should be New Zealand coded (Hex code 512) and meet the AS/NZS Standard 4280.1 for EPIRBs and 4280.2 for PLBs. All New Zealand coded 406MHz beacons are to have a 121.5MHz homing frequency to enable a refined search area close to the emergency.

SENDS

A **Satellite Emergency Notification Device** or **SEND** is a satellite enabled communication device that provides an emergency notification and location capability via a subscription plan. They use commercial communication satellite systems rather than the dedicated Cospas-Sarsat 406MHz satellite system used by beacons. SENDs are small, very portable devices that offer differing services which can include distress/emergency signals, pre-programmed text/email messages, free form text/email messages, and route tracking using GPS capabilities. Some devices allow you to use your mobile phone to send texts or make calls using the satellite technology. SENDs fitted with GPS are preferred for use in the NZSRR. SENDs are not fitted with a homing frequency or have a specified battery duration.

Guideline 1: Beacon Registration

406 MHz Beacons must be registered with the RCCNZ through the Beacons Register (beacons.org.nz), pursuant to the general conditions applying to all transmissions under the Radiocommunications Regulations (General User Radio Licence for Emergency Transmitters) Notice 2019. Registration of a 406MHz beacon is free and only takes a few of minutes.

When transferring an aircraft or a vessel with a fitted beacon, it is the responsibility of the seller to inform the purchaser of the requirements to update the registration information. It is also the seller's responsibility to inform RCCNZ that the beacon has been transferred and to remove their personal information from the register.

Ensuring your beacon is registered with the RCCNZ and the information is updated and maintained on transfer is vital – a registered beacon means a quicker, more targeted response can be launched.

The nominated emergency contacts provided with registration should also be maintained. The registered owner is responsible for ensuring the emergency contacts understand their role and responsibilities, and are provided with the relevant information when required.

On registration to your personal account, RCCNZ will respond to acknowledge registration and include links for proper use of the beacon, expectations of emergency contacts, and good practice in keeping the register information up to date.

Guideline 2: Retailers

Retailers of beacons and SENDs are encouraged to provide:

- salespeople with a full understanding of each system, beacon and SEND
- trained salespeople who deal with distress beacons and SENDs
- an understanding of customer requirements for the environment the equipment will be used in
- point of sale support to register beacons
- point of sale support for service or subscription plans of the products they market, and
- an information brochure to accompany every sale of a SEND or beacon.

Guideline 3: Informed Consumer

Easy-to-access information on how each system (beacon or SEND) works, advantages and disadvantages of each system and when they should be used (as demonstrated at Part A to D) is publicly available.

An Informed Customer should understand, at a high system level approach, that a 406MHz beacon activates an immediate emergency response through a dedicated 406MHz SAR satellite system to the RCCNZ. There is no cost to register or operate 406MHz beacons.

A SEND is first and foremost a communication device using a commercial communication satellite to transmit an emergency message to a third party prior to any notification or information being passed to the RCCNZ. SENDs require subscription and connection through a service plan to perform their functions; there is a cost for this service.

NZSAR Council recommends Global Navigation Satellite System (GNSS) enabled equipment be used in the NZSRR as they have the quickest and most accurate alerts.

Guideline 3 encourages NZSAR Secretariat to manage regular public safety campaigns for beacons and SENDs to assist with information about these systems.

Guideline 4: Responsibilities and Requirements: PECCs and SENDs

Responsibilities and Requirements: Private Emergency Co-ordinating Centres (PECCs)

Service providers and Private Emergency Co-ordinating Centres (PECCs) directly monitor a number of Satellite Emergency Notification Devices (SEND) that operate on a variety of Satellite Networks, each with their own unique characteristics and coverage areas.

It is recommended that each SEND (to be operated in the NZSRR) monitored by a PECC adheres to the SEND standard as defined by the Radio Technical Commission for Maritime Systems (RTCM Working Group 128).

PECCs and Maritime NZ should agree on the individual equipment to be operated in the NZSRR. The addition of new equipment should meet the PECC operational testing requirements to operate on their system and adhere to the RTCM WG 128 standard.

RCCNZ is to be the sole point of contact for PECCs for a SAR event within the New Zealand SRR.

Some PECC customers may be offered a form of additional cover which can be used to pay for SAR resources in their country of origin. In many areas of New Zealand, SAR resources are scarce and any attempt at conducting parallel or competing SAR operations could be counterproductive and potentially cause confusion.

PECCs should acknowledge and agree that no independently funded SAR activity will be sponsored in the New Zealand SRR without first consulting with, and receiving the approval of, RCCNZ.

It is recognised that use of resources funded from private SAR cover may improve the outcomes for persons using a PECC supported device. The PECC should have in place appropriate processes and procedures to manage timely approvals for a request for funding of resources from private SAR cover when requested by RCCNZ or the New Zealand Police.

PECCs are to maintain current user profile information for each device subscribed to their service. The information listed in the user profile varies based on the type of device and service provider. The information listed below is the recommended minimum requirement for all devices:

- Registered Owner Name
- Owners Address/City/State/Territory/Postal Code
- Primary Phone Number
- Secondary Phone Number
- Owner Email Address
- Citizenship
- Device Unique ID
- Device Phone Number (If voice device)

- Additional Info / Emergency Notes (e.g., vessel or aircraft registration)
- Emergency Contact Name, Phone and Email (Up to two emergency contacts are allowed in the system, with additional information that can be provided in the Additional Info Field during registration)

Commercial suppliers and service providers of SENDs are encouraged to provide the following information to ensure a consumer is well informed about the equipment they are purchasing and the services it does and does not provide:

- Information packs for retailers
- Clear promotional material for NZ that includes:
 - The brand and type of device
 - Services the customer can subscribe to and use
 - Subscription fees

Recommended Procedures: PECCs

When a user initiates an emergency response by activating the SOS feature on their supported device within the New Zealand SRR, the following procedures should be followed:

- The PECC confirms that the distress position is occurring within the NZSRR
- If it is a two-way device, the PECC sends a message to the device requesting the nature of the emergency
- The PECC advise RCCNZ of the emergency activation and relay all known information, such as:
 - the time and location of the SOS alert (Latitude/Longitude)
 - registered owner information
 - primary and secondary emergency contacts registered to the device,
 - track data for the device, and
 - any other relevant information
- The PECC makes every effort to determine whether the alert is a false alarm and advise RCCNZ accordingly
- The PECC calls the registered owner and emergency contacts in an attempt to gather more information, such as:
 - the device user's whereabouts
 - the number of individuals in the group
 - any relevant medical conditions of members of the group, and
 - any other relevant information
- The PECC advise RCCNZ of the emergency activation and relay all known information, such as:
 - the time and location of the SOS alert (Latitude/Longitude)
 - registered owner information
 - primary and secondary emergency contacts registered to the device,
 - track data for the device, and
 - any other relevant information
- As soon as practicable after the PECC has contacted the registered owner or any of the emergency contacts registered to the device, the PECC will advise RCCNZ by telephone and email of any direct contact details of the registered owner and/or emergency contacts and any further information obtained

- RCCNZ will update the PECC as required by phone or email. The PECC should update the RCCNZ with any additional information that may be received from the device user or emergency contacts, as well as any movement or changes from the device
- The PECC and RCCNZ will agree as to whom will maintain the relationship with the device user's emergency contacts to keep them up to date on the SAR response
- Once the individual(s) in distress has/have been located and received the required assistance, RCCNZ will advise the PECC by phone or email

Responsibilities and Requirements – Rental Agencies, Entities, and Corporate/Pool use of SENDs

Where a pool of SENDs is employed through a corporate, agency or entity (e.g., adventure event), they assume the role of the PCBU under the Health and Safety at Work Act 2015. Rental agencies are not PCBUs under the HSWA.

All agencies, entities or suppliers of SENDs are responsible for the following:

- A full understanding of the environment the emergency location equipment will be used in
- Ensuring the SEND is part of a layered safety system (i.e., radio, cell phone, sat phone, mountain safety radio, staged check points) and not the only emergency system in use
- Ensure the hirer/user understands the capability of the equipment and how and when to activate it
- Ensure they hold all relevant data (the same as required by the Beacon registration form) is retained each time the equipment is hired/loaned out
- Act as the first Point of Contact if activated
- Maintenance of all information required for SAR
- Ensure registration is updated each time the rental equipment is returned.

The simple provision of the equipment to a worker/user does not mitigate the risk to the worker/user by passing the responsibility of locating the person on to the RCCNZ. Processes and procedures are to be in place to ensure every effort has been made, so far as is reasonably possible, to check in on remote personnel, known routes and work areas, known blind spots in the region for communications and regulated check-in times are promulgated.

Responsibilities and Requirements – Private Ownership

It is the responsibility of the owner of a SEND to understand the service / subscription plan that they have enrolled with the service provider for that specific SEND.

Owners of privately held SENDs are to familiarise themselves with the capabilities and limitations for the equipment they have and the environment they intend to operate them in. It is their responsibility to ensure that the equipment is either in date, has suitable battery life and is activated with the service provider.

When a SEND is on personal loan it is the responsibility of the owner to decide if they need to inform the service provider (see the provider's contractual requirements dependent on the service plan) or to hold all the relevant information (the recognised minimum requirement is the same information that is held on the Beacons Register) and be the first point of contact in the case of an alert and being contacted by the service provider.

Guideline 5: Responsibilities and Requirements: 406MHz Beacon Users

All 406MHz beacons for the NZSRR are to be registered with the RCCNZ through the Beacons Register (beacons.org.nz) and should be New Zealand coded.

It is the responsibility of the owner to ensure the equipment is in date and that the battery expiry date has not been reached. If the battery has expired, it is the responsibility of the owner to either deregister and correctly dispose of the equipment (see Guideline 8: Disposal) or to forward the equipment to a registered supplier for the battery to be replaced.

Responsibilities and Requirements – Rental Agencies, Entities, and Corporate/Pool use of 406MHz Beacons

Where a pool of 406MHz Beacons are employed through a corporate, agency or entity (i.e. adventure event), they assume the role of the PCBU under the Health and Safety at Work Act 2015. Rental agencies are not PCBUs under the HSWA.

All corporate, agency, entity or rental organisation are to ensure the 406MHz beacon is registered and New Zealand coded.

All agencies, entities or suppliers of 406MHz Beacons are responsible for the following:

- A full understanding of the environment the emergency location equipment will be used in
- Ensuring the 406MHz Beacons is part of a layered safety system (i.e., radio, cell phone, sat phone, mountain safety radio, staged check points) and not the only emergency system in use
- Ensure the hirer/user understands the capability of the equipment and how and when to activate it
- Ensure the corporate, agency or entity hold all relevant data (as required by the Beacon registration form) and is retained each time the equipment is hired/loaned out. Do not change the Beacon Register each time the equipment is on loan
- Act as the first Point of Contact if activated
- Maintenance of all information required for SAR

The simple provision of the equipment to a worker/user does not mitigate the risk to the worker/user by passing the responsibility of locating the person on to the RCCNZ. Processes and procedures are to be in place to ensure every effort has been made, so far as is reasonably possible, to check in on remote personnel, known routes and work areas, known blind spots in the region for communications and regulated check-in times are promulgated.

If a 406MHz beacon is permanently transferred to another user, it is the responsibility of all corporate, agency, entity or rental organisation of the 406MHz beacon to inform the purchaser of the requirements to update the registration information. It is also the corporate, agency, entity or rental organisation's responsibility to inform RCCNZ that the beacon has been transferred and to remove their information from the register.

Responsibilities and Requirements – Private Ownership

When a 406MHz beacon is on personal loan it is the responsibility of the owner to hold personal information of the person using the beacon. In the case of an emergency the owner of the device, who's details are held on the Beacon Register, will be the first point of contact to determine if an emergency exists and the circumstances and / information surrounding the alert. The owner is responsible for ensuring the distress contacts are aware of the trip details of the person borrowing the beacon.

If a 406MHz beacon is permanently transferred to another user, it is the responsibility of the current owner (seller) to inform the new owner (purchaser) of the requirements to update the registration information. It is also the current owner's (seller's) responsibility to inform RCCNZ that the beacon has been transferred and to remove their personal information, including the removal of emergency contact details, from the register.

Guideline 6: Preventing False Alerts

With the advent of more alerting equipment (notably commercial SEND devices) it has been noted that the number of inadvertent alerts received by RCCNZ is on the increase. The 2020-2021 NZSAR Annual Report highlighted that of 1,698 Category I land-based incidents, 718 or 42.5% of incidents did not progress past communications or initial investigations or were an unresolved alert with no SAR action required. Of the 974 Category II maritime based incidents, 598 or 61% of incidents did not progress past communications or initial investigations or were an unresolved alert with no SAR action required. Most of these can be avoided.

False alerts place an increasing strain on the SAR system (especially RCCNZ as New Zealand's single point of contact), bringing increasing risk to SAR personnel, and harming the credibility of alerting systems needed to inform the SAR system when help is needed.

SEND Procedure

To reduce the number of false alerts received by the SAR system, commercial providers, retailers and providers of rental or pool emergency location distress alerting equipment and systems are expected to undertake the following:

- Provide clear and precise operating instructions that are easy to understand; this could be through a YouTube video by the manufacturer or service provider
- Ensure that suppliers and/or installation personnel understand how the equipment works, immediate actions to take in case of a known false alert, and the consequences of transmitting a false alert

406 Beacon Procedure

If a 406MHz beacon is inadvertently activated in its distress mode by using the distress switch (or by automatic means, such as water contact by an EPIRB with such an automatic feature), the RCCNZ is to be contacted as soon as possible to request cancellation of the distress alert before deactivating the beacon (if it has a deactivation function).

Contact details are:

1. New Zealand (toll free): **0508 4 RCCNZ** or **0508 472 269**
2. Calling from outside New Zealand: **+64 4 577 8030**
3. Call Police on 111 and advise position and beacon Hex ID.
4. Email: **RCCNZ@maritimenz.govt.nz**

Deactivating the beacon alone does NOT cancel the distress alert that already has been transmitted by the beacon and received by Cospas-Sarsat. That is why the appropriate RCC must be contacted. If the beacon is deactivated and RCCNZ is not advised, then it will be treated as an emergency causing a false callout of assets.

Guideline 7: When to Activate an Emergency Device

A beacon or SEND is part of a layered safety system and should only be activated when all other means of communication with emergency services have been exhausted (radio, cell phone, satellite phone, etc) and if an individual feels that their life, or the life of someone in their group, is in grave or imminent danger¹. This is a personal decision that is unique to each situation.

The layered safety system is made up of, but not limited to, the following:

- Self help
- Buddy aid or assistance from people within your group
- Buddy aid or assistance from other personnel (passing trampers, work mates, nearby boats or watercraft)
- Using a mobile phone to make contact with close friends who know where you are
- Using mobile phones, SEND or VHF Radio to ask for localised assistance
- Using mobile phones, VHF radio, AIF or HF radio to seek assistance using voice or text/data communications (i.e., calling 111 for Police or a MAYDAY call on marine radio)
- When all other avenues have been exhausted, activating a 406Mhz Beacon or SOS function on a SEND.

What is an Emergency?

An emergency is any situation where:

- people are lost or trapped and unable to resolve their situation safely on their own
- there is a threat to life
- people have a non-life-threatening illness or injury but are unable to travel safely out of the remote area without external specialist assistance.

An emergency does not include the loss of equipment unless that results in any of the situations above or where the loss of equipment may present a significant hazard.

While calling 111 or using marine radio CH16 is preferred by the emergency services, it may not be feasible in many remote areas where there is little or no coverage.

In general, NZSAR recommends using a 406Mhz Beacon and sending a message via another method (marine radio, SEND) to help confirm the location and type of an emergency.

Guideline 8: Disposal of a Beacon

Old or obsolete beacons need to be disposed of carefully, to ensure they are not set off by accident.

Beacons are not to be disposed of in household waste/recycling.

Old or obsolete beacons should either be delivered to a local Police Station, who will arrange appropriate disposal, or alternatively they can be sent to:

RCCNZ
Maritime NZ
Level 1 Avalon Studios
41 Percy Cameron Street
Lower Hutt 5010
Wellington

In addition, owners are to log in to their personal MyBeacons account and update the registration details to indicate that the beacon is now deregistered.

¹ This is consistent with the Operational Framework definition for Distress Phase: A situation wherein there is reasonable certainty that a vessel or other craft, including an aircraft or person, is threatened by grave and imminent danger and requires immediate assistance.

Part A: 406 MHz Emergency Distress Beacons

No one expects to have an accident, get lost or experience some other distress situation when they set sail, fly or head into the wilderness for adventure. But it does happen. Mobile phones do not always work in remote areas. Multi-tasking navigation assistance devices require charging. A 406 MHz distress beacon is one's best bet. It only has one function – to alert Search and Rescue (SAR) authorities directly within minutes of activation that someone is in trouble and needs help.

What is a Beacon?

Beacons come with a variety of features for activation in an emergency, although most can be activated manually by pressing a button. When purchasing a beacon, it is recommended that it have an in-built Global Navigation Satellite System (GNSS) as this will assist in providing an accurate position of the user's location.

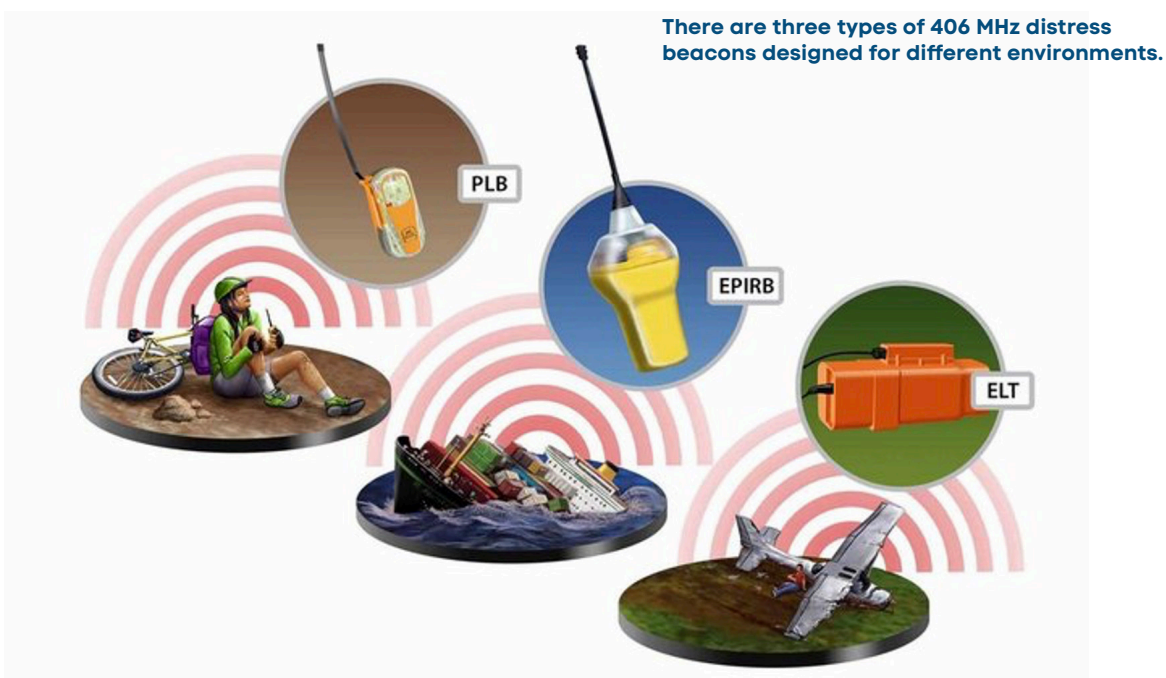


Figure 1: Three main types of 406 MHz beacons
Images courtesy of Cospas-Sarsat

PLB – Personal Locator Beacons

PLBs are designed to be carried by individuals or in vehicles, and only activate manually. Different models of PLBs have different activation and deployment features, so users should evaluate their needs and the situations they will use it in carefully. Most PLBs are as small as a cell phone. Because of their compact size, PLBs are ideal for wilderness hikers, cross country or mountain bikers, kayakers, canoeists, mountaineers, backcountry skiers and snowmobilers – generally, anyone travelling in remote wilderness areas any time of year. There is also a growing trend for coastal and offshore sailors to wear a PLB with their lifejacket, especially if sailing at night.



EPIRB – Emergency Position-Indicating Radio Beacons

EPIRBs are designed for use in vessels. EPIRBs are designed for maritime applications. The 406MHz EPIRBs are divided into categories and all EPIRBs include a built-in strobe light and are designed to float.

Category I EPIRBs are housed in a special bracket equipped with a hydrostatic release unit (HRU). This mechanism releases the EPIRB at a water depth of 1 to 4 meters. The buoyant EPIRB then floats to the surface and automatically begins transmitting.

Category I EPIRBs should be mounted outside the vessel's cabin where it will be able to "float free" of the sinking vessel.

Category II EPIRBs differ in that they are not released automatically. They activate manually or thru immersion in water. They can be mounted above or below deck, in a location that is protected, in the most accessible location on board where it can be quickly accessed in an emergency, either in a Category 1 bracket (fixed, automatic and externally mounted) or a Category 2 bracket (manual and situated where it can be accessed easily). They can also be kept in a 'grab bag' instead of mounting.



Images courtesy of Cospas-Sarsat

Category III EPIRBs are 406MHz beacons (with integral 121.5MHz homing transmitter) that incorporate an internal AIS (Automatic Identification System) locating signal and mandatory internal GNSS receiver. This meets the new IMO rules for vessels under SOLAS regulations and will need to be fitted to vessels in this category when current devices are due for replacement.

AIS enabled 406MHz beacons offer the extra reassurance to the user that a signal will also be received by all vessels and aircraft equipped with AIS in the vicinity, enabling them to respond with immediate assistance. This is in addition to the beacon's traditional capabilities to transmit a 406 MHz distress signal via the Cospas-Sarsat satellite system through to the RCCNZ.

Fitting a Category III EPIRB instead of a Category I or II 406MHz beacon is optional for recreational boats and other non-SOLAS vessels.

The combination of an accurate location received via the Cospas-Sarsat satellites and an AIS signal from the EPIRB will enable Search and Rescue authorities to direct search efforts via satellite communications to the area of the incident, whereupon the ship's or other vessels in the immediate region own AIS equipment will enable them to locate the EPIRB, effecting a speedier rescue in remote locations.

ELT – Emergency Locator Transmitters



ELTs can be manually activated by the pilot using a switch on the instrument panel or automatically activated by a G-switch. A G-switch is a mechanism inside the beacon that activates automatically when it detects excessive G-forces experienced during a crash. ELTs transmit the distress signal for at least 24 hours.

As with EPIRBs and PLBs, some 406 MHz ELTs may also include a GPS signal within the distress alert. This position may be a one-time input from the aircraft's navigation system or may be periodically updated from a GPS processor internal to the ELT. The one-time position input may not represent the most accurate position of the ELT since the position may have changed after the one-time position was last inserted into the message. It does however provide an early indication of the general area of the distress which is extremely helpful to SAR personnel.

Choose a New Zealand Beacon

Every beacon is coded to its country of origin, and while they can be used worldwide, beacons can only be registered in the country they are coded to.

A beacon used in New Zealand should be a 'New Zealand coded beacon' (Code 512) – this includes some Pacific Island nations. Having a beacon coded to New Zealand means that the user's emergency information is held by RCCNZ which can speed up the response time of emergency services.

Users in New Zealand should beware of Australian-coded beacons sold online in New Zealand by ensuring they ask the seller what country the unit is coded for, otherwise they will have to register the beacon in the country of origin.

How is a beacon activated?

If an individual feels that their life is in grave or imminent danger, they should first try to use two-way communications such as a phone or radio so that they can talk to emergency services. If this is unavailable, then a distress beacon should be activated. This is a personal decision that is unique to each situation.

There are two ways to activate a beacon: automatically and / or manually.

Automatic Activation

All automatically activated beacons can also be activated manually. A beacon is activated automatically when:

- An EPIRB is submerged in water
- An ELT is exposed to excessive G-force.

Manual Activation

If a user is at sea, they are to stay on the vessel/craft until it is not safe to do so. If the vessel is sinking, then they are to ensure the life raft is inflated or personal watercraft (dinghy, tender etc) is tethered to the vessel. As a general guide, they should step into the life raft as a last resort and ensure they take their beacon with them.

The user should activate the beacon according to the manufacturer's instructions:

- Position the beacon in a clear and open area
- Point the aerial vertically towards the sky, away from trees, buildings and mountains. If the user is in a vehicle, they should place it on top of the roof for better transmission
- If the user is within a ravine or gully, they should position it at the highest point.

How does a Beacon work?

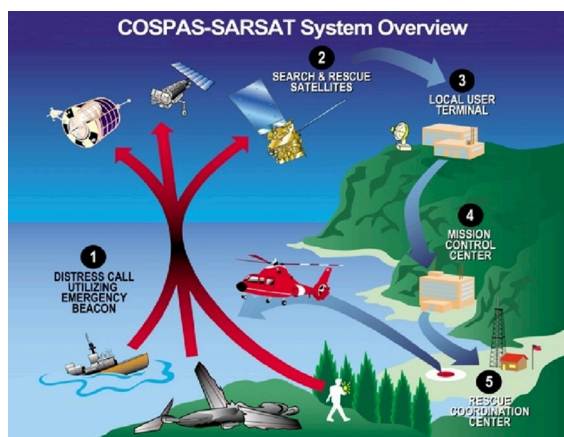


Image courtesy of Cospas-Sarsat

A 406MHz beacon will send a signal to a Cospas-Sarsat satellite within the international search and rescue satellite system, which then notifies the nearest ground station. The distress call is then relayed to the Rescue Coordination Centre New Zealand (RCCNZ), which then activates a search and rescue operation.

It is important that a beacon is registered, so that RCCNZ can immediately contact the emergency contacts of the person in distress and request details about them, their activities or trip that may help coordinate the response more effectively. For example, an EPIRB will have vessel details that will help identify the vessel in distress.

How someone is rescued depends on their location and the circumstances. Factors such as the availability of responders, terrain and weather will impact on how soon they can reach the person in distress. Helicopters, LandSAR, Coastguard, Police and nearby vessels could be used to help.

People heading out should prepare in advance for survival if assistance cannot reach them immediately.

Registering a Beacon

Members of the public need to do their part so that if they need help and activate their beacon, search and rescue personnel can be better prepared when they arrive. Without registration, RCCNZ personnel are unable to react as quickly as possible; ultimately this may delay a SAR response should in the case of an emergency. Anyone with a 406MHz beacon that has not been registered should register it immediately (at beacons.org.nz).

It is free and easy

Registration of a 406MHz beacon is free and only takes a few of minutes. Registrations can be submitted online, emailed or downloaded or by completing the registration form supplied with the beacon at the point of sale and sent through the post.

It is the law

Registering a beacon is a legal requirement.

It could save a life

Ensuring a beacon is registered with the Rescue Coordination Centre New Zealand (RCCNZ) is vital – a registered beacon ensures a quicker, more targeted response can be launched.

RCCNZ may also be able to find out exactly who is with the person(s) in distress, how long they have been gone, and whether anyone has any medical conditions. Rescuers will then be in the best position to help when the parties are located.

Testing a Beacon

A beacon should always be tested according to the instructions of the beacon manufacturer. A beacon should always be properly registered before any testing is conducted.

406MHz beacons are designed with a self-test capability that is activated by a separate test switch or switch-position setting for evaluating key performance characteristics. Initiating the beacon self-test function will not generate a distress alert in the Cospas-Sarsat system, and the self-test can be performed at any time (i.e., it is not restricted to certain times during an hour). It will however use a small amount of the beacon's limited battery power and should only be used in accordance with the beacon manufacturer's guidance for the number of tests to be performed over the lifetime of the beacon. Excessive testing may mean that the beacon-battery reserve will be inadequate for full performance during a real distress situation.

Global Navigation Satellite System (GNSS)

The NZSAR Council recommends Global Navigation Satellite System (GNSS) equipped beacons as they have the quickest and most accurate alerts.

Beacons with GNSS capability

Search and rescue authorities will be able to locate users much faster if a beacon has GPS.

Assuming the beacon has been deployed correctly, what happens next is:

- The Hex ID² or Unique Identification Number (UIN) of a beacon is initially detected by either a geostationary (GEOSAR), Low Earth Orbit (LEOSAR) or Medium-altitude Earth Orbit (MEOSAR) satellites and the regional Mission Control Centre will be notified. They will immediately notify RCCNZ if within the NZSRR.
- If the beacon is registered, RCCNZ will ring the registered owner and/or their nominated emergency contacts immediately to obtain information to assist with the response and ensure it is not a false alert.
- If the beacon has GNSS capability location (accurate to within 120 meters) its position may be provided within 10 minutes to the RCCNZ.
- If the beacon does not have GNSS capability, its location, accurate to within 5km, may be provided within 10 minutes to the RCCNZ.
- The RCCNZ will determine who is responsible for the search and rescue (Category I or Category II) and which region is to be notified (e.g., if the beacon is activated in Australia, the Australian Joint Rescue Coordination Centre will be notified and coordinate the search and rescue); search and rescue assets are then deployed.
- If on land, the beacon user is instructed not to move. The guidance is to seek shelter, water and food nearby if possible.
- If in water, the beacon user is instructed to stay on board the vessel unless it is sinking, then relocate to a life raft or personal watercraft.
- When a beacon user sees or hears search personnel or aircraft in the area, they are to use flares, torches, or light a fire (if it is safe) to help search personnel pinpoint the location of the beacon.
 - Warning: If a person in distress is using parachute rockets or mini flare kits, they must not fire or point them towards aircraft.

Beacons with Return Link Service (RLS) Capability

RLS-enabled 406MHz beacons provide beacon owners with more information and allow search and rescue services a better understanding and management of the distress situation.

The RLS feature provides an indication (e.g., a light or text display) on the beacon that confirms to the user that the distress signal from the beacon has been received and localised by the Cospas-Sarsat system and forwarded to government authorities for action. It does not mean that a rescue has yet been organised/launched, only that the distress alert has been received and routed to the appropriate government agencies.

² A beacon's 15 or 23 character Hex ID uniquely identifies the 406 MHz beacon and is encoded in the message a beacon transmits to search and rescue services if the beacon is activated. When a beacon is activated, satellites will detect the transmission and relay the distress alert to search and rescue services. The Hex ID contains the country code and other identification features relative to the carrier which are dependent upon the coding protocol used. The Hex ID can identify the carrier using the radio call sign, a serial number, aircraft registration marking, etc. New Zealand's Maritime Identification Number is 512.

Part B: Satellite Emergency Notification Devices (SENDs)

International Standards

The Radio Technical Commission for Maritime Services Standard 12800.0 for Satellite Emergency Notification Devices (RTCM Std 12800.0) dated 9 June 2014 contains the minimum requirements for the functional and technical performance of SENDs operating over any satellite system except Cospas-Sarsat for which regulations and standards already exist.

A SEND designed and manufactured to these standards should provide the user with a high degree of confidence that in an emergency the device will perform as intended, thereby maximising the chances of successful notification of a distress to the appropriate emergency services.

Out of Scope

This standard does not cover two-way data or voice communication systems (e.g., VHF radio, mobile or satellite phones, paging systems). In general, the standard does not concern itself with the infrastructure and support services which are required to receive a distress message and route it to the appropriate private or public emergency response services.

What is a SEND?

A SEND – Satellite Emergency Notification Device - is a portable satellite communication device with an emergency notification and location capability that uses commercial communication satellite systems rather than the Cospas-Sarsat satellite system (used by beacons). SENDs are small and very portable.

Some devices can send and receive messages, like SMS messaging, and some can be linked through Bluetooth to a compatible mobile phone to write and read messages using the SEND as the transmitting device (similar to a hot spot, but with limited capacity). This is a good alternative messaging system and can be used to stay connected with a user's headquarters, operations centre or check-in points along a route. The level of integration and service will depend on the make and model of the device and the subscription plan that the user has signed up to.

Each device is different, so it is important that users research their specific functions and select one that meets their needs.

When the SEND is triggered, position and information is sent via commercial satellite to a commercial monitoring agency who will first establish whether the alert is intentional before passing relative information to the RCCNZ. A SEND requires a monthly or annual subscription or service plan with a provider to ensure that it is monitored.

How is a SEND activated?

If an individual feels that their life is in grave or imminent danger, they should first try to use two-way communications such as a phone or radio so that they can talk to emergency services. If this is unavailable, then a distress beacon should be activated. This is a personal decision that is unique to each situation.

SENDs are manually activated.

How does a SEND work?

SENDs have a dedicated SOS distress button that, when pressed, will generate a distress signal via the affiliated satellite network to the service provider back-office systems and raise an alarm at the service provider. The emergency operations team (EOT) personnel will then follow the applicable SOP for the alerting device.

At the time of SOS activation, the device transmits a unique identifier to the service provider that identifies the device in emergency mode, and simultaneously provides the service provider with:

- the current GPS or GNDSS location of the device
- personal profile information such as emergency contacts, vessel or airframe identifiers, and any other information that may be usable from the registration form with the service provider

The service provider should then follow the recommended SOPs, as defined below.

Standard Operating Procedures

RCCNZ is to be the sole point of contact within the New Zealand SRR.

When a user initiates an emergency response by activating the SOS feature on their service provider supported device within the New Zealand SRR, the following procedures will be followed:

- The service provider will confirm that the distress position is occurring within the NZSRR.
- If it is a two-way device, the service provider will send a message to the device requesting the nature of the emergency.
- The service provider will advise RCCNZ of the emergency activation and relay all known information, such as:
 - the time and location of the SOS alert (Latitude/Longitude),
 - registered owner information,
 - primary and secondary emergency contacts registered to the device,
 - track data for the device, and
 - any other relevant information.
- The service provider will make every effort to determine whether the alert is a false alarm and advise RCCNZ accordingly.
- The service provider will call the registered owner and emergency contacts in an attempt to gather more information, such as:
 - the device user's whereabouts,
 - the number of individuals in the group,
 - any relevant medical conditions of members of the group, and
 - any other relevant information.
- As soon as practicable after the service provider has contacted the registered owner or any of the emergency contacts registered to the device, the service provider will advise RCCNZ by telephone and email of any direct contact details of the registered owner and/or emergency contacts and any further information obtained.
- RCCNZ will update the service provider as required by phone or email. The service provider will update the RCCNZ with any additional information that may be received from the device user or emergency contacts, as well as any movement or changes from the device.
- The service provider and RCCNZ will agree as to whom will maintain the relationship with the device user's emergency contacts to keep them up to date on the SAR response.
- Once the individual(s) in distress has/have been located and received the required assistance, RCCNZ will advise the service provider by phone or email.

Activating a Device

A SEND is activated with the service provider and will only operate with an active plan. It can be deactivated and activated as required depending on the subscription or service plan the owner has signed up. RCCNZ is not the registering agent for these devices. SEND users should read the owner's manual for more information.

Global Navigation Satellite System (GNSS)

The NZSAR Council recommends Global Navigation Satellite System (GNSS) capability enabled devices as they have the most accurate alerts resulting in reduced search times.

Part C: An Emergency

If an individual feels that their life or someone in their group is in grave or imminent danger, they should first try to use two-way communications such as a phone or radio so that they can talk to emergency services. If this is unavailable, then a distress beacon should be activated. This is a personal decision that is unique to each situation.

The layered safety system is made up of, but not limited to, the following:

- Self help
- Buddy aid or assistance for people within your group.
- Buddy aid or assistance from other personnel (passing trampers, work mates, nearby boats or watercraft)
- Using a mobile phone / SEND to make contact (voice or SMS) with close friends who know where you are.
- Using mobile phones, SEND or VHF Radio to ask for localised assistance
- Using mobile phones, VHF radio, AIF or HF radio to seek assistance using voice or text/data communications.
- When all other avenues have been exhausted, activating a 406Mhz Beacon or SOS function on a SEND.

What is an Emergency?

An emergency is any situation where:

- people are lost or trapped and unable to resolve their situation safely on their own;
- there is a threat to life;
- people have a non-life-threatening illness or injury but are unable to travel safely out of the remote area without external specialist assistance.

An emergency does not include the loss of equipment unless that results in any of the situations above or where the loss of equipment may present a significant hazard.

In an Emergency

While calling 111 or using marine radio CH16 is preferred by the emergency services, it may not be feasible in many remote areas where there is little or no coverage.

In general, NZSAR recommends using a 406MHz beacon and sending a message via another method (marine radio, SEND) to help confirm the location and type of emergency.

Part D: Beacon and SEND Comparison

Difference between a Beacon and SEND

Knowing the difference between a Beacon and SEND (e.g., Garmin inReach, SPOT tracker) is important as it could impact on one's safety and ability to be rescued.

In broad terms, a beacon is designed for emergency location using a dedicated satellite system and internationally recognised requirements for countries to provide a search and rescue organisation. This service is free. A SEND is a communication device that offers a SOS function utilising commercial communication satellite system. In New Zealand, the commercial provider does not provide the search and rescue function, only the communication link; instead, they pass the relevant information to the New Zealand SAR organisation (RCCNZ in Avalon, Lower Hutt, Wellington) to activate a SAR operation. Maintaining the link between the provider and RCCNZ is essential for a successful outcome. SEND relies on a subscription plan, similar to mobile plans, to be active.

Beacon

Beacons are on a satellite network with good coverage across the New Zealand Search and Rescue Region. Batteries on some models have a battery life up to 10 years. The power they radiate is able to penetrate light foliage and clouds, but it is not perfect; line of sight to the sky and satellites is still required.

In New Zealand 406 MHz emergency beacons come with both a homing radio transmitting frequency (121.5 MHz) which means that when a rescue helicopter gets close to the beacon, they can tune into the radio network and home in on the beacon's location. Newer models should also be GNSS-enabled which will send the user's location to the rescue team.

SENDS – SPOT tracker and Garmin inReach

SPOT and inReach are the two main brands of SEND in New Zealand (as of 2022). They use different satellite communication networks to beacons. SPOT operates on the Globalstar satellite network and inReach on the Iridium satellite network. They have the advantage of being able to live track a user, but they rely on batteries that need charging, similar to a mobile phone. They are first and foremost a communication device that provide good mapping and tracking applications for outdoor activities while also offering a SOS function should a user encounter difficulty.

SENDS use a different network to PLBs, have less coverage and a weaker signal. They might not work if they are under thick canopy, in particularly remote locations, in bad weather.

SEND devices do not have a homing transmission capability and therefore the user must remain in a static location or the searching asset will have greater difficulty in locating the causality.

The inReach and some SPOT models can send pre-set messages or two-way communication like a phone.

The messages and emergency alerts from SPOT and inReach go through a third-party desk overseas which are then forwarded to the RCCNZ after initial triage of the call to ensure it is not a false alert.

SENDS rely on an active (paid) plan to operate. The user is paying for the use of the satellite and the various functions and applications available in that plan (similar to a mobile phone). In the case of an emergency, the service provider does not provide search and rescue in New Zealand; this is passed to the RCCNZ to manage.

Global Navigation Satellite System (GNSS)

New Zealand Search and Rescue recommends only GNSS capable beacons and SENDs for use in NZSRR. This increases accuracy and reduces time to locate.

Features	Personal Locator Beacon (PLB)	Mountain Radio	Satellite Messenger Device	Satellite Phone	Mobile Phone
Works almost anywhere in backcountry	✓ (requires line of site to sky)	✓	✓ (requires line of site to sky)	✓ (requires line of site to sky)	
Waterproof models available	✓		✓	✓	
Does not require recharging in the field	✓**	✓**	✓**		
Easy to be activated by a solo, injured person	✓		✓	✓	✓
Small, compact and lightweight	✓		✓		✓
Two-way communication		✓	✓*	✓	✓
Readily available for hire/loan at reasonable cost	✓	✓		✓ (plus additional call costs)	
Sends alert directly to NZ rescue authorities	✓		✓ (via the International Emergency Response Center)		

* Some models only

** Batteries have limited life. Check and replace when necessary.

The information in the above table is intended to provide basic information about some of the pros and cons of these communications devices. It is not intended as an exhaustive list of communication devices or their benefits and limitations. The New Zealand Mountain Safety Council recommends you undertake further research to determine the device that is right for you and your trip.

	PLB	EPIRB	ELT	SEND
Usage	Land, Maritime, Air	Maritime, Air Land	Air	Land, Maritime
Subscription fee	No	No	No	Yes ³
Registration	Yes RCCNZ	Yes RCCNZ	Yes RCCNZ	Yes through Service Provider ⁴
Fees	No fees	No fees	No fees	Monthly or annual contracts based on plan \$20-\$100 per month plus charges
Satellite System	Dedicated Cospas-Sarsat	Dedicated Cospas-Sarsat	Dedicated Cospas-Sarsat	Commercial: Iridium, Globalstar, etc
Notification to RCCNZ	Via Land Earth Station	Via Land Earth Station	Via Land Earth Station	Via Private Emergency Coordination Centre
Time delay	Up to 5 minutes	Up to 5 minutes	Up to 5 minutes	Up to 1 hour
Fixture	Mobile	Fixed ⁵	Fixed and Mobile	Mobile
Size ⁶	H 75 – 120mm W 50 – 55mm D 30 – 40mm	H 180mm W 100mm D 100mm ⁷	H 90 – 105mm W 70 – 90mm D 150 – 300mm	H 100 – 170mm W 50 – 75mm D 25 – 40mm
Weight ⁸	150gm	500gm – 1kg	1.0 – 3.5kg	100 – 250gm
Buoyancy	Yes ^{9,10}	Yes	Fixed – No Mobile – Yes	No ⁹
Waterproof	Yes	Yes	Yes	Yes

³ Varies depending on the provider and plan subscribed to.

⁴ SEND must be registered with an active plan for the device to work.

⁵ Automatic models must be mounted external to the vessel to enable float free if the vessel sinks.

⁶ Average size for a 2021 model.

⁷ External mounted automatic release bracket not included.

⁸ Average weight for a 2021 model.

⁹ To comply with national regulation, PLBs supplied to Australia and New Zealand must be buoyant, either inbuilt or through provision of a floatation pouch permanently attached.

¹⁰ Some brands provide buoyancy pouch accessories.

	PLB	EPIRB	ELT	SEND
Hours of operation¹⁰	Up to 28 hours continuous	48+ hours continuous	24 hours continuous	Up to 200 hours intermittent dependent on usage, settings and plan
Battery life¹¹	5-7 years	7-10 years	5-7 years	Rechargeable
Manual / Auto	Manual	Both	Both	Manual
GPS enabled¹²	Yes	Yes	Yes	Yes
Homing beacon	Yes	Yes	Yes	No
Strobe	Yes ¹³	Yes	No	No
Two-way communications	No	No	No	Yes

¹⁰ Hours of operation are when the unit is on. For Beacons this is how long it operates when activated. For SENDs this is the total life (texts, tracking, messaging, SOS etc) before recharging.

¹¹ Beacon batteries should be inspected and replaced when activated for an emergency.

¹² NZSAR recommends only GPS-enabled beacons and devices for use in NZSRR. This increases accuracy and reduces time to locate.

¹³ Some beacons have an Infrared strobe as well as normal white light strobe.

NEW ZEALAND SEARCH AND RESCUE

Rapu Whakarauora Aotearoa

New Zealand Search
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