

COMMUNICATIONS FOR BUSHWALKERS



This manual has been prepared to allow bushwalkers in Victoria to make an informed choice on systems suitable for their use in the bush.

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Bush Search and Rescue Victoria**

Published by Bushwalking Victoria Inc. A0002548Y

March 2009

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Bushwalking Victoria is the peak body for all bushwalkers and bushwalking clubs in Victoria, Australia and was formed in 1934

What do we do?

Promote bushwalking, engage in activities that add value to the community and proactively represent the interests of all recreational bushwalkers.

We do this by:

- Promoting bushwalking as an outdoor activity that assists health and wellbeing and helps people understand the natural environment;
- Advising people how to get into bushwalking
- Representing the interests of all bushwalkers to land managers and policy makers
- Providing community services such as:
 - land based search and rescue for persons lost in the bush
 - development and maintenance of walking tracks
 - active conservation of natural areas including hands on projects
 - publication of helpful information about safe, enjoyable and environmentally friendly bushwalking

Bushwalking Victoria is a signatory to the International Charter for Walking

If you need further information about bushwalking or would like to join us visit our website at www.bushwalkingvictoria.org.au or contact our office at PO Box 1007 Templestowe Vic, 3106 phone 8846 4131



Bush Search and Rescue Victoria is a dedicated group of bushwalkers and ski tourers who assist the Victoria Police in searching for lost people, often in rough terrain. Bush Search and Rescue is a specialist division of Bushwalking Victoria and was formed in 1949 after Police were impressed by the professionalism of several volunteer bushwalkers involved in early searches. Since then, it has provided volunteer search and rescue services to the people of Victoria on over 100 occasions.

Bush Search and Rescue volunteers can be asked to participate at short notice, in adverse weather conditions and in rough and extreme terrain. In particular, it has the ability to send out small, self-sufficient search groups, which can navigate accurately without landmarks and stay out overnight. This is what sets Bush Search and Rescue apart from most other volunteer search and rescue organisations.

If you are interested in joining Bush Search and Rescue Victoria or would like to support our work with a donation check the website at www.bsar.org email the Convener at convener@bsar.org or contact the Bushwalking Victoria office.

Rik Head

Rik started skiing in 1954 and bushwalking in 1957. He has been an active ski patroller since 1965. He joined Bush Search and Rescue Victoria in the mid 1970s and became a Field Organiser in 1981. In 1979 he founded and continues to be an active member of what is now Alpine Search and Rescue Victoria. Professionally, Rik is a communications engineering consultant specialising in emergency services technology systems.

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Feedback on the use of any of these systems is welcome.

Please send to admin@bushwalkingvictoria.org.au

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Background

The change to 406MHz emergency/distress beacons and other recent technological solutions provide a good opportunity to review the current communication choices available for bushwalkers. There is now a range of different systems available, each with their own benefits and limitations.

Underlying the choice of system is the need to understand the purpose for which it is required.

- Do you only want to be able to alert the emergency services that you have a potentially life-threatening situation that requires immediate assistance?
- Do you just want to stay in touch with friends and family to keep them reassured that all is well?
- Do you only want to communicate with other members of your party in the bush?
- Would you like some mix of the above?
- Do your family or friends want to remain in contact while you are in the bush?



The choice of system depends entirely on your need. Some systems can potentially meet multiple needs. Having more than one system improves the chance of successfully communicating in an emergency.

This paper has been prepared to assist you to make an informed decision on the type of communication system that best meets your needs in the bush.

Dependence on communication/emergency alerting systems is no substitute for adequate preplanning, good bush and navigation skills, appropriate fitness and sound leadership. A bushwalking trip should be based on the participant's skill and experience and a party of sufficient size and strength for the particular venture. These are the basic requirements for safety and enjoyment of the planned bush activity. Such parties should be safe and not require external assistance in all but the most unusual circumstances.

Let someone know before you go
Leave a plan and party details with a trusted relation/friend with instructions if you have not contacted them by the due time.

Test to ensure each of your chosen communication systems operates correctly prior to commencing your journey into the bush.

Types of Systems

There are basically four types of communication systems:

- One-way distress alerting beacons designed to international standards and recognised by the emergency services throughout the world – PLBs
- One-way satellite-based tracking/alerting systems – Spot, etc
- Telephone-type two-way communication systems either using voice or SMS – Mobile phones, Satellite phones, two-way location trackers, etc
- Communication systems for local use within a group – CB radio

One way systems have the obvious limitation that once activated you do not know for sure that the message has been received by the appropriate authorities.

The various systems currently available now come as a small package, are relatively lightweight, are easy to use and most are available at a reasonable cost.

Distress/Emergency Radio Beacons

Distress radio beacons are specialised radio transmitters that, when activated, are used to detect and locate boats, aircraft and/or persons in distress via the international Cospas-Sarsat satellite system. This is an international system that is recognised and responded to by the emergency services world wide.

Distress beacons come in three forms:

- **Emergency Position Indicating Radio Beacons (EPIRB)** for use in ships and boats
- **Emergency Locator Transmitters (ELT)** for use in aircraft
- **Personal Locator Beacons (PLB)** for **personal use by bushwalkers**, four-wheel drivers, remote area workers, etc on land, boat crew and aircrew

Each type is designed to meet specific requirements appropriate to their use, including a minimum transmission time when activated. The EPIRBs must float, ELTs are designed to survive a plane crash while the PLBs must be wearable. They can all have an integral Global Positioning System (GPS) receiver to enhance the reported location accuracy.

The recently introduced digital 406MHz beacons transmit a unique identification, including the country of origin. Without a GPS they have an accuracy of 5km and with a GPS the accuracy is generally within 100m. Beacons are waterproof and have long-life batteries. They also



have an integrated 121.5MHz homing transmitter that can be used by rescue services when close to the beacon.

When a beacon is activated, the resultant message from the satellite is immediately forwarded to the country of origin and in turn forwarded to the appropriate rescue authority. In Australia, coordination is by the Rescue Coordination Centre (RCC) at the Australian Maritime Safety Authority (AMSA), which works in conjunction with State Police and other rescue authorities depending whether it is a land, marine or aircraft activation. The diagram from AMSA pictorially shows the activation process.

The older 243/121.5MHz beacons are no longer being monitored by rescue authorities. This shutdown occurred on 1 February 2009 and was due to their poor location accuracy (20km), low power and the time delay in activation validation and a high incidence of false alarms. Hence, all users must now upgrade to the newer more accurate 406MHz beacons, with PLBs that have an integral GPS being recommended.

All 406MHz distress beacons must be registered to allow the emergency services to obtain details of the person activating the beacon from next-of-kin and to confirm the activation is not a false alarm. Registration with AMSA can be completed on the web. One feature is the ability to record/update your trip intentions. Register your PLB/ELT/EPIRB at www.beacons.amsa.gov.au.

If you are resident in Australian you must buy a PLB that has Australia as the country of origin otherwise it cannot be registered with AMSA. Do NOT buy a PLB from Canada or the USA as they have features specific to these countries and do NOT comply with the Australian Standard.

There are a number of manufacturers of PLBs for Australia, including ACR, GME, Kannad and McMurdo. Check the AMSA website for details (http://beacons.amsa.gov.au/approved_models.asp#406plb).



GME



McMurdo



ACR



Kannad

Activation of a PLB

PLBs should only be activated to request assistance in an immediate life-threatening situation when no other communication system is available.

To activate follow the instructions on the PLB. It will then operate for a minimum of 24hrs. Once activated, be prepared for a long wait. It will depend on your location, the weather and the time of day. Assistance may not arrive until the next day. While

waiting, make yourself visible for helicopters and rescuers. Once activated, do NOT turn off your PLB unless instructed by Authorities.

In the case of an accidental activation, turn off the PLB and call the RCC on 1800 641 792 as soon as possible, or contact your local Police. PLBs come with a test function to confirm it will operate. Check the instructions for your PLB.

PLB Limitations

For an activation to be received, ensure you are in a clear open area and as high as possible to increase your visible area of sky for orbiting satellites. Steep, narrow gorges or overhanging foliage can affect performance.

Distress Beacons are a one-way device. When activated the flashing red light on your PLB indicates it is transmitting but does not confirm your activation has been received at the RCC and may provide false confidence if you are at the bottom of a steep, narrow gully or in a ravine.

PLB Hire

PLBs can be hired from a number of outlets, some GPS suppliers and Police Stations in some areas. Check the internet.

If you borrow or hire a PLB, make sure that the person who is registered with AMSA as the owner of the PLB is aware of your route and timetable as they will be contacted by the RCC when the PLB is activated.

More Information

Australian Maritime Safety Authority
Phone 1800 406 406
ausbeacon@amsa.gov.au
www.amsa.gov.au

Mobile Phones

Most of us own and regularly use a mobile phone. However, in the bush, range is often limited or non-existent. It also depends on whether you have a GSM or 3G phone, the particular handset, your choice of phone provider and the location of the nearest phone tower.

Line-of-sight Coverage of Populated Areas

Mobile phone carriers, Telstra, Optus, Vodafone, 3, etc provide coverage for very high percentages of the population. Unfortunately, most of the areas frequented by bushwalkers are not populated. At this time, Telstra has the largest coverage of all the phone carriers, especially in rural areas.

Bush coverage for mobile phones is generally line-of-sight to the nearest phone tower. Phone towers are generally located in prominent locations to provide maximum coverage. Normal GSM systems have a maximum line-of-sight distance limitation of approximately 35km, with 50km for 3G systems. Specially-equipped phone towers can double the distance limit. A car kit with an external antenna improves reception, but this is normally of little use when in the bush.

The general approach for mobile phone reception in the bush is if you think you might be in range, move to the top of a hill or a high ridge and try from there.

“Emergency Calls Only” Message on your Phone

At these times you may see a message on your phone “emergency calls only”. This indicates you are in range of a phone tower, not necessarily your provider, and can dial Triple Zero (000) if required.

Locked Phone

You can dial Triple Zero (000) from a locked phone. All GSM phones can also dial 112 and will connect to the local emergency call answer point within any GSM coverage area anywhere in the world. In Australia, you do not require a SIM card in a phone to call 112.

GPS-equipped Mobile Phones

Some mobile phones are now equipped with an internal GPS that will indicate your current location. The handsets often have maps, but these tend to be based on the road network, so may be of limited use in the bush or if injured. However, your position could be sent by voice or as an SMS. It is possible that some of these latest-generation phones could have an application loaded that will regularly send position updates.

Use of SMS for Emergencies

A Short Message Service (SMS) message may get through when you cannot communicate using voice. However, there may be some delay in transmission within areas of marginal coverage.

A limitation with SMS is that it only connects to the network of your mobile phone provider, unlike dialling Triple Zero (000) which will connect using the nearest tower, regardless of the phone carrier. Hence, your SMS coverage depends on your choice of provider.

Be aware that at this time there is no dedicated SMS number for emergencies. So you would need to SMS your relation/friend with whom you left your trip intentions and ask them to contact the emergency services for you. Remember you may need to wait in an area of SMS coverage for message in response.

If you do attempt to use SMS for an emergency your phone will confirm that your message has been received by your carrier but not necessarily by the recipient. It is

recommended that you turn on the Message Delivery function in your phone so you know that your message has been received and when. There is an extra charge per message for this service. Use of Message Delivery does not guarantee that the recipient has actually read and actioned your message request. For this, you will need a return SMS confirming that action is being taken.

If the SMS is not sent within a predetermined time interval due to being out of range, many handsets will stop attempting to send the message. Check your handset to ensure that the message has been sent; if not, try re-sending it from a higher location.

Battery Capacity

More power is used continuously scanning in the bush for connection to a base site. Only turn on your phone when you think you are likely to be in range. Bluetooth on your phone also consumes additional power, turn it off if not required when in the bush. See notes on batteries in a later section.

Advantages of Mobile Phones

- When within range you have two-way communications so you have confirmation that your message has been received
- Direct contact with the emergency services using Triple Zero when within range of any carrier
- Use of SMS with limited confirmation of timely message delivery
- Spare batteries are very small and easy to carry

Limitations of Mobile Phones

- It is advantageous if your mobile phone handset is optimised for rural coverage
- Limited or no coverage in the bush, away from populated areas
- Limited battery capacity (see section on batteries)
- Not able to directly SMS the emergency services
- Mobile phones are not particularly rugged and not waterproof

You can obtain more information from the following web sites www.telstra.com, www.optus.com.au, www.vodafone.com.au, www.virginmobile.com.au and www.three.com.au .

Mobile Phone Trackers

There are a number of specialist mobile phone personal trackers now on the market. They have an integral GPS and can be set up to automatically send SMS location reports when within range to pre-defined mobile phone numbers in near-real time.

Models include the *Globalsat Personal Tracker* and the *World Track*. They are designed to work with existing GSM phone networks throughout the world. The

Globalsat unit comes with an emergency button that initiates an SMS to three preset numbers and can also receive phone calls.

Trackers suffer the same limitations as mobile phones; namely, the lack of coverage in the bush and potential battery capacity limitations on long trips.

More information on phone trackers can be obtained by a Google search or from www.globalsat.com.tw or www.world-tracker.com.

UHF CB Radio

The UHF Citizens Band has 38 radio voice channels and two data-only channels potentially available for mobile and portable use. CB Radios are licence-free and can be purchased from a variety of electronics stores. Radios are small, cheap, low power (5W max), easy to use and provide short range line-of-sight communications. Being public channels there are often a number of other users on the channel and the language can at times be offensive.

CB radios operate in the UHF frequency band have two modes of operation; simplex and repeater.

Simplex Operation

Simplex uses a single frequency to communication directly between radios as shown in Figure 1. In the bush coverage is very much of line-of-sight, typically up to a few kilometres. They are ideal for communications between members of a party. The normal simplex calling channel is Ch 11. This channel is often monitored by CB enthusiasts and can be very busy. Channels 21 and 22 are data-only channels and must not be used for voice transmissions.

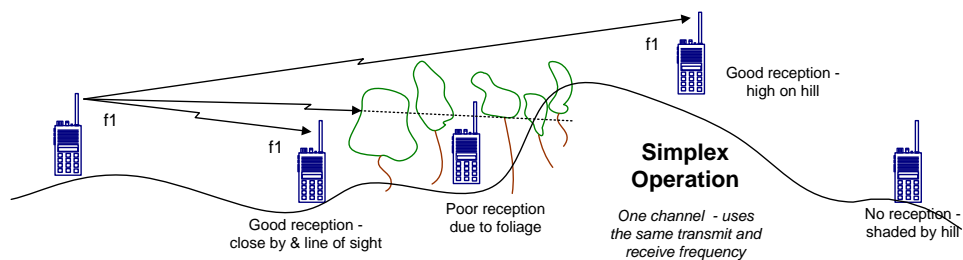


Figure 1

Repeater Operation

Repeaters have been established in various parts of Australia to provide improved coverage for mobile and portable CB users. They use one frequency to receive a message from the field and re-transmit (repeat) the message on a separate second frequency as shown in Figure 2. Channels 1-8 are designated CB repeater output channels. The corresponding repeater inputs are Channels 31-38.

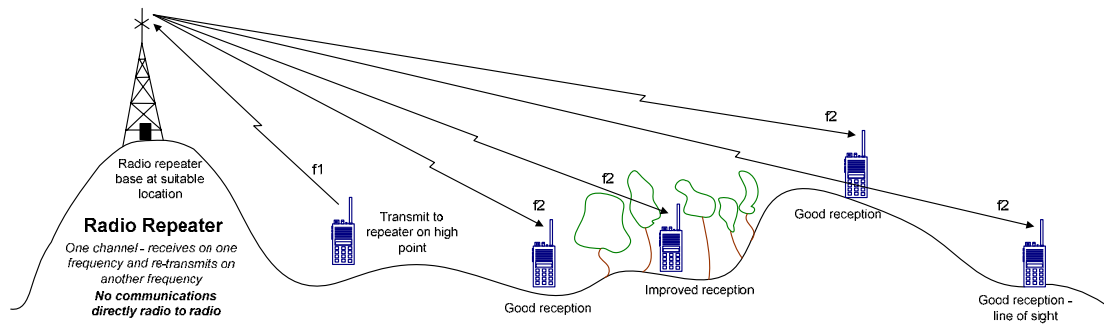


Figure 2

Repeater Channel 5 is the designated emergency channel that provides coverage in a number of areas but do not rely on it always being monitored.

To check if you are within range of a repeater, select a channel, push the PTT for two seconds and listen for a repeater tail and often the identifier for the site in Morse code or voice. If nothing is heard, try the next repeater channel.

Do not use repeater channels for simplex operation. Your radio should have a function to activate repeater operation. In more remote areas, some repeater channels are monitored by the locals in case of emergency.

Choice of Handheld CB Radios

There is a wide range of radio equipment available a reasonable cost. Some characteristics to look for in choosing a handheld radio include:

- Access to all 38 UHF voice channels with the capability to use repeater channels as required.
- Simple and intuitive to use.
- The use of AA batteries to provide greater capacity. Some radios come with rechargeable batteries. On a multi-day bushwalk, take spare batteries.
- A key lock function to prevent accidental channel changing when bumped or in your pocket.
- At least 1 watt power output to provide a reasonable balance between battery usage and coverage. Some radios allow switching to low power when required.
- The radio should be readily available from electronics stores and not be a one-off special.
- A stout wrist/safety strap. It is suggested you tie on your radio so you do not lose it.
- A minimum capability of at least 24 hours of receive-only operation.

Limitations

- Line-of-sight operation, especially when operating simplex.
- In an emergency, there is no guarantee that someone will be monitoring any CB channels.
- At times there is a large amount of chit-chat or inappropriate language that can be very annoying unless some form of selective calling is activated.
- CB radios tend to be larger and heavier than a mobile phone.

Do not rely on CB radio for communications in an emergency as it relies on someone monitoring the channel and being able to correctly pass on the message

Victorian Statenet Mobile Radio Network

The Victorian Statenet Mobile Radio (SMR) network is a large VHF high band analogue radio trunking network managed by Telstra for the Victorian Government. It provides widespread and reliable radio coverage to the remotest locations in Victoria. To provide 95% coverage of Victoria, it uses more than 100 base sites, 500 channels, four switch nodes and supports more than 17,000 terminals (mobile and handheld).

It is used by a number of Victorian Government departments and agencies, a number of emergency and essential services and some private users. DSE, Parks Victoria, Victoria Police and Ambulance Victoria use SMR in the country.

In very remote areas, handheld radio coverage can be limited to hills or along ridges. A number of schools use the system as part of their outdoor education programs for monitoring and safety of their groups in the bush. There is a monthly charge for access to the network.

Radios come with an emergency button that connects to the 24/7 Network Operations Centre.

Use of the radio/telephone interconnect allow calls into the telephone network. However, at the radio end, you can only listen or talk at one time, not both. There is an additional charge for these calls.

For more information complete a Google search using 'Telstra SMR state-wide'



Satellite-based Systems

There are a number of satellite-based communication systems that are accessible across Australia. The satellite systems include Inmarsat, Iridium, Thuraya, Globalstar, Argos and OptusMobileSat. The systems connect to a series of ground station gateways in various parts of the world for access to terrestrial phone systems. The satellite systems provide Australia-wide and world regional coverage, depending on the system.

Some systems such as Iridium and Globalstar use a constellation of Low Earth Orbiting (LEO) satellites (350-800km). Hence, there are times when there are no satellites within range. Iridium has a constellation of 66 satellites while Globalstar has 44. Argos satellites are in polar orbits.

Other satellite-based systems such as Inmarsat Thuraya, and Optus MobileSat use geostationary satellites (35,000km above the equator) that provide focussed coverage in specific parts of the world. As of 24 February 2009 Inmarsat has increased coverage for sat-phone services to include all of Australia, including the east coast. Due to their distance from Earth there is approximately a 0.5 second time delay while talking.

A number of organisations have put together phone and/or tracking solutions to meet the requirements of particular types of users.

Some terminal equipment is built to comply with national and international technical standards, while other equipment is designed specifically to connect to a particular satellite system.

There are Australian telecommunications carriers which offer a choice of satellite network solutions. For instance, Telstra offers access to Inmarsat and Iridium, Optus offers their own MobileSat system and Thuraya while Pivotel offers both Iridium and Globalstar.

Satellite phone and tracking equipment can be hired from a number of outlets. Check the internet for a range of potential suppliers and costs.

Sat Phones

The handsets tend to be larger, are more bulky, have a more prominent antenna and have a shorter battery life than terrestrial mobile phones. Some also have an integral GPS.

All phones offer SMS capability. This can be a cost effective way of staying in touch.

Not all satellite phones recognise Triple Zero (000) for contacting the emergency services. When selecting a satellite-based system check this out. Australian-based solution providers do allow direct connection to Triple Zero (000).

Sat phones have a high up-front handset cost and calls are significantly more expensive than terrestrial mobile phones, with some systems charging calls at international rates.

Advantages

- Reliable coverage all across Australia and off-shore.
- Can talk directly to any phone, including the emergency services.
- Voice, SMS and data capable.
- Some handsets have dual mode (satellite and GSM) if in range of the terrestrial network



Limitations

- Handsets tend to be more bulky than the normal mobile phone.
- Purchase or hire of a handset.
- They are expensive to operate even with an appropriate plan.
- Require a clear view of the sky and at least one satellite within the constellation to be within range for successful communications.
- Coverage is also affected by trees and, to some extent, by rain.
- For LEO systems, you may have to wait for up to 20 minutes for a satellite to come into view so that you can make a call or send an SMS.
- Will not operate inside a building unless dual mode.
- Battery capacity (see section on batteries)
- Some systems do not recognise the Australian national emergency numbers.
- Many GlobalStar satellites are experiencing an anomaly resulting in degraded performance. This is currently adversely affecting their two-way voice and data services. GlobalStar anticipate the issue will be resolved with the launch of a second-generation satellite constellation during the second half of 2009. For more detail check <http://www.globalstar.com/en/news/update.php>. This current limitation will impact all voice and data/tracking systems that are based on the GlobalStar system.

There are a number of web sites for information on Sat phones:
www.telstra.com.au/mobile/networks/satellite.cfm, www.vodafone.com.au,
www.optus.com.au, www.inmarsat.com.au, www.globalstar.com and
www.irdium.com.

Combined Satellite/GSM Phone with GPS

Some satellite phones are multi-functional. Some handsets even have a built-in camera and Bluetooth capability.

For example, Thuraya has small handsets that combine three technologies: satellite, tri-band GSM and GPS to provide seamless connectivity and location information of the caller.

Thuraya offers a free GPS locating service that can be used to send location SMSs from the handset to friends or to a map-equipped website for access by user authorised users.



You can obtain more information on the web from www.thuraya.com.

Personal Satellite Tracking Systems

Personal satellite tracking systems depend on the quality of the handheld terminal and a satellite being visible when you require a location/alert message to be sent.

There are a number of personal tracking satellite-based providers and they offer access to a number of different satellite systems. Not all systems provide Australia-wide coverage.

Generally:

- Most personal locators have an inbuilt GPS to provide accurate location information
- Personal locators can be tracked using the internet
- Location messages can be automatically sent using SMS to predetermined mobile phones
- Being satellite based, it does not have the coverage limitations of terrestrial mobile phones, but does have limitations when the visible sky is small
- Some trackers come with an emergency alert function that alerts the system provider or specific mobile phones of an emergency, but not the nature of the emergency
- Able to report on a regular basis depending on the plan selected

When considering a satellite-based tracking system, do your research. Consider your specific need, system performance, coverage and price when making your decision.

General Limitations

Satellite tracking systems have a number of limitations:

- Requires selection of a payment plan based on your specific requirements. Be aware that some systems are time-based or message usage-based.
- Messages can be delayed by up to 20 minutes depending on how long it takes for an LEO satellite to come within range.
- Some systems do not have full Australian coverage.
- Tracker systems do not have a homing signal for the responding emergency services, especially if the party has moved since the emergency message was sent.
- Any “emergency” message must be passed by the tracking provider to the country where the tracker was activated and from there to the appropriate rescue services. This process can also add considerable delay in initiating of an emergency services response.
- Anecdotal reports of a number of long-term trials in real field conditions suggest that location messages from some personal tracking systems are not always received at their nominated mobile phone.
- The terminal equipment is often designed to meet specific proprietary requirements and is not necessarily designed to internationally recognised standards to ensure coverage and reliability.
- Tracking systems are generally not recommended by the emergency services. Check with your local Police or rescue services.
- You need to consider what happens in an emergency if you have neglected to pay your monthly/annual usage fee.
- Battery capacity of these systems is limited and some require recharging of the internal batteries, others use replaceable AA batteries

Typical Personal Tracking Systems

SPOT Satellite Messenger

- Uses the Globalstar satellite system (refer above)
- Integrated GPS, is small and lightweight
- Requires line-of-sight to be received by a satellite
- Usage Functions
 - Alert 911. Will send the Alert message every 5 minutes until batteries flat or until manually cancelled. Pre programmed emergency contacts are contacted initially or if there is no response it is passed to 911. In Australia the Alert message is forwarded to the AMSA RCC
 - Ask for Help from friends. Will send a help message every five minutes for an hour, or until cancelled. This results in a pre-programmed store and forward email message to nominated friends.
 - Check in function can be manually initiated. Sends the message three times for redundancy.
 - Track Progress automatically – every 10 minutes for 24 hours while SPOT is on, contacts can view track on the net. Track Progress is an additional cost.
- The annual fee depends on required use.
- Uses lithium AA batteries, which should last for 14 days when auto-tracking.
- SPOT only transmits messages it does not receive acknowledgement from the satellite system that a message has been received.
- Water resistant, it floats and is shock resistant.
- Display spot locations using Google Maps.
- Can provide associated rescue insurance at an additional cost.



You can find out more about Spot at www.findmespot.net.au.

Solara Field Tracker

- Uses the Iridium LEO satellite system.
- Uses two-way data communication to ensure message are received.
- User and pre-programmed text messaging.
- Provides an Emergency Alert message function together with optional Solara 24/7 monitoring.
- Position reports can be manually activated or sent automatically at user-defined intervals.
- Waterproof and shock tolerant.
- Uses a web-based interface for position monitoring.
- Uses an internal rechargeable battery and comes with a solar panel.
- Monthly subscription with usage limits.



You can find out more about Solara at www.solaradata.com.

Sat Tracker Personnel Locator

- Uses the Inmarsat IsatM2M low cost communications.
- When activated, a message is sent every five minutes until acknowledged or cancelled.
- Integral GPS.
- Operates for 40 hours without recharge.
- Position reports can be manually activated or sent automatically at user-defined intervals.
- There is also an emergency alert/distress button.
- Messages can be sent to user defined SMS/email locations.
- Uses a web-based interface for position monitoring.



You can find out more about SatTracker at www.tc.com.au.

This document has only highlighted some of a potentially large number of tracking satellite and mobile phone systems.

Handset Batteries

These comments apply to all phone/personal tracker/radio batteries.

- The life of the handset battery depends on your choice of equipment and its intended use.
- Battery capacity is reduced in cold conditions, so keep your handset warm and choose batteries that are better in the cold.
- Consider the use of a common battery type for all your electronic devices in the bush. This will provide interchange ability and require only one type of spare.
- Different types of batteries of the same size (e.g. AA cells) have different capacities, both for single-use and rechargeable batteries
- Consider the use of single-use AA lithium batteries given their high power capacity/weight ratio and their good performance in cold conditions.

Note that PLBs have batteries with a design life of at least eight years and, once activated, are designed to operate for at least 24 hours.

Calling Triple Zero (000)

When you call Triple Zero (000) before being connected to an operator you now hear a short recorded message *'You have dialled emergency Triple Zero. Your call is being connected.'* This new feature is to reduce the number of non-genuine calls.

What information should you have ready when calling Triple Zero?

- The Telstra call answering point will ask: **Which service do you require? – Police, Fire, Ambulance** – if in doubt, ask for Police and they will contact the other services as required.
- Given you are likely to be calling from a mobile or satellite phone, you may be asked from which State or Territory you are calling and the nearest town. This ensures that your call is transferred to the most appropriate emergency service agency near your location.
- You will then be transferred to the **appropriate agency's communication centre** where they will:
 - ask your location, include nearby landmarks. You should provide your Lat/Long or AMG grid reference, if available.
 - inquire as to the nature of your emergency
 - confirm your contact phone number so that rescuers can call you back, if required
 - take your name and other relevant information, such as the number in your party, their physical condition, etc.
- Talk slowly and clearly and stay on the line until the emergency call-taker has all the information they require
- Ask for the name of the person at the Communication Centre, so that if you need to call back you can talk to the same person



The Communication Centre will then initiate a response, using skilled personnel often familiar with your location. You may be contacted by the responding rescue personnel for more information or to advise of their plan of action.

Be aware of your battery usage during this time as you may have to make or receive a number of phone calls. If battery capacity is low, arrange an agreed time for your next call and turn off your phone in between.

Check the Triple Zero (000) web site www.triplezero.gov.au for more information.

Emergency Call 106 National Relay Service

The National Relay Service provides three ways to contact emergency services for people with speech and hearing disabilities: by TTY, by ordinary phone, and by internet relay.

These services, using the **106** free national numbers for people who:

- cannot hear, but can speak,
- can hear, but cannot speak,
- cannot hear and cannot use their voice, or
- are hard to understand on the phone.

In the bush, people with these disabilities should attempt to access the 106 service using the most appropriate available communication system. The 106 service cannot be used for SMS messaging.

More information about the 106 service is available from www.relayservice.com.au.

Requesting assistance using an SMS Message

Carefully consider the information you send by SMS to a relation/friend requesting them to contact the emergency services. It is preferable that the person making the call to the emergency services has details of your trip intentions.

It is suggested you include the following in your message:

- the nature of your emergency
- your location, include a nearby landmark
- your Lat/Long or AMG grid reference
- your name and phone number so that rescuers can attempt to contact you directly
- other relevant information e.g. weather, number and physical condition of party

As an example: *Joe has broken lower leg, Audax Ridge, Mt Bogong 529474E 5935577S – Bill Smith 0408 111 222 - party of 4, now camped, strong wind and low cloud*

Other Systems

This document has not addressed other systems such as HF Radio as used in the Australian outback or in NZ or HF CB as these systems are not likely to be in common use by bushwalkers in south-east Australia.

The Argos satellite-based system (www.argos-system.org) has not been considered, at this time as it is primarily used for environment monitoring, wildlife & resource tracking and the tracking adventurers in the most extreme environments such as the Arctic and Antarctic.

Systems Summary

Summary of communications systems with emphasis on their use in the bush and obtaining external assistance from the emergency services

	PLB	Mobile Phone	GSM Trackers	UHF CB Radio	SMR	Sat Phone	Sat Tracker
Coverage	Whole world	Generally populated areas of Australia	generally populated areas	Line-of-sight to nearby radio or CB repeater base	Almost all of Victoria	Satellite system dependent, most of the world	LEO systems – most of the time – most of the world GeoStat Sat-regional footprint including Australia
Range	N/A	Nearest tower GSM 35km max 3G 50km max	Nearest tower GSM 35km max 3G 50km max	1-15km, power and terrain dependent	VHF radio – handset 3-30km terrain and base site dependant	Satellite system dependent, most of the world	Satellite system dependent - most of the world
GPS included	Preferred	Optional	Integral	Not normally	No	Optional	Integral
Modes	Emergency only, PLB registered ID and location	Voice, SMS	SMS, some also have voice, many have Alert function	Voice only	Voice	Voice/SMS	SMS
Communications type	PLB to satellite only	Voice/SMS/voice mail/voice to text SMS	SMS with location info	Two-way voice only	Voice analogue trunking system	Two-way voice/SMS	Depends on system, - some use one-way multiple message broadcasts - others have messaging with confirmation
Battery Life	>24hrs once activated	2-4 days depends on phone, on-time and use	2-x days depends on reporting settings	2 days, depends on choice of radio, on-time and usage	1 day, depends on on-time and usage	1-2 days, depends on on-time	2-14 days depends on choice of tracker and reporting settings
Emergency services contact	Via AMSA RCC	Voice to Triple Zero (000), SMS via relation/friend	Only SMS via relation/friend	No	Via SMR network Operations Centre	Voice, may not directly connect to Triple Zero	No, via satellite tracking system provider

Systems Summary

Costs	Purchase of PLB with GPS No usage fees	Mobile phone either prepaid or on a plan	Monthly plan	Purchase of Handset No usage fee	Handset cost + monthly usage/access fee	Sat phone handset purchase (not cheap) + monthly fee + usage fee Can be rented for short periods	Tracker purchase + usage fee
Advantages	Emergency only, dedicated network, world wide, accurate location esp with GPS Responded to by emergency services world wide Can be hired	Contact directly with the emergency services Potential use of SMS	GPS location SMSs to pre-defined mobiles	Line-of-sight communications within a group Possible access to repeaters	Generally good Victorian coverage Access to emergency services via NOC	World wide coverage Voice and SMS	Integrated GPS Automatic and manual tracking operation Some have messaging confirmation Emergency alert button
Limitations	Needs visible sky to be received by satellite Last resort one-way emergency contact	Limited coverage in the bush	SMS only Service provider coverage limited, especially in the bush	No access to emergency services Public access channels Generally line-of-sight, limited range Not professional monitored	Limited coverage in steep gullies Cost of access	Cost of handset and access More bulky, heavier than mobile phone Needs visible sky and satellite within range Battery capacity	Cost of tracker and access Not direct access to emergency services Needs visible sky and satellite within range No recommended by the emergency services

Assistance in the reviewing of this paper was provided by Frank Zgoznic, Tony Bedingfield, Mark Whybro, Andrew Boon and John Shenstone.

Rik Head
January 2009