

Text by Pete Mesley

One of the things close to everyone's thoughts is diver safety. We spend good money on quality dive gear and prudently have it frequently serviced and maintained, as this equipment will be sustaining our lives while underwater. But what about when we are on the surface? Just how many of us really do think about getting lost at sea? We assume that the dive boat will be there when we surface but do not really think much about the consequences if it is not.

Here's just a small story to put things into perspective:

I was heading a trip to New Zealand's Kermadec Islands, which is an arc of subtropical islands some 800 to 1,000km northeast of New Zealand's North Island. It is one of the world's largest marine reserves, spanning over 20 thousand square miles. It

is so remote that if someone had a medical emergency (e.g. DCI), two rescue helicopters would have to be despatched from Auckland. It would take them to the limits of their fuel reserves to make it to a barren rock, known as L'Esperance Rock. This rock—which lies about halfway to Raoul Island, the largest of the

Kermadec Islands—was stocked with aviation fuel by the New Zealand Navy for such emergencies. But there was only enough fuel for one emergency. So, when you think of remote diving, this place is first on the list!

We were diving a small island called Nugent Rock. A small group of divers in our group swam

quite close to the point where they got sucked around the corner by a swift current. Luckily, the divers had no decompression obligations, and after a short time, they surfaced.

Ocean conditions was about two to three metres of swell, and the divers were now downwind of the safety tender. The surface

support boat was, however, waiting for the divers in an alcove where they had planned to surface. While the divers deployed their surface marker buoys (SMBs) once at the surface, they were out of sight, as they drifted farther and farther away from the surface support vessel.

One of the guys then deployed

his Nautilus Lifeline (part of the trip mandate was to have one). Meanwhile, on the mothership (which was about 500m away), the captain heard a crackling and muffled, garbled transmission. Not being able to make anything out of the message, the captain notified the surface support vessel, which found and retrieved the

Personal Safety at Sea

Communicating with the Dive Boat

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drifting group of divers.

Everyone made it back in one piece. The lesson here was without the device, they would not have been able to make any contact with the vessel. Even though no one was able to make out one word of the message, an alert was made nonetheless.

This event got me thinking. I have a couple of these devices myself, and I decided to do some tests. The concept was really good but may not have been as effective as intended in real life situations, as the above example showed. If you are bobbing about at the surface in rough seas, equipped with a 1 watt VHF radio with a 6 to 8cm antenna, its range is going to be short distance—and certainly much less than advertised. I wondered what would constitute a more effective and safer system.

A three-tiered safety system

I believe in a three-tiered safety system, comprising the ability to communicate with your dive vessel, knowing your posi-

tion and, when everything else fails, activating an EPIRB (Emergency Position Indicating Radio Beacon).

1. Communication with the dive vessel

Support vessels and the mothership are going to be the nearest vessels to you, so the ability to immediately establish contact with them when problems arise is paramount. Bear in mind that when you are at the surface—that is, low down—in a large ocean, your options with a small antenna are limited, so having the strongest handheld VHF radio possible is the better option. The ability to contact the vessel on any channel is also important.

2. You also need to know your position, so the support team can easily locate you.

Ok, so you have raised the alarm, informed the support vessel or mothership that you are lost. If you relay your exact GPS position, the support boat can come and pick you straight up. Having a VHF radio with GPS location is a massive advantage. In either case, deploying a

brightly coloured SMB will greatly facilitate being spotted by the surface support, as they go downwind or down-current to search for you. There are also extendable flags you can take with you to increase the height of your marker. But realistically, you need to know your position.

If it is difficult to communicate with the vessel, the next option is using Digital Selective Calling (DSC). DSC is a standard for sending pre-defined digital messages and a core part of the Global Maritime Distress Safety System (GMDSS). DSC is basically a paging system that is used to automate distress alerts sent over non-satellite VHF, MF and HF marine radio systems.

The DSC system's digital processing techniques, combined with the relatively narrow receiver bandwidths used, makes DSC signals more resistant to noise and fading, which provides a better range compared with radiotelephone transmissions. Unfortunately, DSC remains one of the GMDSS' least understood sub-systems. This lack of understanding

is reflected in the very high rate of false DSC alarms.

In a nutshell, this system is confused by many as being an EPIRB, which it obviously is not. EPIRBs signal maritime distress and can both detect and locate distressed boats, aircraft and people.

When DSC is activated, all VHF radios within range will be alerted and sent your GPS position. But this is only effective insofar as people are aware of this feature. If your dive vessel has this feature on their VHF and they monitor the radio all the time, this would be a great feature.

3. Activate EPIRB!

The last ditch attempt is to activate your PLB (Personal Locator Beacon).

PLBs work in exactly the same way as EPIRBs, by sending a coded message on the 406 MHz distress frequency, which is relayed via the Cospas-Sarsat global satellite system.

However, there are a number of differences between them. PLBs are designed to be carried on a person, so they are much smaller. Some, such as the "Fast

Find," are not much larger than the size of a mobile phone. PLBs are designed to be used anywhere in the world, both at sea and on land. Some do not float but may come with an additional floatation sleeve, in which they should be carried.

Once activated, PLBs transmit for a minimum of 24 hours, whereas an EPIRB will have a battery life of minimum 48 hours. The other difference is that an EPIRB is registered to a vessel, whereas a PLB is registered to a person. This means that if you are crewing a yacht and you switch to a new yacht, the PLB is still correctly registered; however, if you have an EPIRB and buy a new yacht, you will need to re-register it when installing it in your new boat.

What happens when you activate a PLB or EPIRB?

When I bought my RescueME PLB, one of my first actions was to call the Rescue Response Centre in Wellington (New Zealand) to find out exactly what their protocol was—in case you activated it, for instance. Every country has such a



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The Iridium Extreme lets one send an SMS text message, at set time intervals, with exact location coordinates to anyone, from anywhere on the planet.



centre, and I would strongly recommend you contact them if you purchase a PLB. It will really give you peace of mind.

You have to register and get an MMSI (Maritime Mobile Service Identity) number, which is a nine-digit number used by maritime DSC, automatic identification systems (AIS) and certain other equipment to uniquely identify the sender.

When you activate your PLB, an alarm goes off at the Rescue Response Centre with which you are registered. Now you may ask, what is a Rescue Response Centre located (in my case) in

New Zealand able to do if I am diving Bikini Atoll in the Marshall Islands and get lost at sea all the way over there?

The first step the Rescue Response Centre takes is to get in contact with your immediate next of kin, which you have listed on the form you have submitted. This is also why leaving behind all the details of where you are going, the name of the dive vessel with which you are diving, satellite phone numbers, call signs, etc, is important.

The Rescue Response Centre will then attempt to contact the vessel. If successful, they will pass on your latitude and longitude, so you can be located and picked up. If they are unable to communicate with the dive vessel, the next step is to alert the local national rescue services.

This is a rather roundabout procedure, but at least someone, somewhere, will be aware of your exact location. Bobbing around in the ocean for hours on end is not the best thing to do, so early communication with your dive boat is key to survival.

The ultimate rescue tool

All of this really got me thinking. What would be the "ultimate" tool to initiate a rescue if you are lost at sea?

It has got to be the best possible way to contact your dive vessel with which you are diving. They are the ones looking for you and the closest to you.

One immediate idea is to have a waterproof housing rated for the depths you are diving. In that housing, you would carry a 6-watt VHF radio with DSC function and GPS position data. I would also carry a registered PLB. This is the combo I would use diving all over the world at this point.

The more I thought about this, another idea came into mind. Would it be possible to take a satellite phone in the waterproof housing? I did a bit more digging. The satellite phones you can get these days are really clever. Most of them are IP65- and 66-rated, which means that they can stand

being submerged underwater up to 1.5m for long periods of time. Once you deploy them at the surface, they will still function even when wet. They also have a very clever emergency button, which allows you to rapidly make a call to a recipient, send an alert text message or email to one or more recipients.

The Iridium Extreme even allows you to send an SMS text message with your exact location coordinates to anyone, from anywhere on the surface of the planet at set time intervals. In this case, you would not only have a phone with which you can call anyone, anywhere, but also your GPS location displayed onscreen, and a feature that sends a text or email of your location at one-minute intervals.

All you would need to do is obtain the vessel's satellite phone number or email and have it stored in the phone book beforehand—assuming the boat has a satellite phone, which they really should. In any case, it is always good practice to also save the contact details of related local services, so that they can be alerted if necessary.

Food for thought

The importance of having such safety devices are not restricted to those who venture out to remote diving locations. With a growing number of rebreather divers and extended-range diving going on, using scooters and spending longer times in the water, covering a lot of large areas, it has gotten much easier

to find oneself in a lot of trouble. I would strongly recommend carrying a means of raising alert, if you are ever going to be swimming, diving or scooting in places where the dive vessel cannot maintain linear visual contact with you or see an SMB you deploy.

If you are indeed diving in challenging or remote locations, a small and functional device that could possibly save your life is really worth the investment. ■

Pete Mesley owns and operates Lust4Rust and Shock&Awe Diving Excursions. He frequently dives in remote locations globally, diving some of the best wreck and big animal encounters. For more info, contact Pete at pete@lust4rust.co or visit his site at: Lust4Rust.co.



Housing with 6-watt VHF radio (with DSC function and GPS data) and PLB

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Nautilus lifeline

The Nautilus Marine Rescue GPS is less than half the size of its original radio and is simple to use. Simply undo the latch and open, turn on, remove the

antenna retainer, and press the red button. Your GPS position accurate to 1.5 metres and a man-overboard distress message will be broadcast to all AIS equipped ships within range—up to 34 miles, according to Nautilus—as well as a special DSC message to the marine radio on your own vessel. No MMSI, licences or registration required. The Nautilus GPS is depth-rated to 130m (425ft) with dive cap closed, and splash-proof with dive cap open. It should be noted that this second-generation Nautilus device works in a profoundly different way than Nautilus' original radio, which is still on sale as a refurbished unit, as long as stocks lasts. The original Nautilus lifeline was also a two-way radio, which required a radio license in various regions as described elsewhere in this feature. **Watch video**

PLBs

Personal Locator Beacons (PLB) alerts search-and-rescue services by transmitting a coded message (406 MHz) via the COSPAS-SARSAT global satellite system. PLBs are subscription-free devices but need to be registered to a person. However, most PLBs are not designed to be dived with, and only a few manufacturers offer an underwater housing or have water/pressure-resistant PLBs.



Seareq Enos

The Enos system is self-contained and self-dependent and does not depend on the aid of other rescue institutions and services. It consists of two units: beacons, shown on the right, which are carried by the divers; and a receiver on the boat, which enables the support crew to precisely locate the divers at any given time. After surfacing, divers simply activate their ENOS-Beacon, which sends an alert and the divers' precise GPS position to the dive boat. The position of the beacon, its distance and direction towards the receiver, are shown on the display of the receiver. **Seareq.de**

Dye markers

Ampoules with dye can colour the water brightly green or yellow-green, significantly increasing the chances of being spotted by a rescue boat or plane. The shown ampoule with fluorescein is marketed by Divesoft. It is waterproof and can be permanently kept in the pocket of a BCD or drysuit. Each package is tested to a pressure corresponding to a depth of 100m. **Divesoft.cz**



Bright colours and reflectors

Fluorescent green (green-yellow) and fluorescent orange are the most visible colors. These as well as bright yellow, green and orange, will increase your visibility and safety, making it easier to become spotted on the surface, and to some degree, underwater too. The use of (SOLAS) reflectors also increases visibility, and some manufacturers already have reflector stripes incorporated in BCDs, diving hoods or dive suits. The suit shown is **Waterproof's R7 Rescue suit**, which, granted, has been designed for search-and-rescue workers, but what is the deal with all the black suits we see around these days, anyway?



Surface Marker Buoys

Having a smaller buoy deployed at all times was, once upon a time, a standard practice, which has since largely been abandoned. The advantage was both showing boaters where you were diving, but also enabled a dive crew to keep an eye on your whereabouts from at the surface. The limitation is that nobody really fancies dragging a buoy around, and it does not stick out of the surface enough to be visible over a long distance. The other options are bigger marker bouys, or "delayed SMBs," which are inflated at depth and sent to the surface prior to ascent as a signal to surface crew and/or to aid divers' ascent and safety, or decompression stops. These bouys have more buoyancy, which can support some weight, and they stand taller above the surface. The buoy shown is from **Surface Marker**. It has SOLAS reflective tape for increased night and daytime visibility as well as a holder for light sticks. Some models even have a small safety kit inside with, for example, a whistle, light stick or signaling mirror.



Glow sticks

Dive glow sticks are small and cheap, and are easily attached to a tank valve or BCD. The light does go some way to help locate a diver on the surface or underwater in the dark but only a close range. Opt for battery powered glow sticks, not the chemical disposable ones, as they are more environmentally friendly. The model shown is from **XScuba.com**



Signalling mirror

A stainless steel mirror used to reflect the sunlight can attract the attention of persons on a boat, shore, airplane or helicopter, even over several kilometres. Instructions for how to properly aim the mirror is printed on the back. **Divesoft.cz**

Rescue Streamer

Basically, it is a long and wide, bright orange, high-density, polyethylene foil that is unfolded from a small pouch. It floats on the surface and can be seen by aircraft from a long distance. Some versions have SOLAS-grade reflectors and are equipped with chemical lights, making them also useful at night. **Seerescuestreamer.com**

