



*Wars mostly take lives, but just occasionally they prompt the development of new ways to give them back. Reports of Second World War airmen and sailors at sea awaiting rescue with little more than the faint hope that a passing ship would find them was the catalyst that inspired one company, Signature Industries, to come up with a new way of saving lives by making the search part of search and rescue more effective.*

London-based Signature Industries is a world-leading supplier of personal locator beacons (PLBs) and its SARBE trademark is widely considered a generic term for these devices, which are now found on ships, aircraft and submarines in the armed forces of over 40 countries. It's quite a quantum leap for a company with its roots in living-room radiograms and wireless sets.

# SARBE Calling International Rescue

## FIRST TRANSMISSIONS

Formed in 1993 following a management buy out, Signature Industries developed from a company called Burndept, which was founded in 1919 and manufactured radios in Blackheath, London. From 1921 to 1931, the firm produced some of the finest quality early radios under the brand name Ethophone and was the first to install domestic radio receivers into cars, aeroplanes and yachts. By the time war broke out in 1939, the company had moved to Erith. Although its factory was bombed during the Blitz, Burndept Electronics survived, just, but most of its records were lost so the exact moment it began developing search and rescue beacon equipment is unknown.

Putting its knowledge and experience of radio to good use, Burndept examined the obstacles to effective search and rescue at the time and concluded that too much relied on luck: ships and aircraft often only had a vague idea about where they should be searching, the chances of seeing a man in the water at distance even in a calm sea were small, and if that man was also unconscious he could do nothing to attract attention. The company looked at the feasibility of supplying airmen with a personal device that when activated would transmit a low-power, defined radio signal on an emergency frequency. Searching ships and aircraft fitted with twin antennas and a receiver could pick up the signal, use it to get a direction bearing on its origin and determine the approximate area in which to concentrate a visual search.

Early models of Burndept's SARBE beacon entered service in the 1940s and although crude by modern standards, they were a considerable improvement on what had gone before. Their immediate success quickly led to the creation of a SARBE Survivors Club and with it a record of the many people whose lives have been saved by their SARBE during wars, conflicts and in peacetime.

## MILITARY APPROVAL

Initially, PLBs were just one of several markets for Burndept, which continued to develop its core radio products to the point that by the early 1960s, the UK emergency services relied almost entirely on Burndept radios. The Home Office believed them to be the best radios available and used them almost exclusively in the emergency services for over 20 years.

The Air Ministry of the time was also quick to see the benefits that the company's beacons offered and in the 1950s, UK airmen were amongst the first to carry these life-saving devices. The close relationship, now with the Ministry of Defence, has continued for over 50 years and today every Royal Air Force, Royal Navy and Army airman carries a SARBE. PLBs are also packed in the survival packs of life rafts on RN and RFA ships.

For military personnel, the latest generation SARBE is the software defined G2R, which provides true global reach and recovery. This programmable radio features peacetime and combat modes. As with previous PLBs, G2R can be configured to operate with any fast jet ejection seat and incorporates a specially designed system that automatically activates the beacon and deploys the antenna to the optimum position. This ensures that even if aircrew are unconscious or injured, the SARBE transmission will be initiated immediately as no human intervention is required; reducing the time it takes to initiate a search of the area and thereby improving the chances of a successful rescue.



## MOVING WITH THE TIMES

Signature Industries is alive to the challenges of the marketplace and aware that innovation is key to its ongoing success, identifying new opportunities and supplying robust units that are guaranteed to do the job and flexible enough to be integrated with other life-saving equipment.

Following the disaster that befell the Russian submarine Kursk, for example, the Royal Navy asked the company to develop a new unit specifically for submarine crews – the result was the SARBE 10 Submarine Personal Locator Beacon (SPLB). The design reflects the unique needs of submariners and can be activated before the escape procedure starts, so that it is transmitting as survivors reach the surface. Attached to the escape and survival suit, it is built to withstand water pressures down to a depth of 350 metres and is buoyant, allowing the survivor to deploy it on reaching the surface.

*‘Improving the chances of a successful rescue’*

## LOOKING OVER THE HORIZON

The contribution PLBs have made to search and rescue at sea and on land since the Second World War has been immense. Very early models used valves but the introduction of transistors transformed their efficiency by reducing weight whilst increasing range and the length of time they could transmit for. Later, they began to incorporate a two-way radiotelephone that permitted verbal communication when in range and by the early 1960s could transmit for up to 48 hours with a minimum beacon range of 60 nautical miles to an aircraft flying at 10,000 feet.

Enhanced searches became possible in the 1970s, with the launch of low earth orbit satellites that could monitor beacon transmissions and define the position of the PLB to within 30 kilometres anywhere in the world. But they still took time: it needed several satellite passes to get a fix, and the technology did not permit the identification of who needed rescuing.

Significant progress was made in the 1990s, when a more powerful frequency of 406MHz was introduced to transmit alongside the existing 121.5MHz and 243MHz local signals. This provided an almost instantaneous detection of an active beacon via the constellation of COSPAS-SARSAT satellites across the majority of the earth’s surface. 406MHz also gave beacons the ability to transmit important information such as who was in trouble, the country of origin or the vessel identity, as all beacons could now be registered to their owners.

## CHALLENGES AHEAD

New challenges lie ahead that both PLB manufacturers and users must respond to. Key amongst these is the decision to abandon satellite monitoring of the 121.5MHz and 243MHz frequencies from 2009, and move exclusively to the enhanced capabilities of 406MHz. This is a change that all armed forces need to understand. Some, like the Royal Navy, have already started to consider the practical implications of this, guided by Signature Industries and its experienced team of development engineers, which is currently working on the next generation of PLBs.

*‘Ships and aircraft often only had a vague idea about where they should be searching’*

Another significant change will come in the next few years when the Galileo GNSS network of satellites is launched and becomes operational. This European equivalent of the US GPS system is set to begin satellite launches in 2007 and is likely to add the facility for a confirmation message to be relayed back to the active beacon, so those awaiting rescue will know immediately that their signal has been received and that help is at hand; something the present satellite structure can’t do. It will add an additional degree of confidence to anyone in distress with a PLB.

Half a century after the first PLB started saving lives, there must be many people alive today who might not be, had Signature Industries’ forerunner Burndep Electronics chosen to focus on car radios instead of tackling the rather more difficult but far more rewarding task of helping to save lives.