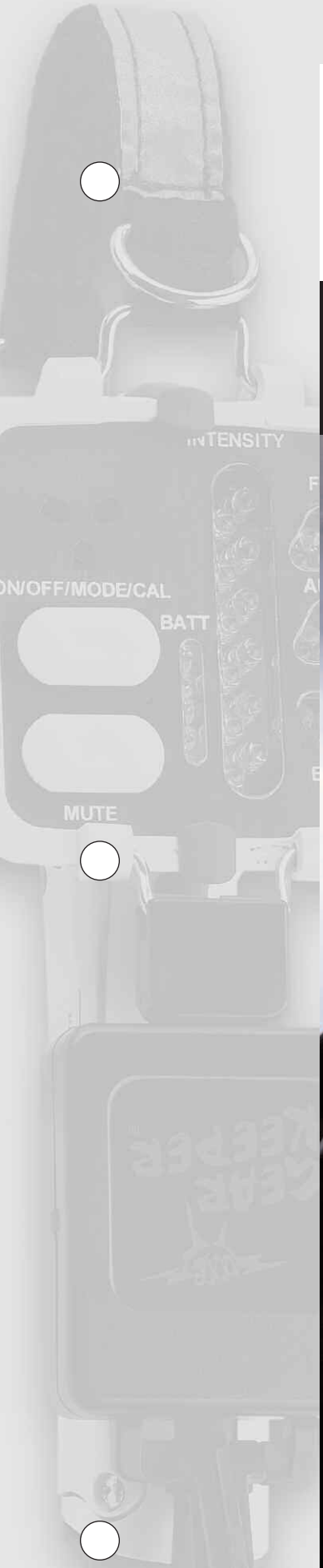
PRODUCT GUIDE

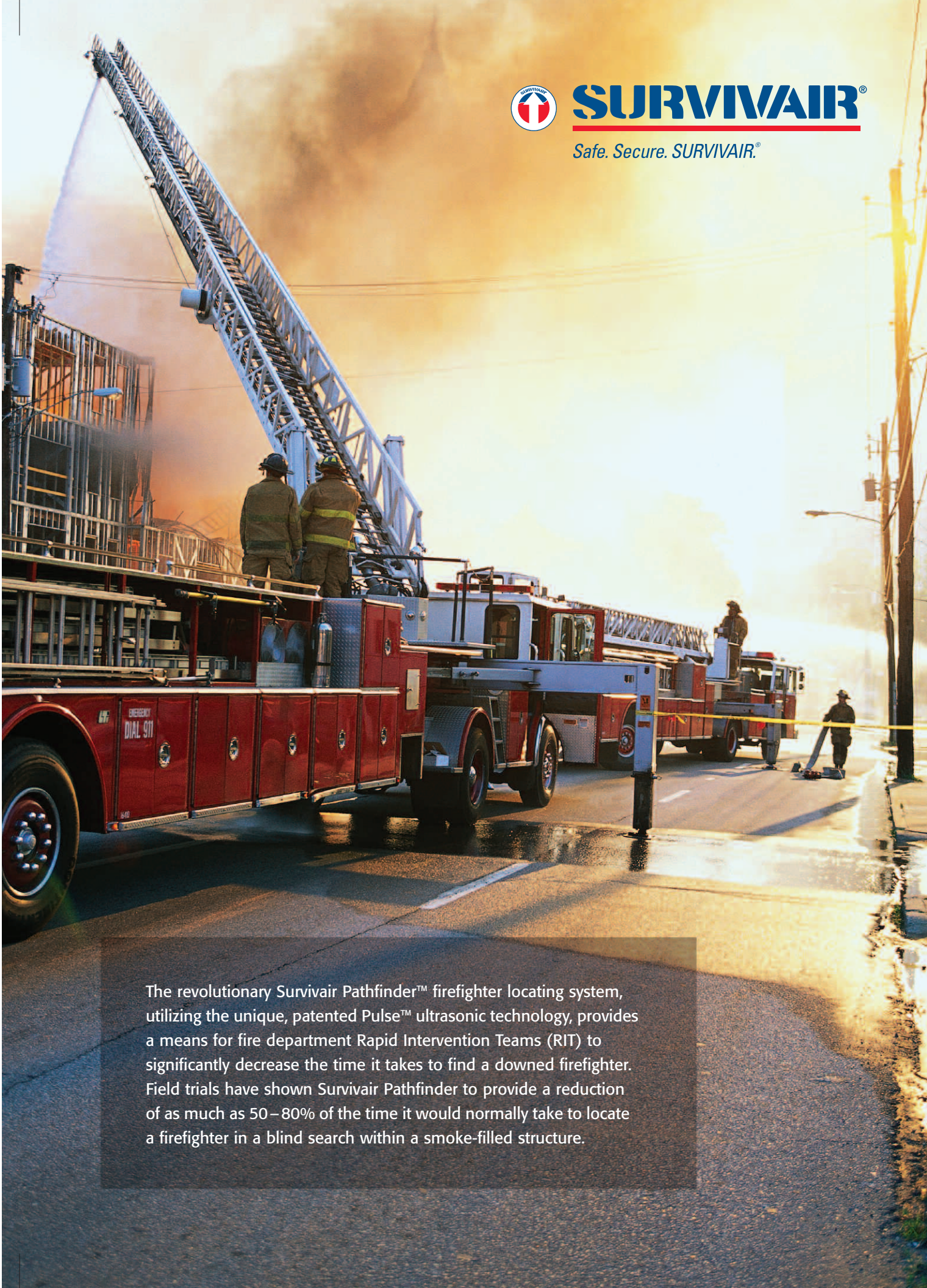
SURVIVAIR®

Safe. Secure. SURVIVAIR.®

Survivair Pathfinder™

Firefighter Locating System





The revolutionary Survivair Pathfinder™ firefighter locating system, utilizing the unique, patented Pulse™ ultrasonic technology, provides a means for fire department Rapid Intervention Teams (RIT) to significantly decrease the time it takes to find a downed firefighter. Field trials have shown Survivair Pathfinder to provide a reduction of as much as 50–80% of the time it would normally take to locate a firefighter in a blind search within a smoke-filled structure.

Disaster!

Background

In 1999, six firefighters from Worcester, Massachusetts, tragically died in a fire in a cold storage warehouse. This incident focused national attention upon the problems associated with entry into and escape from buildings with multiple floors and rooms, especially when firefighters have to protect themselves from high temperatures by crawling on their hands and knees in limited or no visibility conditions caused by dense smoke.

The original lost team, plus two of the rescue teams, perished.

If a firefighter becomes disabled, lost, or disoriented, and a Rapid Intervention Team is dispatched to locate and rescue him or her, search times can often vary, sometimes exceeding the duration of the firefighter's air supply. In the Worcester fire, four separate 2-person teams of firefighters were sent to locate the first pair, and all four teams became lost, with only two of the rescue teams able to find their way back out of the building. The original lost team, plus two of the rescue teams, perished. All three teams had PASS devices which were sounding.

Could Existing Technology Have Helped?

Personal Alert Safety System (PASS) device: PASS devices — which sound a loud alarm when the firefighter is motionless for approximately 20 seconds — proliferate throughout the fire service and are very effective for locating the general area of a downed firefighter. They are an important tool, but now with newly developed technology, they do not have to be the complete solution. Because a person's hearing is not very directional, it may be difficult to determine which direction the PASS device sound is coming from, especially when multiple reflections of sound occur in a room. PASS devices are good for notifying others that a problem with a firefighter exists and are very useful as kind of a "coarse adjustment," but they do not necessarily provide rescuers with the specific path to a downed firefighter.

Thermal Imaging Cameras (TICs): TICs can "see" through smoke, but high heat environments, as they had in the Worcester fire, can disable a TIC through thermal overload. Additionally, TICs require a comprehensive and time-consuming search in every room and behind every obstacle where the downed firefighter might be located. The camera operator can easily become disoriented as well in unfamiliar surroundings and may be transformed from a rescuer to a victim.

Pulse Technology

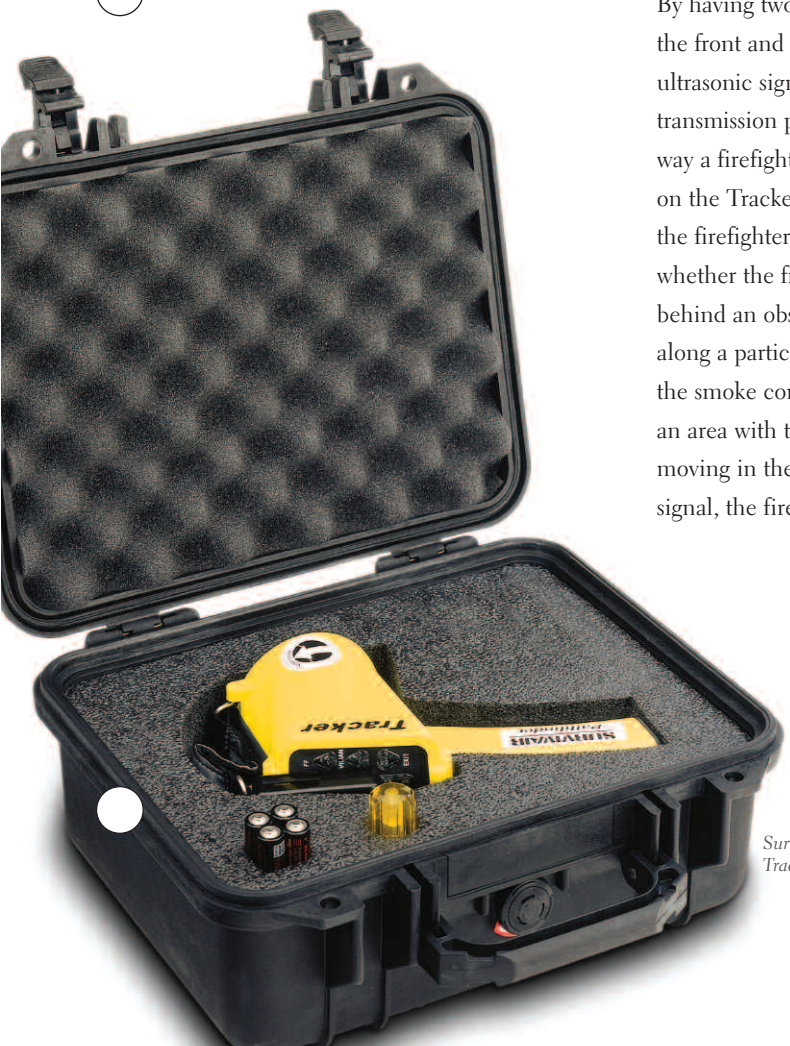
The Worcester tragedy clearly demonstrated that an effective system is needed to assist Rapid Intervention Teams in quickly locating a downed firefighter and enabling them to navigate back to the door through which they entered. Survivair, in conjunction with Summit Safety Inc., has developed and patented products which address that need through an entirely new approach called Pulse technology. The Pulse (which stands for personnel ultrasonic locating safety equipment) technology utilizes ultrasound — high-frequency sound waves similar to sonar. Ultrasound is unique in its ability to determine the shortest path to the firefighter or exit.

The Survivair Pathfinder™

The Answer: Survivair Pathfinder™

The Survivair Pathfinder, utilizing Pulse ultrasound technology, consists of an omni-directional transmitter (the Beacon) and a narrowly focused receiver (the Tracker). On a Survivair Panther,® there are two Beacons built into the SCBA — one attached to the COMPASS™ integrated PASS device on the user's front, and one attached to the back side of the backpack (either with or without an activated DoublePASS™ remote alarm module for COMPASS). The Beacon is the target sensed by the Tracker which indicates the direction and location of the downed firefighter wearing the Panther SCBA. If the firefighter is motionless and the Survivair COMPASS goes into alarm mode, the Panther Beacons are activated (they can also be manually activated).

By having two Beacons — one on the front and one on the back — an ultrasonic signal will have a clear transmission path, no matter which way a firefighter has fallen. Readouts on the Tracker show the strength of the firefighter's signal, indicating whether the firefighter is near or far, behind an obstruction, or accessible along a particular path, regardless of the smoke concentration. By scanning an area with the Tracker and then by moving in the direction of the strongest signal, the firefighter can be located.



Survivair® Tracker

GPS vs. RF vs. Ultrasound

Because the Global Positioning System (GPS) uses 1.5 GHz high-frequency satellite-based radio waves, it will not penetrate the non-metallic materials used in both the building itself and in the contents of the building, such as concrete, plaster, and paper. GPS will not work about one foot into a building. Lower frequency GPS is not a solution, because while better building penetration would occur, a lower frequency means a longer wavelength, and a resulting loss of accuracy.

This is also why radio frequency (RF) devices are problematic for rescue. Radio waves slow down going through building materials and do not penetrate metals, resulting in a loss of accuracy. This loss of accuracy can lead to "blind alleys" in the path to the victim. A searcher could be separated from the fallen firefighter by a physically impenetrable wall, ceiling, or floor, and could lead to a situation similar to the Worcester incident in which the rescuer needs to be rescued.

Because ultrasound signals are reflected by walls, the path to a disabled firefighter who is located around a corner or is

Solution

behind an obstacle, such as furniture, can be determined. Rescue personnel can avoid being led down blind alleys and wasting precious time, as they may be with RF. Walls with a high metal content are also not a problem for ultrasound. As long as even a small opening exists around an entryway, an ultrasonic signal from a Beacon can be received by the Tracker.

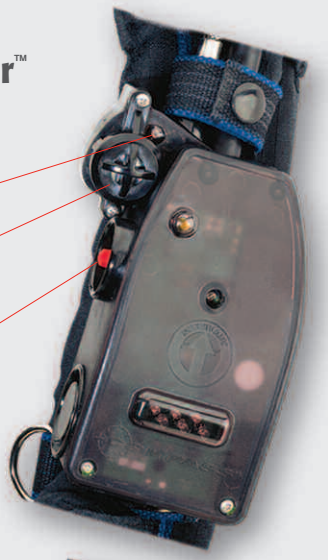
By scanning an area with the Tracker and then by moving in the direction of the strongest signal, the firefighter can be located.

Future Products

Soon Survivair will be introducing Auxiliary Beacons and Exit Beacons, incorporating different frequencies than the firefighter Beacons mounted on the SCBA. The Auxiliary Beacons can be placed at multiple locations during structural entry, enabling the team to be able to follow a "bread crumb" trail back out, utilizing the "Auxiliary" mode on the Tracker. The Exit Beacons can be placed at openings to the building, allowing the team immediately to locate close-by, but otherwise unknown, building exits, using the "Exit" mode on the Tracker, rather than following the possibly longer path used for entry back out again.

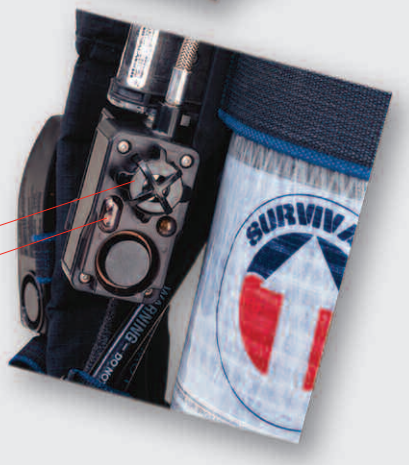
Survivair Pathfinder™

Front-mounted Beacon



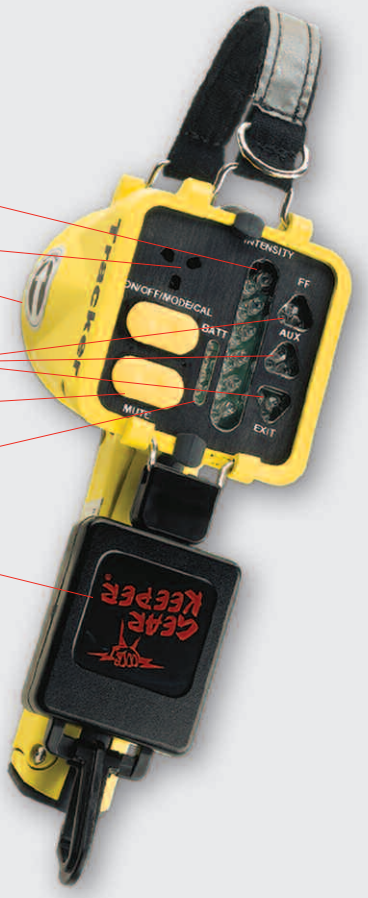
- LED indicator
- Ultrasonic transmitter
- Manual alarm and reset switch (part of COMPASS)

Back-mounted Beacon



- Ultrasonic transmitter
- LED indicator

Tracker



- LED bar graph for signal
- Audible annunciator
- Directional ultrasound receiver
- Mode switch and LEDs (Firefighter, Auxiliary, Exit)
- Mute switch
- LED bar graph for battery
- Gear Keeper® to keep attached to SCBA backpack

Lightweight: 14.5 oz (w/battery)

Survivair Pathfinder™ Features and Benefits

Feature	Benefit
Sensitive, accurate ultrasound technology provides data on the location of and path to a downed firefighter	Saves precious time by steering rescuers away from blind alleys and toward firefighter; may significantly reduce rescue time as much as 50–80% in a blind search in a smoke-filled structure
Beacon transmitter mounted on COMPASS in front of firefighter and on back of backpack	Allows clear transmission path no matter how the firefighter falls
Beacon activated by COMPASS	Allows automatic activation once firefighter is motionless
Beacon allows manual activation	Firefighter who is trapped but conscious may generate signal for rescue
Beacon incorporates flashing LED signals	Four initial flashes of red LED alert user that Survivair Pathfinder is activated; repeated flashes of green LED alerts user that Pathfinder is in sensing mode, looking for a lack-of-motion signal from COMPASS; repeated flashes of red LED when COMPASS is in full alarm mode indicate Survivair Pathfinder is transmitting an ultrasonic signal
Beacon incorporates low-battery signal	Audible alarm in Beacon indicating low battery gives user sufficient time to change battery

Beacon Specifications

Type	360° omni-directional ultrasound transmitter
Weight	9.68 oz. (includes front-mounted Beacon, back-mounted Beacon, and DoublePASS module)
Frequency	Approximately 40 KHz
Battery	9-volt alkaline
Battery Life	100+ hours in sensing mode; minimum of 1 hour in transmission mode

Tracker Specifications

Type	15° directional ultrasound receiver
Size	9" x 5" x 3.5"
Weight	14.5 oz. with batteries
Material	Ultem® thermoplastic
Displays	High-intensity LEDs
Batteries	Four AA alkaline
Battery Life	16–25 hours, depending on number of lighted LEDs

Survivair Pathfinder System Specifications

Range	Approximately 100-120 ft. line-of-sight; range will vary and may be reduced by obstructions
Patent	U.S. 6,504,794 issued January 7, 2003; other patents pending

Ordering Information

Part Number	Description
962001	Survivair Pathfinder Upgrade Kit with DoublePASS
X962001	Installed Survivair Pathfinder with DoublePASS
962000	Survivair Pathfinder Upgrade Kit without DoublePASS
X962000	Installed Survivair Pathfinder without DoublePASS
962160	Survivair Pathfinder (front and back Beacons) Demonstration Unit Kit (muted DoublePASS for Survivair Pathfinder demos) (not NFPA-compliant or CBRN-certified)
X962160	Installed Survivair Pathfinder Demonstration Unit Kit (not NFPA-compliant or CBRN-certified)
962284	COMPASS Demonstration Unit Kit (muted COMPASS for Survivair Pathfinder demos) (not NFPA-compliant or CBRN-certified)
961999	Tracker Kit

P/N: SUR.101 03/05 RPI

SURVIVAIR®
Safe. Secure. SURVIVAIR.®

A Bacou-Dalloz Company • Toll-free 888.APR.SCBA For Ordering & Technical Assistance 800.821.7236 • www.survivair.com