



## MSA's Position on Firefighter Telemetry and Firefighter Location

*Dear MSA Valued Customer,*

Due to the emergence of SCBA telemetry systems and interest by the Fire Service in the development of firefighter location systems, MSA would like to provide you with background information on the technologies within the industry, and inform you of MSA's position on these new products.

### Background on SCBA Telemetry Systems:

SCBA telemetry systems typically consist of a radio frequency (RF) transmitter/receiver mounted to an SCBA, which transmits information about the SCBA to an RF transmitter/receiver base station located with the incident command center. It is important to note that telemetry systems do not provide information about firefighter location.

Current products on the market typically transmit the alarm status of the PASS device, the air status of the SCBA, and are capable of issuing an evacuate signal from the incident command to the SCBA.

The technology of these systems is dependent on an RF signal in either the unlicensed 900 MHz or 2.4 GHz frequency ranges, or they may use one of several licensed frequency ranges. Products designed for the licensed bands are inherently more costly, due to the use of less common electronic components, and require the fire department to obtain an FCC license. Although higher power levels are allowed in a licensed band, they are typically not used due to the effect on battery life.

The license free bands, in conjunction with the latest software for frequency hopping, are highly effective for data transmission of this type.

Although some manufacturers state the system range in terms of line-of-sight distance, there is little correlation with this term to the signal's true ability to penetrate buildings. In general, the ability for low-power RF signals to penetrate buildings is minimal, requiring RF repeater devices to relay the signal between the SCBA and incident command.

RF repeater devices currently consist of battery powered transmitter/receiver units that must be placed within a structure during firefighting, and are often sacrificial, due to the realities of the fire ground. Without these RF repeaters, the operation of the system can be inconsistent, posing a potential safety threat to firefighters. Furthermore, the incremental cost to equip a single fire station with telemetry can be in excess of six thousand dollars.

### MSA's Position on Telemetry Systems:

MSA has been field testing an SCBA telemetry system, which is embodied in the next generation ICM PASS on the gauge line of the SCBA. The launch of this new product has been scheduled for late 2005 to allow for the inclusion of an integrated repeater technology that will maximize the range, penetration, and reliability of the RF signal, which is critical to firefighter safety, and eliminate the need for sacrificial RF beacons.

The MSA product will transmit the status of both PASS and low-air alarms, as well as the SCBA air pressure. The base station will be capable of sending firefighters an evacuate signal (individually or collectively), which firefighters will be able to acknowledge back to the base station with their ICM. The base station will be available as stand-alone product mounted in a rugged waterproof case, or as an option, combined with portable personal computer.



The technology used in the MSA product is based on an RF signal in the 900 MHz band that is transmitted to the base station through a network of integrated repeaters within each ICM PASS device. This network of ICM PASS repeaters, integral to the SCBA worn by firefighters, eliminates the need to deploy and recover expensive independent repeater systems.

The MSA product is also being designed to be upgradeable and affordable. With the telemetry device integrated into the ICM, the incremental cost of an SCBA is minimized and the product allows field deployed SCBA to be easily upgraded by simply replacing their integrated PASS device. Including the base station and software, the incremental cost to equip a team could be as low as a few hundred dollars per firefighter.



## Background on Firefighter Location Technology:

There are currently no commercial products on the market designed to plot the location of firefighters within a structure. Despite some miscommunication among manufacturers, SCBA telemetry devices do not provide information about location. It is believed that several companies are working to provide a firefighter location product and the following is a list of enabling technologies that are being considered. It is important to note that most of the technologies used for locating purposes are significantly challenged with indoor use and are limited by common building materials.

### ■ Global Positioning Systems GPS:

Accurate outdoors, but no signal penetration inside structures.

### ■ Directional Radio Signal:

Effective outdoors, but difficult to determine the origin of the signal indoors due to reflected signals within buildings.

This leads to a time consuming "trial and error" process by the search party, to determine the origin of the signal which represents the location of a downed firefighter.

### ■ Inertial Navigation:

The practical embodiment of this technology drifts over time and would require a means of correcting for the location drift to be effective in finding a firefighter. Currently it is not accurate enough for firefighter location purposes.

### ■ RF Triangulation:

The conventional utilization of this technology requires several transmitters to be established outside of a structure to enable the triangulation (geometric distance calculation between three points) of a firefighter's location. This approach has deployment concerns and may be subject to multiple reflected signals, known as multipath effects.

MSA believes that reliability is critical to the safe operation of a location system. A system that fails to provide accurate information about the location of a victim, or a system that has breaches in it's operation, can endanger firefighters. Prospective buyers of location systems should be sure the product meets their reliability requirements within a variety of fire ground conditions and building structures.

### MSA's Position on Firefighter Location:

MSA believes firefighter location is analogous to the "Holy Grail" of firefighter safety in this decade, and staying true to the company's heritage, MSA is dedicated to providing an effective solution wherever a danger may exist.

Significant resources are being deployed to understand the firefighter's needs and develop a product that meets the reliability, durability, and cost requirements of the Fire Service.

The result will utilize many of the unique competencies within MSA, such as the development and manufacture of electronics in thermal imaging cameras, PASS devices, and instrumentation; and the development and manufacture of SCBA.

Please be assured that MSA, as a technology leader, will be using the latest means available to deliver a highly effective and reliable product to first responders. Firefighters should also take comfort in knowing the system will be developed with continuous input from the Fire Service.

If you have any questions about SCBA Telemetry or Firefighter Location, please feel free to discuss them with your local MSA representative. With the rapid evolution of technology in the Fire Service, MSA believes it is important that customers like you have the necessary information to make the best possible decision to meet your individual department's needs.

Sincerely,



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