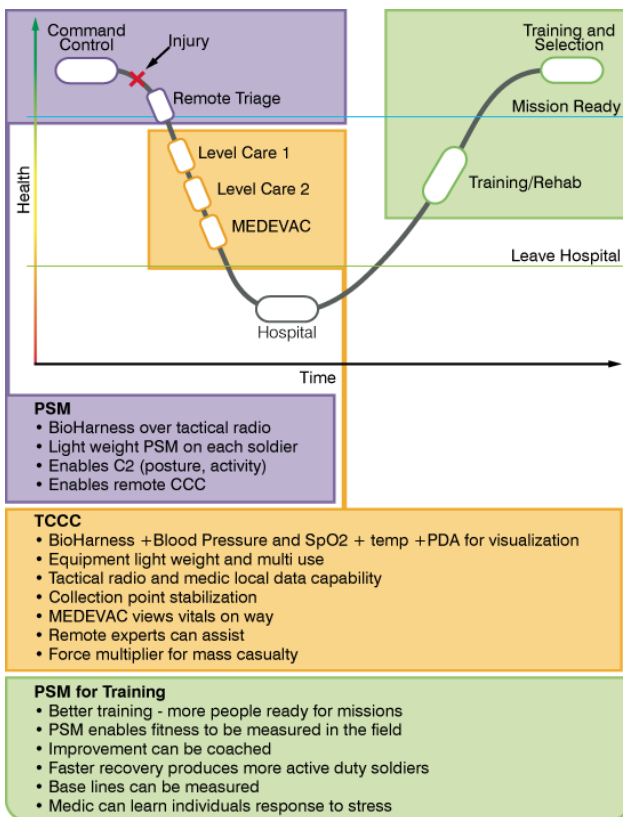


# Zephyr™ PSM Defense



Zephyr™ PSM Defense...  
Keep track of and optimize your most valuable assets

Physiological Status Monitoring (PSM) is the real time visibility into the physiological status of personnel operating in high stress and extreme harsh environments. PSM measures vital signs as well as body of posture, activity levels, and exertion, and interprets the signals to help determine whether personnel are alive, stressed, fatigued, injured or healthy.



## PSM Defense Applications

Designed for squads of people deployed in harsh environments, the PSM Defense system enables remote status monitoring of multiple personnel simultaneously. The PSM Defense system is for both training and live deployment situations.

## PSM Defense Advantage

Knowing the real-time physiological status of personnel in harsh, challenging environments can assist Commanders and Medics in Command & Control (C2), and Combat Casualty Care decisions that can affect the outcome of a mission. The PSM Defense system deploys over existing radio systems, without interference or compromise of security, thus increasing soldier effectiveness, while minimizing weight, hassle and the cost of deployment.

## How is PSM used?

PSM Defense is a command and control solution used to monitor individuals operating in high risk, harsh environments, or anyone deployed in Personal Protective Assemblies (PPE). PSM can be seamlessly applied today in the following activities:

- Command and Control (C2)
- Tactical Combat Casualty Care (TCCC)
- Training

# Zephyr™ PSM Defense



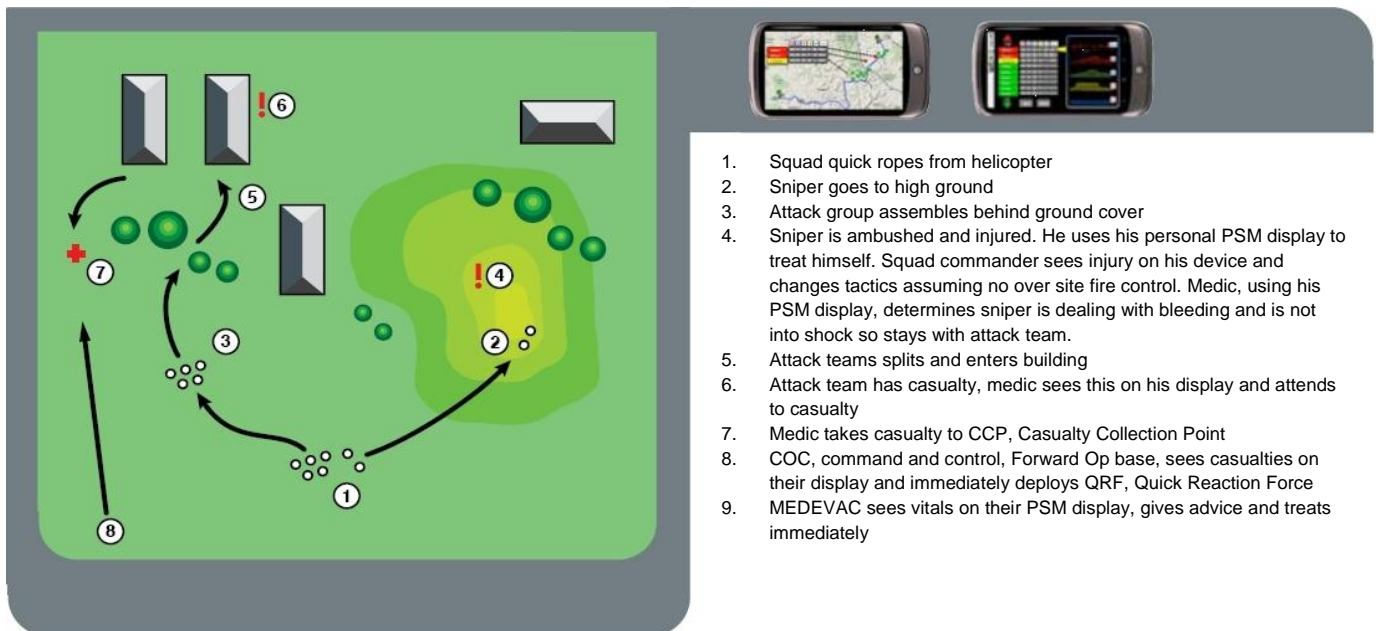
The technology provides information that can assist in determining:

- Warfighter's Physiological Condition
- Mission/Operational readiness
- Heat Stress
- Dehydration
- Fatigue
- Trauma
- Rehabilitation Status

## PSM in a ConOps Situation

Available configurations enable the equipping of all team members with BioModules™ that can stream data to 'higher' through personal radios. For smaller units, where many squad or team members may not have radios, it is possible to relay through individual Z-modems (with up to 300 yard range) that transmit via an encrypted undiscoverable Bluetooth network to a single gateway radio that can transmit the entire team's data.

This ability to have constant and instant awareness of the health status of everyone in harm's way provides commanders and medics with a revolutionary decision-making tool that can save lives and speed Quick Reaction Force response capabilities. Using live monitoring and alerts capabilities decision makers are quickly fed easily discernable vital information that may otherwise be unavailable or may require further commitment of personnel into harm's way.



# Zephyr™ PSM Defense



## What's in the box?

The system comprises three building blocks allowing teams to operate independently or as part of a networked force.

- BioHarness™ : chest strap or shirt that integrates comfortably with PPE
- Tactical or satellite radio (data capable)
- OmniSense™ PC software that can operate independently or provide alerts in the Command and Control or Blue Force tracker environment

## BioHarness™



The components are a Biomodule™ and BioStrap™ or a shirt option.

Measures:

- EKG
- Heart Rate
- Breathing Rate
- Temperature (skin)
- Activity (stationary, walking or running)
- Posture (laying or standing)
- Effort, dehydration, heat stress and risk



The BioHarness™ smart fabric sensors can be integrated into any shirt. Zephyr offers three standard options (BioModules™ can be side mounted to integrate with PPE under the arm):

- Combat shirt
- Fire resistant Under Garment
- Custom 100% cotton t-shirt, available in front mount version only



The BioShirt™ integrates the BioHarness™ technology into the shirt. The BioShirt™ is made from 100% cotton. The shirt and BioHarness™ are machine washable and guaranteed for up to 150 washings.

## Operating Modes

- Secure Bluetooth – MAC paired, AE256, undiscoverable, optical wired configuration
- Cable transmission to tactical radio
- Back box logging feature lasting 20 days

# Zephyr™ PSM Defense



## OmniSense™ Software

PSM Defense's data is presented using Zephyr's OmniSense™ software. There are two applications encompassed by OmniSense™:

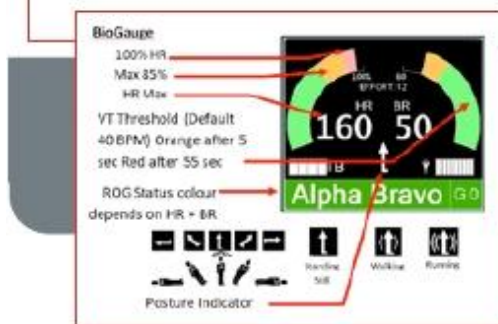
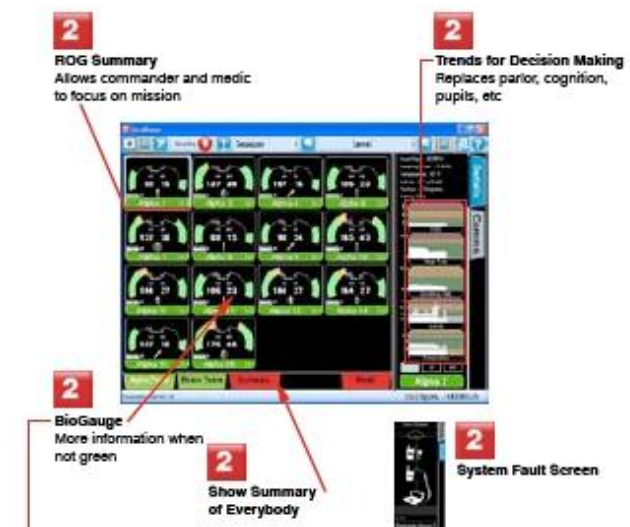
- OmniSense™ Live – Displays real time information on the individual and team's physiological status and to act as a tool in a deployed mode for live monitoring
- OmniSense™ Analysis – used for review and assessment after completion of a training scenario or live operation.

## OmniSense™ Live

- Our interface has been designed in conjunction with US Special Forces for Medics and Squad commanders down range. A touch screen provides instant access of the entire team's mission readiness. This simplifies C2 and remote triage decisions in the fog of war.

Easy to interpret screens provide:

- Summary screen of the entire team
- Deployment tool to add and organise team members
- Team based viewing of operational groups
- Medic Group prioritization of casualties
- Status summary for each individual Red-Orange-Green with configurable settings
- BioGauge™ view for instantaneous physiology update of individuals
- Trends for time-based diagnostic by remote medical personnel



Measures up to 64 People

# Zephyr™ PSM Defense



## OmniSense™ Analysis

### A. Post event software that provides:

- Automatic team fitness assessment of entire team simultaneously in the field
- Team analysis of a scenario
- Individual analysis between events over time
- Auto update of personnel baseline information
- After action reviews

### B. Fitness Test:

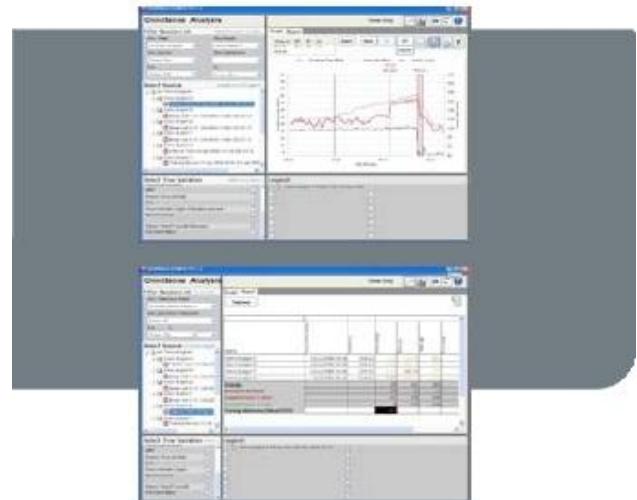
- Used to perform a baseline measurement of team members
- Import actual data – Max. heart rate, breathing rate, heart rate recovery and a myriad of other important personal parameters for refinement of ROG Status thresholds as well as tracking conditioning levels of individuals and teams

### C. Reports:

- Training time
- Red-Orange-Green heart rate zones
- Heart rate maximum
- Heart and breathing rate
- Effort
- Group fitness

### D Additional Views

- Map view integrated into Blue Force tracker allows commanders to pinpoint casualties
- Wrist device view of team member's vital signs



## Group Medical Status



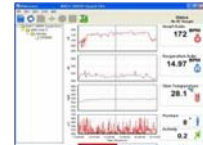
PSM Defense is a one stop solution to monitor and detect your personnel's wellbeing in the field, focussing on the most common causes of injury associated with active deployment; Heat Stress, Dehydration and Trauma.

# Zephyr™ PSM Defense



## PSM Product Catalog

### PSM Research

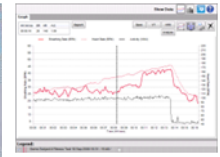


50 ft range 1 person Log or Tx Research Waveforms e.g. EKG  
120Hz Streaming

### PSM Training



Zephyr Wrist  
Modem



300 yard range 64 person Log or Tx OmniSense Live & Analysis  
0.5Hz polling

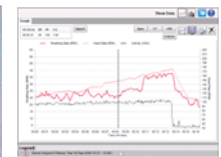
### PSM Responder



MOTOROLA  
XTS Radio



Bluetooth  
Radio Interface Device



2 miles range 64 person Log OR Tx OmniSense Live & Analysis  
15 sec polling *Log and Tx: device transmits and logs to memory all the time*

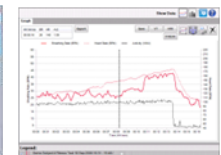
### PSM Defense



TYPE 1  
Tactical radio



Bluetooth / Wired  
Radio Interface Device



2 miles range 64 person Log OR Tx OmniSense Live & Analysis  
15 sec polling  
*Tactical radios are voice priority. Data delay may occur on some models*

# Zephyr™ PSM Defense



## PSM Specification

### BioHarness™ Module

PARAMETER	SPECIFICATION
-----------	---------------

Heart Rate:	25 – 240 Beats per Minute $\pm$ 1 BPM
-------------	---------------------------------------

Breathing Rate:	3 – 70 Breaths per Minute
-----------------	---------------------------

Skin Temperature:	10 – 60 °C $\pm$ 0.2°C in range 30 - 40°C
-------------------	---

Battery Duration:	24 hrs Standby Mode, 18 hrs Active Mode
-------------------	---

Charge Time:	3 hours to 100%, 1 hour to 90%
--------------	--------------------------------

Battery Life:	Capacity 80% after 300 deep discharge cycles (4500hrs of use)
---------------	---

Storage Life:	6 months between charges (for optimal – recharge monthly)
---------------	---

Strap Sizes:	XS (22 – 26”), S (26 – 32.5”), M (32.5 – 39”), L (39 – 45.5”), XL (45.5 – 52”)
--------------	--

Strap Washing:	Remove Device.
----------------	----------------

Wash durability:	Typically 150 washes
------------------	----------------------

### ENVIRONMENTAL-OPERATING

Humidity:	5 - 90 %RH
-----------	------------

Temperature:	-10 - 50°C
--------------	------------

Environmental – Storage:	
--------------------------	--

Humidity:	5 - 90 %RH
-----------	------------

Temperature (< 1 month):	(Power off) -20 - 45°C
--------------------------	------------------------

Temperature (< 6 months):	(Power off) -20 - 35°C
---------------------------	------------------------

Water Resistance (Device):	Splash Proof
----------------------------	--------------

Bluetooth Compliance:	Version 2.0 + EDR
-----------------------	-------------------

Operating Frequency:	2.4 - 2.835 GHz
----------------------	-----------------

Output Power:	2 mW
---------------	------

Regulatory Approvals	FCC Part 15 Subpart C FDA - Pending CE - Pending
----------------------	--

# Zephyr™ PSM Defense



## Typical RID Summary

### ELECTRICAL

Power Source	Radio Battery
Operating Voltage Range	16.5V
Current Drain	TBC
Radio Battery Life Impact	< 1%

### COMMUNICATIONS

Bluetooth Compliance	Version 2.1 + EDR
Supported Profile	Serial Port
Operating Frequency	2.4 to 2.835 GHz
Output Power	2 mW
Operating Range	30ft / 10m typical radius indoors (line of sight)
Antenna Type	Internal

### REGULATORY:

FM	No radio degradation
Contain Transmitter Module	
FCC ID	QOQWT12
IC ID	5123A-BGTW12A
EMC Europe	Article 3.1b of the RTTE Directive 1999/5/EC.
EMC US	CFR 47 FCC Part 15 Subpart C.

### ENVIRONMENTAL

Operating Temperature	-30°C / +60°C
Storage Temperature	-40°C / +85°C
ESD	IEC 801-2KV
IP Rating	IP67

### MECHANICAL

Dimensions	35mmW x 102mmL x16.8mmD
Weight	40 grams (1.4 oz)
Case Material	Flame Retardant Acrylonitrile Ethylene Styrene (AES)
Attachment	Captive Thumbscrew

# Zephyr™ PSM Defense



## Zephyr Background

Zephyr Technology is a global leader in real-time performance and biomechanical monitoring or "Physiological Status Monitoring" (PSM) solutions for Defense, First Responder, Training and the Academic Research markets. Zephyr Technology leverages a world class team of engineers, scientists, physiologists and business experts.

Founded in 2003, Zephyr Technology has been a pioneer in the use of PSM in training and high stress operational environments. The company's ongoing collaboration with fire departments, NASA Ames Research Center, National Guard Civil Support Teams, and US Special Operations Forces has been invaluable in the development and validation of Zephyr's technology and its application in the most extreme operating environments to

**Measure Life . . . Anywhere.**

### CONTACT:

Web:	<a href="http://www.zephyr-technology.com">www.zephyr-technology.com</a>
Email:	<a href="mailto:info@zephyr-technology.com">info@zephyr-technology.com</a>
Phone USA	+1 (443) 569-3603
Phone Europe:	+44 208 099 7650
Fax:	+1 (443) 926-9402

**Zephyr** Measure Life ... Anywhere