Introduction

APCO P25 System Integration of Physiological Status Monitoring (PSM)

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WPSM Requirements for First Responders

• Reliable
• Comfortable and low hassle from a users perspective.
• Use existing communications platform to minimize system cost, complexity and improve communications reliability.
• Voice priority on all radio communications.
• Cost effective.
• Low maintenance and support level.
Why P25 for First Responders System

- High market penetration in First Responder category
- Interoperable with other systems and suppliers.
- IP based data support.
- Efficient data transmission with voice priority
- Cost effective.
History of Standards Project 25

• 1989  Project 25 initiated
  – Chartered to define digital technology for Public Safety
  – Membership Included:
    • APCO (Association of Public Safety Communication Officials International)
    • NASTD (National Association of State Telecommunications Directors)
    • Federal Government representatives,
      – NTIA (National Telecommunications and Information Agency)
      – NCS (National Communications Systems)
      – DoD (Department of Defense)
P25 Facts

WHY P25? There are over 200 P25 state, local, and federal systems with over a million P25 radios sold and used in the United States today.

WHY P25 IV&D DATA? Data applications continue growing… what was not possible yesterday can be done today:

• GPS
• Text Messaging
• Programming Over the Air (POP25)
• Over The Air Rekeying (OTAR)
• PSM Monitoring with Zephyr Bluetooth Mic
Countries with Project 25-Interoperable Equipment or Networks
Solution Hardware – P25 PSM

- P25 Network
- Dispatch Center
- OmniSense
- Incident Commander

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Solution Hardware – P25 PSM

BioHarness™
Integrated into Clothing

MOTOROLA
XTS Radio

ACS US Army Shirt
( Flame proof )

Remote Bio Sensing System

ZO要点

Zephyr OmniSense
Software

Zephyr FRS System
Biometric Monitors
- heart rate,
- breathing rate,
- skin temperature,
- activity and
- posture

Bluetooth radio
On board data analysis and logging

Works under extreme activity

Fabric-based, dry contacts – no skin break down
Comfortable over long periods
Washable
Measure a person’s vital signs using smart fabric sensors integrated into strap or shirt.

Multiple data types give context to any situation

**Vital Signs**
- Heart rate
- Breathing rate
- Skin Temperature

**Motion**
- Activity
- Posture

**Fatigue Types**
- Cardiovascular
- Respiratory
- Heat
- Muscular
- Hydration
- Stress
Algorithm’s based on sensor fusion

- **Red, Orange, Green algorithms**
  - based on US Special Forces customer feedback over two separate contracts.
  - Compares vital signs with types of posture and movement.
  - Customizable relative to mission set

- **Command and control**
  - Real time decisions based on capability of personnel
  - Remote triage if injury occurs. Medic, AFSOC, Hospital.
Solution Software – OmniSense

Live View
Real time heart rate and respiration
Up to 64 people
Automated color alarms for status

Post Event Analysis
- Real time trending
- Multi person comparisons
- Reporting
Work Flow of Graphical User Interface

Safe Guards and self checks

1. ROG summary
   Allows commander and Medic to focus on mission

2. BioGauge
   more information when NOT GREEN

3. Trends for decision making
   Replaces parlor, cognition, pupils etc

4. System fault screen

5. Always show status
PDA Screen – Live Mode

- Trend Data for Selected Subject
- Person List Numbers. Cheat sheet is required to identify each person. • Shows 5 subjects (scroll for more)
- RED auto select to top of screen
- Red and Orange indicate subject status
- Manual Send Button

Trend Data for Selected Subject

- Graph Selection Indicated by Coloured Icon (Icon Colour Matches Trace and Axis Label)
- Icons:
  - Heart Rate
  - Breathing Rate
  - Temperature
  - Activity
  - Posture

- Inverted Bar Indicates Selected Sensor for Graph
- Number of people off screen
- Search for new people
- Scroll down, Colour indicates highest priority off screen

Satellite status connected, non connected

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Multiple Sensor Ecosystem

Based on Zephyr's work with US Special Forces WPSM needs to be integrated with multiple sensor types.

This gives the Incident Commander or Medic an improved view of the user's state and enables command decisions to be made with real data from the scene.

The Zephyr WPSM Bluetooth platform supports multiple sensor integration into one platform.

The variation of sensors and ROG algorithm is dependent on the mission set of the user.

Sensors include:

- Users Location (GPS/ GPS Denied)
- Users Radio Condition (Battery Level)
- SPO2
- Blood pressure
- Gas Detection
- Radiological
- SCBA Tank Level
Problem solved – First Responders

Efficiency – manage fire fighters in and out of the building.

Oversight…In 2006, 106 fire fighter deaths.

- 54 were due to stress or over exertion.
- 9 during training.

Problem Solved - Defense

- Command and control for real time feedback
- Remote triage
- Man down detection
  - Used for real time command and control decisions
- Remote Monitoring and Triage
  - Downed pilot or operative.
  - CBRN suits
  - Border patrol
  - Coast Guard

- 1 in 5 people are injured saving someone who is already dead
APPENDIX
Zephyr Corporate background

- **Founded**: 2003
- **Headquarters**: Washington DC. (R&D- New Zealand)
- **Employees**: 21
- **US Venture capital backed**
- **IP**: 6 patents including provisional