Physiological Status Monitoring For the Fire Service
Watching Out for Stress Before It's Too Late
PPE has improved, but not LODDs

- LODDs remain persistently high at about 100 per year over the last decade
- Stress and overexertion is the Number 1 cause of LODDs in the Fire Service
- 40 – 50% of LODDs are a result of fatal cardiac events

(NFPA 2002-2006, USFA 2002-2006)
Firefighters’ unique set of risk factors

- Sudden nervous system surges caused by unexpected alarms
- Rapid shifts from low to high levels of exertion
- Carrying, lifting and wearing heavy protective gear and equipment
- Prolonged exposure to high temperatures
- Excessive Fluid Loss

(Orange County Fire Authority, Safety and Performance Implications of Hydration, Core Body Temperature and Post-Incident Rehabilitation, Dec 2007)
Firefighter Cardiac LODD by Activity

- 32% during fire suppression
- 17% returning from an alarm
- 13% responding to an alarm
  ➢ 62% of all Cardiac LODDs
- 9% non-fire emergencies
- 13% physical training
- 15% non-emergency duties

(Kales et al, Emergency Duties and Death from Heart Disease among Firefighters in the United States, NEJM March 2007)
Firefighters’ LODD Odds

- The odds of a fatal on duty cardiac event for a firefighter are
  - 10X to 100X greater during fire suppression than non emergency duty
  - 2X the rate of cardiac event LODDs when compared to police officers
  - 3X the rate of cardiac event LODDs when compared to the general working population

(Kales et al, Emergency Duties and Death from Heart Disease among Firefighters in the United States, NEJM March 2007)
Physiological Status Monitoring

• Globe partnered with QinetiQ starting in 2006 to modify the PSM into a health and safety tool for the Fire Service.
  ➢ Collect and transmit firefighter data in real time
  ➢ Alert the individual firefighter and incident commander to potentially dangerous conditions
  ➢ Record data for post-incident analysis
The Fire Service Is Ready

• Fire Service wants the system now
  ➢ Departments clamoring to be Beta sites

• Globe has invested substantial time and resources to
  ➢ Demonstrate that this PSM system is feasible
  ➢ Educate the fire service community about its potential benefits
  ➢ Validate that it will meet the needs and interest of the fire service
  ➢ Earn the support of health and safety committees, fire chiefs, and union leaders
Remaining Commercialization Requirements

• Transition to TRL 10 for Fire Service deployment
  ➢ Develop a practical and actionable heat stress algorithm for firefighters
  ➢ Further develop user interface and software
  ➢ Further develop radio interfaces specific to First Responder needs
  ➢ Beta testing at multiple First Responder sites
  ➢ Standards development and certification
Summary

• Firefighter deaths and disabilities due to stress and overexertion are a very serious issue for the fire service

• The cost of prevention pales by comparison to the cost of LODD and disabilities
  – Boston FD is experiencing a cardiovascular disability at the rate of almost one per week
  – Each disability can easily cost well over $1 million
  – A recent heat related training injury in Seattle resulted in a $1.8 million award
The Last Word

• QinetiQ and Globe’s PSM Fire Service System utilizes a working new technology which has the potential to provide a warning before it is too late.
• Additional development work is still needed to commercialize for Fire Service deployment.
• The Fire Service is very interested in this solution.
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