# Icehouse Challenge

*A Competition to Create the Future of Wearable Tactical Communication and Support Systems*

Emergency responders and Special Operators need to rapidly process information about themselves, their environment, and those that they are rescuing. The emergence of embedded environmental and physiological sensors should enhance situational awareness and decision support for first responders and operators. Recent advances in heads-up displays (HUDs) have produced a medium for converting that data into actionable information via augmented reality displays. The goal of this competitive challenge is to explore novel ways to integrate physiological and environmental sensor data and display actionable information in a HUD with as little manual input as is needed to complete the mission.

The US Department of Homeland Security (DHS) conservatively estimates over 23.5 million first responders nationally, creating a billion dollar marketplace for sensors, communications, and data display/storage. This nationwide challenge attempts to simulate a real-world environment faced by many first responders and law enforcement personnel today. Called "Icehouse" the scenario entails the detection, display and tactical coordination of a small team in a threat-filled environment.

Icehouse is a virtual training environment that provides a framework to spur development of context specific information display systems. This game takes the form of a Live Action Role Playing game (or LARP) with real first responders and special operators playing the roles of workers entering a dangerous environment. It is the job of you developers to create technologies that will help the workers perform their tasks while at the same time minimizing exposure to various threats.

Threats are simulated electronically allowing the gameplay to take a more realistic feel than simple tabletop exercises. It also allows developers to focus on creating the user experience instead of interfacing with sensors and other devices. Threats may be either passive (e.g. chemical, explosive, etc.) or active (e.g. fire, injuries to team members, an armed hostile, etc.).

Just as there are different types of threats, there are also different "specializations" for team members. While all members may complete any action or neutralize any threat within the scenario, "specialized" members may complete certain actions faster. For example, a medic specialization would enable faster assessment and triage than a HAZMAT specialization. In all cases, however, the augmented reality technology should minimize the users's time in the hazardous environment, mitigate associated risks from exposure to hazards (heat, chemicals, etc.), and enable prioritization of actions, such as triage assessments of other incapacitated Operators in the local area.

During the scenario, participants are required to: provide decision support, monitor team physiological state, and display relevant data to team members via WiFi connected mobile devices and Bluetooth connected heads-up displays. In addition to displaying threat and health information, a means to rapidly share command and control information should be provided through the mobile device. Performance will be rated along a number of vectors (in order of weight): user experience, quantitative metrics, and software quality. Key quantitative metrics will include: time to complete mission, level of effort, time of exposure to hazards, and threats correctly neutralized.

Developers will need to create:

- An interface to input information about the environment
- A decision support tool to direct the selection of tools for loadout
- A method for retrieval of information pertaining to threats

Workers will be equipped with an Android cellphone, a Sony Smart Band, and Sony Smart Eyeglasses. These are all of the tools that they need to explore the World of Icehouse. Developers will use these devices to record the status of the environment and coordinate their efforts to save victims and fight hazards.

There are three rounds in the road to winning the Icehouse Challenge. Initial call for proposals is on now and extends to March 4th at 11:59p EST. Interested groups should submit a proposal using the template that addresses the areas identified above. At that point a group of eight teams will be selected for further development. The teams will be notified of their selection by March 14th at 5:00p EST. From eight the field will be cut to four on March 29th. Selection to the final four will be based on a three page outline of development efforts and evaluation of code and hardware prototypes. These four teams will then develop their ideas into full-fledged software for use in the Icehouse Challenge at the IEEE Body Sensor Networks Conference in San Francisco, CA.

Want to create the future of body worn life-saving technology? Submit your ideas to the Icehouse Challenge!