The leading cause of death amongst fire fighters on-scene is cardiac arrest. The technology required to monitor the location and vitals of first responders during a call has existed for years, no one has successfully integrated both functions into a single, easy-to-use system. Such a system would allow rapid response to rapidly changing conditions on scene, alerting necessary personnel to the impending peril of fellow first responders earlier than is now possible. The system will also aid in determining the best course of action (i.e. nearest help, safest path, etc.) should problems arise. Groups 45 and 46 (ourselves) aim to create this type of system. Group 45 is addressing how to collect data, such as heart rate, body temperature, location, etc., while we are focusing on the software systems and user interfaces required for monitoring first responders in real time.

We envision having a computer system on-scene for someone (a fire chief or other trained personnel) to monitor the real time positions in 3-space of each first responder, as well as the vital signs of said responders. The user will be able to manipulate the view screen to check in on each first responder. The system will prompt the user when a first responder is deemed to be 'in danger', due to a change in vitals, rapid change in position (e.g. falling), or a 'panic button' is activated. In addition to this, the system will be able to estimate which first responder, if any, is closest to any other first responder; in this way, the user will be able to assign rescue tasks accordingly.

We foresee the user of this system being a fire chief or other first-responder whose designated task is to monitor the vitals and positions of fellow first responders on scene. This user will ideally have marginal amounts of training on this system before first use, but we aim to make the system easy enough to use that users can potentially be 'hot-swapped' if the need arises.

A more formal list of requirements follows:

- Straightforward user interface, which can be used to *rapidly* access important information
  - Split-screen view, with a map and tiled list of first responders
  - Very important that the user cannot get 'lost' in the interface
- Manipulatable map, with current first-responder locations as dots
  - Ability to access previous locations in a 'trail' format, likely by clicking on dots
- Ability to store environmental data and correlate it with the position of the first responders
  - Allows user to 'see' the historical status of areas of a scene that have been explored previously, in order to better inform first responders who need to pass through said areas
  - Such data includes environmental temperature, oxygen content, and even camera images
- Tiled list of responders, with core vitals depicted in tile
  - Likely colorized for easy viewing
  - Clicking on tile reveals more information
- Rugged hardware
  - Likely installed within response vehicle
  - Likely touchscreen, for ease of use
- Transmission/reception system
  - Specifics to be decided upon by group 46
  - Needs to be very fast – may handle multiple camera feeds