**LEAN - Local Emergency Area Network**

**FInal Report for Senior Design - 2015-2016**

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The original design of LEAN was to have a deployable ad-hoc network that ICS personnel could use to communicate in case of a failure of typical communication systems. The network pods were to be environmentally aware so they could send information to a central server to map out their locations and detect any anomalies that may cause the network to fail. The network pods were to contain a battery, raspberry pi, wifi dongle and a sensor array all located inside an encasing to protect hardware from the environment. When this build phase of the project came to be, we realized that we had to narrow down the scope of the project due to time constraints, in order to insure we could deliver a final proof of concept at the end of our semester.

We decided that for a proof of concept, we did not need the pod encasing or the battery as we could simply plug in the hardware to a wall outlet. We also decided that only one pod needed to have the sensor array as it would just be duplicated on the other pods being used to prove routing, so it was not needed. The mapping of the pods and GUI to view locations and anomalies detected was too much to achieve in the short time we had to complete the project. We had delays in getting our equipment approved for order which also did not help in achieving this requirement. So we decided to focus on showing the sensor data was being gathered and sent over the network by the best possible route, in case of multiple routes being available or being damaged, and the data is being collected in the database on the central server. The mapping GUI and pod self sufficiency via battery and encasing would have to come at a later time.

We tested the network by sending hard coded json objects in a client script and made sure the central server was receiving the information. Then we tested the sensor information was being gathered correctly in the database. The sensors were set up to send the data on time intervals and in a json object. We then used an already established network on campus to determine if the sensor data was being collected in the database, and that it was changing as we introduced different environmental factors, like heat and acceleration. We then set the sensors up on our LEAN network and re-tested that the environmental data was being properly collected and routed to the central server and populated in the database correctly. Then we tested again and again by dropping out different nodes to make sure the data was taking the most optimal route.

Included in the final deliverable will be our requirements documentation for the scoped down product, the test case documentation that correlates each requirement to it’s test case. Both the requirements and test cases will be in the same file. The code and scripts used in all of the products development and the meeting minutes developed each week. We will also be including in a separate zip file all of the documentation from last semester just in case someone would like to see where we started. There will be two zip files named Senior-Design1 and Senior-Design2.