**Message Passing and Queueing - Preliminary Specification**

The task of the Message Passing and Queueing (MPQ) sub-team will be to design and implement a communications protocol to pass messages (defined by the Message Specification sub-team) through a distributed system of nodes using IP. Messages will be requested by accessing the relevant nodes as determined by the Resource Discovery sub-team. This sub-team concerns itself only with node-to-node communication - sensor-to-node is handled locally.

**Sub-team members:** David D., Kyle, Gary

**Assumptions:**

The recipient node is known, either because it has requested the message, or because it has been found using resource discovery. Error detection/correction is handled by the IP layer.

**Requirements:**

* Messages must be routed over ethernet using IP.
* Messages will need to be created from the specified content and unpacked by the receiving node.
* MPQ must be able to handle any type of message determined by Message Specification.
* MPQ must be able to transfer messages of varying sizes, including potentially large amounts of data.
* Messages must be queued in such a way that they will reliably reach their destination in the event of simultaneous data transmissions.
* Messages may be required by multiple recipients simultaneously.
* Messages may need to be re-sent in the event of failure, e.g. buffer overload.
* Messages must be traceable to the sending node.
* Messages should be transmitted quickly, even in dense and/or large networks.

**Beneficial features:**

* MPQ should be implemented as far as possible using existing technologies.
* The process should be light-weight enough to be handled by a variety of processors, so that nodes are not dependant on a single hardware implementation.

**Possible Solutions:**

ZeroMQ has been selected as a likely candidate to implement message queueing, as it offers a simple and reliable off-the-shelf solution that should be straightforward to implement. This must be coordinated with the Message Specification sub-team.

Some form of publisher/subscriber model may be useful to handle requests for messages from and to multiple nodes simultaneously. This will need to be specified in coordination with the Resource Discovery team.

**Deadline:**

There will be a timeframe of four weeks for the subgroup to design and implement the requirements for MPQ and integrate it with the work of the other sub-teams into a working and tested prototype communications network. Our aim is to have a proof of concept for node-to-node communication by 15th November.