Functional Block Requirements

F000  Internal states of subsystems shall be externally available.

F001  Supervisory Station
   F001.00  Receive any error or failure alarms from robot
   F001.01  Send work tasks (keep track or clock and time)
   F001.02  Receive robot location
   F001.03  Interact with wired communication
   F001.04  Request and receive management data
   F001.05  Keep track of completed tasks
   F001.06  Controls the start and stop time of a shift
   F001.07  User I/O

F002  Wired Communication
   F002.00  Communication from Supervisory Station to all Wireless Communication Nodes
   F002.01  Communication from Wireless Communication Node to all Wired Communication and in turn all Wireless Communication nodes
   F002.02  Communication from Wireless Communication Node to Supervisory Station
   F002.03  Able to retransmit message to all nodes Wireless Communication or Supervisory Station
   F002.04  Able to request retransmission from all Wireless Communication nodes and Supervisory Station

F003  Wireless Communication
   F003.00  Allow Tx, Rx between ceiling nodes to robots
   F003.01  Able to communicate and bridge with wired
   F003.02  Each node and robot needs to be specifically addressable
   F003.03  Branch data with central control on each robot
   F003.04  For robot to robot communication, the steps for communication need to be as follows: robot – ceiling – robot
   F003.05  Make location available to navigation
   F003.06  Obtain current location from Navigation.

F004  Navigation
   F004.00  Accepts destination commands
   F004.01  Get position from wireless and send movements to wireless
   F004.02  Decide how to get to final location from current location
   F004.03  Give motor control requests for movement
   F004.04  Know map of mine
   F004.05  Accepts completed movements from motor control
Functional Block Requirements

**F005 Motor Control**
- **F005.00** Follow tape and steer accordingly
- **F005.01** Take requests from navigation for major movements
- **F005.02** Issue control movements specific to each motor
- **F005.03** Panic Shutoff
- **F005.04** Bump Sensor
- **F005.05** Inform navigation of intersections, destination and completion of assigned tasks
- **F005.06** Determines speed of motors
- **F005.07** Respond if robot goes off tape

**F006 Power Monitoring/Distribution**
- **F006.00** Passively distributes power to all functional blocks on the robot
- **F006.01** Informs central control of low battery life
- **F006.02** Current overdraw
- **F006.03** Sends low battery alarm

**F007 Sanity**
- **F007.00** Sanity System – resets central control

**F008 Central Control**
- **F008.00** Transmit and receive with communication network
- **F008.01** Issues mine assignment to navigation
- **F008.02** Control system restart
- **F008.03** Receive faults from robot systems and pass to supervisory station
- **F008.04** Communicate with all robot subsystems
- **F008.05** Handshake with sanity
- **F008.06** Manages shift status
- **F008.07** Manages supervisor commands
- **F008.08** Manages startup position reports