

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 of 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