# System Requirements Review

In the space below detail the requirements the proposed design meets. Then describe and defend the proposed design and finally compare any alternative designs.

| Initial Element Design |
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| Requirement:  The controller board shall have as many control ports as possible so that we can handle as many sensors and motor control boards on the same board instead of having to manage communication with multiple boards. |
| Design:  Using the RoboRIO as the main controller board to handle as many sensors and motor controller boards as possible, so that sensor values are direct input to the board and computations will be direct output to the motor controllers. Programming the RoboRIO will be done with java and the WPILib library, flashing the board will be done with provided flashing software and testing the program can be done with autodesk Synthesis simulation software or with the WPILib provided control software.  The RoboRIO specifications are:  Processor: 2 core 667 MHz, 256MB RAM & 512 MB Storage  Ports: 2 USB & 1 Ethernet  IO: 10 DIO ports, 4 Analog in  Control Ports: 1 CAN, 10 PWM, 1 SPI, 1 I2C, 1 RS-232, 4 Relay controls  Power: Requires 7 - 16 VDC, Max Power consumption of 45 W and Idle Consumption of 5 W  MISC: 1 Accelerometer, and 1 Expansion connection  Pros:  \* The RoboRIO has a good documentation base for references and walkthroughs all in one place.  \* The RoboRIO also has several different communion protocols and more connections than an average microController or development board.  \* Using the RoboRIO we will have access to the WPILib to program the board in either Java or C++  \* The RoboRIO comes with a case and dust resistant coating on the circuit board.  \* The RoboRIO also comes on board with an accelerometer.  Cons:  \* The RoboRIO is $1,142.00  \*The RoboRIO does not have any wireless communications so a kind of wireless access point or system will need to be attached in order to enable wireless control. |
| Alternatives:  An alternative is a system of 1 or 2 CTRE HERO boards that have a much lower cost of $60, although the CTRE HERO board has about half the power of the RoboRIO and has fewer ports. This alternative can also be programmed with java or c++ and the WPILib library and can also be tested with the autodesk Synthesis simulation software or the WPILib provide control software. There may be a need to use 2 boards in series or in parallel due to the lack of ports that the board has, also the board does not have wireless communication, but the manufacturer sells an ESP8266 Expansion board that can allow for WIFI and Bluetooth connectivity. |