Senior Design Project Description for FALL 2016
Project Title: Industrial Controller IO Simulator (IR_CONTSIM)

Supporter: Ingersoll Rand
Supporter Technical Representative: ASSIGNED
Faculty Mentor: __X__ ASSIGNED _____ TBD (check one)
Single Team __X__ Dual Team _____ (check one)
Personnel (EN/ET): __2__ E, __2__ Cp, _____ Cv, _____ M, _____ SE
(Complete if the number of students required is known)
Expected person-hours: (250 per student)

Description of Project:

An industrial controller module communicates to an IO board through a combination of SPI, I2C and discrete IO pins. In order to test applications that integrate with that IO, the physical inputs must be simulated through those data interfaces, driven by a PC application. The industrial controller module will use an Arduino Uno layout as the physical interface for this project.

Initial Project Requirements (e.g. weight, size, etc.):

1 Create models of the I2C and SPI parts the industrial controller interfaces to
2 Develop a hardware module that plug into the industrial controller module as an Arduino shield interface, but provides a USB interface for a PC to drive the IO data over the SPI and I2C busses in response to controller requests
3 Develop the PC application to drive the individual IO channels the control module reads through those interfaces

Expected Deliverables/Results:

1. Schematics and Bill of Material for the interface board (a sample board would be a plus)
2. Any programmed logic for parts used in the interface board
3. List of tools required to update/change the programmable logic on the interface board
4. End-user document for the PC application to be developed
5. Source code for the PC application developed

List here any specific skills or knowledge needed or suggested (If none please state none):

1. Exposure to microcontrollers and serial busses (I2C and/or SPI)
2. Familiarity with programmable logic devices
3. PC application development in C/C++ or Java