

Sponsor: Environmental Protection Agency

ECE 480- Clean Room Sensor Monitoring (with ME capstone team)

ME is seeking 2-3 ECE Students interested in joining their team. ECE will grade the projects jointly with ME so there will not be duplication of effort. For example, presentations will only need to be made once and there will be only a single final report created jointly.

PROJECT TITLE:

PM HEVAC IoT Dashboard Project

ABSTRACT:

Vehicle test laboratories rely upon increasingly complex emissions sampling systems to meet testing requirements defined in Title 40 of the Code of Federal Regulations (CFR), part 1066. These requirements are designed to ensure universally consistent, repeatable and accurate fuel economy and emissions measurements from test-to-test, site-to-site and laboratory-to-laboratory. The project described below will provide a device and method to monitor and display our PM Clean Room HEVAC system environment on an ongoing basis. The prototype system is intended to be designed by a multidisciplinary group with mechanical, electrical and computer science knowledge. The resulting low cost, device must acquire, store and broadcast sensor data from a HEVAC system to a remote terminal display using, where possible, Internet of Things (IoT) hardware and methods. The prototype device will be evaluated at our National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan.

PROJECT DESCRIPTION:

The proposed project is intended to provide a IoT prototype device that provides monitoring of our PM Clean Room HEVAC system through a remote display. The project will entail five areas of concentration:

- Study existing HEVAC system and determine the range of operation within our laboratory.
- Determine the flow arrangement and process using analytical and/or empirical methods to clearly show the group's understanding of the HEVAC system operation.
- Calibrate sensors to be employed using known methods and standards and demonstrate that they can withstand the anticipated thermal and mechanical stresses that exist within the system.
- Within time and budget constraints, determine preferred packaging, construction materials and processes necessary to fabricate a prototype system. Prototype a low-cost data acquisition device using IoT hardware and the necessary interface to a laptop computer to display results.
- Demonstrate setup and use of the prototype device.

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