



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

Senior Design Project Description

Company Name	Center for Precision Metrology	Date Submitted	4/30/18
Project Title	Portable System for Evaluating Environments for Precision Manufacturing and Metrology (CPM_PORT)	Planned Starting Semester	Fall 2018

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	1
Computer	1	Systems	
Other (MET)	1		

Company and Project Overview:

Center for Precision Metrology (UNCC) industrial affiliates require a portable instrumentation system for characterizing environments for precision manufacturing and metrology internationally. Member companies have facilities operating over different size scales in different industries but all are affected by in-plant environmental conditions – dominantly temperature and seismic vibration – but including acoustics, humidity, atmospheric pressure, atmospheric composition, and cleanliness (particulates).

Project Requirements:

The project objective is to design and build a system including: sensors and hardware for their deployment in both precision manufacturing and precision metrology environments; electronics/ data acquisition hardware; software that guides a user in setting up a selected sub-set of the instrumentation for evaluation of particular environmental characteristics; automated data logging and report generation; automated evaluation of uncertainty in the reported measurands (user input may be required). Specific ranges for all measurands will be developed by the CPM Affiliates during the summer of 2018 and provided to the SD team on or before 8/15/2018

The team is expected:

- 1. To complete a review of relevant, available sensors, including Bluetooth compatibility*
- 2. Review ranges and requirements provided*
- 3. Prioritize measurands and obtain agreement from CPM Affiliates reps*
- 4. Down-select sensors*



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5. *Define system architecture*
6. *Procure and test sensors*
7. *Develop/build prototype shippable system*

Expected Deliverables/Results:

See above

Disposition of Deliverables at the End of the Project:

Hardware to be delivered to the Director of the Center for Precision Metrology after the last EXPO

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

- *One ME student with industry experience working in precision metrology environments (Mennuti based on Cummins internship)*
- *One ME student familiar with evaluating precision metrology environments (Hopper)*
- *MatLab familiarity*