INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Moore Nanotechnology Systems, LLC*	**Date Submitted**	*5/1/2023*
Project Title	*Wireless Sensing and Recording of Precision Pressures (**MOORE_PRESSURE**)*	**Planned Starting Semester**	*Fall 2023*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer	1	Systems	

Company and Project Overview:

Nanotech is a global leader in the design, development and manufacture of state-of-the-art ultra-precision machine tools and associated processes (single point diamond turning, micro-milling, micro-grinding and glass press molding) to produce advanced optical components in consumer electronics, defense, aerospace, lighting, medical and automotive sectors.

Please see our website at nanotechsys.com for more information.

Nanotech is interested in developing a test fixture to automate the collection of multiple pressures within a system. The data will be collected and then transmitted wirelessly to an application run on a Windows-based computer.

Project Requirements:

This project is to design, develop, and build a test fixture to accurately measure pressures in a liquid and wirelessly transmit the data to a Windows-based computer running an application

developed during this project to visualize and store the data.

- The fixture will be used to test hydrostatic bearings on machines in the facility
- The fixture will be capable of collecting up to 15 independent pressures and transmitting the data every 0.5 seconds to the windows computer.
- The windows application will utilize a SQL database to store pressure data and have a GUI programmed in C#.

Expected Deliverables/Results:

- Hardware Fixture:
    - Will be capable of reading and transmitting pressure measurements wirelessly.
    - Configurable from 1 to 15 independent pressure measurements.
    - Pressure range is 100psi to 350psi.
    - Input power will be 110V single phase 10A max.
    - Output will be Bluetooth or other appropriate wireless standard.
    - Measurement uncertainty will be less than 1 psi.
    - Transmission rate will be 2Hz.
    - Fixture body will be less than 250 in^3 and weigh less than 5 lbs.
    - One functioning fixture will be completed as part of this project.

- Windows-based C# application:
    - GUI to display pressure data.
    - Display real-time pressure data and option to chart data over time.
    - Ability to store and recall data.

- Documentation:
    - All source code for firmware and software.
    - BOM, mechanical drawings, and schematics detailed enough to produce additional fixtures as needed.

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

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

- Sensor controls
- C# programming
- SQL knowledge
- Wireless technology
- Mechanical Design
- ECGR 3123 and 3183 for CPE
- ECGR4123 Analog and Digital communications. For EE