



Company Information

Company Name	<i>Stabilus</i>	Date Submitted	<i>11/8/2022</i>
Project Title	<i>Design of a Field Measurement Device for Solar Dampers (STAB_FIELD)</i>	Planned Starting Semester	<i>Spring 2023</i>

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	2	Electrical	1
Computer	2	Systems	

Company and Project Overview:

Organization Background



As one of the world’s leading providers of gas springs, damping solutions and electromechanical POWERISE drives, Stabilus has demonstrated its motion control expertise for eight decades in the automotive, aerospace, medical, and a host of other sectors. Gas springs, dampers and electromechanical drives from Stabilus optimize opening, closing, lifting, lowering as well as

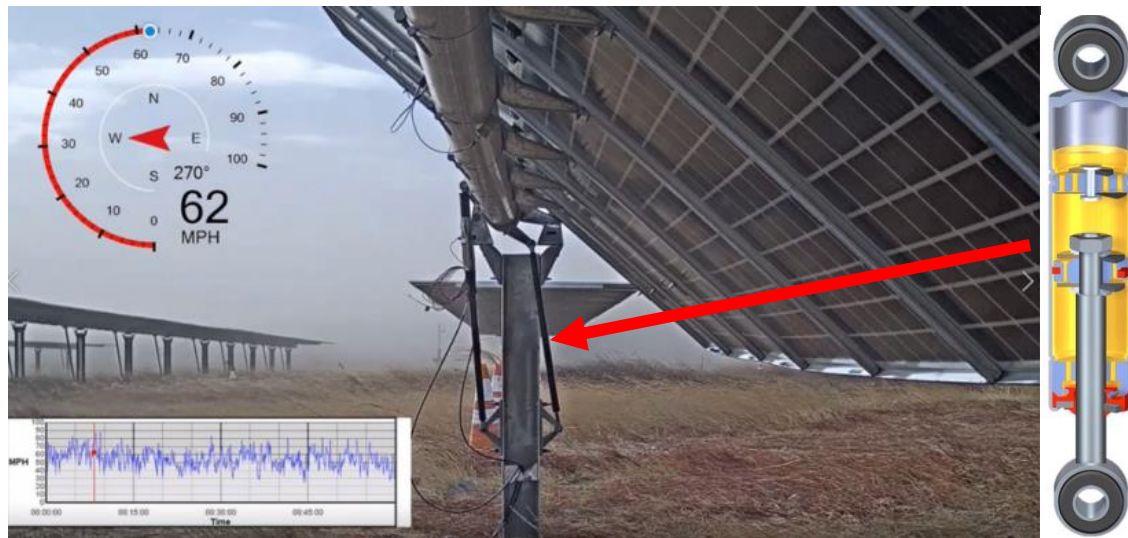


adjusting actions and protect against vibration. Employing more than 6,200 people worldwide, the company has its operational headquarters in Koblenz, Germany and global annual revenue of over \$1 billion. Stabilus operates production plants in nine countries and distributes its products in over 50 countries in Europe, North, Central and South America as well as Asia Pacific via its regional offices and sales partners. Stabilus produces products for the automotive industry from its plant in Gastonia NC

Project Requirements:

Field Measurement Device for Solar Dampers

Currently one of the biggest industries for our industrial department is the solar industry. The product shown below is used to dampen the oscillation caused by wind. The primary factor controlling this dampening is the oil fill in the product. As the damper strokes the product slowly loses oil. This can cause the product to fail, risking damage the solar panels. We are in need to provide a measurement device to use in the field to assess the oil fill in the device without the need to uninstalling the damper.



The objective of this project will be design and build a field portable measurement system for determining the amount of oil in a sealed damper.

The Scope of Work:

1. Meeting with Stabilus representatives
2. Collect additional customer requirements and specifications



3. Research sensing methods, data collection and Stabilus products.
4. Preliminary design alternatives and decision process.
5. Testing and validating of measurement methods/systems
6. Proposal of conceptual design and operation method
7. Proposal for electrical design and user interface
8. Vendor specifications and initial Bill of Materials
9. Quoting, Lead time, and Cost analysis
10. Design review and sign off
11. Prototype construction
12. Testing and Validation

Requirements:

- Measure oil fill without uninstalling the damper from the application.
- Method needs to be fast, repeatable and accurate.
- Non-destructive measurement method from exterior surface.
- Portable and battery power.
- Digital display showing the amount of oil (Go- NoGo)
- Needs to collect and store all data measured.
- Electrical sensor needs a high duty cycle.
- Blueprints and design drawings
- Operation manual, and testing documentation.
- Calibration reference procedure.

Expected Deliverables/Results:

- Prototype of the design
- Complete drawings and BOM
- Operational instructions including a video
- Field testing and documentation of the results

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):

- Sensors, Measurements and Controls



- AutoCAD/ SolidWorks
- Students must travel to Stabilus/Solar Field
- Low voltage electrical design