INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Aviation Metals*	**Date Submitted**	*11/8/2025*
Project Title	*Design of a Sheet Metal Moving System - Phase 2 (AVIATION_SHEET2)*	**Planned Starting Semester**	*Spring 2026*

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:

Aviation Metals is a metal distributor that supplies raw metals to the airline and aerospace industry such as sheet, plate, bar, tubing, extrusions, castings and forgings. One common supply item is aluminum sheets. The 12’ x 4’ sheets come into the building on pallets and then are transferred to different pallets and moved to stocking locations. Currently, it takes 2 people to move one 4’x12’ sheet from one skid to another. Aviation Metals is looking for a method to be able to lift and move sheets using only 1 person. During the transfer from the receiving pallet to the stocking pallet, it is desired to also capture the information printed onto the sheet (part number, heat lot, bar code, etc.) It is also desired to capture the condition of the sheet (front and back) so there is a record of its arrival condition. A Spring 2024 Senior Design Team worked on Phase 1 for this project. This Phase 2 project will have the objective to design and implement enhancements to the Phase 1 prototype.

Project Requirements:

The Phase 1 team developed a vacuum lift system to pick-up and move large metal sheets. See photos below:

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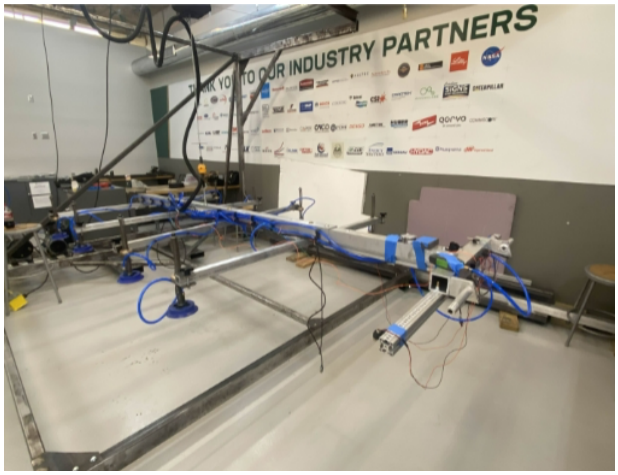

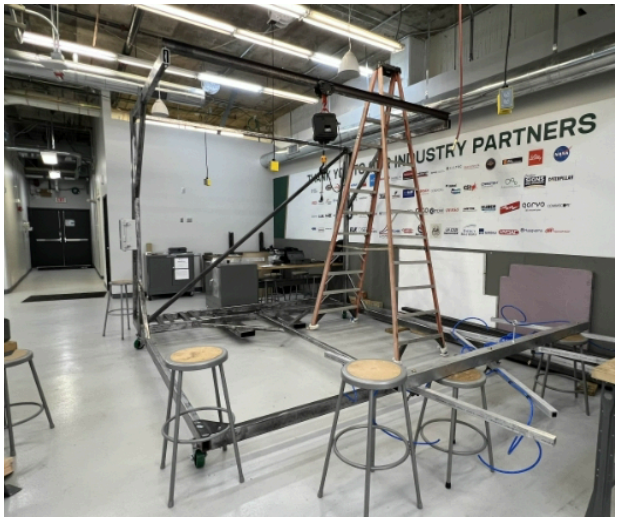

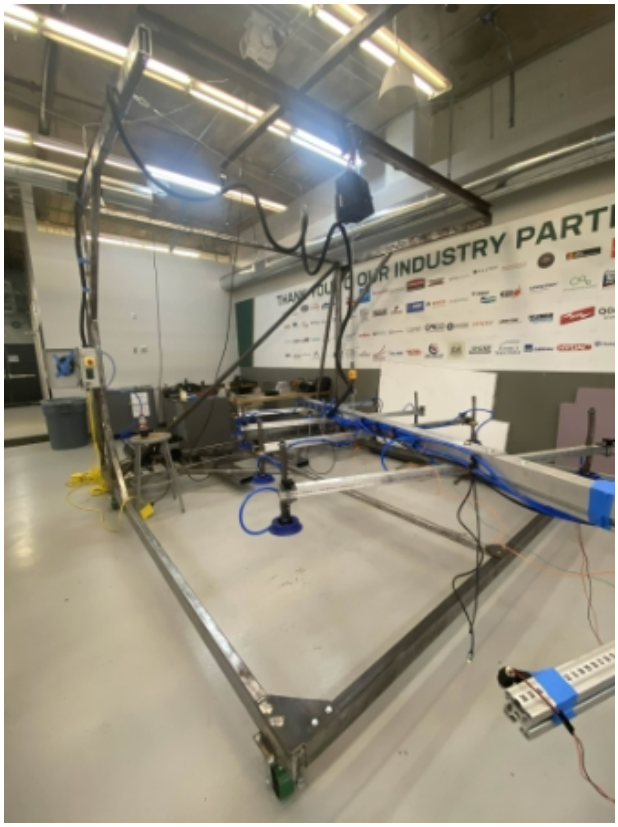

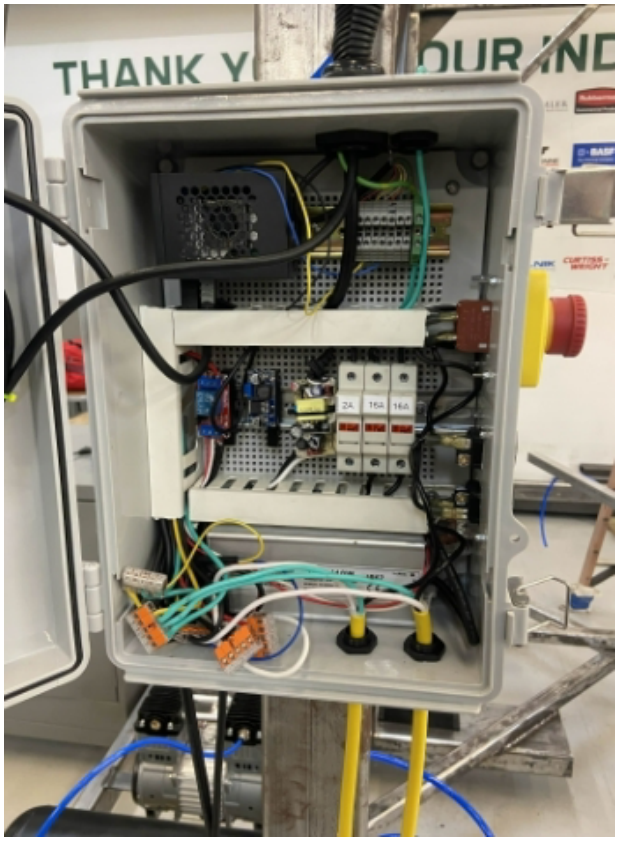

This system is designed to pick up and move metal sheets and while doing so, capture the information printed on the sheet by the manufacturer and the condition of the sheet upon arrival.

Design Improvements for the Phase 2 Project are:

1) Make the side motion of moving the sheet much easier
2) Improve the optical character recognition capabilities and address glare issues
3) Improve the function of the lasers
4) Design a better way to line up the sheets using more than one cable that keeps the motion in a 360 degree position when side shifting vs having 2 cables.
5) Revise vertical motion speed to allow for faster operation
6) Improve the OCR capabilities and improve with faster movements than the current system.

Other criteria for a solution to address:
Scratching Concerns
Thin gage damage concerns
Speed of use
Max lift: 300lbs
Quiet
Required operators: 1
Can handle small pieces of plate possibly with alternate attachment?
Portable

Expected Deliverables/Results:

- Research possible solutions that provide the functionality described
- Make determinations of make vs. buy or a hybrid for a design solution
- Implement design changes and verify at ISL lab
- Verify the system in operation at Aviation metals
- Full drawing package
- Operations and maintenance manual

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):

- Interest in Machine design and integration
- Ability to travel to Aviation Metals Charlotte location as required