



Company Information

Company Name	<i>Aviation Metals</i>	Date Submitted	<i>9/25/2024</i>
Project Title	<i>Design of a Sheet Metal Moving System (AVIATION_SHEET)</i>	Planned Starting Semester	<i>Spring 2025</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	4	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.

Project Requirements:

The student team is free to consider any solution they can imagine for achieving the goal of

- Transfer the sheet from the receiving pallet to the stocking pallet. This movement is to be done safely and without damage to the sheet. Some method of guiding the sheet onto the stocking pallet should be provided.



- Capturing the information printed on the sheet by the manufacturer
- Capture of the sheets arrival condition (front and back)

Again, the team can consider any solution, but one possible type of solution could be a vacuum lift system. You can see an example of this type of system here:

<https://youtu.be/8OkTtvX88Cg?si=vO6VA0goMT8wTDuB>

As you see, this system sits along the wall but can telescope to “grab” the package. We would like something very similar to this all while adding and addressing order validation utilizing barcode, taking pics of the material for quality and lasers (some other alignment method) for lining up on skids.

Other criteria for a solution to address:

Scratching Concerns

Thin gage damage concerns

Speed of use

Max lift: 1000lbs

Quiet

Required operators: 1

Can handle small pieces of plate possibly with alternate attachment?

Electrical: 110v preferred

Foldable for storage (as in link above)

Telescoping arm

Any concrete pad considerations (if mounted to floor)

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
- Purchase/build a system to implement at Aviation Metals
- Verify the system in operation at Aviation metals

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