



Company Information

Company Name	<i>Aviation Metals</i>	Date Submitted	<i>08/12/23</i>
Project Title	<i>Design and Fabrication of a fully operational secret mirror door for document storage AVIATION_DOOR</i>	Planned Starting Semester	<i>Spring 2024</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	3	Electrical	1
Computer	1	Systems	

Company and Project Overview:

Aviation Metals is a full stocking aerospace metals distributor that supplies the aerospace and airline industries with a wide range of alloy types and product forms all while offering many value added services such as heat treating, gun drilling, anodizing, grinding, etc. to name a few. Since 1976, we have supplied many manufacturers such as Lockheed Martin and Gulfstream Aerospace, airlines including but not limited to American Airlines and Delta, and many MRO facilities (maintenance repair overhaul).

Project Requirements:

As the company is moving into supplying more “sensitive” materials for the US government, it is in need of an outside secure area to house certain documents. This location will consist of a room that will only be accessible through a mirror door that is remotely operated and self-closed. The design of the door will be required to be mounted in the wall within a space of 32” wide x 74” high. This is a modification from an existing inferior wooden door in which only the



mirror itself and, preferably, the original control box and fob will be repurposed. The goal is to transform this from a wooden structure to an aluminum or lightweight steel with security in mind. Below is a list of requirements.

1. Utilizing metal, replacing wood for inner frame, locking, and front facing piece (a metal panel behind mirror that acts as the surface for the window and wood outer frame) all while retaining the wood outer frame. Design to maintain strength but be lightweight for installation. May need steel in certain areas, aluminum in others? The idea is prevent a break-in.
2. Reinforce, replace, and/or add additional locking mechanisms, if needed.
3. Use hydraulics with an auto timer to close in event of accidentally leaving open. For safety, a release sensor and mechanism would be required in the event of someone getting in the way of the closing door.
4. A small lip on the out edge of the inner section that fits within the wall space to “hide” the seam when the mirror is open.
5. Use the existing method of opening (key fob), though open to inventive ideas regarding any better options.
6. Wanting this door to be solid yet lightweight.

Expected Deliverables/Results:

- Have a full operable and secure yet lightweight self-closing hydraulic door that is opened via a key fob (or similar)

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):

- Fabrication/Metal work
- Software Knowledge for controller/actuator
- Ability to travel to company’s Charlotte location