



Company Information

Company Name	NAVAIR FRC-East	Date Submitted	5/1/2023
Project Title	Maintenance Interface Panel (MIP) Latch Redesign (NAV_F35)	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	5	Electrical	
Computer		Systems	

Company and Project Overview:



NAVAIR Fleet Readiness Center – East: Capstone Submission Form

For more than 60 years, Fleet Readiness Center East, at Marine Corps Air Station, Cherry Point, N.C., has played an integral role in our national defense. The facility's In-Service Support Center provides multi-disciplinary, engineering services in both design and maintenance. Our workforce has earned a reputation of excellence, providing worldwide support for Navy and Marine Corps aviation.

Fleet Readiness Center East has provided maintenance, repair, and overhaul support to virtually



every weapons platform the Marine Corps has flown – from the inverted gull-winged F4U Corsair of World War II fame, to the Corps newest aircraft, the F-35B Lightning II. It is one of eight fleet readiness centers operated by the United States Navy. It is also the Department of Defense Vertical Lift Center of Excellence. FRC East has a workforce of about 3,800 civilian, military, and contractor personnel. It is North Carolina's largest industrial employer east of Interstate 95.

NAVAIR is an active participant in capstone projects for a variety of College and uses said projects as a means for recruiting high achieving engineers.

For this project, the student team will develop a conceptual design for a new latching mechanism to replace the latches on existing 2107/2108 panels on F35 aircraft. The redesign is to prevent panels from departing the aircraft in flight.



View of
Panel
Opened



Picture of
result of a
panel
departing in
flight

Project Requirements:

Shall have the ability to provide a visual and physical indication to let the maintainers know that panels are latched and unlatched. The physical indication corresponding to the panel being unlatched shall protrude beyond the OML to give physical indication that the panel is unlocked for low light conditions.

- Mechanism shall fit the envelope/volume available within those panels and provide adequate clearance (per spec)
- Mechanism shall attempt to eliminate the need for 9+ latches. i.e., just one latch handle with a planetary gear, rods, pulleys, etc. that lead to the locking feature... like bank vault door. Mechanism and panel desired to be as light weight as possible and not to exceed the existing latch mechanism

Expected Deliverables/Results:

- Drawings
- 3D model (working Adams type model or sim) + 3D printed prototype
- Stress Analysis (able to handle aero loads, TBD load/torque at latch handle, etc.)
- Prototype and testing of design as able within the student project budget.

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):

- CAD Modeling
- FEA
- 3D Printing
- May have trip to Cherry Point, NC to see unit