



Company Information

Company Name	NAVAIR	Date Submitted	05/02/2025
Project Title	Design of Payload MX Assistance Devices (NAVAIR_PAYLOAD)	Planned Starting Semester	Fall 2025

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	5-6	Electrical	
Computer		Systems	

Company and Project Overview:

Home to nearly 4,000 employees, NAVAIR Fleet Readiness Center East has more than 1,100 engineers shaping the future of naval aviation. Engineers can work on a variety of different aircraft, components, and support equipment, growing their technical skillset and keeping America's Marines and Sailors in the fight. NAVAIR Fleet Readiness Center East is home to many Fleet Support Teams (FSTs), all of which possess technical authority to provide guidance to Naval and Marine Corps squadrons around the world. Each FST supports a major aircraft or platform and includes engineers in a variety of disciplines. NAVAIR is an active participant in capstone projects for a variety of schools and uses said projects as a means for recruiting high achieving engineers

Project Requirements:

Many MQ-9 Reaper Payload/Pods require maintenance that can be intensive physically for maintainers. This is due to lifting/holding heavy (~30-50lbs, largest size 3'x1'x1') components during maintenance evolutions in tight areas. To facilitate this maintenance, extra tasks must be



completed which significantly increases payload downtime and risk of damage to hardware.

The team will be designing and manufacturing a fixture or array of fixtures that will be able to support the weight of numerous components during removal and installation tasks. Design considerations:

- Free-stand inside/outside the pod OR mount to existing hardpoint locations
- Support up to 100lbs in weight (at least a factor of safety of 2)
- Must adequately support the bottom of components while minimizing impact to task
- Must not damage aircraft nor pods when in typical usage
- Must be corrosion resistant
- Must require minimal periodic maintenance for upkeep
- Must be able to be used when pods are on-wing OR within cradles
- Must be sufficient to where only 1 maintainer is required for each task
- Must not be electrically powered
- Must be easy to manipulate in tight areas around pod when mounted to wing

Expected Deliverables/Results:

- Fixture/Set of Fixtures to facilitate tasks
- Mock-up of items to be lifted so the fixtures can be tested on campus prior to testing at Navair and to be demonstrated at Expo
- Standard Operation Procedures on how to execute necessary tasks
- Periodic Maintenance requirements
- Technical Data Package containing all CAD files, mathematical proofs, maintenance documentation, etc.

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. It is also a mandatory part of this Program that the Industry supporter attend the 2 expos to grade their team's performance. 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



- Mechanical Design
- Knowledge of Safety Factors
- Interest or experience with maintenance operations
- This project is sponsored by NAVAIR in Pax River, Maryland. Students selecting this project must be able to support the logistics of travelling to this site. Travel reimbursement will be provided in accordance with ISL Purchasing procedures.
- Must be a US Citizen