



Company Information

Company Name	NAVAIR FRC East	Date Submitted	04/20/2026
Project Title	Design of an Adjustable Ballast System for the KC-130J (NAVAIR_BALLAST)	Planned Starting Semester	Fall 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	5-6	Electrical	
Computer		Systems	

Company and Project Overview:

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.

Home to nearly 4,000 employees, NAVAIR Fleet Readiness Center East has more than 1,100 engineers shaping the future of naval aviation. Engineers have the opportunity to 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 a large number of 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.

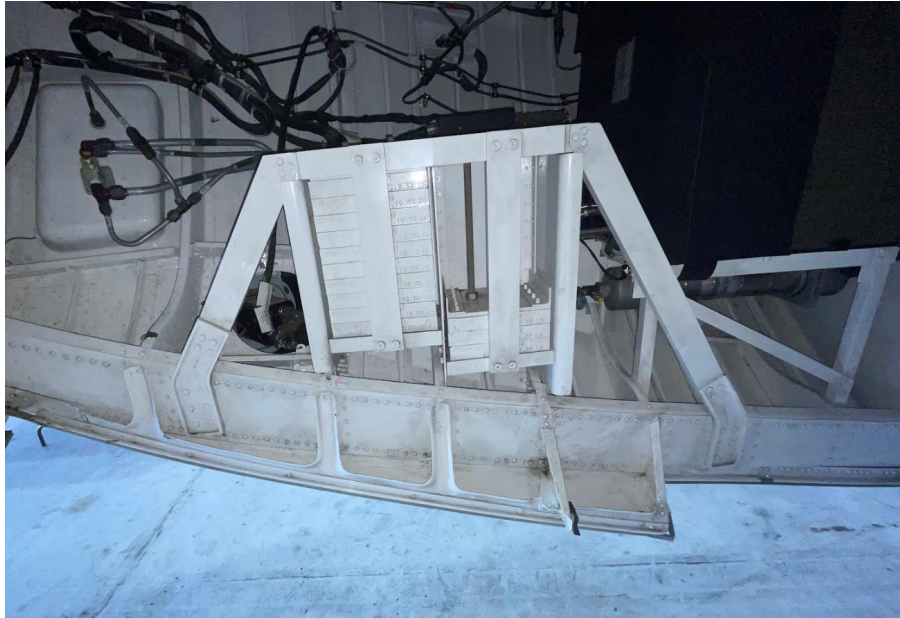


NAVAIR is an active participant in capstone projects for a variety of colleges and uses said projects as a means for recruiting high achieving engineers.

This project is related to the system used in the KC-130J aircraft to balance the plane during flight operations.



The KC-130J ballast system consists of a permanent installation of provisions to mount lead ballast plates in the aircraft forward wheel well. The adjustable ballast system is located on both the port and starboard sides of the wheel well at approximately Fuselage Station 125. The system has provisions to mount up to 1000 pounds of lead ballast plates. See photo of ballast system installed in an aircraft:



The KC-130J Adjustable Ballast System is a ballast system that addresses weight and balance concerns experienced by the fleet. The ballast replaces the requirement for the armor to be installed to meet aircraft CG envelope restrictions.

The objective of this project is to analyze the current system and develop a replacement design that solves the problems with the current system. The new design will address corrosion concerns, lack of reparability of the current system, and ease of removal if the system needs to be removed to be replaced with armor for certain missions. The new design will need to include structural analysis to demonstrate that the design can survive the G forces experienced in operation.

Project Requirements:

- 1) System shall have reparability in the design.
- 2) System shall prevent corrosion of threaded rods, securing nuts and ballast weights.
- 3) System shall meet adjustable ballast requirements.
- 4) System shall be designed to fit in same location and integrate into the airframe.
- 5) System shall meet requirements of up to 1000 lbs of ballast plates.
- 6) System shall operate within the shock, vibration and environmental conditions experienced by the aircraft.



Expected Deliverables/Results:

1. Provide 3D model of design.
2. Design drawings
3. Bill of Materials
4. Prototype demonstrator/mock-up
5. Provide instructions for operating and maintaining the design.

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Industry Supporter. The work product (if applicable) is displayed at the final presentations or design expo then immediately handed over to the supporter unless arrangements have been made to deliver at a future date.

List any specific skills, requirements, specific courses, knowledge needed or suggested:

Static Loading

Solid Mechanics

3D Modeling

Geometric Dimensioning and Tolerancing

Interest in corrosion prevention materials