



Company Information

Company Name	NAVAIR FRC-East	Date Submitted	5/1/2023
Project Title	Design of a H-53K Airframe Lifting Dolly (NAV_LIFT)	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	1
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 school and uses said projects as a means for recruiting high achieving engineers.

Project Requirements:

NAVAIR is requesting a comprehensive engineering design package for a wheeled dolly for jacking and supporting the H-53K airframe in order to facilitate removal of helicopter sponsons for inspection.



The dolly will be capable of being towed with aircraft behind a tug in a Depot (Heavy overhaul facility) environment.

Expected Deliverables/Results:

- Design a wheeled dolly that can support the weight of an empty H-53K helicopter ~35000 lbs.



- The design needs to tie into existing jacking points and frame stations to distribute loading as much as possible amongst the airframe.
- The dolly needs to hydraulically lift the airframe safely to support sponson removal.
- The hydraulic system should be powered by 220v 3 phase
- The dolly should be designed for infinite life or 50 years service, with minimal service items during that time period. Expect a few miles of travel per year.
- The dolly should be able to be towed using a tug.
- Corrosion resistant design, ie capable of being stored outdoors for extended periods of time.
- Prototyping the design will be beyond the allowable budget, so a portion of the design or a scale model of the design will be prototyped.

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):

- Hydraulics system design skills,
- Statics,
- Solid Mechanics,
- Fatigue analysis,
- CAD (solid edge preferred but not required)
- May have a trip to Cherry Point, NC to see unit