



Company Information

Company Name	<i>Fleet Readiness Center East</i>	Date Submitted	<i>04/22/2021</i>
Project Title	<i>AH-1Z Weapon Pylon Sling Design (NAV_AH1Z)</i>	Planned Starting Semester	<i>Fall 2021</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	5	Electrical	
Computer		Systems	
Other ()			

Company Overview:

Company Background:

Fleet Readiness Center East (FRCE) is North Carolina's Largest maintenance, repair and overhaul, and technical services provider with more than 4,000 military, civilian and contract workers. FRCE has the capability to repair nearly 20,000 distinct aircraft components, and is the preferred repair source for all Navy and Marine Corps rotor blades, providing full life cycle support for current and future rotor blades. FRCE maintainers perform phased depot maintenance, planned maintenance intervals, integrated maintenance, aircraft modification, aircraft conversion, overhaul or in-service repairs on numerous aircraft. Examples including, but not limited to, AV-8B and TAV-8B Harriers, the MV-22 and CV-22 Osprey, the AH-1Z Viper, the UH-1N Huey, the UH-1Y Venom, the CH-53E Super Stallion, and MH-53E Sea Dragon, the F/A-18A-D Hornet, the F/A-18E-F Super Hornet, and the F-53A/B/C Lightning II, The H-60 Seahawk; and the C-130 Hercules.



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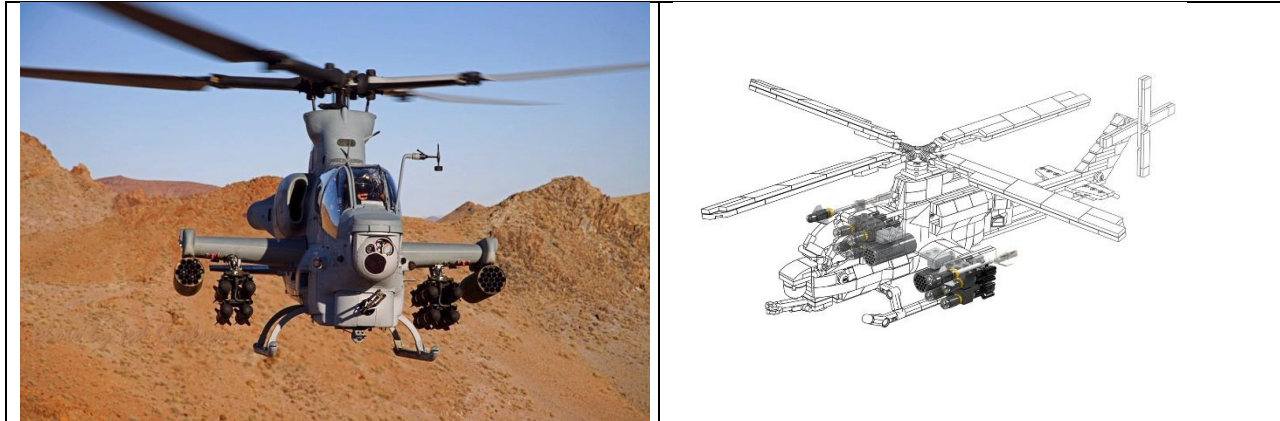
The WILLIAM STATES LEE COLLEGE of ENGINEERING

Industrial Solutions Laboratory



Project Background:

This project will focus primarily on supporting the H-1 Support Equipment (SE) Fleet Support Team (FST), and the Integrated Maintenance Plan (IMP) Line at Marine Corps Air Station (MCAS) New River through the design of improved tooling for removal and installation of AH-1Z Weapons Pylons Assemblies.



The IMP line at MCAS New River has ongoing issues while removing H-1 Weapons Pylon Assemblies due to the current lifting sling design and/or the state in which the aircraft come in for maintenance. The current original equipment manufacturer (OEM) lifting sling does not allow maintainers to remove and replace (R&R) the Weapons Pylon without requiring artisans to lift the outboard end of the Weapons Pylon manually to ensure proper alignment during R&R. Manually lifting the Weapons pylon introduces opportunity for injury to personnel and potential damage to aircraft components. Another issue with the current OEM lifting sling is the way it attaches to the aircraft. The sling attaches to the weapons pylon by pinning to three aircraft fittings with quick release pins. If any of the fittings on the aircraft are damaged or broken, the sling cannot safely remove and install the Weapons Pylon assembly. New River H-1 Integrated Maintenance Plan line needs an improved method to remove and install the AH-1Z Weapons Pylon Assembly.

Project Requirements:

The current lifting sling introduces opportunity for injury to personnel and damage to aircraft components, and cannot be used if the attachment fittings are damaged or broken. The design team will be required to design an alternative lifting method for the Weapons Pylon Assemblies. The design solution must safely support the Weapons Pylon Assemblies during removal and installation procedures. The design solution must meet the proof load requirements of the original lifting sling, and ensure that the Weapons Pylon does not require manual adjustment during removal or installation procedure. The design solution must also guarantee that the weapons pylon is secured to the lifting device in a manner that no damage is done to the Weapons Pylon, other aircraft components, and presents the opportunity for injury to personnel.

Expected Deliverables/Results:

- Records of initial research.
- Records of problem solving process. (Problem Definition, Problem Research, Brainstorming, Solution Selection, Solution Development)
- Solid Model of Design Solution.
- Brief of initial prototype (technical design review with Support Equipment Team)
- Detailed Drawing of Design Solution
- Quotes from government approved manufacturers (Given by Technical POC)
- Prototype of Design
- Records/brief of prototype testing.
- Revision of drawing as necessary.



Disposition of Deliverables at the End of the Project:

All research, solid models, detailed drawings, prototypes, and hardware designed or manufactured will be property of Fleet Readiness Center East/NAVAIR and turned over to the technical point of contact (POC) at the conclusion of the project.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Engineering Problem Solving Process, Solid modeling, FEA, Geometric Dimensioning and Tolerancing
- Must be US Citizens (Students and Faculty Mentors)
- Must be willing (entire team, no exceptions) to travel to Cherry Point NC to gather data for project. Note mileage for travel will be reimbursed according to ISL procedures