

Senior Design Project Description

Company Name	<i>NAVAL AIR SYSTEMS COMMAND FRC-E (NAVAIR)</i>	Date Submitted	<i>05/08/2020</i>
Project Title	<i>Universal Fuel System Pressure Test Set (NAV_PRESS)</i>	Planned Starting Semester	Fall 2020

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	4	Electrical	2
Computer		Systems	
Other ()			

Company and Project Overview:

Fleet Readiness Center East is part of Naval Air Systems Command or “NAVAIR.” During its more than seven decades of operation, 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 employer for UNC Charlotte graduates and has many COE Alums on their staff.

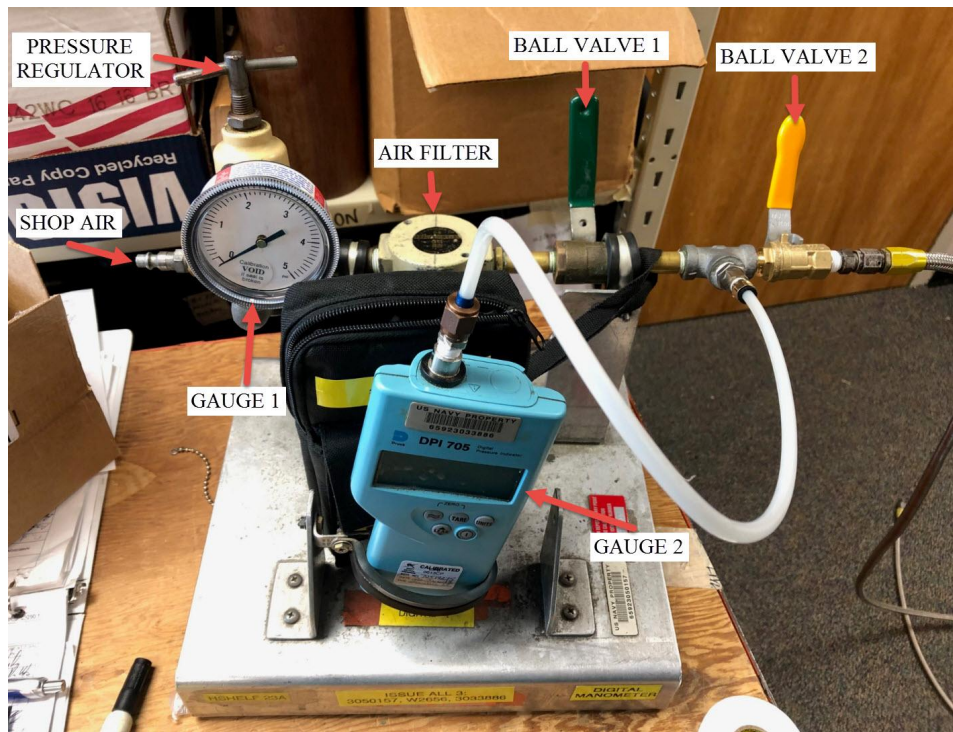
FRC East artisans perform phased depot maintenance, planned maintenance intervals, integrated maintenance concepts, modernizations, conversions, overhaul or in-service repair on the AV-8B and TAV-8B Harriers, the V-22 Osprey, the AH-1W Super Cobra, the AH-1Z Viper, the UH-1N Huey, the UH-1Y Venom, the CH-53E Super Stallion, and MH-53E Sea Dragon, the F/A-18 Hornet, the F-35B Lightning II, the H-3 Sea King; the H-60 Seahawk; the EA-6B Prowler; and the C-130 Hercules. FRC East is also the depot repair point for the drive and rotary systems of the MQ-8B Fire Scout.

At the end of an aircraft’s Planned Maintenance Interval (PMI) an aircraft’s fuel system / fuel bladders are inspected for leaks before the fuel bladders are reinstalled and the aircraft is refueled. Each aircraft uses a different pneumatic test set in order determine leaks in the aircraft’s fuel system / fuel bladders. The various aircraft that are tested each have their own test procedure and different pressure ranges that their fuel system are pressurized to. The issues that all the aircraft lines face is that if one of the pressure test sets is either broken or down for calibration then the aircraft line is at a work stoppage with no work-around. The scope of this project is to design and prototype a universal fuel system test set that can be used on all the aircraft lines (H-1, H-53, and V-22).



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Current Pressure Test Set used to test the UH-1N Fuel System and T400 Engine.



Current Pressure Test Set used to test the H-53 Fuel System.



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Project Requirements:

- Must be able to regulate pressure from 0-100 PSI.
- Be able to display the fuel system pressure (gauge).
- Be able to prevent over pressurization depending on the aircraft's pressure requirements.
- The unit is moved frequently for the operation so it is desired to be operated off of battery power.
- Must be portable so that the test set can be transported to the different aircraft lines.
- Must be rugged to withstand repeated movement throughout the shop.

Expected Deliverables/Results:

1. Full system schematic and drawing
2. Parts list
3. Analysis of solution to prove all components will be sufficient
4. Solid models of physical design components.
5. Proof of concept prototype which is tested and verified on an Aircraft's full system.

Disposition of Deliverables at the End of the Project:

NAVAIR will take possession of all deliverables and research at the completion of the project. Project team to co-ordinate shipment with NAVAIR.

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

- 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.