



Company Information

Company Name	<i>Curtiss - Wright</i>	Date Submitted	<i>11/10/2023</i>
Project Title	<i>Design and Implementation of a Gear Wear Test Rig (CURTISS_GEAR)</i>	Planned Starting Semester	<i>Spring 2024</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	3	Electrical	1
Computer	1	Systems	

Company and Project Overview:

Curtiss-Wright Corporation has the most renowned legacy in the aerospace industry. In 1929, Curtiss-Wright was formed by the merger of companies founded by Glenn Curtiss, the father of naval aviation, and the Wright brothers, renowned for history's first flight. These technological pioneers ushered in the era of aviation and their trailblazing spirit made history. Curtiss-Wright has changed dramatically over the past nine decades and continues to transform itself to be at the forefront of the markets that we serve.

Curtiss-Wright Actuation Division designs, manufactures, and supports electro-mechanical actuation products and systems for use in demanding applications in Aerospace, Defense, and Industrial Automation markets. Our market leading solutions help improve the reliability, efficiency and performance of our customers' operations and platforms, as well as reducing their environmental impact with energy efficient electro-mechanical designs and technology.

Leveraging both standard products and custom designs, our engineering teams are experts in the markets they support and focus on a deep understanding of customer requirements to develop

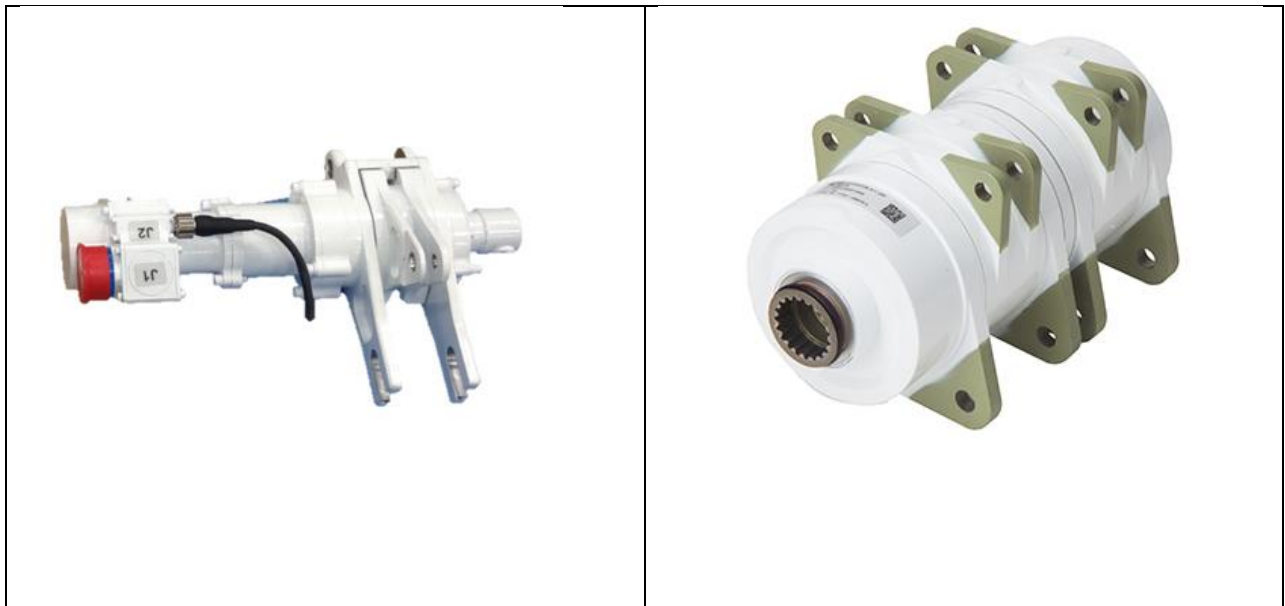


the right solution. We make use of an extensive technology portfolio and lean manufacturing processes to offer faster time to deployment.

For the Aerospace market, we supply actuation systems for flight control, landing gear, utility and other applications on both commercial and military aircraft.

In Ground & Naval Defense markets, we support a wide array of applications ranging from door assist, ramp and hatch actuation, weapons handling systems, radar and launch platform actuation, and robotic (AUV/ROV) actuation.

This project will involve wear testing for Rotary Geared Actuators. See product examples below:



Project Requirements:

Curtiss-Wright rotary actuators are used in aerospace applications for control of primary control surfaces (ailerons, rudder and elevator) and secondary control surfaces (tabs, flaps, spoilers and slats). Primary control surfaces are used continuously during flight. Secondary control surfaces are typically used during takeoff and landing. Rotary actuators are a combination of planetary gear sets in ratios needed for the application. The actuators are electrically powered. The cycles an actuator experience therefore varies dramatically based on its usage as a primary or secondary application. The purpose of this project will be to design a life cycle test rig for use in testing primary actuators. This rig will be used to test various actuators to determine gear wear experienced. This data will be used in the design of gear improvements.



Curtiss-Wright has an existing test fixture that was used for testing gears in a horizontal orientation. This project will use that test fixture as a starting point and redesign it to work in a vertical orientation. The team will determine which parts can be re-used and which parts need a new design. The team will design, build, and test a vertical orientation gear test stand. This test stand will be used to life-cycle various rotary actuators. Long term (1 month) continuous testing will be done to prove the operation of the test rig. Students will use precision metrology methods to characterize gears, prior to and immediately after testing.

Expected Deliverables/Results:

- A test rig that can be used for long term rotary gear testing with the actuator in the vertical orientation.
- Rig to have user interface screen that can be used to program test parameters.
- Rig to have sensors to capture elapsed time and cycles completed.
- All drawings and software need to replicate the design.
- User/Operators manual along with video demonstration
- Before and after Precision Metrology measurements of gears tested
- Final report documenting all results.

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):

- Precision metrology interest
- CAD and 3D modelling
- Interest in control systems
- May require travel to the Company's location