

Senior Design Project Description for FALL 2016

Project Title: Ballistic Test Equipment Multi-Axis Precision Barrel Alignment

Supporter: Metal Works Mfg.

Supporter Technical Representative: ASSIGNED

Faculty Mentor: _____ ASSIGNED TBD (check one)

Single Team Dual Team _____ (check one)

Personnel (EN/ET): 1 E, _____ Cp, _____ Cv, 4 M, _____ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

Ultra Armoring/Metal Works Mfg. Co. is a lean contract manufacturing company specializing in build to print metal fabrication solutions for Commercial, Government, and Defense industry applications. Ultra Armoring/Metalworks Manufacturing are in need of an updated platform needed for the precise alignment of test articles at the Ultra test range.

Initial Project Requirements (e.g. weight, size, etc.):

This project involves building a multi-axis precision alignment device. This device will incorporate a number of functions and requirements including:

- (4) axis function
- Contain data acquisition on board for a chronograph
- Designed for interchangeable barrels for different munitions testing.
- Video recording capability (high speed, up to 100 meters away from the machine)
- Environmental Data capture (temperature, humidity, barometric pressure, wind speed & direction).
- Recorded output that lists environmental conditions, chronograph reading, shot number, and a link to the video file that can be opened in excel.
- Laser pointer alignment that can be adjusted.
- Remote operation, wired.
- This unit will be stored outside where it could come in contact with rain, snow, wind, rodents, ants, etc. Part of the project is defining material and potential structures or covers to help resist infiltration by these elements.
- Lock-out system to prevent usage
 - Possibly a code-in system to activate & use the test apparatus
- Motion sensor deactivation.
- This unit needs to be durable enough to have a life cycle of 10 years (details to come)
- The intended size is dependent on design, but is generally expected to be around 24 inches wide, 24 inches long, and 18 inches tall with a track that is approximately 12 feet long to move laterally.

Expected Deliverables/Results:

This will be a multi-stage project with milestones established by University and Company collaboration to walk the student through a true design process, including, but not limited to:

- Requirements Capture
- Engineering Capture
- Schedule Generation
- PDR (preliminary design review)
- CDR (critical design review)
- Pre-Release
- Release
- Solid modeling using Solidworks 2015 or newer using appropriate modeling techniques
 - o Solid modeling assembly with appropriate part numbers and structure
- Indentured Bill-of-Material
- Modification print to all off-the-shelf modified items
- TDP to a level that can be reproduced by an outside vendor.

The end result is to have a fully functional prototype intended for usage for 10 years (full life cycle details to be announced). This is a design & build project.

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

None