Team: Emulation of Aerospace Actuation Systems

Date: 9/14/2021

Attendance:
☒ Whole Team Present
☐ Members Missing

Missing Senior Design Students, if any:
Click or tap here to enter text.

Meeting:
☒PDR
☐CDR

EiR Mentor: Matt Heath
EiR Signature: Click or tap here to enter text.

EiR mentor's recommendation for future steps:
(to be filled-in by mentor) – continue writing/typing on the back, if needed

- Complete Project Plan
- Elicit requirements from the stakeholders. Understand the "needs" and how it relates to the problem statement (Scope of work).
- Find the model of the OPAL-RT HIL hardware.

The main purpose of the meeting was for introductions and start working on the alignment of what the scope of work is for the project. The team is well organized and motivated.

Tell us what you think about the meeting:
(to be filled-in by the team after the meeting)

The meeting was very productive. The team introduced themselves to Matt, who shared his background and his role on the EM-TRAS project at Woodward, Inc. Matt expressed that he would like to be more involved in the project than a typical EiR because he is directly responsible for the completion of the testbed being constructed at the ASET lab and wants to see significant progress made via the senior design team's efforts this year. Overall the team was very excited to be able to work on such an important project and is optimistic that Matt will be able to help guide the project to successful completion.

Matt shared a few major facts about TRAS (Thrust Reverser Actuation Systems) on airplanes to give the teammates a better understanding of the purpose and scope of the project. TRAS immediately deploys <2 seconds after a WOW (weight on wheels) signal when a commercial plane has landed. Only a few military planes in existence have the permission to deploy TRAS while in the air for the purposes of rapid descent and movement. There are several different types of TRAS; Matt discussed traditional/cascade systems and older clamshell systems. Cascade systems operate where a solid nacelle around the airplane's engine pushes half to 2/3 of the way back, blocking bypass air around the engine and pushing it forward to slow the plane. This system does not push as hard at the bottom of the engine enclosure to prevent debris from getting into the engine. Smaller/older planes use a clamshell system, where part of the nacelle protrudes and creates an open clamshell shape that pushes thrust and bypass air forward. Current efforts at Woodward involve a new

style of nacelle that is being motivated by several actuators with an anti-jamming algorithm being developed in conjunction with the systems engineering department at CSU.

Matt's thoughts for the testbed are to ultimately allow us to test any single piece of physical hardware by itself with everything else around it fully emulated by a model loaded on the OPAL-RT machine.

Matt warned the team to be cautious of what the TI Microcontroller can produce in terms of voltages in relation to the OPAL-RT. He said it may not matter in the long run due to potential compatibility between drivers for both machines, but this needs to be investigated and defined in the coming weeks. Matt would like Kori to focus on modifying current system requirements to fit the HIL system and to also focus on identifying requirements around the interface between the two hardware elements themselves to ensure the project can be completed efficiently.

EIR Mentor to fill-in the form and email back to the Team.
Team will be uploading this form to Canvas by the specified date.