

Senior Design Project Description – COE Department Project

Department Name	ETCM	Date Submitted	5/1/2018; revised 7/23/18
Project Title	Air Force University Engineering Design Challenge (UNCC_AFRL)	Planned Starting Semester	F 2018

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	2
Computer	1	Systems	1
Other ()			

Project Overview:

Challenge: Personnel Detection – Rescue teams (for example in hostage rescue or disaster relief) may need to locate survivors/hostages in rubble or in a room/building from an external, standoff distance. For example, rescuers arriving at a collapsed building must rapidly identify location of trapped personnel to optimize rescue efforts. As another example, operators may be stationed in a nearby building or hiding location prior to a hostage rescue operation, and need to identify the location of hostile forces and hostages prior to commencing the mission. These two missions differ by the level of detectability/covertness of the solution, and the challenge could focus on one or the other.

Structured as a competition amongst undergraduate university teams, the University Engineering Design Challenge is expected to provide improvements and alternatives related to existing RRTAS approaches to practical design engineering, including systems engineering, requirements allocation and flow down, design synthesis and problem solving, and innovative solution development, test and validation.

Project Requirements:

Example Competition Concepts (Preliminary Thoughts – Not Final):

A. *Rescue scenario: Person is hidden in simulated pile of rubble resembling collapsed building, and teams attempt to locate the victim while staying on the perimeter of the rubble pile. Scoring based on speed of execution, accuracy of location, ease of operation, and system size/weight.*



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B. Hostage scenario: Teams execute a surveillance mission from outside a 2-story building, with the objective of identifying the location of persons in the building. Scoring based on speed of execution, accuracy of location, ease of operation, and system size/weight.

Expected Deliverables/Results:

- *AFRL Concept review, PDR and CDR*
- *On-site presentation and demonstration*
- *Final report*
- *Travel to competition – A travel team will be selected to travel to the competition in April 2019 at a site yet to be announced. Selection will be based on contribution to the effort, as well as performance during the fall and spring semesters.*

Disposition of Deliverables at the End of the Project:

AFRL reserves the rights to retain the hardware.

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

Specifics unknown, but based on past two years:

- Machining
- Robotics
- Control systems
- Programming