

Senior Capstone Project Proposal

The project is designed for a team of students working toward completion of a project, within two semesters¹.

Title	GNU Radio Waveform Simulator
Sponsor	Contact person: Adam Mielke Company name: Pacific Defense
	Contact info: Adam.Mielke@Pacific-Defense.com
Description	<p>This project will utilize open source software to generate and simulate some commercial signals. The preferred software platform will be GNU Radio. (https://www.gnuradio.org/about/). During the course of the project, the following signals should be evaluated to determine suitability for simulation. The following criteria should be used: a) availability of publicly available specification b) the difficulty of implementing the signal c) ??</p> <p>These are the primary signals to evaluate:</p> <ul style="list-style-type: none"> ▪ LoRa Physical Layer ▪ SigFox ▪ Digital Television – DVB-T (terrestrial) ▪ Automatic Dependent Surveillance Broadcast (ADS-B) – Mode-S <p>A successful project will:</p> <ol style="list-style-type: none"> 1) Survey the various protocol specs and select one or more (prefer two or three) signals to simulate. 2) Use GNU Radio open source software to implement a flowgraph that is capable of generating the I/Q data that simulates the selected protocol. 3) Demonstrate the waveform (s).

¹In general, one semester has 15 weeks. For a 3 credit hours course, a student is expected to work minimum of 8 hours per week for the project which is equivalent to minimum of 120 hours.

Disciplines (ME, EE, CS, etc.)	Jacob Lister + (1-2 ECE)
Estimated budget	No budget required. All tooling should be free for use in academic setting.
Technology Disclosed? If so, what?	None
Additional requirements	Requires U.S. Citizenship
NDA or IP Assignment agreement requested?	Pacific Defense would retain IP.
Faculty Advisor	Bruce Reidenbach

Technology and ECCN:

“If your project involves ‘technology’ that is either (a) not publicly available or (b) includes proprietary source code (not executable files), then it requires an ECCN.” ‘Technology,’ for this purpose, is defined as “information necessary for the development, production, use, operation, installation, maintenance, repair, overhaul or refurbishing of an item. Technology may be in any tangible form, such as written or oral communications, blueprints, drawings, photographs, plans, diagrams, models, formulae, tables, engineering designs and specifications, computer-aided design files, manuals or documentation, electronic media or information revealed through visual inspection.”

Interactive tool to determine ECCN:

<https://www.bis.doc.gov/index.php/export-control-classification-interactive-tool>

NDAs and IP Assignments:

The sponsoring company typically has NDAs and IP assignment forms that it wishes to use. Neither the NDA nor the IP assignment is an agreement with Purdue directly; these agreements are between the students and the sponsoring company. Of course, our office can review the company-provided documents to be certain it aligns with Purdue’s standards. Alternatively, our office has draft agreements which we could provide for the sponsor’s use. Again, as NDAs are between the student and the sponsor, Purdue cannot be a party to or advise the sponsor or the student on the NDAs, other than to outline some basic expectations as to fairness and suitability of the NDA to a student project.

Sponsor Acknowledgements:

¹In general, one semester has 15 weeks. For a 3 credit hours course, a student is expected to work minimum of 8 hours per week for the project which is equivalent to minimum of 120 hours.

By way of background, Purdue University professors who have senior capstone class projects involving outside sponsor companies notify our office so that we can prepare an acknowledgement form for the sponsoring company's completion. This is not a contract but an acknowledgement form signed by sponsoring companies which lays out Purdue's guidelines regarding class projects and outside company inputs, potential export control issues, and student intellectual property. Some sponsoring companies offer a monetary donation to the project, but that is not a requirement.

¹In general, one semester has 15 weeks. For a 3 credit hours course, a student is expected to work minimum of 8 hours per week for the project which is equivalent to minimum of 120 hours.