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FY17 ISCR Scholar End-of-Assignment Report - Robbie Sadre

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Disclaimer

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FY17 ISCR Scholar End-of-Assignment Report

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Home Institution/University: UC Davis

Mentor's Name: Jovana Helms

Division: Global Security

Employment/Assignment Dates: June 26 2017-Sept 21 2017

Project Title: (title describing your work) SKYFALL

Project(s) Assignment/Description: (what did you do? – average report is ~250 words)
MS Word format is preferred. Plain text is also acceptable.

Throughout this internship assignment, I did various tasks that contributed towards the starting of the SASEDS (Safe Active Scanning for Energy Delivery Systems) and CES-21 (California Energy Systems for the 21st Century) projects in the SKYFALL laboratory. The goal of the SKYFALL laboratory is to perform modeling and simulation verification of transmission power system devices, while integrating with high-performance computing. The first thing I needed to do was acquire official Online LabVIEW training from National Instruments. Through these online tutorial modules, I learned the basics of LabVIEW, gaining experience in connecting to NI devices through the DAQmx API as well as LabVIEW basic programming techniques (structures, loops, state machines, front panel GUI design etc).

While this training was being completed, I also helped with physical aspects of the SKYFALL laboratory set up. I installed seven audio amplifiers into a 19-inch rack. I also set up the shelves for the voltage amplifiers as well. These devices would eventually be used as the amplifiers that would connect to the National instruments devices that m LabVIEW code would control. I also performed the wiring of the audio amplifiers and voltage amplifiers to the National Instruments controller in a detail-oriented fashion, including accompanying documentation, to ensure that the laboratory setup matched the design schematics.

Once my training was completed, my main task was to create a LabVIEW VI (a LabVIEW program file or virtual instrument) that could create customizable 3-phase wave forms. The way the program works is a user will enter various voltage amplitudes and time durations, and the program will control the National Instruments devices to behave accordingly. For example, a user will specify 3 sequences and then input the following data into the appropriate fields:

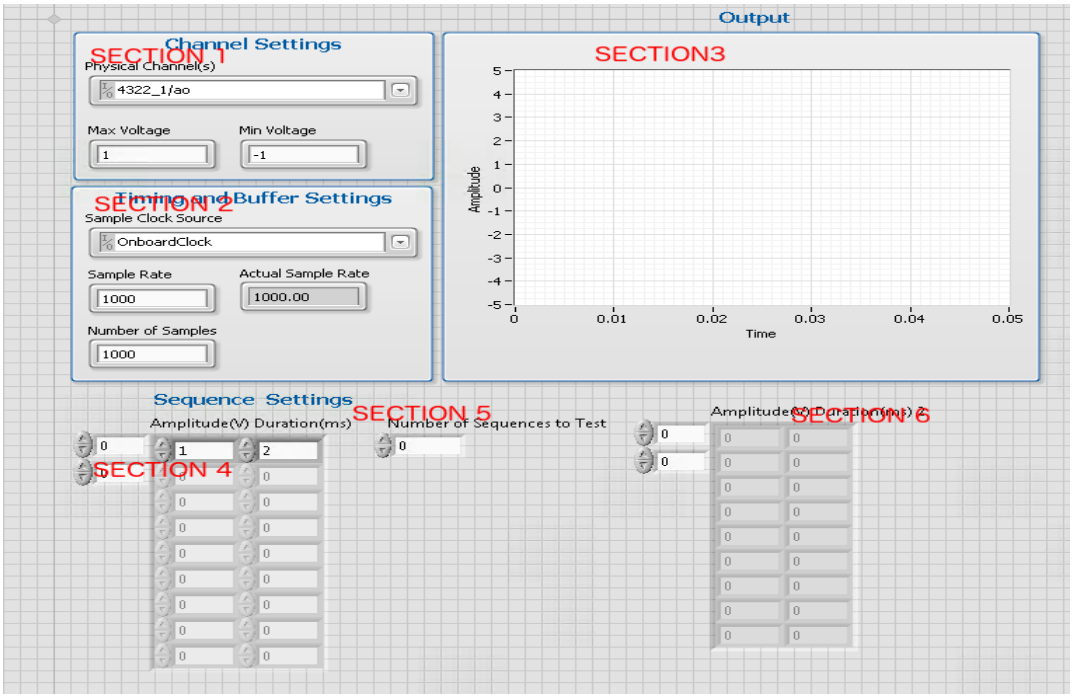
<Voltage (V), Time(MS)>
<1, 4000>
<.5, 3000>
<.25, 6000>

Once this data is entered, the user can then run the VI. This particular data will generate a 60Hz 3-phase voltage sinusoidal wave sequence at an amplitude of 1 volt for 4000 milliseconds, .5 volts for 3000 milliseconds, and then .25 volts for 6000 milliseconds. The user can specify which 3 analog output nodes on the device to run each 3-phase wave signal, and can create up to 3 different 3-phase wave signals at once.

Aside from these specific tasks, my other day to day tasks of working for on the SKYFALL laboratory involved ensuring that the laboratory is organized and assisting other members of the team with the amplifiers and devices.

As a result of my work this summer, I was able to get initial testing and verification of wiring from the National Instruments generated signals, to the voltage and current amplifiers, to the relay panels, to the distribution panels, and finally to the devices themselves. This work enabled SKYFALL related projects, such as SASEDS and CES-21, to perform hardware-in-the-loop testing for their deliverables.

Here is a picture of the front panel of the VI I created.



Here is a picture of the skyfall testbed