

# Project E2.8 – 2.5MW TEST BAY IMPROVEMENTS



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Instructor: Mr. Lee Hinkle

## Project Description

- Create a Web user interface (WebUI) that indicates the status of 12 breakers
- A user can remotely operate and observe the breakers' and its parameters
- Create database tables that will log breakers' parameters and log system commands

## Sponsor Info.

Aggreko is the global leader in mobile power, heating, and cooling. They seek to provide smart energy and grid solutions based on battery storage. Their compact energy storage solutions require exhaustive testing at their test bay facility, which Team YOU&I will be making improvements on.

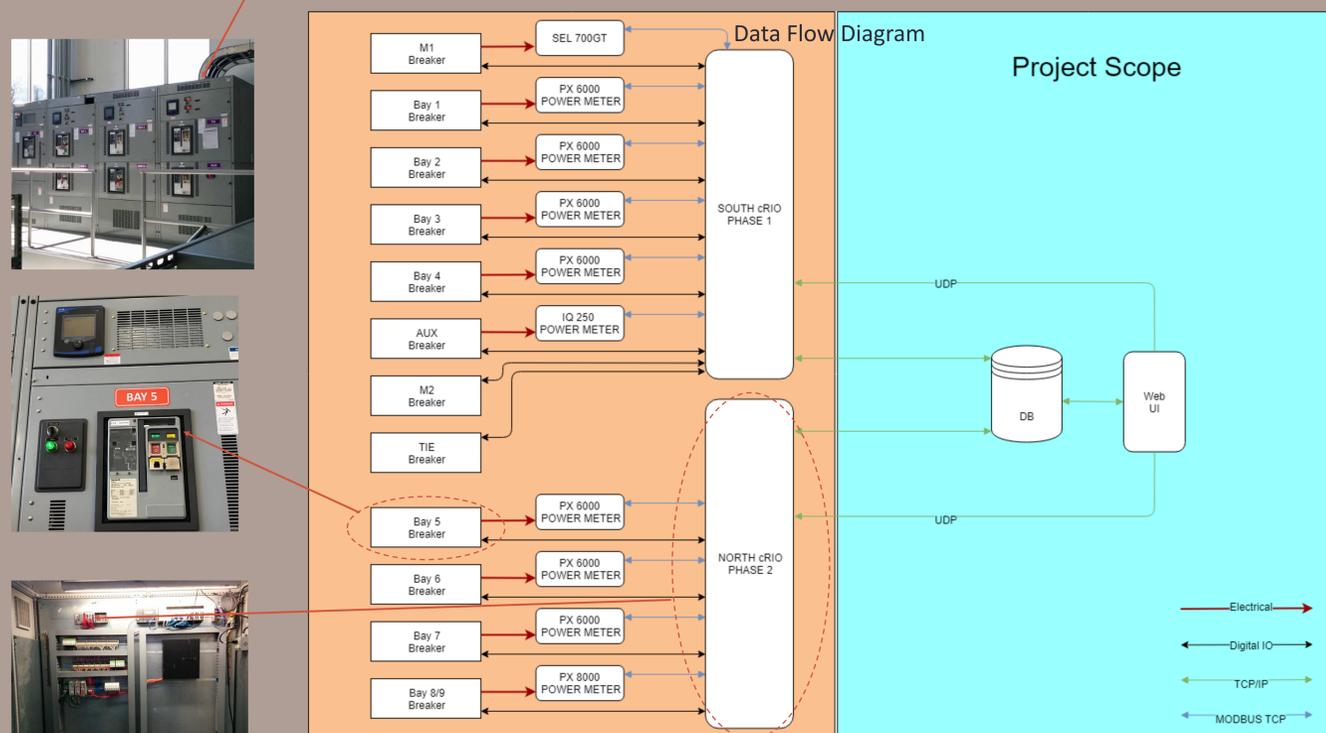
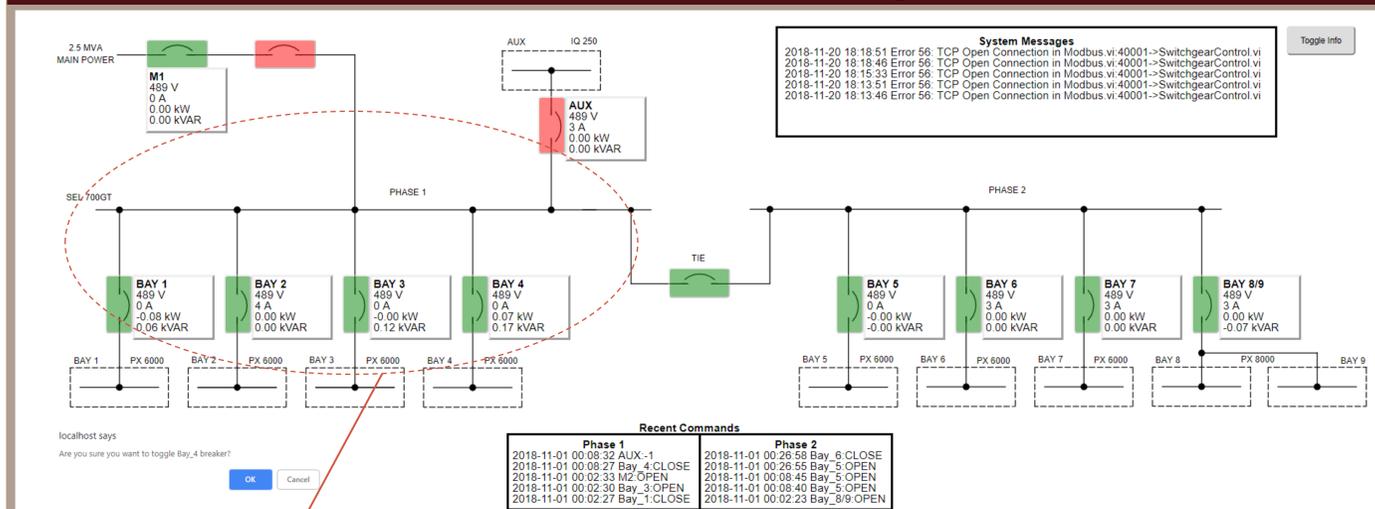
## Software Languages

Frontend	
Language	Description
HTML	Create static frontend of WebUI
JavaScript	Make WebUI more dynamic
CSS	Styling frontend such as editing font, color, etc.
Backend	
Language	Description
PHP	Server language to control WebUI
MySQL	Used to create database for WebUI

## Test Cases

Software Performance Parameters			
Function	Description	How Tested	Results
User interface	Page loads in five seconds or less	Use timer to measure load time	Pass
Error Display	Errors generated by cRIO are passed to and displayed in system messages, five latest messages are displayed	Ensure error message is displayed in system messages	Pass
Undefined value error display	An undefined value in the tables will be differentiated between a zero value	Observations from testing	Pass
Simulation Software	A simulation that will verify commands were sent and received, and mimics the response of the cRIO, which will change the state of the breaker	Run our code through the simulator to verify that our code is functioning as expected	Pass
System reliability	The reliability that the system manipulates the cRIO's digital output and updates the MySQL database.	Comparison of the expected breaker state with actual breaker state tested through multiple trials	Pass
Confirmation Dialog	The user will be required to confirm a breaker state change	Confirmation dialog will be tested by its load time and response time	Pass

## Web User Interface Configuration



NAME	ROLE
Martin Ramirez	Test breaker's response to WebUI commands, PM responsibilities
Vanessa Garza	Configure hardware to server; creating MySQL database, test logging of data into database
Chris Georgoulis	Coding the frontend of the WebUI (determining display screen)
Nhan Pham	Coding the backend (communication with database and frontend)



## Background Info.

- Currently at Aggreko, employees physically operate breakers and are susceptible to arc flash due to their 480 V system. The implementation of this project will remove need for physical operation.
- Allow employees to observe breaker status and parameters from work station
- Increase efficiency and safety in the workplace

## Approach

Team YOU&I had the flexibility to determine the frontend WebUI display and the database tables structure. We decided to give each breaker its own data table to simplify the SQL queries. This resulted in a total of 12 data tables and an additional table was used to log system messages.

## Results

- Displays 480V schematic and system commands\*
- Page scales appropriately when condensed
- Breakers' color changes w/out needing to be refreshed, updated every 2 seconds
- Undefined value is differentiated between a zero
- Confirmation dialog is displayed with every command sent
- Runs on Chrome and Firefox
- Voltage, current, power, and reactive power is displayed for all breakers\*

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