**STEM Outreach - SCADA Home Security**

**(Formerly SCADA Home Automation)**

**Progress Report 1**

**2023-02-07**

**Team Members:**

* Jon Beason - Team Lead/Cybersecurity Engineer
* Chad G Bryan - Computer Engineer
* Ben Calvert - Cybersecurity Engineer
* Ben Curths - Computer Engineer
* Simone Gbouomou - Cybersecurity Engineer
* Ben McAnulty - Cybersecurity Engineer

**Project Summary:**

The SCADA Home Security project will design and develop an interactive physical model that simulates some common components in today’s smart home systems and demonstrates how those systems may be vulnerable to malicious actors via targeted cyberattacks. This model aims to educate and generate interest in cybersecurity amongst prospective students and young professionals entering the field by clearly demonstrating the physical effects of real-world vulnerabilities created by digital cyberattacks.

To accomplish this demonstration. The project will incorporate microcontrollers, including two Raspberry Pis and an Arduino running the open-source ScadaBR and OpenPLC software packages. The ScadaBR devices will connect to an LCD panel to serve as a human-machine interface. The OpenPLC device will be connected to and manage the external sensors and actuators that simulate the common home automation components. These simulated components will include an IR sensor for alarm and intrusion detection, an electronic lock for access control, a DC-motor-controlled door for remote opening/closing, and LED lighting for model illumination and status indication. The final objective is to have the demonstration participant launch preloaded cyber attacks and exploits from an attached device to change the model state without using the embedded HMI.

**Current Project Status:**

As of this report, the model construction is progressing, and the component layout within the model is still being decided. In parallel, sensors are being integrated with the Arduino microcontroller to build out the base-level functionality of the model. Construction of the exterior case has begun and is currently 80% completed. Once the interior right side of the external case is completed, the HMI and sensors can begin to be integrated into the right side. Prior short-term goals have been mostly met, as many of the components have been sourced and distributed to team members for development, but some still remain to be acquired, and alternate solutions may need to be explored. The electric deadbolt was lost in the mail and had to be reordered. Development is slow to progress due to limited team member availability and scheduling conflicts. The lack of familiarity with the development tools and environment is also hindering progress, but this obstacle is expected to resolve itself as the project progresses. The method to attach the protective panels to the exterior case had to be changed due to the screws used to attach the panels not sitting flush. Also, we have been unable to find a clear answer on whether OpenPLC can control addressable LEDs.

The primary goals for the upcoming time period are to complete the integration of at least one component, the PLC microcontroller, and the SCADA controller, to create a functional prototype system, to finish the exterior case, and to begin integrating the HMI monitor, electric deadbolt, sensors, and flash alarm light into the right panel. This will allow the team to begin the cybersecurity component of the project while the model and system development continue.

**Individual Responsibility Record:**

* Jon Beason - 13 hours - order parts, research OpenPLC controlling addressable LEDS, exterior case, Documentation.
* Chad G Bryan - 5 hours exterior case construction
* Ben Calvert - 5 hours - Documentation and exterior case
* Ben Curths - 8 hours - Sensor Interfacing and Document Preparation
* Simone Gbouomou - 5 hours exterior case construction
* Ben McAnulty - 5 hours - exterior case construction