**Design of Cyber-Physical Systems Cyber Defense Competition**

by

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**ABSTRACT**

In an increasingly digital world, it is more important than ever to study the security implications of Internet connected devices. In addition to the power and convenience of on-demand and always available information, devices, and services, significant privacy and security concerns are raised. New data breaches and security vulnerabilities are announced regularly, frequently from corporations or protocols once thought to be secure. This increasingly frequent narrative of stolen passwords, credit card numbers, social security numbers, and other confidential digital information is tragic, but pales in comparison to what might be in store for the future. Consider that connected *devices* means more than just information, passwords, credit card numbers, and social security numbers, are under siege. Connected devices are pieces of hardware which manage and control real world physical infrastructure, hence the name the cyber-physical infrastructure. This document outlines the design for a project which intends to leverage an already successful security education tool, the Cyber Defense Competition (CDC), to educate students on the importance of cyber-physical systems (CPS). CPS security is emphasized especially in the context of critical infrastructure. The design describes a new type of CDC called the CPS-CDC. Once complete, the CPS-CDC will be included with an existing Internet security test bed (ISEAGE) and distributed to other educational institutions. The CPS-CDC platform can also be leveraged for research and simulation of disaster scenarios and emergency response planning. The CPS-CDC promises to deliver virtualized CPS devices all within the existing ISEAGE test bed. CPS devices are virtualized in a way that allows flexible network design and emulation of any critical infrastructure.