- The objective of this research is to develop an integrated cyber-physical tolerance engine that can model, predict, and take proactive countermeasures against complex security incidents in CPS platforms in a near-real-time manner.

- Our solution enables operators to maintain important infrastructural operations despite sophisticated cyber-originated attacks with consequences in cyber and/or power platforms.
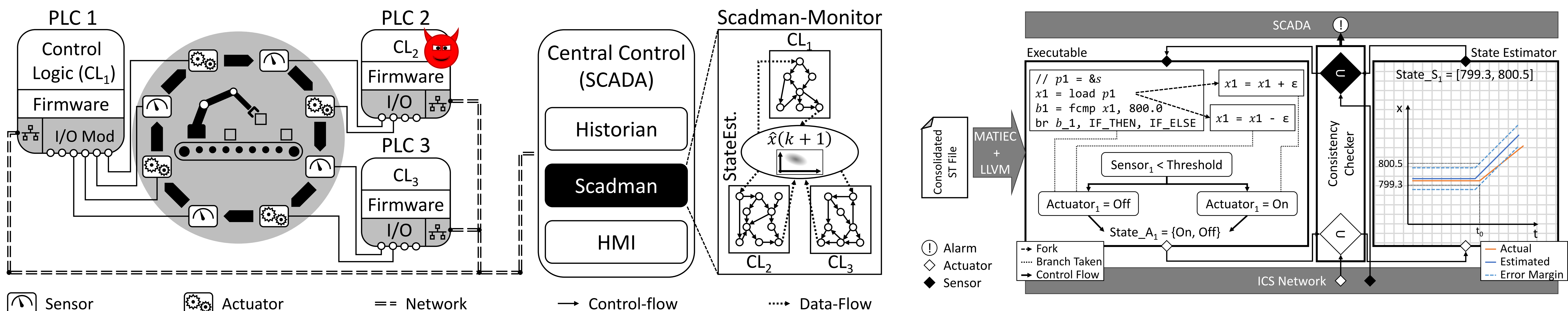
CPS Control Behavior Integrity Monitor for distributed industrial control systems.

- Unlike previous state estimation approaches, it does not abstract the behavior of the cyber-components (i.e., PLCs). Instead, it precisely simulates the state of all PLCs.

- By monitoring the input and output behavior of the entire ICS, SCADMAN can detect inconsistencies within the actions of PLCs.

- To enable a global view of the entire ICS, a consolidated control program of all PLCs in the system is generated to resolve functional dependencies between individual programs. The consolidated control program in conjunction with a physical state estimator is used to determine a set of acceptable states at any particular point in time.

Broader Impact

- We have worked with Siemens Corp for Tech Transfer initiatives on several proejcts including PLC code verification and ICS intrusion detection and response systems.

- PI Zonouz has worked with a female high school student (Sruthi Suresh) throughout regular meetings on related CPS Security topics. She is currently admitted to Cornell University to start in Fall 2021.