Cybersecurity at MIT Sloan
Interdisciplinary Consortium for Improving Critical Infrastructure Cybersecurity, (IC)^3

Security Threats to Cyber Physical Systems

Cybersecurity at MIT Sloan brings together thought leaders from industry, academia and government with MIT faculty, researchers and students to address strategy, management, governance and organization of cybersecurity of critical infrastructure using an interdisciplinary approach.

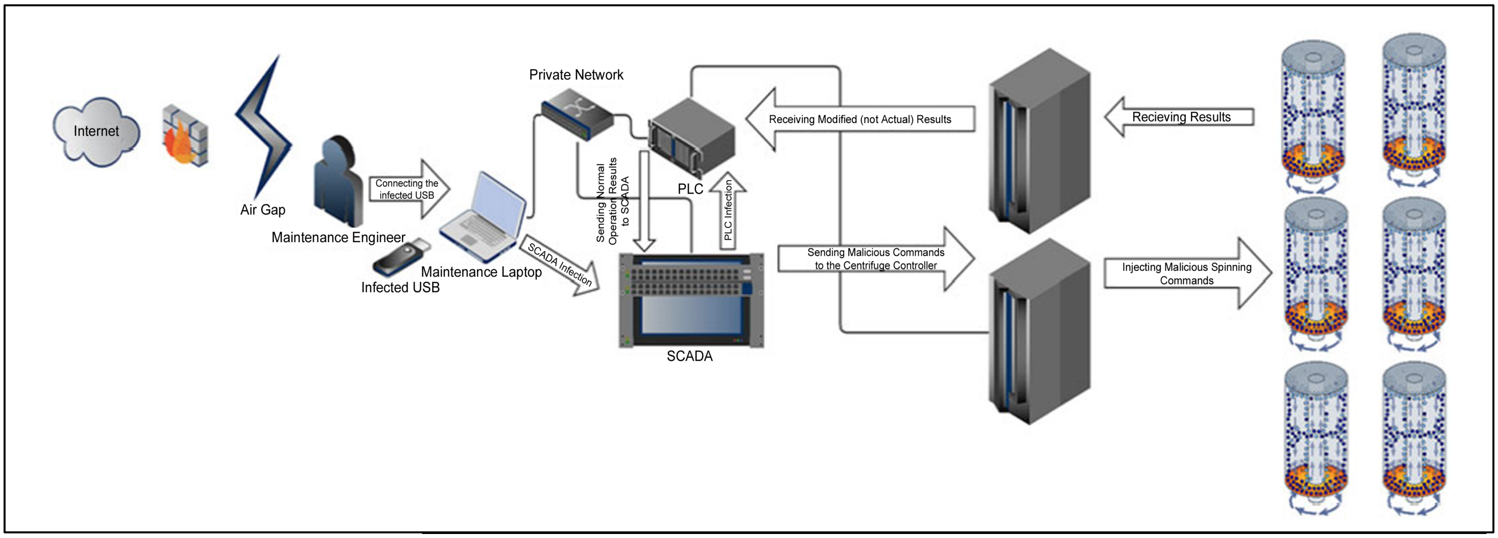
With physical manifestations in the real world, attacks on a CPS can cause disruption to physical services or create a national disaster.

Security Weaknesses in Cyber Physical Systems (CPS)

A cyber-attack to a CPS is more than just a threat to virtual space; it can create real, physical hazards. This was the case in 2010 when the Stuxnet virus infiltrated an Iranian nuclear power plant controlled by a Cyber Physical System. Traditional IT safety strategies and approaches are not sufficient to address the security challenges of a CPS. Assessments that analyze the failure of individual components miss critical threats to the *interactions* between these components. Research by Cybersecurity at MIT Sloan explores better approaches to CPS protection. This project utilizes case studies such as Stuxnet to study threats and vulnerabilities and suggest how the problems could be addressed at the most basic levels of device design.

IMPACT: Since traditional IT approaches are not enough, this research develops new approaches for dealing with cybersecurity in a CPS; Using these analysis methods, threats can be mitigated at the system design level.

Stuxnet Attack Diagram


Internet
Air Gap
Maintenance Engineer
Connecting the infected USB
Infected USB
Maintenance Laptop
SCADA Infection
Private Network
Sending Normal Operation Results to SCADA
PLC
PLC Infection
SCADA
Receiving Modified (not Actual) Results
Sending Malicious Commands to the Centrifuge Controller
Recieving Results
Injecting Malicious Spinning Commands

Cybersecurity at MIT Sloan welcomes funding from sponsors for general support of the consortium research, and from organizations interested in specific research topics. All members and sponsors receive invitations to consortium events and activities, and access to consortium research, websites, and newsletters. For more information, visit https://ic3.mit.edu or contact:

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