

GRID SECURITY CONFERENCE, OCTOBER 16, 2018

# CODEF

Collaborative Defense of Transmission and Distribution Protection and Control Devices against Cyber Attacks – a DOE CEDS funded research project

Panel DOE - Game-changing Research, Development, and Deployment

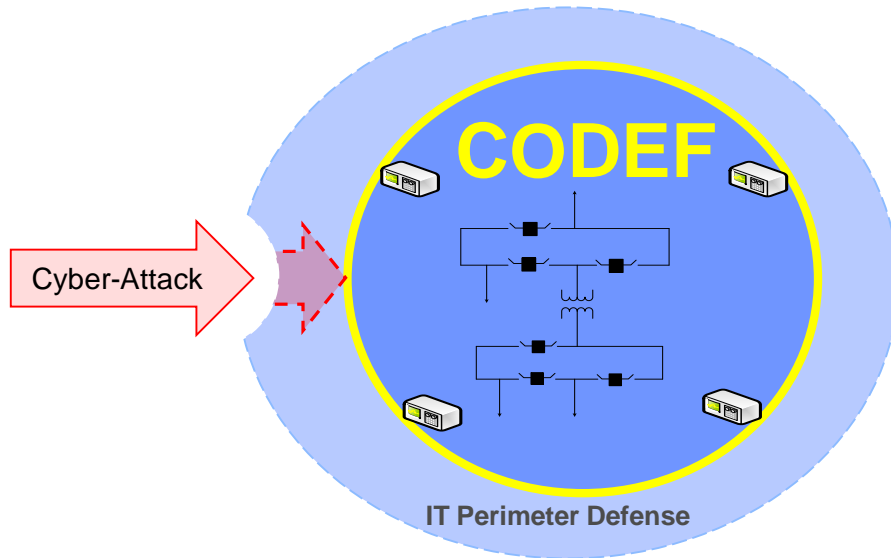
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# CODEF

## Collaborative Defense of Transmission and Distribution Protection and Control Devices Against Cyber Attacks



Cyber Security for Energy Delivery Systems



Roadmap Milestone - 3.5 Capabilities that enable security solutions to continue operation during a cyber attack available as upgrades and built-in to new security solutions

Demonstrated transmission level research-grade cybersecurity functions at Bonneville Power Administration (BPA)

Four CODEF functions were used to detect and block cyber-attacks designed to control the substation circuit breakers

Attacks on the intelligent electronic device (IED) configurations were also detected and blocked by the functions

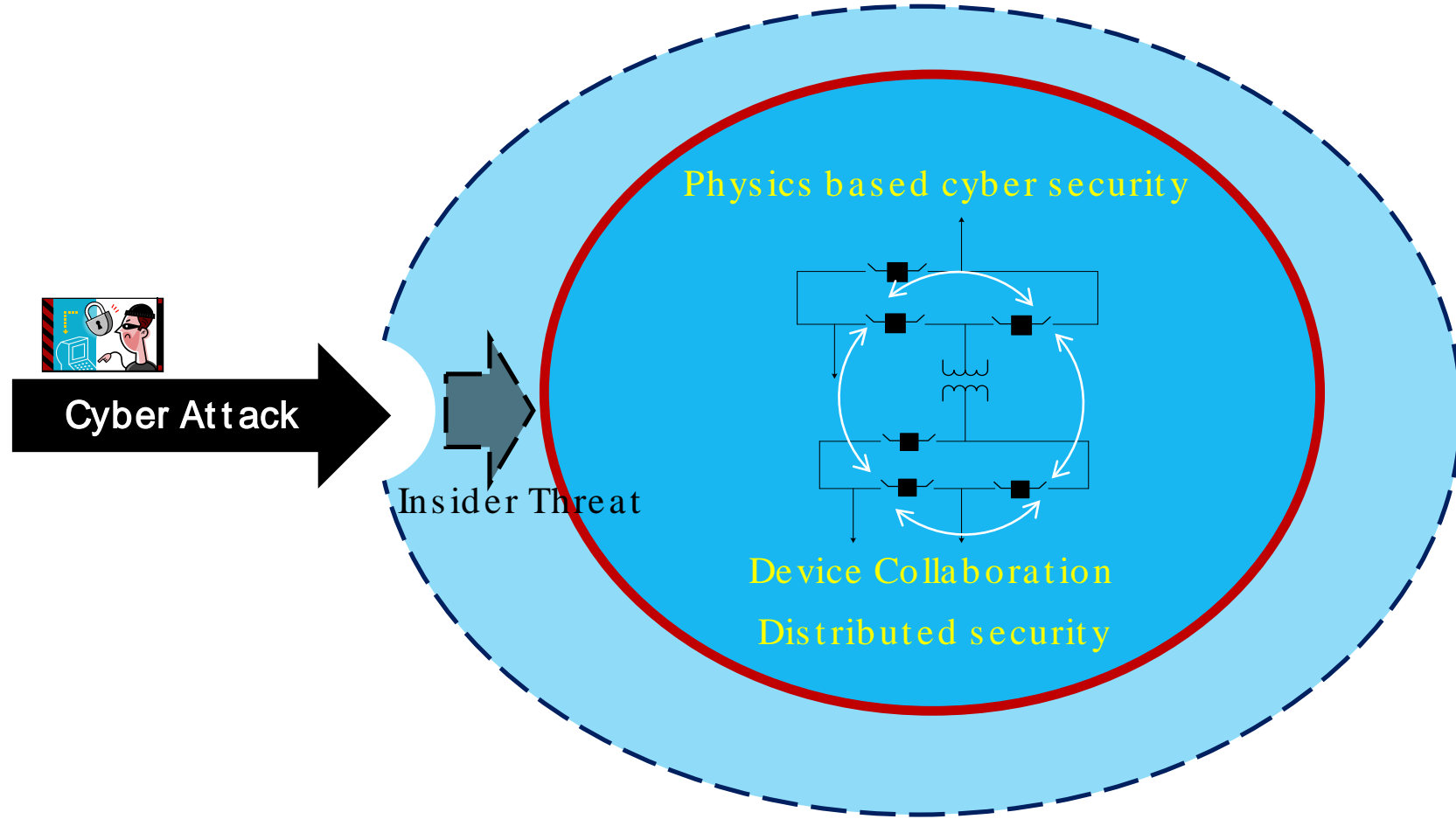
The functions were tested utilizing protection relays configured with actual BPA high voltage line and transformer protection settings

Demonstrated distribution level research-grade cybersecurity functions at Ameren-Illinois



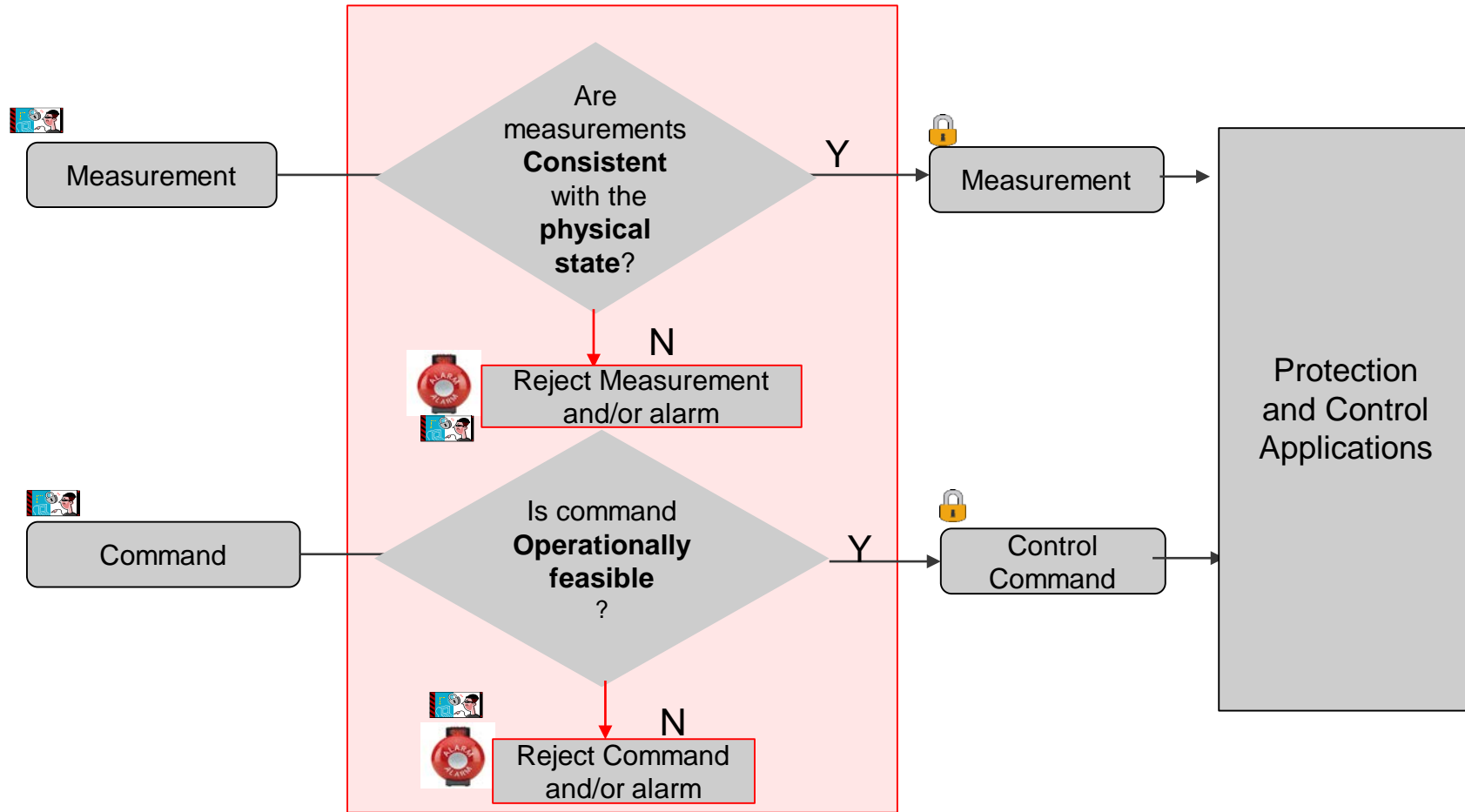
# Physics based cyber security

Domain layer within the IT layer



# Cyber Physical Consistency for Cyber Security

Consistency checking of commands and measurements





**ABB**