

AT A GLANCE



Substation Physical Security

Program 37.114

Research Value

- Leveraging R&D on cross-cutting topics, such as ballistics, intrusion detection, and insider threats
- Establishing a technical basis to enhance security and decision making
- Increasing understanding of the effectiveness of protective, defensive, and recovery technologies
- Increasing understanding of the component vulnerability to physical attacks

Member Benefits

- Improving resilience and protection of critical infrastructure
- Detecting and deterring threats for a substation
- Understanding the impact of various mitigation and hardening solutions on day-to-day operations
- Protecting public and employee health and safety

The energy sector’s assets, systems, and networks are so vital that their incapacitation or destruction could have a debilitating effect on national security, the economy, employee and public health, and safety. Other vital industry sectors (e.g., water, banking, and transportation) depend on safe, reliable power.

Intentional attacks against electric power systems include sabotage, theft, disruption of sensors and information systems, and physical damage. Emerging technologies may exist that could enhance situational awareness and asset protection.

This research seeks to enhance resilience and reduce the potential of disruptions in substations through a better understanding of physical security events and the efficacy of mitigation and response options.

EPRI’s research intends to identify, evaluate, or develop better ways to detect, deter, and respond against these threats.

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Research Highlights



UAS Detection Technologies

Uncrewed aircraft systems (UAS) present security risks to substations, either from malicious or unintended operations. This research explores technologies that could detect unauthorized UAS operations around substations. Research objectives include understanding detection effectiveness in substation environments as well as potential unintended consequences.



Robotics Technologies

Automated or teleoperated robotics hold significant potential to increase situational awareness during physical security events. This research aims to create laboratory tests using security scenarios, then evaluate the effectiveness of robotic systems to increase situational awareness, decrease response times, and decrease risks during the simulated events. The results of this research could inform utility deployments of this technology.



Ballistics Testing of Substation Assets and Protective Measures

This task aims to characterize the ballistic performance of substation assets and protective measures. The research seeks to identify and evaluate cost-effective protection measures. In 2024, the research will focus on ballistic barriers. The results of this testing could enable utilities to deploy protective measures more selectively, lowering costs while still reducing risks.

For more information, contact:

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