

# AT A GLANCE

## Balance of Substations: Batteries, Arresters and Ratings

Program 37.105

### Research Value

- Improved reliability of the balance of the substation assets
- Help in assessing and managing risks through early insights from new diagnostics tools
- Lower life-cycle risks to improve reliability
- Improved understanding of issues associated with different vintage assets

### Member Benefits

- Assistance in making informed decisions about substation ratings including improved thermal models to optimize power output and guidance for applying this information in overall transmission system ratings
- Considerations for asset lifecycle including planning/procurement, operation, maintenance, and disposal
- Guidance for more effective asset inspection, monitoring, assessment, and maintenance
- A sound technical basis for decisions when specifying balance of the substation assets

Substation assets such as arresters, batteries, and instrument transformers are critical to the reliability and safety of substations. Online monitoring systems can provide visibility of asset health to identify degradation prior to failure or to inform condition-based replacements. Use of drones and robotics for inspections and maintenance tasks have become increasingly desired in the industry to increase the safety and security of substations and personnel. Guidance and tools can benefit the industry to perform required ratings evaluations.

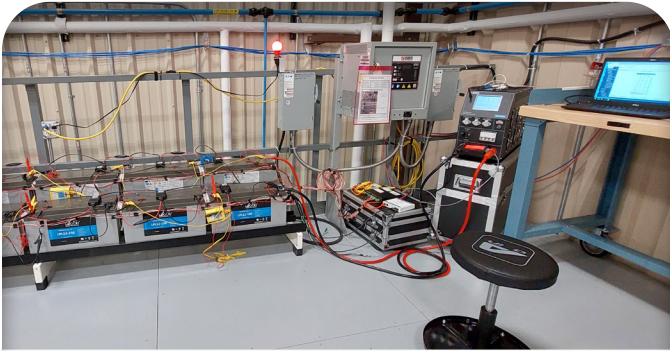
Unique EPRI research laboratories and expertise are feeding the development of new tools and knowledge to help substation owners to manage these substation assets: anticipate and prevent failures, extend asset life, retain key subject knowledge, and specify new diagnostic equipment with confidence.

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## Research Highlights



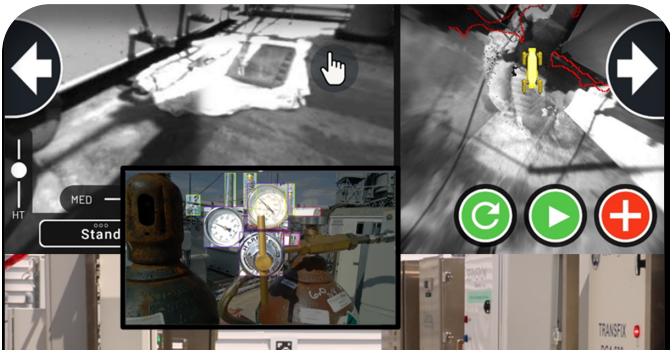
### Battery Monitoring Systems

EPRI is investigating the use of battery monitoring systems to assess the condition of substation batteries. Laboratory testing will evaluate effectiveness and compliance with NERC Standard PRC-005 and offer insights and considerations for planning and specifications, procurement, installation, and operation. Additionally, this task intends to evaluate the short-term and long-term reliability of selected monitoring devices.



### Ratings

Each year the Increased Power Flow Guidebook ([3002026100](#)) is updated with new material on the state of the science and best practices for increasing and optimizing power flow through transmission systems and their associated circuit components. Ratings tools such as Transmission Ratings Workstation (TRW) software ([3002024614](#)) and online calculators will continue to be updated based on industry need and feedback.



### Robotics and Drones in Substations

This task explores potential substation applications of robotics and drones while continuing to test novel technologies and their capabilities. selected monitoring devices.



### Substation Arresters

This task intends to provide an update to guidance on selection, application, and monitoring of substation arresters. This revision will include up-to-date research data, information on new technologies, and industry findings.

For more information, contact:

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