Transmission Resiliency Summit

Role of Research in Resilience

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Charlotte, NC
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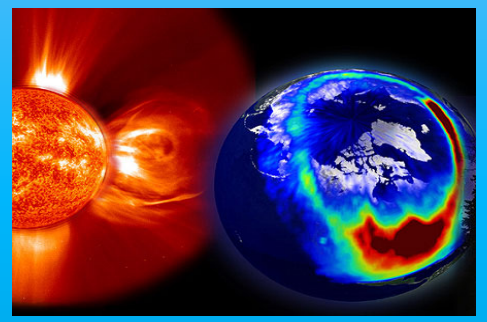
Transmission Grid Resiliency – Externalities

NATRUAL



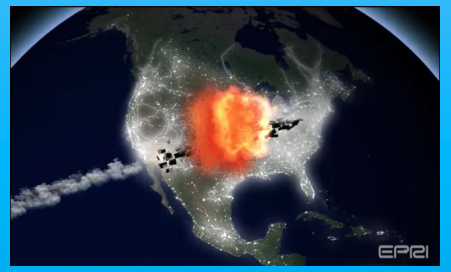
Solar Storms

Earthquakes

Hurricanes/ Ice Storms / Floods / Straight-line Winds

High Impact Low Frequency (HILF)

MAN MADE



HEMP

Physical Attacks

IEMI

Cyber

Foundation to Address Resiliency

Understand Threat and Impact on System

Mitigation Options and their Performance

Predict Risk Reduction and Benefits

Technical Basis

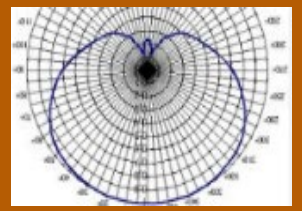
Test Results

Implementation Tools

Experience from Pilots

EPRI Roles

Threat Characterization



Vulnerability

Impacts

Mitigation: Hardening & Recovery

- Identify
- Evaluate
- Develop
- Document

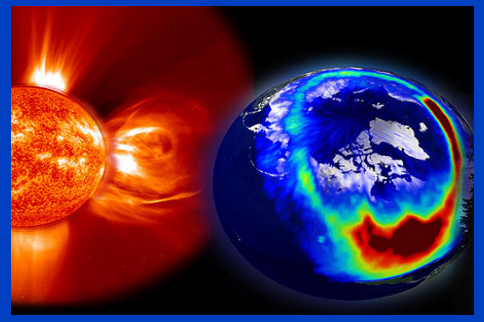
Unbiased Technical Basis & Decision Support

Research Mapped to NATF / EPRI Resiliency Matrix

Mode	Hazard / Threat									
	GMD	EMP	IEMI	Earthquake	UAS	Physical Attack	Hurricane	Ice Storms	Cyber	Wildfires
Assess	Characterize	Characterize	Characterize	Characterize					Supply Chain Vulnerability Testing	
Harden	Blocker Placement	E1, E3 protection	Testing			Testing	Investment, Design Practices	Investment, Design Practices, Coatings	Practices Technologies	Design Practices
Detect/ Monitor	Monitoring				Detection	Robotics, Sensors	Storm Prediction Sensors	Storm Prediction Sensors	ISOC Metrics	Monitoring
Recover / Restore	Spare Tx, Spares Strategy, Resilient Comms	Spare Tx, Spares Strategy, Resilient Comms				Spare Tx, Spares Strategy	UAS Spare Tx, Spares Strategy, Resilient Comms	UAS Spare Tx, Spares Strategy		

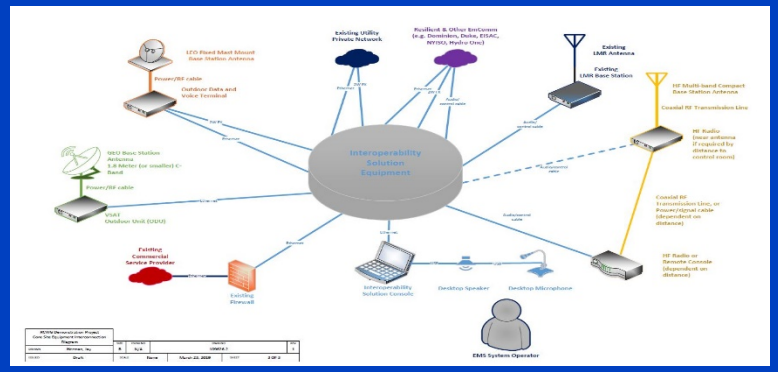
24 T&D Asset Resiliency Related Projects Underway

EPRI Research Highlighted @ Resiliency Summit



GMD

EMP



Resilient Communications

Cyber Security Metrics

Role of Research in Resiliency

Technical Basis

Test Results

Implementation Tools

Experience from Pilots

Collaboration

Together...Shaping the Future of Electricity