

# EMP/GMD Challenges and Research

MONDAY: TRACK 1

## SESSION CHAIR

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- Jesse Reeves, Idaho National Laboratory

## SPEAKERS

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- LtCol Stamper, United States Air Force
- Timothy Carty, EMP Shield
- John Ostrich, DOE/CESAR

## SESSION ABSTRACT

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### EMP PROTECTION OF ELECTRICAL MICROGRID

*Timothy Carty, EMP Shield*

Microgrids improve the operational flexibility, resilience, coordinated-energy management capabilities, self-adequacy, and increased reliability of the electrical power systems. This requires that the microgrid itself is resilient to physical and cyber threats. Building on the Department of Energy's definition of a microgrid, this presentation defines a resilient electrical microgrid as a set of interconnected subsystems and facilities that include any of the 16 critical infrastructure sectors defined by the U.S. Department of Homeland Security. The focus is on the practical aspects and protection of the distributed energy resources from naturally occurring events (CME, GMD) and man-generated EMP (HEMP, HPM) and the ability to isolate a microgrid into an "island mode" when a HEMP E1 or GMD is detected. The methodological assessment of EMP threats, identification of vulnerabilities, and design of mitigation strategies are presented. The system engineering approach to understanding threats and vulnerabilities and a methodology for designing resilient microgrids are addressed based on EMP Shield's experience and current R&D.

### EMP/GMD MISSION AND CURRENT PROJECTS

*John Ostrich, DOE/CESAR*

John is program manager for risk and hazard analysis at DOE/CESER will explain the mission of CESER and the overall objectives of the risk and hazards (R&H) program. The R&H program evaluates and compares all natural hazards and adversarial threats and compares them to identify the risks that are of the highest concern and the ones that should be the focus of CESER efforts. John will present on the DOE/CESER Risk and Hazards program with a focus on efforts to address the risks of EMP and GMD to the grid. Objective of the EMP and GMD efforts is to enhance resilience of the grid to both the EMP threat and GMD hazard. The program to address the EMP and GMD risks will be highlighted because of that is a critical focus of



the program currently. (Cybersecurity is top priority for CESER, but will not be covered in this briefing.) Specific EMP and GMD projects underway will be mentioned. These projects cover the gamut of understanding HEMP effects (field strengths, geographic extent, and duration), modeling, simulations, analysis (criticality, susceptibility, vulnerability) system assessments, testing, and mitigation and protection technologies.