

# EIP 160: Evaluating RDS GTSOC vs RTDS Replicas for Advanced Control System Simulation

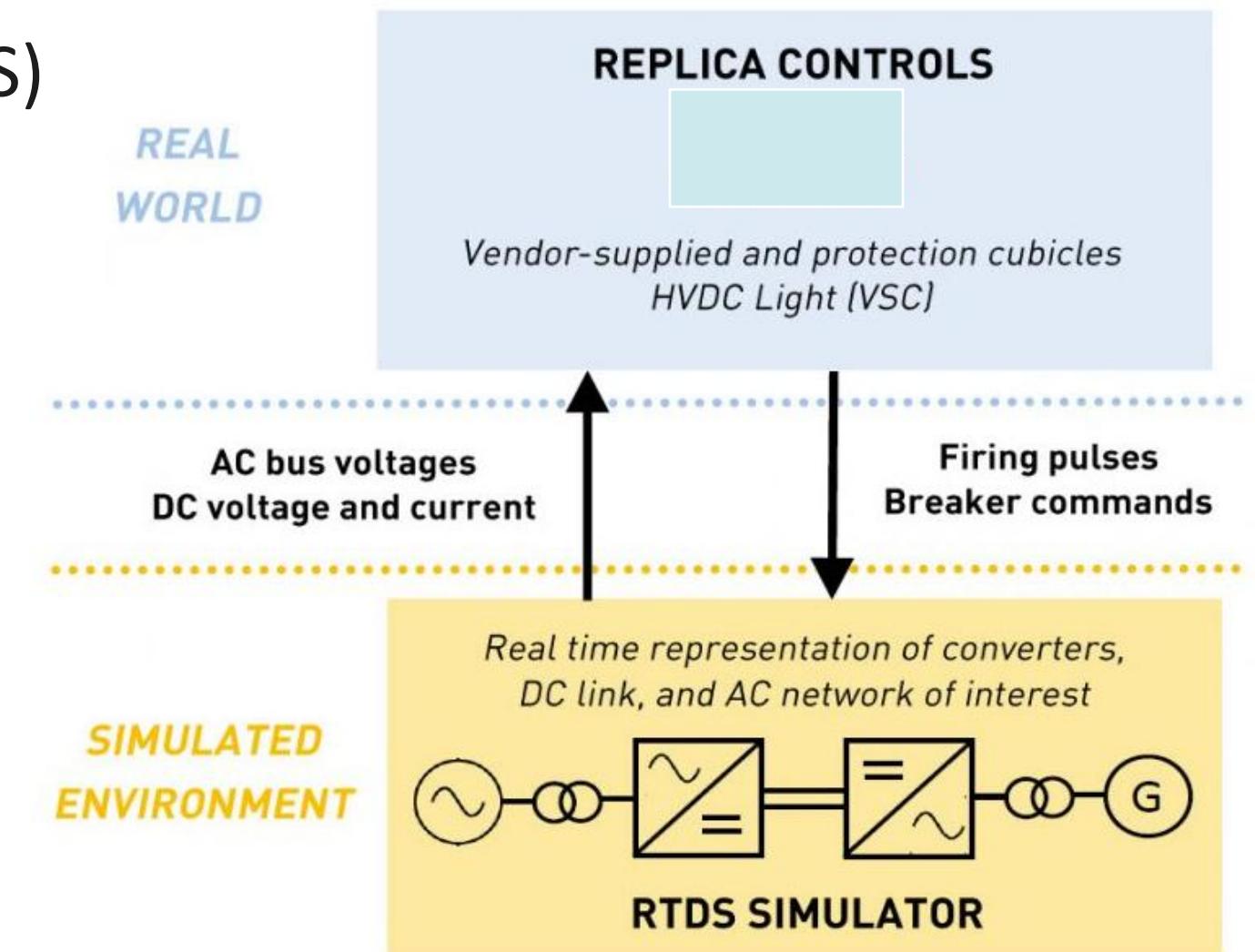
ENA Basecamp 2026

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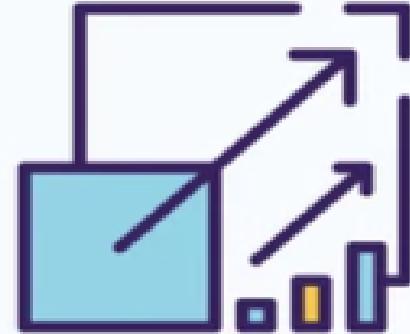
# The Challenge

- Firstly, What is a Real Time Digital Simulator (RTDS)
- Current control system validation relies on RTDS replicas:
  - Resource intensive
  - Integration complexity
  - Expensive
- Greater use of Inverter Based Resources (IBRs) in the energy system:
  - Need: advanced simulation tools for stability
  - GTSOC offers potential improvements

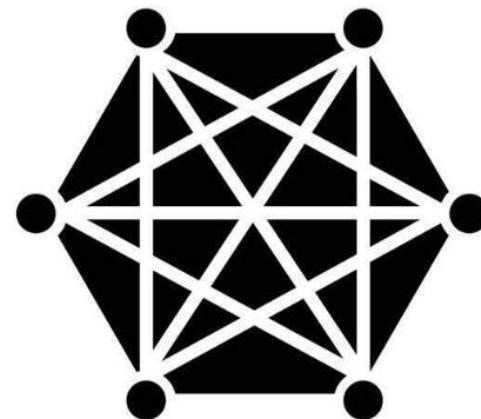


The fidelity of RTDS is limited by processor hardware

# The Impacts - continued use of RTDS replicas



**Scalability Limitations:**  
Number of nodes, converters and EMT resolution



**Limited Fidelity:**  
Modern converters controls not captured sufficiently



**Higher Cost and Footprint:**  
Expensive to buy and maintain, large



**Slower Model Updates and Development Cycles:**  
Complex trouble shooting frequent re-validation, slow configuration cycle



**Vendor Integration Challenges:**  
Proprietary hardware versions, communication protocol



**Security and IP Handling:**  
Replicas rely on shared networks, possible hardware firmware exposure

# What are we looking for

- **Benchmarking framework:**
  - RTDS vs RTDS-GTSOC
- **Metrics for comparison include:**
  - Performance
  - Ease of Integration
  - Cybersecurity and IP protection
- **Requirements:**
  - Able to integrated with existing RTDS software/hardware
  - Scalable for widespread TO and NESO environments
- **TRL6:**
  - Technology validation in relevant environment

