

RTDS SERVICES

Real-Time Digital Simulation (RTDS) has emerged as a crucial technology in the face of the evolving challenges that the electrical grid faces. We support customers with our four dedicated RTDS laboratories, to ensure reliable and robust grid operations during and after disruptive events. Example of service includes:

- **Audit of existing protection settings** that can be tested in a **hardware-in-the-loop (HIL)** environment, including a model of the power system, to assure proper performance and coordination on all potential fault scenarios. **Playback testing** can also be performed, to check setting modification based on historical fault libraries.
- **Validation of protection algorithms and philosophy** that require fine-tuning based on transient stability studies, like islanding detection protection, high-speed falling conductor protection, or high-impedance protection.
- **Testing of special protection schemes** like Remedial Action Schemes (RAS) or Wide-Area Monitoring, Protection, and Control (WAMPAC) systems.
- **Grid Compliance Tests** with power plant controllers and protection elements tested at the same time in an HIL environment.

Key Benefits

- **HIL testing** in a real-time EMTP environment under **most realistic conditions**.
- **Multiple testing scenarios** run in automatic mode.
- Interoperability with external systems tested through **PMU and IEC 61850** interface



Features

- Hardware in the Loop Testing
- Protection Settings Audit
- Protection Relays Verification
- Playback Testing
- New algorithms validation
- Special Protection Scheme Tests
- Grid Compliance Tests



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Reference 1 - Island Protection Implementation

Challenge: An industrial customer needed to detect islanding conditions from the main grid

Our Service: Parameters and methodology to detect disconnection from the main grid were identified and validated through RTDS tests

Benefits: Allow plant to continue operating during islanding conditions, minimizing production downtime.

Reference 2 - Audit Settings

Challenge: A customer faced unexpected protection tripping, impacting plant production and costing \$1M in lost profit.

Our Service: Malfunctioning relays and their settings were audited in an HIL environment. Multiple scenarios and faults were analyzed, new settings were proposed and tested.

Benefits: Plant operation time is optimized thanks to proper protection coordination, and fast faults identification and isolation.

Reference 3 - System Integrity Protection Scheme Validation

Challenge: System Integrity Protection Schemes (SIPS) are complex systems where multiple devices must be tested at the same time in the most realistic conditions.

Value Added Proposition: Power system electrical values were simulated, amplified, and hardware to IEDs included in the SIPS. PMU and IEC61850 communication signals were also simulated on RTDS for non-available devices during FAT, to complete the required scenarios. Testing scenarios were run in automatic mode, including all possible negative scenarios.

Benefits: Unforeseen scenarios were detected, minimizing the risk of disruption to the grid, and commissioning time was reduced.

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