Implementation of NYPA's Convertible Static Compensator on the Transient Network Analyzer and OPAL-RT's FPGA platform

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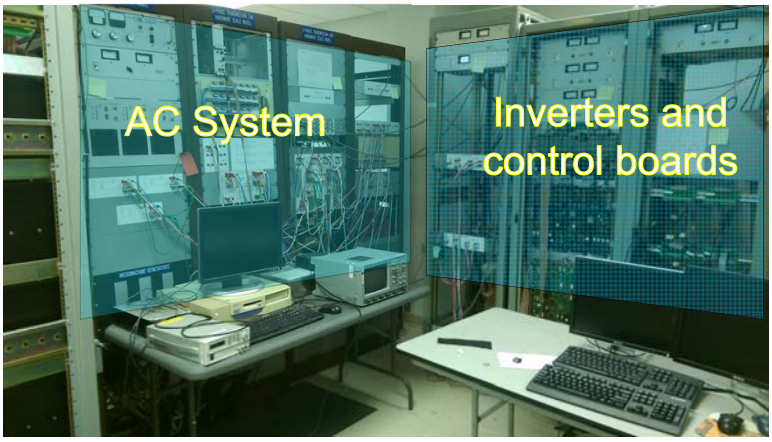
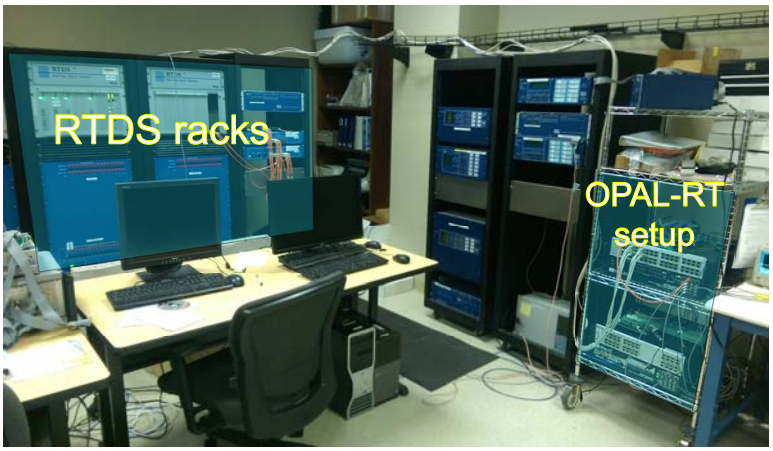
Introduction

- The Convertible Static Compensator (CSC) is a FACTs controller located at Marcy 345kV substation commissioned by the New York Power Authority (NYPA).
- Consists of two 100MVA 48-pulse NPC 3-ϕ inverters which can be connected at the Marcy substation in 10 different configurations, including:
  - Static Synchronous Compensator (STATCOM)
  - Static Series Synchronous Compensator (SSSC)
  - Unified Power Flow Controller (UPFC)
  - Inter-Line Power Flow Controller (IPFC)
- The Transient Network Analyzer (TNA) is a scaled-down analog model of the CSC with identical controls and all equipment ratings modified to an equivalent 12VA, 100V system.

Features

- The TNA allows real-time testing of the CSC with fully adjustable sinusoidal 3-ϕ voltage sources generated using PWM generators.
- TNA allows injection of low frequency oscillations in source voltage magnitude and angle to allow simulation of transient power system oscillations.
- The TNA results have been validated against actual CSC commissioning test results from site.





References

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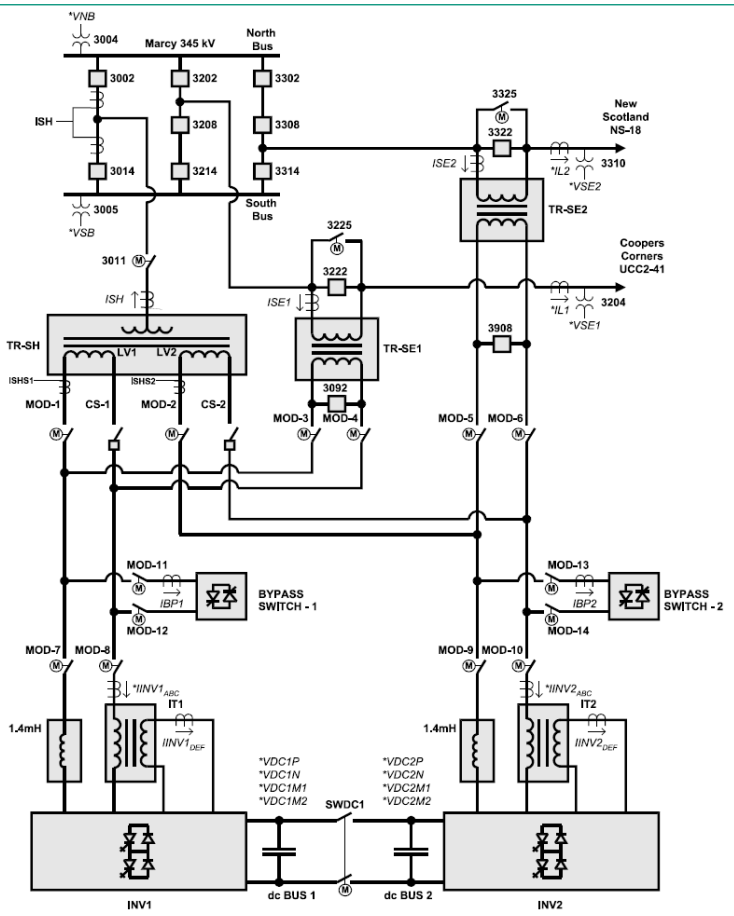
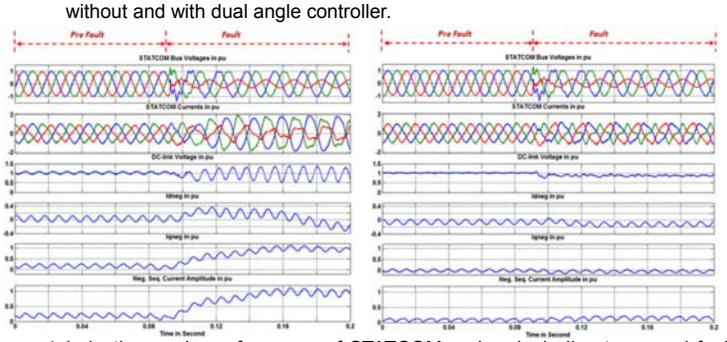
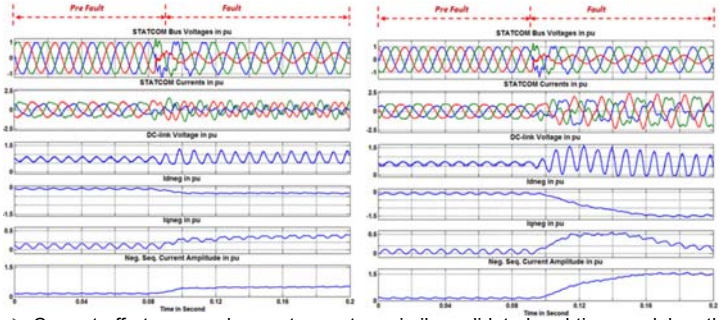


Accomplishments and Future Work

- **Testing of modified controllers for FACTs devices using TNA**
  - Capacitive mode performance of STATCOM under single line to ground fault without and with dual angle controller.



  - Inductive mode performance of STATCOM under single line to ground fault without and with dual angle controller.



- Current efforts are underway to create a similar validated real-time model on the RTDS and OPAL-RT real-time simulator platforms.