ISO-NE's Model Validation of HVDC and Nuclear Unit using Synchrophasor Data

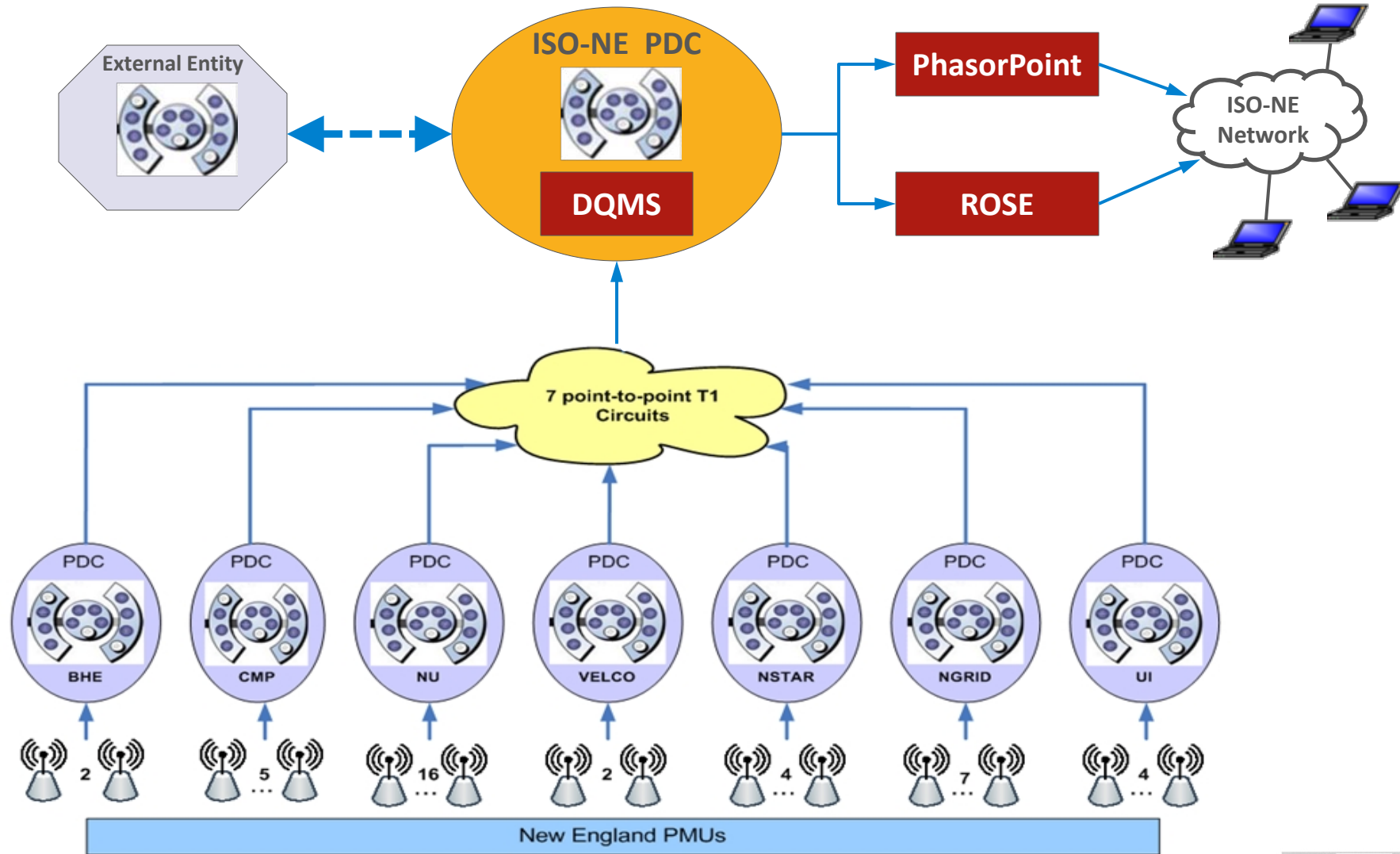*NASPI Model Validation Workshop*

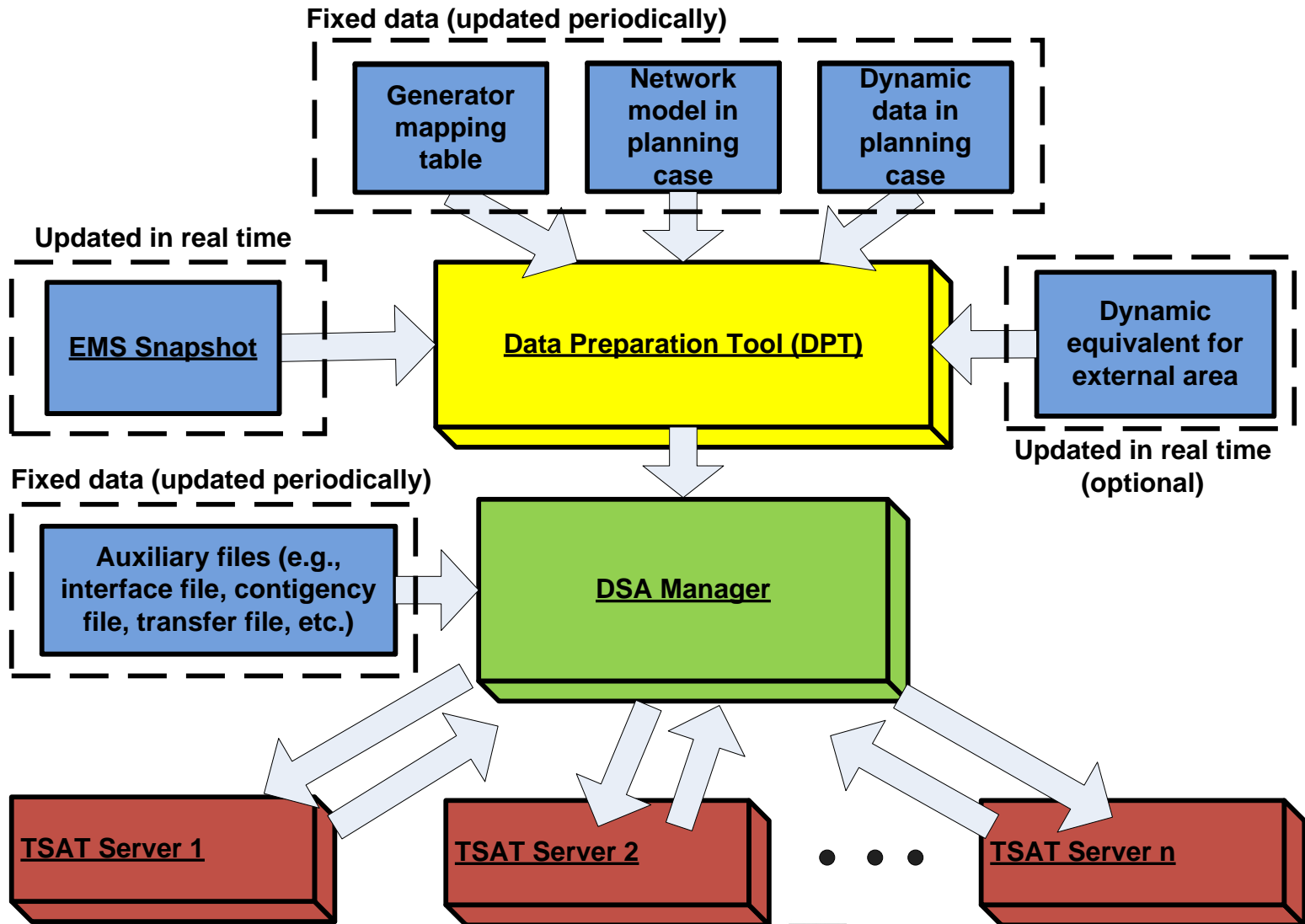Xiaochuan Luo

TECHNICAL MANAGER

Outline

- ISO-NE's Synchrophasor Infrastructure and Data Utilization (SIDU) Project

- Pilot On-line Transient Stability Assessment

- Model Validation of HVDC

- Model Validation of Nuclear Unit

- Conclusion and future plans

# ISO-NE's Synchrophasor Infrastructure and Data Utilization (SIDU)

Pilot On-Line Transient Stability Assessment

Fixed data (updated periodically)

Generator mapping table

Network model in planning case

Dynamic data in planning case

Updated in real time

EMS Snapshot

Data Preparation Tool (DPT)

Dynamic equivalent for external area

Updated in real time (optional)

Fixed data (updated periodically)

Auxiliary files (e.g., interface file, contigency file, transfer file, etc.)

DSA Manager

TSAT Server 1

TSAT Server 2
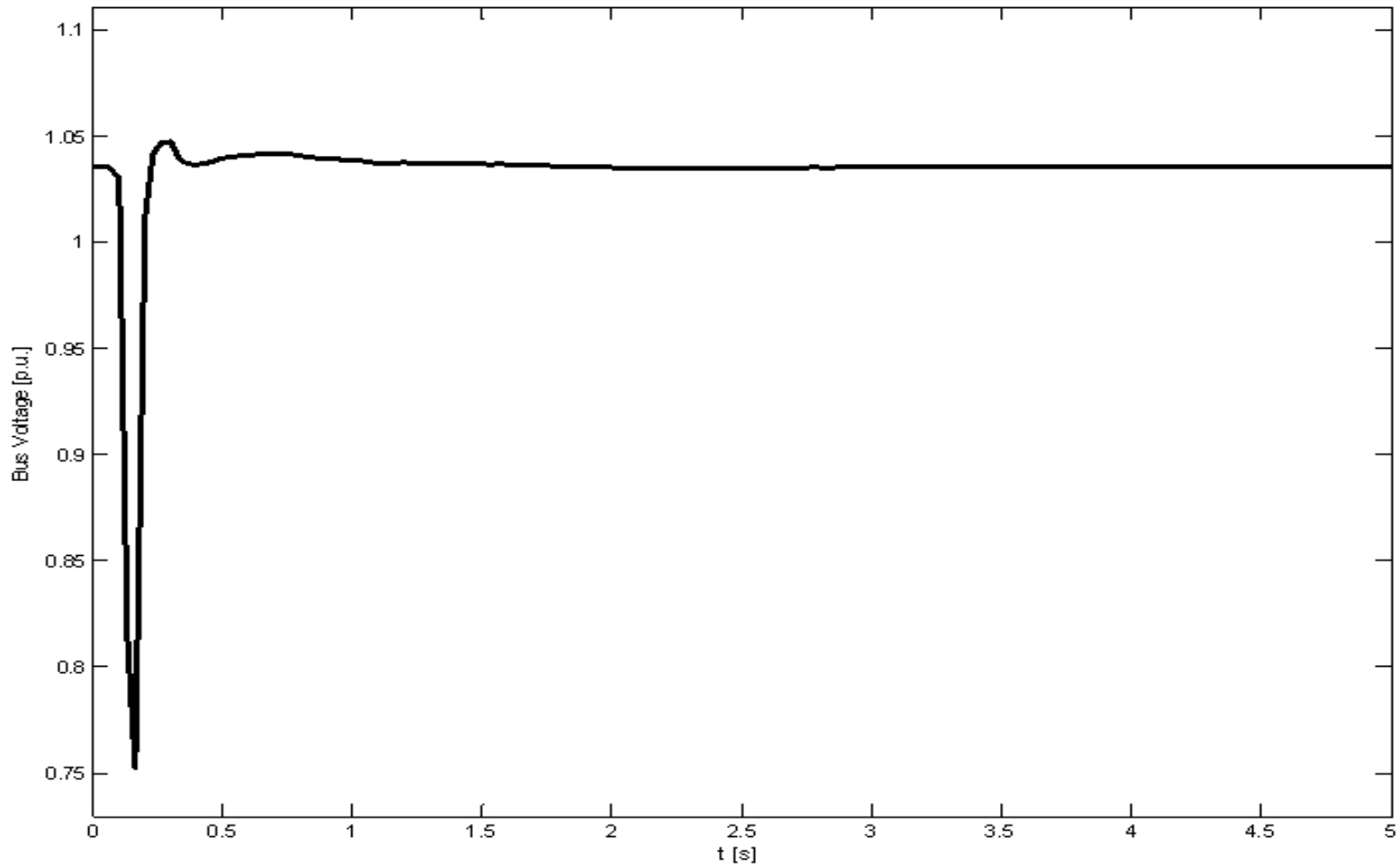
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TSAT Server n

Validation of HVDC Model

- Single phase-to-ground fault occurred at 18.2% of line 337 from SANDY POND station

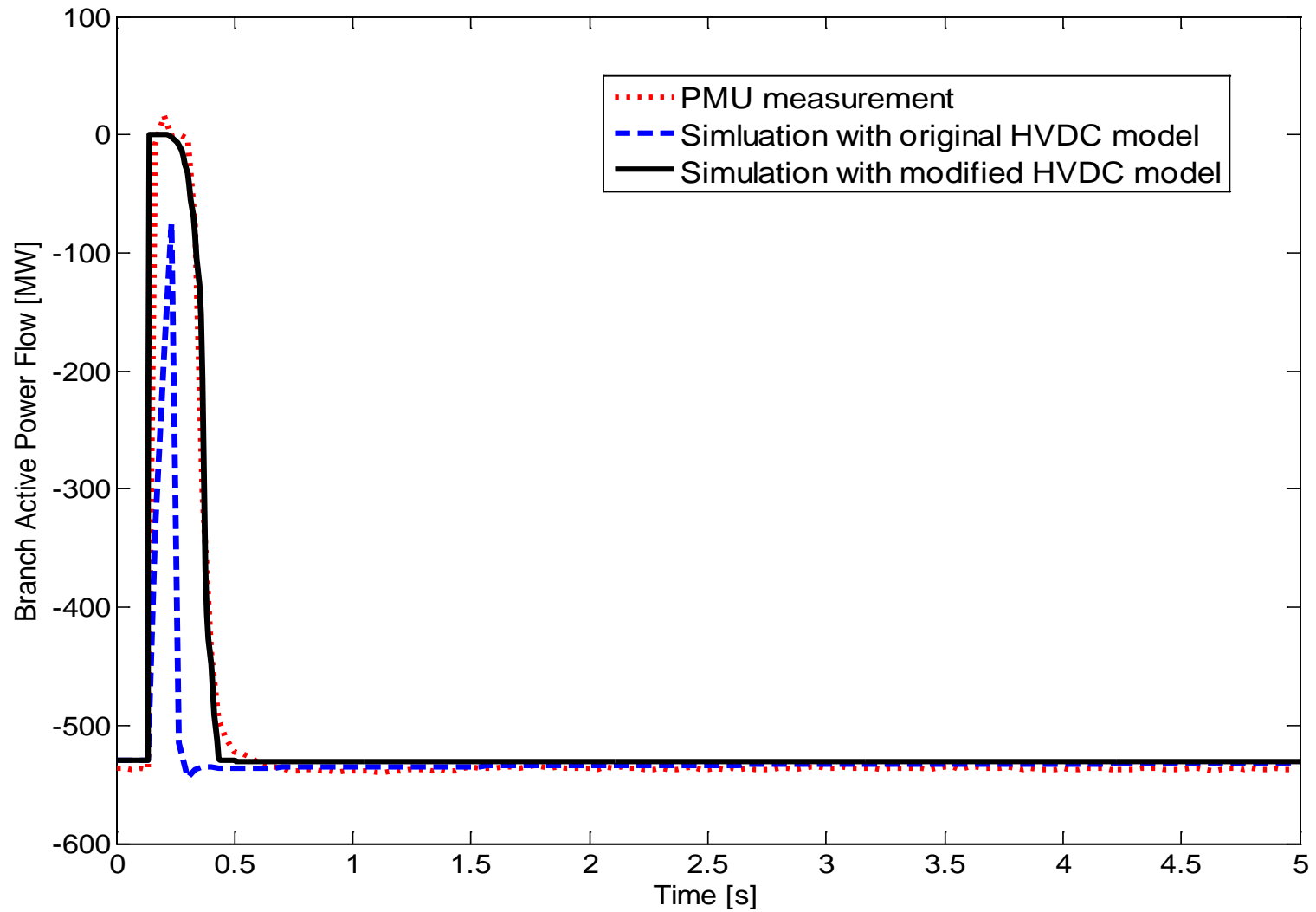- Fault was cleared after 5 cycles by opening line 337
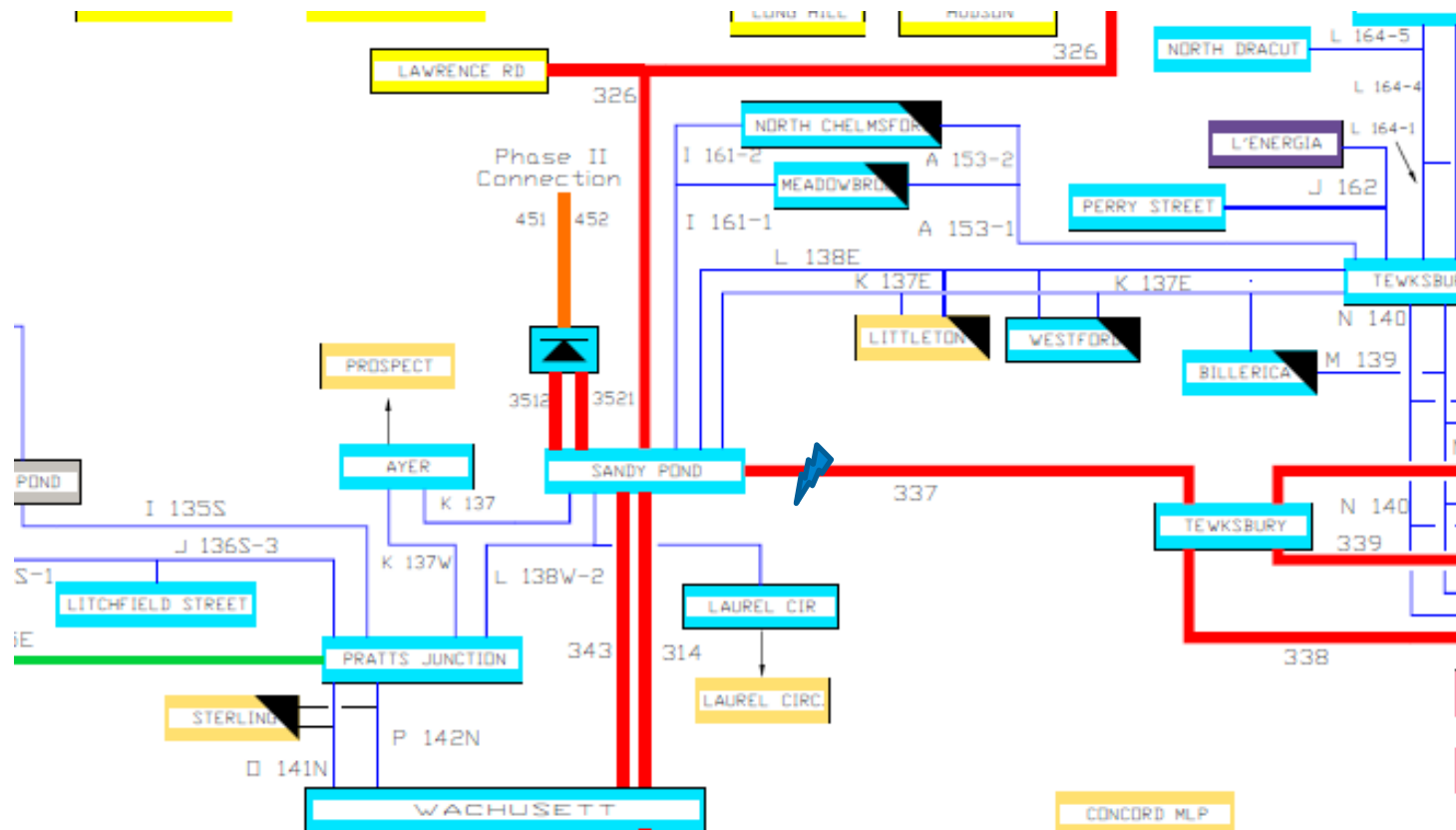
Validation of HVDC Model

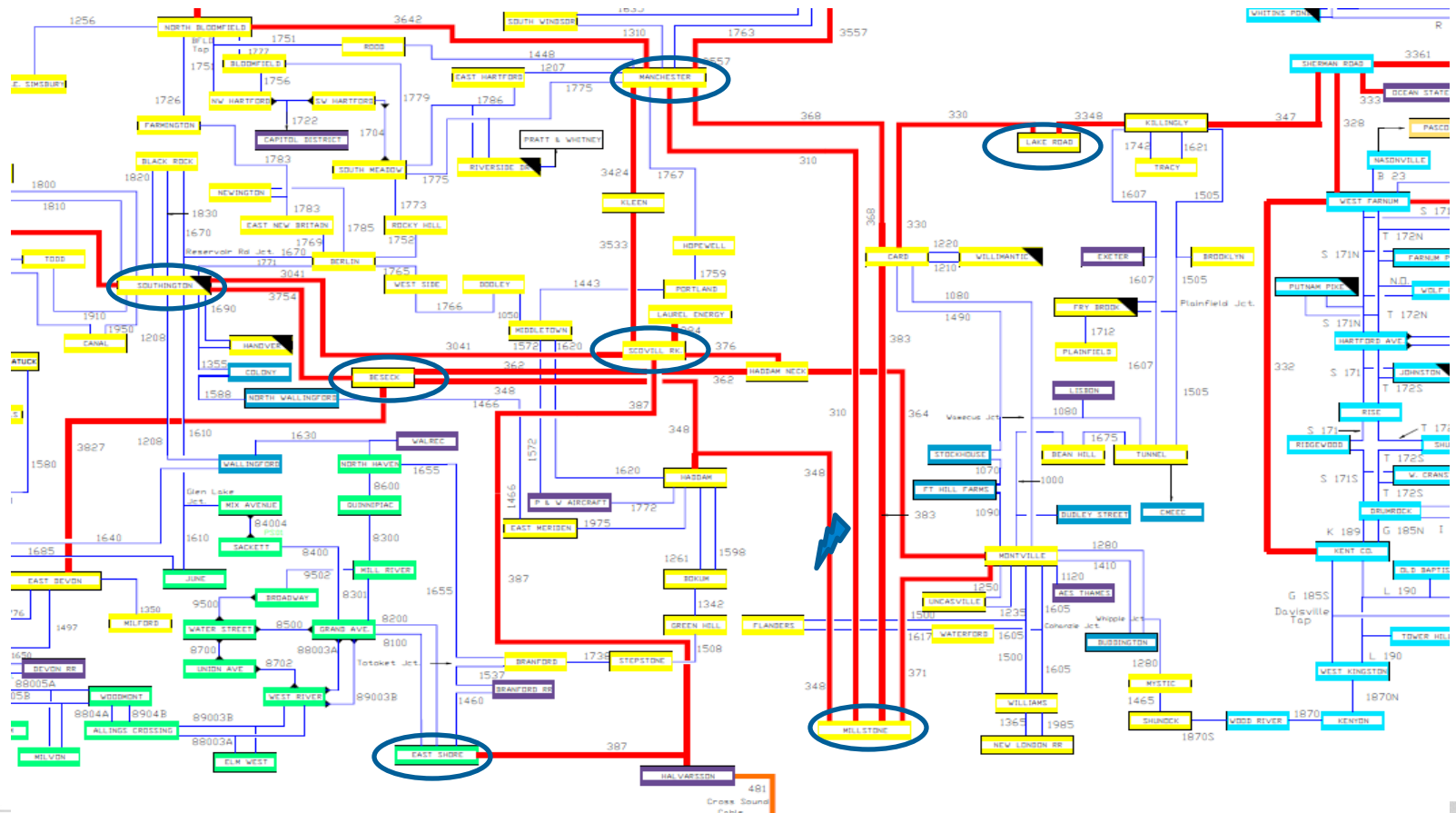Sandy Pond 345 kV Voltage - PMU
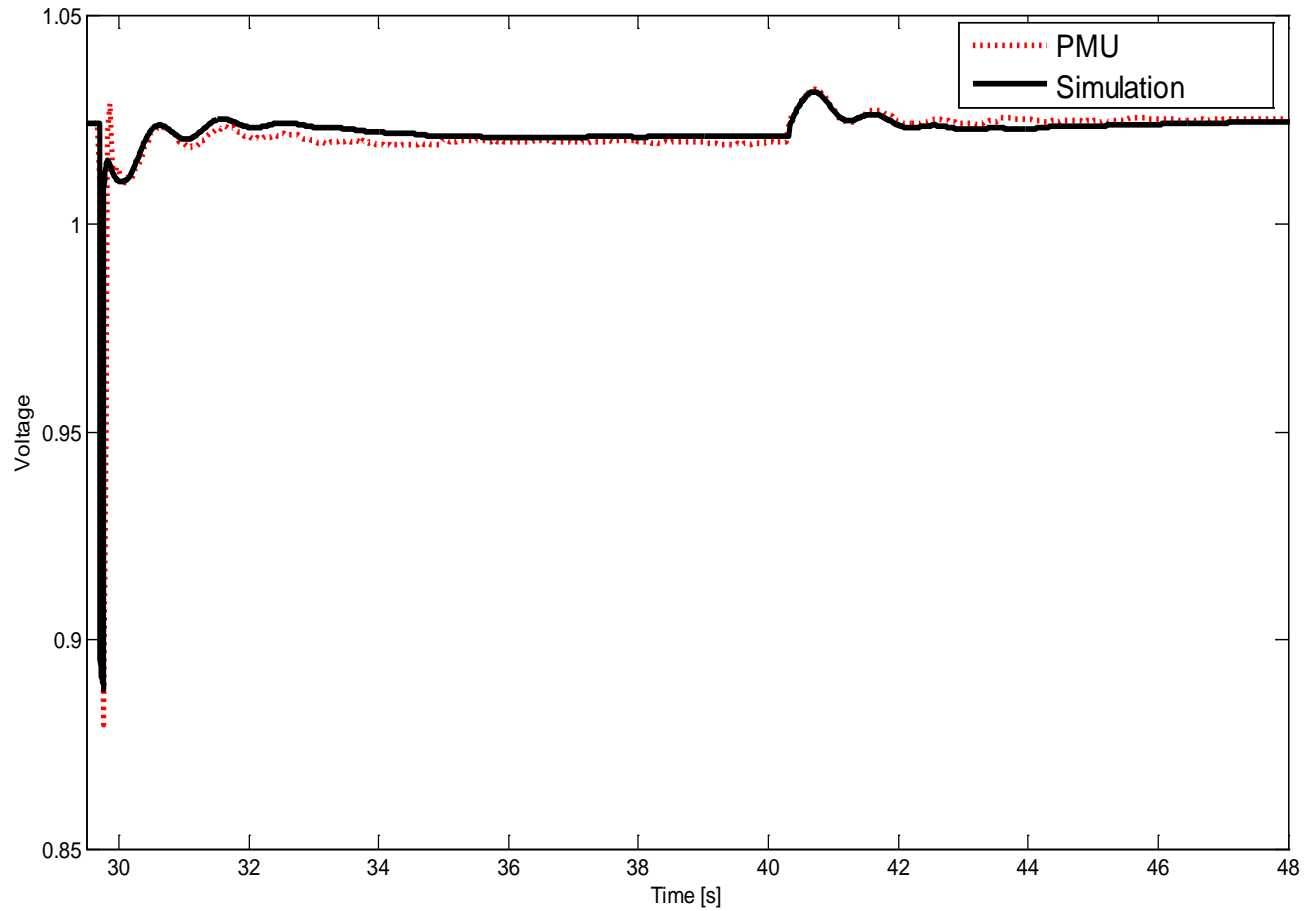
Validation of HVDC Model

Validation of Nuclear Unit

- Phase B to ground fault on line 348, 16 miles away from the MILLSTONE station

- Fault was cleared after 5 cycles by opening line 348; Line was reclosed after 10.5 seconds
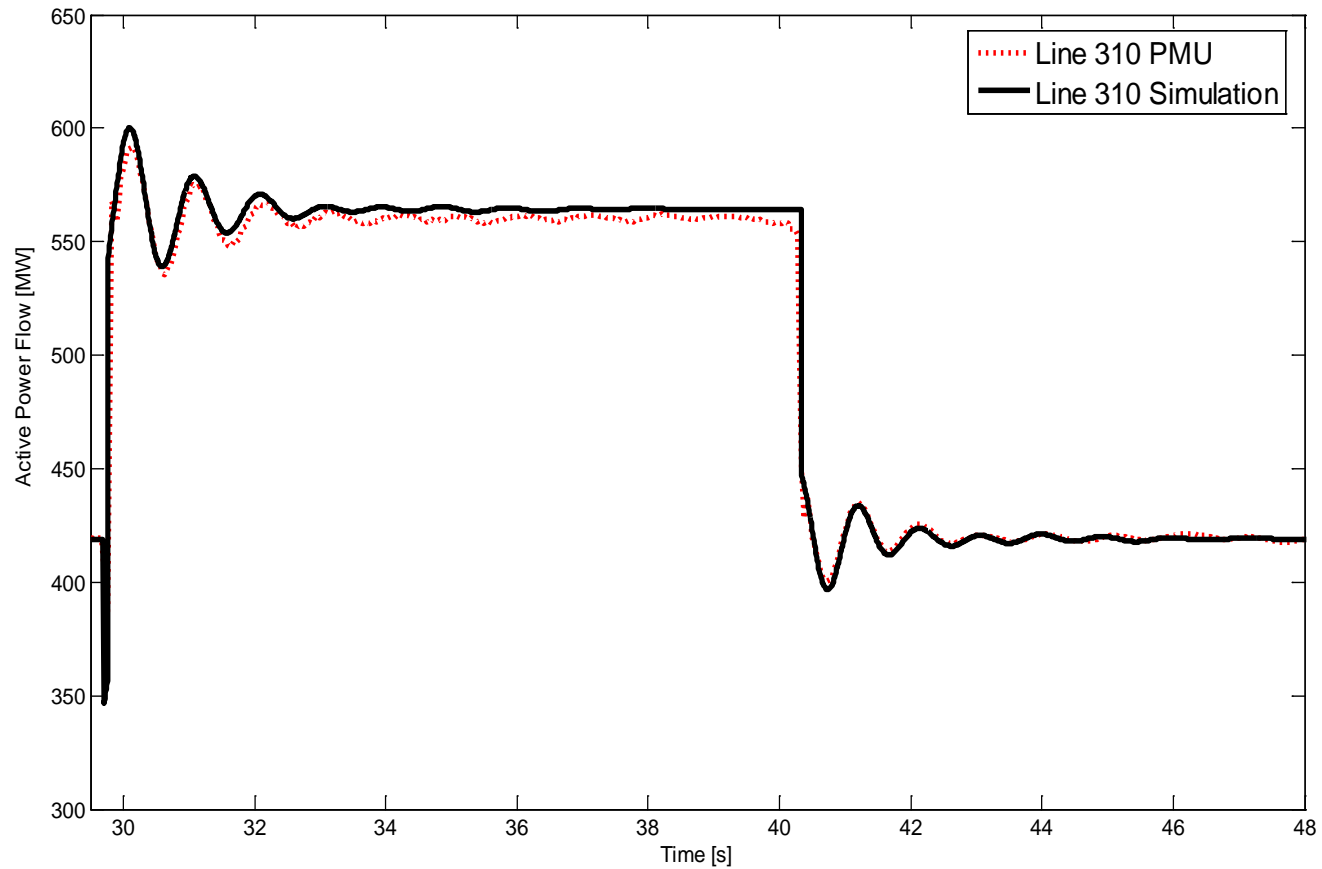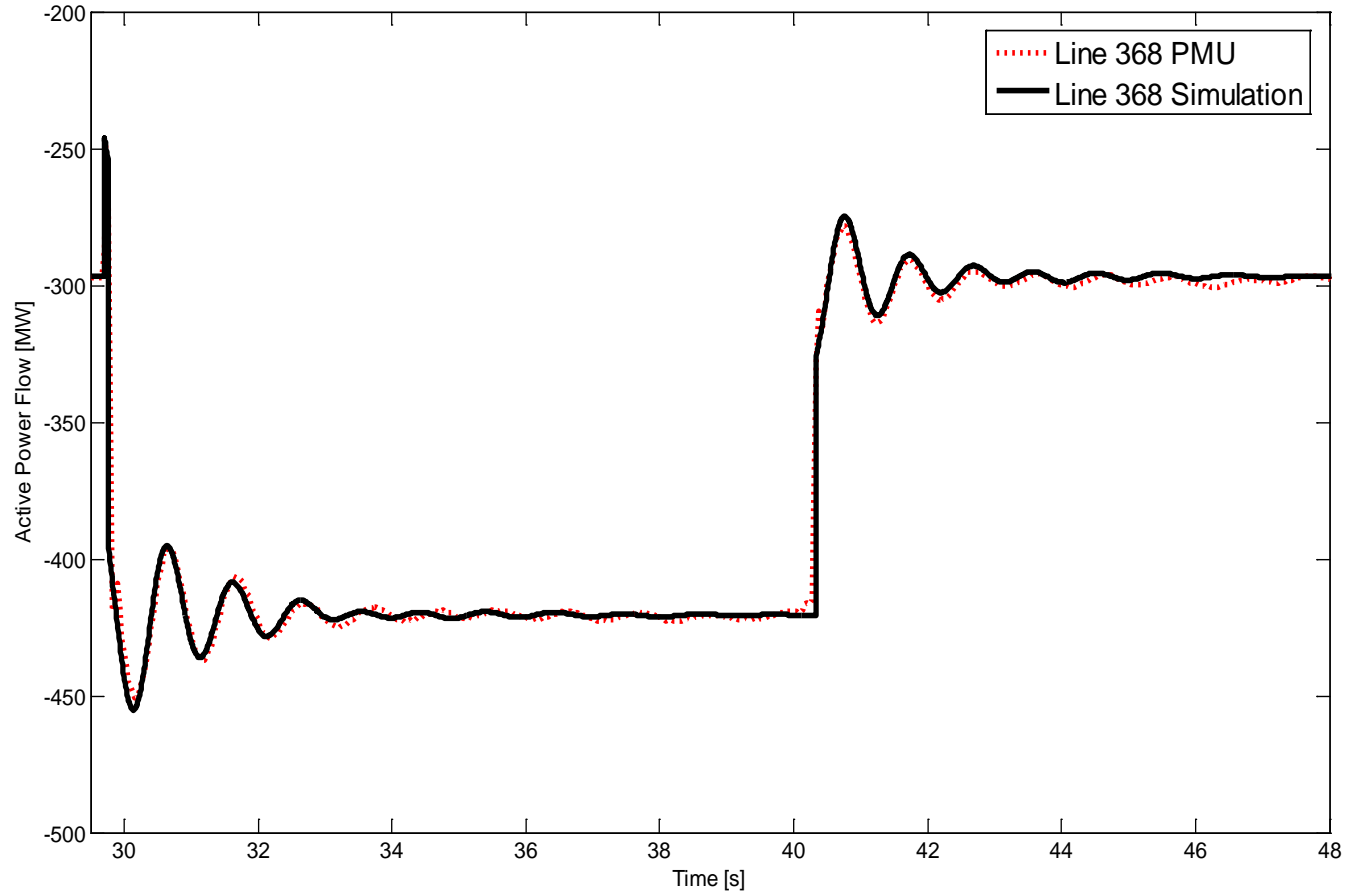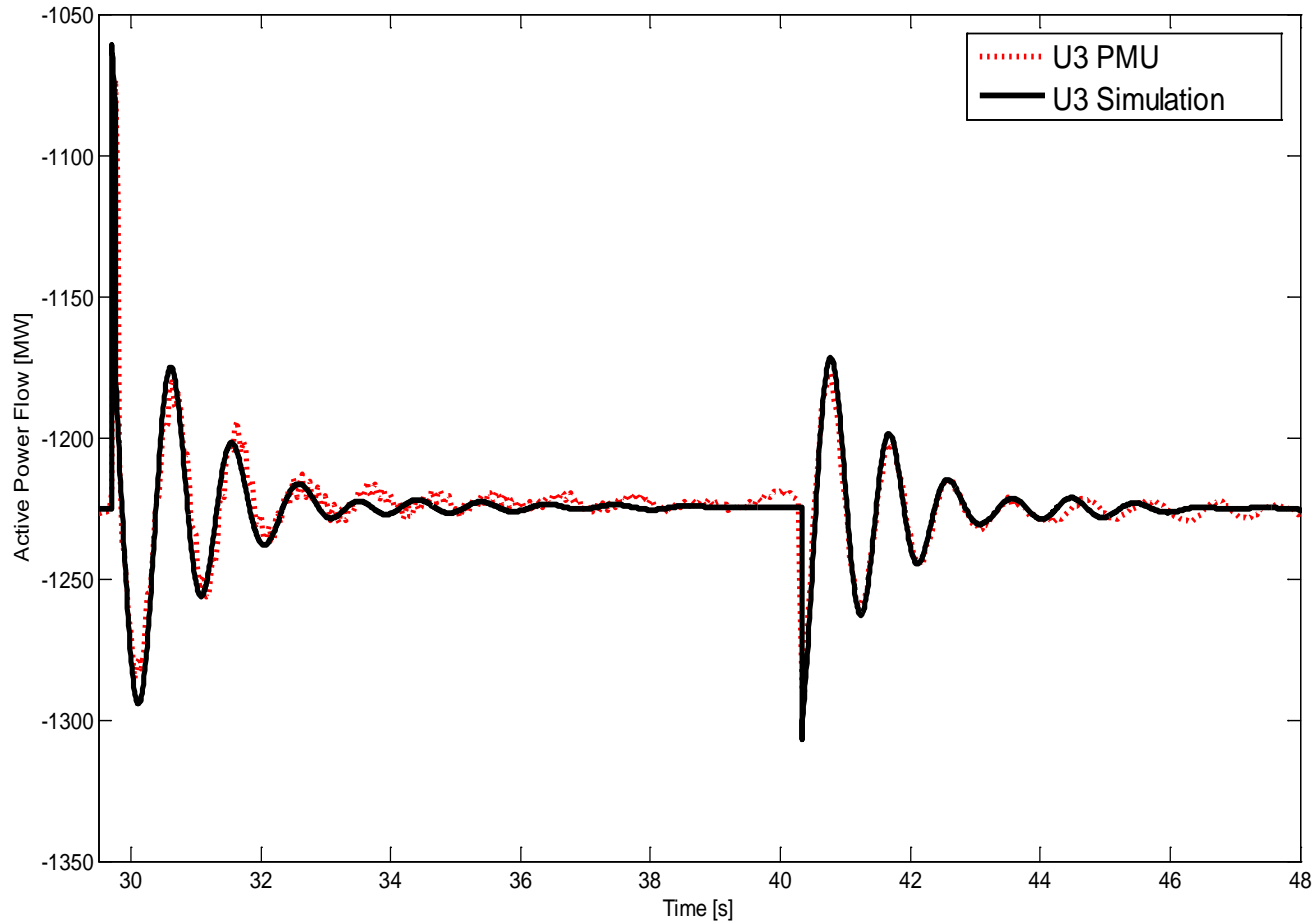
Millstone 345 kV Voltage

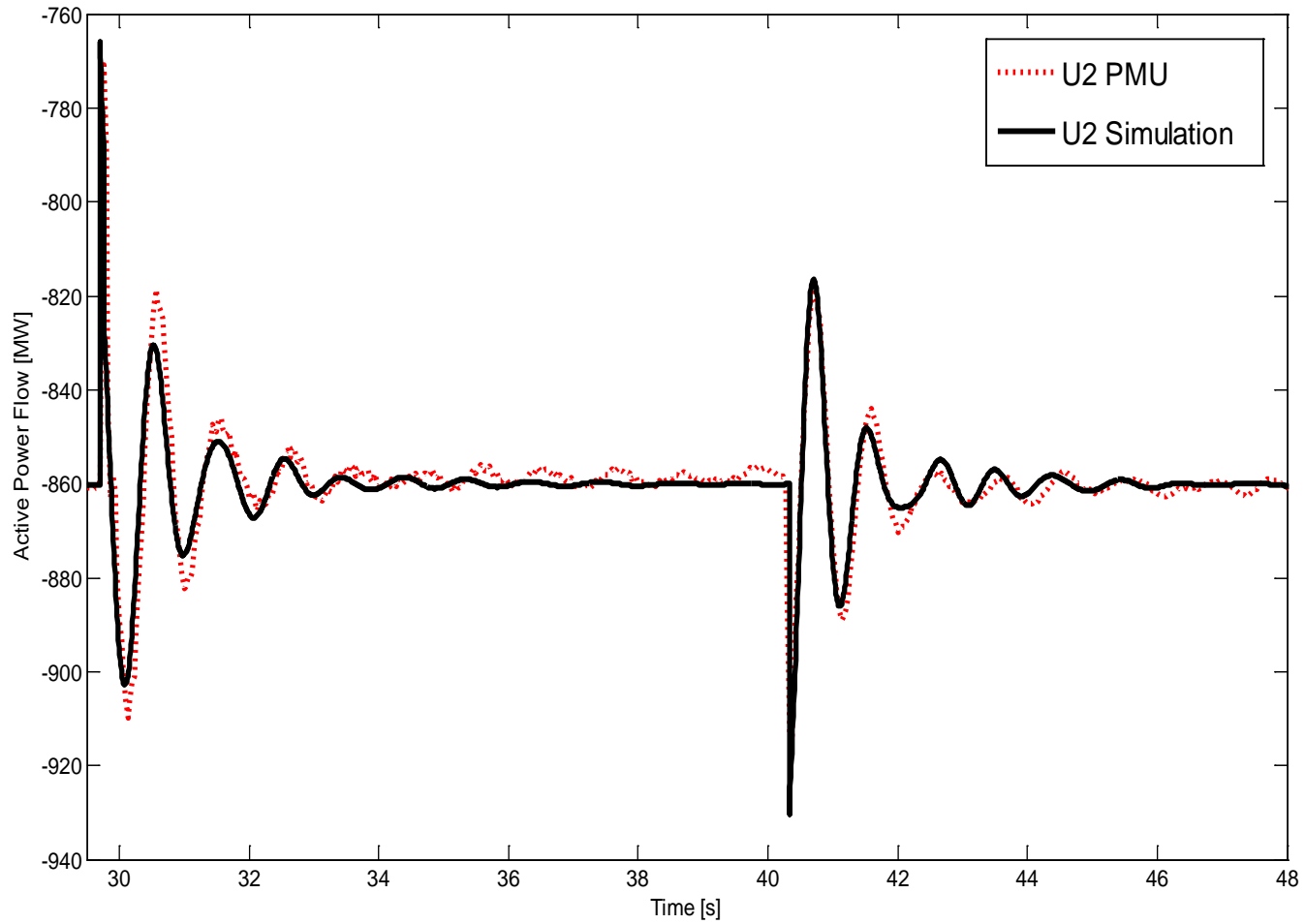# Line 310 Active Power (Millstone – Manchester)

Line 368 Active Power (Manchester – Card)

Millstone Unit 3 Active Power

Millstone Unit 2 Active Power

Conclusion and Future Plans

- The synchrophasor system and On-line Transient Stability Assessment build the foundation for dynamic model validations

- Develop the process and tools to automate certain parts of the dynamic model validation
  - NERC MOD-B that ISO must "validate" system models with actual disturbance events

- Access DFR and DDR data from Transmission Owners
  - Historian/database to support storing different types of time tagged data

- Continue the exercise of dynamic model validation for generators, HVDCs, load, SVC, etc

Questions