Transient Security Assessment Tool (TSAT) Data Requirement Update

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Resource Integration Workshop

RRGRR-021 - Background

- RRGRR021 added new dynamic model/data requirements to the Resource Registration Glossary needed for real-time TSAT implementation
- RRGRR-021
  - Approved by TAC on Feb. 28, 2020
  - Effective as of August 1, 2020

Resource Entities and TSPs - TSAT Requirement

- As of August 2020, all existing and new generation resources are required to submit the TSAT dynamic models for ERCOT operations model.
- Resource Entities are required to review their existing PSSE user-defined models for IRRs, Battery/Storage and submit TSAT user-defined dynamic models (if needed)
- TSPs are required to review the PSSE user-defined models for existing transmission equipment's (Dynamic reactive devices etc.) and submit TSAT dynamic models (if needed)
- New GR and SOG connecting to ERCOT Transmission Grid on or after August 1, 2020 will have to submit dynamic models for both PSSE and TSAT

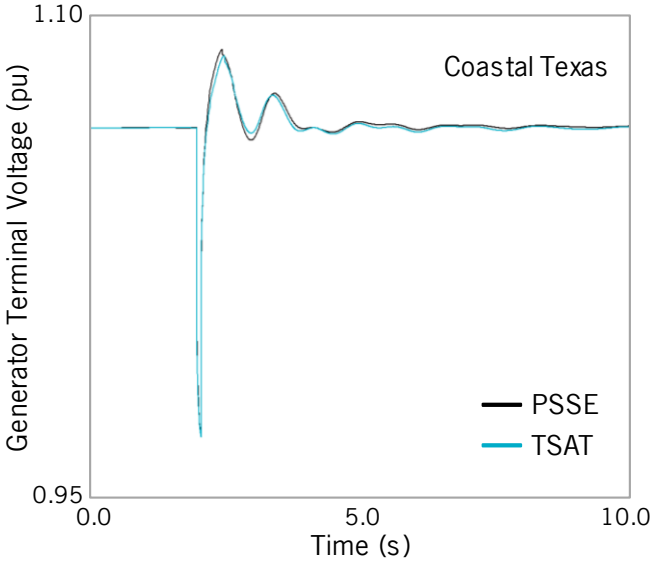
RRGRR-021 TSAT Data Requirement

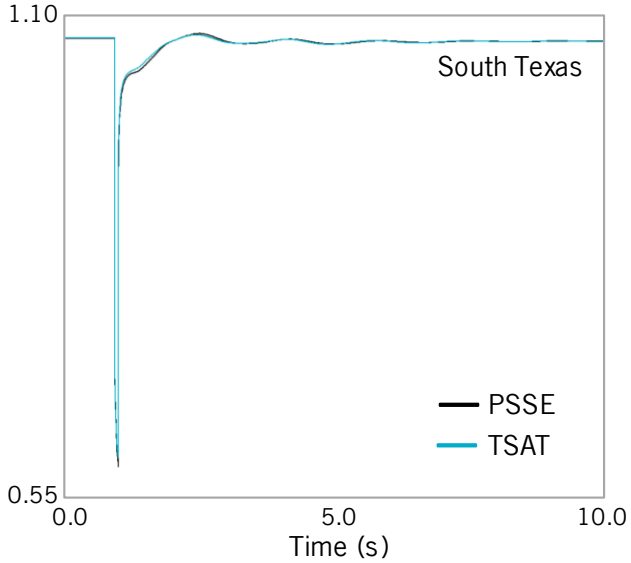
- Generator Resources that has provided a user-defined planning model (in PSS/E) are required to provide the same user-defined model for TSAT operations model.
- Generic TSAT model are not acceptable where GRs have submitted user-defined models for planning model (PSS/E)
- The planning (PSS/E) and operations (TSAT) user-defined model should be able to use (read) the same dynamic model parameters (dynamic data format dyr file)

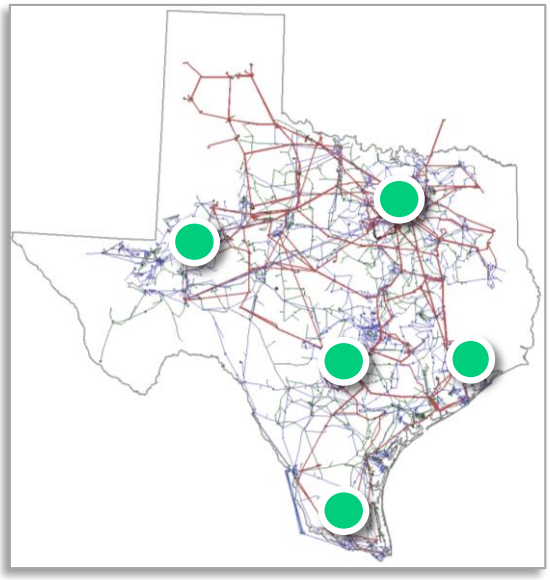
Real-time TSAT Implementation/Progress

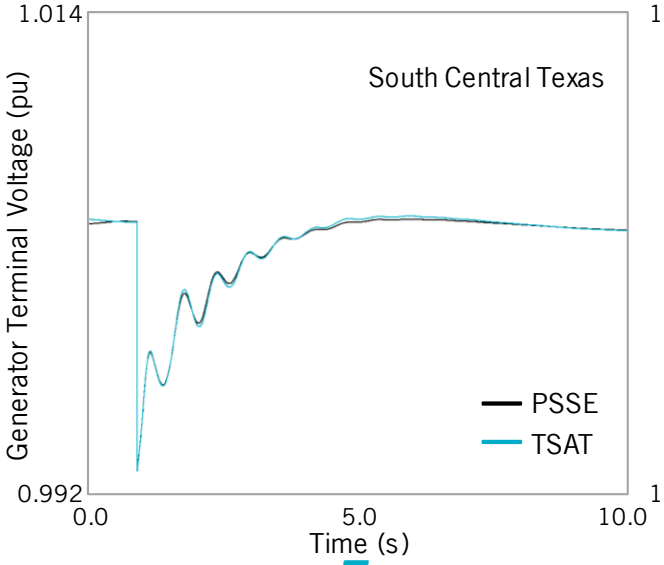
- ERCOT is in the process of implementing TSAT for Real-Time operations
- The ERCOT conventional generator (Coal, Nuclear, Combined Cycle etc.) dynamic models implemented in PSS®E are available in TSAT standard dynamic model
- The ERCOT conventional generator fleet has been implemented in TSAT and validated/benchmarked against PSS®E

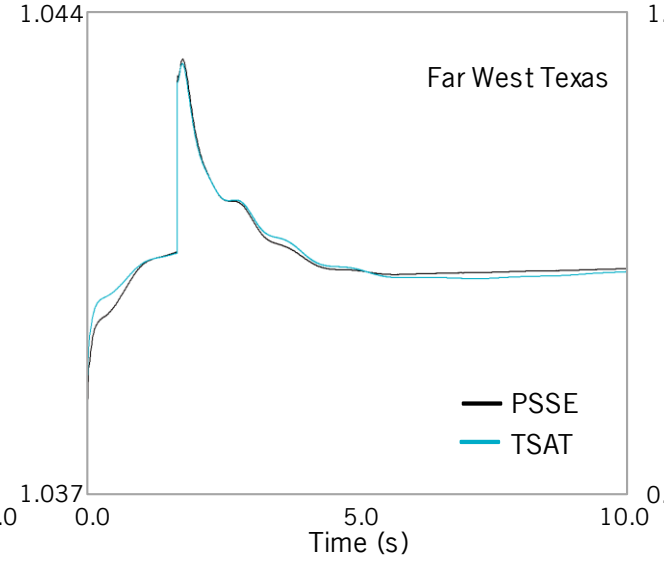
TSAT Conventional model Vs PSS®E Benchmark

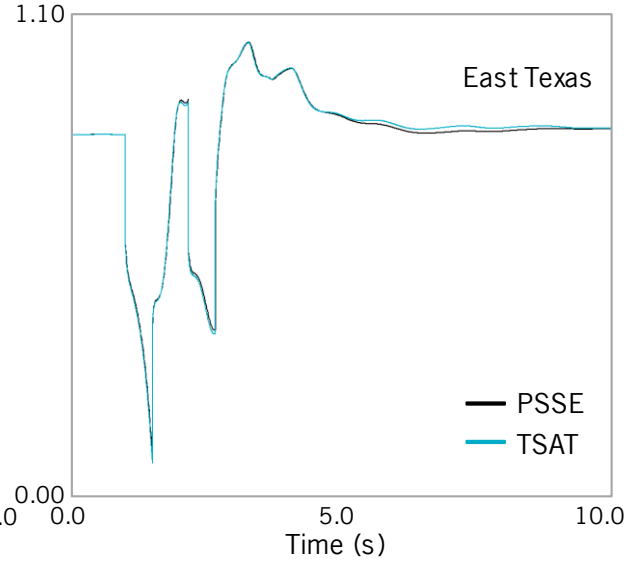






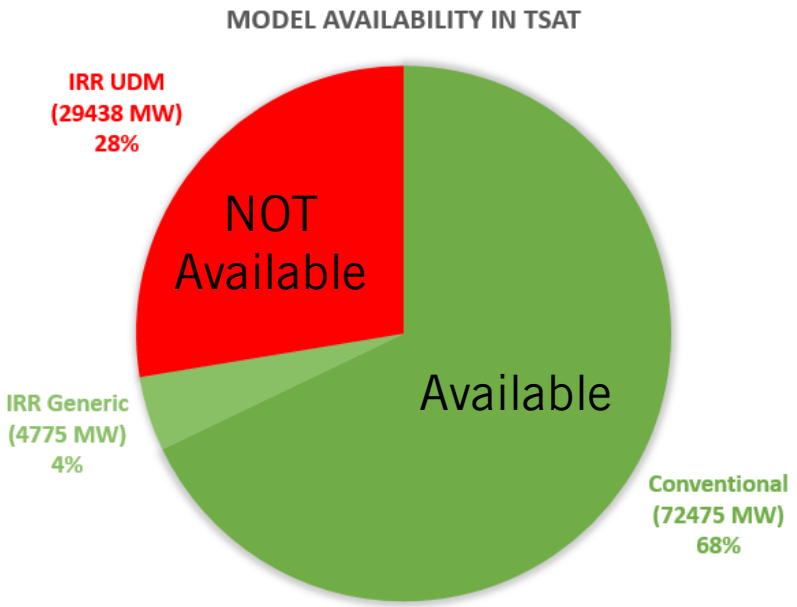






Real-time TSAT – Model Deficiencies

- Models for renewable generation (wind and solar) often use user-defined code (user-defined models available in PSS®E)
  - Generic equivalent representations in TSAT are not suitable for ERCOT regions with low system strength



TSAT Dynamic model status

- ERCOT has a total of 286 GRs that have user-defined models in the planning model (PSS/E)

- TSAT Operations model status as of Dec. 01, 2020
  - 45 GRs has submitted TSAT model through RARF
  - None has submitted user-defined models for TSAT
  - All have submitted generic model as a substitute for planning user-defined model (which is not acceptable)

ERCOT user-defined models

Vendor	PSSE User-defined Models (UDM)	TSAT UDM Status (as of Dec. 1, 2020)
Acciona (Nordex)	6 different generator models	No model will be available in short/medium term.
Nordex	2 generator models	
AMSC	2 STATCOM models	No update is available.
Bonus (Siemens)	1 generator model	Certain type 3 WTGs will be available by 15th Jan 2021. No updates on the rest.
Gamesa (Siemens)	8 generator models	
Siemens	3 generator models	
GE	4 generator models	Working on the newest model which will be available by August 2021.
Goldwind	2 generator models	No update is available.
Kaco	1 generator model	No update is available.
Mitsubishi	1 generator model	No update is available.
Power Electronics	3 generator models	The newest model should be available after December 15, 2020.
SMA	1 generator model	No UDM is under development.
Vestas	16 generator models	1 model provided. No timeline for the rest.

Real-time TSAT Implementation

- The current TSAT dynamic user-defined model deficiencies and delays will have a significant impact on the TSAT implementation timeline

- ERCOT will continue to calculate GTC limits using off-line PSSE studies until these TSAT models can be provided

Questions?