



Synchrophasor Applications in Indian Power System

26 May 2021
1:30 pm – 2.45 pm (CET)

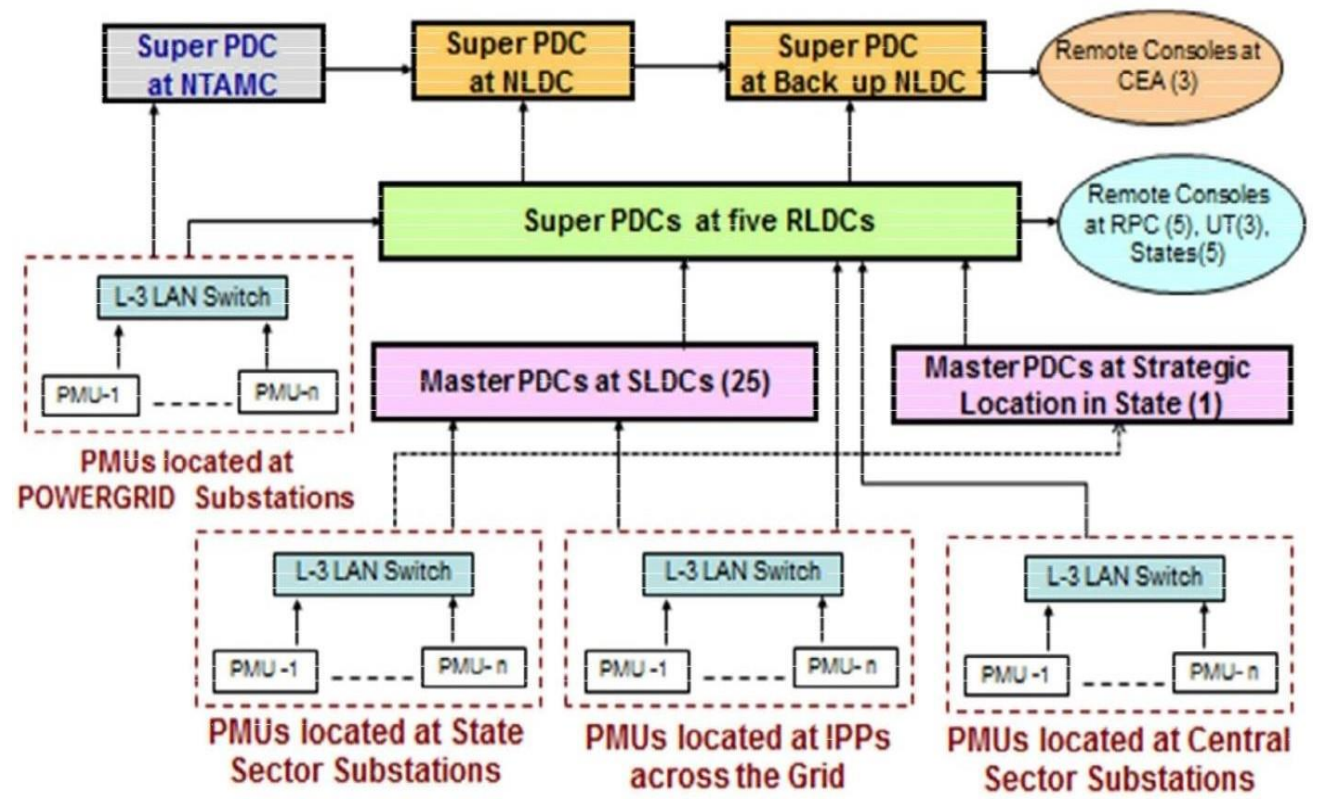
IEEE SGMA 2021

Power System Operation Corporation Ltd. (POSOCO)

Unified Real Time Dynamic State Measurement System Hierarchy

SCOPE

- **3 Level Hierarchical System** – National, Regional, State
- 34 Control Centers, 351 Substations, 1186 PMUs, 30 K Phasor Measurement with sample rate of 25 samples per sec, 500 TB storage.
- Execution in 24 months & thereafter, 7 years of AMC.



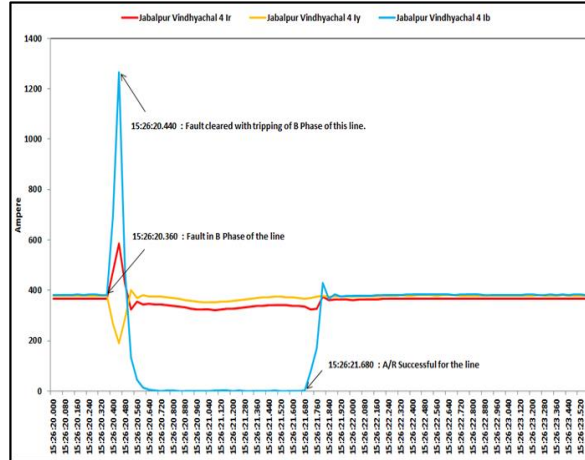
Real Time Applications



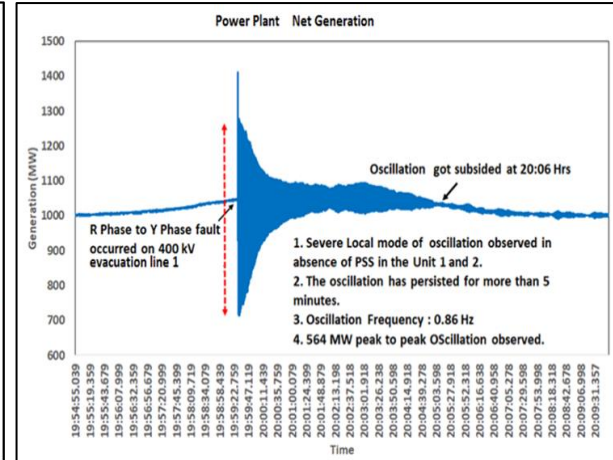
Monitoring and Alarm



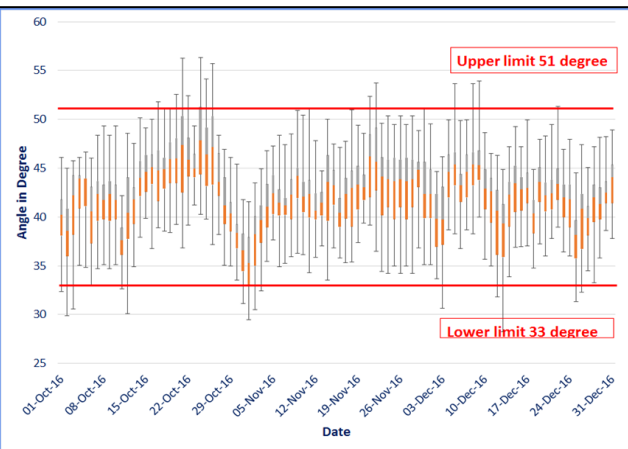
Event Detection



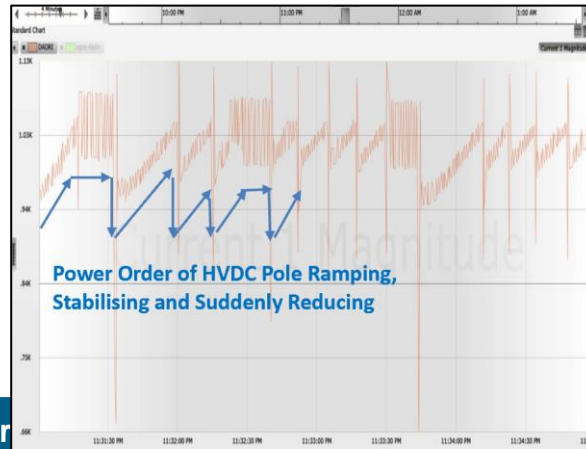
Low Frequency Oscillation



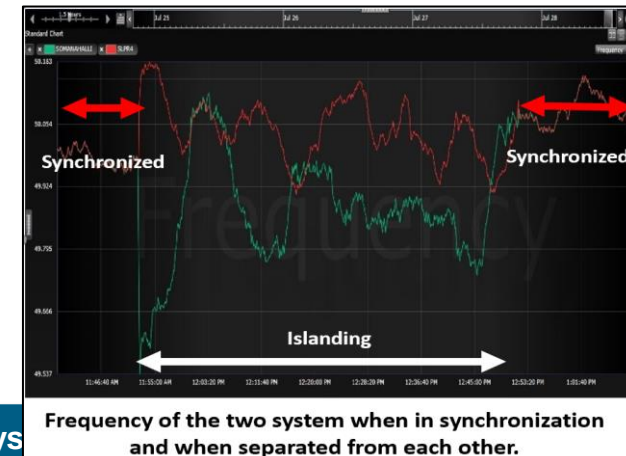
Wide Area Angular Separation



Monitoring of Controlling Devices



Synchronisation and Islanding

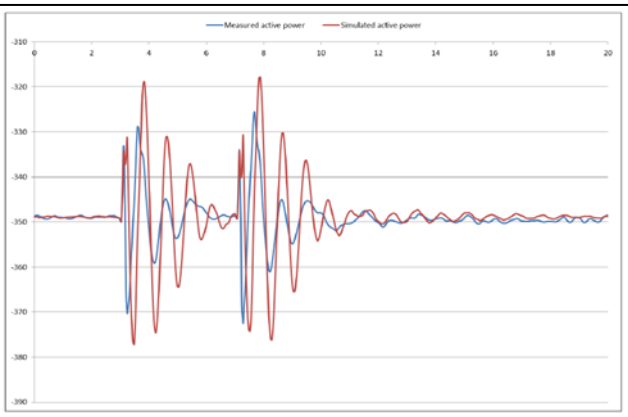


Frequency of the two system when in synchronization and when separated from each other.

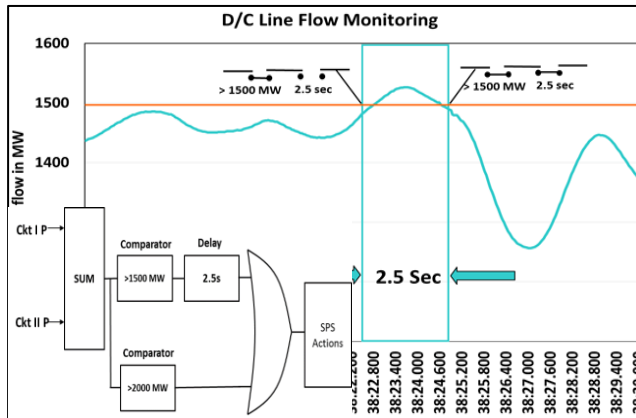
Off-line Applications



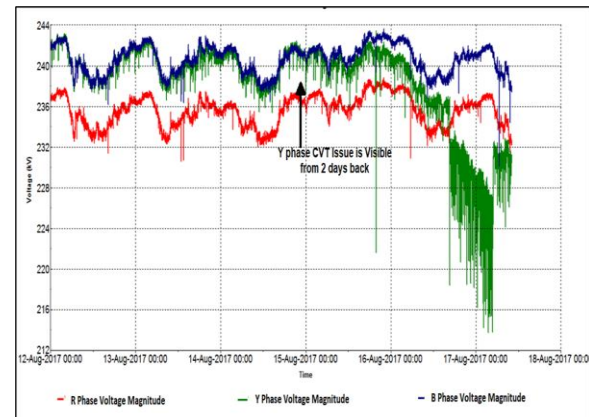
Model Validation



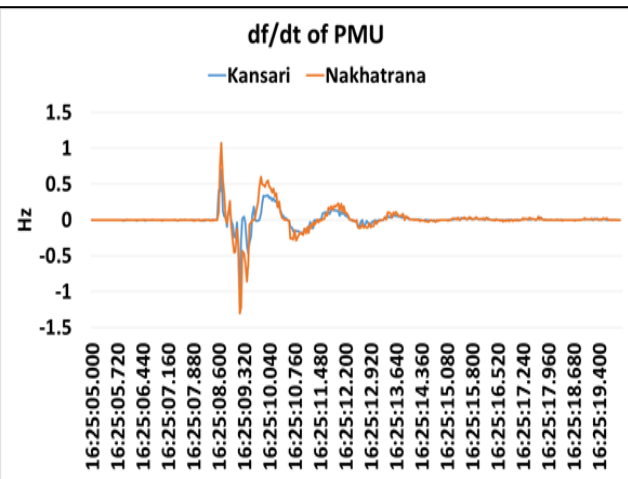
SPS Improvement



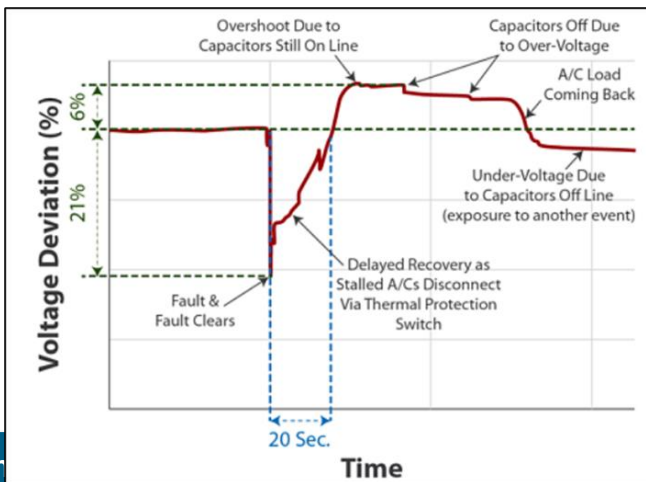
Asset Management



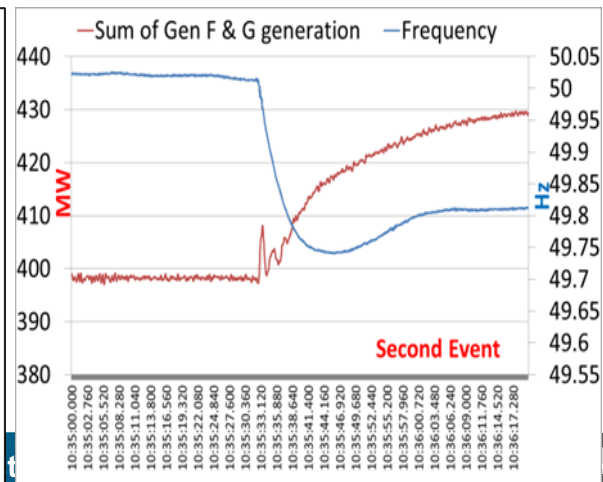
Protection Operation



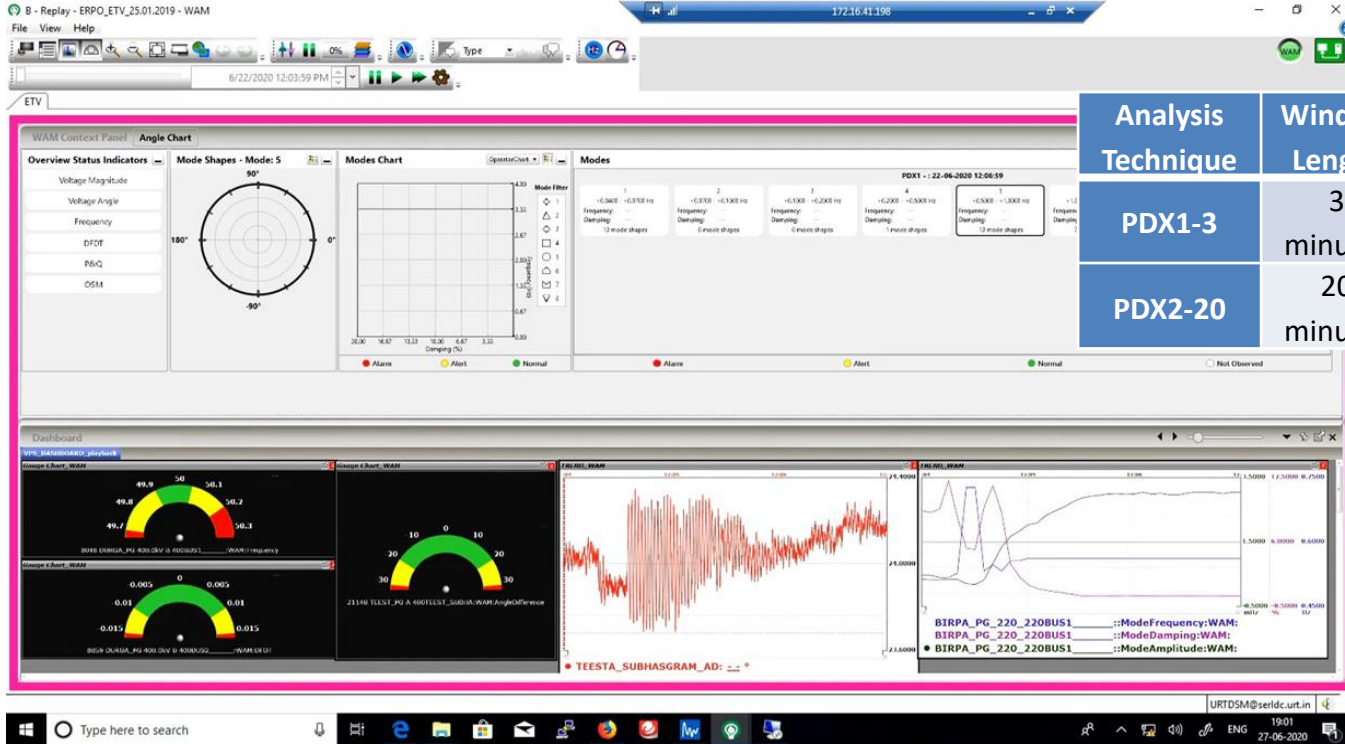
Delayed Voltage Recovery



Governor Response of Generator



Oscillatory Stability Management System (OSM)



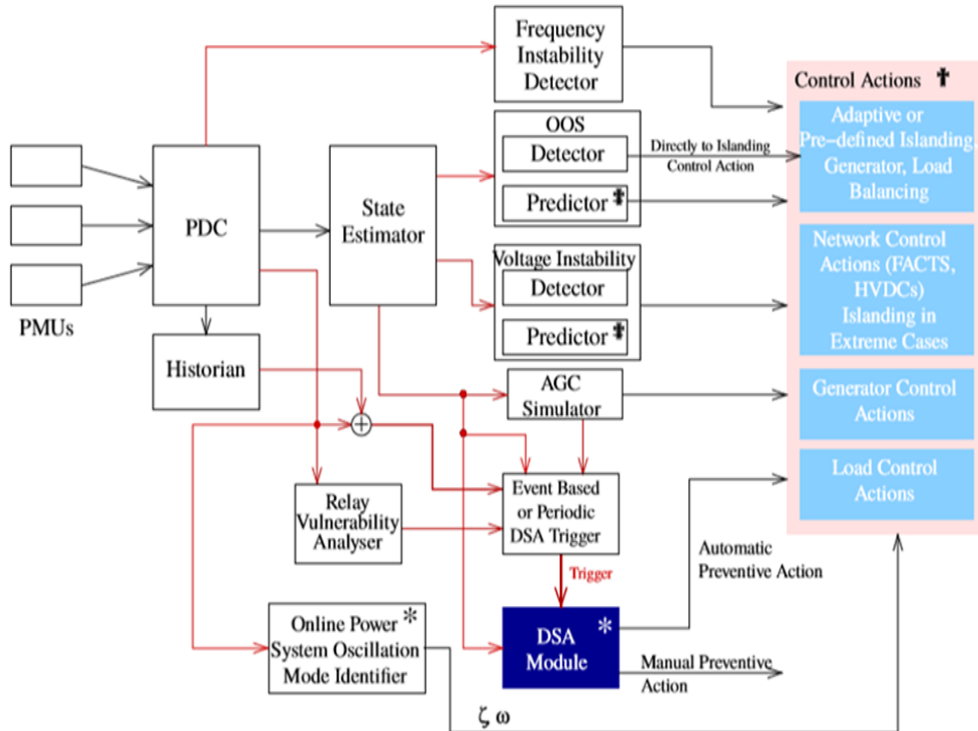
Analysis Technique	Window Length	Update Rate	Useful applications
PDX1-3	3 minutes	5 seconds	Operational use
PDX2-20	20 minutes	20 seconds	Planning & analysis use

- Monitoring Electromechanical Oscillations.
- Extracts oscillatory stability parameters using ARMA analysis of the measure signal.

▪ Inter – Area oscillation (12:04PM to 12:07PM on 22/06/2020)

Synchrophasor (Upcoming)

PMU SUPERVISED SCHEMES



Upcoming URTDSM Applications in Indian Power System

S.N	Application Name
0	
1	Voltage Stability Monitoring
2	Detection of disturbances
3	Online monitoring of Inertia.
4	Identification of source of Oscillation.
5	Identification of stressed corridors
6	ROCOF calculation over variable window
7	Locating contributions to poorly damped or unstable oscillations
8	Model Validation
9	Higher frequency sub-synchronous oscillation analysis
10	Big Data Analytics

Thank You