



PLANNING IMPLEMENTATION TASK TEAM (PITT)

North American SynchroPhasor Initiative (NASPI)

Working Group Meeting

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Montreal, CANADA



PLANNING IMPLEMENTATION TASK TEAM (PITT)

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PLANNING IMPLEMENTATION TASK TEAM (PITT)

Outline:

- 1. PITT Charter**
- 2. Key 2007 Deliverables**
- 3. Recent Activities**
- 4. Next Steps**



1. PITT CHARTER

Identify & Facilitate the Development, Deployment & Training of Tools/Techniques...

that Enable Planners/Analysts/Others to Support Assessment of System Performance & Model Validation...

and to Enhance Decision-Making Related to Bulk Grid Reliability



PITT WORK PLAN

Document Dated May 2006

- **EIPP Off-Line Applications Task Team (OLATT)
Near-Term Tasks**

Task 1: Phasor Angle Analysis for Wide Area Situational Awareness

Task 2: Small Signal Stability Analysis

Task 3: Primary Frequency (Governing) Response Analysis



2. PITT KEY 2007 DELIVERABLES

- **Develop a plan for baselining measurements of phase angles & small signal stability performance**
- **Gather statistics on phase angle separations across the Interconnection(s)**



2. PITT KEY 2007 DELIVERABLES

KEY 2007 DELIVERABLES

- **Get familiarized with tools/techniques to perform small signal stability using PMU data. Identify dominant frequency modes and associated damping for system ambient conditions**
- **Report on normality of phase angle separations and dominant frequency modes**



3. RECENT PITT ACTIVITIES

Focus:

- **To encourage active involvement of entities with PMUs installed**
 - **Initiated monthly conference calls**
- **To improve PMU data quality**
 - **Conducted a survey**
- **To analyze system events**
 - **Analyzed the 6/23/07 EI event**



Monthly Conference Calls

- Monthly conference calls since June 2007
- Participants from PMU-owning EI utilities, RTOs and NERC
- Agreed to use TVA SPDC for EI-wide phasor data analysis activities
- Agreed that addressing data quality issues is very important, in order to do meaningful analysis

Survey Results

	No of PMUs	Data Rate (sps)	Verification Tests	Time Stamp	TVA SPDC	TVA SPDC Comp	Softwares in use	Software planned for use
AEP	5	30	Magnitude, Angle, Timestamp	UTC	Yes	Yes	MATLAB, DSIToolbox	OSISoft, RTDMS, PSO
Ameren	3	30	Magnitude (Mag)	UTC	Yes	Yes	BPA Program, Excel	RTDMS & others
ATC	1	30	Magnitude, Angle, Timestamp	CST/CDT	Yes	Yes	SEL Utility	
ConEd								
Entergy	20	30	None	UTC	Yes	Yes	OSISoft PI	PSO, DSIToolbox
FirstEnergy	2	30	Phase Sequence (Seq)	EST	Yes	No	RTDMS	Areva EMS, OSISoft's PI
FPL	3	30	Magnitude, Angle, Timestamp	UTC	Yes	No	Excel	Excel
Manitoba Hydro	1	30	Seq, Magnitude, Angle (Ang)	UTC	Yes	N/A(1)	RTDMS	RTDMS, StormMinder, etc
MidAmerican	1	10	None	CDT	Yes	No	RTDMS	RTDMS
NYPA	9	6	Magnitude, Timestamp	UTC	Yes	No	VT program and others	
Southern	2	15/30	Seq, Mag, Ang, Timestamp	UTC	Yes	Yes	RTDMS, GE Enervista	
TVA	12(+1)	30	Magnitude		Yes	N/A(2)	RTDMS, DataWare, VT etc	RTDMS, DataWare, VT etc
Notes								
1. Since MH doesn't have their own PDC they have nothing to compare								
2. TVA is sending the same data to their PDC and the SPDC. No sense in comparing								
3. The GE N60 contains four virtual PMUs, so mutiple points are monitored at each site. (Southern)								
4. Some companies did some accuracy tests (TVE determination) prior to installation. (AEP, Manitoba Hydro)								
5. Some companies chose to contribute data from only some selected PMUs to the TVA SPDC.								



Survey Results

- About 60 PMUs in operation and integrated with the TVA SPDC. More being added.
- Most of them provide data at 30 samples/sec, the desired rate.
- Most of the data providers have compared their data at the TVA SPDC with data from their PMU/PDC. Such a comparison is essential.
- Most of them have performed sanity checks for data reasonableness and accuracy. (Simple tests need to be performed to rule out obvious data quality issues).



Improving Data Quality

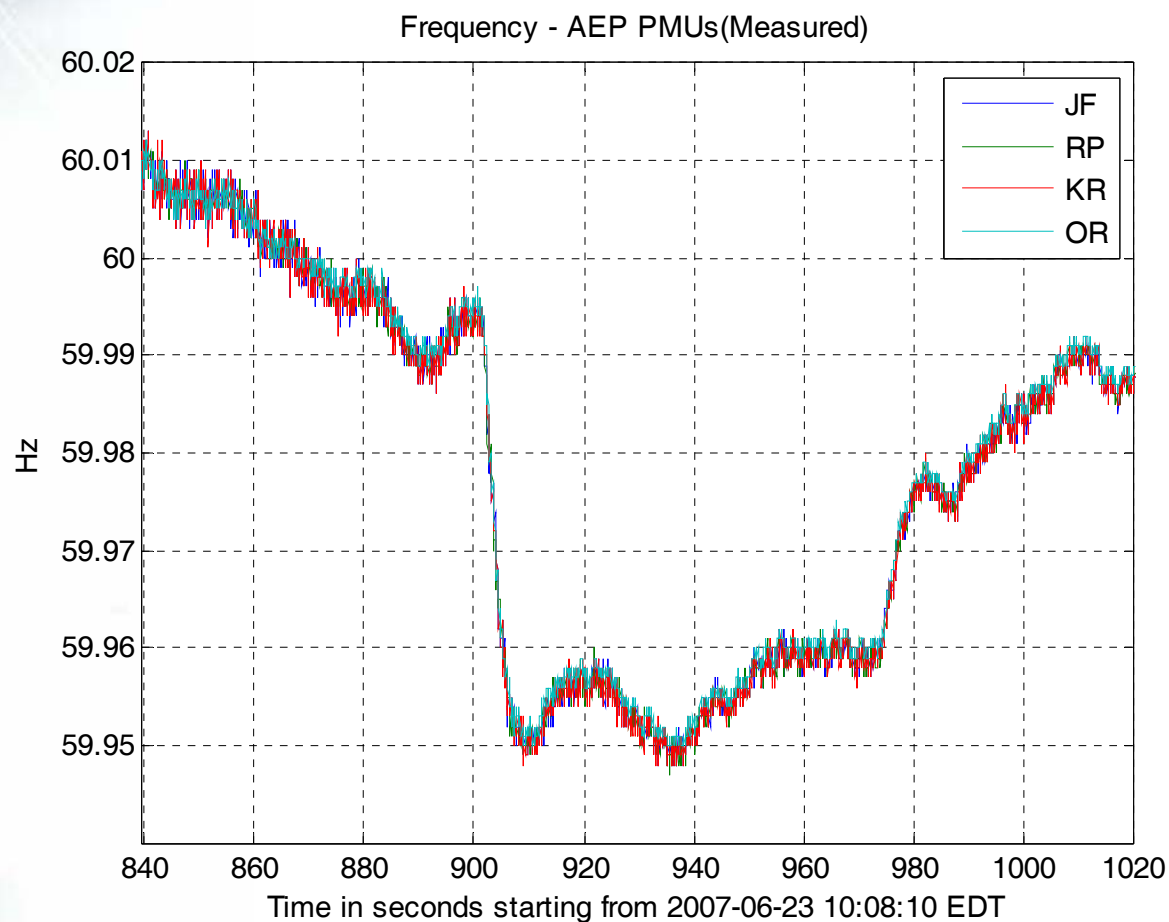
- Challenges in using TVA SPDC data for analysis:
 - Process of obtaining data could be lengthy
 - Old Data (e.g., from 2006) not readily available
 - Data from all PMUs not available all the time
- Above challenges could be caused by equipment or communication issues at sending end (Data Provider) and/or receiving end (TVA)
- TVA has done (and continues to do) a great deal to address data quality issues at its end
- Data providers need to continue to ensure quality of data and reliability of communication channel with TVA



Analysis of June 2007 EI System Event

- Generator: Cumberland Unit 1
- Frequency change: 40 mHz
- Generation Loss: 1052 MW (Based on VT Trigger info)
- Beta (β) = 26.3 MW/mHz
- $df/dt = 8.51$ mHz/sec

Analysis of June 2007 EI System Event





4. NEXT STEPS

- Continue Event Analysis
- Workshop(s) on PMU data processing (to prepare for data analysis)
- Workshop(s) on data analysis software programs
- Revise 2007 Plan
- Develop 2008 Plan