



Cigre JWG C4/C2.62

Review of Advancements in Synchrophasor Measurement Applications

NASPI Work Group Meeting
Charlotte, NC
September 23-24, 2025




Terms of Reference (TOR)

C4/C2.62 TOR

- C4: Power System Technical Performance
- C2: Power System Operation and Control

Approved in March 2021

 CIGRE Study Committee C4	
PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP	
JWG 'N° C4/C2.62/IEEE	Name of Convenor: Athula Rajapakse (CANADA) E-mail address: Athula.Rajapakse@umanitoba.ca
Strategic Directions #2: 1, 2, 4	Sustainable Development Goal #3:7
The WG applies to distribution networks: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	
Potential Benefit of WG work #4: 1, 2, 4, 5	
Title of the Group: Review of Advancements in Synchrophasor Measurement Applications	
Scope, deliverables and proposed time schedule of the WG: Background: The commercial use of phasor measurement units by utilities started in the 1990s. A series of IEEE standards were published starting in 1995 to ensure consistent accuracy. Emergence of organizations such as the North American Synchrophasor Initiative (NASPI) has contributed to the deployment in real-world applications. CIGRE has published two major reports on the application of phasor measurement units, including CIGRE TB 702 "Application of PMUs for Monitoring Dynamic System Performance" published in 2017 and CIGRE TB 330 "Wide Area Monitoring and Control for Transmission Capability Improvement" in 2007. The technology continues to rapidly evolve, and it is important to understand the current state of the technology. In 2017, the most common and mature applications were wide area monitoring, state estimation, and model validation. Out of these three applications, wide area monitoring is becoming common practice for TSOs of electrically interconnected systems. The protection and control applications are emerging. The experience of using remote synchrophasor measurements as feedback control signals is not widely reported by the industry. IEEE currently has an active task force on Oscillation Source Location and a working group on Power System Dynamics Measurements in the Power System Dynamic Performance committee that should be coordinated with as they are investigating new applications for PMUs. CIGRE has an active working group focusing on PMU-based decision support tools for System Operators (WG C2.18) that will also be coordinated with. The proposed working group will provide an updated review of specific PMU applications including: <ul style="list-style-type: none">• detection of subsynchronous resonance, very low frequency governor modes, control modes;• improved situational awareness, PMU-enhanced state estimation (linear, three-phase, distributed, dynamic);• voltage instability detection;• on-line and off-line model parameter identification (generator, load, lines, short circuit level);• emerging applications such as grid code compliance monitoring (voltage and frequency control, fault ride through performance, power quality, etc.), wide area protection and control systems (synchrophasor based backup protection, special protection systems, enhancements to FACTS and HVDC control, etc.) .	

Working Group Officers & Members

- **Convener:**
 - Dr. Athula Rajapakse – University of Manitoba, Canada
- **Secretary:**
 - Dr. Dinesh Gurusinghe - RTDS Technologies/Ametek, Canada
- **Membership:**
 - 38 members from 16 countries

Scope

1. To provide an updated overview of synchrophasor technology including standard updates. Cover (micro)PMUs for distribution system applications as an additional area.
2. To provide an updated view of industry and academia experience on the concentration, archiving, and use of PMU data.
3. To describe emerging applications and any technology gaps such as high dependency on reliable telecommunication, precise time synchronisation, signal latency, etc. requiring further research and development.
4. To discuss the end-user's experiences of deploying synchrophasor measurement systems and applications and elaborate additional specially tailored applications for enhancing secure power system operation.
5. Elaborate and deliver application examples for new specific PMU applications

Deliverables

- Technical Brochure (TB) and Executive Summary in Electra
- Cigre Science & Engineering (CSE) journal
- Tutorial
- Webinar

Status

- TB draft completed
- TB reviewed by Study Committee chairs
- TB revised to address comments
- Expected TB publication by December 2025

Review of Advancements in Synchrophasor Measurement Applications

JWG C4/C2.62

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TB Content

EXECUTIVE SUMMARY	3
TABLE OF CONTENTS	6
FIGURES AND ILLUSTRATIONS	10
LIST OF ABBREVIATIONS	14
1. INTRODUCTION	21
1.1 BACKGROUND	21
1.2 NEED FOR THE REVIEW	21
1.3 OBJECTIVES AND SCOPE OF THE REPORT	22
1.4 ORGANIZATION OF THE REPORT	22
1.5 REFERENCES FOR CHAPTER 1	23
2. ADVANCEMENTS IN THE TECHNOLOGY AND STANDARDS	24
2.1 SYNCHROPHASOR-BASED WIDE AREA MEASUREMENT SYSTEM	24
2.2 STANDARDS	24
2.2.1 History of Synchrophasor Standards	24
2.2.2 Measurement Standards	25
2.2.3 Communication Standards	25
2.2.4 Testing Guides and Standards	26
2.2.5 PDC Guides and Standards	26
2.3 TIME SYNCHRONIZATION	26
2.4 PHASOR MEASUREMENT UNITS	27
2.4.1 Distribution PMUs	27
2.4.2 Distribution PMU Applications	28
2.5 DATA CONCENTRATION	29
2.5.1 Time Alignment of Data	29
2.5.2 Data Forwarding	29
2.5.3 Communications	30
2.5.4 Data Format and Coordinate Conversion	30
2.5.5 Reporting Rate Conversion	30
2.6 TESTING, VERIFICATION AND COMMISSIONING OF PMU/PDC	30
2.7 SECURITY AND CERTIFICATION OF SYNCHROPHASOR SYSTEMS	31
2.8 CHAPTER CONCLUSION	32
2.9 REFERENCES FOR CHAPTER 2	32
3. SYSTEM ARCHITECTURE, DATA INTEGRATION & PROTOCOLS	34
3.1 DATA COMMUNICATION NETWORKS	34
3.2 SYSTEM ARCHITECTURE	35
3.2.1 Requirements	35
3.2.2 Functional Flexibility	35
3.2.3 Typical Architecture for PMU Installation within Substations	36
3.2.4 Substation to Control Centre Communication Architecture	37
3.2.5 Recent Trends and Advancements	37

3.2.6 NASPNet 2.0 Architecture	38
3.3 SCADA/EMS AND WAMS INTEGRATION	39
3.3.1 Information Exchange Methods	39
3.3.2 Protocols for Real-time Data Exchange between SCADA and WAMS	40
3.3.3 CIM (Common Information Model) File Exchange	40
3.3.4 Information and Data Transferred from WAMS to SCADA	40
3.3.5 Information and Data Transferred from SCADA to WAMS	41
3.4 SYSTEM ARCHITECTURE EXAMPLES	41
3.4.1 Manitoba Hydro Wide Area Measurement System	41
3.4.2 Grid-India Real-Time Dynamic State Measurement System	43
3.5 DATA VALIDATION	45
3.6 CHAPTER CONCLUSION	46
3.7 REFERENCES FOR CHAPTER 3	46
4. APPLICATIONS DEPLOYED IN THE INDUSTRY	48
4.1 IMPROVED SITUATIONAL AWARENESS	48
4.1.1 Wide Area Monitoring Systems	48
4.1.2 Visualization Techniques	49
4.1.3 Data Visualization Methods in Power Systems	50
4.1.4 Alarm Management	55
4.1.5 Comparison of Visualization Methods	56
4.1.6 Future of Visualizations	57
4.2 POST-EVENT ANALYSIS	58
4.2.1 Fault Clearance Time	58
4.2.2 Verification of Auto-redose Operation	58
4.2.3 Validation of RoCoF Relay Operation and Over-Voltage Tripping	60
4.2.4 Identification of Voltage Transformer Failure	60
4.3 PMU-ENHANCED STATE ESTIMATION	61
4.3.1 Basic Concept of State Estimation	61
4.3.2 Linear State Estimation	61
4.3.3 Implementation of PMU based State Estimation at Manitoba Hydro	63
4.4 OSCILLATION MONITORING	64
4.4.1 Monitoring of Electromechanical Oscillations	64
4.4.2 Forced Oscillation Source Location	65
4.4.3 Monitoring Sub-Synchronous Oscillations	65
4.4.4 Oscillations Monitoring Tools	67
4.4.5 Examples of Oscillation Monitoring and Source Location	69
4.5 LONG-TERM VOLTAGE STABILITY MONITORING	71
4.5.1 Real-time Monitoring of Long-term Voltage Stability	72
4.5.2 Examples of Long-term Voltage Stability Monitoring	74
4.6 MODEL VALIDATION AND CALIBRATION	76
4.6.1 Model Validation	77
4.6.2 PMU Based Model Verification	78
4.7 CONTROLLER TUNING REQUIREMENTS AND PERFORMANCE VALIDATION	80
4.7.1 Practical Experiences of PSS Tuning and Performance Validation	80
4.7.2 Use of Synchrophasors for Validation of FACTS and HVDC Control	82
4.8 GRID CODE COMPLIANCE MONITORING	83
4.8.1 Frequency Compliance	83
4.8.2 Monitoring Fault Ride Through Response of Solar and Wind Power Plants	84
4.8.3 Voltage Unbalance	85
4.9 INERTIA ESTIMATION	86
4.9.1 Methods of Inertia Estimation Using PMU data	86
4.9.2 Inertia Monitoring in Indian Grid	88
4.9.3 Inertia Estimations of Scottish Grid	88
4.10 SPECIAL PROTECTION SYSTEMS	89
4.10.1 South Australia Wide Area Monitoring, Protection and Control (WAMPAC) Scheme	90



TB Content

4.11	ISLANDING DETECTION	95
4.12	WIDE AREA CONTROL SYSTEMS	97
4.12.1	HVDC Power Oscillations Damping Control in China Southern Power Grid.....	97
4.12.2	Wide area damping controller for Pacific DC Intertie	99
4.12.3	Wide Area Damping Control (WADC) in Italy.....	100
4.13	CHAPTER CONCLUSIONS	102
4.14	REFERENCES FOR CHAPTER 4	102
5.	POTENTIAL APPLICATIONS	109
5.1	DYNAMIC STATE ESTIMATION	109
5.1.1	Network and Measurement Model for DSE	109
5.1.2	Numerical Solution of DSE.....	110
5.1.3	Maturity Level.....	110
5.2	PROTECTION APPLICATIONS	110
5.2.1	Potential Applications of Synchrophasors in Asset Protection	111
5.2.2	Potential Applications of Synchrophasors in System Protection.....	111
5.2.3	Maturity Level.....	112
5.3	FAULT LOCATION	112
5.3.1	Fault Location in Transmission Lines.....	112
5.3.2	Fault Location in Distribution Systems	113
5.3.3	Practical Considerations.....	114
5.3.4	Maturity Level.....	116
5.4	SHORT-TERM VOLTAGE INSTABILITY DETECTION.....	116
5.4.1	SVS Assessment Approaches Proposed in Literature	117
5.4.2	Practical Considerations.....	118
5.4.3	Maturity Level.....	118
5.5	TRANSIENT INSTABILITY DETECTION	118
5.5.1	Recently Proposed Approaches for Transient Stability Prediction.....	119
5.5.1	Application Example of Transient Stability Prediction	120
5.5.2	Challenges for Data Driven Approaches.....	122
5.5.3	Maturity Level.....	122
5.6	FAST FREQUENCY CONTROL	122
5.6.1	Non-Estimation-Based Approaches.....	124
5.6.2	Estimation-Based Approaches.....	124
5.6.3	Enhanced Frequency Control Capability Project in UK	126
5.6.4	Under Frequency Load Shedding (UFLS).....	126
5.6.5	Maturity Level.....	126
5.7	ASSET MANAGEMENT	126
5.7.1	Transformer ageing evaluation	126
5.7.2	Maturity Level.....	128
5.8	MONITORING GEOMAGNETIC DISTURBANCES (GMD)	128
5.8.1	GIC Monitoring Methodology.....	128
5.8.2	Maturity Level.....	129
5.9	USE OF DIGITAL TWINS FOR SYNCHROPHASOR APPLICATION VALIDATION.....	130
5.9.1	Digital Twins in Power Systems.....	130
5.9.2	Example of Developing a Digital Twin System in a Laboratory.....	130
5.9.3	Use of Digital Twins to Design a Wide-area Damping Controller	131
5.9.3.1	Controller Structure.....	132
5.9.4	Maturity Level.....	135
5.10	DYNAMIC LINE RATING	135
5.10.1	Ambient Adjustable Rating (AAR)	135
5.10.2	Dynamic Line Rating (DLR).....	135
5.10.3	Use of Synchrophasors.....	136
5.10.4	Maturity Level.....	137
5.11	CHAPTER CONCLUSIONS	137
5.12	REFERENCES FOR CHAPTER 5	138

6.	OUTLOOK FOR NEXT 5-10 YEARS	145
6.1	CLOUD-BASED IMPLEMENTATIONS.....	145
6.1.1	Benefits	145
6.1.2	Challenges.....	146
6.1.3	Systems Proposed in Literature	146
6.1.4	Future Scope	148
6.2	ROLE OF DATA SCIENCE, ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING.....	148
6.2.1	Artificial Intelligence and its sub-fields	148
6.2.2	Areas of Application	149
6.2.3	Future Scope	151
6.3	SYNERGIES WITH SYNCHRONIZED WAVEFORM MONITORING.....	151
6.3.1	Applications of Synchronized Waveform Data.....	152
6.3.2	Existing Standards for Waveform Data Encoding and Transfer.....	155
6.3.3	Other Practicalities.....	156
6.3.4	Future Scope	157
6.4	TECHNOLOGY GAPS	157
6.4.1	Cybersecurity Concerns	157
6.4.2	Applications facilitating Integration of Renewable Energy Sources.....	158
6.4.3	Standardization and Interoperability	158
6.4.4	Validation of AI and ML Applications.....	158
6.5	POTENTIAL RESEARCH AREAS FOR THE FUTURE.....	158
6.5.1	Resilient Communication Networks	158
6.5.2	Cloud Computing for Scalable Data Processing	158
6.5.3	Quantum Computing for Grid Optimization	158
6.5.4	Edge Computing for Real-time Analysis	158
6.5.5	Advanced Linear State Estimation (LSE).....	158
6.5.6	Real-Time Grid Assessment using LSE Data.....	159
6.5.7	Real-Time Contingency Analysis.....	159
6.5.8	Hybrid Power Flow Analysis	159
6.5.9	Advanced Forecasting Models	159
6.5.10	Real-time Fault Level Estimation	159
6.5.11	Oscillation Source Location in IBR Heavy Power Systems.....	159
6.6	CHAPTER CONCLUSIONS	159
6.7	REFERENCES FOR CHAPTER 6	159
7.	CONCLUSIONS	165
	APPENDIX A. SECURITY REQUIREMENTS FOR BULK CYBER ASSETS.....	167