



**NASPI Work Group Meeting
March 22-23, 2017
8:00am – 5:00pm**

Meeting Location:
National Institute of Standards and
Technology (NIST)
100 Bureau Drive
Gaithersburg, MD 20899
Phone: 301-975-2002

Hotel Information:
[Marriott Washingtonian](#)
9751 Washingtonian Boulevard
Gaithersburg, MD 20878
Phone: 1-800-393-3450

This meeting will feature technical sessions and presentations on secure and robust time synchronization, data quality, and application requirements for quality data, control room uses of synchrophasor technology, generator and equipment diagnostics for asset management, and advanced networking technologies. Dr. Chris Greer, Director of NIST’s Smart Grid and Cyber-Physical Systems Program Office will deliver our keynote speech.

[NASPI Work Group registration.](#) The *early bird* registration fee will be \$325 for regular attendees and \$75 for students. The regular rate will be \$425 and \$175 respectively for registrations made on or after Monday, March 6, 2017. **Due to required security background checks at NIST there will be NO onsite registration. All attendees must register in advance no later than March 13, 2017.**

ATTENTION FOREIGN NATIONALS: If you are a foreign national you will need to download, fill out and fax this [form](#) to Mary Lou Norris at NIST. This [form](#) cannot be emailed, mailed, or delivered the day of the event so plan accordingly. Mary Lou needs this form by **March 14, 2017**, her fax number is 301-948-2067. The NIST host is Allen Goldstein (301-975-2101 / allen.goldstein@nist.gov) and the organization code is 684.

[Book your hotel reservations.](#) A group rate of \$169/night at the Marriott Washingtonian, Gaithersburg, MD will be available until Tuesday, February 28, 2017. This rate is applicable for the nights of March 21-23, 2017. If you want to make your reservations by calling Marriott at 1-800-393-3450, please ask for the *EPRI NASPI Work Group Meeting Room Block* rate when making your reservations.

Transportation: There will be buses at the Marriott Wednesday morning to take NASPI attendees to/from NIST. These buses will depart the Marriott promptly at 6:45am. Once at NIST attendees will then make their way to badging. Please remember your I.D./passport. At the conclusion of Wednesday meeting, the buses will then depart NIST at 5:45pm Wednesday to the Marriott for the reception. Thursday morning the buses will depart the Marriott for NIST at 7:15am and will depart NIST at 4:45pm to return to the Marriott.

Final Agenda (3/22/17)

Wednesday, March 22, 2017	
6:45 - 7:00 am	Depart Marriott for NIST - board bus/depart
7:00 - 7:30 am	Badging at NIST (bring valid ID or passport)
7:30 - 8:00 am	Coffee & Networking at NIST near entrance to the Green Auditorium
8:00 - 8:15 am	Green Auditorium - Welcome, Introductions, and Logistics Review – Jeff Dagle (PNNL)
8:15 – 8:25 am	NASPI PM – Alison Silverstein
8:25 – 9:10 am	Keynote Speaker – Dr. Chris Greer
9:10 - 9:20 am	DOE - Michael Pesin

9:20 – 10:10 am	<p>NIST/DOE Time Distribution Alternatives for the Smart Grid Panel Moderator: Allen Goldstein (NIST)</p> <ul style="list-style-type: none"> • eLoran – Complementary Time for Grid Applications - Stephen Bartlett (URSA Nav) • Wide-Area Time Distribution with PTP Using Commercial Telecom Optical Fiber - Lee Cosart (Microsemi) & Marc Weiss (NIST) • GPS Time Backup for Power Industry -- John Lowe (NIST)
10:10 – 10:25 am	Break (refreshments and networking)
10:25 – 10:50 am	Advanced Synchrophasor Protocol DOE Project – Russell Robertson (GPA)
10:50 – 12:00 pm	<p>Session 1: Control Room Uses of Synchrophasor Technology</p> <ul style="list-style-type: none"> • Real-time Forced Oscillation Detection and Source Location in the Western Interconnection -- Hongming Zhang, Jiawei (Alex) Ning, Tianying Wu (Peak Reliability), & Mani Venkatasubramanian (WSU) • Wide-area Oscillation Resonance Event in the Western Interconnection on September 5, 2015 -- Mani Venkatasubramanian, Yuan Zhi (WSU), James O'Brien (PNNL), Hongming Zhang, Haoyu Yuan, Tianying Wu, & Jiawei (Alex) Ning (Peak Reliability) • Oscillation Source Locating Tool at ISO New England -- Slava Maslennikov & Eugene Litvinov (ISONE)
12:00 - 1:00 pm	<p>Lunch (provided) – NIST cafeteria</p> <p>Thank you IEEE for your continued NASPI support!</p> 
1:00 – 2:45 pm	<p>Session 1: Control Room Uses of Synchrophasor Technology (cont.)</p> <ul style="list-style-type: none"> • Utilizing Synchrophasors for Integrated Operation of EHVAC & HVDC in Indian Power System -- Amandeep Singh, Rahul Shukla, Rahul Chakrabarti, S.R. Narasimhan, & K.V.S. Baba (POSOCO) • Low Frequency Local Mode Oscillations in NER Grid, Validation Using Model Based Analysis, & Mitigation -- Rahul Chakrabarti, T.S.Singh, Amaresh Mallick, Momai Dey, & Jerin Jacob (POSOCO) • Low Inertia and Abnormal ROCOF Detection Using Phasor Measurements – Kevin Frankeny, Terry Bilke (MISO), Ling Wu, & Yilu Liu (UTK) • Initial Approach for Monitoring Online Angular Coherence Between State Estimator and Synchrophasor Measurements. -- Brayan Andres Arboleda Tabares (CIDET) & Jorge Enrique Gómez Castro (XM Colombia) • Tracking Three Phase Untransposed Transmission Line Parameters Using Synchronized Measurements -- Ali Abur, Pengxiang Ren, & Hanoch Lev-Ari (Northeastern University)
2:45 - 3:00 pm	Break (refreshments and networking)
3:00 – 5:45 pm	<p>Control Room Solutions Task Team</p> <ul style="list-style-type: none"> • Utility Evaluation of Improved Event Triangulation Using Synchrophasor Technology – Clifton Black, Ihsan K. Hakima (Southern Company), Abigail Till, Ling Wu, Shutang You, & Yilu Liu (UTK) • Experiences on Implementation of New Control Center with Synchrophasor Technology at Columbian System Operator -- Brayan Andres Arboleda Tabares, Wilson Daniel Giraldo Gómez (CIDET), Lina Ramírez, & Samuel Sánchez Moreno (XM Colombia) • Hybrid WAMS & EMS Operator Training Simulator – Radhakrishnan Srinivasan, Robert Fairchild, Manu Parashar, & Jay Giri (GE) • CRSTT Business
3:00 – 5:45 pm	<p>Data & Network Management Task Team</p> <ul style="list-style-type: none"> • PMU-based Distributed Power System Stability Enhancement Framework -- Pavel Kovalenko, Alexey Danilin, & Viktor Litvinov (GRT Corp.) • PMU Registry for Automated Metadata Administration – Ryan Nice (PJM) • DNMTT Business

3:00 – 5:45 pm	<p>Distribution Task Team</p> <ul style="list-style-type: none"> Using Synchrophasor Measurements to Detect Cyber Attacks on AC Power Distribution Grids -- Alex McEachern (Power Standards Lab), Sean Peisert, & C.P. McParland (LBNL) Distribution PMU's – Hardware and Firmware Lessons Learned -- Alex McEachern (Power Standards Lab) Why IEEE C37 Does Not Work Well for Distribution-level Synchrophasor Measurements -- Alex McEachern (Power Standards Lab) & Harold Kirkham (PNNL) WISER: Waveform Instrument for Synchronized Environmental Recording – Sean McDaniel, Michael Cohen, & Peter Weed (MITRE) DisTT Business
3:00 – 5:45 pm	<p>Engineering Analysis Task Team</p> <ul style="list-style-type: none"> Online Calibration of Phasor Measurement Unit Using Density-based Spatial Clustering -- Di Shi, Zhiwei Wang (GEIRI North America, Inc.), Xiao Lu, Jianyu Luo, & Chunlei Xu (State Grid Jiangsu Electric Power Company) Selection of Reference Node and Angular Baselining Using Synchrophasor Measurements for Real Time Operation -- Srinivas Chitturi, Sunil K Patil, Chandan Kumar, Rajkumar Anumasula, Pradeep Kumar Sanodiya, & Vivek Pandey (POSOCO) Machine Learning with PMU Data -- Daniel Bienstock, Mauro Escobar, Apurv Shukla (Columbia), Michael Chertkov, Sidhant Misra, Marc Vuffray, & Seyoung Yun (LANL) Failure Diagnosis and Cyber Intrusion Detection in Transmission Protection System Assets Using Synchrophasor Data – Anurag Srivastava, B. Cui & P Banerjee (WSU) EATT Business
3:00 – 5:45 pm	<p>Performance, Requirements, Standards & Verification Task Team</p> <ul style="list-style-type: none"> IEEE - Conformity Assessment Program -- Jason Allnutt & Ravi Subramaniam (IEEE-SA: ICAP) Nyquist and the PMU -- Harold Kirkham, Frank Tuffner, Matt Engels (PNNL), R. Jay Murphy (Macrodyne), David Schoenwald (SNL), Matt Donnelly (Montana Tech), David Laverty (Queen's University, Belfast, Ireland), & Artis Riepnieks (Riga Technical University, Latvia) Model of Parameterized PMU Estimation Error -- Jiecheng Zhao (UTK), Allen Goldstein (NIST), & Tom King (ORNL) PMU Application Requirements Task Force: Update on Data Quality Attributes Document and Methodology for Examining Data Quality Impacts- Allen Goldstein (NIST); Frank Tuffner (PNNL) PRSVTT Business
5:45 – 6:00 pm	Board Bus at NIST for Marriott
6:00 – 8:00 pm	Reception – Marriott Lakeside Ballroom

Thursday, March 23, 2017	
7:15 – 7:30 am	Depart Marriott for NIST - board bus/depart (please remember your badge)
7:30 -- 8:00 am	Coffee & Networking – NIST near entrance to the Green Auditorium
8:00 – 9:00 am	<p>Task Team Report-outs</p> <ul style="list-style-type: none"> CRSTT • DisTT • PRSVTT • SMS DNMTT • EATT • WECC JSIS • EIDSN
9:00 – 9:45 am	<p>Session 2: Advanced Networking</p> <ul style="list-style-type: none"> NASPI Net 2.0 – Jeff Taft (PNNL) Closed-Loop Wide-Area Control Using an Exogeni-Based Cloud Computing Network -- Aranya Chakraborty (North Carolina State University)

9:45 – 10:00 am	Break (refreshments and networking)
10:00 – 11:30 am	Session 3: Data & Data Quality <ul style="list-style-type: none"> • Understanding and Analyzing Synchrophasor Data Quality at Scale – Sean Patrick Murphy, Jerry Schuman, Allen Leis (Ping Things), & Matthew Rhodes (Salt River Project) • Ensemble Based Technique for Synchrophasor Data Quality and Analyzing Impact on Applications – Anurag Srivastava, S. Pandey, M. Zhou, P. Banerjee, & Y. Wu (WSU) • Real-Time Model-Free Detection of Low-Quality Synchrophasor Data -- Meng Wu & Le Xie (Texas A&M University) • Discovery through Situational Awareness -- Brett Amidan (PNNL) • DR POWER: Data Repository for Power System Open Models with Evolving Resources -- Mark Rice & Stephen Elbert (PNNL)
11:30 – 12:30 pm	Lunch (provided) – NIST cafeteria
12:30 – 2:20 pm	Session 4: Time & Time Synchronization <ul style="list-style-type: none"> • GPS Timing in Substations – Where We Are Now and Where We Need To Go -- Patrick Hawks, Robert Orndorff, Kyle Thomas (Dominion Virginia Power), Dao Zhou, & Yilu Liu (UTK) • A White Rabbit Synchronized PMU -- Reza Razzaghi, Asja Derviškić, & Mario Paolone (EPFL) • Synchrophasors Using eLoran Timing Source -- Erik Johannessen, Andrei Grebnev, Stephen Bartlett (UrsaNav Inc.), Lingwei Zhan, Jiecheng Zhao, & Yilu Liu (UTK) • Ultra-accurate Synchronization of Distributed Equipment via Long-distance Ethernet Links to Enhance Time-sensitive Applications like Travelling Wave Fault Location. -- Dan Lutter (Allied Partners LLC and Seven Solutions S.L.) • Quantum Communication Techniques for Time Authentication and Distribution -- Phil Evans, Jay Billings, Jason Bonior, & Terry Jones (ORNL)
2:20 – 2:35 pm	Break (refreshments and networking)
2:35 – 3:35 pm	Session 4: Time & Time Synchronization (cont.) <ul style="list-style-type: none"> • Is NTP A Suitable Alternative Timing Source for Grid Applications? --Terry Jones & Phil Evans (ORNL) • Backup Timing Source for Synchrophasor Using Chip-scale Atomic Clock -- Jiecheng (Jeff) Zhao, Lingwei Zhan, & Yilu Liu (UTK) • TSTF Report Update – Alison Silverstein
3:35 – 4:15 pm	Session 5: Generators and Equipment <ul style="list-style-type: none"> • Wind and Solar Power Plant Model Validation Using Test Data – Gang (George) Zheng & Sam Li (Powertech Labs Inc.) • PMU-based Power Plant Operation Monitoring and Innovative PMU Implementation-- Pavel Kovalenko & Alexey Danilin (GRT Corp.)
4:15 – 4:30 pm	TSTF Leap Second Report Update – Alison Silverstein
4:30 pm	Meeting Adjourns
4:30 - 4:45 pm	Board bus depart NIST for Marriott