

**NASPI VIZ WORKSHOP
OPENING CONTEXT NOTES
DRAFT 021312 DRAFT**

Good afternoon. Thanks for coming to be part of this workshop.

As far as we know, this is the first-ever cross-company effort to compare how different visualization tools improve situational awareness by looking at how they deliver information to operators. And this is the first time, we think, that there's been an effort to ask operators what works for you, rather than leaving it to the many excellent engineers and human factors people to decide what the operators get.

Let's take a minute to review the goals of this workshop. First, this is about improving situational awareness of the bulk power system through the use of effective visualization tools. You all know that situational awareness is about getting information about what's going happening on the grid, understanding whether those conditions are good or bad, and understanding how things are changing and what might be coming next. Since the 2003 blackout, there's been more emphasis on using visualization tools to improve operators' situational awareness.

Second, our goal is specifically to look at visualization tools that use synchrophasor data. SCADA data are pretty good, and you all have screens back home that show you what's going on at a 4 to 6 second sample rate. But synchrophasor data, sampled at 30 samples per second or faster, reveal a lot about grid conditions that you just can't see from slower SCADA systems, so there's been a lot of effort to develop new visualization tools to exploit the higher resolution of phasor data, transforming it into usable information.

Third, we want to learn how operators think these new tools are meeting their needs. When you're working the dispatch desk, there's a lot going on and you need displays that help you understand as much as possible about what's happening on the grid, and what could happen next, with as little effort and time as possible. Our focus for today will be on the, "What's happening right now?" question, and we won't be poking the tools for predictive information. But we are looking for you operators to give us feedback on whether it's easy for you to understand and interpret what each tool is showing you on the screen. We want your thoughts about whether what and how each tool shows you makes it possible

for you to quickly understand what's happening on the grid in real time; we're not trying to compare the analytics under the hood of each tool.

We're delighted to have five vendor-created visualization tool, and one user-created tool, to look at today. We'll be comparing their displays for several different grid events and asking you to take some notes about what works and what doesn't work for you during each display and event. Every tool has some excellent techniques and elements, and every one is different. Our fourth goal is to be fair and clear about what works for you as operators, and what could be improved to make your job easier. Please don't let your prior experience with any particular tool or vendor bias your feedback or make you see or talk about any tool or vendor as "bad" or "good".

Additionally, all of you have different jobs and roles – and therefore, different needs for a visualization tool to help you maintain situational awareness. So although your neighbor likes this symbol and you don't, or you want to see voltage instead of frequency, this doesn't mean your feedback is more valid than his or he's right and you're wrong. Each of your views is valid in the context of your job requirements, and that's what we want to hear about and understand.

You'll find a set of comment forms on your chair. The comment forms give you space to enter some notes and reactions to each display for each grid event. At the top of each form is space for you to fill in your job title (like, Operator or Dispatcher or Operating Support Engineer), so we can understand your role and needs and how that informs your comments. We'll give you a couple minutes to jot down a few comments after each tool display so you can keep everything straight.

I'm not a human factors or visualization expert, and most of you probably aren't either. We are lucky to have several electric industry human factors experts with us today to give us some suggestions about what to look for as we watch these event clips. They'll also be listening to the conversation this afternoon and offering some closing observations for your consideration.

Our experts and coaches for the afternoon are:

- Dr. Jodi Heintz Obradovich, a PhD in Cognitive Systems Engineering on the staff of the Pacific Northwest National Laboratory. Jodi has done research on human factors in the areas of military, medical and electric utility applications, and has worked for Ohio State, Intel and PNNL. She's

currently working with BPA staff on several transmission and dispatch projects.

- Dr. Mike Legatt is the principal human factors engineer at ERCOT and has been instrumental in the design and implementation of several data visualization systems now in use at ERCOT, including the Macomber Map. Mike has a PhD in neuropsychology and clinical health psychology, is an experienced programmer, and is working toward a graduate degree in energy systems engineering.
- Dr. James Merlo is NERC's Manager of Human Performance and a trained human factors engineer. James has served with the U.S. military in Iraq and taught at West Point, and researched helmet-mounted displays and multi-modal displays that use eyes, ears and skin to deliver information.

Jodi will be giving us some suggestions about what to look for as you watch these event video clips. And after we've watched all the event clips and talked them over, she and James and Mike will offer some closing observations and suggestions based on what they see and hear from the videos and your collected responses.

At the end of the workshop, we will take a few minutes to ask you what you want to do next. We pulled together this workshop because one of the synchrophasor project managers expressed some frustration that there isn't much commonality in how visualization tools show what's happening. Maybe that's ok, or maybe that's not – we'll see what you think in a few hours. So before we end the workshop, we'll ask you whether you think the industry, or maybe just a small group, should do something else based on what we see and learn today. With or without a specific plan for next steps, I'm confident that the vendors and tool developers participating today will learn a lot from your comments and that you will have some impact on what shows up on your operators' screens in a few months.

One more thing – I want to recognize and thank the people who pulled this workshop together.

- Jim McIntosh with the CAISO, Vickie VanZandt with WECC, and Jeff Dagle with PNNL worked with me to develop the initial idea and format,
- Tony Johnson of SCE and Kevin Frankeny of MISO made sure it was both sensible and operator-centric.

- Jodi Obradovich, James Merlo, and Mike Legatt offered a wealth of expertise, enthusiasm and common sense to make sure we get what we need out of this workshop.
- Dmitry Kosterev of BPA, Dr. Dan Trudnowski of Montana Tech, Dr. Joe Chow of RPI, Dr. Yihu Liu at the University of Tennessee Knoxville, and Ian Grant of TVA were critical at wrangling all the datasets for the events we're about to see (and one we won't see).
- And the good people of Alstom Grid, Electric Power Group, OSISoft, PowerWorld, SpaceTime Insight and WECC have put a lot of time into developing the event visualization clips you'll see next.
- Larry Kezele and Mark Lauby of NERC have been very supportive and helped get the word out about this workshop to all of you.
- Last, Teresa Carlon of PNNL and Wanda Peoples of NERC have worked magic to make all the logistics work smoothly.

Please help me thank them all.