



## SUMMARY



### Industry

Power, Transmission and Distribution

### Business Value

- Process Productivity

### PI System™ Components

- PI Server™
  - Data Archive
  - Asset Framework (AF)
- PI ProcessBook™

## CENACE: Achieving Real-Time Situational Awareness

In his presentation, Raúl Cubillo, Operations Manager for CENACE, the technical and commercial administrator of Ecuador's wholesale electricity market, described how CENACE is applying Real-Time Situational Awareness concepts and techniques – through configuration models and visualization – to give operators contextualized information for decision-making.

Raúl Cubillo began his presentation by mentioning that CENACE has multiple systems for real-time operation, including SCADA, WAMS, SPS, and SIGDE. Cubillo shared the company's history of real-time operations. "We have deployed twenty-nine PMUs (Phase Measurement Units) at the level of all substations in the Ecuadorian electrical system, which constitute the WAMS system (Wide Area Monitoring system). The operator also has consoles that receive data from the TransElectric transmission company, as well as data obtained from the SIGDE distribution companies."

"In its real-time tasks, CENACE receives large volumes of data that come with specific parameters for each of the systems." How can OSIsoft help? "Precisely by taking all of this data from all of these systems and bringing them to a properly contextualized single platform as information in the PI System," said Raul Cubillo.

New indicator panels (displays) were developed with PI ProcessBook. To ensure that the operator could "spend more time dealing with the issue of real-time situational awareness, they were configured to minimize navigation time between different panels, making them highly assertive and timely for decision-making when dealing with emergencies".

### Awareness: Perception, Understanding, and Projection

In order to configure the panels/displays, CENACE researched situational awareness. Situational awareness is the ability to identify the elements in an operating environment – with respect to time and space – understand their meaning and project their status in the near future. In other words: perception, understanding, and projection.

"**Perception** is precisely ensuring that all information received by the operator is appropriate and can be harnessed for development of his/her operations and proper performance, especially in emergency situations," Cubillo said in the presentation. The operator's process of **understanding** includes, for example, knowing what a

particular alarm refers to and knowing, not just that an alarm was triggered, but also the context and implications. So it is important for them to be trained to understand both the information and the context. And upon receiving an alarm about an event, the operator needs to know the answers in that situation – **projection**. This is all considered in the “Situational Awareness” process.

There are also adverse considerations, elements, and situations, for example short-term loss of focus by the operators, that cannot be controlled through panels. “The conditions that we can control through panels,” says Raúl Cubillo, “are the distracting channels, unnecessary complexity, and highly eye-catching elements.”

Thinking in terms of Operational Awareness, the new CENACE panels were configured based on the PI ProcessBook design principles, such as: removing unnecessary pixels and highlighting relevant data. According to Raúl Cubillo, “with regard to the visual part, we used a concept called the Data/Pixel ratio, which entails reducing the information to be included on the panel. We have determined the visual plots: we have sections that are less important and those that are most relevant are in the middle.”

### New Panels Versus Previous Panels

“In the panels we used to work with,” says Raúl Cubillo in his presentation, “we tracked the total demand from distribution companies. We had a set of several curves with distracting elements. In order to supervise all of the companies, the operator had to keep navigating through all these displays/panels. All that was considered and now we have established a single panel. This single panel, is developed in PI ProcessBook and arranged with all distribution companies on the left side in a constant rotation. The former panels/displays had a great deal of information on them and a new operator could get lost. With the new panels/displays, a pattern and structure were created, and when the operator sees that an alarm was triggered, he/she already knows that behind that there were other elements that were generated in a controlled manner.”

Raúl Cubillo concluded by saying that CENACE has a lot of information stored in its different systems. “Now all of this information is being stored in the PI System which allows for integration in order to show the operator the most relevant information. To ensure that the panels have the necessary elements, we aim to minimize the time required for operators to find information so they can make decisions.”

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– Raul Cubillo  
Operations Manager