Visualization & Situational Awareness Demonstrations Project

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Visualization and Situational Awareness Demonstrations

Aksel Encinas

Project Technical Lead

SDG&E EPIC Communication Infrastructure Projects

- Visualization and Situational Awareness Demonstrations (EPIC-1 Project)

  - Focus: Presentation of data to system operators in a way that enhances situational awareness

- Smart Grid Architecture Demonstrations (EPIC-1 Project)

  - Focus: Communications standards for integration of feeder equipment and DER into networked automation

- Modernization of Distribution System and Integration of Distributed Generation and Storage (EPIC-2 Project)

  - Focus: New communication standards for substation network

- Monitoring, Communication, and Control Infrastructure for Power System Modernization (EPIC-2 Project)

  - Focus: Open Field Message Bus (presented at last EPIC symposium)

Visualization & Situational Awareness Demonstrations Project

Objective:

- Pre-commercial demonstration to explore how data collected from sensors and devices can be processed, combined, and presented to system operators in a way that enhances grid monitoring and situational awareness.

- Examine how data currently unexploited and separately processed can be integrated and visually presented for strategic use by system operators.

Visualization & Situational Awareness Demonstrations Project

Scope Overview:

- Requirements definition for GIS-centric visualization for improved situational awareness based on where data could yield significant value.

- Prototyping the data integration schemes, displays and algorithms.

- Performing pre-commercial demonstrations with stakeholders in utility system operations.

- Documentation of findings.

Visualization & Situational Awareness Demonstrations Project

Project Technical Team:

- Internal - SDG&E project technical staff from different departments:

    - Electric Ops & Smart Grid support team (IT)

    - Electric GIS & Asset Management (IT)

    - Geographic Business Solutions (GBS)

    - BI & Analytics – SAP Solutions (IT)

- External – Contracted resources, as may be needed

Visualization & Situational Awareness Demonstrations Project

Selected use cases for pre-commercial demonstrations:

1. Visualization of electric transmission outages

2. Visualization of electric load curtailment

3. Self-service electric eGIS reporting interface

4. Historical play back

5. Real time system visualization dashboards based on Distribution SCADA and AMI Data

6. Incorporate a representation of customer-owned Energy Resources

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1. Visualization of Electric Transmission Outages

➢ To display Electric Transmission fault distance details in a geospatial map.

➢ Electric transmission outages are reported via alerts (emails with embedded hyperlink) that include a linear distance along the transmission line where the fault is occurring.

➢ Providing the fault distance information from the Data Historian system

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2. Visualization of Electric Load Curtailment

➢ Develop a program that has the ability to visualize the Load Curtailment or Demand Response.

   ➢ Color coding, displaying circuit information via circuit on the map near real time.

➢ This program will allow SDG&E to potentially reduce the electricity usage of certain customers for a brief period, on demand, to help manage during peak usage events.

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3. Self-Service Electric eGIS Reporting Interface

➢ Develop a concept design for an intuitive user interface that would allow Electric eGIS users to generate a variety of GIS reports based on any combination of the following four criteria:

  ➢ Features, e.g., wood poles.

  ➢ Attributes, e.g., characteristics like length of poles.

  ➢ Polygons, e.g., high risk fire area.

  ➢ Networks, e.g., by circuit.

4. Historical Play Back

➢ Develop the ability to play back historical data to get more information about the system outages and events; weekly and daily outages playback and fire perimeters

➢ Maps that contain a time-enabled layer can include the time slider at the bottom of the map like below:

August 22, 2016, 7:07 PM to 7:08 PM

5. Real time system visualization dashboards based on Distribution SCADA and AMI Data

➢ Overlay the AMI and SCADA voltage data onto a GIS map with circuit topology and create a heat map that shows the voltage swell and swag data on the GIS map.

➢ Voltage for primary distribution circuits with visual indicator % of nominal voltage.
➢ Visualizations for emergency operations various scenarios:
  ➢ Storm
  ➢ Red Flag (e.g., Wind – Santa Ana)
  ➢ Earthquake
  ➢ Wildfire

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6. Incorporate a representation of customer-owned Energy Resources

➤ Incorporate a representation of customer-owned energy resources name plate data by transformer, circuit and substation data presentments.

   ➤ Visualizing customer generated load via the transformers to the circuits in ArcGIS portal.

   ➤ Real time visualization of DER (generators and storage) data for dispatch (30 kW or more).

- **Schedule:**

  - Use-case development and pre-commercial demonstration:

    - December 2016 to August 2017

  - Contractors' Final Report:

    - September 2017

- **Project Status:**

  ✓ Project plan development in progress

  ✓ Internal project team created

  ✓ Use-case development in progress

Q&A

For further questions and interests in this project:

- EPIC Program Manager:

  ➢ Frank R. Goodman - FGoodman@semprautilities.com

- Project Technical Lead:

  ➢ Aksel V. Encinas – AEncinas@SEUcontractor.com

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Thank you!