

BIOGRAPHICAL INFORMATION

Shari Ishikawa
Operations Superintendent, System Operations
Hawaiian Electric Co., Inc.

Specific Responsibilities

Joined Hawaiian Electric in 1997. Responsible for managing System Operations on the Island of Oahu. Responsibilities include strategic planning and visioning, application development budgeting, project management, and managing all aspects of the Electric Dispatch Operations.

Past Experience

Generation Planning Engineer 1997 – 2002

- Generation planning for generation activities including short term and long term plans for the Big Island

Director, Transmission Planning 2002-2004

- Transmission planning activities including short term and long term planning for Hawaiian Electric Company and its subsidiaries.

System Operations 2004-present

- Responsible for construction of the new HECO Dispatch Center
- Responsible for implementing the new Energy Management System, wallboard, wallboard applications and other computer systems for the new Dispatch Center in 2006
- Responsible for implementing the Outage Management System, including integration with Ellipse, HECO's Customer Information System and Mobile Workforce Management in 2007
- Responsible for the day-to-day operations of the dispatch center including clearing lines for maintenance, dispatch of Oahu generating units (HECO owned and Independent Power Producers) and responding to system disturbances and outages.

Educational Information

Bachelor of Science in Electrical Engineering, Illinois Institute of Technology, Chicago Illinois
MBA, University of Hawaii, Honolulu, Hi

Professional Memberships

GITA
IEEE
Professional Engineer

BIOGRAPHICAL INFORMATION

Volker Elste
Business Development – Utility Practice
Intergraph Corp.

Specific Responsibilities

Business Development and Management in various industry sectors including 13 years in the utility business sector with focus on Geospatial Information Systems including Outage Management, Workforce Management and other areas leveraging the intelligent Geospatial model such as Inspection, Joint use and other areas.

Past Experience

- Development, adaptation and selling of Utility Specific delivery architectures using COTS technology in the area of AM/FM, OMS, WFM.

Educational Information

University of Michigan – BSE and MSE

Professional Memberships

GITA, Board Member
GITA, Past President Pacific Northwest Chapter
SNAME
Honorary Member of U of M Quarterdeck Society

State of the Art Command and Control at Hawaiian Electric Company, Inc.

Shari Ishikawa

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ABSTRACT

Energy Management and Distribution is a delicate matter at Hawaiian Electric Co. Inc (HECo). HECo moved from manual operation to command and control in the digital age. HECo delivers power to about 300,000 customers on the densely populated island of Oahu. With tourism as the primary industry keeping a balance between generation and delivery is paramount. Unlike mainland utilities, HECo must be self-sufficient in all ways. This places emphasis on load balance and command and control. This session focuses on the evolution from manual operations to digital command and control featuring a 48 x 8 ft high resolution wallboard with interfaces to SCADA and OMS. A wallboard application was designed and implemented which is used to troubleshoot and restore HECo's system when a sub-transmission line trips open. The wallboard application also features an interface to HECo's Energy Management System (EMS). The wallboard application will be automatically updated based on the SCADA conditions from the EMS allowing real-time representation of the system. In addition, HECo also developed a load shed application which provides dispatchers and managers access to critical information on the impact of load shed scenarios; combining network intelligence, customer and spatial data.

MAJOR HEADINGS

HECO Background

Hawaiian Electric Company, Inc. and its subsidiaries, Hawaii Electric Light Company (HELCO) and Maui Electric Company (MECO), provide electricity for 95% of Hawaii's residents. Established in 1891, HECo remains one of the few locally owned and operated major companies in the state. HECo serves approximately 300,000 customers with a peak load of about 1324 MW. HECo controls the transmission (138kV bulk power), sub-transmission (46kV), and distribution (12kV and below) systems. HECo also owns and operates 3 power plants, 3 independent power producers and 5 distributed generation sites totaling 1669 MW.

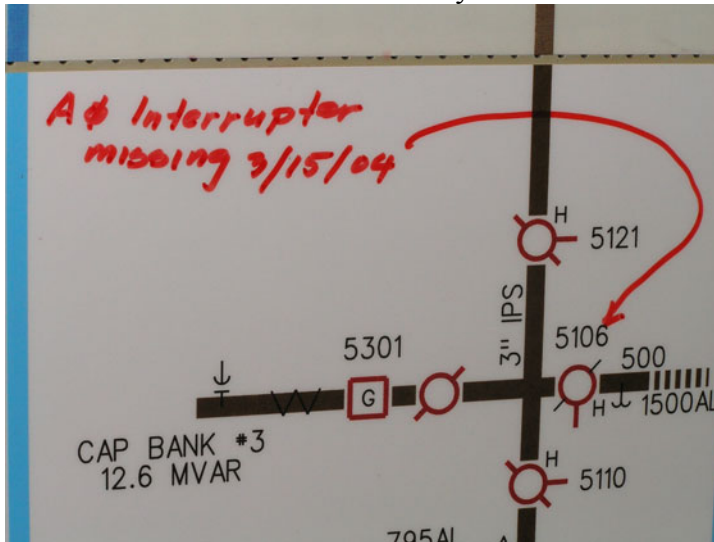
HECO's State of the Art Dispatch Center

In March 2006 HECo completed the construction of its new State of the Art Dispatch Center in Honolulu, Hawaii. The dispatch center is a 16,800 square foot concrete building designed for 100 mph winds with a 5,491 square foot control room. The control room contains the New Energy Management System consoles, dynamic wallboard map, Outage Management System Consoles, circuit maps and equipment necessary to operate HECo's electrical system.

Within the control room is a 48 foot by 8 foot high resolution wallboard manufactured by Barco and purchased through Siemens. The wallboard provides HECO the capability to display information from its Siemens Power TG Energy Management System (EMS), HECO's wallboard application developed by Intergraph which is integrated with HECO's EMS, and various video feeds to display information from outside media sources and the internet.

HECO's Wallboard Application:

HECO's original dispatch center included a 52 foot by 7 foot static magnetic wallboard. HECO plotted out tiles of its 138kV and 46kV system onto the magnetic board and utilized magnetic pins and yellow post it notes to represent the state of the transmission and subtransmission systems.



The original wallboard was the traditional maps on a magnate board with notes reflection status.

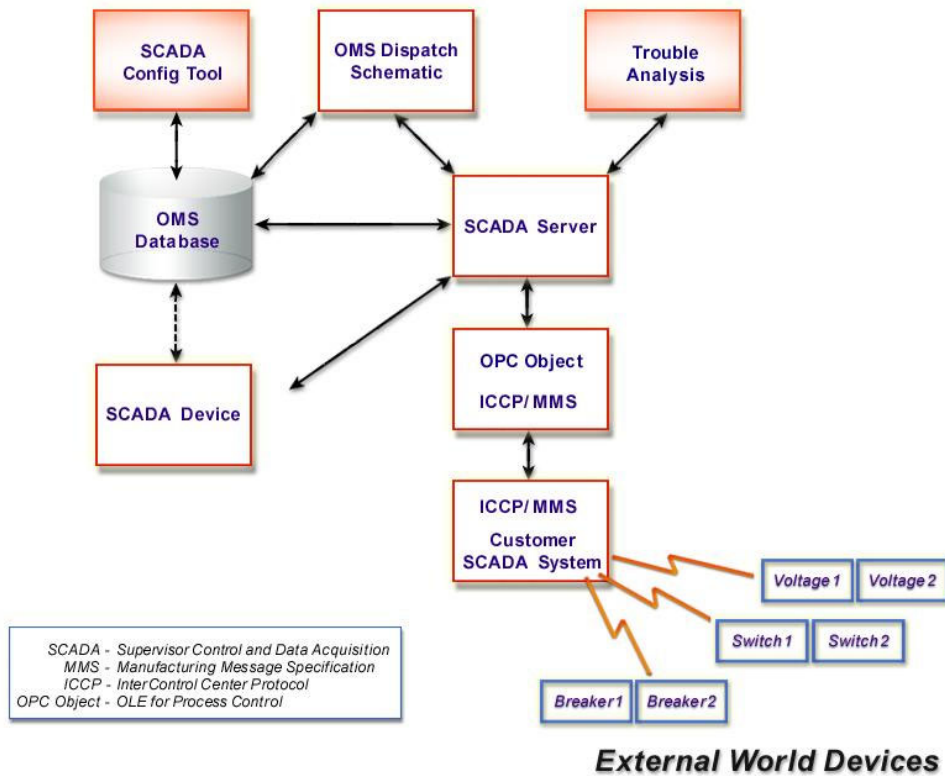
Part of the new dispatch center included converting the magnetic wallboard into an electronic form which included electronic pins and electronic post it notes. The wallboard application functions included a Graphic User Interface which provided the ability to use magnified windows, pre-set zoom areas, place operational tags with text representing an electronic version of the post it note. The wallboard application also included a study mode where a person could perform switching operations in a study mode and at the end erase all actions with a click of one command. Included with the wallboard application is a time stamped database which records all operator actions, and EMS actions. Review of operator actions can be performed when an operator placed a pin and it provides the coordinates for those pins in order to identify specific breakers or switches.



Digital Wallboard in operation (Barco, Siemens, Intergraph)

The wallboard was also integrated with HECO's new EMS in order to update the wallboard automatically when performing switching using the EMS. This provided HECO the ability to see the state of the transmission and subtransmission system in real time. A productized interface was configured to the EMS SCADA System. This SCADA interface product enables HECO to use information from an electric utility's real-time monitoring systems, such as a Supervisor Control and Data Acquisition (SCADA) system. Through this interface, HECO is able to request specific information from the SCADA system and accept unsolicited information in real time. The most common use of the SCADA interface is between a customer's SCADA system and Intergraph's Outage Management System, specifically the OMS Dispatch and Trouble Analysis Components. For this implementation, the interface will be used to trigger updates to the electronic wallboard.

Using the SCADA interface allows the server to receive notifications from the OLE for Process Control (OPC) object. These notifications indicate value changes in the OPC items. The OPC items are typically associated with actual SCADA devices. The names of the items must correspond to the actual device names defined in the database tables. SCADA does not have support for writing to devices such as device manipulation.



The SCADA interface uses the OPC (OLE for Process Control) COM interfaces version 1.0A from the OPC Foundation. The current SCADA implementation uses the ICCP protocol for real-time data transfer.

General Functionality

The SCADA Server provides the following functionality:

- There are two sources for the SCADA information.
 - The compliant OPC object.
 - The SCADA device utility allows testing and demonstration of the SCADA interface as well as the other applications to which it interfaces.
- Allows the SCADA names to be different from the OMS names (device mapping).
- Open/Closed values for each device
- SCADA values may be associated to specific OPC groups with different refresh rates

Device Status Codes

The following status codes are used internally between InService and SCADA.

- SCADA_CLOSED - the device is closed
- SCADA_OPEN - the device is open
- SCADA_UNK_DEV - requested device unknown in SCADA
- SCADA_ERROR – when the OPC quality is not *good* or the status cannot be determined at this time

Asynchronous Updates

When a device status changes (for example, a breaker operates), the OPC software notifies the SCADA interface, which in turn updates the database tables and subsequently the wallboard. The status changes are written to the *scadachanged* database table that contains the SCADA system timestamp, device name, and the device status. HECO staff has the responsibility to identify and add intelligence to the wall board dgn file in order to support SCADA devices. Symbols and text is associated using the graphic group functionality in MicroStation.

HECO's Load shed Application

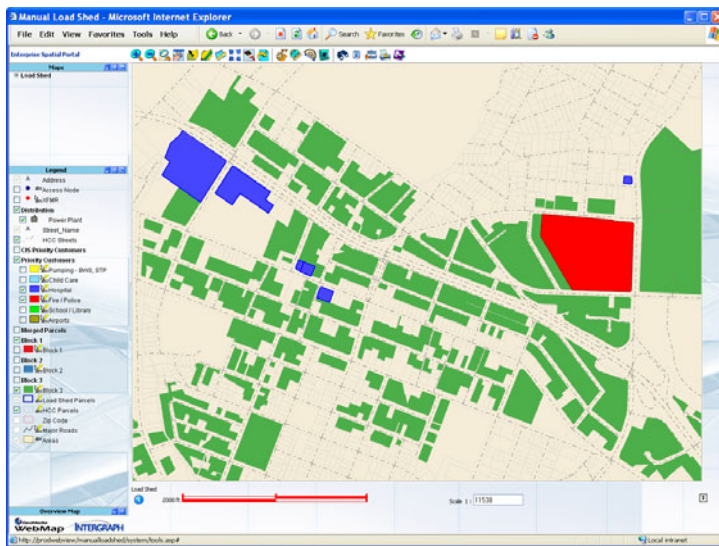
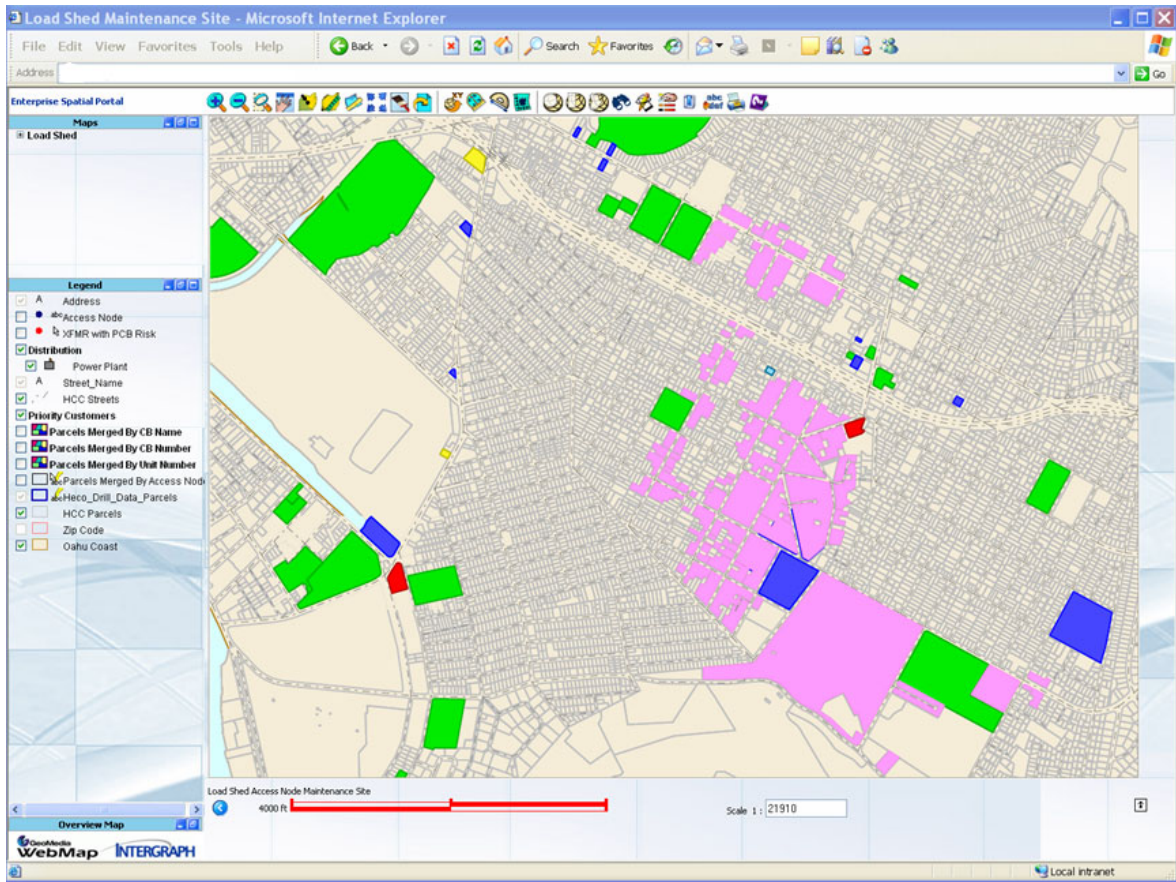
HECO's Load shed Application allows for load balance planning providing a graphic and tabular view of the impact on the customers in the event load needs to be shed to keep up with demand in other parts of the territory.

The core of the load shed application is the rich county landbase data or parcel fabric. Many features are exposed including, roads, location of hospitals, schools, parks, flood zones. Along with this geographic information the data store also includes the network intelligence of the HECO AM/FM System (G/Technology). An Oracle database is used to store the data, attribute and spatial. This geospatial repository is also linked to the HECO CIS data. The net result is a spatially enabled database that is web enabled allowing users to simulate load shed options and see the effect on the critical facilities such by generating a thematic view real time.

The implementation was conducted in three phases. An initial node cleanup phase was followed by the generation of the load shed blocks through a desktop application. The latter phase was the web deployment phase with security offering a wide users base access to many different geospatial information display themes.

Typical tasks conducted as part of a workflow includes:

- Display of all parcels on a circuit
- Display of the parcel characteristics
- Identifying critical customers in a load shed analysis. These can be:
 - Schools
 - Hospitals
 - Day care and assisted living
 - Police
 - Fire and more
- Incrementing through the various load shed options to select the best case.



Load Shed web portal uses thematic display of parcels effected.

The combination of the load shed application with the wallboard provides real-time visibility into the critical power distribution challenge at HECO.