Role of collaborative visualization systems in smart grid control centers

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Introductions

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Agenda

- Importance of enhancing situational awareness
- Real life implementation of strategic visualization
- Technologies for enhancing situational awareness
- Q&A
Austin Energy’s Mission:
Deliver clean, affordable, reliable energy and excellent customer service.
420,000 Customers

1,000,000 People

8th Largest COEU

437 Square Miles

3,467 MW Gen Capacity

$1.2 Billion Budget

Serving Austin since. (1895.)
1,721 Employees. (2013.)
Importance of enhancing situational awareness
Why should I care about **situational awareness**?
Missing critical alarms in a haystack.
Can cause system instability.
Can cause system instability and blackouts.
Start design at the **operator** and build out.
“The holistic planning of visual design and human factors to provide user’s with a simple, comprehensive, and accurate view of critical situations.”

Strategic Visualization.
Work directly with AV integration specialist.
Identify needs. Collect data, verify & develop.
Test and refine your virtual design.
Keep Interface Systems Simple.
“Design is not just what it looks like and feels like. Design is how it works.”

Steve Jobs.
Real life implementation of strategic visualization.
Control Center. (15,000 B.C.)
Energy Control Center. (1967-2012 A.D.)
System Control Center. (Today.)
System Quality requires AE great team.
Operator setup.
Interacting with the walls.
ECC static magnetic distribution wall.
SCC digital distribution display.
Desktop perspective.
Enhanced **display wall** perspective...
Desktop Extension.
Critical system data.
Organized system information.
System situational awareness.
ECC Tape and bulb transmission wall.
SCC digital transmission display.
System awareness.
Growing with Austin.
Application Adaptability.
Start & finish design at the operator.
Refine design. (to be continued.)
Operators.
Field crews.
People of Austin.
Technologies for enhancing situational awareness.
Technologies and their advantages

- Display Technologies
- Collaboration Technologies
- Content Technology

- Overview, reliability & redundancy
- Accelerated remote decision making
- Power of networked visualization
Networked Visualization Technology
Infocomm 2012 world wide study results

**Global: Audio & Video Acquisition & Delivery Equipment**

- **2009**
  - ME / Africa: $2,529
  - L. America: $1,447
- **2012**
  - ME / Africa: $4,322
  - L. America: $2,189
  - Europe: $1,119
  - Asia-Pacific: $357
  - N. America: $305
- **2015**
  - ME / Africa: $7,311
  - L. America: $739
  - Europe: $2,037
  - Asia-Pacific: $576
  - N. America: $1,119

**Total CAGR**
- **2009 – 2012**: 16%
- **2012 – 2015**: 17%
- **2009 – 2015**: 17%

**Global: Control Systems**

- **2009**
  - ME / Africa: $89
  - L. America: $133
  - Europe: $400
  - Asia-Pacific: $425
  - N. America: $1,000
- **2012**
  - ME / Africa: $177
  - L. America: $490
  - Europe: $694
  - Asia-Pacific: $1,210
  - N. America: $1,128
- **2015**
  - ME / Africa: $202
  - L. America: $250
  - Europe: $654
  - Asia-Pacific: $1,128
  - N. America: $1,702

**Total CAGR**
- **2009 – 2012**: 10%
- **2012 – 2015**: 13%
- **2009 – 2015**: 12%

Growth = through digital technology conversion
Technology waves support user needs

1. Centralized - Mainframe
   - Central computer center
   - Software in computer center only
   - Work brought to the computer center

2. Networked - Decentralized
   - PC enabled and network enabled
   - Software distributed in both server and client computers
   - Work from the user location

3. Internet
   - Virtualized compute; global network enabled
   - Software decoupled from hardware
   - Work from anywhere

Waves represent many co-dependent technologies, matured over time
Adding functional capability has become easier with each new wave
How do Customers want to treat Information today?

Access

Control
How do Customers want to treat Information today?
Collaboration Technologies
Building in enhanced collaboration

• Share images or views
• Share or transfer control
• Strictly controlled by administrator

• Collaborate with colleagues within the control room
• Share with others in subsidiary rooms
• Bring in colleagues elsewhere on your secure network

• Ideal for quickly bringing in experts
• Ideal for restricting what’s shown within subsidiary rooms and main control room.
Faster, more effective issue resolution

Collaborative systems allow you to get your experts working more quickly and closely together - leading to faster, more effective issue resolution.
Recapitulations.
Key takeaways from what we covered today…

- Enhancing situational awareness allows you to quickly understand current conditions and anticipate what will happen next.

- SA can be enhanced through overview displays, networked visualization platform and remote collaboration technologies.

- Collaborative networked platform is fast becoming the de facto technology in control centers.
Thank you for your attention!

Q&A

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