INTERNATIONAL DISTRICT ENERGY ASSOCIATION

Controls Master Planning Process leads to Campus-Wide BAS Upgrade

ESD

11 February 2015

Agenda


BAS Overview / Benefits
Case Study – Confidential Energy Company, Illinois
Integrated Master Planning Approach
Stakeholder Engagement
Design Implementation
Lessons Learned / Results
Q & A

BAS Overview / Benefits

- Building Automation System (BAS):
  - A computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment
  - Involves systems such as:
    - Lighting
    - HVAC
    - Electrical Power
    - Fire Alarm
    - Security
    - Transportation
    - Telecommunications

BAS Overview / Benefits

Occupant

- Control of Comfort
- Increased productivity
- Adjusts Automatically

Owner

- Satisfied Tenants
- Reduced Operating & Maintenance Costs
- Enhances Property Value

Building Engineer

- Predictive Maintenance Schedule
- Improved System Reliability
- Comprehensive System Status

Case Study Overview

- Confidential Energy Company, Illinois
  - 1.2 million square feet of Research and Development Labs, Offices, Conference rooms, pilot energy plants and Utilities
    - Central plant includes: Cogeneration, Chillers, Boilers
- 20+ Year Client Relationship
  - Ongoing Discussions about the campus aging BAS and controls System

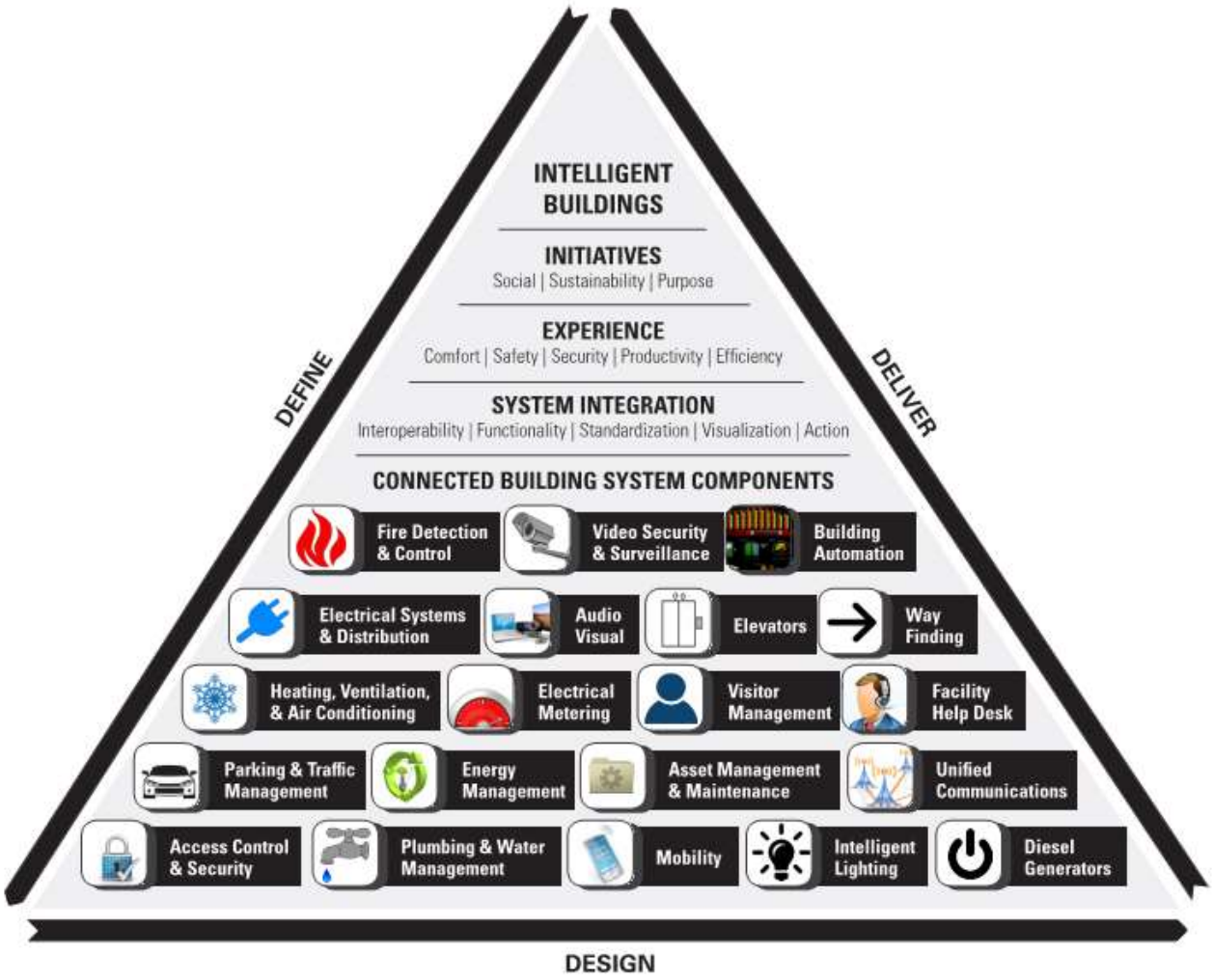
Case Study Overview

- Initial Request
  - Building Automation System Study
    - No equipment redundancy
    - Existing controllers failing / at end of life
      - » Becoming difficult to replace / repair
    - Campus Equipment utilized multiple DDC manufacturers
      - » Proprietary controls protocol
    - Limited master controls
      - » Lacked remote monitoring of equipment
      - » No graphical user interface
- Mixed Pneumatic Controls and DDC
  - Several generations of DDC
  - Multiple Manufactures
- Further Collaboration
  - Led to study expanding to a integrated campus master plan

Opportunities

- Energy Saving Project led to BAS upgrade discussions
- % saved

Integrated Master Planning Approach



Integrated Master Planning Approach

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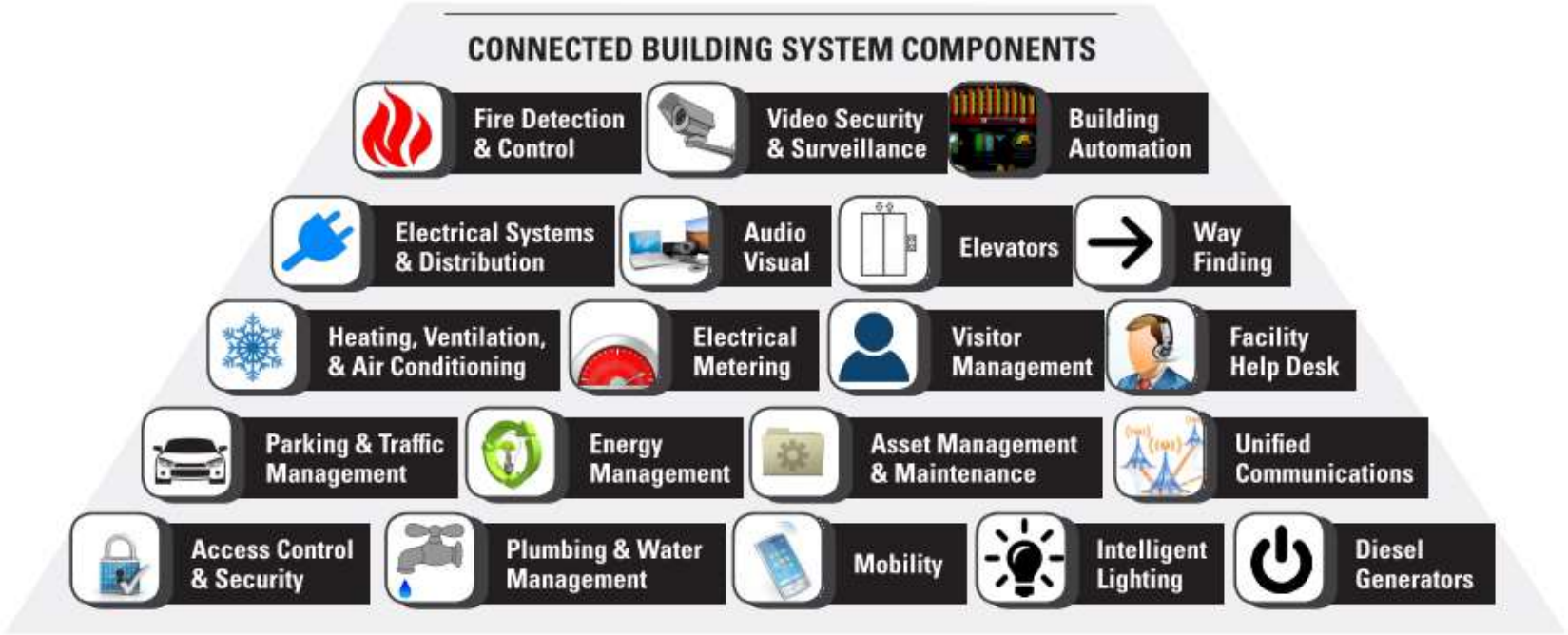
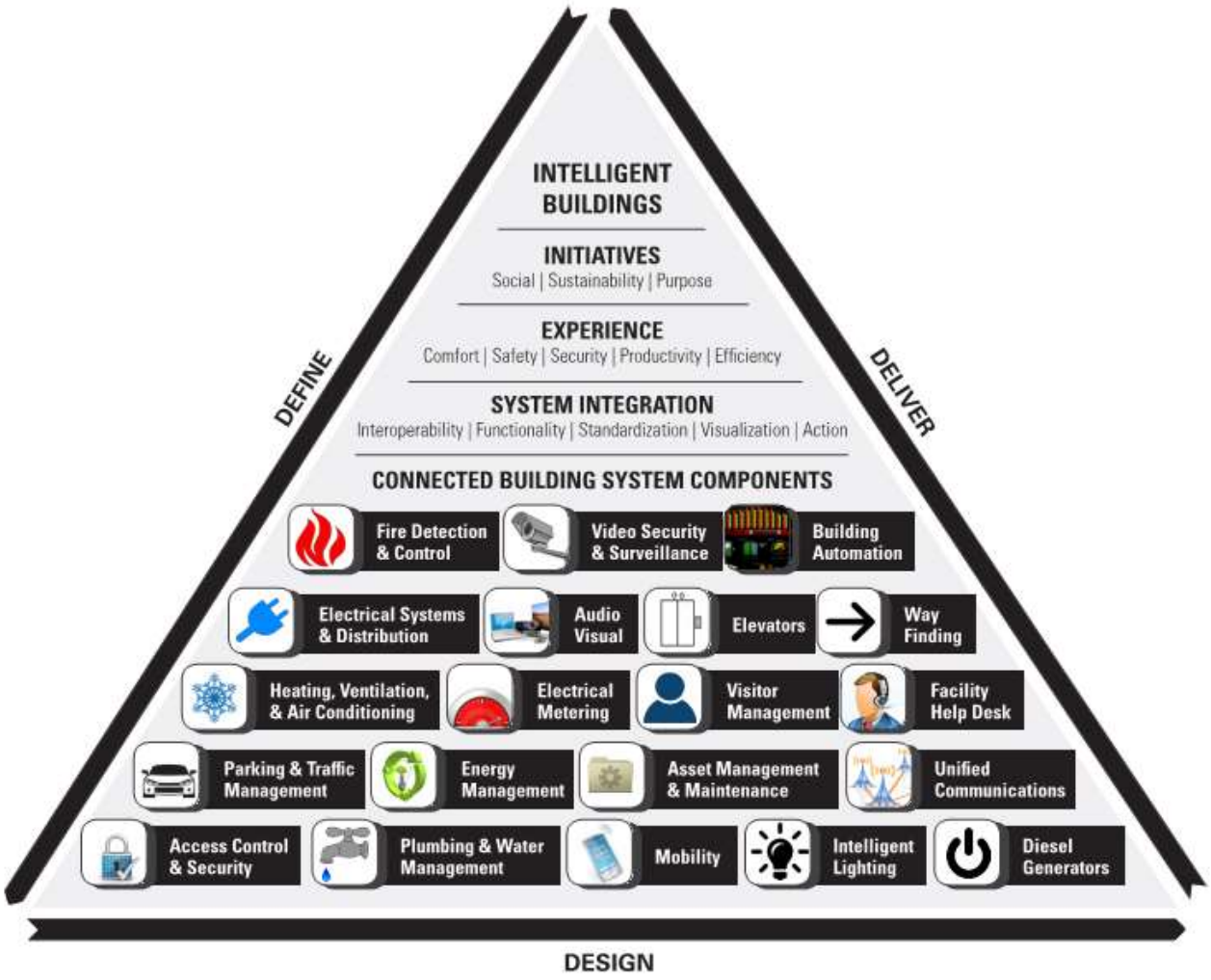


Integrated Master Planning Approach



Stakeholder

- Engage ALL Stakeholders
- Understand Business Drivers and Initiatives
- Prioritize Project Goals and Initiatives; Gain Consensus on Project Goals
  - Just as important – gain agreement on what will NOT be included
- Define the Expected Functionality and Experience
- Identify the Systems Required to Deliver the Experience and Achieve the Functionality

Stakeholder Engagement

Financial

- Reduce costs
- Enable more granular data
- Enable comparative/ competitive analysis across campus(es)

Operational

- Increased Operational Efficiencies
- Improved Functionality
- Increased Productivity

Life Safety Systems

- Life Safety, Fire Alarm
- Security
- First Responders

People, Social + PR

- Prestige/Recognition
- Increased Awareness
- Public and Employee Engagement

Sustainability

- Utility Consumption Reduction
- Water Conservation
- Lifecycle Performance

Stakeholder Engagement

- Critical Parameter Development Form
  - Questionnaire to assess client needs and priorities
    - Ex: Wireless Connectivity, Equipment Specs, Employee Access, etc…
  - Feedback from Chief Engineers, Lab Managers, Procurement Engineers etc..
  - Established BAS needs for:

ROBUSTNESS

Reliability

Flexibility

Stakeholder Engagement

- Comprehensive Decision Matrix
  - Stack systems side-by-side for direct comparison

	Company A	Company B	Company C	Company D
Service Location				
Energy Management				
Graphical User Interface				
Alarming Capabilities				
Wireless Capabilities				
Fixed Pricing				

Design Implementation

PHASE 1 – Network Infrastructure

- New servers & switches
- Redundant fiber pair
- New network controllers
- Integrate to existing field level controllers

PHASE 2 – Building Level Controls

- Replace proprietary controllers with open protocol controllers
- New sensors/field devices
- Improve sequence of operations

PHASE 3 – Process Enhancements

- Additional monitoring of process equipment
- Graphical User Interface for Business Units

Design Implementation

- Improvements Through Mobile Devices
  - Access to BAS, Internet, drawings, & work order system from mechanical rooms
  - Only one operator required for troubleshooting
  - Simultaneous access for multiple operators
- Requirements for Implementing Tablets
  - Web-enabled BAS
  - Wireless Internet in mechanical rooms
  - Secured client network
  - Operator training

Design Implementation

- Future Opportunities
  - Photo documentation of field issues
  - Equipment barcodes for tracking & orders
  - Installing additional software on tablets

Results

- Existing control system deficiencies were identified and addressed
- BAS upgrade resulted in many improvements including use of mobile devices
- Tablets improved operator efficiency and provided access to additional resources

Lessons Learned

- Confirm actual controls routing / equipment when possible
  - Labels in the field are not always up to date
- Engage all required personnel on the client side during the planning stage
- Thoroughly document decisions and define expectations
  - Send copy to project team for confirmation

Thank You!

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