SCADA System Procurement Alternatives

2017 Automation Committee Seminar
August 24, 2017
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Discussion Topics

• SCADA Overview
• System Hardware / Software Procurement
• Additional System Configuration Options
• Summary

Presentation Goals

• Discussion of options available for procurement of SCADA Systems
• Compare relative strengths and weaknesses of each approach
• Provide general recommendations for each method
Definitions / Acronyms

- SCADA = Supervisory Control And Data Acquisition
- PCS = Plant Control System / Process Control System
- PLC = Programmable Logic Controller
- RTU = Remote Terminal Unit
- HMI = Human Machine Interface
- DCS = Distributed Control System

SCADA Systems

- An application of computer technology which:
  - gathers information from field devices
  - displays it for use by an operator
  - executes automatic control sequences
  - stores and displays data for analysis.

Elements of a Typical SCADA System
Procurement Alternatives

- Traditional Design/Bid/Build
- Traditional with Vendor Prequalification
- Evaluated Procurement
- Separate SCADA Systems Integrator
- Design/Build Approach
- Utility Direct Procurement

Traditional Design/Bid/Build

- Most common approach
- Detailed plans and specifications
- Low bid procurement
- Build phase provides oversight of contractors
- Often part of a larger physical improvement project, such as plant upgrade or rehabilitation project
Traditional Design/Bid/Build

- **Advantages**
  - Lowest initial cost
  - General Contractor responsible for coordination

- **Disadvantages**
  - Limited Utility input or control
  - Qualifications of system integrators and/or panel shops may vary
  - Requires significant oversight to ensure compliance with specifications

Traditional D/B/B Recommendations

- Develop detailed vendor qualifications
- Name specifics wherever possible
  - SCADA software
  - Computer hardware
  - Network hardware
- Specifications for screen development and workshops
- Extensive, detailed testing

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DBB with Vendor Prequalification
- Maintains low bid procurement
- Detailed plans and specifications
- Adds list of prequalified system integrators
- Prequalification can be based on previous experience at an individual utility or with the Engineer
- Prequalification can be based on structured evaluation

D/B/B with Vendor Prequalifications
- Advantages
  - Maintains low cost bidding environment
  - GC remains responsible for coordination
  - Only prequalified SI firms allowed to bid
- Disadvantages
  - General Contractor perceptions of limited choices for subs
  - No assurance the “right team” from SI will be on project
  - Requires oversight to ensure compliance with specifications

D/B/B with Vendor Prequal Recommendations
- Everything we discussed for traditional D/B/B
- Develop methodology for prequalification of SI
  - Specific experience
  - Training
  - Project experience (similar size and complexity)
- Maintain ability to allow additional System Integrators to “petition” to be qualified during bid period
- Verify approach with Utility procurement staff
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**Evaluated Procurement – using RFP**

- Typically used for stand-alone SCADA projects, but can be used for construction projects
- Functional specifications are part of Request for Proposal (RFP)
- System Integrator / Software Supplier responds to RFP
- SI outlines project approach in RFP
- Selection is Based on detailed evaluation of technology, approach and price – what is the **best value** for the Utility?

**Evaluated Procurement – using RFP**

- **Advantages**
  - Allows SI / Software Vendor to propose their best approach
  - Selected on qualifications and price, not price alone (best value)

- **Disadvantages**
  - Cost to develop and evaluate RFP
  - Typically not done for construction projects
  - Can be contested, delaying project
Evaluated Procurement Recommendations

- Detailed RFP with functional requirements
- Detailed, objective evaluation criteria
- Allow sufficient time for proposers to develop responses
- Verify approach with utility procurement staff

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Separate SCADA Systems Integrator

- Used as part of a physical expansion or rehab project
- Separate SCADA SI performing in parallel with General Contractor (GC)
- SI Selected by methods outlined previously
- Separate contract between utility and SI
Separate SCADA Systems Integrator

**Advantages**
- Increased Utility control over SI
- Useful if more than one contract is underway at same facility

**Disadvantages**
- No clear contractual relationship between SI and GC
- Additional coordination by Owner/Engineer
- Potential for schedule conflict and “fingerpointing”

Separate Systems Integrator Recommendations

- Detailed scope of work for systems integrator
- Coordinate between GC Contract and SI Contract to eliminate gaps
- Clearly outline schedule and contract interface requirements
- Scheduling techniques to minimize effect of schedule slip

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Background Concepts: Design-Build

• What is Design-Build
  • Design-build is a method of project delivery in which one entity - the design-build team - works under a single contract with the project owner to provide design and construction services.
  • http://www.dbia.org/about/designbuild/

• Types of Design-Build
  • Performance Based Design-Build
  • Prescriptive Design-Build
  • Progressive Design-Build
Background Concepts: Design-Build

- Why Design-Build (again, from DBIA)
  - Faster delivery
  - Cost savings
  - Better quality
  - Singular responsibility
  - Decreased administrative burden
  - Reduced risk (to Owner/Utility)
  - Reduced litigation claims

Design-Build Pros / Cons

Pros:
- Shortest schedule
- Appropriate risk transfer
- Creative technology solutions
- Potential lower costs
- Owner guarantee of design is a non-issue
- Trust and synergy

Cons:
- Major effort during selection process
- Limited case law (better every year)
- Loss of control over design by Utility
- Multiple solutions must be evaluated
- QBS as a selection factor is a challenge

Advantages of Progressive DB

- Offers flexibility and Owner input, with final cost determined during design
- Best when Owner wants design input and “design to budget”
- Performance guarantee by D-B team
- Provides early price certainty and Owners' off-ramp
  - If agreement on Guaranteed Maximum Price (GMP) can't be reached ➔ Off-ramp
  - Overall GMP can be determined as early as 30%
- Can support multiple “phased” GMPs
The Progressive Part of Design-Build

- The Progressive Design-Build approach:
  - Design Process Continues at least until Guaranteed Maximum Price Set
  - For many utilities, a full biddable set is produced
  - Owner provides input throughout the design
- Progress Design-Build provides benefits:
  - Innovation during Design
  - Flexibility for Equipment Selection
  - Operations Input and Flexibility
  - Cost Benefit
  - Schedule Benefit

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Utility Direct Procurement

- Utility contracts directly with System Integrator / Vendor
- No Engineer involvement in design or construction/configuration oversight
- Selection of SI based on low bid or prequalifications

Advantages
- No Engineering Fees
- Cost Advantage based on Procurement Methods
- May have Schedule Advantage

Disadvantages
- Relies on In-House Expertise for Functional Requirements
- No Structured Design to take advantage of new technologies
- Increased Workload on Utility Staff throughout Implementation

Utility Direct Procurement Recommendations

- Develop Detailed Functional Requirements, Including Testing and Documentation
- Clearly Outline Schedule
- Ensure Sufficient Utility Staff for Oversight and Testing Observation
- Ensure Procurement Staff is On-Board with Direct Procurement
- Discuss with Professional Engineers Board regarding Design Responsibility
Additional System Configuration Approaches

- Utility provided programming
- Utility approved single programming vendor
- Engineer provides programming
- Other variations

Utility Provides Programming

- Advantages:
  - Highest level of control over final product
  - Lower capital costs for programming
  - Familiar with facility and usually with the process being controlled

- Disadvantages:
  - Utility is in critical path
  - Burden on utility resources

Engineer Provides Programming

- Advantages:
  - Access to Process Experts
  - Most Knowledgeable of Design Intent
  - Increased Level of Utility Input and Control
  - Selected on Qualifications

- Disadvantages:
  - Engineer in Critical Path
  - Higher Cost
Other Variations

• Engineer Subcontracts with Desired Integrator
• Contract Allowance for Systems Integration
• Owner Direct Contract with SI, SI coordinating with General Contractor

Summary – SCADA Procurement

• Design-Build is gaining in popularity and usage
• Design-Bid-Build is still the predominant method

• Regardless of method used:
  - Evaluate Existing Systems
  - Plan for Migration
  - Develop Implementation Plans
  - Develop firm requirements / specifications
  - Test / Test Again
  - Extensive Training

Questions?

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