# System Procurement and Negotiation

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COMMUNICATIONS EXPO

IWCE  Session F512

March 31, 2017

Federal Engineering, Inc.
*"Unleashing the Power of Technology"*

# Participant Expectations

- What are your expectations from this session?

- Why are you here?

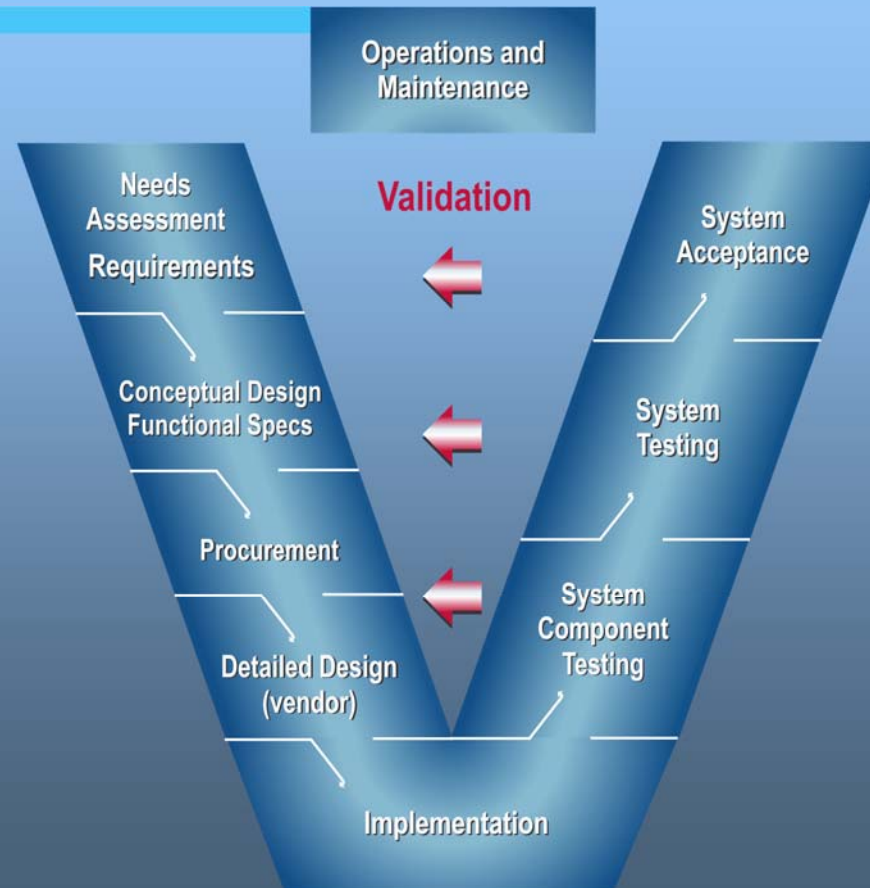- What would you like to take away?

# Session Overview

- Present key issues and considerations throughout the communications system lifecycle
  - From Planning → Operations and Maintenance
- A high level action plan with recommended steps to follow
- Applies to land mobile radio (LMR) and broadband/LTE system
- Our goal is a highly interactive session
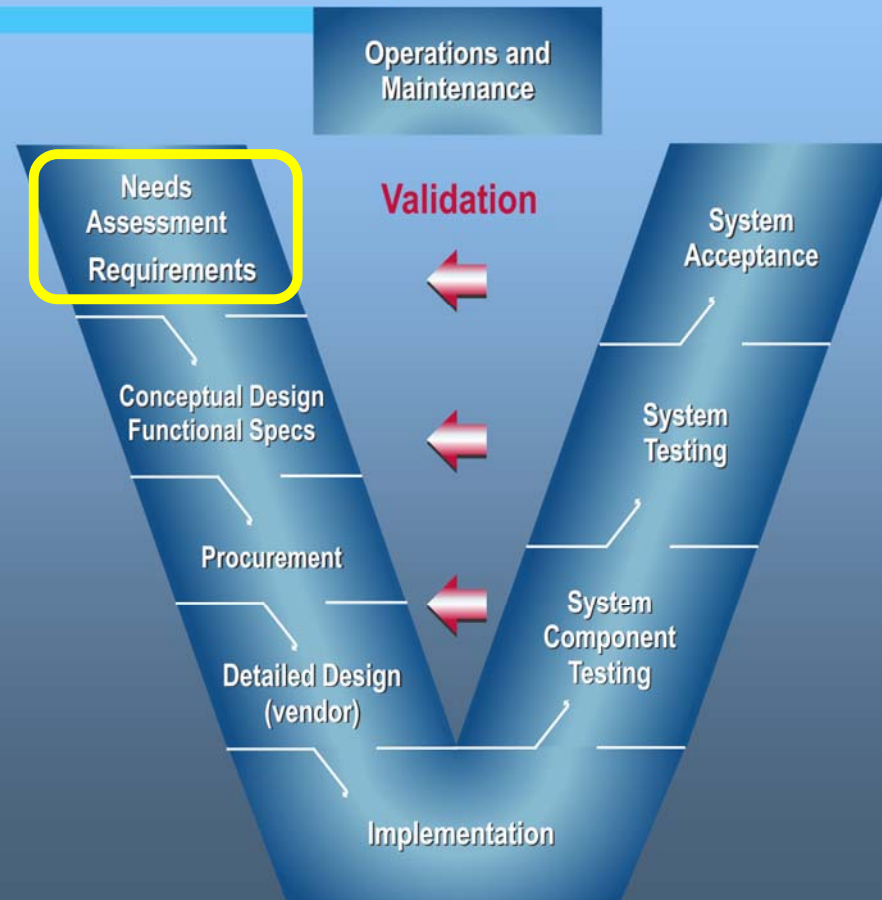
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# System Lifecycle

## System Lifecycle Support

- Project Management
- Quality Assurance/Quality Control
- Cost Management
- Time/Schedule Management
- Resource Management
- Configuration Management
- Scope Management
- Implementation Oversight
- Testing Supervision and Review
- Change Control

Operations and Maintenance

Needs Assessment Requirements

Validation

System Acceptance

Conceptual Design Functional Specs

System Testing

Procurement

System Component Testing

Detailed Design (vendor)

Implementation

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# PLANNING, NEEDS ASSESSMENT, AND REQUIREMENTS

# Planning, Needs Assessment, and Requirements in the System Lifecycle

Operations and Maintenance

Needs Assessment Requirements

**Validation**

System Acceptance

Conceptual Design Functional Specs

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Procurement

System Component Testing

Detailed Design (vendor)

Implementation

# Planning, Needs Assessment, and Requirements Overview

- Identify project team
- Define objectives
- Evaluate funding
- Analyze existing system and resources
- Conduct needs assessment
- Develop and validate/approve requirements
- Perform gap analysis

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# Identify Project Team

- Should be cross-functional
  - Users, administrators, dispatchers,
  - support staff, procurement,
  - government officials, consultants
  - Stakeholders - affected
  - agency/dept. heads, and govt. officials
- Project leader or champion aids in promoting consensus and communication of a unified message
- Develop communication plan based on project scope

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# Define Objectives

- What needs are primary, secondary and optional (project drivers)?
  - Aging, soon to be obsolete infrastructure
  - Regulatory concerns (T-Band, etc.)
  - Expanded coverage area (service area)
  - Increased coverage (in building portable/user safety)
  - Enhanced features (unit location, higher speed data, security/authentication)
  - Improved interoperability (internal and external)
  - Greater resiliency/reliability
  - Meet FirstNet requirements/LTE design

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# Evaluate Funding

- Evaluate funding sources
  - Bonds
  - Tax levies or special tax districts
  - Grants
    - Favor multi-jurisdictional systems
  - Partnerships (public and private)
  - Lease purchase
  - User fees
- Don't overlook O&M funding, internal costs, replacement funding for user radios, infrastructure upgrades, etc.
- What steps, who do you need to talk to, get approvals?

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# Existing System Analysis

- Baseline existing system(s)
- Review existing documentation
  - Previous studies, system and network diagrams, SOPs, policies and practices, licenses, interfaces (CAD, RMS, WMS, etc.), programming maps, equipment inventories (users & infrastructure)
- System(s) Assessment
  - Site surveys
  - Dispatch centers
  - Radio, mobile data, fixed data, SCADA, etc.
  - Coverage

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# Needs Assessment

- Select participants
- Develop Assessment Survey (formal)
  or discussion points (informal)
- Conduct survey
  - Web based, phone, in person by groups/functions
- Conduct interviews with key users/managers
- Review preliminary findings with key stakeholders
- Document in a report

# Develop Requirements

- **User needs**
  - Drill down into specific needs
- **Current features and limitations**
  - Understand how systems are used today
- **Operational, functional, and technical requirements**
  - Baseline
  - Validate
- **Alternatives analysis**
- **Communicate, communicate…**

| Requirement ID | Requirement Classification | Requirement Description | Architecture/ Design Document | System Component(s) | Test Case(s) | Verification | Additional Comments |
|---|---|---|---|---|---|---|---|
| ER 1.0 | Equipment Requirement | Base station installation | Design V2.6 | Site #5 | 1.3, 1.8, 2.6 | Passed | Issues resolved at site location |

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# Gap Analysis

- What features are needed to support short and long term requirements?
- Which existing facilities can be reused?
  - Need to renovate, rebuild or secure new facilities?
- What regulatory issues must be addressed?
  - FAA, FCC, NTIA, FirstNet, etc.
  - NERC, FERC, NRC
  - Local and or state regulations, ordinance, zoning
- Will additional staff, training, equipment, etc. be needed to support new systems?
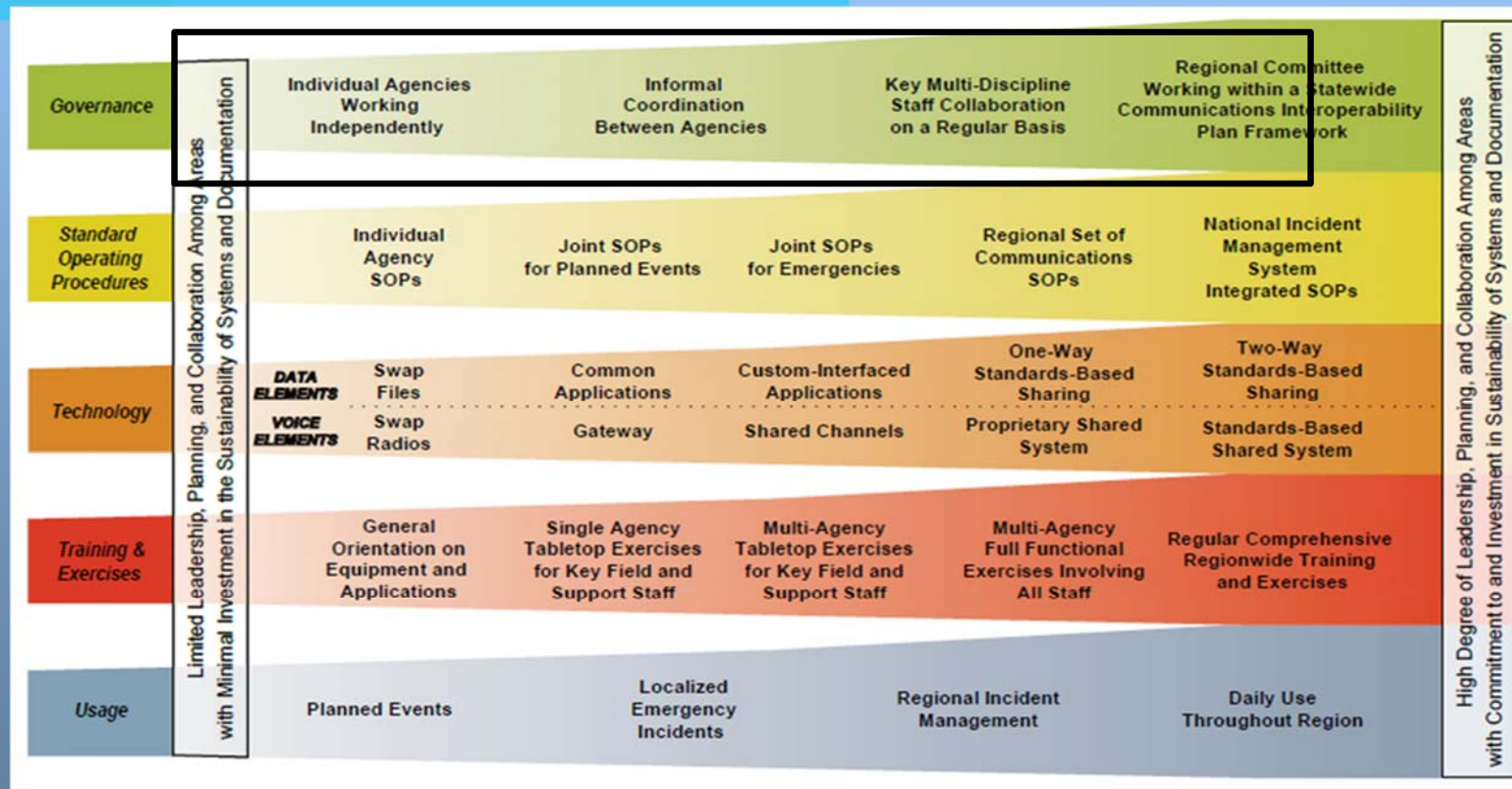
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# Governance

"A support system that helps decision makers within Federal, State, local, and tribal governments make informed decisions that meet stakeholder requirements."

- DHS Establishing Governance Guide, December 2008

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# Governance – SAFECOM Continuum

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# Governance Considerations

- May be THE most important aspect of system planning and operation!
- Outline the structure and policies that will be used for governance and ensure that ALL users are represented in the process
- Develop technical user and management structure
- Establish system/user policies and procedures

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# What is Effective Governance?

- Effective Governance Promotes:
  - Transparency
  - Consensus building
  - Shared understanding of interoperability goals
  - Technical coordination
  - Operational consistency
  - Sustained effort



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# Planning Aspects to Remember

- Develop preliminary system operations plan
  - Will have to be refined as system design evolves
- Communicate goals, needs and objectives continuously
  - Develop a communications plan early and use it often
    - List sever, web site, conferences, group meetings, emails, newsletters, social media, press releases
- Set realistic expectations
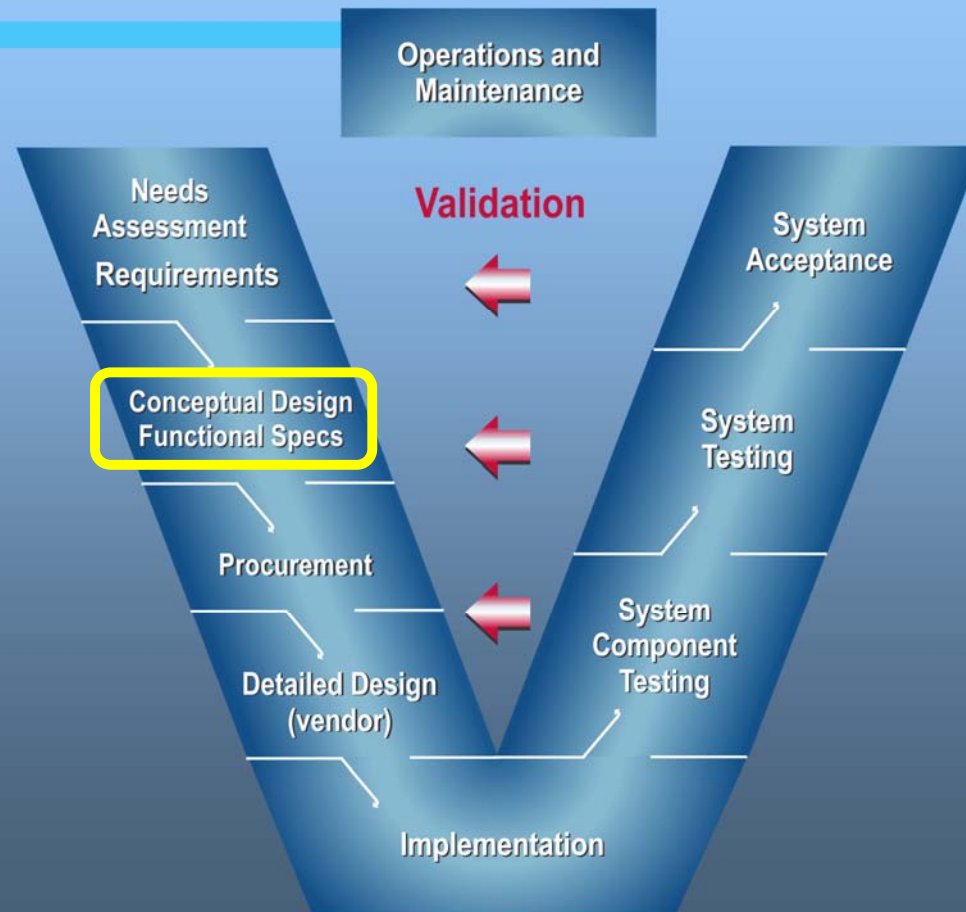  - Coverage, project timelines, scope

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# Q&A - DISCUSSION

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# Conceptual Design

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# Conceptual Design in the System Lifecycle

# Developing the Conceptual Design

- What is a Conceptual Design?
- Why develop a Conceptual Design?
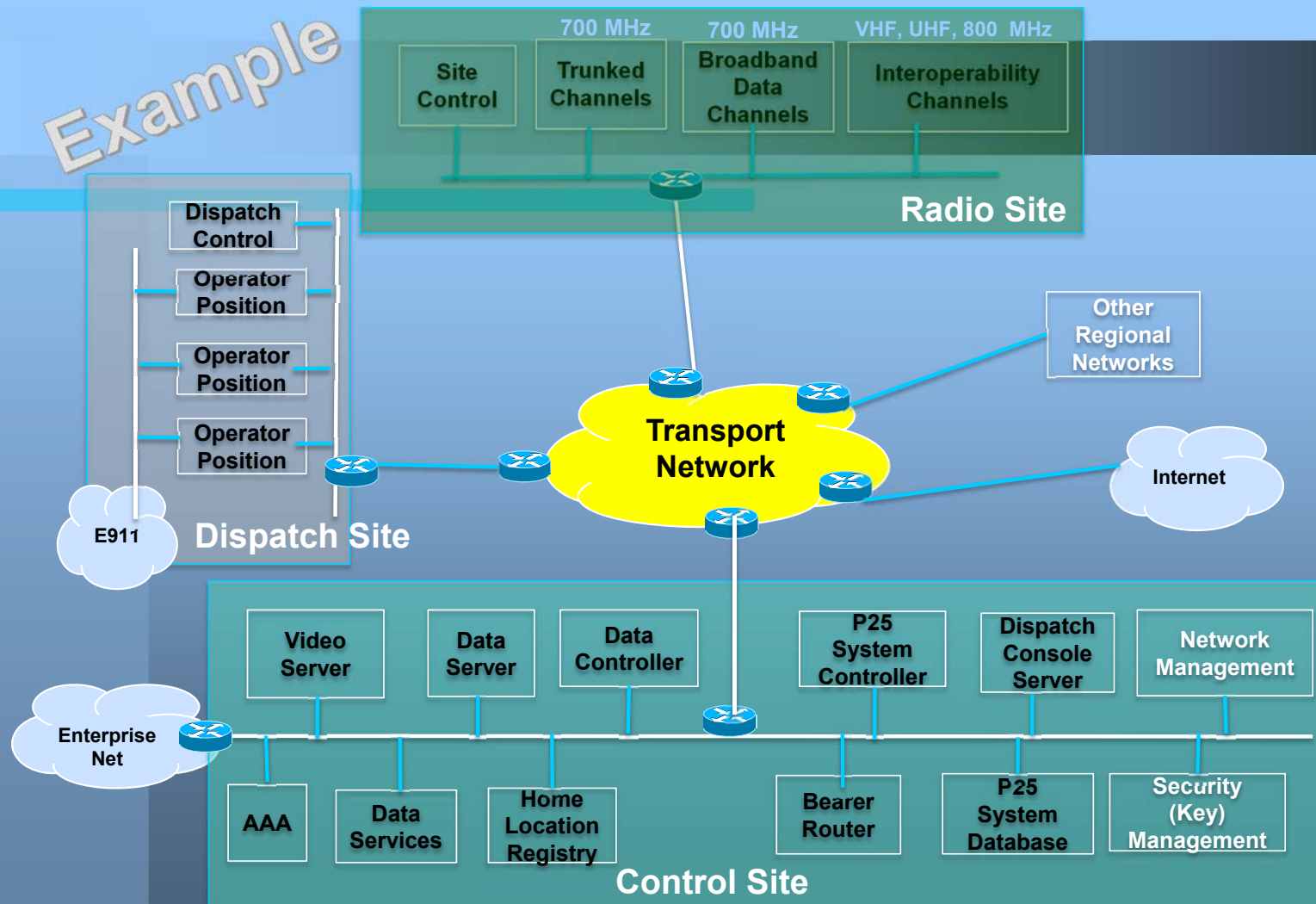- Categorizing needs and capturing in the design
- Conceptual Design validation

# What is a Conceptual Design

- High level system design fulfilling requirements
- Evaluate system architectures
  - Explore alternatives
  - Validate against requirements
  - Analyze costs and benefits
  - Evaluate tradeoffs
  - Evaluate for risks
    - Technical risks
    - Schedule risks
    - Procurement risks

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Example

**Radio Site**

700 MHz — Site Control | Trunked Channels
700 MHz — Broadband Data Channels
VHF, UHF, 800 MHz — Interoperability Channels

**Dispatch Site**

Dispatch Control
Operator Position
Operator Position
Operator Position
E911

**Transport Network**

Other Regional Networks

Internet

**Control Site**

Enterprise Net

Video Server
Data Server
Data Controller
P25 System Controller
Dispatch Console Server
Network Management

AAA
Data Services
Home Location Registry
Bearer Router
P25 System Database
Security (Key) Management

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# From Needs and Requirements To a Conceptual Design

- **Design based on the captured requirements**
- **Iterative process**
  - Drill down into specific needs
  - Often uncovers unexpressed needs
- **Current features and limitations**
  - Understand how systems are used today
- **Operational, functional, and technical requirements**
  - Baseline
  - Validate

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- **Alternatives analysis**

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# Categorizing Needs

- **Unmet current needs**
  - What you need now that you do not have?
  - What you have now that does not work well?

- **Unmet future needs**
  - What you can use now that you do not have?
  - What do you see coming in the short and long term?

- **Meet current needs**
  - What do you have now that could be improved?
  - What do you have now that works well and should or must be retained?

# Why develop a Conceptual Design

- Realization and validation of requirements
- Solidification of system goals
- Basis for cost analysis
- Presentation/explanation tool

Remember;

Always Communicate, Communicate, Communicate

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# Conceptual Design Validation

- Validate against requirements
- Validate against budget
- Validate against governance
- Validate against risks
- Validate against test plans

# Conceptual Design Technical Elements

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- Architecture decisions
- Features and functions
- Capacity
- Reliability
- Coverage

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# System Architecture Decisions

- **System Type**
  - Voice, Data, Mixed (V&D), Broadband, Fixed, Backhaul (microwave or fiber)

- **Bands**
  - VHF, UHF, 700 MHz, 800 MHz,

- **Technology (LMR/Broadband)**
  - Analog, DMR, P25 (Phase 1 or Phase 2), TETRA, LTE, etc.



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# System Architecture Decisions

- **Technology  (Network)**
  - MPLS, Carrier Ethernet, SONET
- **System Architecture**
  - Conventional, Trunked, Single site, Multi-site, Simulcast, Networked
- **Interoperability**
  - Technically, Operationally, Administratively

# Features and Functions

- Feature set
  - Alignment with requirements
  - Emerging requirements
- Capacity
  - Current needs
  - Margin
  - Expansion

- Coverage
  - Absolute needs
  - Desired needs
  - Emerging needs
- Interoperability
  - Local, state, federal
  - Inter and Intra jurisdiction

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# Reliability/Availability

- System
  - System
  - Backhaul
  - Power
  - Support infrastructure
  - Management systems



- Coverage and other performance
  - Coverage reliability
  - Capacity
  - What percent / What area?
  - Specific locations
  - In-building average vs. in specific buildings
  - Interference

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# Organizational Aspects

- The design team
- Alignment with organizational requirements
- Establish a balance
- Outreach and stakeholder buy-in

# The Design Team

- Team leadership
- Core and extended team
- Stakeholder participation
- Technical support
- Managerial / budgetary interface

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# Alignment with Organizational Requirements

- Alignment of team members and organizational goals
- Appropriate level of responsibility and authority
- Stakeholder interface beyond the core team

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# Outreach and Stakeholder Buy-in

- Communicate, Communicate, Communicate

- Communicate up
  - Administrative, executive, and political levels

- Communicate down
  - Stakeholders, user groups, interoperability partners, and even other agencies not directly involved

# *Project Management Aspects*

- Use project management tools and processes
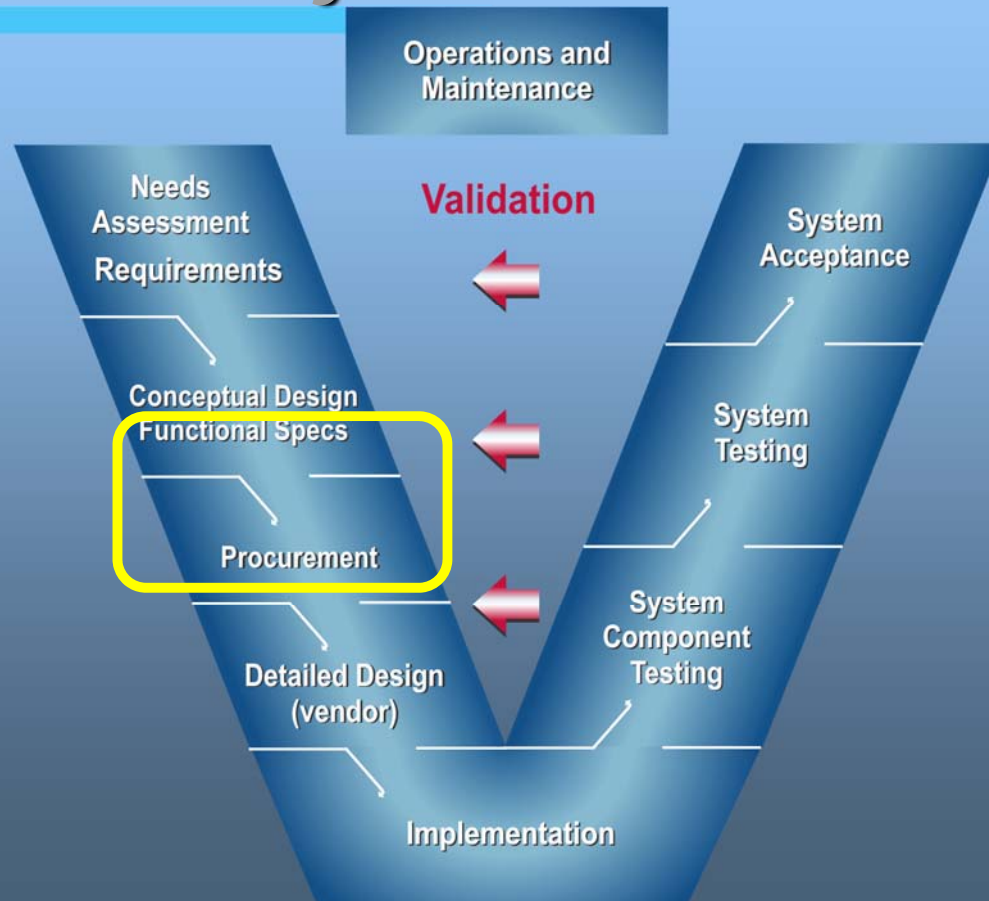- Don't wait for the procurement process before implementing project management

# Q&A - DISCUSSION

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# FUNCTIONAL SPECIFICATIONS AND PROCUREMENT

# Functional Specs and Procurement in the System Lifecycle

# Procurement and Functional Specification Development Overview

- **Procurement Process Decision**
  - Competitive Procurement
  - Sole Source Procurement
  - RFP? RFQ? RFI? IFB?
- **Functional (Technical) Specifications – regardless of procurement process**
- **Competitive Procurement Activities**
  - Evaluation Criteria
  - Prebid/Q&A/Site Walks
  - Solicitation Response Review
- **Vendor Selection**
- **Contract Negotiation**



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# Competitive Procurement

- Opportunity for all or a few vendors to participate
- Often end up with lower costs since competitive
- Choice whether or not to disclose budget – vendor will scope to budget
- Role of RFP, RFQ and RFI

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# Sole Source Procurement

- Situational
  - Expansion
  - Upgrade
  - Migration with significant resource reuse
- Still has many considerations
  - Am I getting a fair price?
  - Do I understand what I am getting?
  - What are lessons learned from others who have done the same thing?

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# Technical Specifications

- **Functionality**
  - System functional, protocol, and operational requirements
  - Local, regional, state, and federal interoperability
  - Performance; coverage, capacity, reliability, redundancy
  - Connectivity
  - Network and physical security
  - Network management
  - Standards adherence

# Technical Specifications

- **Equipment**
  - Infrastructure
  - Dispatch
  - Subscribers
  - Backhaul
  - Network management
  - Redundant infrastructure and spares

- **Spectrum**
  - Band
  - FCC Regulatory and standards compliance

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# Technical Specifications

- Implementation
  - Migration and cutover/transition requirements
  - Continuity of operations
  - System delivery
  - System installation
  - As-built documentation
  - User and technical training

- Testing /Acceptance Guidelines and Criteria
  - Factory
  - Interoperability
  - Coverage
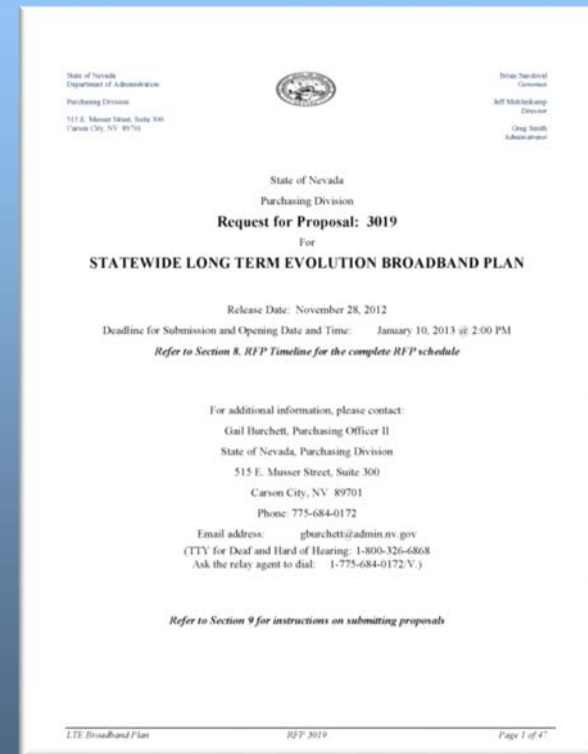  - Site
  - 30/60/90-day Operational Acceptance

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# Technical Specifications

- **Maintenance**
  - Maintenance requirements
  - Warranty
  - Local and remote support

- **Other Considerations**
  - Expandability to accommodate future growth
  - Leverage existing resources

# Competitive RFP

- **RFP Sections**
  - Project overview
  - Instructions to proposers
    - Alternate proposals allowed?
  - Technical specifications
  - Project management
  - Overall project schedule
  - Pricing sheets
  - Mandatory submittals
  - Client terms and conditions/forms



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# Competitive Procurement Activities

- Prebid conference
- Questions and answers
- Addenda
- Site visits
- Establish evaluation criteria
- Review responses
- Select vendor
- Negotiate contract

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# Evaluation Criteria

- Should be developed by all agencies involved
- Pass/Fail items
  - Financial disclosures, complete proposal, agreement to terms and conditions
- Specific Criteria
  - Feasible design
  - Adequate coverage and capacity
  - Sites proposed - paying specific attention to any new sites
  - Adherence to the technical specification and other requirements

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- **Specific criteria (continued)**
  - Complete equipment list
  - Adequate factory, coverage, functional, performance, and acceptance test plans
  - Financing solution(s)
  - Required interoperability
  - Partnering solution(s)
  - Other client-specific criteria

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# RFP Response Evaluation

- Evaluate vendor responses
  - Use predefined rules and criteria
  - Educated evaluation team
  - Compliant with local, state and federal rules, requirements and processes
- Benefits of an independent, unbiased review
  - Mitigates possibility of protest
  - Allows review by experts familiar with each vendor's system
  - Relieves client of full responsibility
  - Client has technical and operational support

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# CONTRACT NEGOTIATIONS: GETTING EXACTLY WHAT YOU WANT

# Setting the Stage: Knowing What You Want

- Develop Your Team
- Establish a "Chain of Command"
- Create a Roadmap
- Define Expectations

# If It Is Not In Writing, It Does Not Exist

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- Precedence of Documentation
- Clear Responsibilities
- Named Staff / Key Personnel
  - Rights to change
- Use Plain Language
  - Even for common terms
- Require Detailed Equipment Lists
- Title and Title Transfer
- Confidentiality

# The Statement of Work; Your roadmap to completion

- Three Critical Components
  - The Implementation Plan
  - The Schedule
  - The Responsibility Matrix
- Each should be clear and concise
  - Proposal "Sales-ey" language should be avoided

# Test Plans; *If it can not be measured, It can not be assured*

- Test to the proposed design as well as the standard features
- It is your right to have every feature tested
- Define criteria for success
  - And the requirements if failed
- Define requirements and allowances for retesting
- Define which tests are separable
  and which are not
- Tightly define coverage, voice quality, message success, and other performance tests

# Taking Ownership:
## System Acceptance, Beneficial Use, and Warrantee

- Define System Acceptance
  - Avoid unintended acceptance
- Define Beneficial Use
  - or "use for intended purpose"
- Define warranty start, and maintenance responsibilities during;
  - Implementation, Testing, Test Use,
  - And Inadvertent Use
- Define warranty/maintenance requirements and allowances

# Negotiation: It's Not a Contest

- A Successful Implementation can not start if one side "loses" during negotiations
  - For success both sides must come to agreement
- Negotiation failures are rarely a success for anyone
- Know your parameters and limits
  - Know when to call it quits

# Contract Negotiations

- Specific items that could impact final contract
  - Parts list errors
  - Factory, site, and acceptance testing that are not representative of true system performance or do not provide adequate test "coverage"
  - Factory acceptance testing performed out of the country or in a location that would be cost-prohibitive to attend
  - Clear coverage, subsystem infrastructure, and subscriber acceptance terms
  - Adherence to good workmanship standards

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# Contract Negotiations

- **Specific items that could impact final contract**
  - Payment schedules that favor the vendor
    - Payment on shipment rather than on receipt/acceptance
  - Anything that causes acceptance before testing is complete
    - "Beneficial Use" statements not appropriate to the system
  - Extra fees for personnel that are not wanted or needed
  - Items that can be split out of the contract and completed by the agency at a substantially lower cost

# Contract Negotiations

- Many seemingly small items can impact the final contract

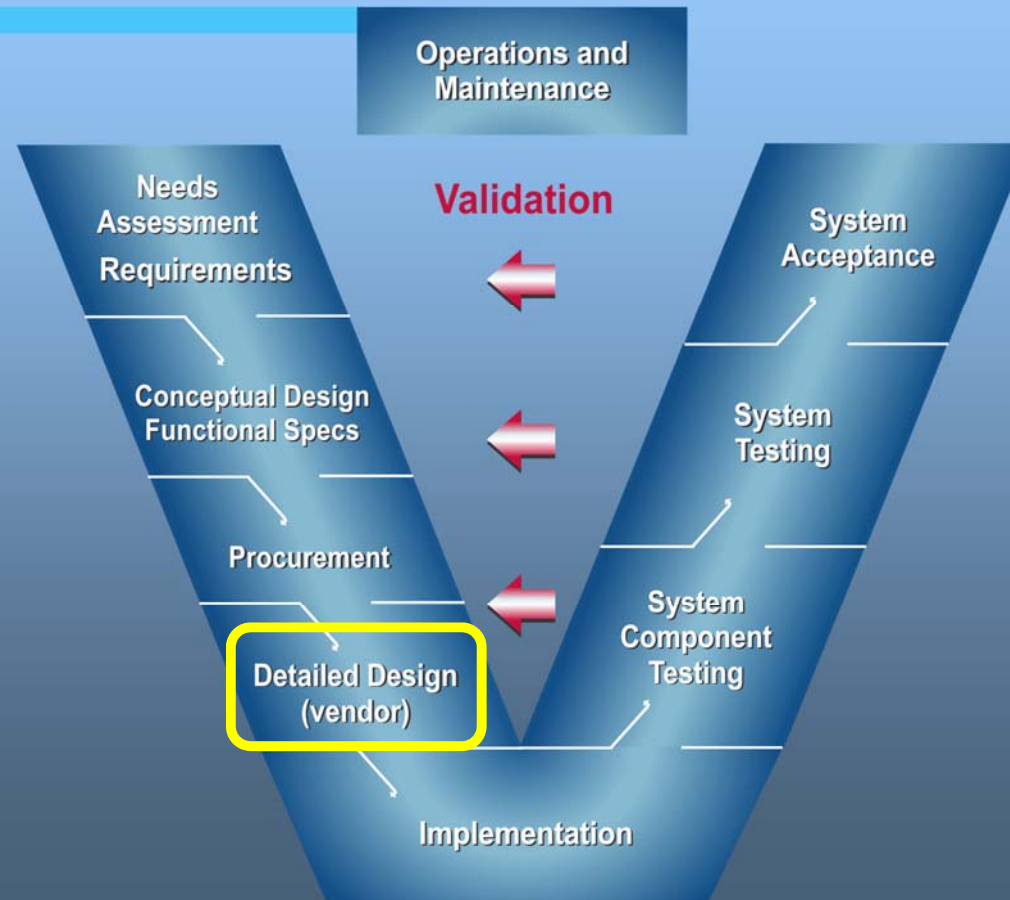$ Contract negotiations with the right support and knowledge can ultimately save millions $

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# Q&A - DISCUSSION

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# DETAILED DESIGN

# Detailed Design Activities

- Responsibility of the vendor (primarily)
- Proposal has preliminary design
- Design revisions based on contract negotiations/any resulting change in scope
- Schedule design reviews – on-site with the client and client representatives
- Maintain communication with all stakeholders; consider each agency's input
- Sign off before moving to implementation
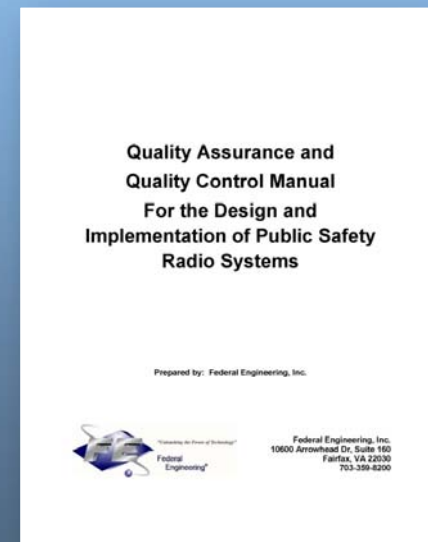
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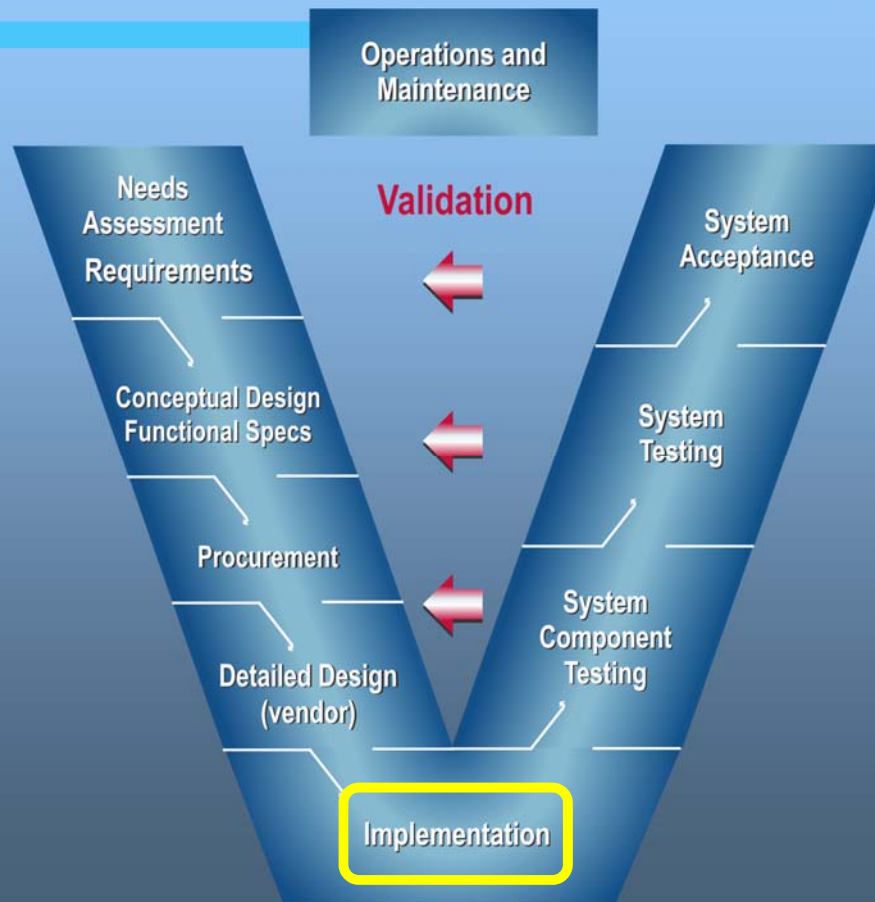
# IMPLEMENTATION

# Quality Assurance / Quality Control

- Quality assurance and quality control throughout detailed design and implementation
- Maintain "Punch-list"
- Client always in the loop
- Client signs off at each step
- How smooth it runs depends on previous phases

Quality Assurance and
Quality Control Manual
For the Design and
Implementation of Public Safety
Radio Systems

Prepared by: Federal Engineering, Inc.

Federal Engineering, Inc.
10600 Arrowhead Dr, Suite 160
Fairfax, VA 22030
703-359-8200

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# Vendor Responsibilities

- Drawings
- Equipment lists
- Equipment deployment
- Installation

- Test plans
- Testing
- Correct problems
- Acceptance

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# Preparing for Implementation

- Staging/Factory Acceptance Testing
  - Confirm that equipment matches contract
  - Execute tests to demonstrate performance
- Receive equipment at client site(s)
  - Equipment storage, inventory, tracking, deployment
  - System documentation complete
- Site development - the "long pole in the tent"
  - Site inspections
  - Regulatory compliance
  - Site sharing agreements
  - Greenfield – special considerations
  - Weather and site access

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# Implementation - Deployment

- Equipment installation and deployment
  - Manage internal and external resources
- Prepare sites
- Users are ready and trained!!
  - How will user and dispatcher training be conducted?
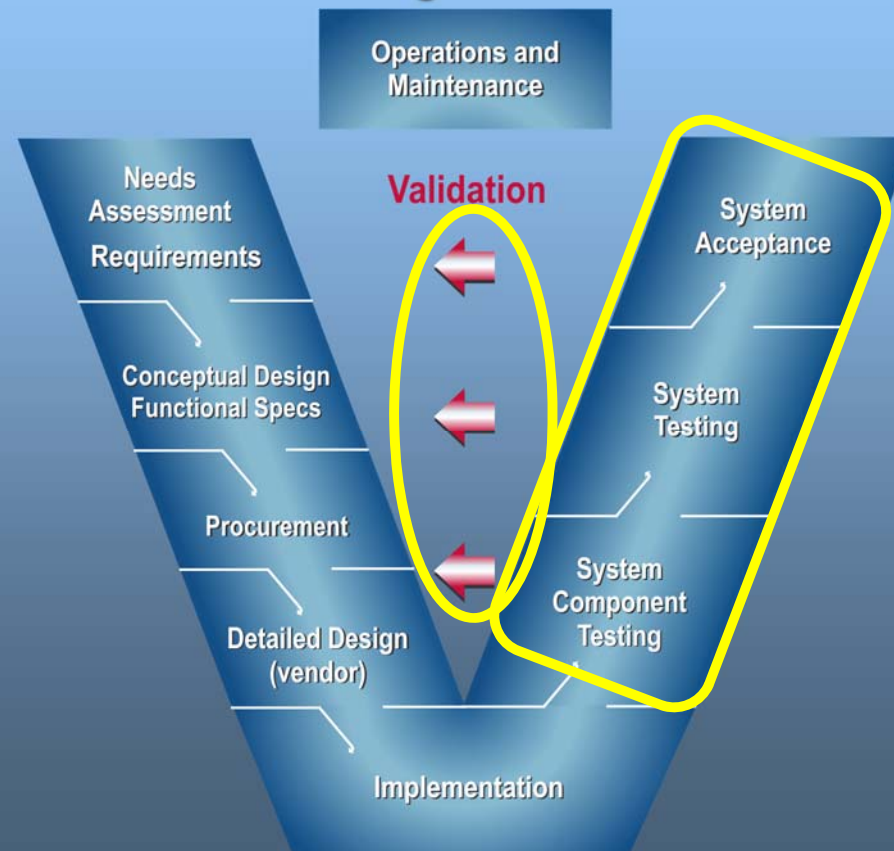  - Ensure that regular training is available as needed



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# Q&A - DISCUSSION

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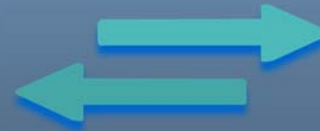Federal Engineering, Inc.
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# TESTING AND SYSTEM ACCEPTANCE

# Testing and System Acceptance in the System Lifecycle

# Testing Validates...

- Component level testing validates detailed design
- System level testing validates conceptual design and functional specifications
- Acceptance validates requirements



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# Testing Stages

- Keep the Vendor accountable!
  - Maintain a thorough punch-list throughout!
- Component testing (staging and field)
  - Individual sites, Control, dispatch
- System testing (staging and field)
  - Selected sites
  - Coverage and other performance testing
- System acceptance
  - Final set of tests
  - Sign off

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- Migrate to new system(s)
  - Determine method of migration
    - Gradual transition by groups,
    - Parallel operations needed
    - Monitor and track progress, issues that may arise
- Remove old system(s)
  - Are some existing systems needed for interoperability?
  - Decommission old systems
    - Update existing plans, user agreements, support contracts, file construction notices, etc.
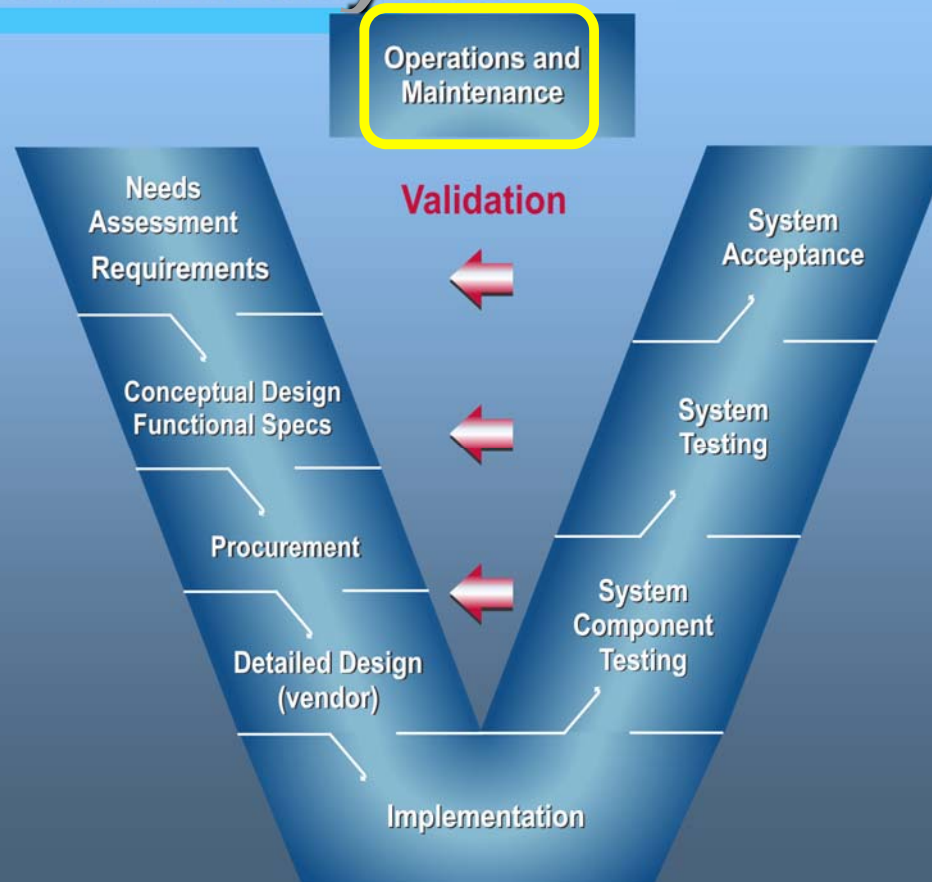    - Dispose of equipment properly!

# Q&A - DISCUSSION

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# OPERATIONS AND MAINTENANCE

# Operations and Maintenance in the System Lifecycle

**Operations and Maintenance**

Needs Assessment Requirements

Conceptual Design Functional Specs

Procurement

Detailed Design (vendor)

**Validation**

System Acceptance

System Testing

System Component Testing

Implementation

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# O&M Planning and Monitoring

- Operations and maintenance plans
  - Update operations plans as needed
  - Budget for ongoing maintenance and upgrades
- Develop and maintain system inventories
  - Critical for future system updates
  - Track hardware, software and firmware versions
- Monitor regulatory environment and compliance
  - Track and maintain site permits, authorizations, and FCC licenses

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# O&M Monitoring and Training

- **Network Management Systems**
- **Monitor system operation and performance**
  - Determine what is monitored, and how (NOC)
  - FCAPS (Fault, Configuration, Accounting, Performance, Security)
  - Fault - Develop processes and procedures for;
    - Faults – critical, major, minor
    - Field technician dispatch
    - Response and repair times
    - Escalation (internal, vendor TAC, external)
    - Trouble ticketing

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- **Monitor system operation and performance**
  - Configuration – Monitor changes to the system
    - Add sites, channels, subscribers
    - Add or revise talk-groups
    - Partition system
  - Accounting – Monitor usage of the system
    - Track usage by user, talkgroup, agency
    - Used for billing if multiple agencies on the network

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# O&M Monitoring and Training

- **Monitor system operation and performance**
  - Performance - Analyze system usage
    - May require modifications to operations plans, system and user radio programming, console configurations, etc.
    - Watch for degrading performance – set triggers
    - Trends can forecast future needs
  - Security - Ongoing cyber security measures and administration
    - Evaluate and update as needed
    - Logical security management (IDs and passwords)

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# O&M Monitoring and Training

- Initial and Ongoing training
  - User training - "train the trainer"
  - Technical training – system and database administration – hands on, classroom
  - Ongoing and system upgrades - combine recurring user meetings with ongoing training, utilize web based training
- Communicate, communicate…

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# Ongoing Maintenance

- Corrective maintenance
  - critical for maintaining proper system operation
- Establish processes and procedures
  - Monitoring – 24 x 7
  - On-call technicians
    - Know who they are and how to contact them
    - If vendor provided – defined Service Level Agreements
  - Access to vendor technical assistance (TAC)
  - Spare parts inventory – accurate tracking
    - Parts repair/return process, emergency parts process

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# Ongoing Maintenance

- ● Proactive preventive maintenance
  - – Processes and procedures
  - – Schedule all preventive maintenance
    - • Establish time "window" for preventive maintenance
  - – Not just for radio system equipment
    - • HVAC
    - • Power systems
      - – UPS, back up batteries, generators, transfer switches
    - • Fault monitoring devices
    - • Site civils – signage, tower, shelter, grounding, fuel tank, fencing, gates & locks, access road, weed control

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# Ongoing Maintenance

- **Test all systems periodically**
  - Exercise the generator and transfer switch
  - Better to cause minor planned disruptions than experience major unplanned outages!

- **Don't overlook user devices too!**
  - Improperly maintained devices can cause system wide issues

# Q&A - DISCUSSION

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# *YOUR EXPECTATIONS REVISITED*

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# Thank You!!

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