Session B3: Maintenance and Operations Management - Are we thinking strategically

- Format – Panel and Audience participation
- Presentation
- Q+A, Discussion
- Next Steps and Future Research
Oregon ITS Maintenance Plan

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Overview

- Review project scope
- Discuss plan methodology
- Present key findings
- Highlight lessons learned
- Review potential future research activities
Project Description

- ODOT partnered with WTI/MSU to produce a statewide ITS maintenance plan
- The plan is intended to serve as a companion document to the Oregon ITS Strategic Plan 1997-2017

Graphic courtesy of ODOT
Project Approach

Data Collection
- Gather stakeholder input
- Research other maintenance plans

Analysis of Resources
- Assess resource/skill requirements
- Identify available resources/skills
- Identify gaps in resources/skills

Results
- Develop repair prioritization schedule
- Establish a preventative maintenance schedule
- Develop a method for processing ITS maintenance
- Recommend training/contracting to fill gaps in resources/skills
- Prepare budget for all ODOT ITS maintenance activities
Review of Other Plans

- Several metropolitan areas have developed models; no statewide plan was identified
- No documented private sector plans
- Some plans relate device deployment and resource levels
- Most maintenance models are for a single, centralized organization
- Budgeting a major emphasis
The following stakeholders were identified as critical in ITS maintenance:

- Electricians
- TOC Managers
- Traffic Signal Services Unit (TSSU)
- Transportation Data Section
- Information Services
- Motor Carrier Transportation Division
- District Managers
- ITS Executive Steering Committee
Stakeholder Input

What did stakeholders identify as major concerns?
- Inadequate staffing levels and/or conflicting priorities
- Ambiguous responsibilities
- Inadequate training
- Poor logging and tracking systems
- Non-standardized devices
What did stakeholders want this maintenance plan to accomplish?

- Serve as a foundation for addressing all issues and regions
- Develop a process for maintaining new technology once it is implemented
- Raise awareness of staffing, training, maintenance, and standardization needs
- Clearly define organizational responsibilities
Four alternative models were presented to stakeholders

Consensus favored two-tier approach:
- On mainstream devices (e.g. RWIS), perform ITS maintenance through district / regional model
- On emerging technologies (e.g. video detection, travel time estimation), perform ITS maintenance through coordinated ITS model
Two-Tier Maintenance

- Advantages
  - Provides maintenance process
  - Provides some relief to district work burden
  - Simplifies repair process for emerging technologies by involving fewer parties
  - Addresses technological evolution and training
  - Uses existing ODOT diagnostic capabilities
Two-Tier Maintenance

- Advantages (cont.)
  - Improves statewide coordination for procurement and standardization
  - Allows for integration between design, operations and maintenance of ITS
Repair Prioritization

- Existing guidelines
  - Top five priorities
    » Emergency services
    » Draw bridges
    » Traffic signals
    » ODOT radio communications sites
    » Ports of entry and scales
  - All of these recommend 24 hr/7 day support
  - Not adequate for prioritizing ITS
Repair Prioritization

- ODOT Surveys
  - Regional flexibility was found to be important
  - Safety is a paramount concern
  - Geography is relevant
  - Device function is more critical than device type
Recommended priorities

- Fulfill legal mandates
- Address safety hazards
- Safety-critical devices (field devices first)
- Operations-critical devices (largest scale first)
- All other devices (greatest exposure first)
Resource Analysis

Resource Needs \( \rightarrow \) Resource Availability \( = \) Resource Gaps
Resource Needs

- Maintenance needs estimated at device and component level
  - Sensors
  - Communications
  - Field processor
  - Software
  - Center sub-systems
  - Information delivery
Resource Needs

■ Other considerations for resource needs
  – Preventative and repair maintenance
    » Visits per year, hours per visit, skill set
    » Multiple data sources
  – Employee classifications
  – Technological change
  – Minimal vendor support
  – Number of hours in FTE year
  – Travel time
Resource Availability

- Telephone interviews used at first, but...
  - Few people have 100 percent commitment to ITS maintenance
  - Lack of easily accessible tracking system
  - Trip-chaining by maintenance technicians
  - Overcommitment of people’s time
  - Deployment vs. maintenance time

- Therefore, job descriptions for ODOT staff were used
Resource Gaps

- Analysis revealed staffing gaps
  - In each region
  - In each skill set

- To continue to perform maintenance in-house through the end of the Strategic Plan, ODOT would need to add 2 FTEs per year to keep up
Gap Management

- Two alternatives for addressing resource gaps:
  - Enhance and develop resources within the organization
  - Rely on contract support

- The appropriate method may vary according to:
  - Device type
  - Geography
Training

Recommendations

- Require training on new procurement
- Provide in-house training on basic troubleshooting
- Maintain extensive repair capability on high-priority devices
- Minimize remedial training
- Pursue greater cross-training
  » Allocate time for training activities
- Give staff chance to use training
Contracting

- Recommendations
  - Provide performance specifications
  - Don’t necessarily use vendor
  - Multiple, concurrent contracts may lead to “finger pointing”
  - Short duration with renewal options
  - Consider cost of specialized equipment
Contracting

Recommendations (cont.)

- Price contracts may hinder long-term relationships
- Don’t restrain competition
  » Cost competition between ODOT and contractor
  » Subdivide activity between multiple contractors
- Some in-house expertise needed to assist new contractors
Contracting

Criteria for deciding when to contract

- Is a particular device especially critical to how ODOT plans to fulfill its mission to the traveling public?
- Does a particular device have a broad enough deployment around the state to make a contract economically viable?
- Could clear lines of responsibility between ODOT and the contractor be readily established?
Comprehensive Budget

- Components
  - Staffing
  - Contractors
  - Training
  - Spare parts
  - Emergency device replacement
  - Test/specialized equipment
Lessons Learned

- Stakeholder input is critical
- Need an agency champion
- Organizational issues are as critical as technical issues
- Geography is critical
- Device inventories are critical
- Maintenance should not be an afterthought
Q&A

- What are the major concerns with ITS and maintenance?
- Is a strategic plan needed?
- What models exist that could be used to plan better for maintenance needs and activities?
- What are the priorities?
- Are there resource needs and contracting models?
- What are the future research needs?
Future Research Activities

- Maintenance model evaluation
- Refine planning-level budgeting estimates based on actual maintenance experience
- Explore contracting issues beyond ITS maintenance