Where is the IT in ITS?

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Definitions

• **What is IT?** Information Technology
  – “A technologically implemented medium for recording, storing, and disseminating linguistic expressions, as well as for drawing conclusions from such expressions.”

• **What is ITS?** Intelligent Transportation Systems
  – “Electronics, communications, or information processing used singly or in combination to improve efficiency or safety of a surface transportation system”
    • *Transportation Equity Act for the 21st Century*, 1998
Challenges for putting the IT in ITS

• Challenges
  – Procurement
  – Security
  – Telecommunications
  – Differing priorities
  – Personnel
Challenge #1: Procurement (1)

- **The problem**
  - IT software acquisition rules sometimes hinder ITS deployment. Examples: Requirements for:
    - Low-bid contracts
    - Statewide list of approved equipment
    - IT office approval of equipment being purchased

- **What CIOs can do to help**
  - Consider exemptions to ITS software acquisition rules for ITS software.
    - Alternatives to low-bid
    - Consideration of equipment not on statewide list
    - **Timely approval** of purchase requests
  - Encourage use of systematic software development process.
Challenge #1: Procurement (2)

• The problem
  – Lack of IT recognition of the importance of legacy systems, low-tech options, and purchasing over leasing.

• What CIOs can do to help
  – Offer the DOT as much flexibility as they require.
    • Consider waivers to mandates of quick replacement of legacy systems.
    • Recognize that the newest technology is not always the best-suited for the agency.
    • Consider allowing purchasing over leasing when it best meets the agency’s needs.
Challenge #2: Security (1)

• The problem
  – Interdependence between security software and the DOT network as a whole.
    • One system can serve as a “back door” to the other.
      – Hackers can use the traffic management center software to get to the DOT network and obtain personnel data about DOT employees.
      – Hackers can use the DOT network to get to the traffic management center network and post malicious messages on the dynamic message signs.

• What CIOs can do to help
  – State clear security requirements that ITS software must meet.
Challenge #2: Security (1)

- Examples of hacked signs:

Florida

New York City, NY
Challenge #2: Security (2)

• The problem
  – Conversely, security requirements set by IT policies can sometimes be overly strict for ITS software.
    • Example: Not allowing remote access, when remote access can actually be key to restarting key ITS functions, such as dynamic message signs, in an emergency.

• What CIOs can do to help
  – Weigh security requirements against functionality needed by the ITS software.
Challenge #3: Telecommunications

• The problem – Typical scenario:
  – A state has already or is initiating a statewide communications network.
  – The DOT wants to use this network for ITS
    • e.g., traffic signal coordination or activation of dynamic message signs
  – The state IT office and the DOT have vastly different performance and security standards.

• What CIOs can do to help
  – Promote better inter-agency communication.
  – Be flexible. Seek solutions in which the needs of all parties can be at least partially accommodated.
Challenge #4: Differing priorities

• The problem
  – DOTs sometimes complain that IT offices lack understanding of how ITS is core to the DOT’s mission.

• What CIOs can do to help
  – Take a cooperative approach to ITS software procurement, including timely approvals and consideration of new technology options.
    • e.g., wireless communications
  – Recognize the urgency of emergency situations.
    • e.g., statewide traveler information website going down
  – Recognize the importance of keeping legacy systems up and running until new systems can be brought on line.
    • Continuity of operations is key to DOT.
Challenge #5: Personnel (1)

• The problem
  – DOTs have difficulty finding & retaining people in-house to develop, operate, and maintain ITS software.
    • Many agency personnel systems are set up to benefit civil engineers.
    • Training and certification opportunities are limited to civil engineering disciplines.
    • In-house IT staff become frustrated and leave the agency.
    • Agencies are forced to hire consultants at a much higher cost.
      – Sometimes, they hire ex-DOT employees who have recently quit.

• What CIOs can do to help
  – Encourage agencies to provide training and certification in IT disciplines to DOT personnel.
    • e.g., specifications writing, new software packages
  – Encourage agencies to provide alternate career paths for IT personnel.
Challenge #5: Personnel (2)

• The problem
  – DOTs have difficulty finding & retaining people to manage consultants who develop, operate, and maintain ITS software.
    • IT project management is different than construction project management.

• What CIOs can do to help
  – Offer training in IT project management to DOT personnel.
  – Consider helping the DOT in adopting a systematic software development process, such as Systems Engineering.
  – A good consultant should not be afraid to ask the agency: “Is this what you really want?”
  – Examples of successful agency-contractor projects:
    • Maryland CHART, Colorado CoTRIP, ongoing work in Oregon
Conclusions

• The challenges to putting the IT in ITS are many.
• And CIOs can be a big help in making ITS a reality in their states.
Resources

• ITS Benefits Database
  – www.itsbenefits.its.dot.gov
  – Over 200 entries profiling the documented benefits of ITS
    • Safety, mobility, efficiency, etc.

• ITS Costs Database
  – www.itscosts.its.dot.gov
  – Over 200 entries profiling the documented costs of ITS components and systems

• ITS Deployment Statistics Database
  – Results from surveys of over 2,000 transportation professionals on the extent of ITS deployment in the U.S.
Resources (cont.)

• ITS Lessons Learned Knowledge Resource
  – Advice to transportation professionals on how to design, deploy, operate, and maintain ITS
  – Covers many issues discussed: procurement, *intra-agency* communication and cooperation, *inter-agency* communication and cooperation, and human resources

• ITS/Operations Resource Guide
  – Over 400 documents, videos, websites, training courses, software tools, and points of contact to help with operations and ITS deployment
  – Covers many issues discussed, such as *procurement* and *telecommunications*
• FHWA Systems Engineering Website
  – Compilation of resources pertaining to **Systems Engineering**:  
    • Training courses  
    • Publications, including the **Systems Engineering Guidebook**