Applying Past Experience To Achieve Future Success

Industry Forum on Connected Vehicles

Chicago, IL

September 27, 2012

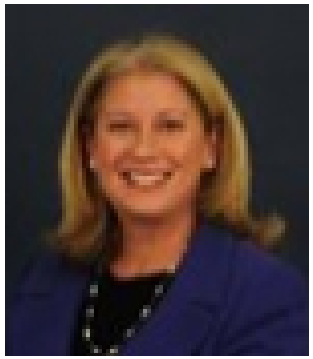
James Pol and Marcia Pincus
ITS Joint Program Office

Welcome

Workshop Objectives:

- Promote a lively discussion of the next generation of ITS
- Learn from past experiences in ITS deployment – the good, the bad, and the unexpected
- Tell us what you need to achieve future success of Connected Vehicle environment

James Pol



Marcia Pincus

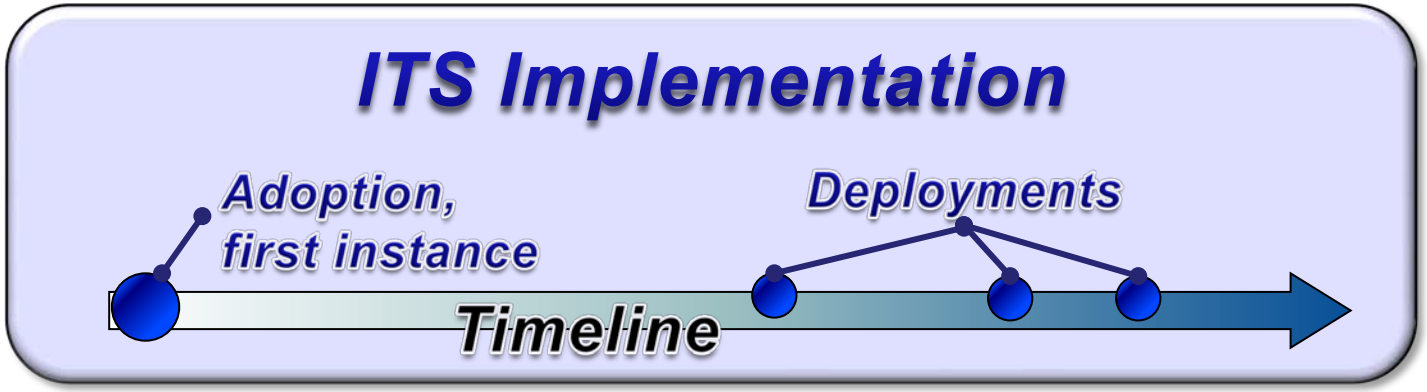
Join the conversation

Three words to share about Connected Vehicles

- Jot down up to three words (one per note card) that come to mind when you think of the Connected Vehicle environment.
- The facilitators will collect your note cards to post on our Connected Vehicle Word Wall.
- Webinar participants: type your three words into the chat box.

Common Definitions

- Implementation – The strategy and activities to apply technology to satisfy specific needs.
- Adoption – First instance of technology selection and application.
- Deployment – Continued application and expanded use of technology.



Study of ITS Implementation Factors

Objectives:

- Identify motivating factors for adopting and expanding use of ITS technology.
- Determine if continued implementation produced measurable effects.
- Understand what information best supports decision-makers needs and how to deliver it.
- Suggest actions the U.S. DOT can take to accelerate ITS technology adoption and deployment. Examine applicability toward connected vehicle technology and next generation ITS.

Study of ITS Implementation

Conducted by Noblis

Vaishali Shah

Greg Hatcher

Elizabeth Greer

noblis
For the best of reasons

Study of ITS Implementation Factors

Four Stages

Lit Review

- Findings from review of literature on technology innovation
- Factors influencing ITS adoption
- Factors influencing ITS deployment

April 2012

Stakeholder Interviews

- Fill gaps and validate motivating factors
- Prioritize decision factors
- Webinar

June-Oct 2012

Post-Hoc Data Analysis

- How do deployment levels, costs, and benefits evolve over time?

Fall 2012

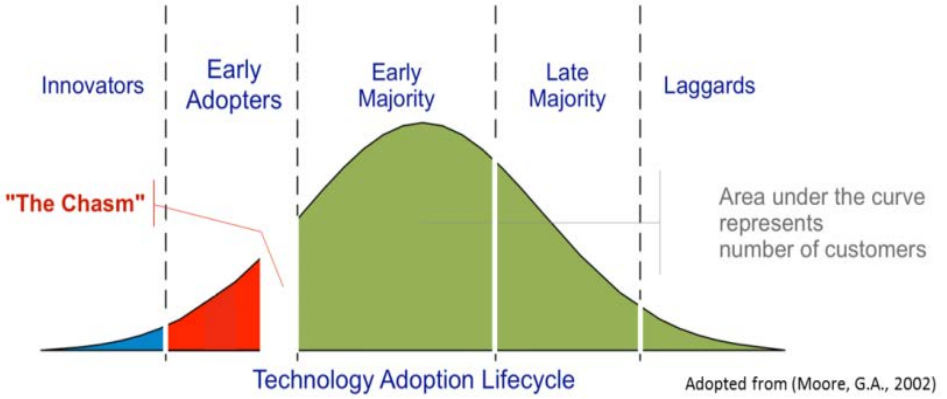
Workshop & Suggested Actions

- Considerations for future ITS policy and initiatives

Preliminary Research Results

Conclusion: Peer influence more significant now than with the first wave of early ITS adopters.

- Many agencies look to their regional peers for the 'right fit' in implementing ITS.
- ITS innovation is happening in many areas, but documented benefits specific to regional characteristics can be lacking.
- Multi-state coordination plays a significant role in accelerating of ITS deployment as in the case with 511.



Preliminary Research Results

Conclusion: Compatibility and interoperability become more critical as ITS installed base increases.

- Compatibility was the second most frequent decision factor cited (26%) based on the webinar polling.
- Looking back at 15 years of ITS, deployers are very concerned about existing systems working together.
- Interoperability is now a consideration locally, regionally, statewide, and between states.

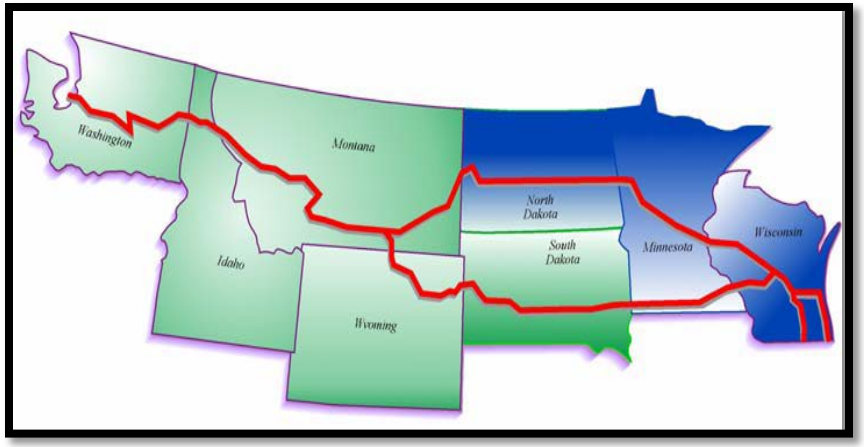
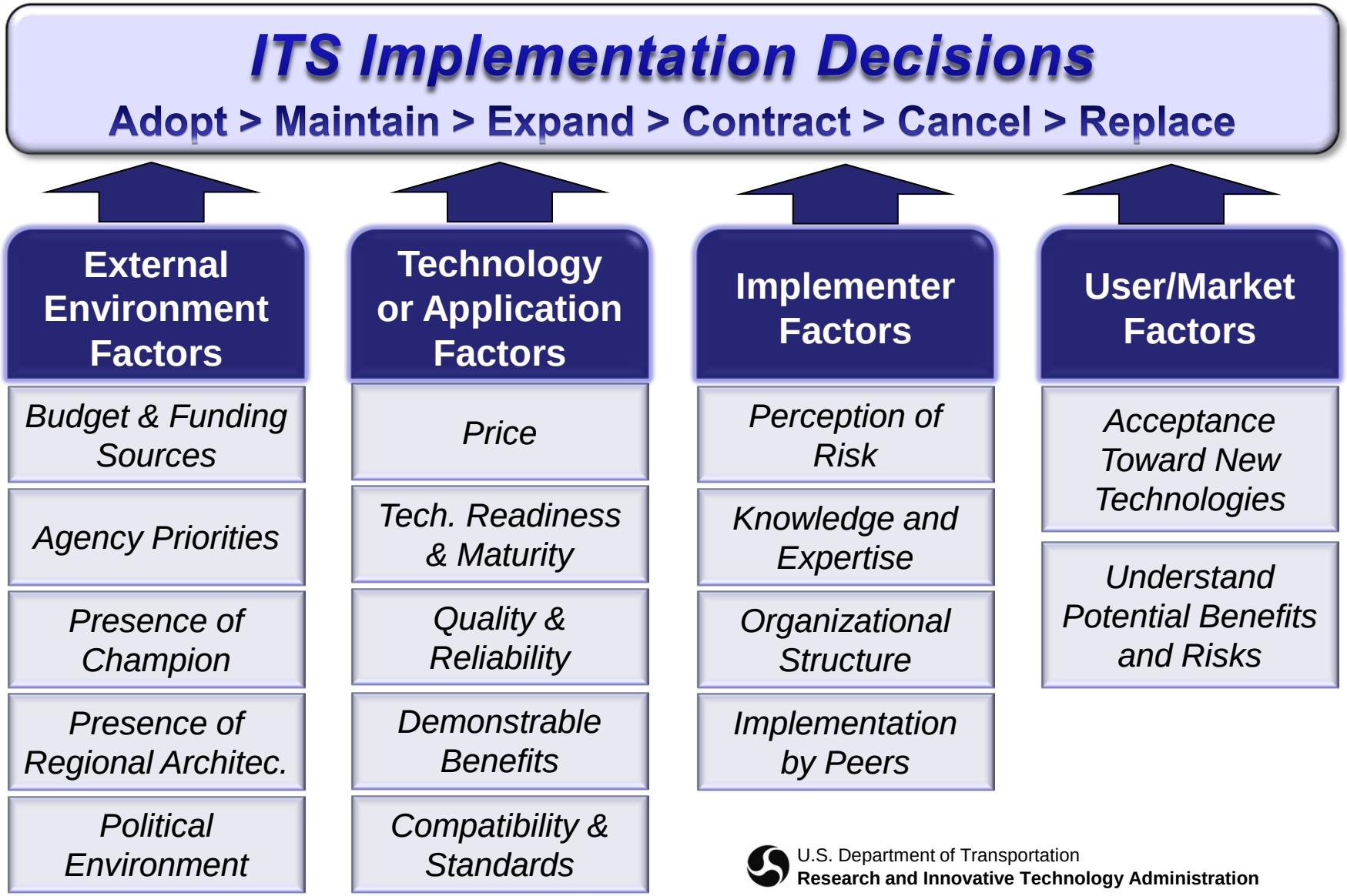


Image: Northwest Passage Pooled Fund Study

Key Decision Factors



Steps in the ITS Implementation Process

Initiation

What is the problem, and how do we solve it?

Generation of ideas, shocks and triggers that initiated the development or consideration of a technology

Development

Will the solution work, Does it need changes?

Valuation of ideas, development, evaluation, modifications to prototype, fluid participation by stakeholders and top management, and financing

Deployment

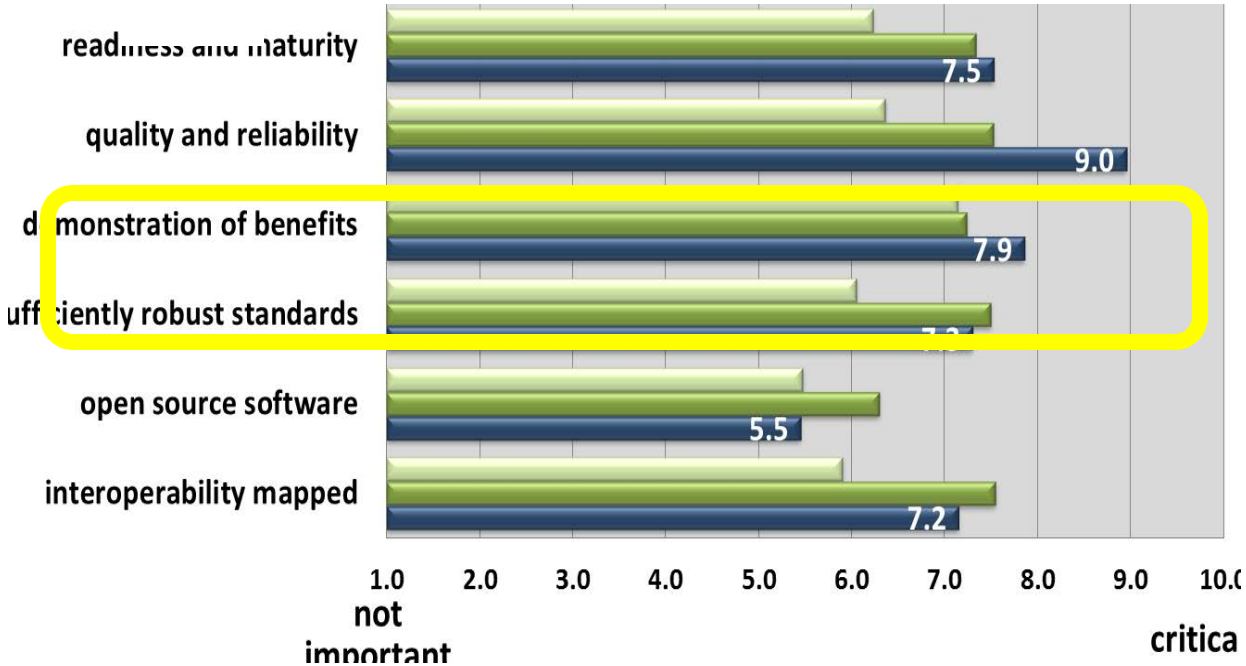
Get the solution on the ground and use effectively.

Fielding systems, integrating new with the old, developing user expertise

Preliminary Results – Technology Factors

The importance of decision factors changes from initiation to development through deployment or adoption of a technology.

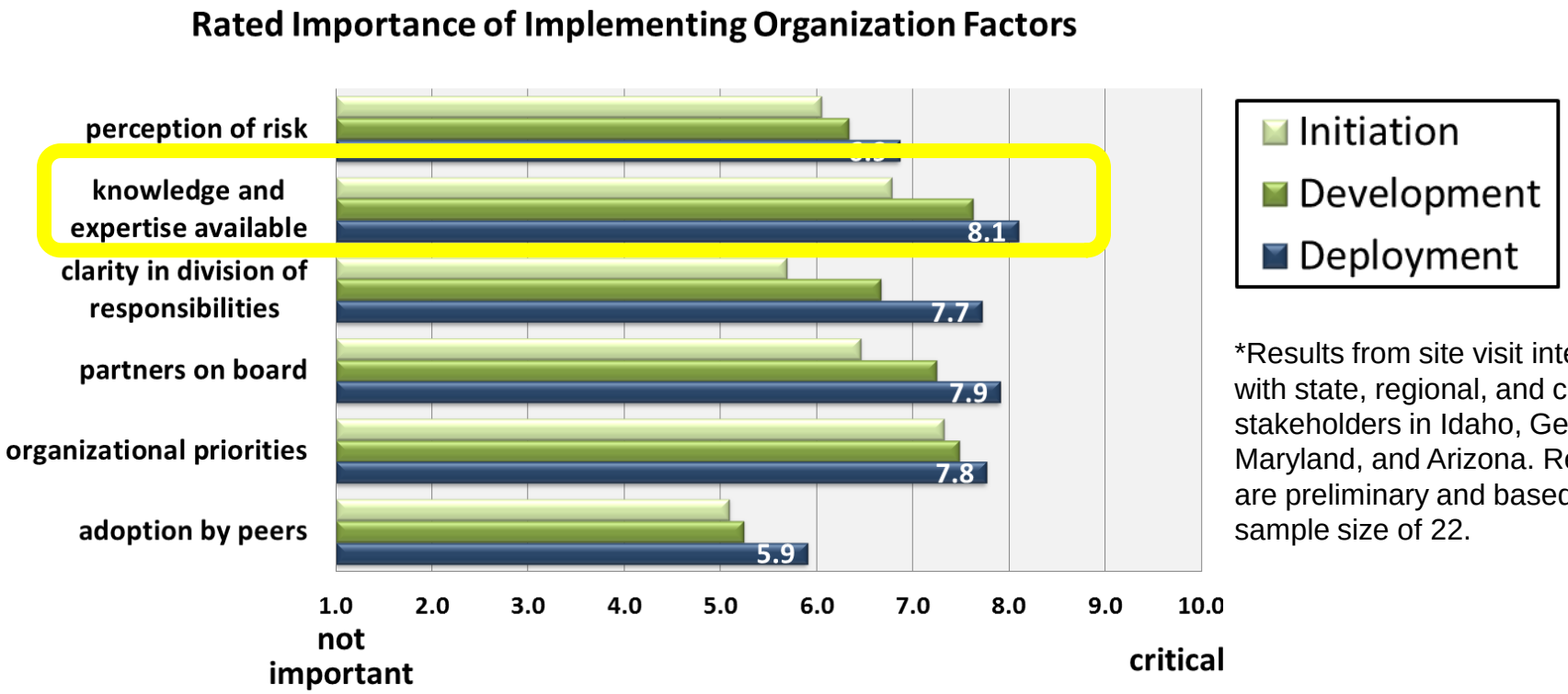
- ***Most important during the initiation phase is demonstration of benefits.***
- ***Quality & reliability are overall the most important technology factors.***
- ***Price is among the least critical of 7 technology factors.***



*Results from site visit interviews with state, regional, and city stakeholders in Idaho, Georgia, Maryland, and Arizona. Results are preliminary and based on sample size of 22.

Preliminary Results – Implementer Factors

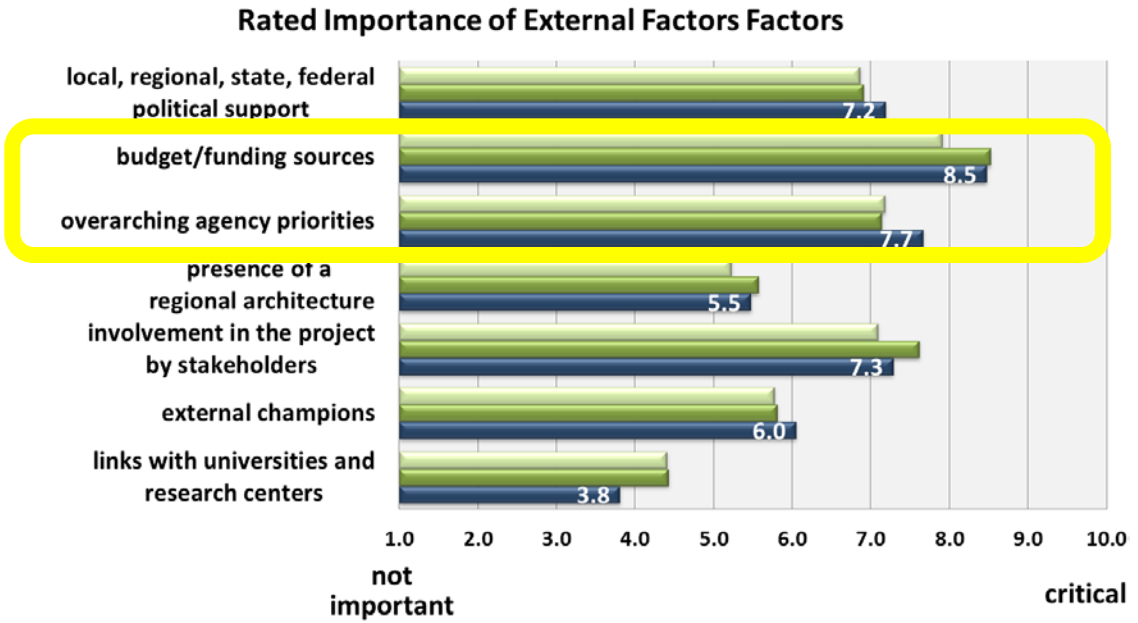
- ***With ITS mainstreamed, knowledgeable and skilled workforce are cited as most critical to ITS implementation.***



*Results from site visit interviews with state, regional, and city stakeholders in Idaho, Georgia, Maryland, and Arizona. Results are preliminary and based on sample size of 22.

Preliminary Results – External Factors

- Securing sources of funding is the most critical organizational factor for ITS implementation.
- To succeed, the project must be well aligned with overarching agency priorities, and stakeholders must be involved through all phases of the implementation.

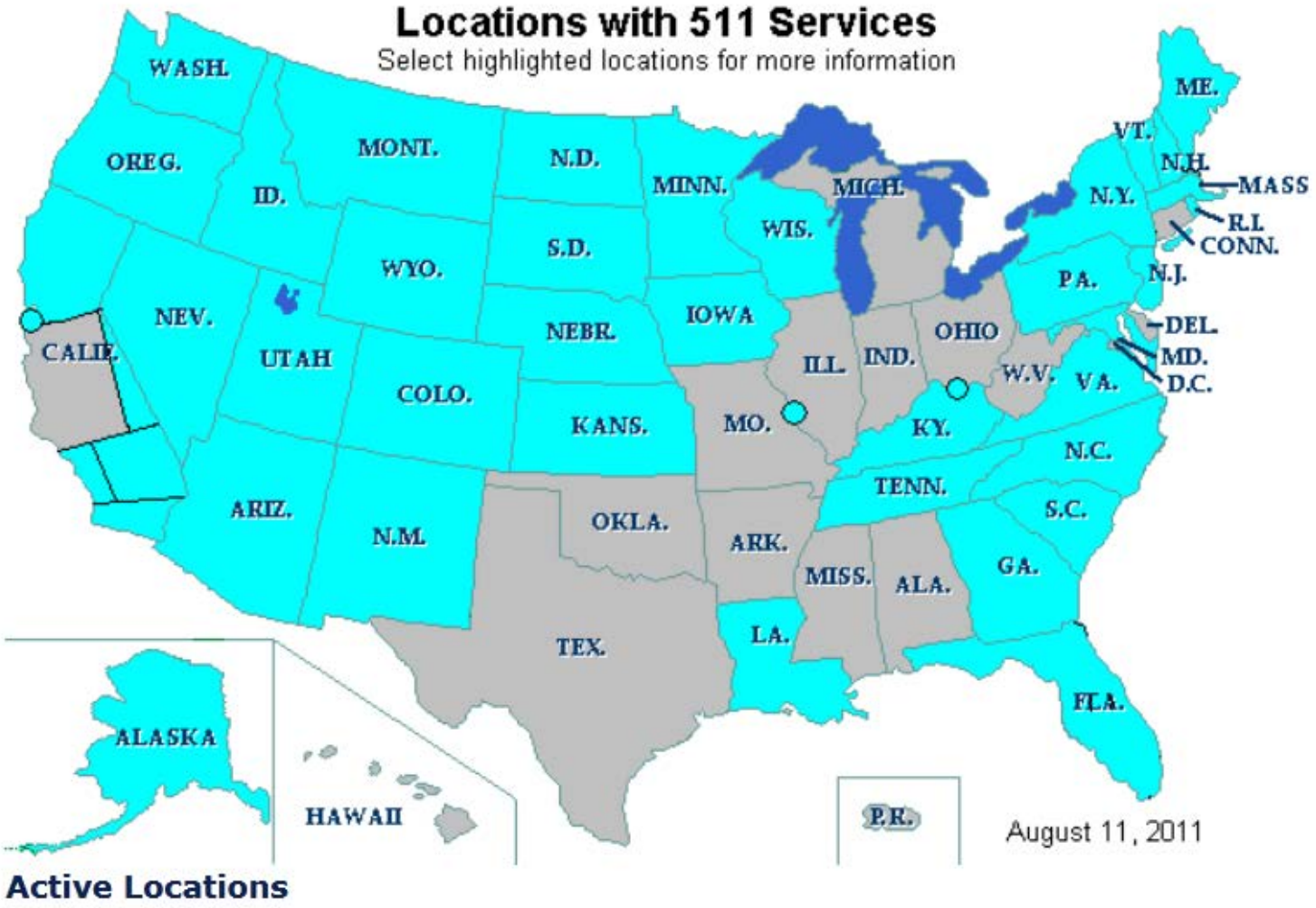


*Results from site visit interviews with state, regional, and city stakeholders in Idaho, Georgia, Maryland, and Arizona. Results are preliminary and based on sample size of 22.

Case Study: 511 Initiative

- Pre 2000 - various disconnected, local traveler information phone numbers
- July 21, 2000 - the Federal Communications Commission (FCC) designated 511 as the single travel information telephone number to be made available to states & local jurisdictions across the country
- Organic growth in deployment without a significant gap from early adopters to early majority

Case Study: 511 Travel Information Telephone Services Deployment



Factors Contributing to 511 Success

- Strong Coalition with support from AASHTO, ITS America, APTA, and U.S. DOT that:
  - Provided a peer network for deployment
  - Championed a vibrant branding effort
  - Developed standards and technical guidance
- User Needs Focused
  - Systems developed to address end user
  - Coordination of traveler information across modes
  - Common branding – recognizable across jurisdictions
  - Success was visible and measurable
- Planning Assistance Program
  - Help defray the costs associated with converting existing traveler information telephone numbers to 511
  - Help agencies plan for 511 systems and fill gaps in 511 planning

Top 5 Lessons Looking to Connected Vehicles

5. Recognize that **unforeseen shortcomings of new systems may result in long-term risk aversion**, pushing innovators and early adopters toward the late majority for technology acquisition.

4. Demonstrations should engage diverse constituents in terms of modality, levels of congestion, and size of deployment to **establish a robust peer group** for market share growth.

3. To more effectively initiate technology implementation, **clearly define and publicize the benefits** cases for connected vehicle as the first step followed by price, interoperability or other features.

2. **Develop a strong coalition** for education and information dissemination through PCB, AASHTO, APTA, and other media to inform the public sector, trucking industry, and end users.

1. **Leverage funding models** in fostering the innovation and early adoption while establishing a users group.

Poll Results

Break

- Please return in 15 minutes.

Case Study: Bluetooth Implementation

Bob Koeberlein, P.E.

Mobility Services Engineer

Idaho Transportation Department

Robert.Koeberlein@itd.idaho.gov

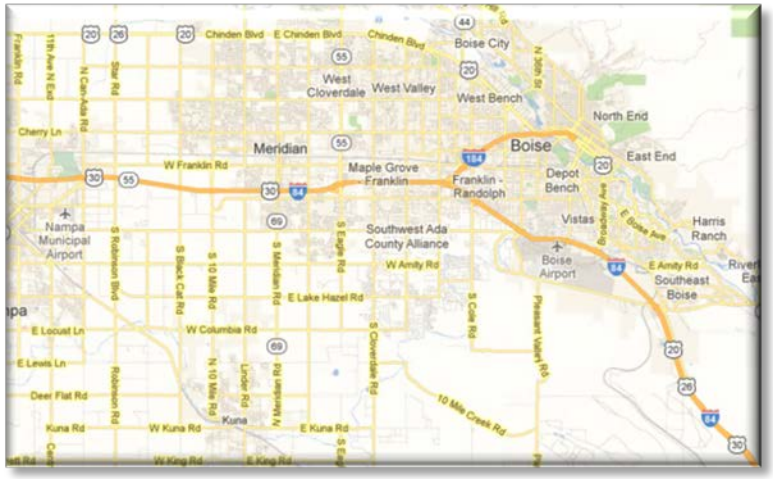
ITS Implementation Process at ITD

- Needs are identified typically through the ITS Strategic Plan and architecture development.
- Projects are proposed by HQ or the Districts in the annual update to the 5 year Surface Transportation Improvement Program (STIP).
- The STIP is released for public comment, approved by the Transportation Board, and then approved by Idaho FHWA office.
- We typically use the Term Agreement (pre-qualified on-call list) for consultant design services.
- We use either a low bid approach or a best value approach for ITS projects.

Low Bid	Best Value
DMS	RWIS
HAR	ITS Control Software

Freeway Monitoring Implementation – 1 of 2

- In 2009, ITD started a pilot project to quantify freeway congestion in the Boise area (I-84 and I-184) supporting two goals:
  - Performance monitoring
  - Traveler information
- Contract with a 3rd party data provider was executed.



I-84 and I-184 Highway Corridors in Boise, Idaho

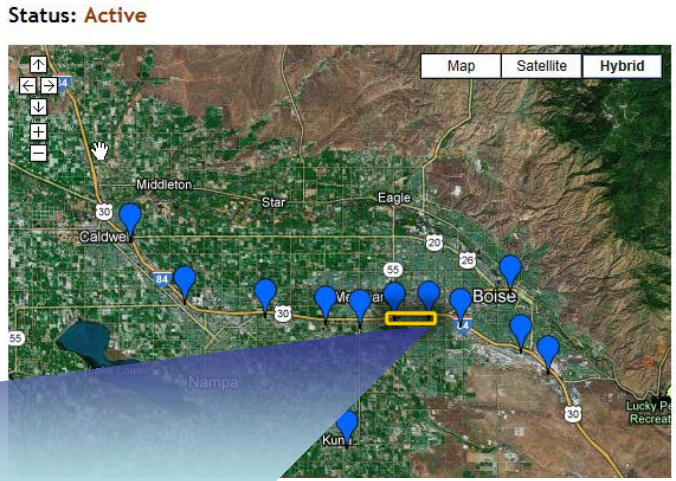
- After several months of study, the team concluded that the data service was not meeting ITD needs due to data round off and defaulting to historical data.

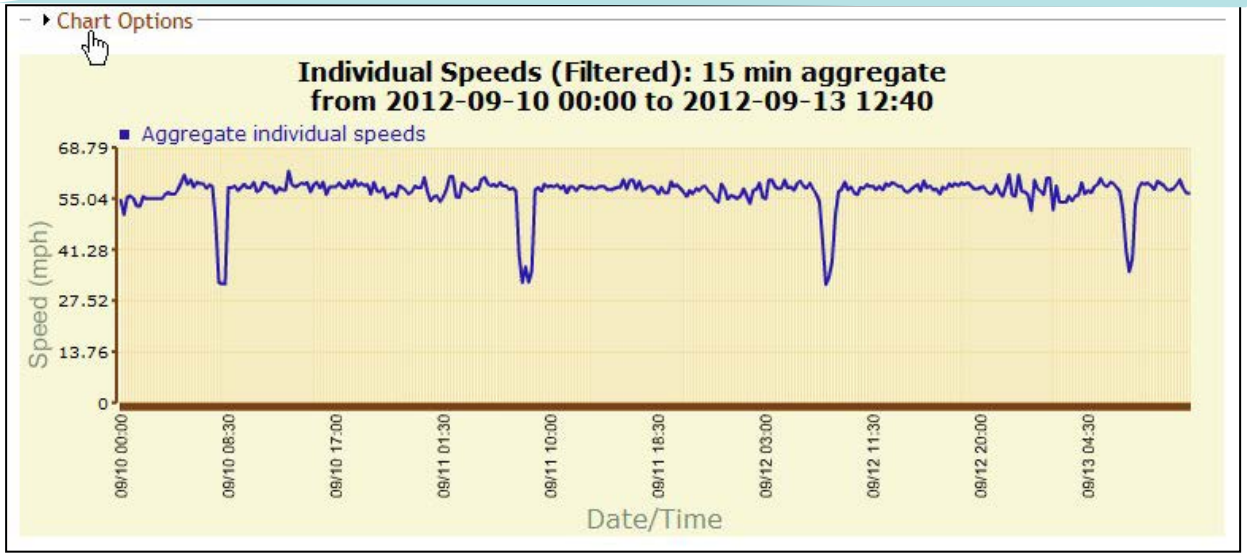
Freeway Monitoring Implementation – 2 of 2

- **The team decided to evaluate a Bluetooth data collection approach**.
- RFP was advertised and a vendor selected to furnish 10 units plus the data service.
- System implementation occurred in 2011.
- After initial problems were resolved, data collection is going well.

Bluetooth Detector with Cellular Communications and Solar Power

Bluetooth Detectors on I-84/I-184





ITD Current ITS Project Priorities

- HQ office is assuming more of a support role for ITS. Project initiation coming from the district offices.
- RWIS sites have become a priority with the district offices.
  - Technology supports performance measures, winter maintenance, and winter mobility.
- Funding for planned HAR and DMS projects in FY12 and FY13 has been redirected to expanding the RWIS network.

Adaptive Signal Control Project

- Ada County Highway District (ACHD) deployment of ITS by ‘opportunity’
- 20-intersection / $1M adaptive signal system
- Selected in Feb 2012
- 2013 deployment goal
- Involved local, federal, and other funding streams

Walk-In DMS on US 95 in North Idaho

Non Invasive Pavement Sensors

Case Study: Last Mile Comm. Deployment

Bruce Dressel

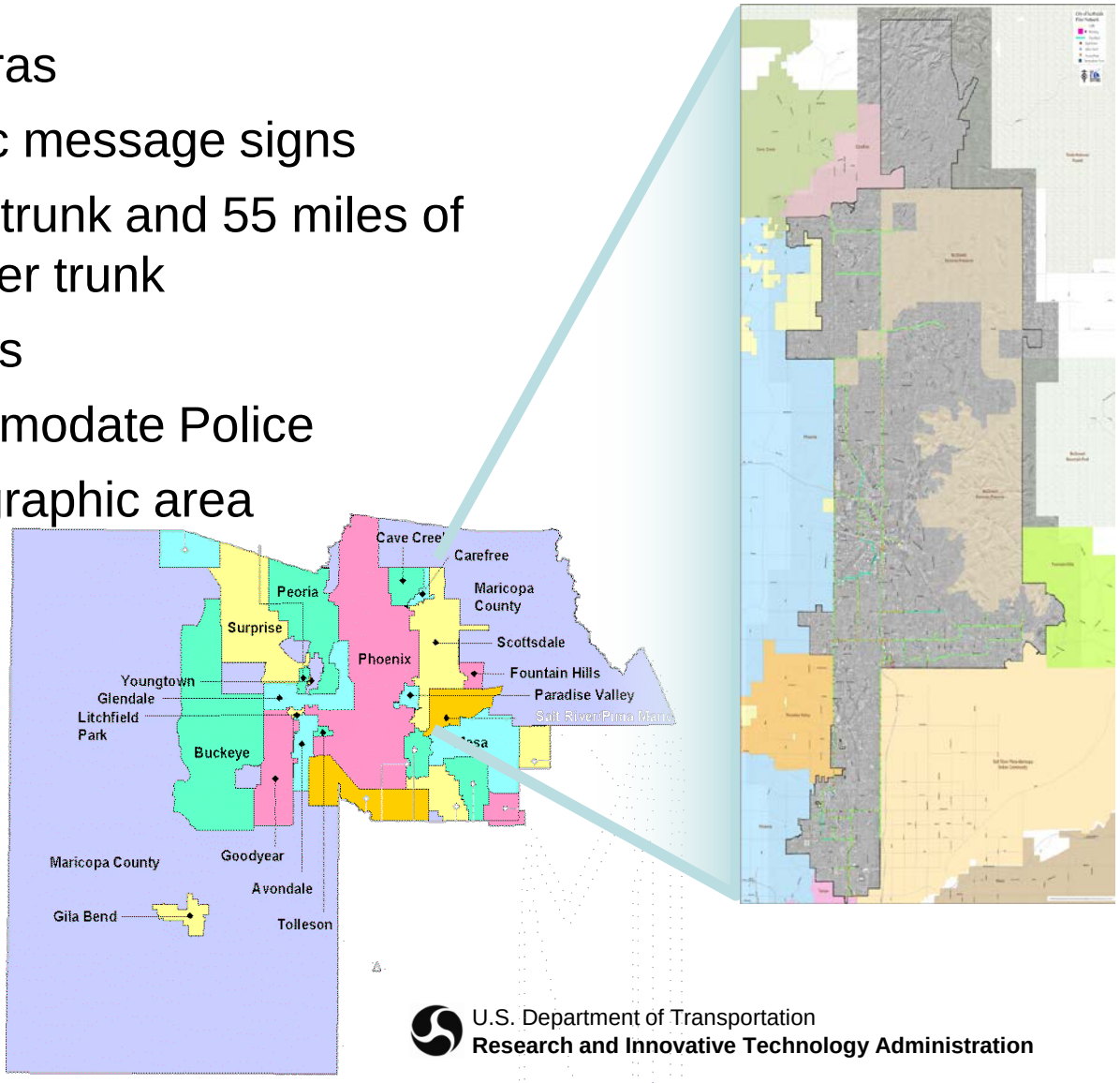
ITS Manager

City of Scottsdale, Arizona

bdressel@scottsdaleaz.gov

City of Scottsdale – by the Numbers

- 86 CCTV Cameras
- 35 fixed dynamic message signs
- 65 miles of fiber trunk and 55 miles of public/private fiber trunk
- 300 traffic signals
- TMC can accommodate Police
- Very “long” geographic area



The Communications Challenge

- City faced with 10-15% cuts in operations budget
- Leased phone contract to reach 70 ‘last mile’ signals costing $21K/month
- Existing phone lines did not have capacity for video, or would need upgrading at higher monthly costs
- For years, the TMC was looking for better solutions to the “last mile” of communications but not finding systems that met needs.

The Last Mile Communications - Exploration

- In 2009, we contacted seven radio vendors for equipment and bandwidth (4 MB) requirements.
- Tested 2 vendors for 1 year at 7 locations along a segment of roadway.
- Project went through Capital Funds Committee to secure $800K cost for radio system.
  - City of Scottsdale Bond 2000 program totaling $358.2 million worth of capital improvement projects has ITS line item.
  - Scottsdale has a 2% transportation sales tax which helped defer the cost of implementation.
- Project put out to bid. The vendor provides the radios and the city installs it.

The Last Mile Communications Deployment

- 140 radios purchased through a federal contract which replaced leased telephone lines to the traffic signals.
- Oct 2011 began implementation of radio. Completion of the system is expected Dec 2012.
- Expected M&O costs for system is $15K annually for replacement of device failures.
- Breakeven costs within 4 years, significant savings going forward.

Growth of ITS in Scottsdale

- Management is supportive of ITS, and the ITS department does not usually have trouble securing project funding.
- Given current constrained economic environment, the ITS department has shelved a few other projects.
- This Last Mile project was an easy sell.

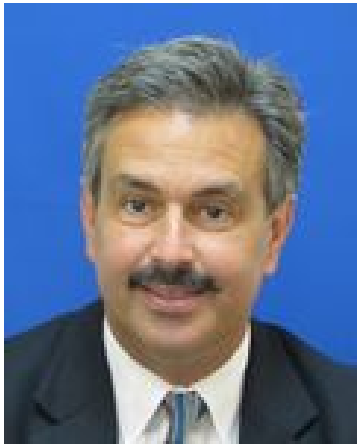
ITS Communications Network Considerations

- All ITS devices need a complete communications infrastructure.
- The last mile connections are often the most expensive.
- The bandwidth usually remains the same for the last mile.
- Determining bandwidth requirements is imperative, consider all potential partners.

Questions

NCHRP 03-101: Costs and Benefits of Public Sector Vehicle to Infrastructure Deployment

Preliminary Results



Taso Zografos, SAIC

Panel Discussion

Bill Ball
Merriweather Advisors

Dan Murray
ATRI

Jim Wright
AASHTO

Taso Zografos
SAIC

James Pol, USDOT
Moderator

Panel Discussion: Connected Vehicle Implications

- *What are the similarities and differences in the deployment decisions for ITS today vs. connected vehicle environment of tomorrow?*
- *What is the transferability of the decision factors from traditional ITS applications and technologies to a connected vehicle environment?*
- *What are the roles of various actors in the connected vehicle environment: consumers, automobile manufacturers, commercial vehicle industry, state and local transportation agencies?*

Lunch Break

- Please return by 12:55 pm to begin breakout sessions:
  - Group A to Room **Skyway 272**
  - Group B to Room **Skyway 273**
  - Group C stays in **Auditorium**
- Thank you for your cooperation.

Discussion Session 1

- Break into three groups to consider the following questions:

1. *What is the perceived value your organization expects to get from a Connected Vehicle environment and what is your organization willing to invest to create this value?*
2. *What barriers do you or your organization perceive with respect to making a Connected Vehicle Environment happen?*

- Rank barriers if time allows

Please move to next session

- Move with your group to the next session:
  - Group A to Room **Skyway 273**
  - Group B to **Auditorium**
  - Group C to **Skyway 272**

Discussion Session 2

- Move as a group to the next room to consider the following questions:

1. *How can you or your organization overcome barriers for creating the connected Vehicle environment and what will it take to create this environment?*
   - Take your HIGH Barriers and brainstorm ways to overcome then.

2. *What past experience can you or your organization apply to achieve future success in creating the connected vehicle environment?*
   - Propose ownership of recommended actions.

- Report out

Let's take the poll again

Question 1:

How do you rate the probability of a Connected Vehicle Environment being established in the next 15 years?

A. Greater than 50%
B. Less than 50%

Question 2:

Do you think the factors necessary to invest in the connected vehicle environment are being considered?

A. YES
B. NO

Break

- Please return in 15 minutes.

Report on major themes

New Poll Results