



SHRP2 SOLUTIONS
STRATEGIC HIGHWAY RESEARCH PROGRAM

Gummada Murthy

Associate Program Director, Operations
AASHTO

ITS America
April 23, 2013

U.S. Department of Transportation
Federal Highway Administration

American Association of State Highway and Transportation Officials
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Today's Agenda

- SHRP2 Overview
  - Gummada Murthy, AASHTO
- Operating for Reliability Tools
  - Jennifer Toth, Arizona DOT
- Testing SHRP2 Reliability Tools
  - Dr. Mohammed Hadi, FIU
- Other Reliability Tools + the AASHTO Role
  - John Corbin, Wisconsin DOT
- FHWA's SHRP2 Implementation Plan
  - Robert Arnold, FHWA

What is SHRP2?

Save lives. Save money. Save time.

- Multi-million dollar, federally funded research program to address critical transportation challenges:
  - Making highways safer
  - Fixing deteriorating infrastructure
  - Reducing congestion

- Collaborative effort of AASHTO, FHWA, and TRB

- Aims to advance innovative ways to plan, renew, operate, and improve safety on the Nation's highways

Turning Research into Every Day Practice

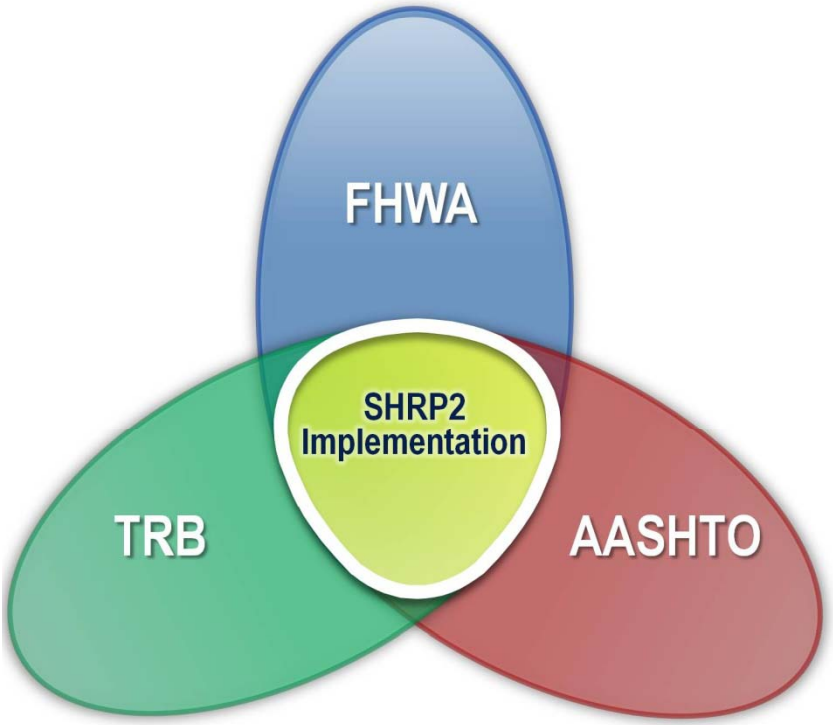
- For past two years, SHRP2 research has been wrapping up and implementation gearing up
- Products include:
  - Guides
  - Software tools
  - New processes
  - Technologies and Tools
  - Testing procedures
  - Safety data

Who will benefit?

- Motorists
- State/local transportation agencies
- Metropolitan planning organizations
- Highway designers, suppliers, and construction contractors
- Freight industry
- Environmental agencies
- Communities and businesses
- Emergency medical services
- Railroads

Efforts are Collaborative

- Implementation is cooperative
  It engages:
  - AASHTO
  - FHWA
  - SHRP2/TRB staff
- States are the customers of AASHTO implementation
- FHWA, TRB also serve locals, academia, MPOs



Prioritizing States' Needs

- AASHTO's role is focused on identifying which products meet the states' practical needs
- We are relying on members and committees to define how implementation can be successful

Focus Areas

Safety: fostering safer driving through analysis of driver, roadway and vehicle factors in crashes, near crashes, and ordinary driving

Renewal: maintaining and repairing the deteriorating infrastructure using already-available resources

Reliability: managing non-recurring events to create more predictable travel times

Capacity: building a highway system that creates minimum disruption and meets the environmental, and economic needs of the community

Reliability Focus Area

Management and technical tools to improve traffic operations and reduce congestion; managing non-recurring events to create more predictable travel times.

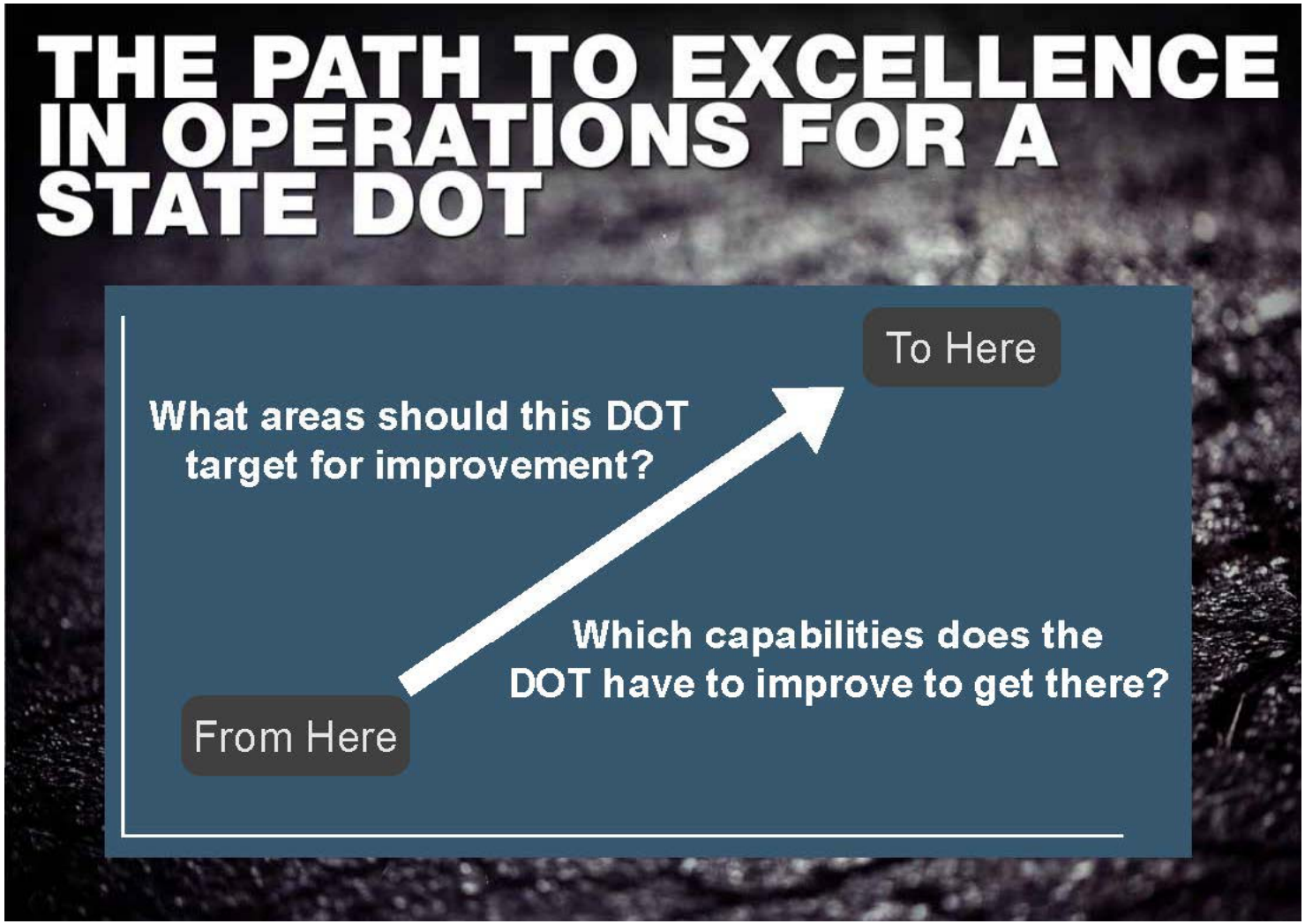
PRODUCTS ADDRESS:

Monitoring and management of travel-time reliability; reliability in planning, programming, and geometric design; coordinated incident management; organizing transportation agencies to improve reliability and prepare for future needs

BENEFITS:

- Predictable travel times
- Reduced congestion
- Improved safety through rapid incident resolution

Strategic Implementation of Reliability Products



Strategic Approaches for SHRP2 Reliability Implementation

- **Organizing for Reliability**
  - L06 CMM workshops for DOTs and MPOs
  - Support for implementation of agency action plan

- TIM Training (L12, L32b, L32c)
- Knowledge Transfer (L17)
  - Gap filling projects
  - Communications tools
  - Data archive (L13A)
  - Regional operations forums (L36)
- Reliability Analysis Tools
  - Reliability Monitoring (L02)
  - Planning and Program (L05)
  - Reliability Design (L07)
  - HCM (L08)
- Organizing for Reliability
  - Business Process (L01/L34)
  - Workshop materials (L31)
- Other Products
  - Modeling tools (L04)
  - Economic evaluation models (L11)
  - Traveler information (L14)

- **Individual Product Implementation: DOTs, MPOs, Cities, Counties**
  - Single or multiple product implementation

SHRP2 Plan of Action

Opportunities for implementation assistance

- Proof of concept pilots
- Lead adopter incentives
- User incentives

Timeline

- Application process through FHWA
  - First round solicitation of interest ended March 22, 2013
  - Reviews and awards (late Spring)
  - Second round in summer/fall 2013

Reliability Product Timeline

Organizational Assessment and Leadership to Improve Operations (L01/06)	**2013**
Online Knowledge Transfer System (L17)	**2013**
Reliability Analysis Tools (L02/L05/L08)	**2014**
Regional Operations Forum (L36)	**2014**





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Organizing for Reliability

Jennifer Toth
Deputy Director for Transportation/State Engineer
Arizona Department of Transportation

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April 23, 2013

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SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Organizing to Improve Operations

- Suite of tools to generate systematic approach to improve operational capabilities through:
  - Systems Operations & Management Capability Improvement Workshops and
  - Integrating Business Processes to Improve Reliability

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Organizing to Improve Operations

PROBLEM:

>50% of congestion is caused by weather, crashes, special events, and other unforeseen factors

Agencies need better tools to holistically address non-recurrent congestion

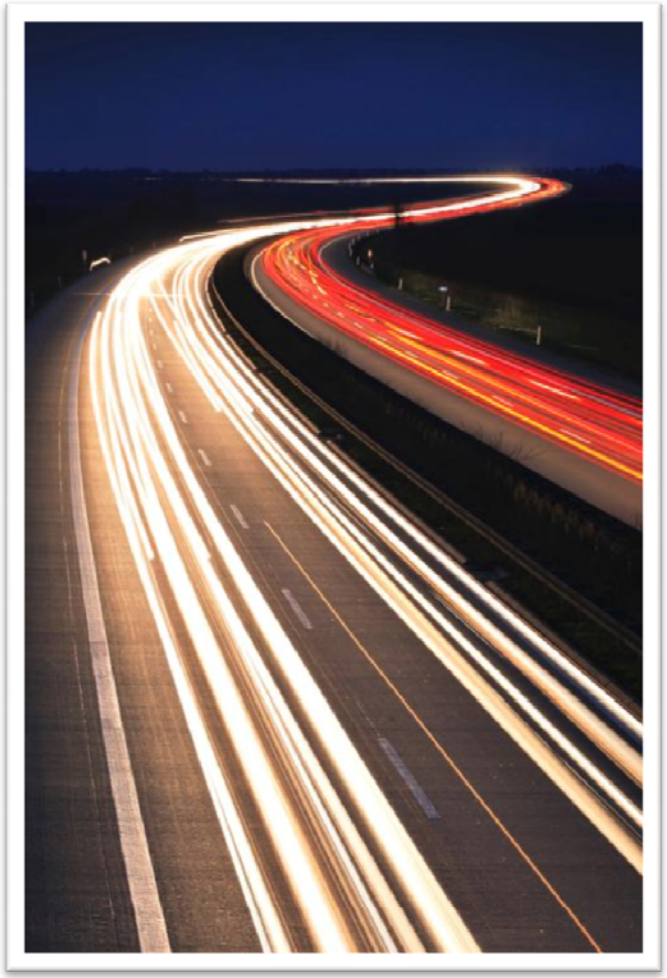
SOLUTION:

Comprehensive approach that includes an assessment tool, guide, training, and case studies to optimize systems operations

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Organizing to Improve Operations – The Benefits

- Tailored approach to making operational changes that result in the greatest gains
- Fewer closures and delays through identifying and resolving potential issues in advance
- More predictable travel times save motorists time and money



SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Four-step Process

Outreach

- Creating awareness and interest in developing and sustaining operations as a core business function

Assessment

- Analyzing of needs and potential business process strategies to address key organization issues and institutional gaps impacting travel-time reliability

Development

- Creating an action plan with specific steps to improve operational efficiency and effectiveness

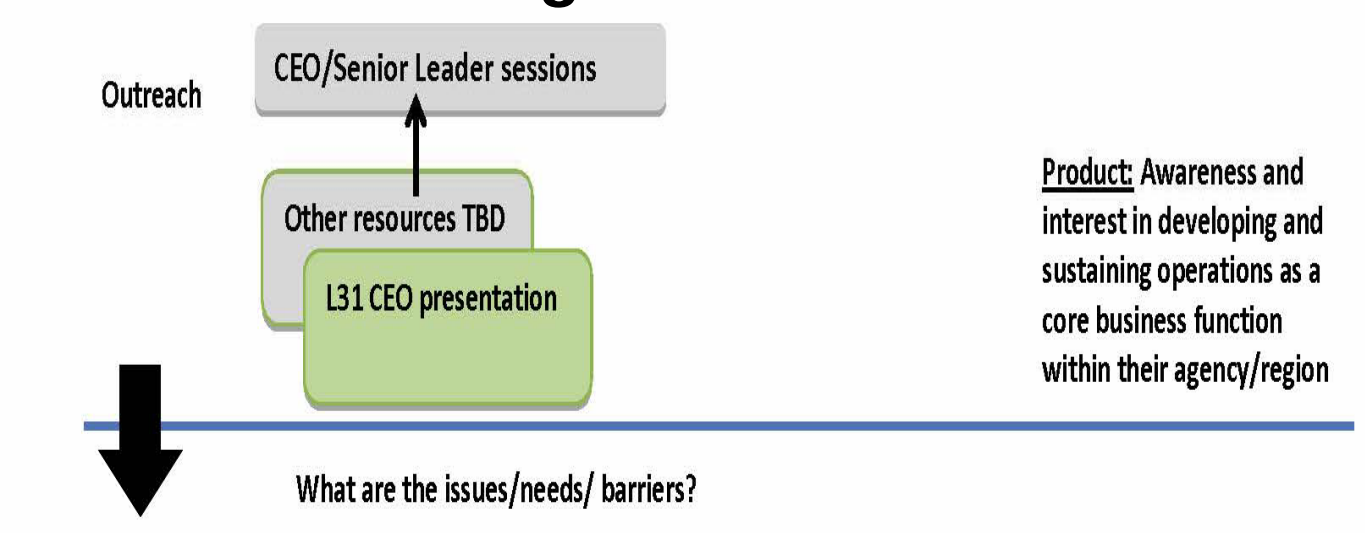
Implementation

- Delivering action plan and measuring progress

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Implementation Approach

Level 1 Outreach Strategies

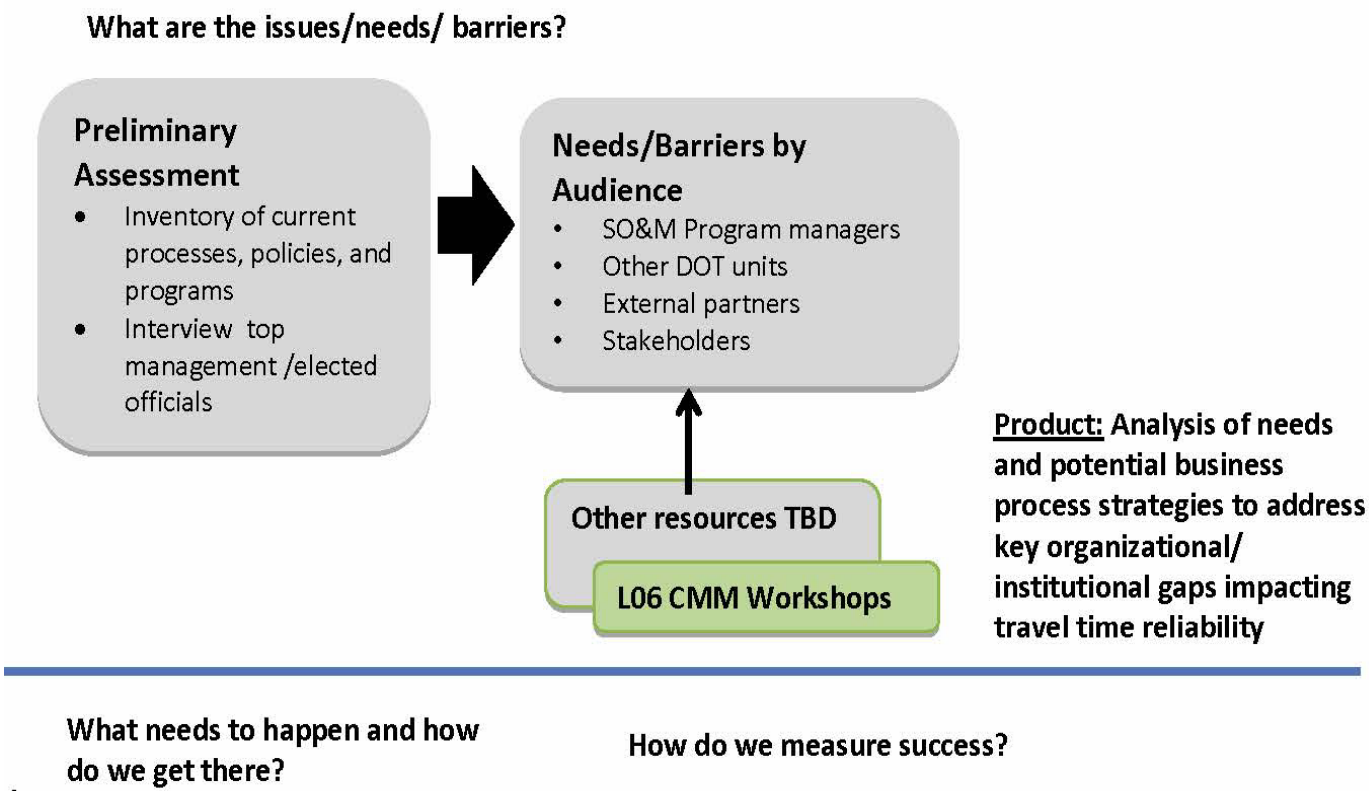


- **Provide CEO/executives an understanding of what this approach has to offer and gain their interest in serving as an initial implementer**
- **Gain commitment from CEO/executives and key staff and stakeholders**

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Implementation Approach

Level 2 Assessment Strategies

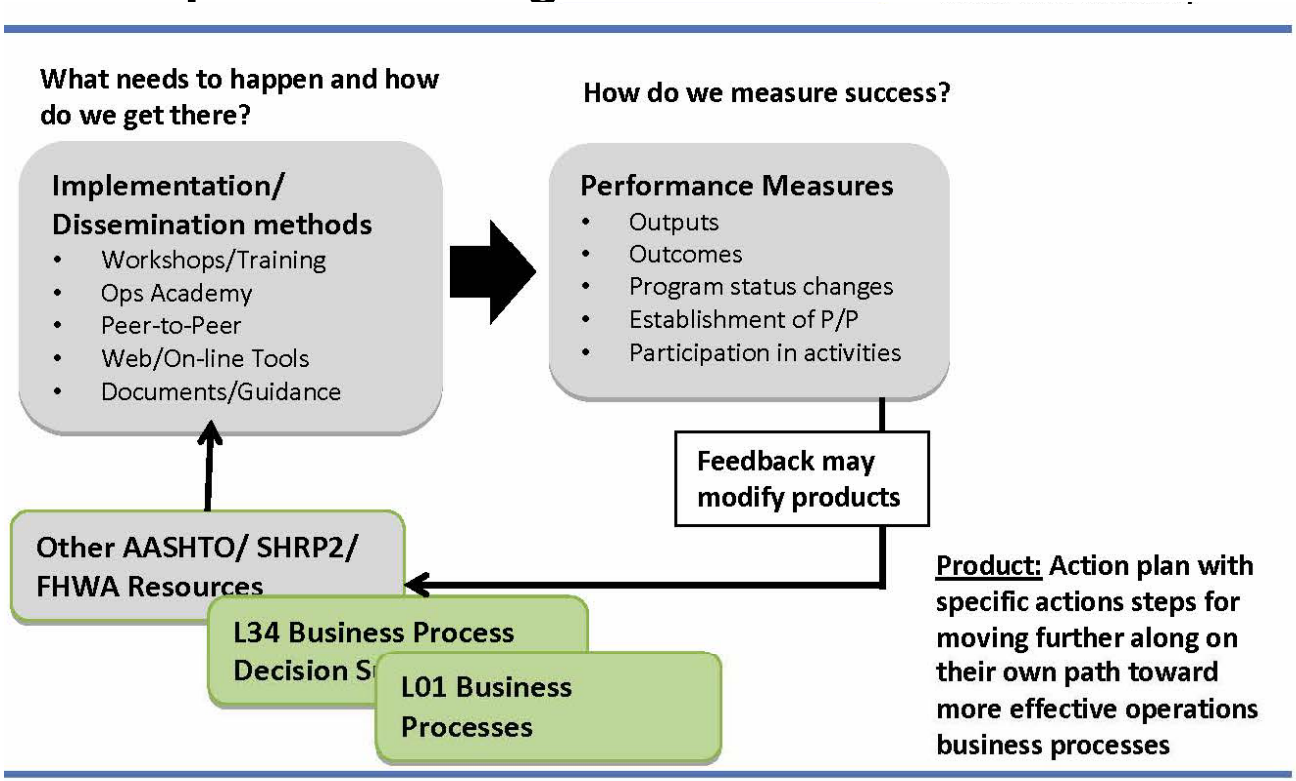


Assess the organizational maturity of agency/region

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Implementation Approach

Level 3 Development Strategies

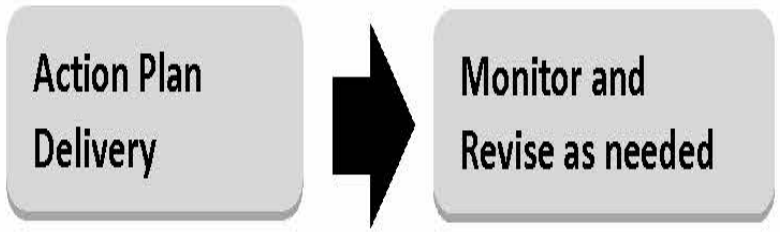


Develop an action plan to improve the agency/region level of operations capability

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Implementation Approach

Level 4 Implementation Strategies



Product: Measured progress toward being more effective and sustained operations programs

Deliver resources to improve processes, garner support of leadership to continue funding the program, and foster relationships among the various stakeholder groups involved in operating the systems

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD





SHRP2 SOLUTIONS

STRATEGIC HIGHWAY RESEARCH PROGRAM

Pilot Testing of SHRP 2 Reliability Data and Analytical Products

April 23, 2013

Mohammed Hadi, Ph.D., P.E.

U.S. Department of Transportation
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Pilot testing the data and analytical products of the Reliability focus area (L38)

- Pilot test the use of tools and procedures from five SHRP 2 projects to support planning and programming decisions
- Objectives are:
  - Assist agencies in moving reliability into agency business practices through testing of data integration and tools developed by SHRP2
  - Provide feedback to SHRP2 on the applicability and usefulness (benefits and value) of the products tested and suggest potential refinements

Products to be Tested

Data	Analysis	Prioritization
Project L02: Establishing Monitoring Programs for Travel Time Reliability	**Project L07:** Evaluation of the Costs and Effectiveness of Highway Design Features to Improve Travel Time Reliability **Project L08:** Incorporation of the Non-Recurrent Congestion Factors into the Highway Capacity Manual Methods **Project C11:** Development of Improved Economic Analysis Tools Based on Recommendations from Project C03	**Project L05:** Incorporating Reliability Performance Measures into the Transportation Planning and Programming Process

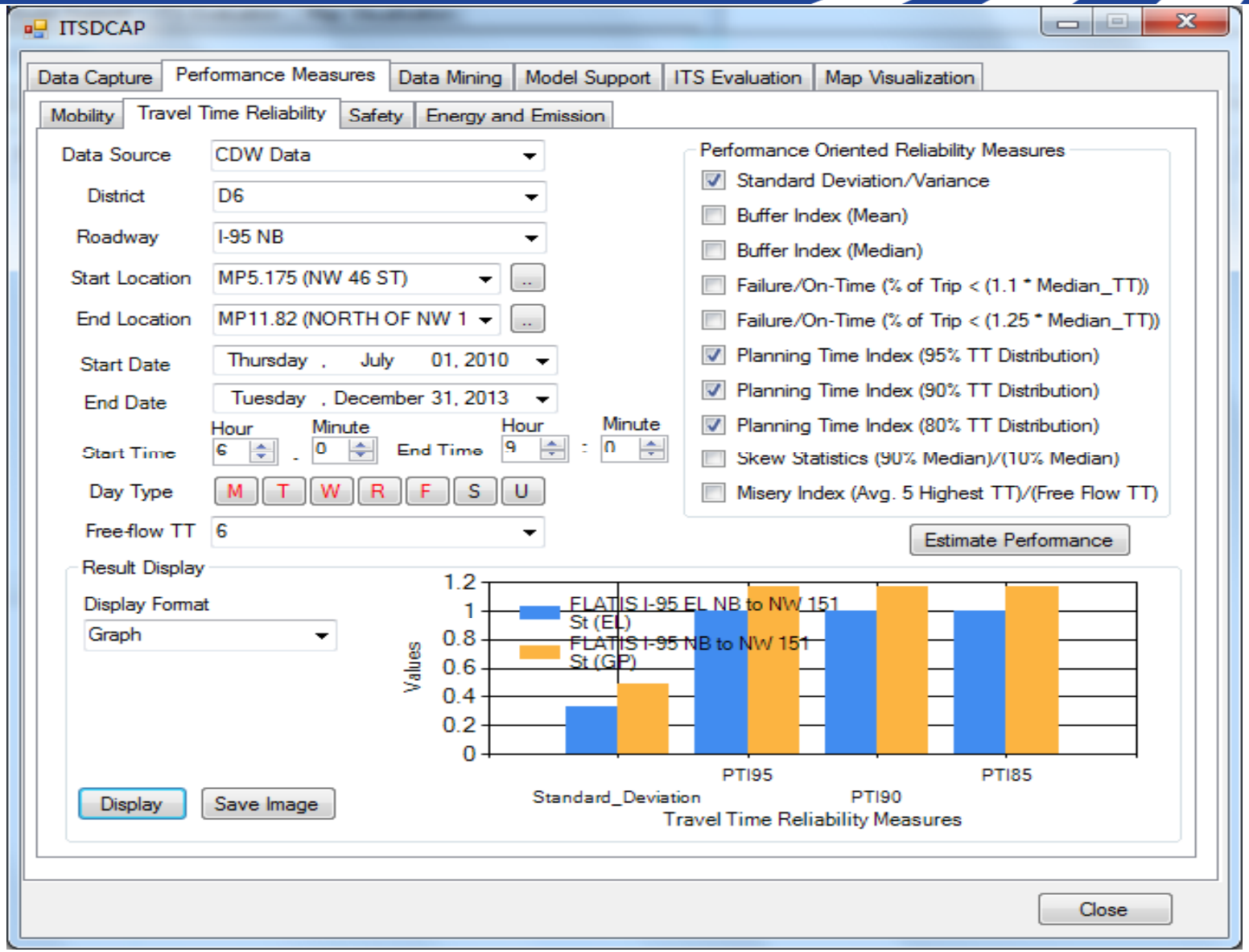
Research Teams

- One of four selected L38 project teams
- Investigate how Miami-Dade County can assess and improve its traffic data collection, estimate the travel-time reliability based on the limited traffic and network data captured by their own system, and assess the impacts of alternative reliability enhancement strategies.
- Team members
  - FDOT District 6 in Miami with strong involvement from District 4 and FDOT central office TSM&O and reliability programs
  - Florida International University
  - AECOM – General Consultant of ITS Operational Support Services for FDOT District 6
  - HNTB – TSM&O consultant for D6

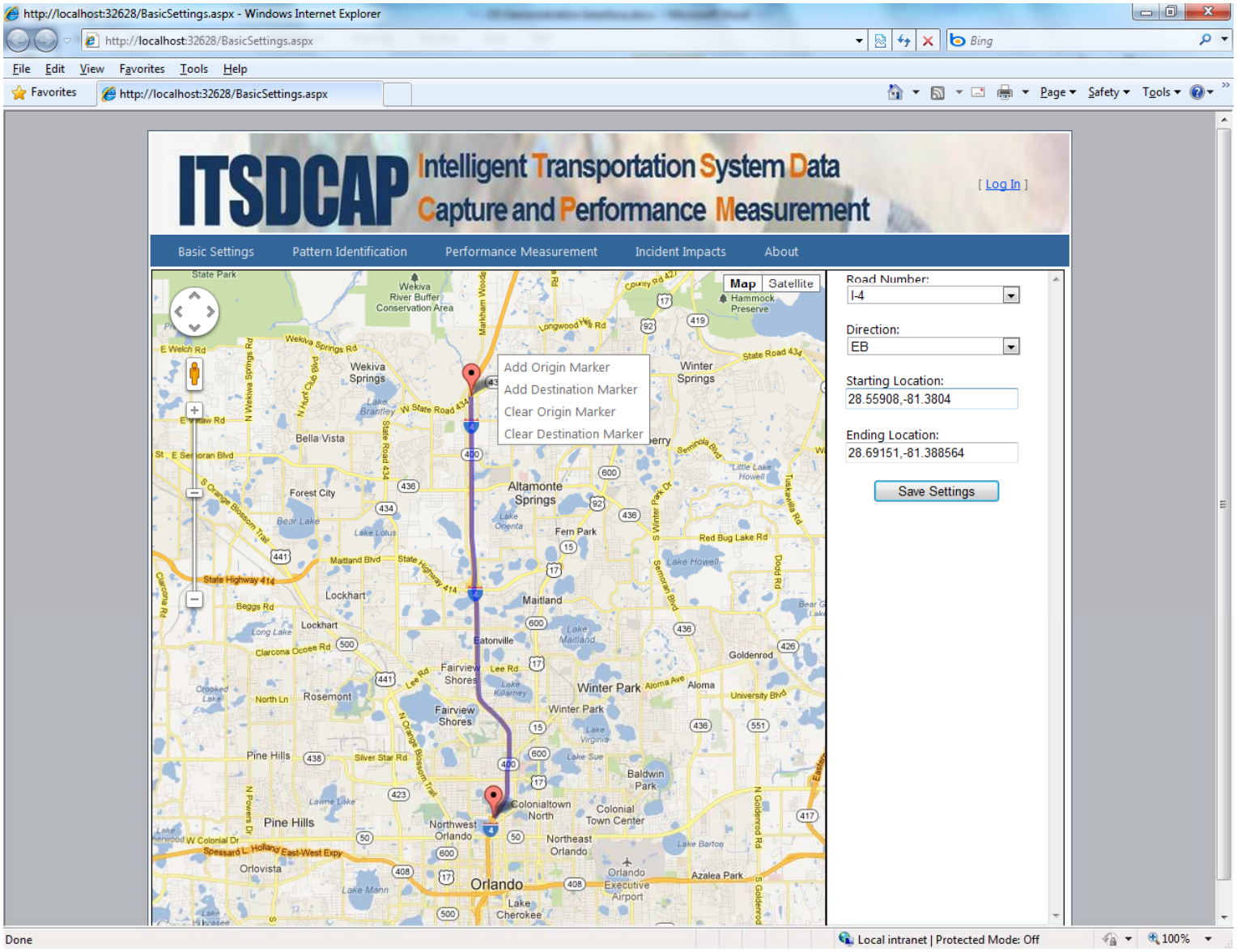
Intelligent Transportation System Data Capture and Performance Measurement

- ITSDCAP modules
  - Data capture, fusion, and grouping
  - Performance measurements (mobility, reliability, safety, emission, fuel consumption)
  - Data mining
  - Modeling and analysis support
  - Visualization
- Originally desktop application but recently a subset of it has been made web-based

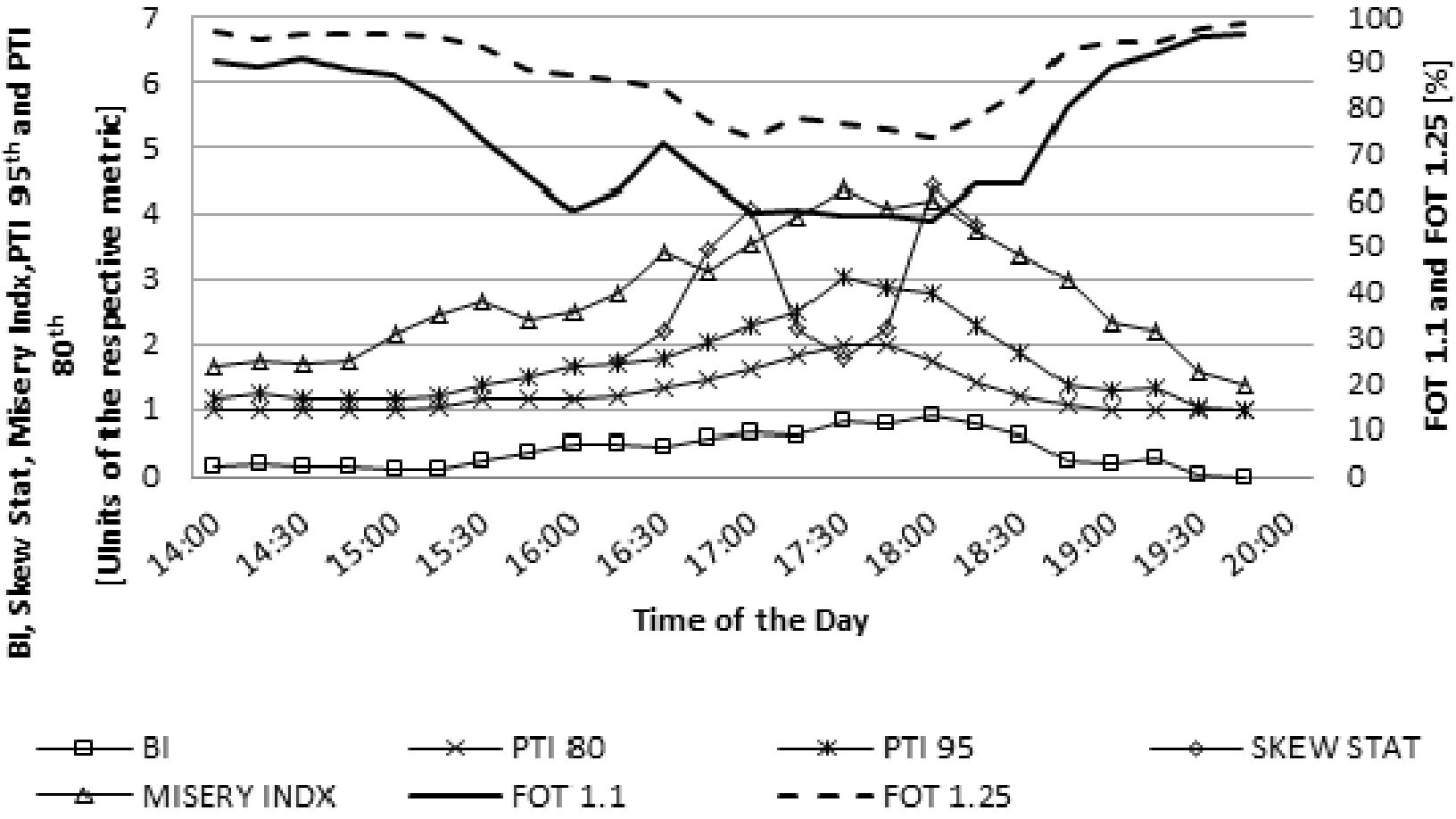
ITSDCAP Desktop Interface



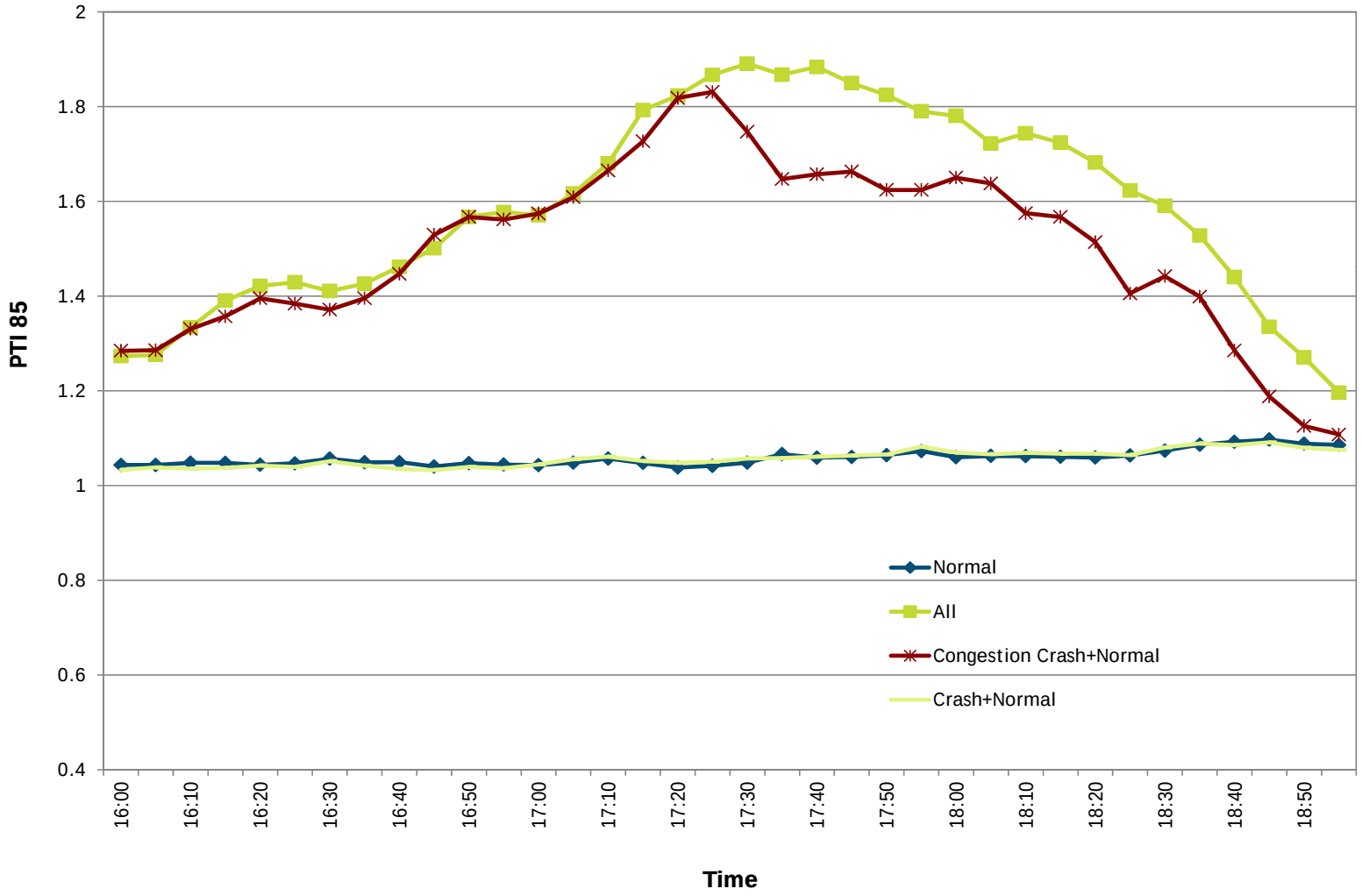
Web-Based ITSDCAP



TTR Metrics for I-95



PTI 85 (1-4 EB)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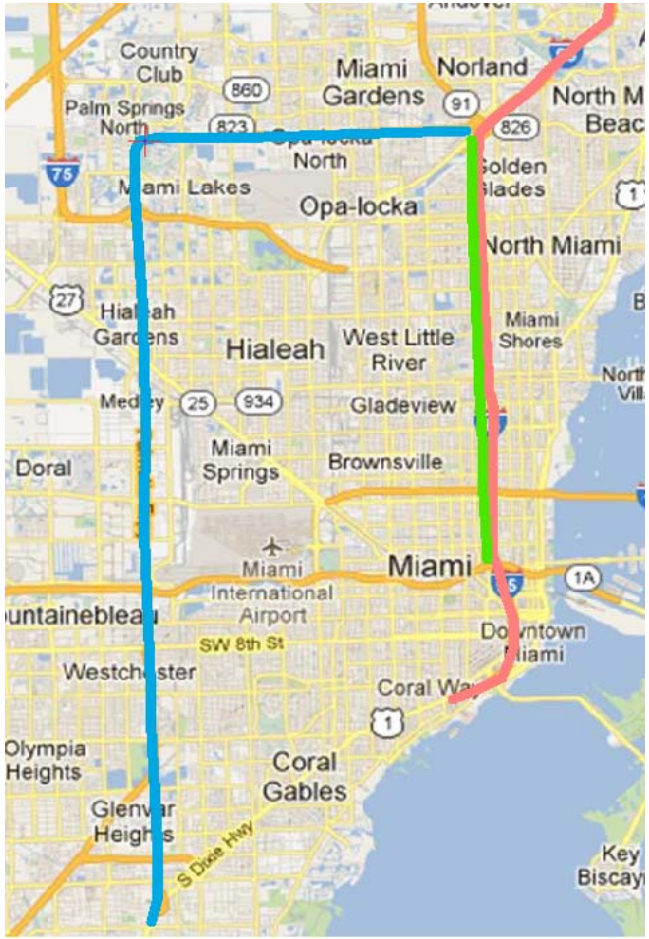
Time
Normal
All
Congestion Crash+Normal
Crash+Normal

Tested Products

- L05 guidance to support the use of SHRP 2 products in various business processes of the FDOT
- L02 for assessing reliability performance based on system monitoring
  - Based on point detector and INRIX data
- L08 methodologies for freeways and arterials to assess improvement alternatives
- L07 to assess highway design features to reduce non-recurrent congestion and thus improve reliability

Test Corridors

- I-95 between SR 836 and GGI (Freeway)
- SR 826 (Freeway)
- SR 7 (Arterial)



Basis of the Analysis

- Perform analysis based on stakeholder involvement and L05 products guidance
- Examine how partner agencies incorporate reliability in their policy statement
- Identify the reliability measures and the associated thresholds to determine unreliability
  - Threshold may be a function of the case under consideration
- Identify appropriate tools for each analysis type
- Identify methods to select between alternatives

Assessment based on Real-World Data

- Assess existing reliability based on real-world data
  - Consider different locations, times, and event regimes
  - Determine reliability deficiencies
  - Identify influencing factors
- Compare the reliability before and after ramp metering and managed lane
- Compare GP and ML reliability
- Assess segment, route, and route bundle reliability

Data from Multiple Sources

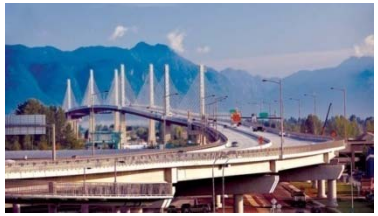
- SunGuide data (TSS, TVT data, incident, DMS, etc.)
- Central data warehouse
- FHP incident database
- FDOT planning statistics office data
- Weather data
- Managed lane dynamic congestion pricing rates
- Work zones → D6
- Crash data/CAR System
- 511 data
- INRIX data
- AVL/AVI data

Assessment Based on Modeling

- The sketch planning methods of the L07 project and the HCM procedure of the L08 project utilized to determine the effectiveness of improvement alternatives
  - Integration and use of L07 and L08 products with ITSDCAP
  - Results from L07 and L08 tools will be compared with real-world data
- Improvement strategies will be examined with inputs from project stakeholders to identify potential alternative mitigation actions with the help of L05 products
  - Improvement strategies will be identified based on influencing factor analyses and evaluation results using L07 and L08 products

Evaluation of Product Use

- Evaluate the utility of reliability analysis tools in the decision-making process
- Evaluate the functionalities and outcomes of the products
  - Technical feasibility of the products
  - Understandability and credibility of the results by decision makers
  - Acceptability and implement ability of the recommendations resulting from the products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Reliability Tools + AASHTO's Role

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Director of Operations, Wisconsin
Department of Transportation

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Reliability and SHRP2 Solutions

- National Training Program for Traffic Incident Management
- Knowledge Transfer System

- AASHTO SSOM Reliability Implementation Task Force

Training for Traffic Incident Responders (L12)

Coordinated Training for Traffic Incident Responders and Managers

PROBLEM: Traffic incidents cause nearly half of nonrecurring congestion and pose safety hazards to both motorists and responders. Restoring traffic flow sooner requires improved incident response practices.

SOLUTION: Establish a continuing mechanism by which responders can acquire a common set of core competencies that enable quick and safe incident clearance.

Training for Traffic Incident Responders

PRODUCTS: A coordinated, multidisciplinary training program for traffic incident responders and managers delivered through interactive seminars, tabletop role-play, and field practicum.

- "Train-the-Trainer" course for incident responders (L12) ***Now being implemented***
- E-Learning for training traffic incident responders and managers (L32B) ***October 2013***
- Interdisciplinary Traffic Incident Management (TIM) training post-course assessment tool (L32C) ***January 2014***

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Knowledge Transfer System (L17/L13A)

PROBLEM: Systems operations is an emerging priority as state DOTs look to improve the functionality of their highway networks. Information that is needed to improve and enhance systems is not always easily found or accessible.

SOLUTION: Provide a first point of access to searchable data that recognizes the numerous key audiences; provides analytical tools and guidance; and offers opportunities to engage communities of practice.

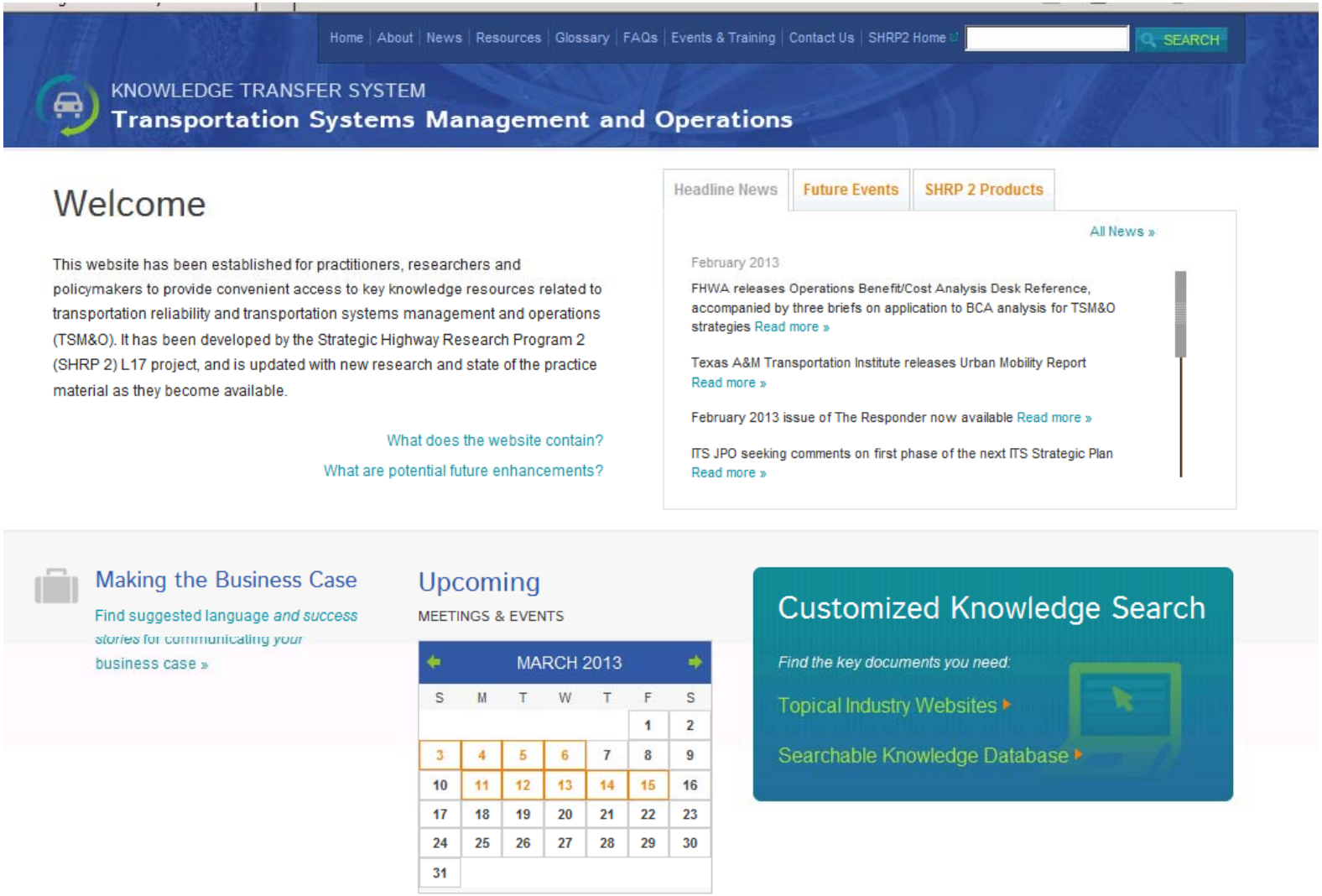
Knowledge Transfer System (L17/L13A)

A Framework for Improving Travel-Time Reliability

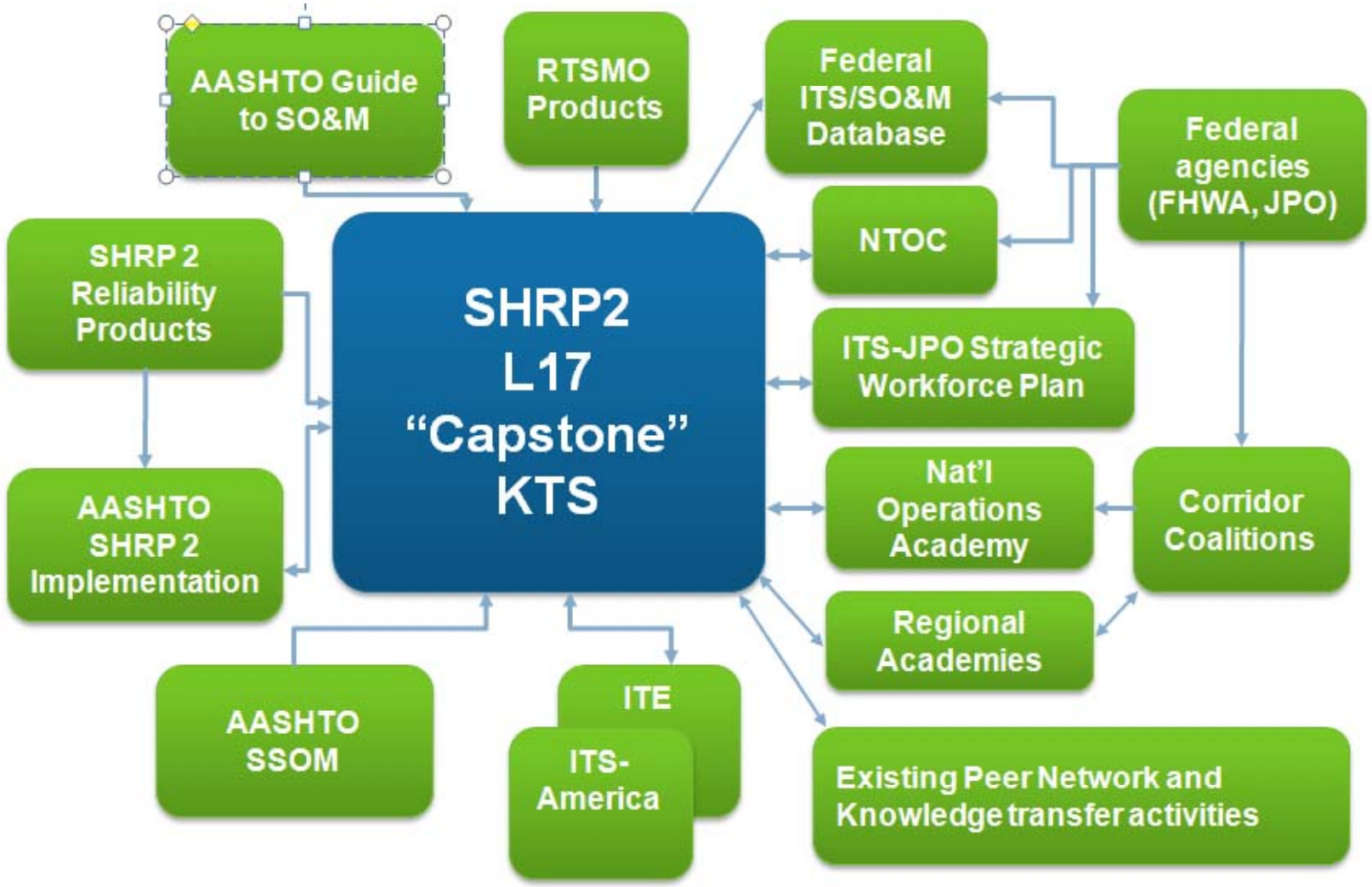
PRODUCTS: Comprehensive online resource known as a Knowledge Transfer System (KTS) that serves those involved in systems operations and management. The KTS includes Business Case Primer that provides tools to identify “who, what, when, and how” to communicate the business case for transportation systems operation and management most effectively.

BENEFIT/VALUE: As systems management and operations becomes a more critical to organizations, this makes the latest information, techniques, and approaches readily available to practitioners and policymakers alike.

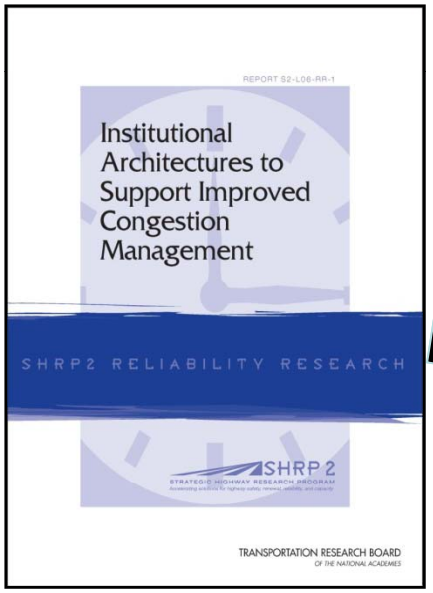
Existing KTS Website
http://demo5.pbid.com/

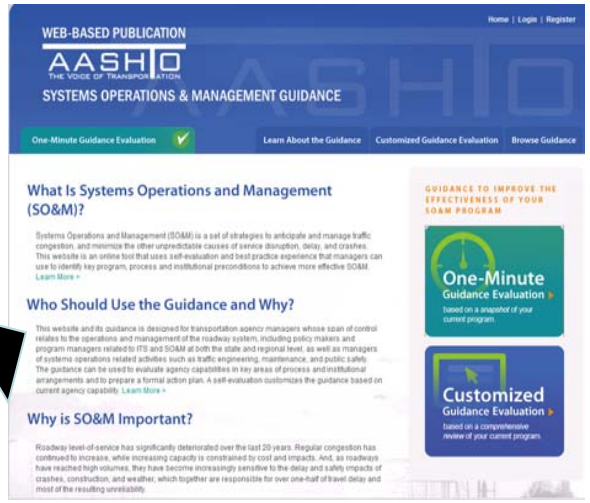


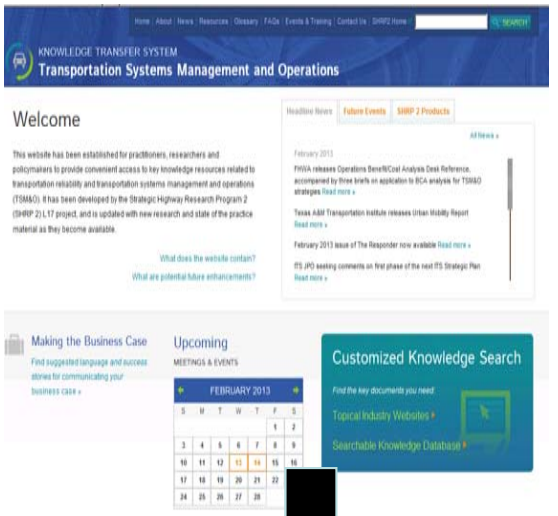
KTS as the Reliability Portal

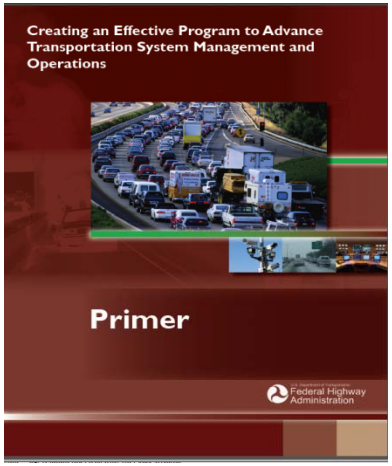


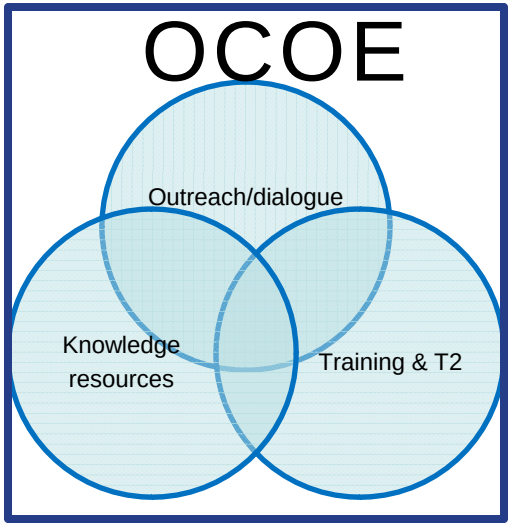
Range of Resources











Future Reliability Products

- Reliability Analysis Tools (L38 Bundle) 2014
  - Monitoring Programs for Reliability (L02)
  - Planning/Programming for Reliability (L05)
  - Reliability by Design (L07)
  - Reliability and the Highway Capacity Manual (L08)
- Regional Operations Forums (L36) May 2014
- Communicating Travel Time Reliability (L14) TBD
- Incorporating Reliability into Operations and Planning Models (L04) TBD

AASHTO Leadership and Support

SSOM Reliability Implementation Task Force

- Jennifer Toth, ADOT, chair
- John Corbin, WisDOT
- Dennis Motiani, NJDOT
- John Nisbet, WSDOT

SSOM Organizational Structure

SSOM

Don Hunt – Colorado Dot – Chair

John Corbin – Wisconsin Dot – Vice Chair

Jeff Lindley – FHWA – Secretary

Gummada Murthy – AASHTO, Liaison

SSOM Leadership Team

{Chair, Vice Chair, FHWA Secretary and Task Force Chairs, AASHTO Liaison}

Agenda Planning

Strategic Plan Development

Partnerships and Peer Exchanges

American Association of State Highway and Transportation Officials
AASHTO
The Voice of Transportation

2013 SSOM Key Outcomes

- TSM&O & SHRP2 Reliability Alignment
  - Institutional Architectures (AASHTO Guide to SOM)
  - Knowledge Transfer System
  - Regional Operations Forums (under development)
  - SHRP 2 Bundle projects
  - L-17 KTS transformed into TSM&O CoE
- SSOM as AASHTO Anchor Committee for other ASHTO Sub Committees TSM&O Facilitator
- TSM&O CoE Resolution – Approved by SSOM





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Implementation Assistance Levels of Engagement

Proof of Concept Pilot

- Funds for piloting products to evaluate readiness for implementation
- Contractor support to collect data and evaluate the application

Lead Adopter Incentive

- Funds for early adopters to offset implementation cost and mitigate risks
- Recipients required to provide specific deliverables designed to further refine the product, and possibly “champion” the product to other States and localities.

User Incentive

- Funds for implementation support activities after early adopter use
- Used to conduct internal assessments, build capacity, implement system process changes, organize peer exchanges, or offset other implementation costs

Implementation Assistance Products & Solicitation

First Round Products February 2013	Proof of Concept Pilot	Lead Adopter Incentive	User Incentive
R09 – Managing Risk	2	0	0
R10 – Complex Projects	0	4	0
R04 – Bridge	0	6	12
R26 – Pavement Preservation	0	7	10
C06 – Eco-Logical	0	6	20
L01/L06 – Organizing for Reliability	0	20	0

Update on current SHRP2 Reliability Priorities

Organizing for Reliability

- CEOs briefed at 2012 AASHTO Spring meeting.
- MPO leadership presentation being developed
- Implementation plan complete and approved by AASHTO and FHWA

- 27 proposals to FHWA / AASHTO solicitation.
- Selection of up to 20 in April.
- Full implementation later this Spring

Organizing for Reliability Plan Goals

Goal 1

– By December 2013, 15 to 20 State DOTs and larger MPOs will be identified and committed to applying the SHRP2 reliability products for Organizational Assessment and Leadership to Improve Operations

Goal 2

– By December 2014, all the selected State DOTs and large MPOs will have their action plans developed

Goal 3

– By December 2015, a framework will be established that will lead to nationwide adoption

Goal 4

– By December 2016, all selected State DOTs and Large MPOs will have completed their two year implementation of their action plans

FHWA and AASHTO Partnership Roles

FHWA/AASHTO Management Team

– Day-to-day assistance and support to the 15 to 20 early implementers.

FHWA

– HQ/RC/Division office staff

AASHTO

– SSOM SHRP2 Reliability Implementation Task Force

TIM Train-the-trainer program

- 24 Train-the-Trainer courses in 17 States
- 1,200+ instructors and 3,600 students trained
- IACP TIM video “Manage to Survive” viewed 20,000+ times
- FHWA Every Day Counts 2 initiative
- Goal: Hold at least one train-the-trainer workshop in each State, and in 75 largest metropolitan areas, by the end of 2014

Knowledge Transfer System

- IPW held on March 11-12, 2013
  - Draft plan completed by May

- Work to Come:
  - Develop framework and plan for enhanced version of the KTS
  - KTS will include:

    Reliability Data Archive (L13)

    Regional Operations Forums (L36)

Reliability Implementation Resources

Train-the-trainer TIMs suite	$4.4 million approved, additional $3.65 million recommended by AASHTO / FHWA
Organizing for Reliability	$6.6 million approved
Knowledge Transfer System	$2.5 million recommended by AASHTO / FHWA
Regional Operations Forums	$1.0 million approved
Reliability Analysis Tools	$4 million approved, additional $2 million recommended by AASHTO / FHWA
Traveler Information	$500k recommended by AASHTO
Guidelines for Modeling	$500k recommended by AASHTO

What's Ahead?

- Integrating SHRP2 products into FHWA program areas.
- Coordinating with AASHTO to advance implementation
- Providing sustainable platforms and governance for products
- Investigating follow on proposals

Let’s move!

Questions?

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SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD