

Maintenance Decision Support System (MDSS)

The FHWA Road Weather Management Program for
Decision Support

To the Second MDSS Prototype Review

Hanover, NH June 21, 2001

**Gary G. Nelson
Mitretek Systems Inc.
gnelson@mitretek.org
202 488 5718**

Contents

Federal Highway Administration (FHWA) Road Weather Management Program

Surface Transportation Weather
Decision Support Requirements
(STWDSR) project

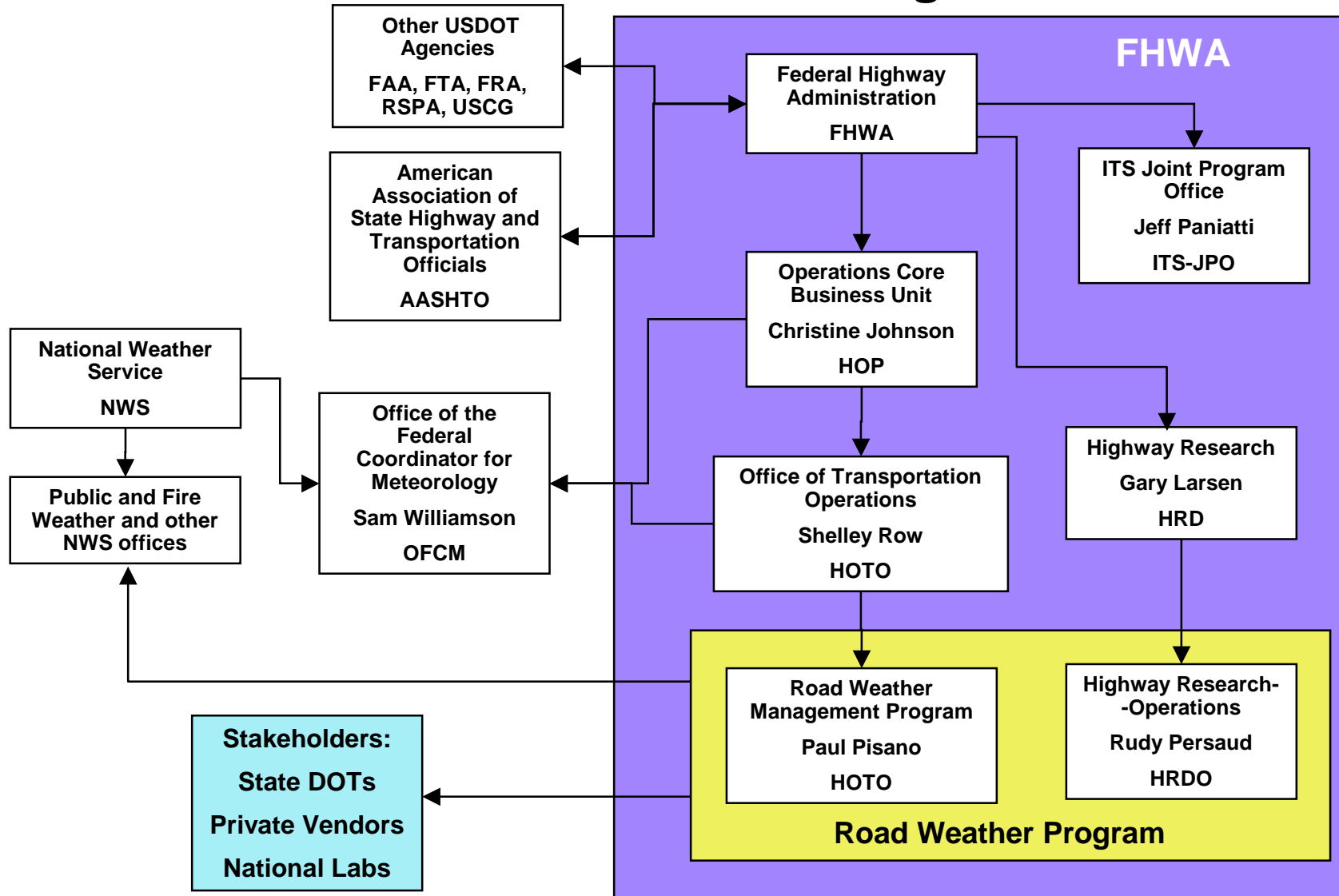
Maintenance Decision
Support System
(MDSS) project

Mitretek Role

Mitretek Role

- **Mitretek Systems, Inc., is a non-profit, non-competitive, government services corporation**
 - **Created from Mitre in 1996 to serve non-FFRDC* work.**
- * **Federally Funded Research and Development Corporation**
- **Mitre/Mitretek has supported the FHWA Intelligent Transportation System (ITS) program since inception:**
 - **Research, program development, procurement support.**

Federal Road Weather Programs



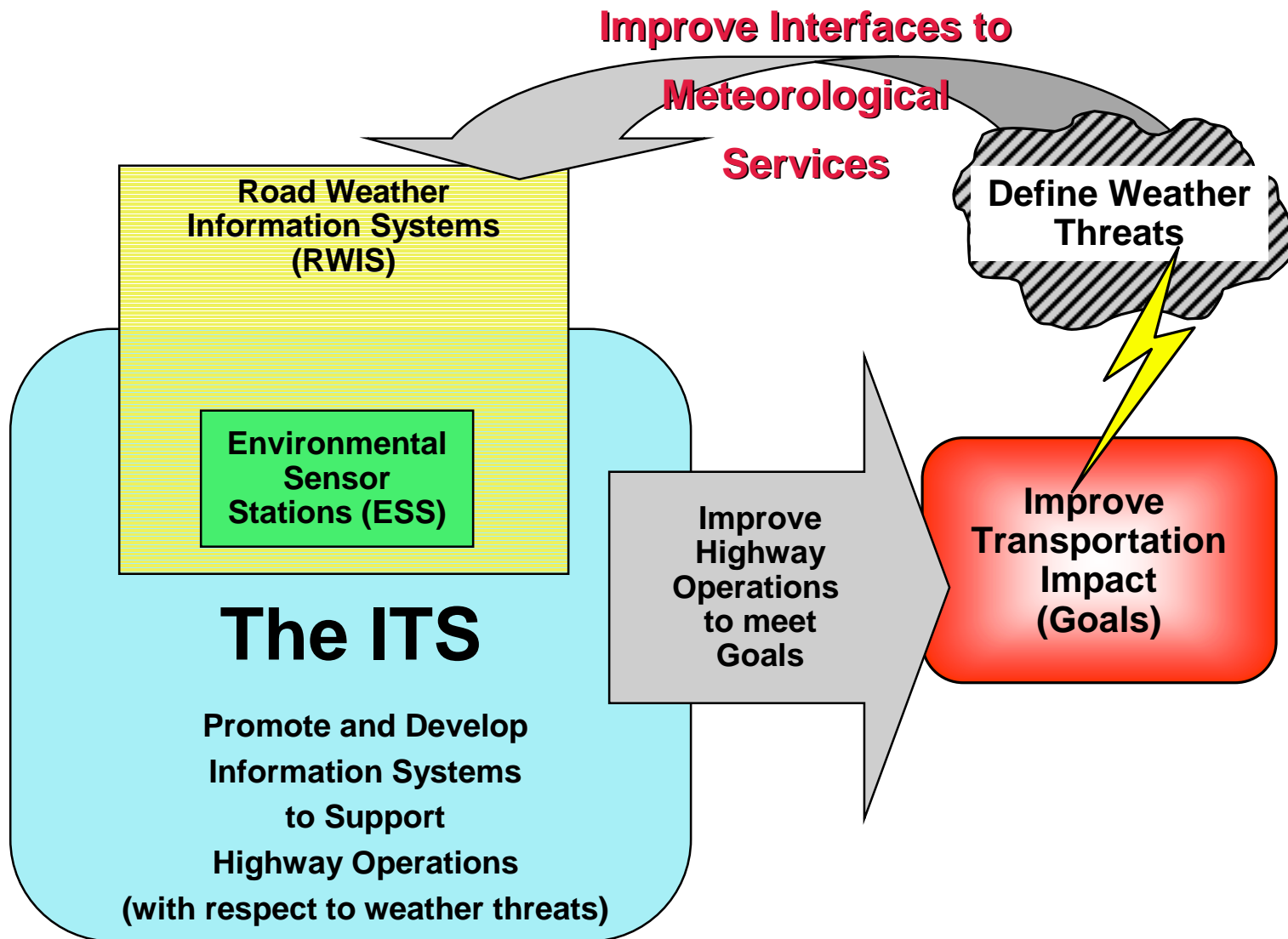
Road Weather Management Program Goals

- 1. Develop improved weather information systems that meet the demands of all users and operators;**
- 2. Develop improved maintenance technologies for winter mobility, and;**
- 3. Develop traffic operations/incident management procedures under all weather events.**

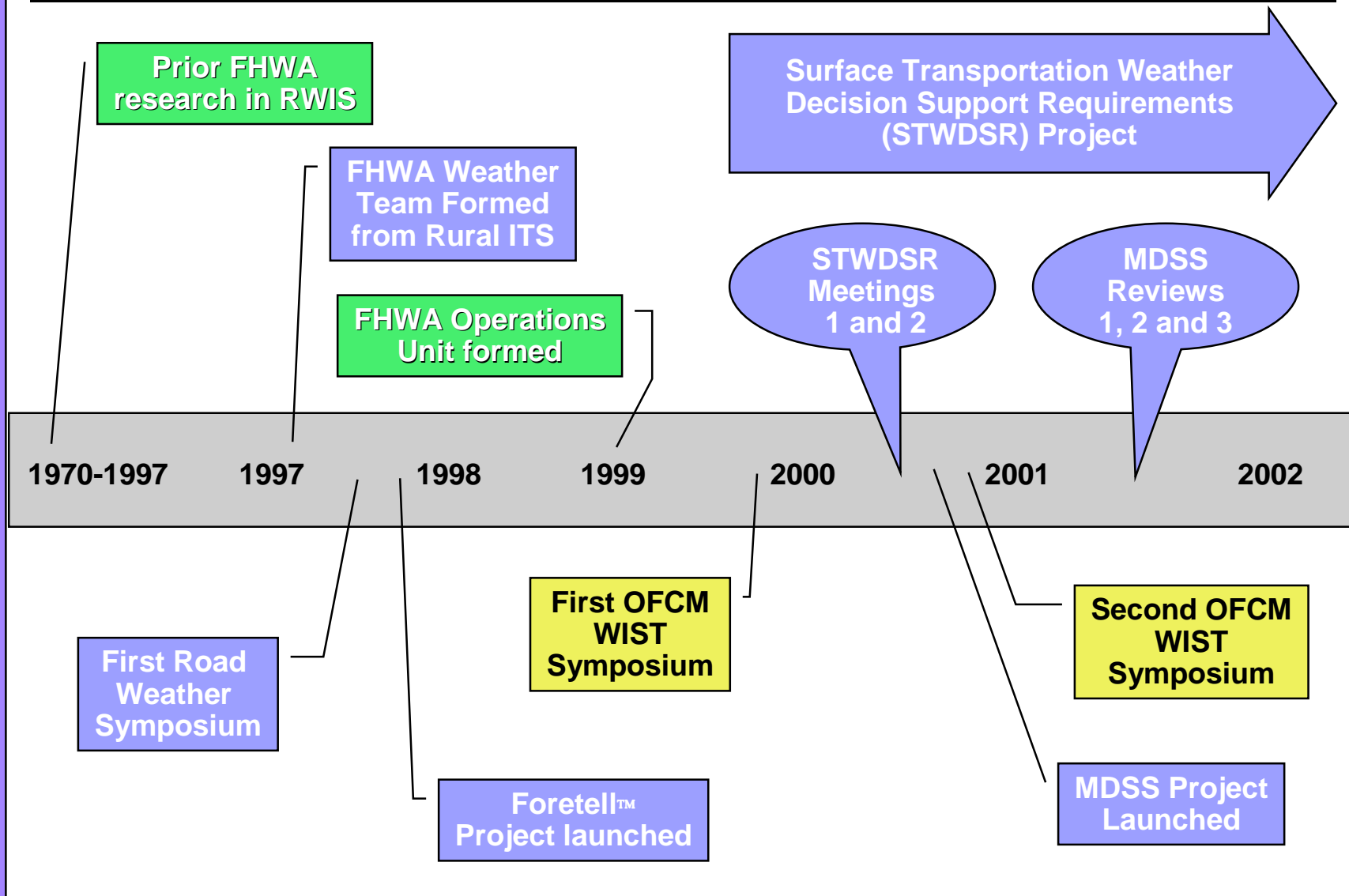
Road Weather Management Program Objectives

- a. Build relations between meteorologists and transportation professionals...to create a common vision and support state efforts;**
- b. Improved decision support systems...;**
- c. Advanced maintenance technologies...;**
- d. Road weather management practices for traffic and incident managers...;**
- e. Develop outreach materials...**

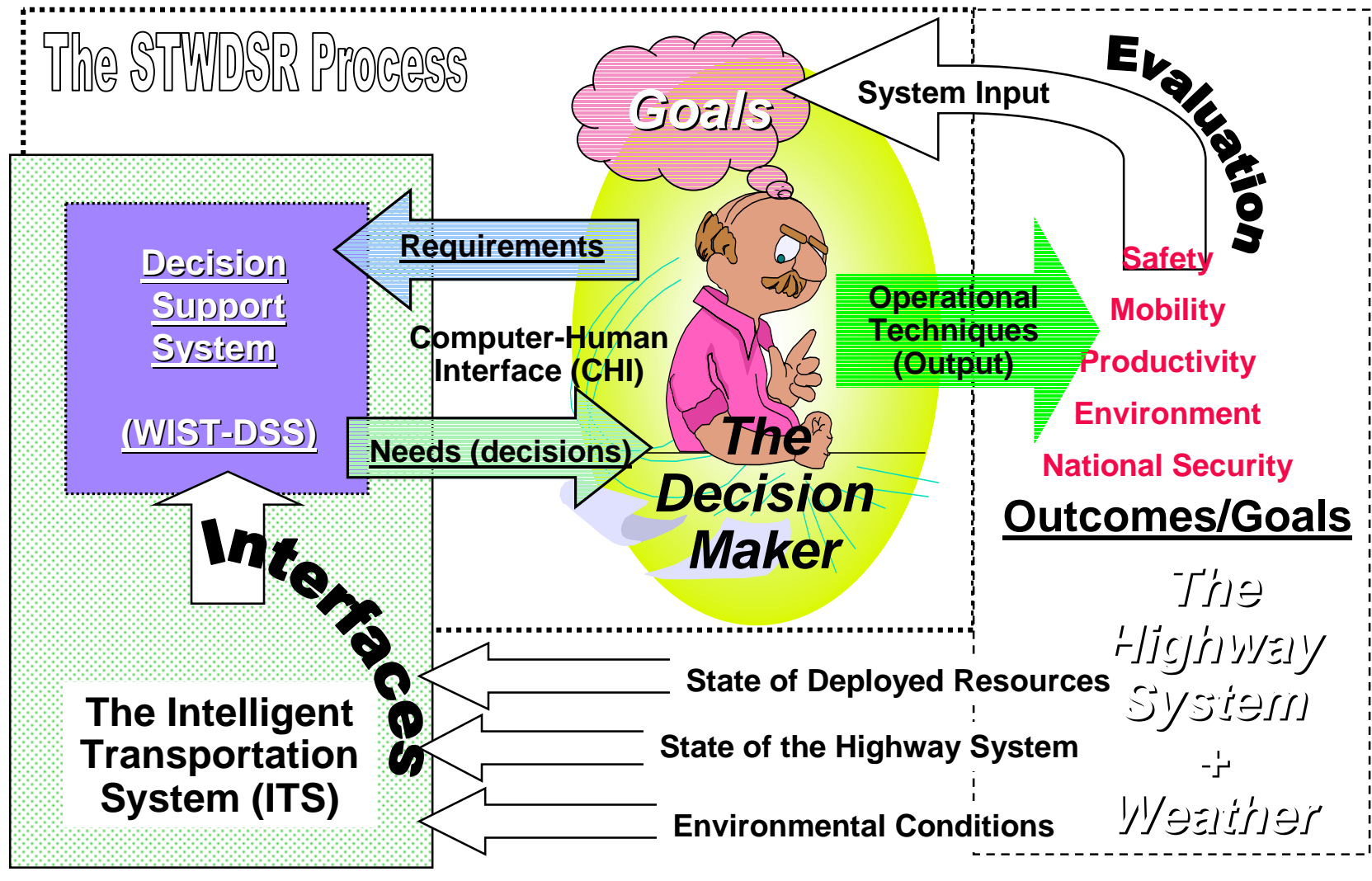
Scope of Road Weather Management Program



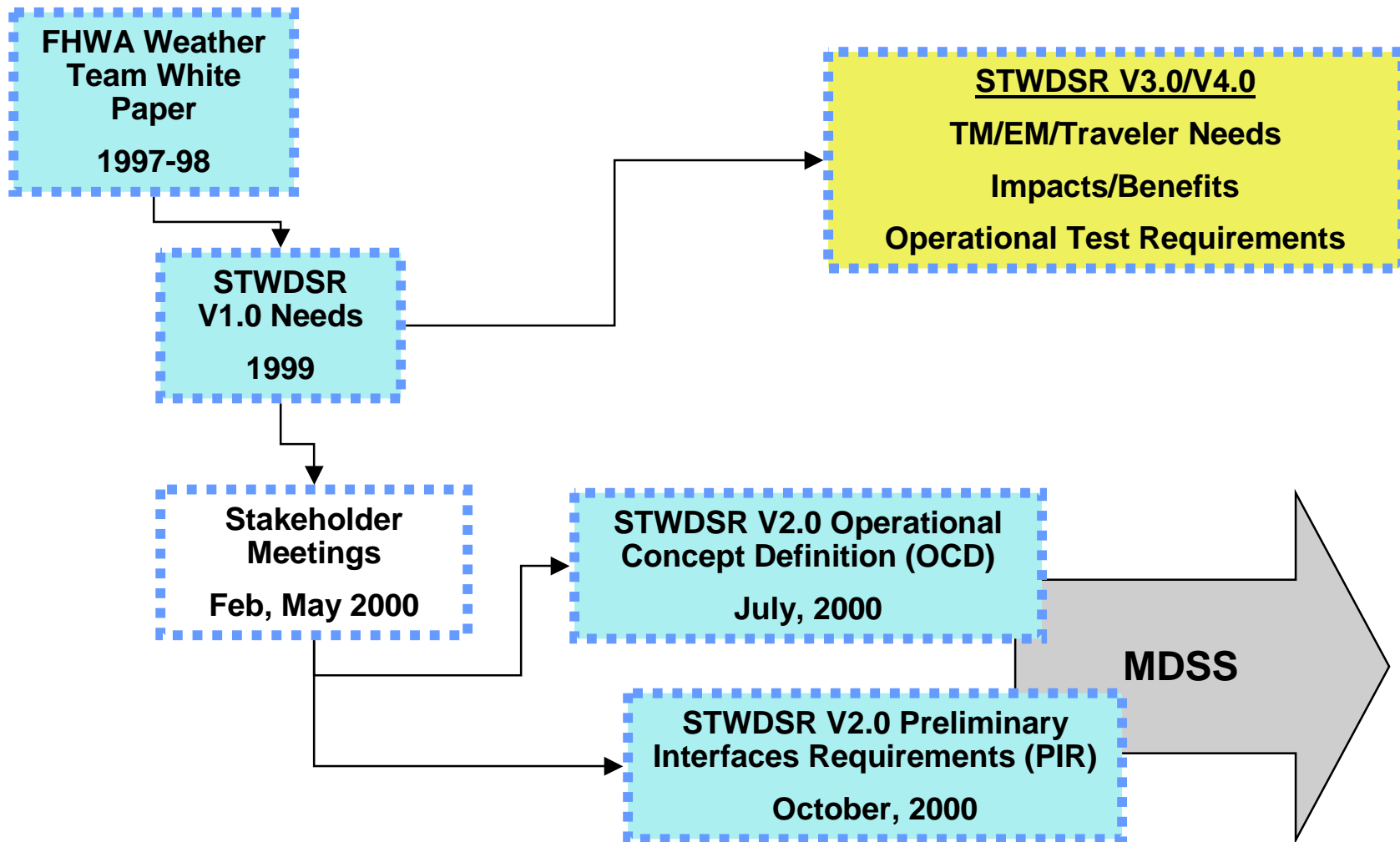
Road Weather Management Program Progress



STWDSR Scope



Major STWDSR Documents



STWDSR Documentation

- Electronic Documents Library

www.its.dot.gov/welcome.htm

- White Paper (1998)
 - STWDSR V1.0
 - STWDSR V2.0: Operational Concept Definition (OCD)
 - STWDSR V2.0 Preliminary Interface Requirements (PIR)
 - STWDSR V2.0 Executive Summary
-
- Contact: gnelson@mitretek.org

STWDSR Needs

Operational Scale Winter Road Maintenance

STWDSR V1.0

44 User Groups

<u>Needs Matrix</u>		
	Scales	
	Warning	Operational Planning
	10 decisions	
426 decisions		

Stakeholder Meetings:

Value Added Met. Services (VAMS)

Maintenance Managers (28 states)

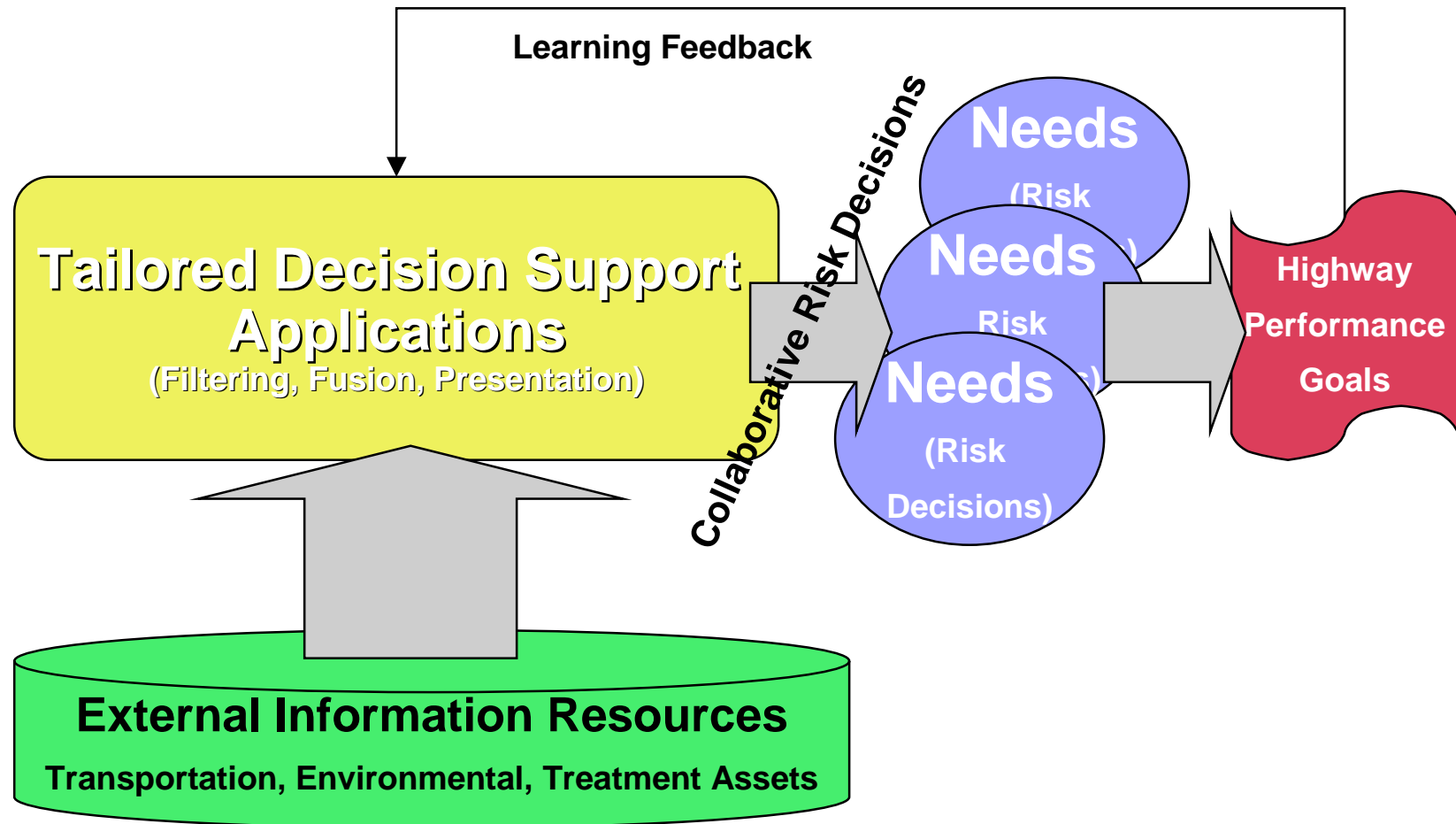
National Labs (6)

53 Decisions

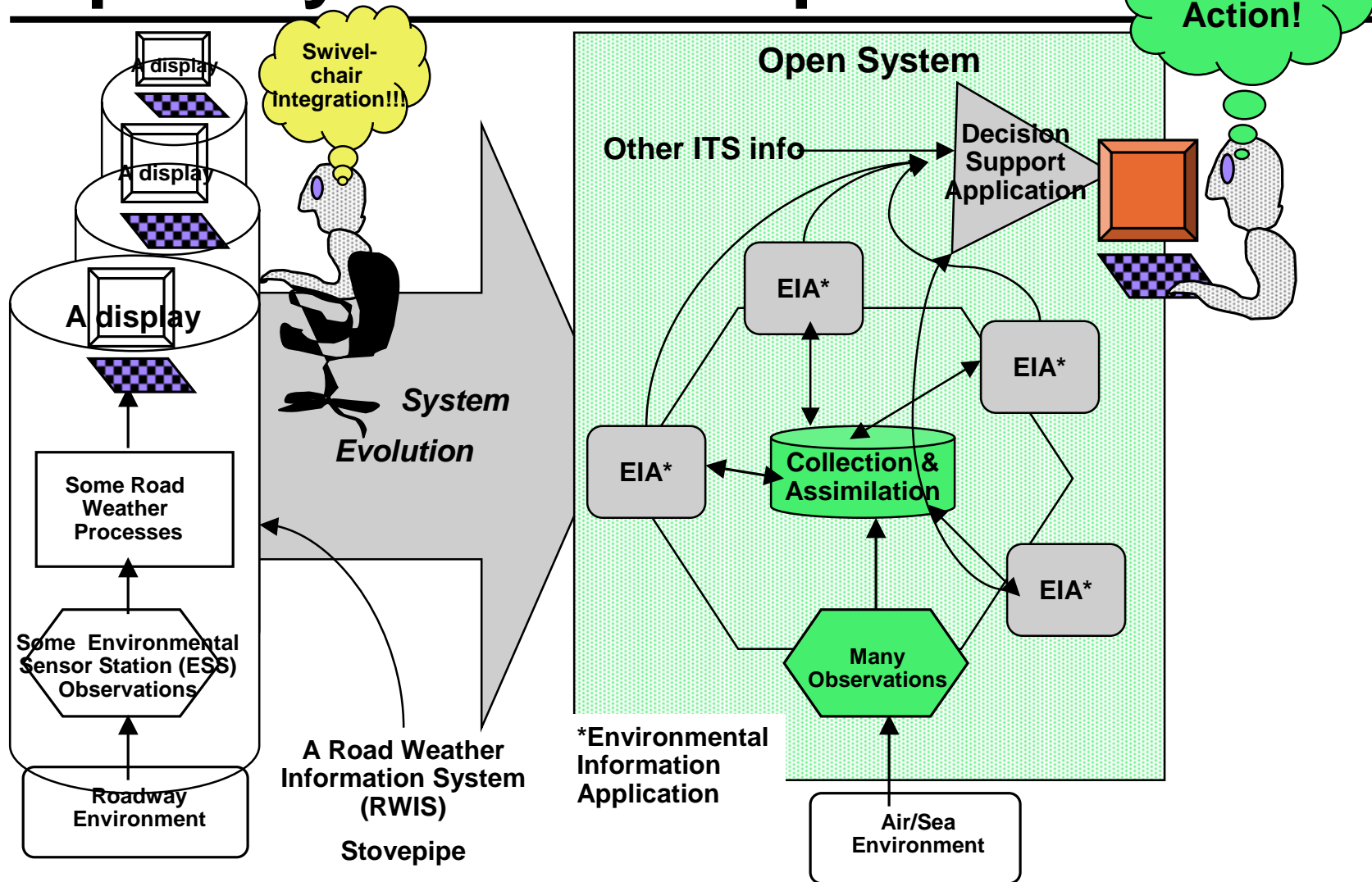
16
Clusters
by Time
Lead

STWDSR V2.0

STWDSR Operational Concept



Open System Concept



The Scale Concept

Scales	<u>Time Horizon</u> Functions	Corresponding Weather Scale	Winter Road Maintenance Example
Planning	<u>months +</u> Provides resources.	Climatic	Buying equipment or chemical stocks; Hiring and training staff.
Operational	<u>hours to days</u> Manages the deployment of resources.	Synoptic/meso	Calling up crews, readying vehicles, dispatching treatment beats.
Warning	<u>sub-seconds to minutes</u> Operates the resources.	Micro	Operating a treatment vehicle (snow plow and spreader); Control of automatic equipment.

Needs (Decision) Clusters

Cluster ID, Name	Confidence %	Time Lead hrs.
2.A Monitor Conditions		29.0
	Aware	49.0
	Detect	3.8
2.B Prepare	40	41.0
2.C Get Ready	72	16.0
2.D Prepare Expendables	56	14.0
2.E Select Strategy	70	12.0
2.F Assign Crews	60	33.0
2.G Prepare Equipment	75	14.0
2.H Activate Staff	73	15.0
2.I Initial Dispatching	77	9.0
2.J Contracting	85	2.0
2.K Primary Dispatching	96	0.0
2.L Remedial Dispatching		
2.M Mid-Storm Management		
2.N Discretionary Dispatching		
2.O Termination		
2.P Cleanup		

Maintenance Decision Support System (MDSS) Project

- **The MDSS is one realization of the STWDSR Operational Concept Definition (OCD)**
 - **For a set of functions and operational-scale decisions of winter road managers**
- **Continues STWDSR stakeholder alliance**
 - **National Labs will develop *non-exclusive* components**
 - **State DOTs will *operate***
 - **Vendors will *provide and integrate* into Road Weather Information System (RWIS)**

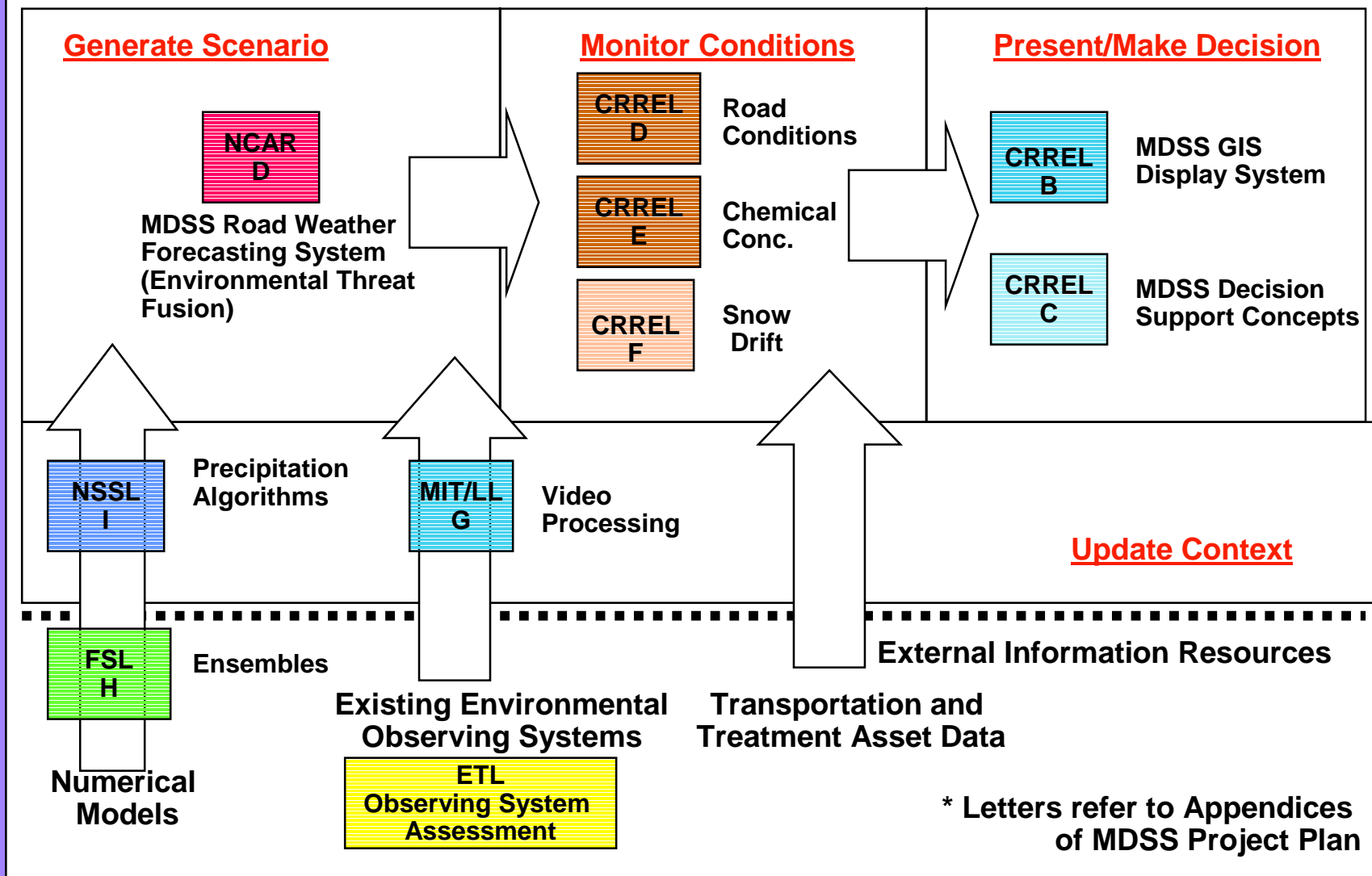
MDSS Documentation

- FHWA Road Weather Management Website

www.ops.fhwa.dot.gov/weather/mdss.pdf

- MDSS Project Plan
- ...with Labs' contacts

Map to WIST-DSS Components



MDSS: Benchmarks

- **Prototype Phase**
 - **First Prototype Review, January at NCAR**
 - **Second Prototype Review, now**
 - **Prototype demonstration (September)**
- **Further Development Phase**
 - **Notice of Intent (Federal Register, April)**
 - **Next presentation**

Mitretek Support

- DOT representative travel funding
 - Submit original receipts!!!
- Needs, OCD and PIR tracking
- Monitor progress for FHWA
- Work for recognition/support within surface transportation community

*Our job was to match expertise (National Labs)
with user needs and vendor opportunities.*

From here on, this development track is up to the stakeholders.