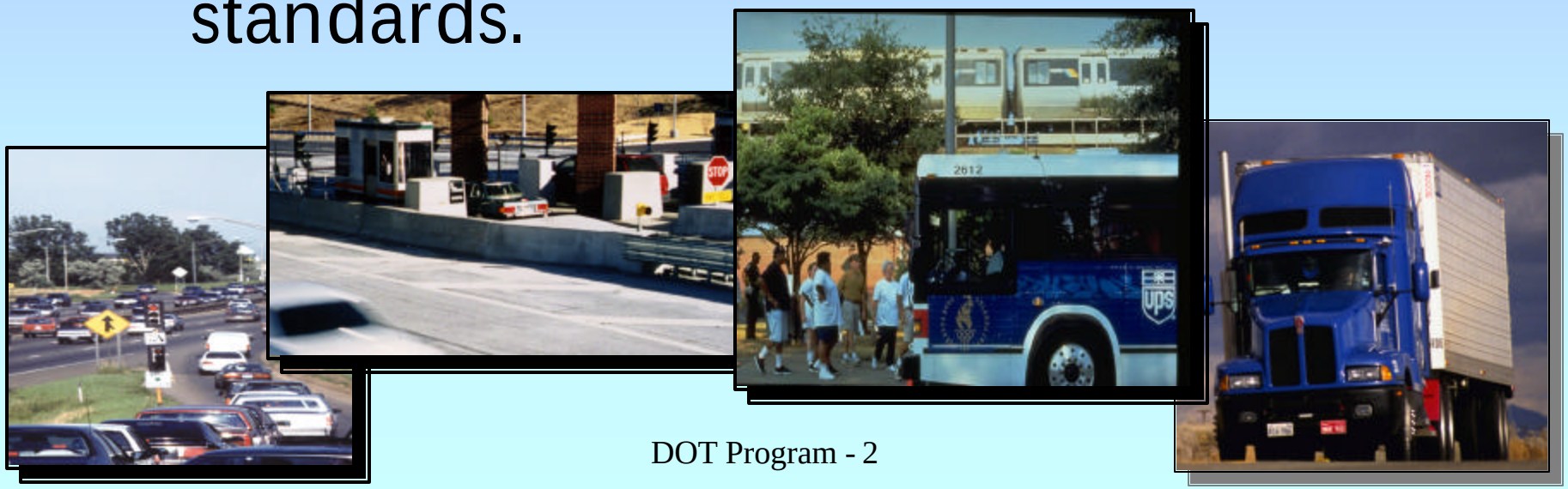
U.S. DOT ITS Standards Program

ITS Standards Program Goal

To foster the widespread use of interoperable intelligent transportation systems (ITS) by accelerating the development and deployment of ITS standards.



ITS Standards Program Guiding Principle

ITS standards are essential for achieving the interoperability and compatibility necessary to allow ITS systems to function consistently and effectively nationwide.

The U.S. DOT ITS Standards Program Evolution

ISTEA/TEA-21

Goal of National interoperability

National ITS Architecture

ITS Standards

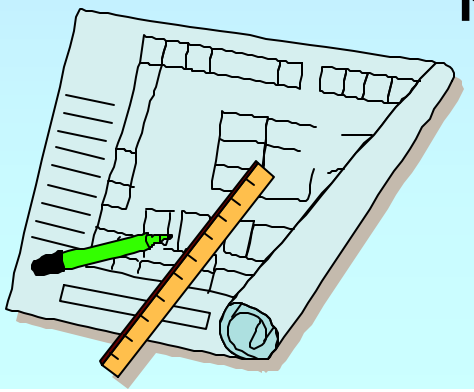
U.S. DOT ITS STANDARDS PROGRAM

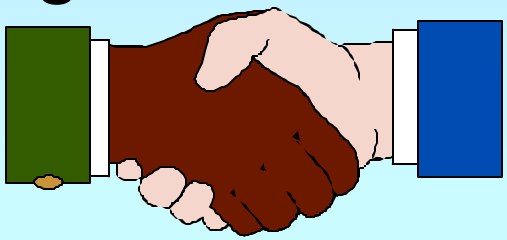
ITS Standards Program Objectives

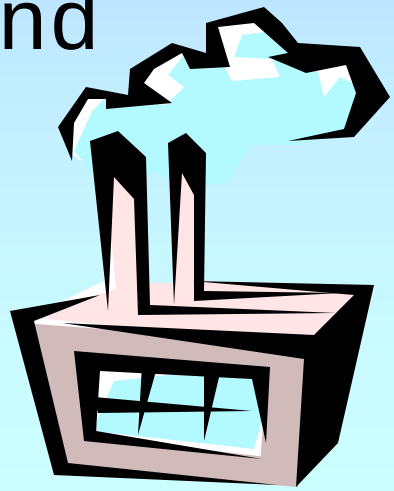
- Promote the ability of public sector agencies to choose ITS products and services from multiple vendors
- Promote the creation of an innovative ITS market
- Facilitate interoperability at all levels
- Ensure the safety of the traveling public
- Facilitate deployment of ITS technologies
- Support testing and evaluation of standards
- Promote international competitiveness of American industry

ITS Standards Program Influences and Limitations

- Direction from Congress
- Requirements from the National ITS Architecture
- Conditions imposed by the consensus standards process
- Participation by industry and public agencies





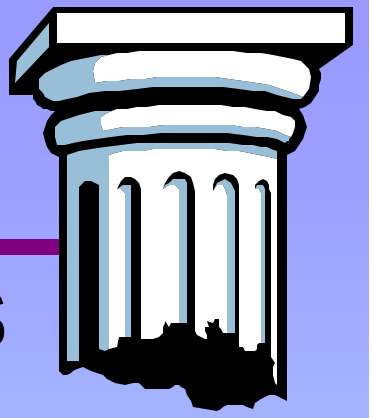


Direction from Congress

TEA-21 requirements:

- "Continued investment in architecture and standards development ... is needed to accelerate the rate at which intelligent transportation systems are incorporated into the national surface transportation network, thereby improving transportation safety and efficiency..."
- "The Secretary shall ensure that [ITS] projects carried out using funds made available from the Highway Trust Fund ... conform to the national architecture, applicable standards ... and protocols…"

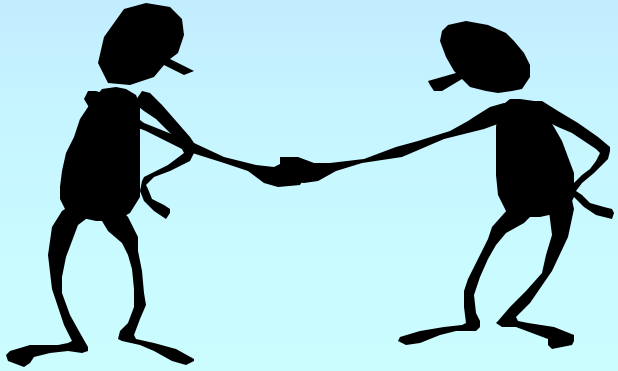
National ITS Architecture



- Framework and foundation for ITS interoperability
- Information flows in the National ITS Architecture determine needs for interoperability
- Information flows and interfaces between subsystems where interoperability is needed lead to standards requirements

Conditions Imposed by the Consensus Standards Process

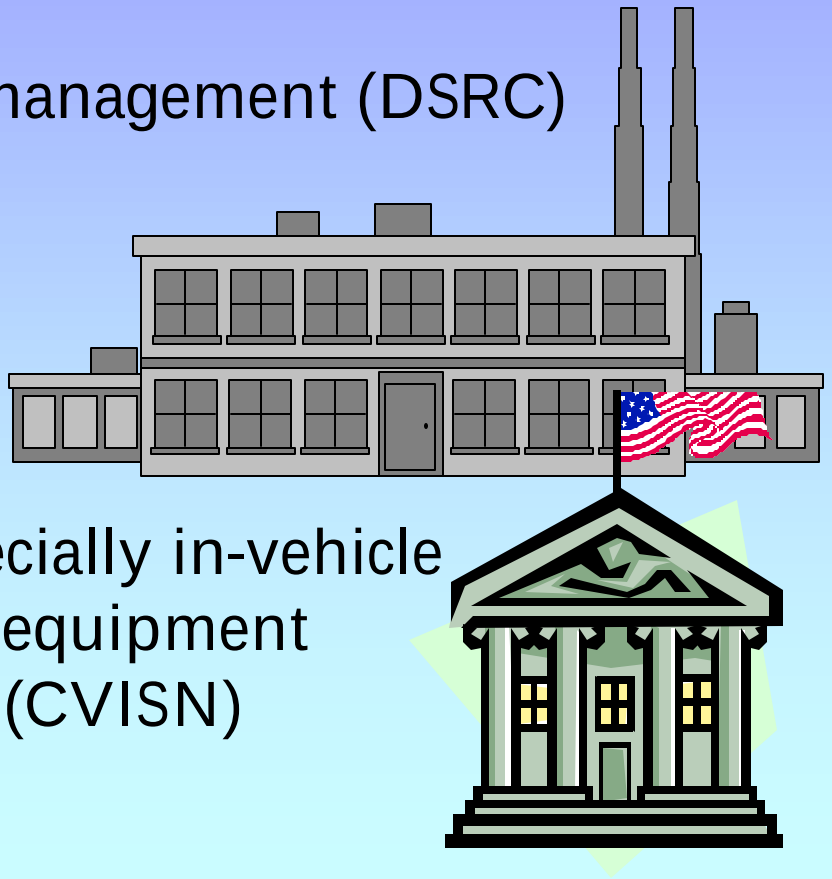
- All stakeholders able to be involved
- The process is open and balanced
- Information is freely available to the entire ITS community
- Process takes time, but yields a robust, durable standard that is well-accepted



Participation by Industry and Public Agencies

Strong interest from industry and public agencies:

- Map database standards
- Electronic toll and traffic management (DSRC)
- FM subcarrier
- Vehicle databuses
  - "Smart bus" bus
  - ITS data bus



- Human factors and safety, especially in-vehicle
- Traffic sensing and monitoring equipment
- Commercial vehicle operations (CVISN)
- Traveler information services

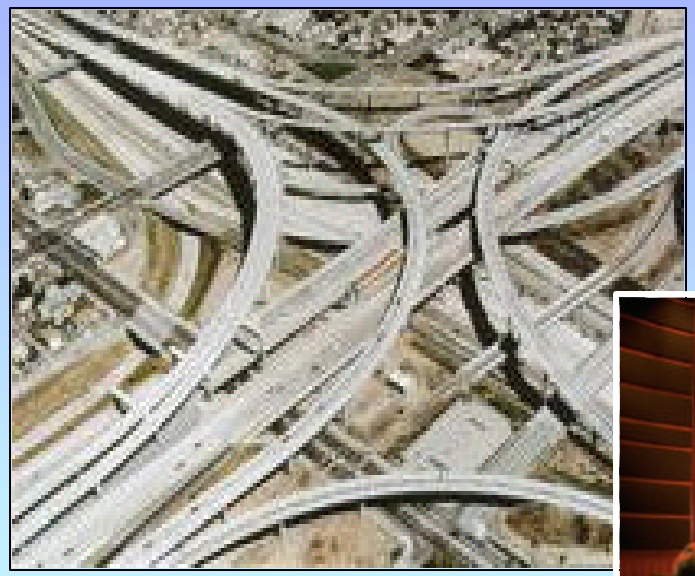
Role of U.S. DOT Joint Program Office

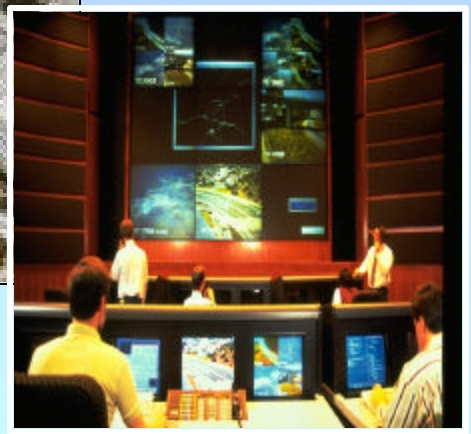
- Overseeing development, testing, deployment, evaluation
  - National ITS Architecture
  - ITS standards
  - Modal and intermodal ITS solutions
- Providing focused funding to accelerate the deployment of ITS
- Assuring safety and national interoperability
- Designing and effecting ITS policy
- Providing guidance and technical assistance

ITS Standards Program
Five Major Program Elements

1. Standards Development
2. Standards Testing
3. Outreach and Education
4. Technical Assistance
5. Policy Support

ITS Standards Program
1. Standards Development





Standards Development Goal

To accelerate the development of consensus ITS standards by standards development organizations by:

- Funding technical support for standards committees
- Supporting the participation of public agency representatives
- Encouraging the participation of all appropriate stakeholders

Standards Development Organizations (SDOs)

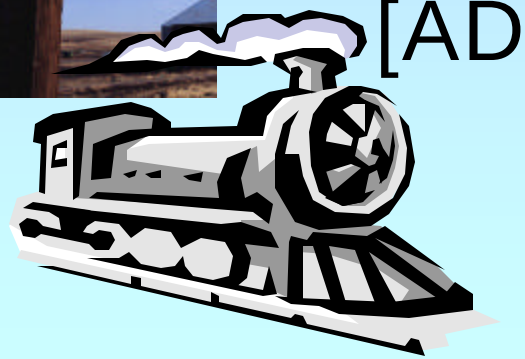
- American Association of State Highway Transportation Officials (AASHTO)
- American Society for Testing & Materials (ASTM)
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute of Transportation Engineers (ITE)
- Society of Automotive Engineers (SAE)

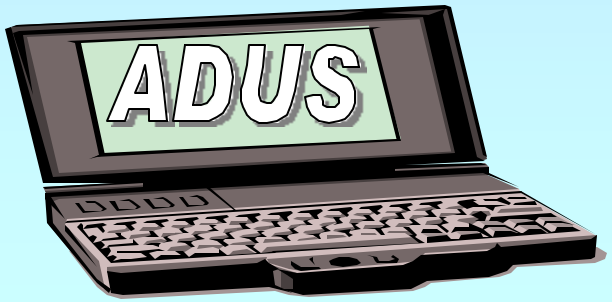
- American National Standards Institute (ANSI) Committee X12
- National Electrical Manufacturers Association (NEMA)
- Electronic Industries Alliance (EIA)
- Telecommunications Industry Association (TIA)

(Cooperative agreements signed with the first five SDOs)

Standards Development: Level of Effort

- About 90 ITS standards development efforts underway
- New standards development efforts are expected (e.g., highway-rail intersection [HRI] archived data user service [ADUS], public safety, etc.)



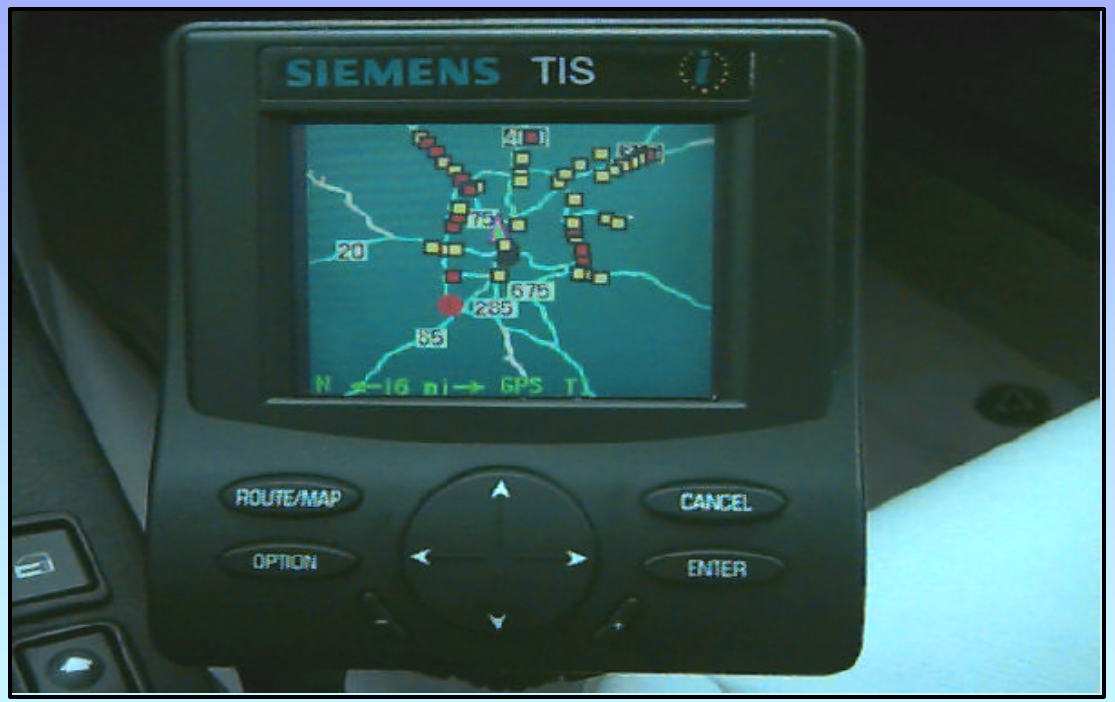


Standards Development: Status

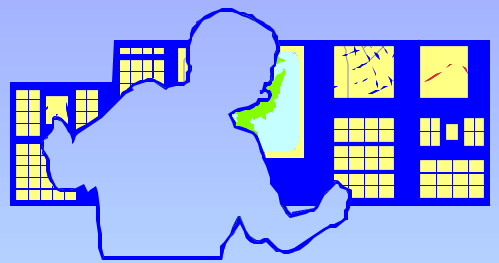
✦ 31 Published	Available for purchase
✦ 14 Approved	Passed all necessary ballots and approved by the applicable SDO(s), but not yet published
✦ 16 In Ballot	Being voted upon by a committee, working group, or other SDO-recognized entity
✦ 28 Under Development	Being drafted by committee, but not yet distributed for formal ballot

(as of 5 January 2001)

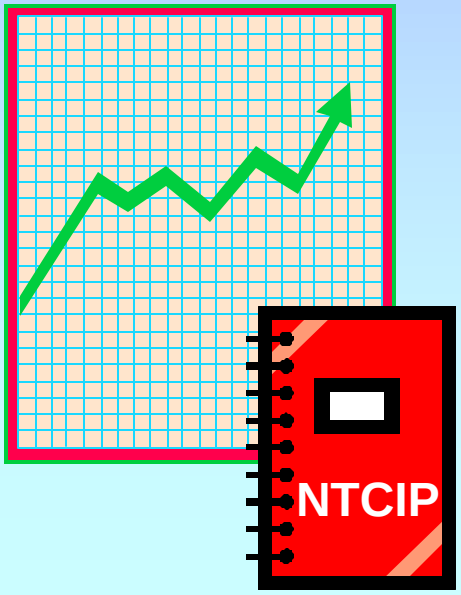
ITS Standards Program
2. Standards Testing



Standards Testing Goal



- Measure the operation, correctness and completeness of standards under realistic transportation operating conditions



- Measure the degree of interoperability among standards
- Provide information about the performance of the standards to the ITS community

Why Test Standards?

- Testing "proves" the standards, determines how to improve them if necessary, and promotes integration and interoperability of standardized ITS systems
- Testing in a realistic setting builds credibility and demonstrates maturity of standards
- Testing is a mechanism for creating awareness and promoting acceptance of ITS standards

Testing Promotes Use of Standards By Building ...

State and Local Governments — Vendors and Contractors

Commercial Viability

Does she have products that meet the standards?

Are there customers for standardized products?

Credibility

Can her products do the right job?

Will my products satisfy his needs?

Buyer-Seller Confidence

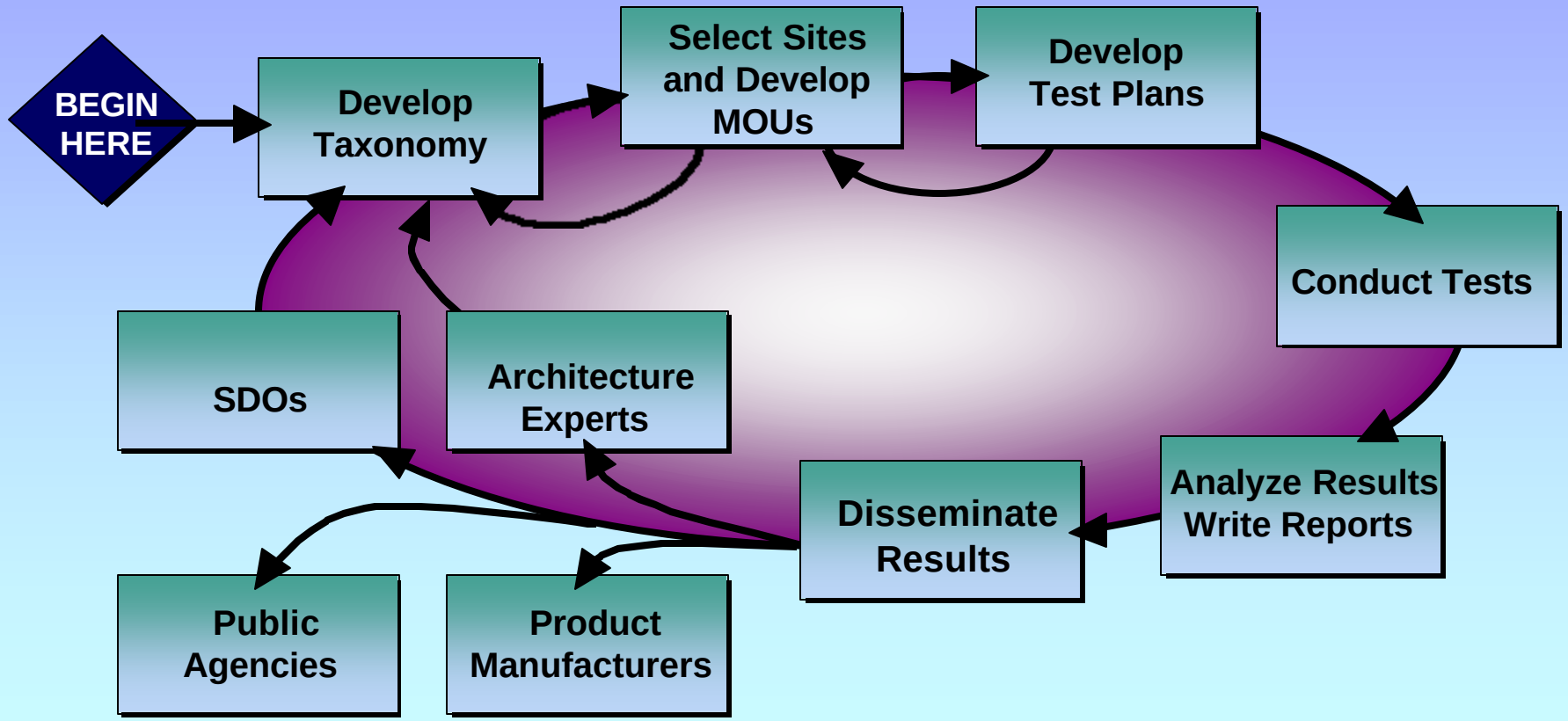
Will her products do what she claims?

Is he specifying his real needs?

Standards Testing Approach

- Standardized formal test plan (based on “IEEE Standard for Software Test Documentation”)
- Engineering-based testing of the correctness and completeness of the standard (not validation, verification or conformity assessment)
- Testing in a real-world environment

Formal Testing Process



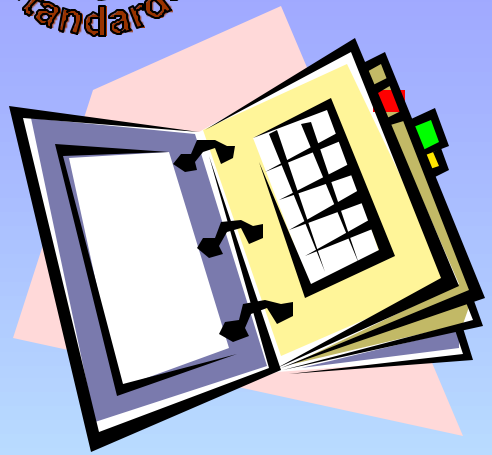
ITS Standards to be Tested

- About 50% of standards have been selected for testing
- Not selected include:
  - Standards for standards (e.g., ITS Message Set Template)
  - Framework standards (e.g., TCIP- Framework)
  - Standards for commercial products that will be tested by the private sector (e.g., ITS data bus)

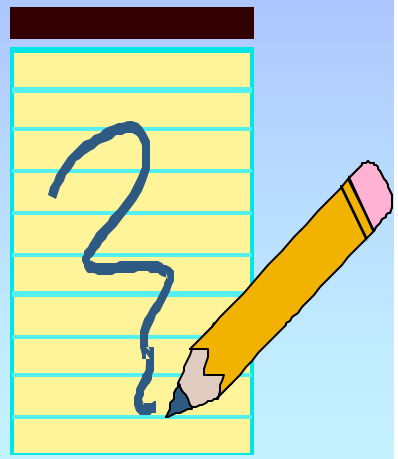
List of standards to be tested on ITS standards Web site:

www.its-standards.net

Testing Output



- List of standards to be tested
- Taxonomy Report
- Criteria for test site selection
- MOUs with test sites
- Draft test plan guidelines
- Detailed test plan



- Site specific test plans
- Report to SDOs (if deficiencies are found)
- Stakeholder workshops (after each test)
- Formal test reports
- Experience-based case studies, lessons learned, etc.

Results of Dynamic Message Sign (DMS) Test

First test completed in March 2000

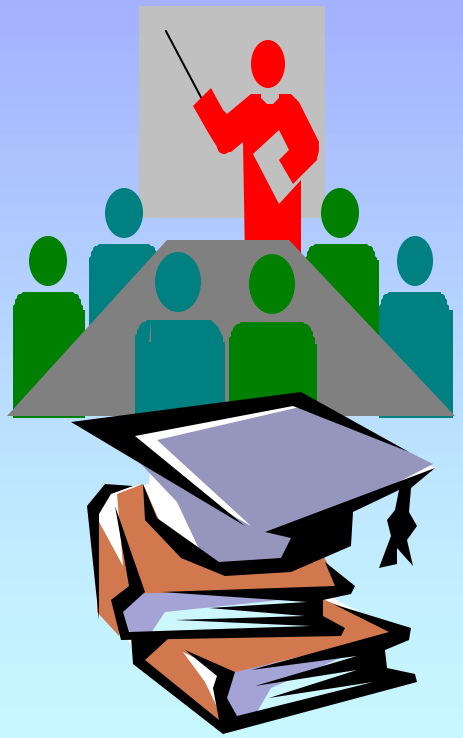
- Test took place in cooperation with Illinois State Toll Highway Authority (suburban Chicago)
- Six NTCIP standards tested
- Conclusions:
  - Overall, standards were useful and effective
  - Several minor “exceptions” found, none critical
  - Recommendations for minor revisions returned to SDOs
- Result reports completed and available on standards Web site
- Workshop held to discuss results of testing

Testing Process

- Accept and review responses from candidate test sites; select additional test sites
- Develop MOUs and test plans for each selected test site
- Perform on-site testing
- Disseminate testing results (on-site workshop, test report)

ITS Standards Program
3. Outreach and Education

Outreach and Education Goal



To provide federal, state and local transportation stakeholders with useful information and materials that will help them with the application of ITS standards.

Outreach and Education Target Audiences

- State and local transportation and transit personnel
  - Decision-makers, administrators, managers, planners, engineers
- U.S. DOT field staff (FHWA, FTA and FMCSA)

Outreach and Education

Role of U.S. DOT Field Staff

- Articulate overall program policy
- Implement standards policy and program initiatives
- Promote use of standards
- Provide effective project oversight
- Provide technical assistance
- Seek available resources for information and assistance
- Serve as a source for information and a link to technical contacts

Outreach and Education Organizational Interactions

Deployment Community

- Manufacturers
- Suppliers
- Consultants
- Contractors

Public transportation and transit agencies

(State/regional/local)

Other Stakeholders and Partners

- Professional organizations
- Trade associations
- Academia
- ITSA

Program Core Delivery Group

SDO Partners

- ITE
- IEEE
- SAE
- AASHTO
- NEMA
- ASTM

U.S. DOT

- JPO
- FHWA
- FTA
- Battelle
- FMCSA
- VOLPE
- Support consultants

U.S. DOT Field Delivery

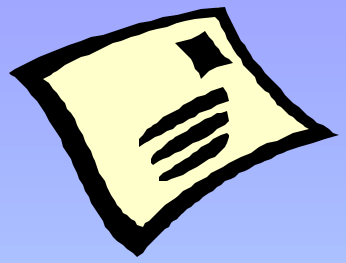
- FHWA Divisions
- FTA Regions
- Resource Centers
- FMCSA

Outreach and Education
Examples of Products

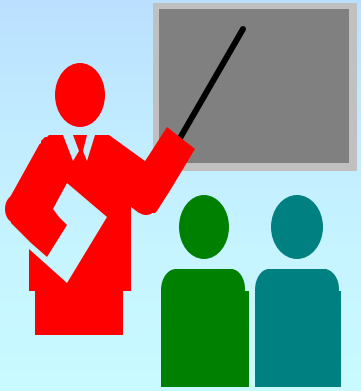
- General program brochure
- Fact sheets
- Implementation guides
- Sample procurement specifications
- Lessons learned reports
- Case studies
- Deployment contact information
- Standards newsletter
- Test results

Outreach and Education
Examples of Delivery Mechanisms

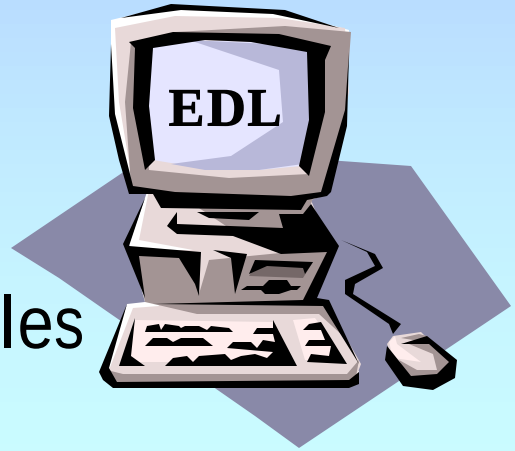
- Direct mailings



- Standards Web site
- Electronic Document Library (EDL)
- ITS Cooperative Deployment Network (ICDN)



- Meetings and conferences
- Training and workshops
- Courses and course modules



Outreach and Education: Training

One-day courses:

- National ITS Architecture and standards conformity
- ITS standards overview
- NTCIP center to center communications and traffic management data dictionary standards
- NTCIP dynamic message sign standards
- NTCIP actuated traffic signal standards

Check Web site for additional course information

Outreach and Education Training Providers

- U.S. DOT Professional Capacity Building Program (PCB)
- National Highway Institute (NHI)
- National Transit Institute (NTI)
- ITS America
- Institute of Transportation Engineers (ITE)
- Society of Automotive Engineers (SAE)
- American Public Transit Association (APTA)

Outreach and Education: Web Site

ITS Standards
Home Page

www.its-standards.net

- **Contact Us**
- **Related Links**
- **FAQs**
- **U.S. DOT Contacts**

Resource Documents

- General Information
- Deployment
- Slide Presentations
- Topical Reports

ITS Standards Fact Sheets

Grouped by:

- Application Area
- SDO
- Title

Standards Status

- Milestone Charts
- Summary List of Standards

Testing Program

- Background Papers and Reports
- Testing Fact Sheets
- List of Testable Standards
- Test Results Reports

Deployment Contacts

- Field Staff Contacts
- ITS Contacts Database
- Peer-to-Peer Program
- SDO Contacts

Training

- List of Available Courses

Application Areas

- Matrix
- Application Area Packages
- Application Area Roadmaps

COMING SOON:

- **Standards Development Database**
- **Sample Procurement Specifications**

http://www.its-standards.net

U.S. DOT ITS Standards Web Site Home Page - Netscape

File Edit View Go Communicator Help

ITS Standards

About ITS Standards | Resource Documents | Fact Sheets | Development Status | Testing | Deployment Assistance | Training | Application Areas

What's New :

In the *Resource Documents* section an ITS America report, "Ensuring Conformance to ITS Standard". Click *here* to view it.

New Fact Sheets have been added, click on the *Fact Sheets* tab to view them.

- Contact Us
- Web Links
- FAQs
- U.S. DOT Contacts

Click *here* for this Web site's viewing requirements.

About ITS Standards

ITS standards are industry-consensus standards that define how system components operate within a consistent framework. The framework is known as the National ITS Architecture. By specifying how systems and components interconnect, the standards promote interoperability.

To expedite deployment of nationally interoperable ITS systems and services, the U.S. DOT supports specific ITS standards initiatives, especially in areas that have significant public benefit.

The ITS Standards Program

The U.S. DOT ITS Standards Program is working toward the widespread use of standards to encourage the interoperability of ITS systems. Through cooperative agreements with five standards development organizations (SDOs), the Standards Program is accelerating development of about 100 non-proprietary, industry-based, consensus ITS standards, and is encouraging public-sector participation in the development process.

U.S. DOT ITS Standards Web Site Home Page - Netscape

File Edit View Go Communicator Help

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U.S. DOT Contacts

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ITS Standards Fact Sheets

View standards fact sheets that will help you understand, use and order ITS standards. Standards fact sheets are concise, "plain English" descriptions of ITS standards. Select from the three groupings below to locate specific fact sheets. *New Fact Sheets added 2/12/2001!*

SDO View the fact sheets grouped by the lead standards development organization (SDO).

Title View the fact sheets listed alphabetically by title.

Market Package View fact sheets organized by market package.

For a definition of "market package," visit the *National ITS Architecture Market Package* Web page.

For information on a specific market package, visit the *National ITS Architecture Market Packages List* Web page and then click on the market package name.

Note: The market packages and standards list may be slightly different than the list on the National ITS Architecture web site.

Sample Standards Fact Sheet

(in PDF Format)

HOT LINKS

U.S. Department of Transportation

SAE INTERNATIONAL

Intelligent Transportation Systems
Standards Fact Sheet

SAE J2353 (Draft)

February 2000 **Advanced Traveler Inform**
Dictionary

HOT LINK

Overview

Data dictionaries are essential components in the design and operation of modern, computer-based systems. They provide the basic information definitions, generally described as data elements (DEs), necessary for the exchange of information between systems.

Data dictionaries work in conjunction with at least two other sets of standards to provide effective data exchange. The first of these other sets of standards are message sets that handle information exchanges on specific topics. In a simple analogy, message sets are the sentences, while DEs are the words. The second set of standards needed for data exchange provides the actual communications protocols, and describes how the messages are encoded for transmission, transmitted and then decoded by the receiver.

To obtain a copy of this
please contact:

Society of Automoti ers (SAE)
400 Commonwealth
Warrendale, PA 150
Tel: (724) 776-4841
Fax: (724) 776-024
Web site: www.sae.o

Expected Publication Date: May 2000

This standard, **SAE J2353, Advanced Traveler Information Systems (ATIS) Data Dictionary,** defines the data elements for advanced traveler information system (ATIS) messages. In addition, it may be used by other ITS systems that convey information about ATIS-related items. This standard is the repository of unambiguous definitions needed to convey information to travelers and is one of a group of basic standards that are often referred to as functional area data dictionaries.

What is this standard for?

This standard provides the concise definition of data elements, including instructions on how to encode them at the bit level. It also describes the implied meaning of various phrases and points to other related data concepts on an element-by-element basis.

Who uses it?

This standard is intended for use by technical implementers who work with the structural format that is used to convey ATIS-related information. The information provided in this standard can be converted into software structural representation in a wide variety of implementation languages. The specification itself is composed in Abstract Syntax Notation One (ASN.1), as are most message-related standards used in ITS.

How is it used?

This standard is used by implementers to understand and create mess
it could be used to establish a set of messages for suppliers of travele
definitive list of ATIS data elements.

HOT LINK

Scope

This standard defines ATIS data elements and is the reference companion for SAE J2354. SAE J2354 p mary set of messages that build upon the DEs defined in this standard.

Related documents

SAE J2354—Advanced Traveler Information Systems (ATIS) Message Sets

SAE J2369—Standards for ATIS Message Sets Delivered over Reduced Bandwidth Media

SAE J2313—On-Board Land Vehicle Mayday Reporting Interface Standard

ITU-TX.680—Data Networks and Open System Communications, OSI Networking and System Aspects - Abstract Syntax Notation One (ASN.1) Specification of Basic Notation

HOT LINK

For more information on ITS standards, contact the Federal Highway Administration, ITS Joint Program Office, Room 3422, HOIT-1, 400 7th Street, SW, Washington, DC 20590, phone: 202-366-2180, fax: 202-493-2027, Web site: www.its.dot.gov/standard/standfact.htm
Produced by the Jet Propulsion Laboratory for the U.S. Department of Transportation.

ITS Standards Program
4. Technical Assistance

Technical Assistance Goal

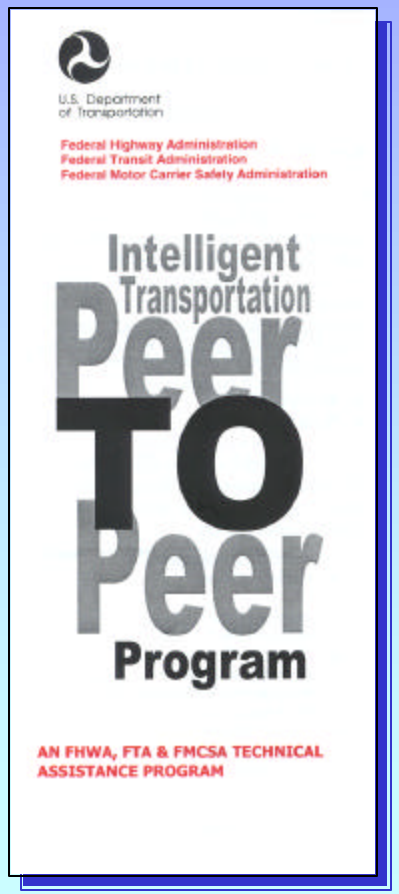
To provide transportation stakeholders involved in ITS standards implementation with technical advice and assistance.

Technical Assistance Resources

- *Peer-to-Peer Program* - standards experts available to provide assistance on an as-needed basis
- *U.S. DOT Field Offices* - ITS standards assistance, resource libraries, access to additional technical resources
- *Standards Development Organizations (SDOs)* - standards developers and consultants can help interpret the standards

FMCSA
FTA
FHWA
ASTM
AASHTO
ite
IEEE
NEMA
SAE INTERNATIONAL

Peer-to-Peer Program



- Provides technical assistance via phone, e-mail, and on-site consultation, if necessary
- Facilitates ITS implementation

Peer-to-Peer Program Goals

- Solve deployment challenges through
  - Tours of successful sites
  - Off-site reviews
  - Presentations
  - Workshops
  - Referrals
  - On-site consultation

Peer-to-Peer Program for ITS Standards

- Peers are public and private sector professionals who have successfully addressed similar challenges
- About ten ITS standards peers are available for assistance

Peer-to-Peer Program Audience

- State DOTs
- Transit agencies
- Metropolitan Planning Organizations
- Turnpike, tollway, bridge, port or similar agencies
- Transportation professionals and associations
- Policy and administrative officials
- Other public sector agency staff

Peer-to-Peer Program
How to Get Help

For information about obtaining free technical assistance through the Peer-to Peer Program, or to enroll as an ITS peer and provide assistance to other transportation professionals:

- Call Peer-to-Peer Hotline at *(888)700-PEER*
- E-mail *dotpeer@erols.com*
- Log onto Peer-to-Peer Web site:

www.its.dot.gov/peer/peer.htm

U.S. DOT Field Resources

- Staff members with competence in ITS standards use
- Library of standards, reference materials
- Contact information for ITS deployment projects
- Liaison to U.S. DOT ITS Joint Program Office (JPO)

Standards Development Organization Assistance

- Contacts for standards development committees and experts on standards content
- Purchasing information
- Technical information about standards content and technologies

ITS Standards Program
5. Policy Support

Policy Support Goals

- To develop policy related to ITS standards and the use of Federal funds for ITS projects
- To provide policy guidance and support to public agency deployers

Critical Standards vs. Conformity to Standards

- The issue of *critical standards* is separate from the issue of *conformity to standards*
- U.S. DOT is applying resources towards ensuring the standards are “mature” prior to requiring their use, whether or not they are on the critical standards list
- Standards will not be required until the rulemaking process is complete
  - SDO-approved standards, however, are strongly encouraged

Critical Standards and TEA-21

The primary goal of the ITS Standards Program is "… to promote and ensure interoperability in the implementation of intelligent transportation system technologies, including actions taken to establish critical standards." The Secretary of Transportation shall identify by June 1, 1999 "which standards are critical to ensuring national interoperability or critical to the development of other standards..."

–TEA-21 Title V, Sec. 5205(a)(2)(c)

Critical Standards

- Identified as critical to *ensuring national interoperability* or critical to the *development of other standards*
- Report delivered to Congress June 1, 1999 (available on standards Web site)
- The Secretary *shall* invoke a provisional standard for any critical standard not published by an SDO by January 2001
  - waiver option available

What It Means To Be "Critical"

- It *does* mean:
  - 2001 deadline for approval by SDOs or a provisional standard may be established
- It *doesn't* mean:
  - Development of other standards will not be funded
  - Other standards are not important
  - Critical standards will automatically become required by U.S. DOT

Architecture and Standards Conformity

"The Secretary shall ensure that ITS projects carried out using funds made available from the Highway Trust Fund...conform to the national architecture, applicable standards or provisional standards, and protocols..."

–TEA-21 Title V, Sec.5206(e)

What The Conformity Requirement Means

- To be eligible for Federal funding for ITS projects, U.S. DOT-adopted ITS standards must be used, where applicable
- A rulemaking process is prerequisite to U.S. DOT requiring use of standards

The FHWA Conformity Rulemaking Process

- Standard is developed
- Standard is operationally tested and "mature"
- A "Notice of Proposed Rulemaking" is published (opportunity for public comment) in the Federal Register
- Standard is "adopted" by FHWA in a published final rulemaking notice

Note: FTA uses "circular" to set policy

ITS Standards Program Summary

- Focus of program is on accelerating the development and deployment of ITS standards
- Users' needs determine program direction and deliverables
- Feedback from users is essential - how are we doing, what else is needed?
- Web site has lots of information and is continuously updated - check it regularly!

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Prepared by the Jet Propulsion Laboratory for the U.S. Department of Transportation

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ITS STANDARDS PROGRAM