Developing Consistency in ITS Safety Solutions: Intersection Conflict Warning Systems

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National Rural ITS Conference – Session S2: ITS Safety Solutions
September 17, 2012

Outline

- ENTERPRISE Program
- Intersection Conflict Warning Systems
- Design and Evaluation Guidance
- Systems Engineering
- Next Steps

E N T E R P R I S E

ENTERPRISE Program

- What is a transportation pooled fund?
  - Allows federal, state, and local agencies and other organizations to combine resources to support transportation needs
  - Federal, state, regional or local transportation agencies may initiate pooled fund studies
    - Private companies, foundations, and colleges/universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects
  - Approved by FHWA

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ENTERPRISE Program

- Goals
  - Facilitate rapid progress in the development and deployment of ITS technologies
  - Accelerate the systematic advancement of selected ITS projects
    - Members carry out ITS projects and activities including fundamental research, technology development, demonstration, standardization and deployment
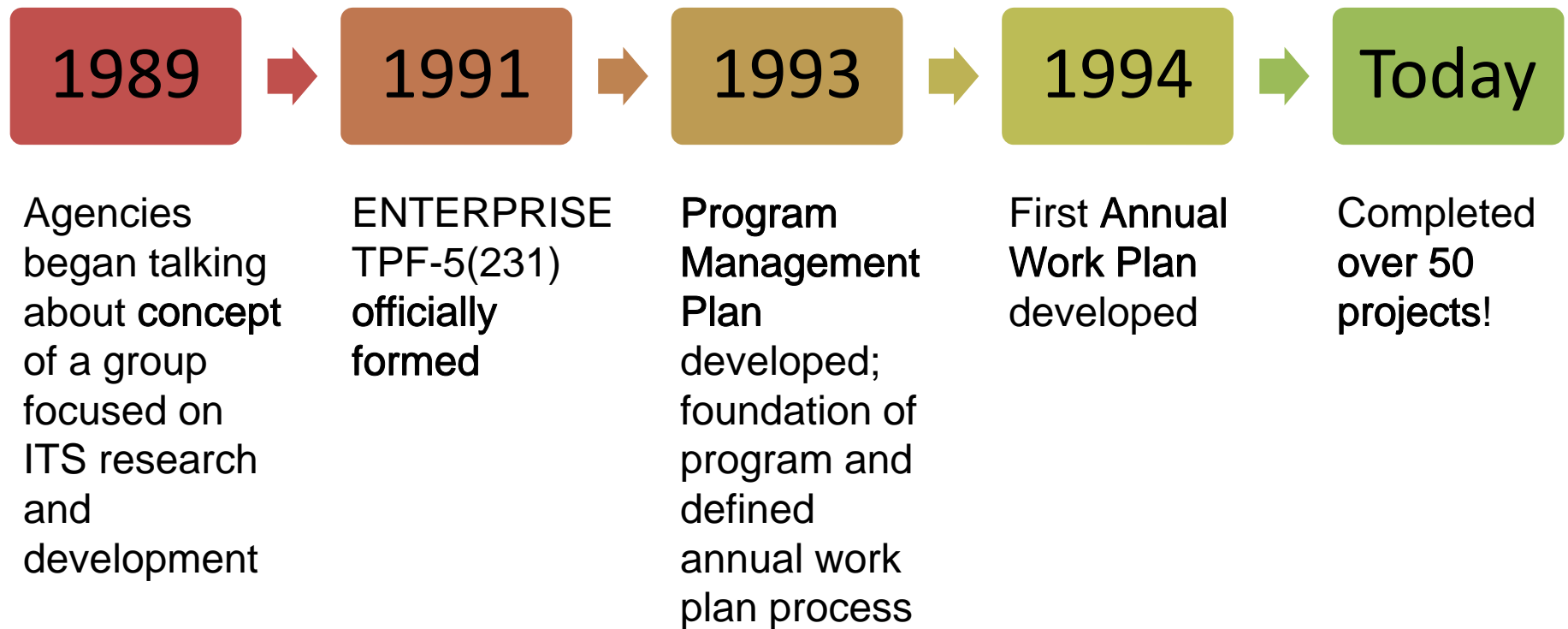
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ENTERPRISE Program

Members

- Arizona DOT
- Georgia DOT
- Idaho Transportation Department
- Illinois DOT
- Iowa DOT
- Kansas DOT
- Maricopa County, Arizona
- **Michigan DOT***
- Minnesota DOT

- Mississippi DOT
- Oklahoma DOT
- Texas DOT
- Virginia DOT
- Washington State DOT
- Ontario Ministry of Transport
- Transport Canada
- Dutch Ministry of Transport
- FHWA

* Michigan DOT administers program and is a founding member

ENTERPRISE Program

Major Milestones

1989 ➤ **1991** ➤ **1993** ➤ **1994** ➤ **Today**

| 1989	1991	1993	1994	Today
Agencies began talking about **concept** of a group focused on ITS research and development	ENTERPRISE TPF-5(231) **officially formed**	**Program Management Plan** developed; foundation of program and defined annual work plan process	First **Annual Work Plan** developed	Completed **over 50 projects!**

E N T E R   P R I S E

ENTERPRISE Program

- Recent projects
  - Warrants for ITS Devices
  - Understanding Utilization of Third Party Travel Data and Information
  - Impacts of Travel Information on the Overall Network
  - Next Era of Traveler Information
  - *Developing Consistency in ITS Safety Solutions – Intersection Conflict Warning Systems*

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Intersection Conflict Warning Systems

Intersection conflict warning systems (ICWS) are used at stop-controlled intersections to provide drivers – on major or minor roads – with **dynamic warning** of other vehicles approaching the intersection
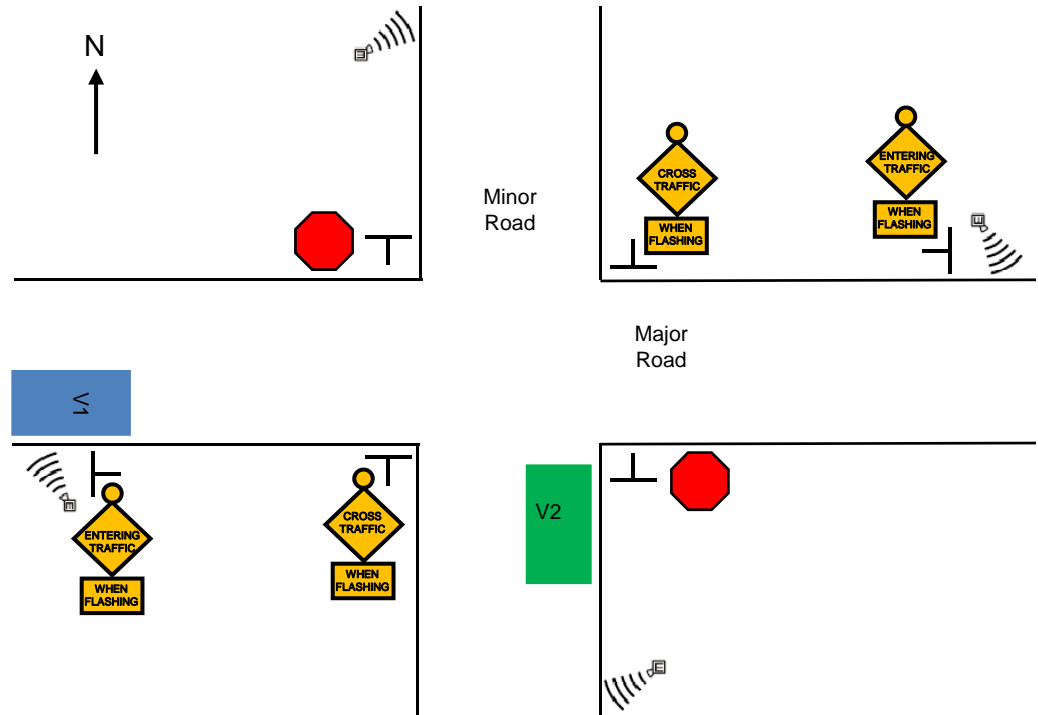
Intersection Conflict Warning Systems

Major Road Warning

Intersection Conflict Warning Systems

Minor Road Warning

Intersection Conflict Warning Systems

Design and Evaluation Guidance

Bring together organizations that have developed and deployed ICWS to **develop a consistent approach for accelerated, uniform deployment and further evaluation** of them, and to **recommend preliminary design and evaluation guidance** for MUTCD consideration.

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Design and Evaluation Guidance

- Webinar (June 23, 2011)
  - **Shared knowledge** and educated each other on systems deployed
  - **Identified challenges** with future deployments
- Workshop #1 (July 28-29, 2011)
  - Discussed content of a preliminary **design guidance**
  - Discussed **roadmap** for reaching standardization
- Workshop #2 (September 15-16, 2011)
  - Reviewed preliminary **design guidance**
  - Developed **evaluation framework** that may be used in future deployments
  - Discussed **plans for future** deployment and coordination plans
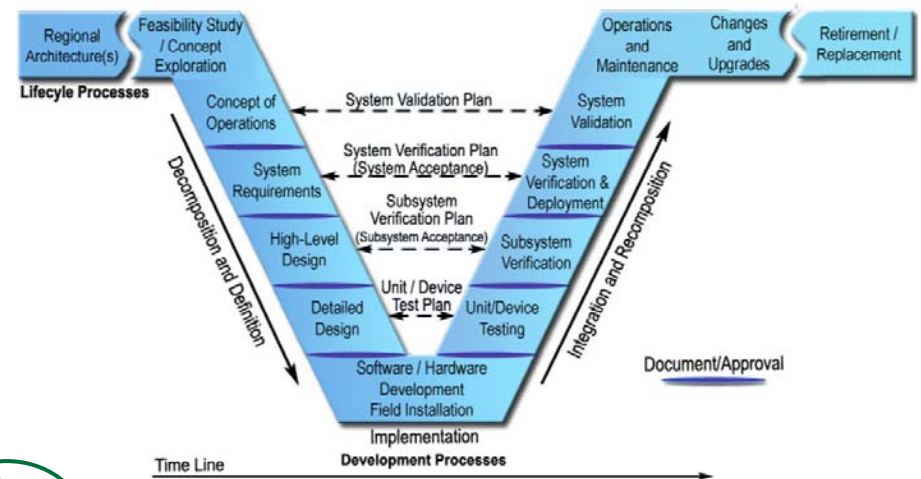
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Design and Evaluation Guidance

- Results
  - Increased **awareness** of systems deployed
  - Developed **design guidance** to support more consistent deployment
  - Established **evaluation framework**
  - Created **roadmap for standardization**

Design and Evaluation Guidance for Intersection Conflict Warning Systems (ICWS)

Version 1: December 2011

Prepared for and with support from:

ENTERPRISE Transportation Pooled Fund TPF-5(231)
www.enterprise.prog.org

USDOT FHWA Office of Safety
www.safety.fhwa.dot.gov

Prepared by:

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Systems Engineering

- Why develop a concept of operations or system requirements?

  – ICWS are intelligent transportation systems and FHWA requires systems engineering for ITS

  – Some agencies are unfamiliar with systems engineering

  – Time and budget aren't always available for adequate systems engineering

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Systems Engineering

Concept of operations and system requirements will **offer a starting point** for transportation agencies deploying ICWS

Systems Engineering

- Draft concept of operations reviewed on Sept 11
  - Copy available online for further review and comment
  - Stakeholders, needs, operational concept and system

Challenge	ID	Need
Continuous alerts can diminish the credibility and value of a dynamic warning for drivers.	**5**	**Drivers and transportation agencies** need **alerts to be dynamic and not become nearly continuous** so as to lose impact.

3.2 Operational Concept – Transportation Agency Perspective

3.2.1 — Transportation agencies will not deploy ICWS where traffic volumes cause **alerts to be displayed in a nearly continuous manner. (5)**

System Component	Support Required
Overall ICWS	Determine where ICWS should be installed based on traffic volumes, speeds and intersection design characteristics for maximum safety effectiveness. **(3.2.1) (3.2.12) (3.2.14)**

Next Steps

- For ENTERPRISE...
  - Review draft concept of operations with ENTERPRISE board on **Sept 19**
  - Finalize concept of operations by **Oct 1**
    - Post to ENTERPRISE web site
  - Develop draft system requirements in **Oct**
  - Webinar review of draft requirements in **mid-Nov**
  - Finalize system requirements by **Dec 31**
    - Post to ENTERPRISE web site and share with key stakeholders

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Next Steps

- Work beyond ENTERPRISE...
  - Traffic Control Devices TPF-5(065)
    - Human factors research on placement and legend
  - Evaluation of Low Cost Safety Improvements TPF-5(099)
    - Nationally oriented safety effectiveness evaluation
  - NCUTCD R/WSTC Task Force
    - Determine what may be needed for ICWS in MUTCD
  - AASHTO SCOTE
    - Resolution to SCOH
  - ATSSA
    - Signing Committee collaboration with ENTERPRISE

Next Steps

- More work beyond ENTERPRISE...
  - NCDOT Safety Effectiveness Evaluation
    - Major and major/minor road ICWS = 25-30% reduction (total crashes)
    - May be even higher reduction for severe injury crashes
  - MnDOT Rural ICWS project
    - Design-build deployment at 20-50 sites

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