Connected Vehicle Pooled Fund Study

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Connected Vehicle Pooled Fund Study

- **The Pooled Fund Study (PFS) is a partnership of transportation agencies who have established a program to facilitate the development and evaluation of Connected Vehicle applications**

- **The program will prepare state and local transportation agencies for the deployment of Connected Vehicle technologies**

- **The program will result in the following outcomes:**
  - **Development and demonstration of connected technology, algorithms, tools and applications**
  - **Preparation for field deployments**
  - **Development and deployment documentation**
  - **Lessons learned and identification of challenges from field deployments**

Current PFS Membership

Core/Voting Members

- VDOT is lead agency with administrative support from UVA
- Fifteen Core Members:
  Virginia, California, Florida, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Texas, Utah, Washington, Wisconsin, Maricopa County and FHWA

Associate Members

- *Palm Beach Co, FL; Oakland Co, MI; MTC (Bay Area), San Diego's Regional Planning Agency*, Los Angeles County Metropolitan Transportation Authority (Metro), *Transport Canada, Arizona DOT*, Rijkswaterstaat and North Texas Toll Authority

Liaisons

- *NCHRP/SHRP 2; AASHTO (strategic and deployment plans)*

Connected Vehicle Pooled Fund Study

- **The PFS was initiated as a phased program**

Phase I - Research to educate to connected vehicle technologies

Phase II - Develop and field testing connected vehicle applications

Phase III – Continue develop and field testing connected vehicle applications

Dynamic Mobility Application – Develop and field test a Multi-modal Intelligent Traffic Signal System (USDOT Partially Funded)

July 2009 July 2012 July 2015 Aug 2017

PFS Phase I Program
July 2009 – August 2012

- **Connected Vehicle Traffic Signal Control Algorithm – Developed and evaluated a new traffic signal control algorithm using connected vehicle data**
- **Pavement Maintenance Support Algorithm – Determined the benefits of using CV probe data to develop IRI estimates and detect and map potholes**
- **Evaluation of Signal Phase and Timing Data – Developed CONOPS and benefits assessment for use cases of SPaT data**
- **Connected Vehicle Certification Program – Educated PFS members on potential issues related to a future connected vehicle certification program**
- **Aftermarket On-Board Equipment – Identified requirements for a Multi-Communications enabled OBE and provided recommendations for rapid introduction of equipment**

PFS Phase II Program
September 2012 – December 2015

- **Traffic Management Centers in a Connected Vehicle Environment – Investigated how the Connected Vehicle environment will change the TMC of the future, both technically and the role of TMC operators/managers (Complete)**

- **5.9GHz DSRC Vehicle Based Road and Weather Condition Application (Phase I) – Develop a 5.9GHz DSRC application that is used on fleet vehicles for road and weather condition data (Completed Phase I, moved to test in Phase II)**

- **Surveying/Mapping for CV Applications**

  Analyze and document the surveying and mapping requirements for expected connected vehicle applications and determine best practices (Complete)

Dynamic Mobility Application
Multi-Modal Intelligent Traffic Signal System
October 2011 – June 2016

- **Objective: Develop and test a system that integrates connected vehicle information and devices into a more effective and safer traffic signal control system for multiple modes of travelers**

- **Funded in part by USDOT to support its Dynamic Mobility Application Program**

- **Phase I – Develop the CONOPS, systems requirements and system design (Complete)**
- **Phase II – Demonstrate and field test the system in two locations**
  - **Maricopa County, Arizona**
  - **El Camino Real, California**
- **Status**
  - **CONOPS – complete**
  - **Application development – complete**
  - **Infrastructure deployment – complete**
  - **Final documentation – complete**

PFS Phase III Program
December 2015 - August 2017

- **Basic Infrastructure Message Development and Standards Support for Connected Vehicles Applications**
  - To be awarded in July/August
  - Project objectives:
    - To develop a Basic Infrastructure Message (BIM); and
    - To establish a means to collaborate with the relevant standards development organizations

- **5.9 GHz Dedicated Short Range Communication Vehicle Based Road and Weather Condition Application, Phase 2**
  - Awarded to Synesis Partners
  - Project objectives:
    - Building on work performed in Phase 1, to deploy a DSRC based Road Weather application in New York and Michigan
    - To evaluate and interface with existing back office systems, including
      - New York's INFORM
      - Michigan's DUAP
      - FHWA Weather Data Environment (WxDE)

Future Projects/Direction

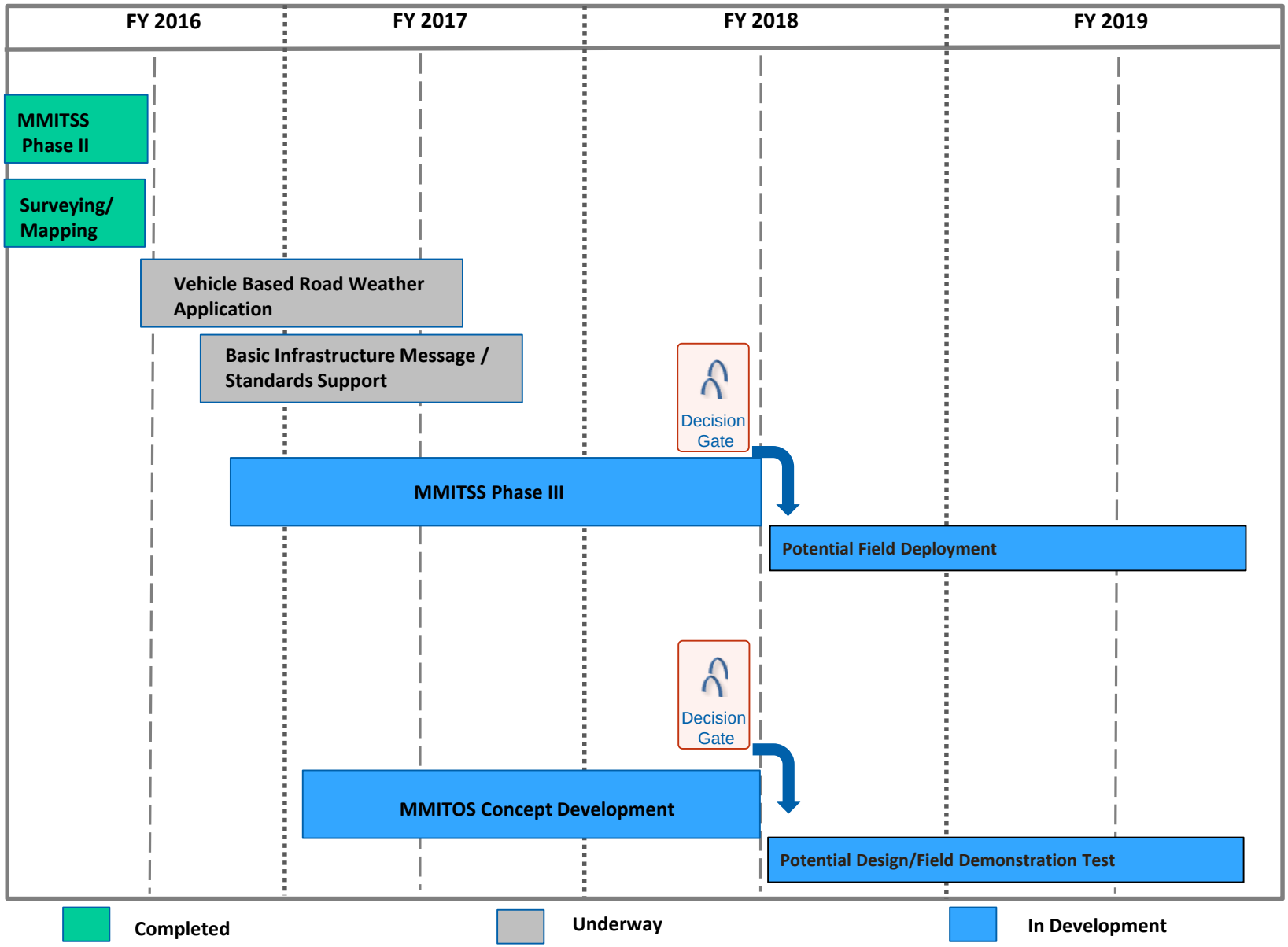
Working with FHWA to develop the following projects:

- **Multi-Modal Intelligent Transportation System Phase III**
  - Gap analysis of what additional work needs to be completed to prepare MMITSS for large-scale deployment
  - Enhancement of existing application to state of deployment-ready software, documentation, etc.
- **Multi-Modal Intelligent Traffic Operations System**
  - Build on the foundation of MMITSS and other CV prototype applications to develop a Concept of Operations for a CV application(s) that integrates freeway and arterial operations to better manage the flow of traffic across the entire system

Additional focus:

- Coordination with Auto manufacturers
- Involvement with standards development
- Continue to develop and demonstrate CV technology and applications

CV PFS Work Plan



Benefits Realized through PFS

Benefits

- **Identify issues that require further research or development**
- **Readily available CONOPs and deployment documentation**
- **Deployment lessons learned and deployment guidance from other states**
- **Member peer exchanges**
- **Site visit to member deployments during face-to-face meetings**
- **Provide input to standards organizations for improvements or identify missing standards**
- **Shape a national interoperable system**
- **Identify potential challenges for CV deployments**
  - Roadside Equipment is still maturing
  - Legacy equipment and communications systems in the field
  - Standards are not fully developed – the PFS provides feedback to standards organizations to help address any gaps

Additional Information

- **Connected Vehicle Pooled Fund Study**
  http://www.cts.virginia.edu/cvpfs/
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