



# CONNECTED VEHICLE PILOT Deployment Program



CV Pilots Open  
Source Software  
and the OSADP



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ITS Joint Program Office



# TODAY'S AGENDA



- Purpose of this Technical Assistance Webinar Series
  - To assist not only the three selected sites, but also other early deployers of connected vehicle technologies to conduct Concept Development activities.
  
- Webinar Content
  - Connected Vehicle Pilot Deployment Program Overview
  - CV Pilots Open Source Software Requirements
  - Using the OSADP
  - Stakeholder Q&A
  - How to Stay Connected
  
- Webinar Protocol
  - Please mute your phone during the entire webinar
  - You are welcome to ask questions via chatbox at the Q&A Section
  - The webinar will be recorded except the Q&A Section
  - The webinar recording and the presentation material will be posted on the CV Pilots website within a week

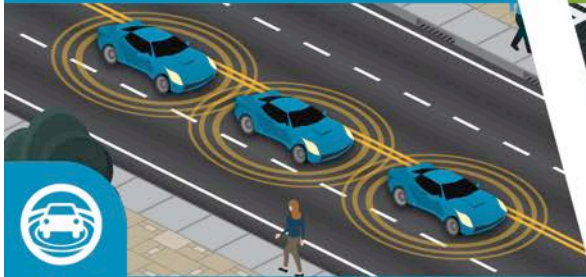




# CV PILOT DEPLOYMENT PROGRAM GOALS



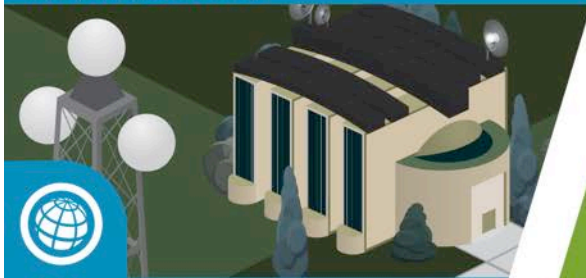
## Spur Early CV Tech Deployment



Wirelessly Connected Vehicles



Mobile Devices



Infrastructure

## Measure Deployment Benefits



Safety

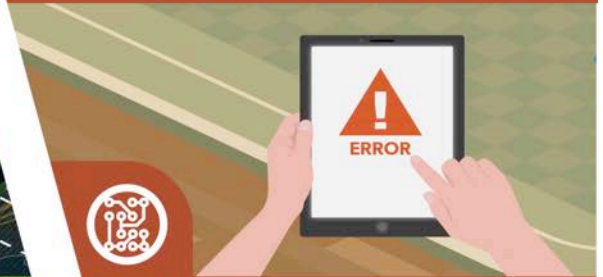


Mobility



Environment

## Resolve Deployment Issues



Technical



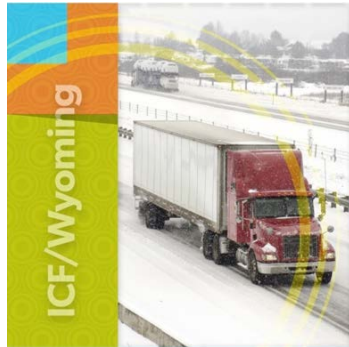
Institutional



Financial



# Sites Selected – 2015 Awards



- Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.
- Focused on the needs of commercial vehicle operators in the State of Wyoming.



- Improve safety and mobility of travelers in New York City through connected vehicle technologies.
- Vehicle to vehicle (V2V) technology installed in up to 10,000 vehicles in Midtown Manhattan, and vehicle to infrastructure (V2I) technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.

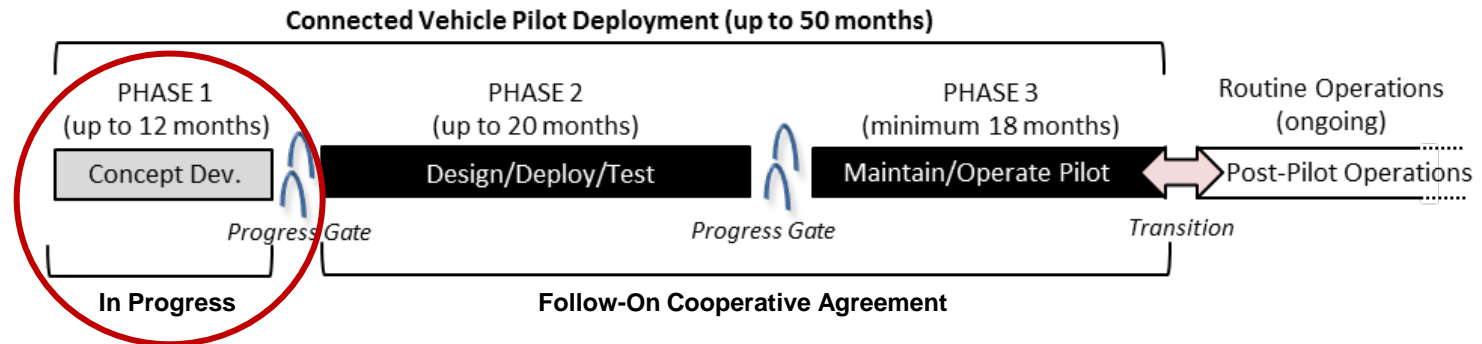


- Alleviate congestion and improve safety during morning commuting hours.
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.





# Deployment Schedule



- Overall Deployment Schedule
  - Phase 1: Concept Development
    - Creates the foundational plan to enable further design and deployment
  - Phase 2: Design/Deploy/Test
    - Detailed design and deployment followed by testing to ensure deployment functions as intended (both technically and institutionally)
  - Phase 3: Maintain/Operate
    - Focus is on assessing the performance of the deployed system
  - Post Pilot Operations (CV tech integrated into operational practice)
- Public webinars to share the concept development activities from the three sites
  - Concept of Operations Webinar (February – March 2016)
  - Performance Measurement Webinar (May – June 2016)
  - Deployment Plan Webinar (August 2016)



# Why Open Source?



- **Definition**

- Software that gives users the right to run, copy, distribute, study, change, and improve it as they see it, without having to ask permission from or make fiscal payments to any external group or person. (<http://opensource.org/osd>)

- **Why USDOT is interested in Open Source**

- Allow others to build upon USDOT funded development work
- Provide transparency into developed applications/software
- Promote collaboration on development activities
- Facilitate sharing of common code





# WHAT IS REQUIRED OF A CV PILOTS APPLICATION



- New code development under CV Pilot must:
  - Be made available through the OSADP
  - Be licensed under an Open Source License (Apache 2.0 preferred)
  
- Existing applications brought to the pilot deployment need not be made open source
  - However, code related to new interfaces or enhancements added with Pilots funding are expected to be made open source
  
- At least one application needs to use the Connected Vehicle Security Credential Management System (SCMS)
  
- Requirements must be derived from the System Requirements Specification (SyRS) document (Task 6)
  
- Follow software development best practices (traceability, coding standards, unit testing, regression testing, user acceptance, etc.. ). Note: development processes are left to the discretion of the individual Pilots



# APACHE 2.0 OPEN SOURCE LICENSE: OVERVIEW



## Can

Download and use  
for free

Incorporate  
software in  
proprietary  
package you  
create

Make changes  
without having to  
resubmit as open  
source

## Cannot

Redistribute without  
proper attribution

Use any  
Trademarks or  
Logos that may  
State that the  
Organization  
Endorses your  
Distribution

Restrict use of the  
software

## Must

Include License in  
any redistribution that  
includes the software

Document which files  
were modified in any  
New Distribution

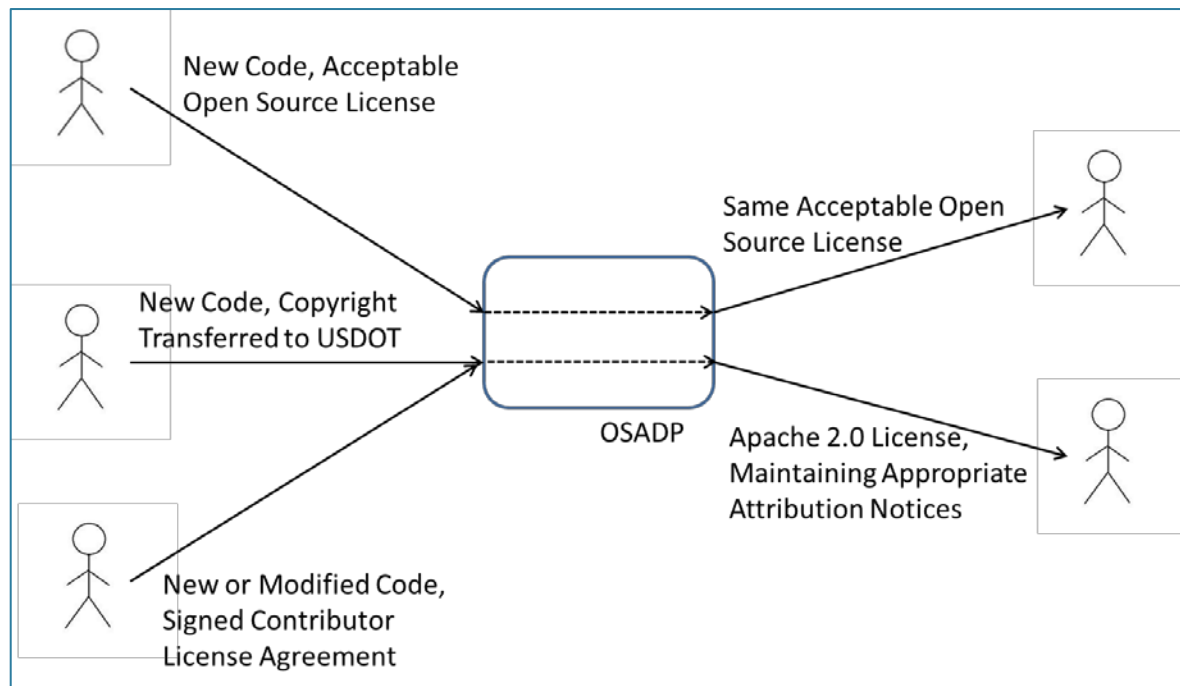






# OPEN SOURCE IN THE OSADP

- Case 1: New Code, Acceptable Open Source License
- Case 2: New Code, Copyright Transferred to USDOT
- Case 3: New or Modified Code, Signed Contributor License Agreement



- Cases 2&3: The code, if accepted, will be released by USDOT under the Apache 2.0 License

# What is the OSADP?



- Purpose: The Open Source Application Development Portal (OSADP) provides web-based access and collaboration on the source code and documentation for innovative, open source transportation applications.
  
- Objectives:
  - Reusability - promote the reusing of software wherever possible
  - Transparency - application development is transparent and broadly available
  - Provide complete application package
  - Collaborative development - a friendly and collaborative community

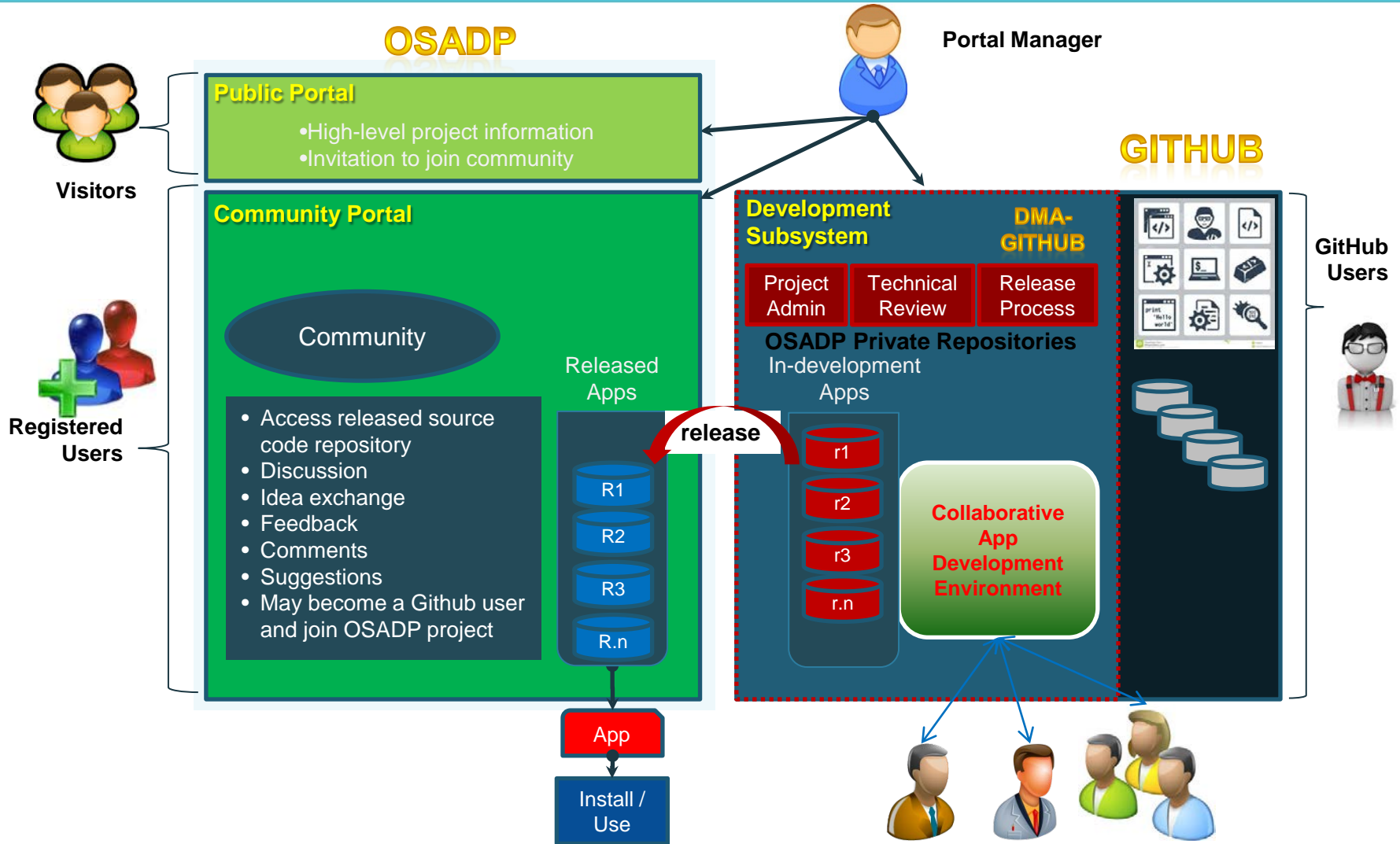
# OSADP Features



- Application download page
- Information on new applications
- Forums for community discussions
- Resources to use applications
- Developer uploader guide
- FAQ's
- Platform to test (GitHub) applications before posting
- Application Submittal (e.g., upload, collaboration)

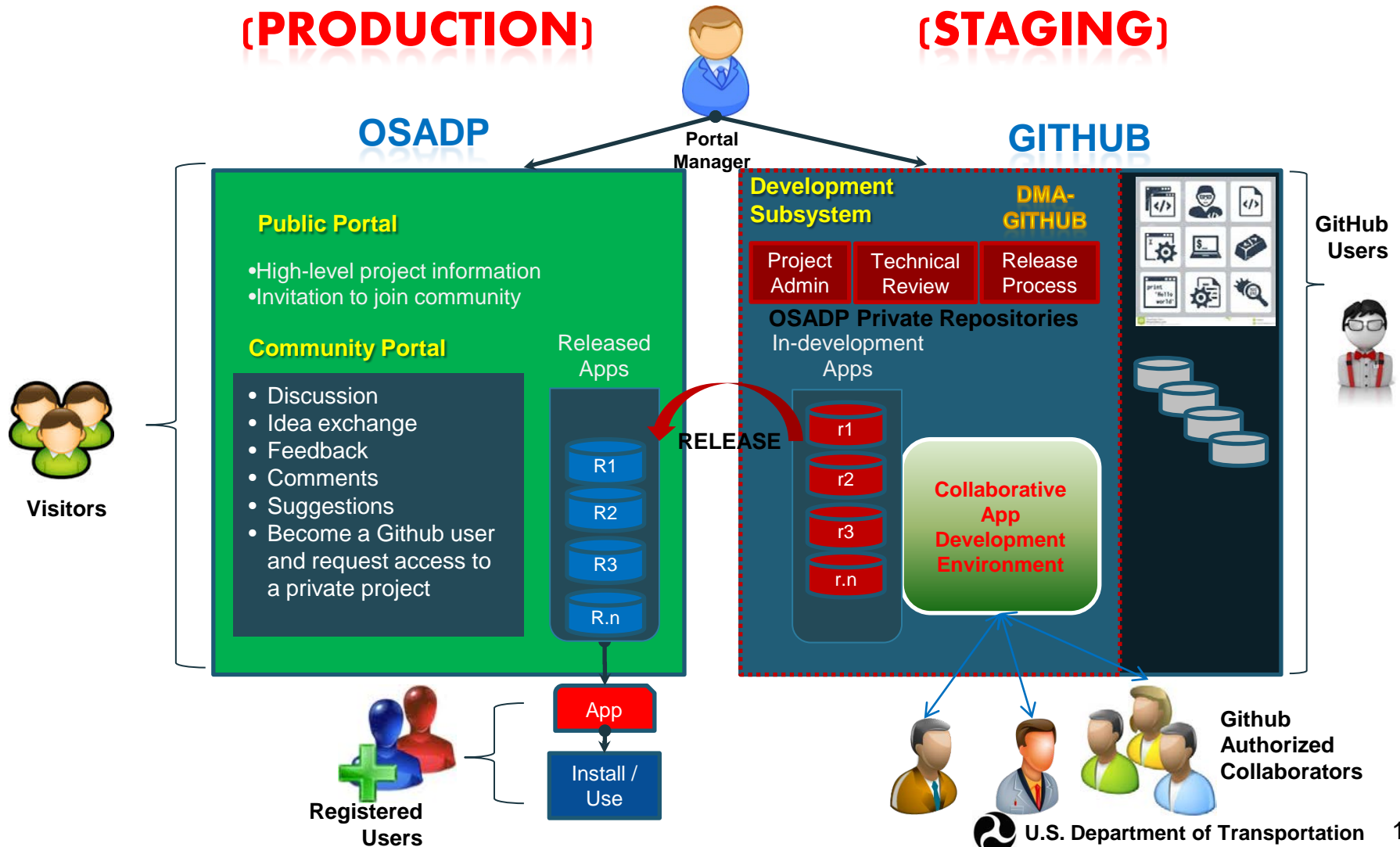


# OSADP Architecture





# OSADP 2.0



# Current OSADP Applications



- Total Number of Applications: 39
- DMA Applications
  - MMITSS, FRATIS, INFLO, CACC (CARMA 1.0), R.E.S.C.U.M.E., IDTO
- Non-Field Applications
  - Performance Measure Application, TCA, Co-Pilot, P-ODE, CACC-VISSIM, BDEM-CAV, BSMDE Measures Estimation, VEDM, Road Weather Perf. Measures
- Data Applications
  - SPaT, RSD, CV-DSRC message parser
- Non-DMA Commercial Vehicle Applications
  - C-TIP, SRI



# Collaborative Project: OpenAWAM



- Owners: City of Moreno Valley, CA and LACMTA
- Description: Anonymous Wireless Address Matching, and is a generic term for Bluetooth- or WiFi- based travel time data collection systems. The OpenAWAM uses field devices, called nodes, running Linux software, to collect Bluetooth addresses and pass the data over an agency-owned data telecommunication network to a central computer.
- Collaboration Opportunity:
  - Contributing sections of code
  - Testing and obtaining user feedback
  - Identifying new use cases, or validating use cases currently in development
  - Proposing other areas to collaborate and apply your skills



# Applications Coming Soon



- FHWA ITS JPO Mobility Challenge:
  - SmarTrAC
  - CloudThink Motion Logger
- Pikalert<sup>®</sup> Vehicle Data Translator (VDT)/Enhanced Maintenance Decision Support System (EMDSS)
- Connected, Longitudinally Automated Lane Change



# How to Download Applications



- You must be a registered user to download application on the OSADP
- Applications available for download can be accessed on the 'applications/download' page
- All applications download directly to your machine

### Trajectory Converter Analysis 2.3 Stable

The Trajectory Converter Analysis (TCA) Software is designed to test different strategies for producing, transmitting, and storing Connected Vehicle information. The VISSIM add-on (TCA-V) runs with the VISSIM tool using real-time simulation vehicle information, Roadside Equipment (RSE) location information, cellular region information, and strategy information to produce a series of snapshots that the vehicle would produce. Vehicles can be equipped to generate and transmit Probe Data Messages (PDMs) or Basic Safety Messages (BSMs) which can be transmitted by either Dedicated Short Range Communication (DSRC) or via cellular.

Please share your experience and insight on the [Forum](#).

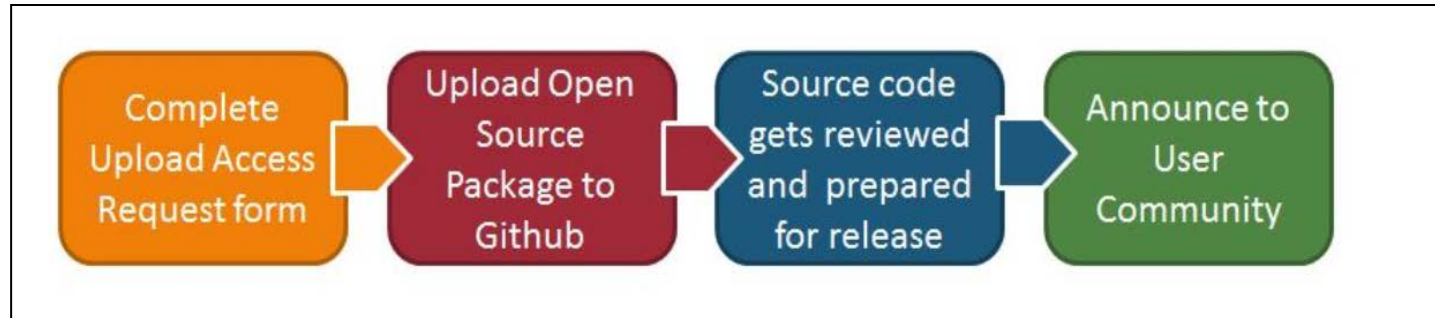
**Maturity:** Stable  
**Released on:** Thursday, 23 October 2014 20:00

<a href="#">TCA-VISSIM-2_3_2</a>	<a href="#">DOWNLOAD NOW</a>	Downloaded 4 times
<a href="#">TCA-2_3_3</a>	<a href="#">DOWNLOAD NOW</a>	Downloaded 3 times
<a href="#">TCA 2.3.2</a>	<a href="#">DOWNLOAD NOW</a>	Downloaded 8 times
<a href="#">TCA-VISSIM 2.3.1</a>	<a href="#">DOWNLOAD NOW</a>	Downloaded 98 times
<a href="#">TCA-PARAMICS 2.3.1</a>	<a href="#">DOWNLOAD NOW</a>	Downloaded 84 times

[View files](#)



# Application Upload Process



- Upload Request
  - Terms and conditions
  - Access Request Form
- Required files:
  - Source code or assets
  - README.txt gives user a brief summary of the open source package
  - RELEASE-NOTES.txt describes incremental difference of this release and associated instructions
  - LICENSE.txt declares the license that this open source is released under
  - CONTRIBUTION.txt acknowledges or gives credits to individuals, a group, or an organization that have contributed to the open source
- Optional:
  - User guide and/or Instructions
  - Project Documentation (Final Reports or Systems Engineering documentation)



# Using GitHub



- GitHub is the staging environment for the OSADP
  - GitHub is a stable, proven, popular, affordable and provides a flexible infrastructure for open source software collaboration and staging/vetting
  
- The OSADP uses private repositories on GitHub
  - Uploader must be a registered GitHub user
  - OSADP administrator will invite uploader to access repository to upload code
  - Uploader uses GitHub application to add code from their computer to repository
  - Uploaders can then access application source code and perform updates in the repository
  - OSADP administrator will vet and approve application before release onto the OSADP



# Live Demo



[www.itsforge.net](http://www.itsforge.net)



# Preview of OSADP Version 2.0



U.S. Department of Transportation  
Federal Highway Administration

OSADP
HOME INFORMATION COMMUNITY CONTACT LOGIN

Welcome to Open Source Application Development Portal!

A channel for distributing and collaborating on transportation related open source applications

**LATEST APPLICATION RELEASES**

- **SPaT 1.2**  
Signal Phase and Timing
- **VEDM-CAV 1.0**  
VISSIM External Driver Model for Connected and Automated Vehicles
- **BSM-Data-Emulator 1.0**  
Basic Safety Message Data Emulator
- **P-ODE 1.0**  
Prototype Operational Data Environment
- **CACC-VISSIM 1.0**  
Cooperative Adaptive Cruise Control VISSIMS

... on the Development of Anonymous Wireless Address Matching Application... Signal Phase and Timing

Explore Applications

Upcoming Releases

Resources & Tools

Discussion Forum

**STATISTICS**

Application Releases: 36  
Application Downloads: 1000

**APPLICATION CATEGORIES**

Arterial Management	Freeway Management	Collision Avoidance	Collision Notification	Commercial Vehicle Operations	Crash Prevention & Safety	Driver Assistance	Electronic Payment & Pricing
Information Management	Intermodal Freight	Roadway Operations & Maintenance	Road Weather Management	Transit Management	Traffic Incident Management	Emergency Management	Travel Information

TOP

# Stakeholder Q&A



- Please keep your phone muted
- Please use chatbox to ask questions
- Questions will be answered in the order in which they were received
- This Q&A section will not be recorded, nor posted to the website



# STAY CONNECTED



## Contact for CV Pilots Program:

Kate Hartman, Program Manager

[Kate.hartman@dot.gov](mailto:Kate.hartman@dot.gov)

## Join us for the *Getting Ready for Deployment Series*

- Discover more about the 2015 CV Pilot Sites
- Learn the Essential Steps to CV Deployment
- Engage in Technical Discussion



**Website:** <http://www.its.dot.gov/pilots>

**Twitter:** [@ITSJPODirector](https://twitter.com/ITSJPODirector)

**Facebook:**

<https://www.facebook.com/DOTRITA>

## February 2016 Webinars

### Technical Assistance Webinars

- 2/1/2016, 11:00 – 12:30 pm EST  
*Preparing a Privacy Concept for Connected Vehicle Deployments*
- 2/9/2016, 2:00 – 3:00 pm EST  
*Preparing a Performance Measurement Plan for Connected Vehicle Deployments*
- 2/10/2016, 2:30 – 4:00 pm EST  
*SCMS Proof-of-Concept Interface Requirements for Connected Vehicle Deployments*

### Public ConOps Webinars

- 2/5/2016, 1:00 – 2:00 pm EST: ICF/Wyoming
- 2/8/2016, 2:00 – 3:00 pm EST: Tampa (THEA)

Please visit the CV pilots website for the recording and the briefing material of the previous webinars.

