



CONNECTED VEHICLE PILOT Deployment Program



Partnership Finalization and Coordination
- Institutional, Business and Financial Issues -



Brian Cronin, ITS JPO, Team Lead, Research and Demonstration

ITS Joint Program Office



Introductions – Today's Speakers



- Brian Cronin, ITS JPO, Team Lead, Research and Demonstration
- Bill Hyman, Support, Noblis
- Phil Tarnoff, Consultant

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
 - Institutional, Business and Financial Issues in CV Deployments
 - 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





OVERVIEW OF CV DEPLOYMENT PROGRAM



Brian Cronin

CV PILOT DEPLOYMENT PROGRAM GOALS



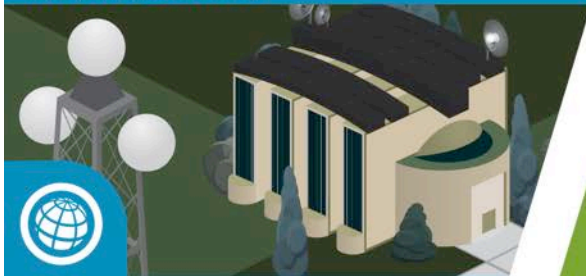
Spur Early CV Tech Deployment



Wirelessly Connected Vehicles



Mobile Devices



Infrastructure

Measure Deployment Benefits



Safety



Mobility



Environment

Resolve Deployment Issues



Technical



Institutional



Financial



Sites Selected – 2015 Awards



ICF/Wyoming



- 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.

New York City



- 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.

Tampa (THEA)
Tampa Hillsborough
Expressway Authority

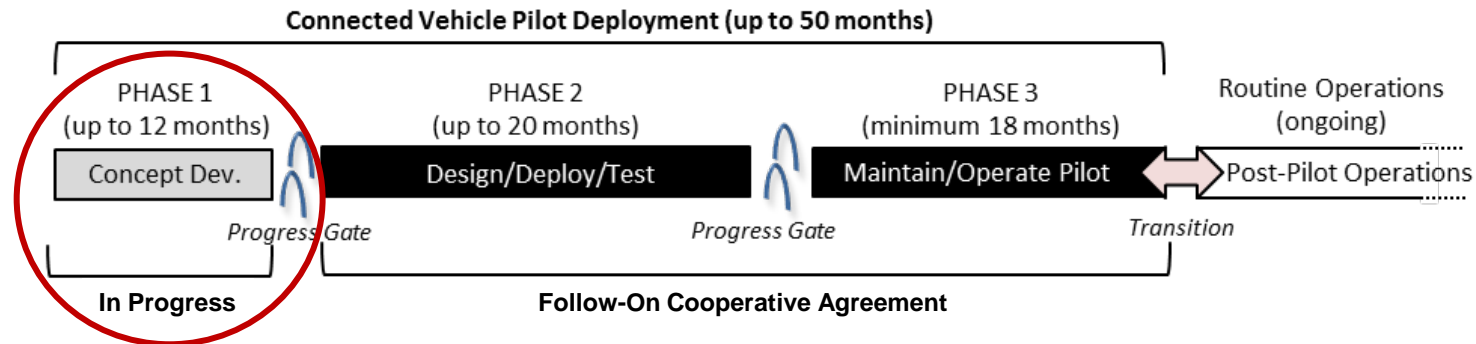


- Alleviate congestion and improve safety during morning commuting hours.
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.





Deployment Schedule



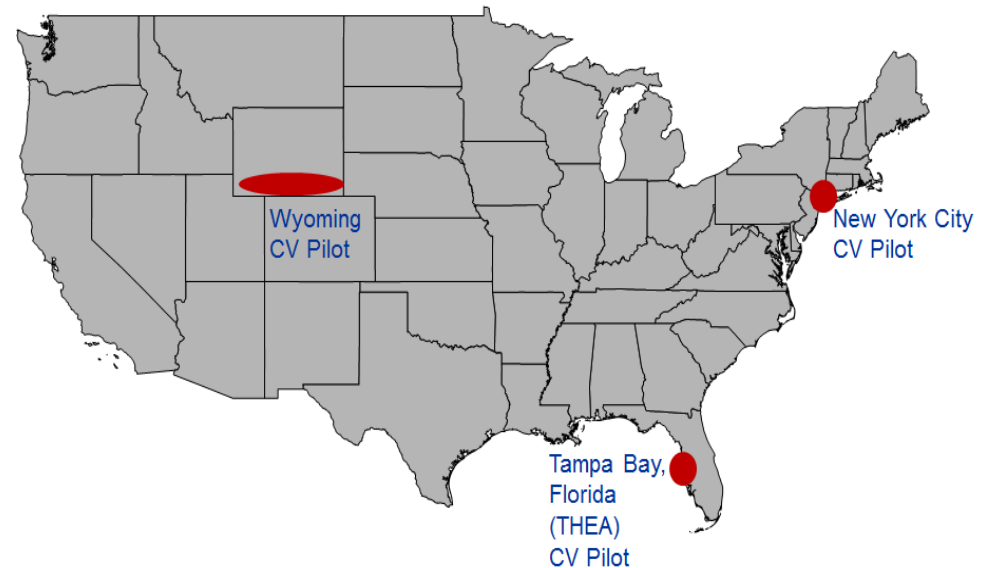
- Overall Deployment Schedule
 - Phase 1: Concept Development
 - Creates the foundational plan to enable further design and deployment
 - Phase 2: Design/Deploy/Test
 - Detailed design and deployment followed by testing to ensure deployment functions as intended (both technically and institutionally)
 - 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)



Remainder of Webinar



- Approaches to institutional issues and importance of documentation
 - Some basics
 - Organizational context
 - Institutional Risks
 - User-oriented Business Process Maps
 - Capability Maturity Model
 - Institutional Frameworks
 - Financial Sustainability



- Task 10, Partnership Finalization and Coordination
- Q&A





BASICS AND IMPORTANCE OF INSTITUTIONAL ISSUES



Brian Cronin

Some Basics



- Dynamic tension between two goals at pilot sites
 - Successful local pilot deployment
 - Fostering national deployment

- Deployment is expected to be incremental with some exceptions
 - Norm will generally be DOT-centric or deployment facilitated by toll roads
 - May be a role for public-private partnerships and innovative business models and finance

- Pilots are resources for others to use
 - Documentation of applications, frameworks and models
 - Lessons learned for handling institutional, business and financial issues



Types of Institutional Issues



- The institutional underpinnings of technical systems and elements, for example the organizational entities and relationships that make the following possible:
 - Interoperability
 - Security and credentialing,
 - Classes of CV applications such as safety or freight

- Non-technical systems/subsystems (economic, business, social, cultural, ethical)

- Purely institutional issues (legal authority, regulations, contracts, MOUs, agreements, intellectual property rights)

- Issues concerning different geographic scale or levels of government
 - International
 - Federal
 - State
 - Regional
 - Local



Importance of Institutional, Business, and Financial Issues



It is often said that CV deployment is technically feasible but the real challenges are institutional...

Examples:

- A Midwestern state drafted a statute modeled after Minnesota's to provide broad authority for ITS Public Private Partnerships, but the legislature never enacted the law
- Contract negotiations were terminated regarding one of four ITS Model Deployments after the public agencies and their private sector partner could not reach agreement.
- Difficulty developing policy and corresponding institutional and business models for ITS caused a long hiatus in national deployment and large loss of benefits





INSTITUTIONAL CONTEXT



Bill Hyman

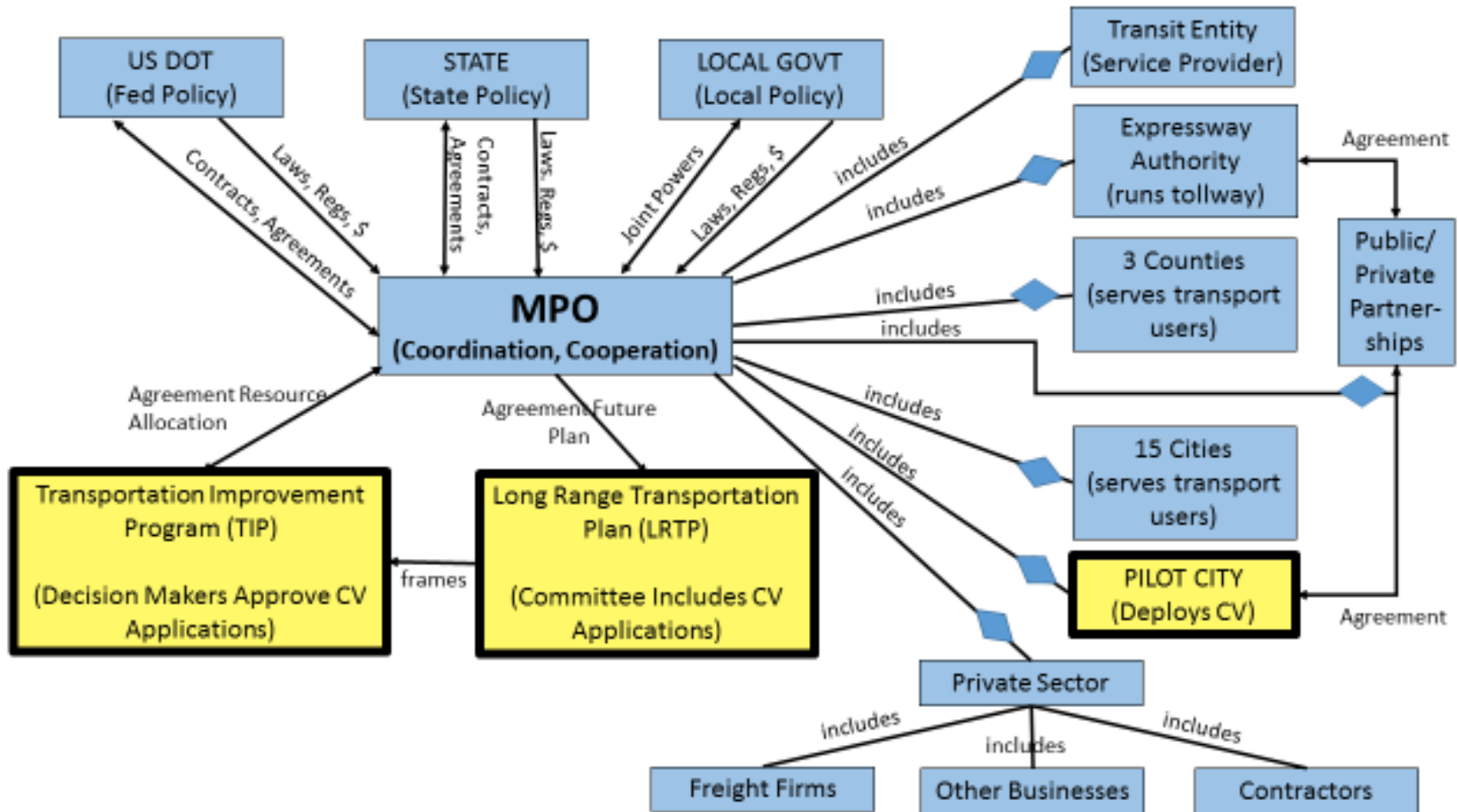


Documenting Institutional Context

- Reasons for Preparing Institutional Context Diagrams
 - Not sufficient to just have technical context diagrams
 - Help to understand roles, responsibilities and relationships among organizations
- How to Prepare Institutional Context Diagrams
 - The Enterprise View of CVRIA/SET-IT
 - PowerPoint
 - Visio
- Example of a Context Diagram
 - Concerns ensuring CV is included in the regional Long Range Plan (LRP) and the Transportation Improvement Program (TIP)
 - Focus on regional decision making



PARTIAL “INSTITUTIONAL CONTEXT DIAGRAM”





INSTITUTIONAL RISKS



Bill Hyman

Inventorying and Assessing Risks



- Do a comprehensive examination of institutional, business, and financial risks as well as related performance measurement issues
- Obtain insights from
 - Proposals and kickoff presentations of own and other Pilot sites
 - Expanded USDOT guidance
 - Early deliverables
 - Literature
 - Discussion with partners and stakeholders
- Prepare risk matrix on institutional, business, financial and related issues
- Incorporate top institutional risks in corresponding Risk Management Plan

Examples of Institutional Risks



- Security Credential and Management System is an example of a technical system with complex institutional underpinnings and risks
 - **Risk: May not work seamlessly and reliably to protect security and privacy**
- Economic discipline of Industrial Organization provides insight on competition, antitrust, pricing, economies of scale, public and private roles, and gaming behavior
 - **Risk: Autonomous and shared vehicles plus multimodal transport likely to affect market penetration and benefits of CV**
- Horizontal and vertical equity raise concerns about ability to pay for CV
 - **Risk: Backlash due to social inequity of CV deployment**
- Increasing numbers of elderly paired with rapid technological advances
 - **Risk: Aging population will look to driverless cars, not CV, to maintain mobility**



Inventory of Potential Risks (Partial)



National

- Federal law
- Federal Regulations
- Categorical limitations on use of federal funds (Construction, O&M)
- Dedicated spectrum for DSRC
- International coordination
- Interoperability
- Security and privacy (SCMS)
- A major public relations incident that draws national attention
- Coordination with and among federal agencies
- Applicability of the National Environmental Policy Act
- Frameworks for addressing sets of CV applications (Intersections, Freight)
- Chicken or egg structural issues (V2V or V2I first?)

Local, Regional or Unique

- Legal authority and regulations
- Tort Liability
- Regional joint powers authority and cooperative arrangements
- Public-public partnerships
- Public-private partnerships
- Contracts
- Revenues for financial sustainability
- Willingness to pay of users and taxpayers
- Long Range Plan (needs to include CV)
- Transportation Improvement Program (must allocate funds for CV)
- Insufficient trained staff
- Barriers to leveraging local assets (ROW, data, knowledge)
- Low Capability Maturity Level





Sample Institutional Risk Matrix

TITLE	OWNER	PROBABILITY (L=1;H=5)	IMPACT (L=1;H=5)	SEVERITY	RESPONSE	MITIGATION
Security and Credential Management System has minor perceived vulnerability	ITS JPO	1	5	5	Continue improving safeguards	Strengthen code; provide necessary training to all parties involved; develop and follow rigorous test procedures
Institutional Review Board does not give approval for Pilot to proceed	State	2	5	10	Be as responsive as possible to IRB's concerns	Keep strengthening the case for justifying the Pilot Deployment until the IRB approves
The TIP includes no funding for CV	State	1	2	2	Address need in Long Range Plan; line up funds	Take steady, concerted action to address this need – consider traditional sources of funds, transportation option taxes, creative business models, and innovative finance
Project Manager (PM) takes another job	City	1	2	2	Backfill with qualified PM	Ensure qualified backup is fully engaged in all phases of Pilot deployment





BUSINESS PROCESS MAPS



Bill Hyman

Documenting Application Business Process and Linkage to Performance Evaluation



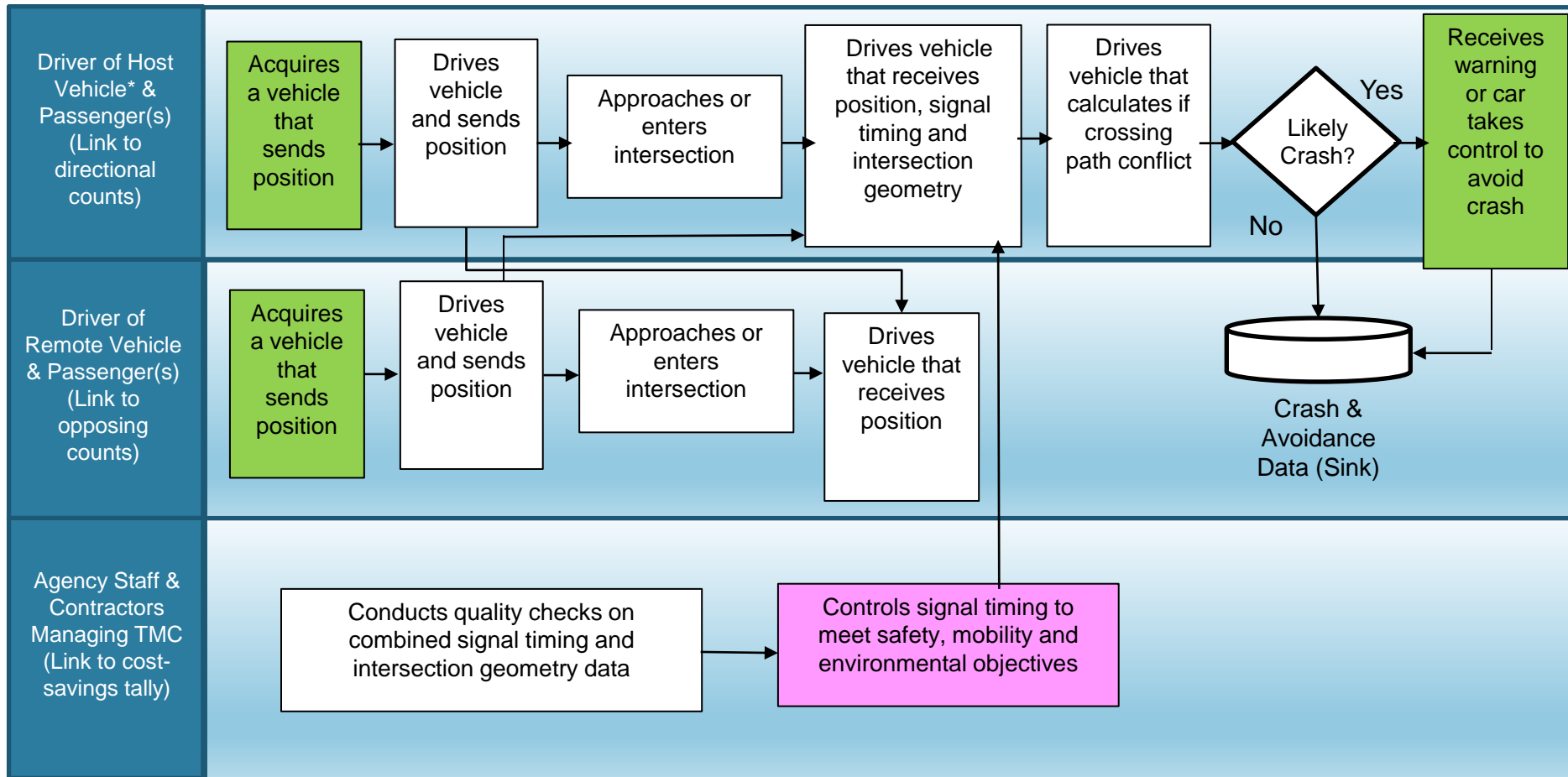
- Recommend that Pilots document their applications by using a modified version of a standard business process map

- The modified diagramming convention is based on the following:
 - Focus is on users as people and organizations
 - Users are operators of vehicles with or without passengers or freight, and with or without OBEs. May be pedestrians or bicyclists with or without nomadic devices
 - Shows where the most value accrues or where an actor most contributes value
 - There are potential linkages to the performance evaluation (e.g. spreadsheet)

- It is recommended that the “As Is,” “To Be,” and “Implemented” cases be mapped.



Modified Business Process Map for CV Intersection Application





CAPABILITY MATURITY MODEL



Phil Tarnoff

Capability Maturity Model (CMM) Background



- CMM offers proven technique applied in more than 40 transportation workshops
 - Originally developed for IT industry
 - Refined for Transportation Systems Management and Operations (TSM&O)
 - Extended for Connected Vehicles

- Use of CMM ensures a balanced program; it is recommended
 - Addresses both institutional and technical characteristics of Pilots
 - Maintains national deployment as long-term vision



CMM – Dimensions of Capability

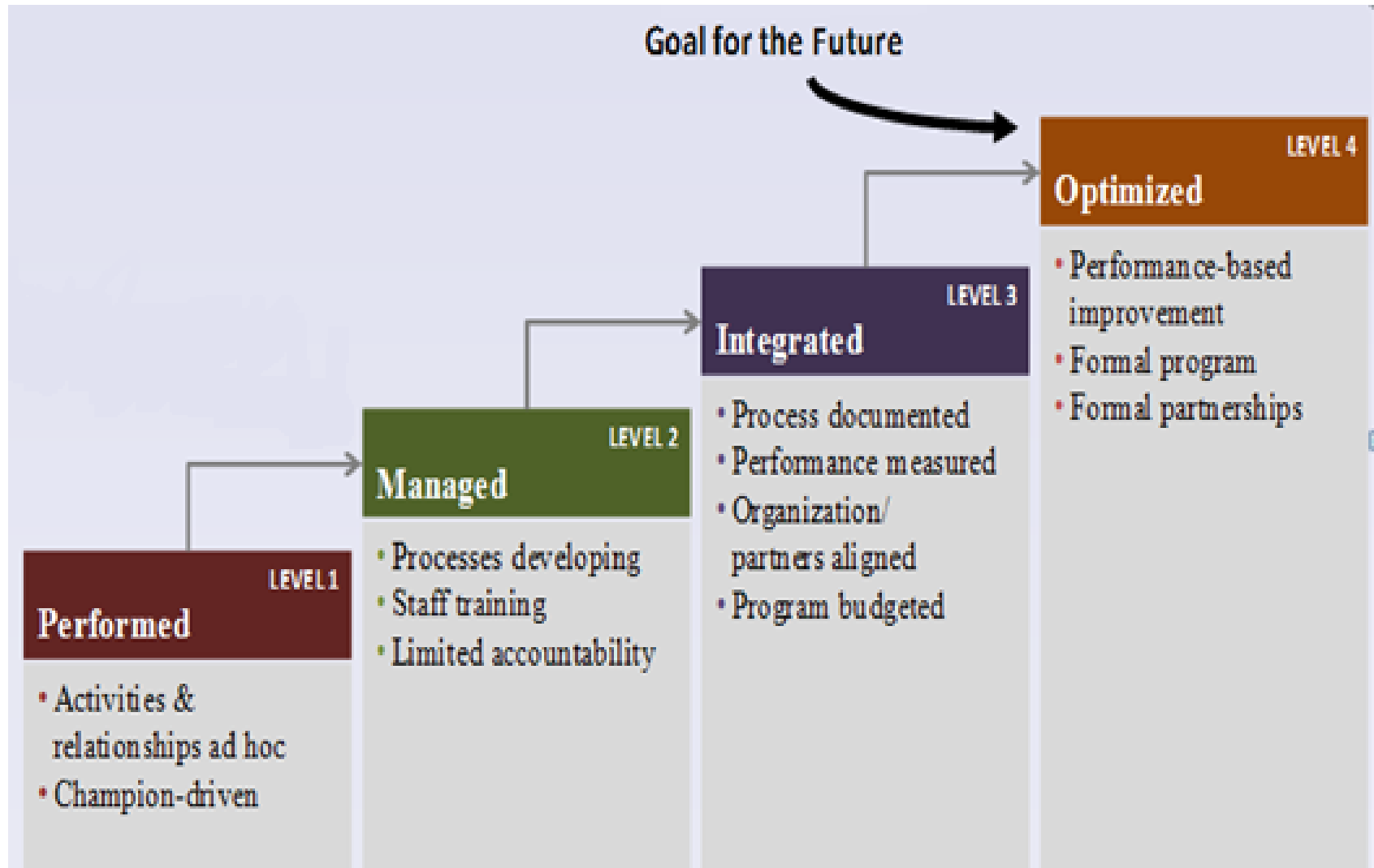


- Planning and Programming: prioritizing, benefits and costs, budgeting, planning (both near term and long range)
- Technology and Systems-Design: Systems engineering, standards and procurement
- Technology and Systems-Operations & Maintenance: O&M procedures and responsibilities
- Performance Management: Definition, measurement, reporting and utilization
- Culture: Participants understanding, championship and leadership
- Organization/Staffing: Structure, adequacy and development
- Resources: Adequacy of financial and staff support
- Collaboration: Relationships with participating and external organizations





CMM – Maturity Levels for Each Dimension





CMM – Self Evaluation Example

Dimension	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimizing
Planning & Programming	X			
Technology & Syst.-Design			X	
Technology & Syst.-O&M		X		
Performance Management			X	
Culture	X			
Organization & Staffing		X		
Resources	X			
Collaboration		X		

Lowest levels are the constraint

CMM – The Assessment Process



1. Participants Identify the state of play at their site – consensus on strengths and weaknesses
2. Participants Identify current level of capability (criteria)
3. Participants Identify actions to get to next level
4. Follow up: Convert actions to plan for achievement and secure commitment





INSTITUTIONAL FRAMEWORK



Phil Tarnoff

Institutional Framework - Background



- BAA indicates that a robust institutional framework is a desirable output of the Pilot Program
- A key consideration is the program's long-term sustainability
- Sustainability must be achieved without reliance on Federal funding
- Current DOT-Centric approach may not be optimum for achieving these goals



Institutional Framework - Alternatives



- DOT-Centric
 - Overall approach defined by USDOT BAA
 - Federal funding is primary resource
 - Contractor selection and system development process governed by Federal and State procurement regulations

- Two additional alternatives are emphasized
 - Public-private partnership (P3)
 - Franchise
 - Not mutually exclusive – public-private partnership can operate with a franchise
 - Suggested alternatives proven for other infrastructure-based applications



Institutional Framework – P3



- Characteristics
 - Contractual arrangement between one or more public agencies and one or more private sector entities
 - Skills and resources of public and private sectors are shared
 - Typically managed by a governing board made up of representatives from participating parties
- Incentives
 - Private sector funding offsets public sector cost
 - Private sector personnel resources minimize demands on public sector staffing
 - Private sector flexibility when contracting for services and products
- Advantages
 - Access to expanded range of funding
 - Public sector retains some degree of control over program
 - Private sector has access to potentially profitable program



Institutional Framework – Franchise



■ Characteristics

- Definition: Privilege of a public nature granted to a private entity (e.g. use ROW)
- Electric utilities and many other industries build out and operate under franchises
- Revenues can come from a utility fee or a franchise fee

■ Incentives

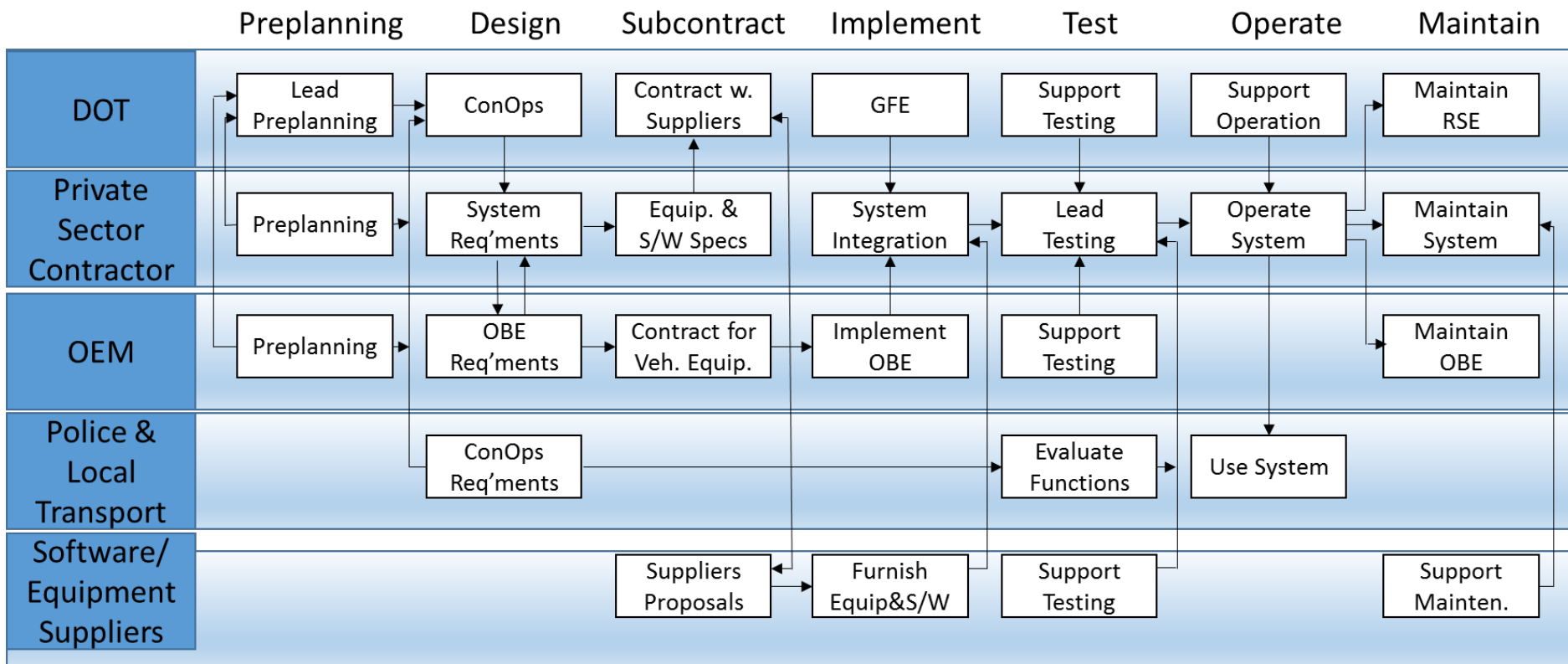
- Similar to P3
- Private sector has flexibility to determine location and applications to be provided
- Exclusive franchise increases incentive for investment

■ Advantages

- Attracts outside investment
- Minimizes or eliminates need for public sector resources



DOT-Centric High Level Institutional Model





FINANCIAL SUSTAINABILITY



Bill Hyman

Financial Sustainability and Cash Flow



- Need formal commitment to continue to fund Pilots after deployment

- Sources of Public Funds
 - Traditional sources such as Federal aid, state and local gas taxes, transportation fees and impact fees
 - Toll road revenues
 - Bonds
 - Local option transportation taxes
 - Parking taxes and fees
 - Property taxes,
 - Vehicle registration fees
 - Car rental taxes
 - Sales tax



Financial Sustainability and Cash Flow



- Some other possible sources of funds in addition to PPPs and Public Franchises
 - Shared products or services involving vehicles, infrastructure, products or services through renting or purchase
 - A business franchise that replicates a format and logo for selling products or services in different locations
 - Internet freemium model offering free and subscription (or member) premium content, either or both possibly ad-supported
 - Cost savings of insurance companies resulting from fewer claims due to the safety benefits of the CV system
 - Crowdfunding venture capital – in some cases has raised millions

- Other Financial Considerations
 - FHWA Office of Innovative Program Delivery
 - Incentives
 - Business Plan with financial statements



Task 10 – Partnership Finalization and Coordination



Pilot deployments are expected to become a part of a permanent connected vehicle capability that is fully integrated into routine operational practice in the pilot site – and create a foundation for expanded and enhanced deployments. The CV Pilots program seeks institutional and financial models that enable long term sustainment of successful elements of pilot deployments without federal funding.

- To this end, under Task 10, the Pilots are required to document agreements, contracts and subcontracts among partners that cover:
 - Agreed-upon and main elements of the ConOps
 - Performance measures and targets
 - Operational Changes
 - Governance framework and processes
 - Financial agreements





Q&A



Brian Cronin

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



Join us for the *Getting Ready for Deployment Series*

- Discover more about the Wave 1 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>

Contact for CV Pilots Program:

Kate Hartman, Program Manager

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December 2015 Technical Assistance Webinars:

- [12/7/2015, 2:00 – 3:30 pm EST](#)
Preparing a Safety Management Plan for Connected Vehicle Deployments
- [12/9/2015, 1:30 – 3:00 pm EST](#)
Preparing a Security Concept for Connected Vehicle Deployments
- [12/10/2015, 12:30 – 2:00 pm EST](#)
Preparing Institutional/Business Models and Financial Sustainability for Connected Vehicle Deployments

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

