Work Zone Data:
Next steps in evolving work zone management

An outline of the background, objectives, and current activities comprising the **Work Zone Data Initiative**

U.S. Department of Transportation

Federal Highway Administration

Office of Operations
Work Zone Management Team

Frequently Asked Questions:

How many active work zones were there in the US last year? How many right now?

What percent of the NHS is currently under construction?

How much traffic congestion is due to work zones?

How many work zone crashes were due to traffic queues forming upstream of a lane closure?

What do we need to know about work zones?

- Where are they?
- When are they going to be there?
- How bad is traffic going to get and should I do something different than I usually do?
- Are workers present and are those "work zone speed limits" actually in effect right now?

What do we need to know about work zones?

- Are we maintaining mobility and safety?
- How bad were delays? Are we going to be hearing it from the public?
- Did the contractor comply with lane closure restrictions?
- Is the last thing we tried to make things better working the way we want?
- That crash that happened the other day – was that caused by one of our work zones?

What do we need to know about work zones?

- How well are agencies complying with 23 CFR 630?
- What work zone management best practices are most effective for maintaining mobility, safety and constructability?
- How do work zones factor into national policy regarding Connected and Automated vehicle readiness?
- What does industry WANT from the government?

State of the Practice: Challenges

- Poor grasp of work zone "exposure"

- No common definition for
  Work Zone Activity Data (WZAD)

- Diverse user base / use cases for WZAD

- Many disparate and duplicative approaches to WZAD management currently in development

- Current use cases may not reflect future needs for data driven work zone management.

How do we fix this? Questions abound:

⟫⟫⟫ What are all the ways in which people use work zone data?

⟫⟫⟫ What are all the ways in which people WILL use work zone data?

⟫⟫⟫ What is Work Zone Activity Data?

⟫⟫⟫ How can WZAD management practices be implemented?

⟫⟫⟫ How can local WZAD inform national interests?

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Industry Support

"We strongly encourage the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA) and the American Association of State and Highway Transportation Officials (AASHTO) to work with industry to develop mechanisms through which work zone location information is communicated utilizing dynamic digital mapping and short-range communication technologies."

Work Zone Activity Data (WZAD)
…an incomplete picture
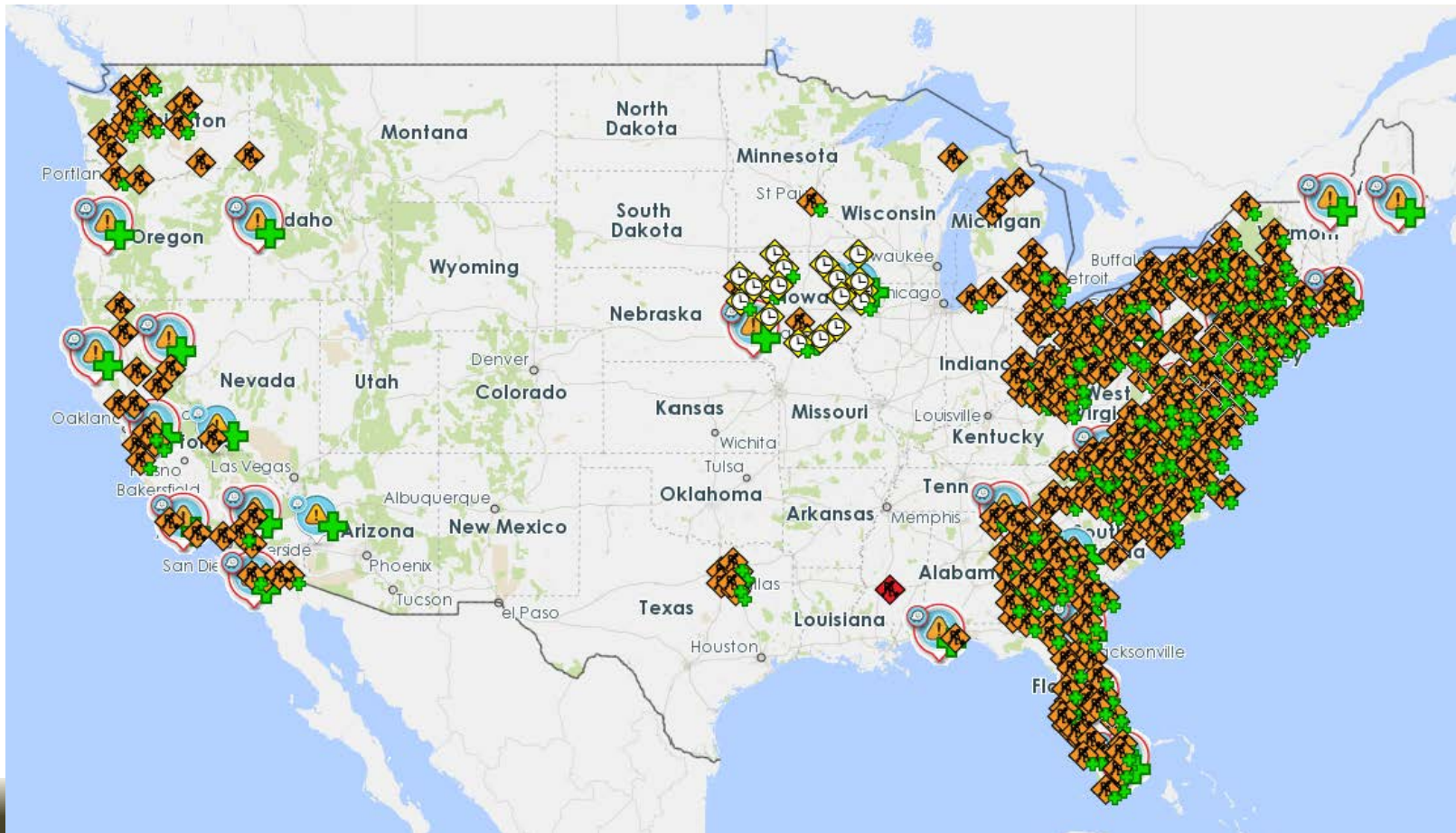
Work Zone Data Initiative

》》》GOAL:
Elevate the national state-of-the-practice regarding WZAD management.

》》》OBJECTIVE:
Develop and promote practices for generating WZAD databases that will:

> 》》》 Support enhanced work zone management operations within agencies
>
> 》》》 Advance development of WZAD apps that enable data use by stakeholders

WZDI Roadmap

>>> R&D (FY 2017-18)

>>> State-of-the-practice synthesis on collection & use of WZAD

>>> Develop WZAD use cases, core data requirements

>>> Develop agency guidance for WZAD recordkeeping

>>> Pilot Work Zone Data Environment (FY 2018+)

>>> Engage candidates for work zone data sharing in pilot deployment

>>> USDOT JPO support data sharing / app development platform

>>> Inform ConOps through WZAD applications

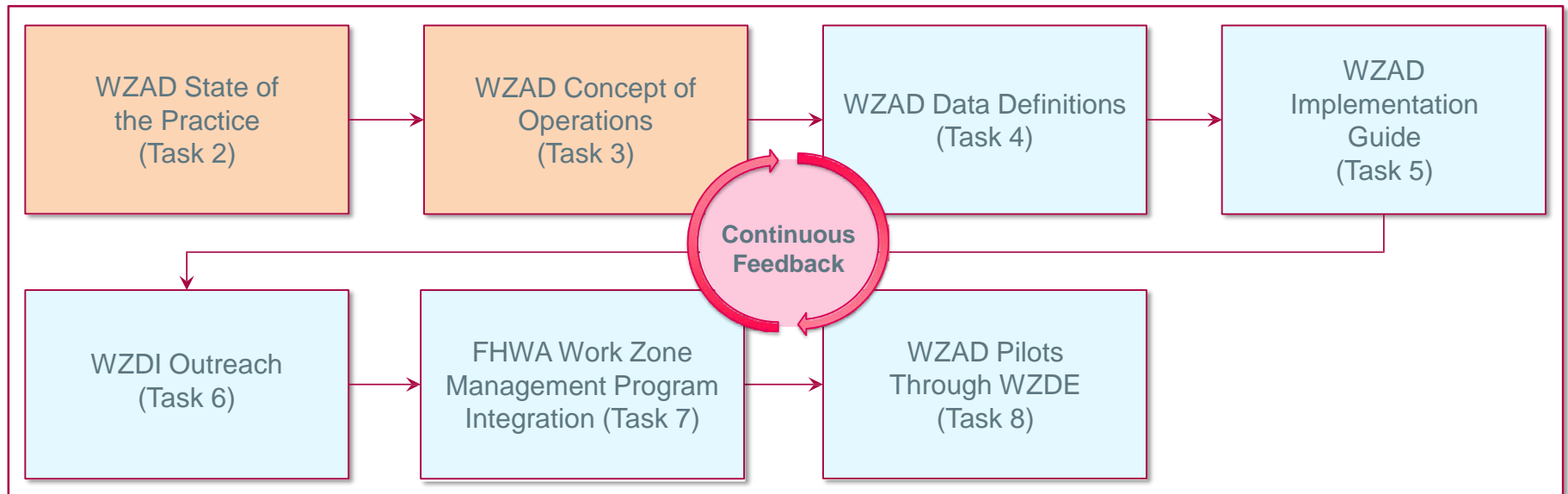| Identify User Needs	Craft ConOps and Data Definitions	Create Guidelines	Conduct Outreach	Implement Program Integration	Conduct Pilot Testing

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WZDI Activities

WZAD State of the Practice (Task 2) → WZAD Concept of Operations (Task 3) → WZAD Data Definitions (Task 4) → WZAD Implementation Guide (Task 5)

Continuous Feedback

WZDI Outreach (Task 6) → FHWA Work Zone Management Program Integration (Task 7) → WZAD Pilots Through WZDE (Task 8)

Related Efforts

⟫⟫⟫ Smart Belt Coalition Strategic Plan CAV readiness initiative
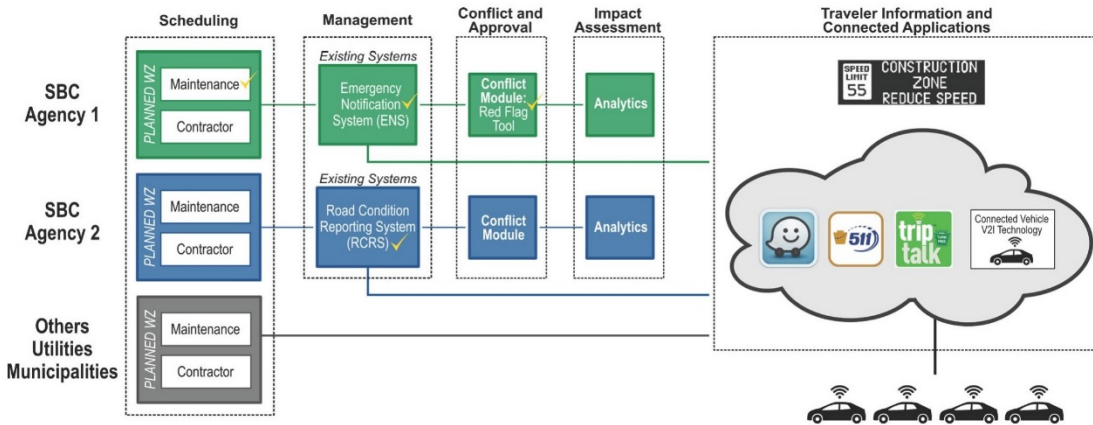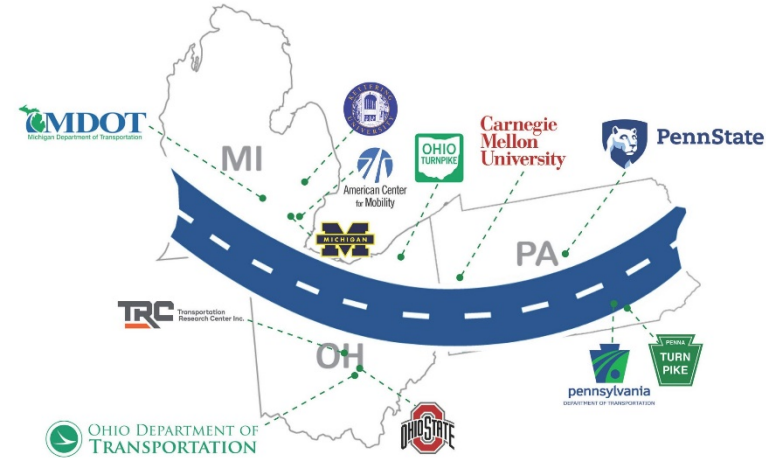
Figure 8: Work Zone Reservation and Traveler Information System

SERVICE LAYER	OPERATIONAL AGENCY				
	MDOT	ODOT	OTIC	PennDOT	PTC
Work Zones	🚗	🚗	🚗	🚗	🚗
Traffic Incident Management		🚗	🚗	🚗	🚗
Freight	🚗	🚗	🚗	🚗	
Safety Applications (Curve Warning, Low Vertical Clearance)		🚗	🚗		🚗
Integrated Corridor Management (Traffic signals, ramp metering, transit priority)	🚗			🚗	
Weather	🚗				🚗
Traveler Information					
Customer Service Applications (Tolling Points, Service Plazas, Border Crossings)					

Table 9: Operational Agencies: Top Service Layer Priorities

Related Efforts

⟫⟫⟫ Enterprise Pooled Fund Study TPF-5 (231)

Real-Time Integration of Arrow Board Messages into Traveler Information Systems (February 2017)

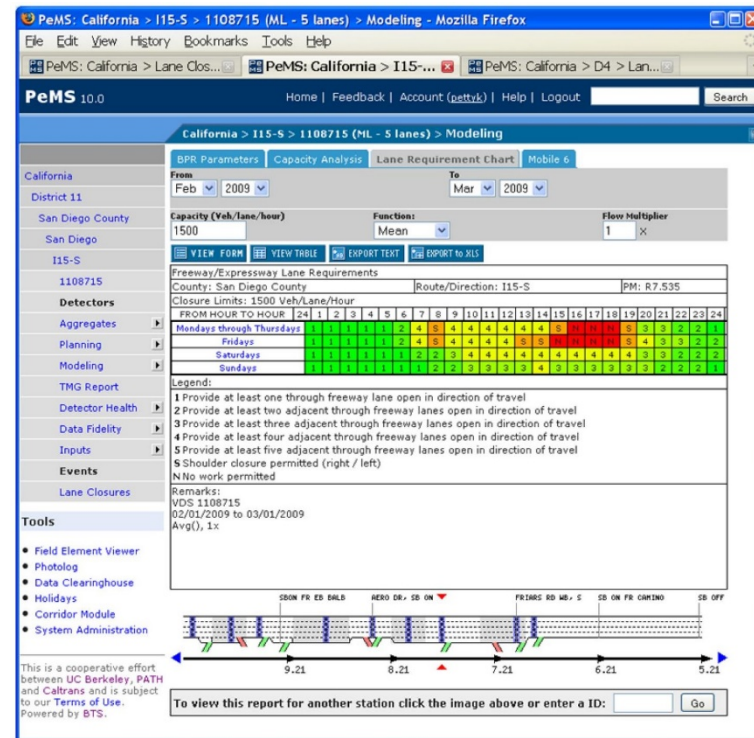http://enterprise.prog.org/Projects/2015/workzone_notifications/ENT%20ActWZ%20Notific%20ConOps%20FINAL.pdf
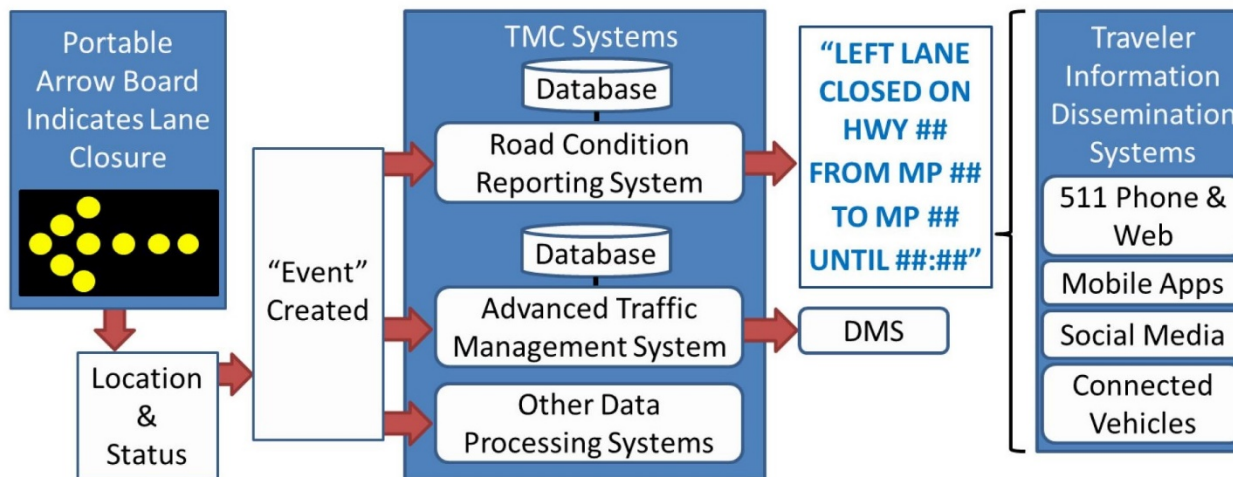
Related Efforts
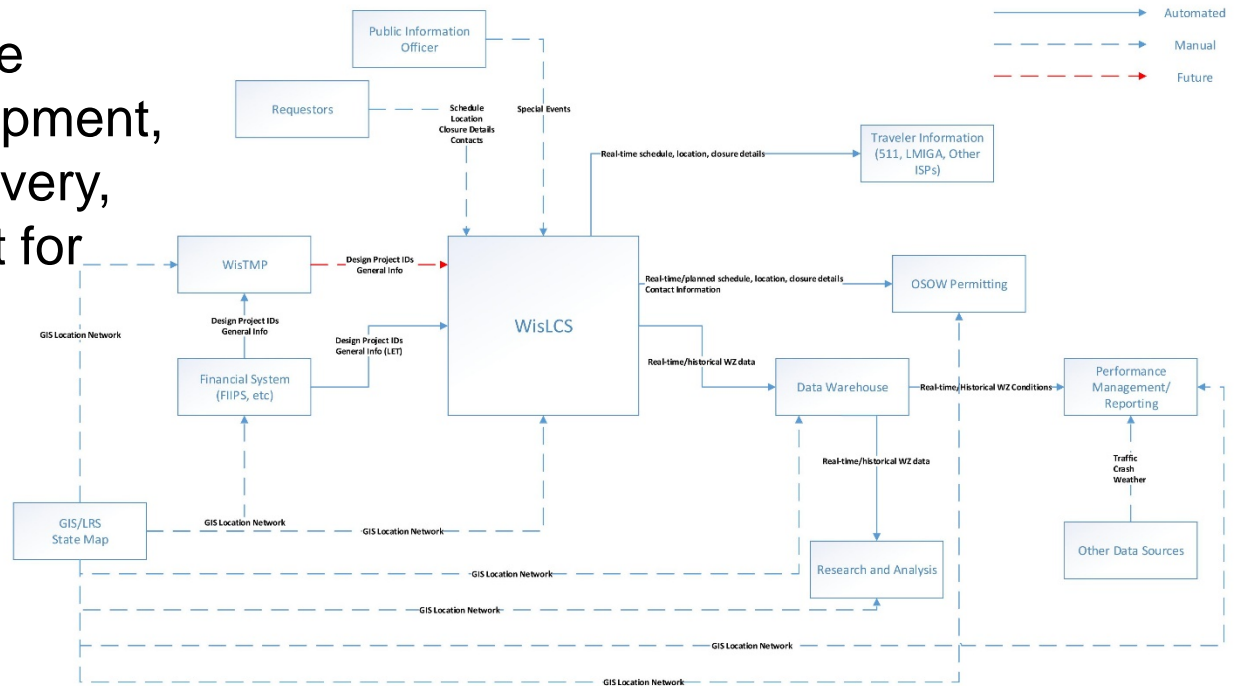
>>> Caltrans Lane Closure System

Electronic lane closure requests integrated with performance management functions (PeMS)

Related Efforts

▶▶▶ Wisconsin LCS

Integrates lane closure requests, TMP development, public information delivery, and asset deployment for traffic control during construction

WZAD Users and Uses

⟫⟫⟫ Targeted engagement of stakeholders by use themes

WZ Planning and Project Coordination	Project Management	Performance Management / Impact Analyses	Real-time System Management	Connected / Automated vehicle readiness
Local DOTs				
	Academia			
Contractors			Industry	
			Public Sector Information Brokers	
		Regulatory / Policy Oversight		
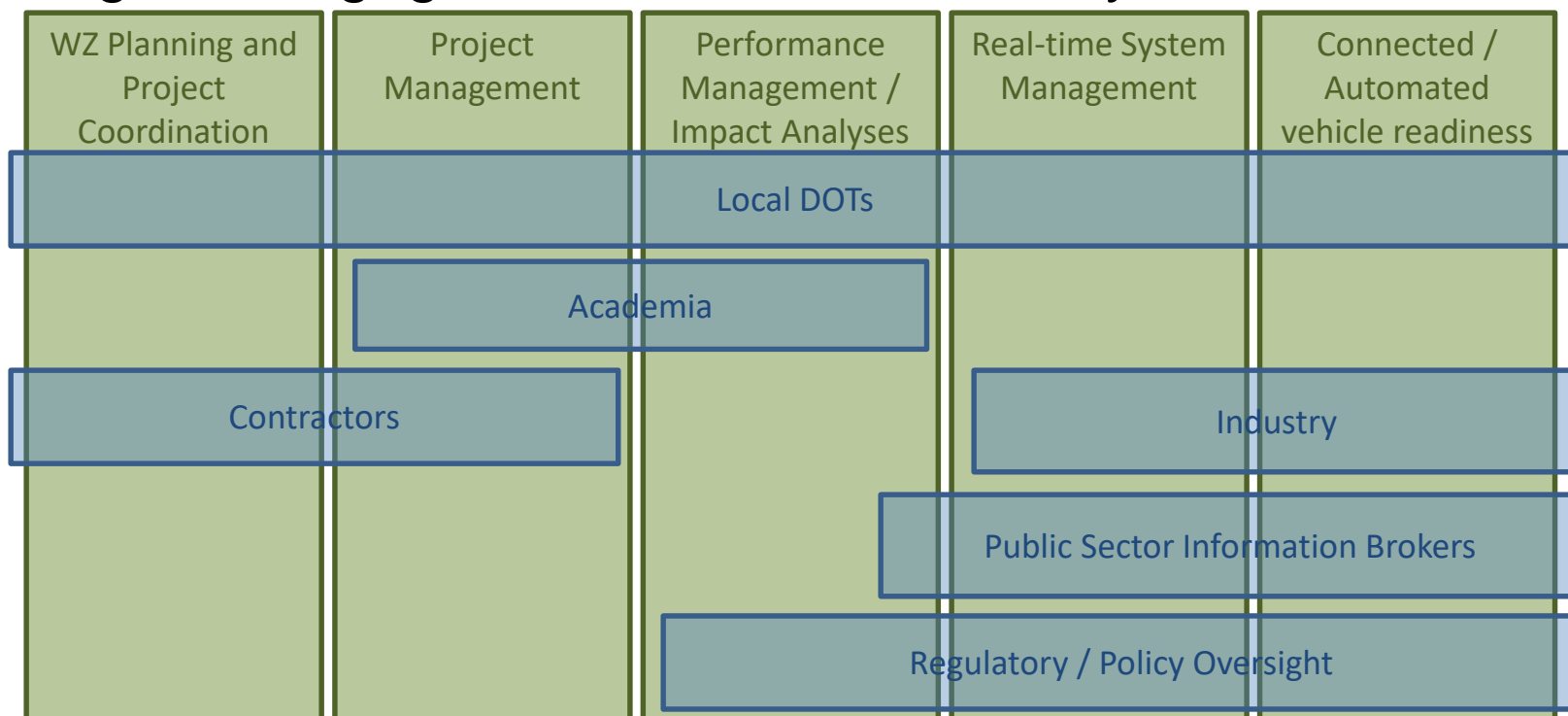
WZAD life-cycle

PLANNING

- Future activity
- General in nature
- Anticipated capacity reduction
- Less detail regarding work zone configuration
- Information on activity location / date / duration may be generalized or reflect multiple work areas with similar impacts
- Facilitates coordination

"First cone down" →

CURRENT

- "Active" in reference to presence of temporary traffic control
- Could be triggered automatically by activation of connected hardware
- Location specific; georeferenced and/or keyed to TMC segments/milepoints
- Metadata: traffic flows, video feeds, or documents on file such as access permits, TMPs, or TTCPs.

"Last cone up" →

HISTORICAL

- Permanent record of prior activity
- Read-only
- May be overlaid with other historical information such as crashes, traffic probe data, etc. to establish correlation between work zone activity and other information.
- Key applications are for analytics and performance management.

Define Consolidated Use Cases

Themes	Users	Use Cases	
Work Zone Planning and Project Coordination	**Divisions/Units Within the Same Agency**	**Use Case #1:** Maintenance office check of planned lane closures by contractor next week for possible lane closure coordination opportunities for maintenance work on the roadway adjacent to the project limits.	**Use Case #2**: Permit office check of work zone design features prior to approving request for oversize load shipment along a route where the work zone is located.
	Divisions/Units Within Other Agencies/Entities	**Use Case #3**. Trucking company check of updates to planned roadwork activities prior to dispatching a vehicle from its warehouse	
Real-Time System Management/ Traveler Information Provision	**Divisions/Units Within the Same Agency**	**Use Case #4:** Enhancement of coordinated adaptive traffic signal progression to automatically adjust timings when work activity is occurring on the route in the vicinity of a signal	**Use Case #5:** Automated change of DMS work zone advance warning message when change is detected in work zone status from "planned" to "actual"
	Divisions/Units Within Other Agencies/Entities	**Use Case #6**: Law enforcement incident response command center check of current lane closures along a route prior to enacting a traffic detour around a major incident	**Use Case #7:** CAV application developer verifying the lack of work zone activity along a test route during the times of planned calibration and testing

Define Work Zone Activity Data

⟫⟫⟫ Core specification
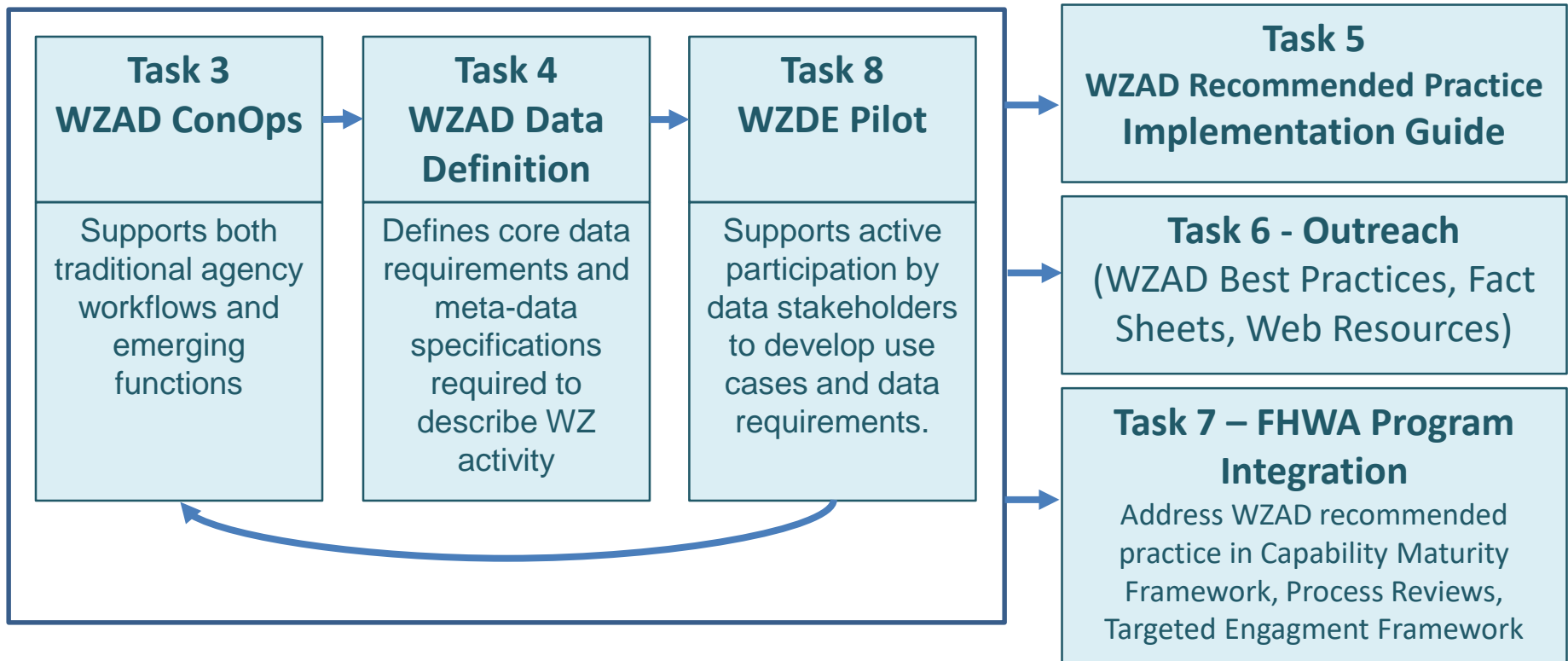
- ⟫⟫⟫ Geographic location
- ⟫⟫⟫ Duration, recurrence
- ⟫⟫⟫ Operational changes
- ⟫⟫⟫ Changes to lane geometry
- ⟫⟫⟫ Project owner, field contacts

- ⟫⟫⟫ Location / content of TCDs
- ⟫⟫⟫ Messaging / content of signs, PCMSs
- ⟫⟫⟫ Influence area (geofence)
- ⟫⟫⟫ Next event?

⟫⟫⟫ Extensibility for unforeseen use cases

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WZDI Task Integration

Task 3 WZAD ConOps	Task 4 WZAD Data Definition	Task 8 WZDE Pilot	Task 5 WZAD Recommended Practice Implementation Guide
Supports both traditional agency workflows and emerging functions	Defines core data requirements and meta-data specifications required to describe WZ activity	Supports active participation by data stakeholders to develop use cases and data requirements.	**Task 6 - Outreach** (WZAD Best Practices, Fact Sheets, Web Resources)
			Task 7 – FHWA Program Integration Address WZAD recommended practice in Capability Maturity Framework, Process Reviews, Targeted Engagment Framework

Post Roadmap – FY19 and onwards

- Expansion of WZDE, ongoing collaboration with data contributors / application developers

- Continued development of WZDI supporting materials through workshops, webinars, peer exchanges, web resources, best practices, fact sheets, and revisions to WZAD Implementation Guide.

- Every Day Counts 6 (2020-2021)

- Formalization of data standards (NTCIP, SAE?)

How to Get Involved

⟩⟩⟩ Help refine our understanding of users and use cases

⟩⟩⟩ Become an active participant in the WZDE

⟩⟩⟩ Visit our website for updates: http://ops.fhwa.dot.gov/wz

⟩⟩⟩ Contact us:

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