Connected Vehicles and Maintenance Operations

Presentation to AASHTO SCOM

Dean Deeter
Athey Creek Consultants

AASHTO ITS AMERICA ite

Topics

- Connected Vehicle Priorities Survey Results
- Connected Vehicle Applications Related to Maintenance Operations
- Upcoming Activities of the V2I DC of Interest to Maintenance and Operations

CV Reference Implementation Architecture

CVRIA CONNECTED VEHICLE REFERENCE IMPLEMENTATION ARCHITECTURE

Google™ Custom Search

Comment on Page

About | Applications | Views | Standards | Resources | Glossary | Contact Us

Home

Connected Vehicle Reference Implementation Architecture

Welcome to the Connected Vehicle Reference Implementation Architecture (CVRIA) Website! This site is your tool for reviewing, providing feedback, and using the architecture content for standards and project development. CVRIA is being developed as the basis for identifying the key interfaces across the connected vehicle environment which will support further analysis to identify and prioritize standards development activities. CVRIA will also support policy considerations for certification, standards, core system implementation, and other elements of the connected vehicle environment.

As shown in the figure, CVRIA is developed in 4 Views:

- Enterprise - Describes the relationships between organizations and the roles those organizations play within the connected vehicle environment
- Functional - Describes abstract functional elements (processes) and their logical interactions (data flows)that satisfy the system requirements
- Physical - Describes physical objects (systems and devices) and their application objects as well as the high-level interfaces between those physical objects
- Communications - Describes the layered sets of communications protocols that are required to support communications among the physical objects that participate in the connected vehicle environment

Another way to view the architecture is from the perspective of the connected

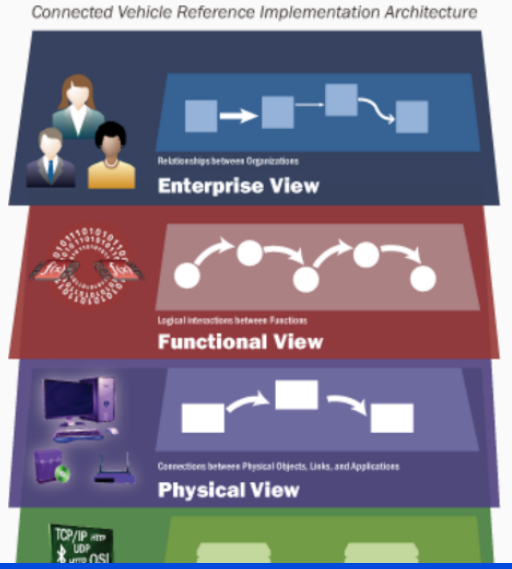
Latest News

The Systems Engineering Tool for Intelligent Transportation (SET-IT) Version 2.2.31 is available as a download from the Tools page. In addition to supporting all of the updated and newly added CVRIA content, this version includes numerous fixes to improve the user experience. See the Tools page and Readme file for more details.

CVRIA has been updated to Version 2.2. In CVRIA 2.2, the separate "Signal Phase & Timing" application has been removed and the "Connected Vehicle Map Management" application is now, simply, "Map Management." Other smaller changes have been made to the Communications, Enterprise, and Physical views to support SET-IT.
Click here to see the details of What's changed in CVRIA 2.2!

Stakeholder Feedback

Feedback is encouraged as the CVRIA is developed and maintained. Key stakeholder



AASHTO ITS AMERICA ite

Maintenance Operations Related Connected Vehicle Applications

- Vehicle Data for Traffic Operations
- Enhanced Maintenance Decision Support System
- Road Weather Information for Maintenance and Fleet Management Systems
- Road Weather Motorist Alert and Warning
- Variable Speed Limits for Weather-Responsive Traffic Management
- Warnings about Hazards in a Work Zone
- Warnings about Upcoming Work Zone

Survey of Infrastructure Owners & Operators

Attempted to learn 3 things:

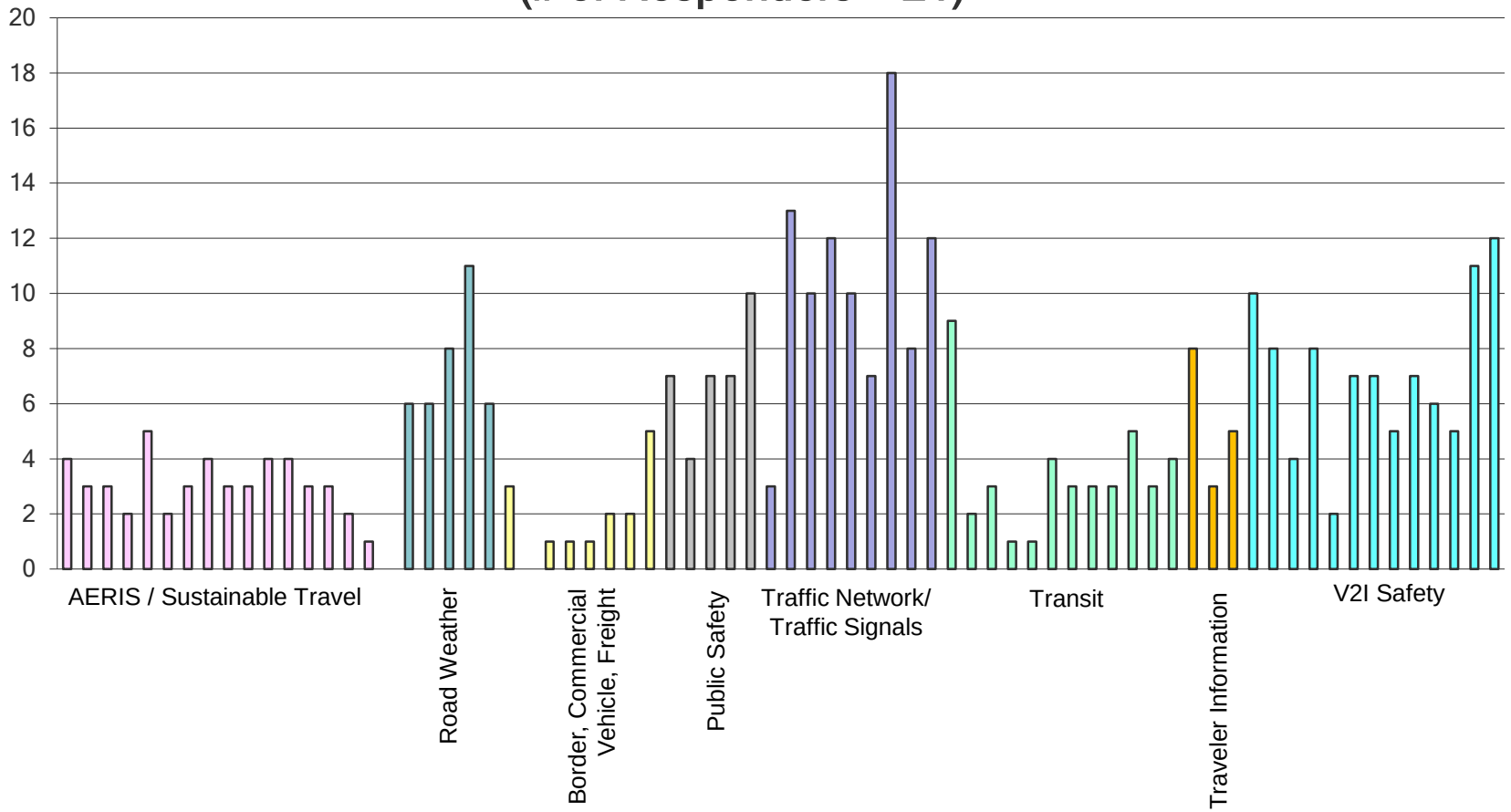
- Which CV applications responding agencies had **included in their proposal or plan** for CV deployment
- Which CV applications responding agencies felt **were most beneficial**; and
- Which CV applications responding agencies **had already deployed**

Q3: V2I Applications

72 V2I Applications from CVRIA Website (presented in 8 categories)

Category	Number of V2I Applications
AERIS/Sustainable Travel	16
Border, Commercial Vehicle, Freight	8
Traffic Network/Traffic Signals	9
Traveler Information	3
Road Weather	6
Public Safety	5
Transit	12
V2I Safety	13

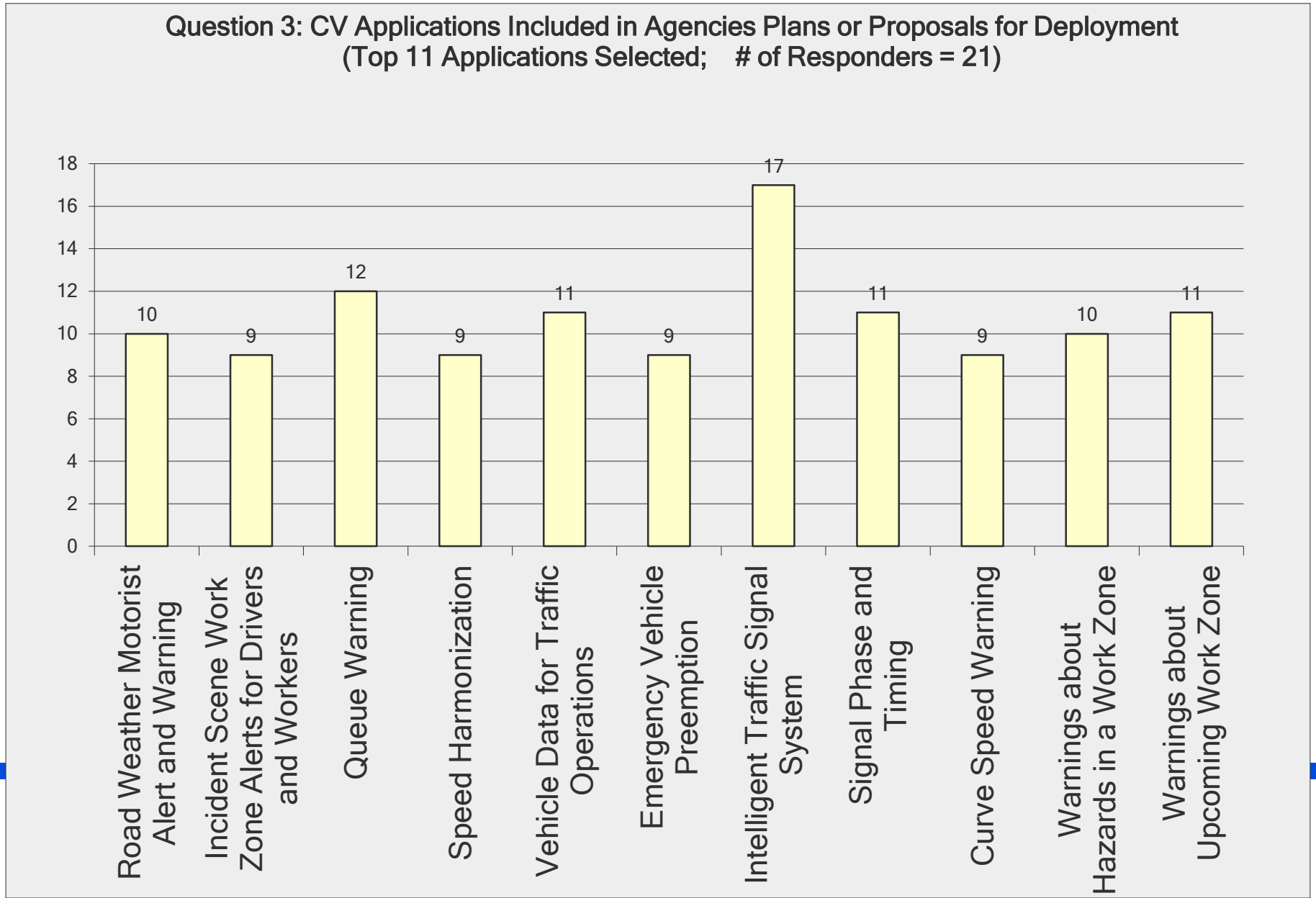
CV Applications Included in Plans or Proposals



7

CV Applications Included in Plans or Proposals

11 Most Selected Applications



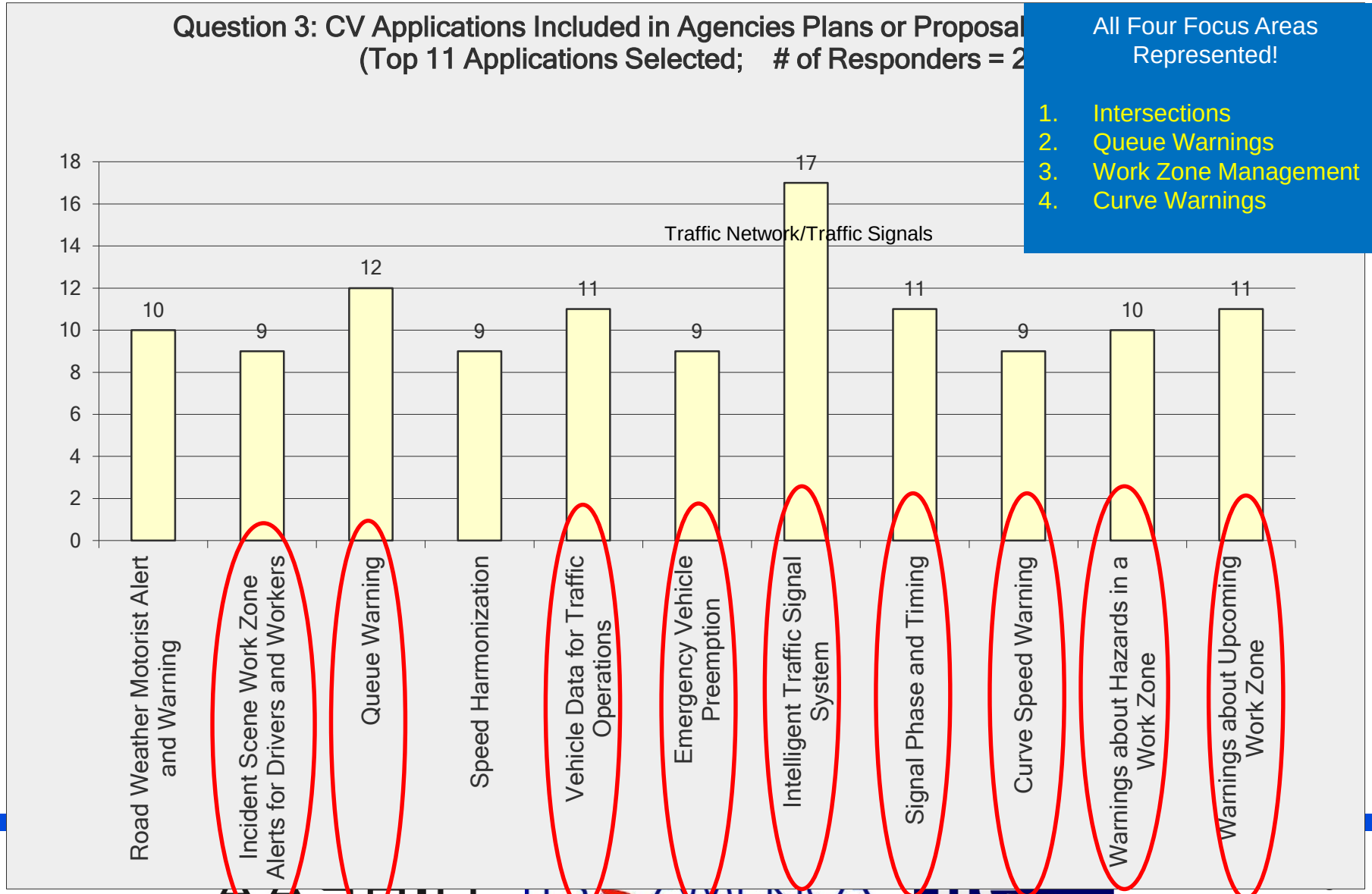
4 Focus Areas of the V2I Deployment Coalition

- At the September, 2015 V2I DC Executive Committee meeting, four focus areas were defined for the V2I DC

Focus Areas Defined by V2I DC

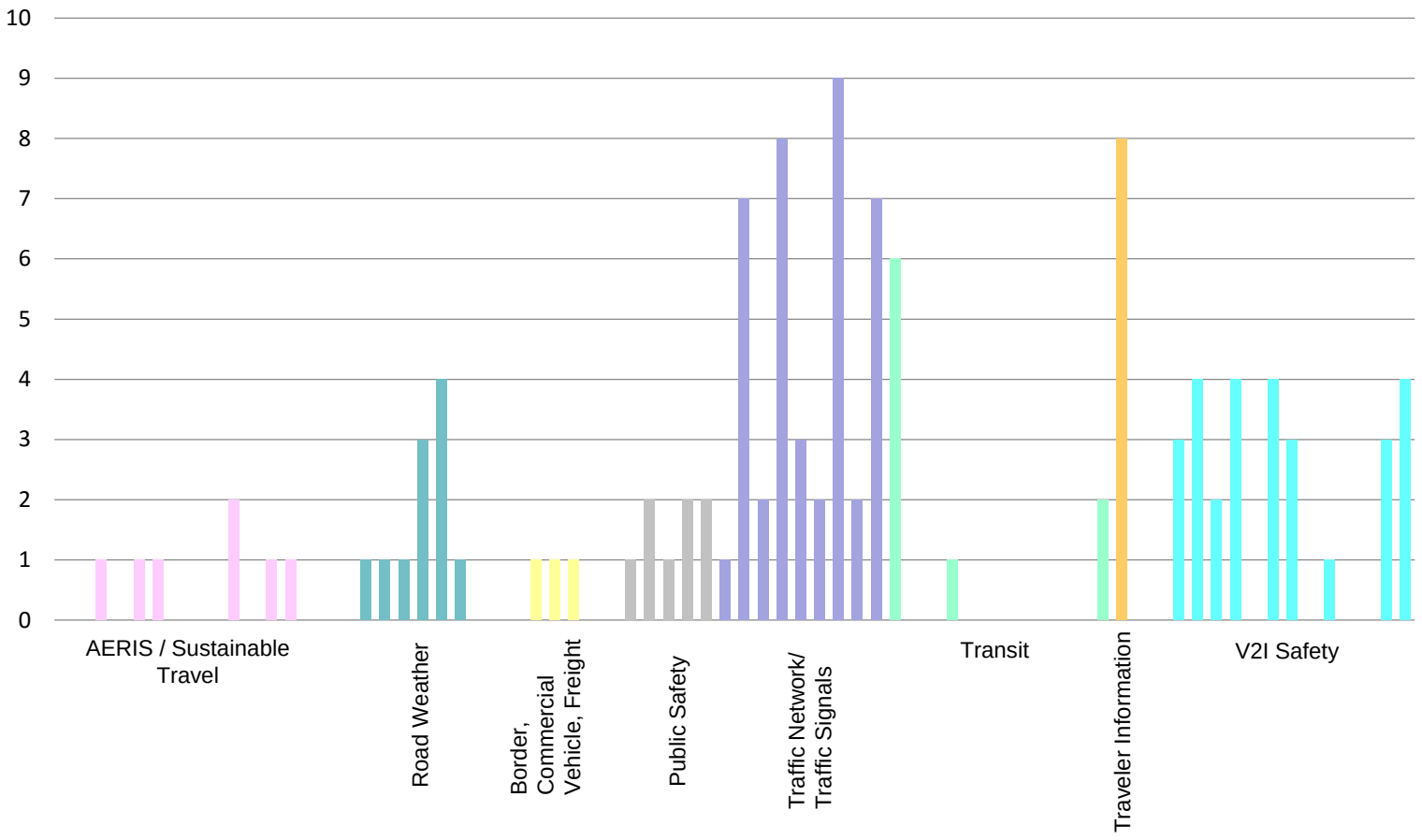
1. Intersections
2. Queue Warnings
3. Work Zone Management
4. Curve Warnings

How do the most selected Applications map to the focus areas?



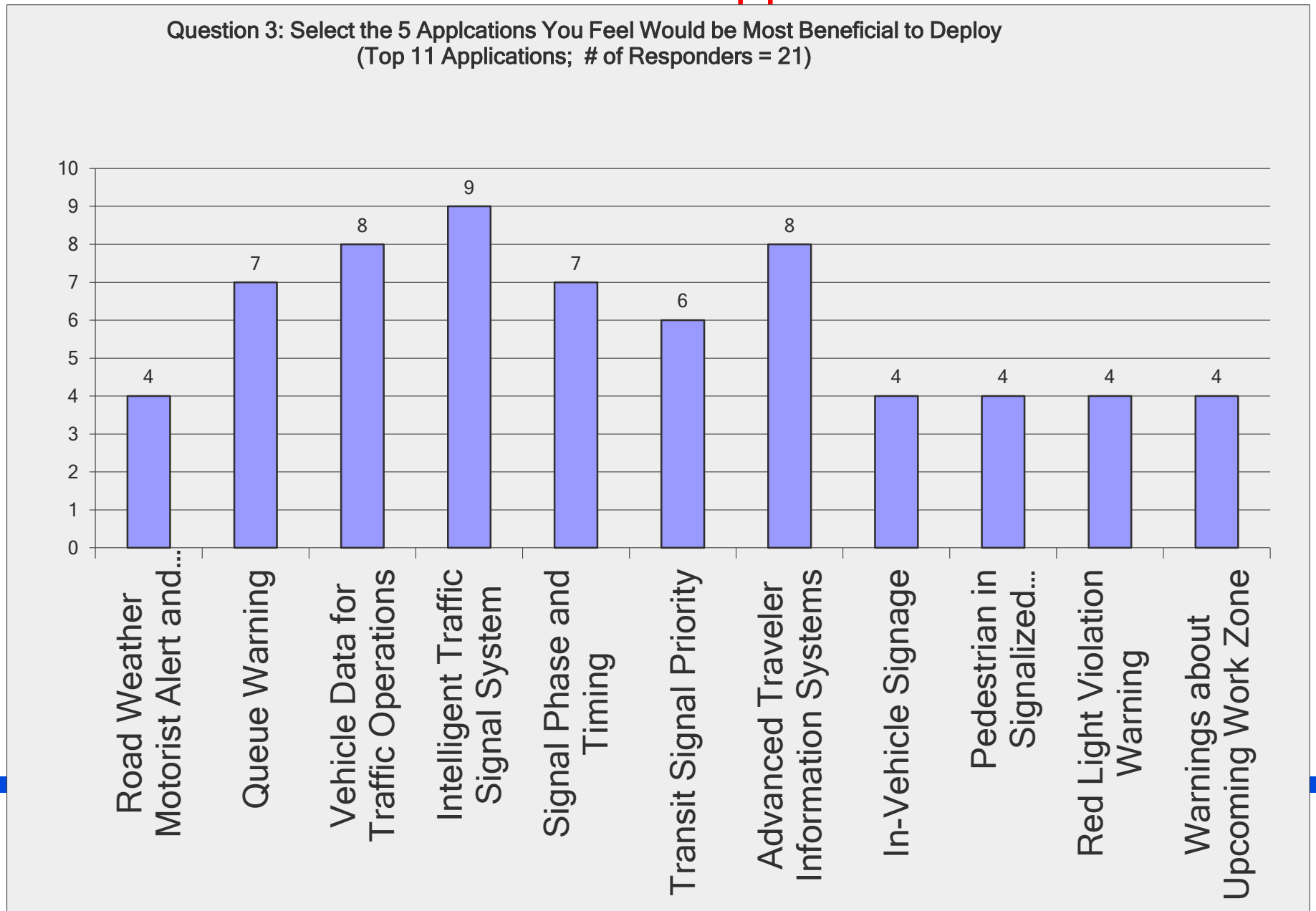
CV Applications Responders Feel Would Be Most Beneficial to Deploy

Q3: Select the 5 Applications You Feel Would Be Most Beneficial to Deploy (# of Responders=21)

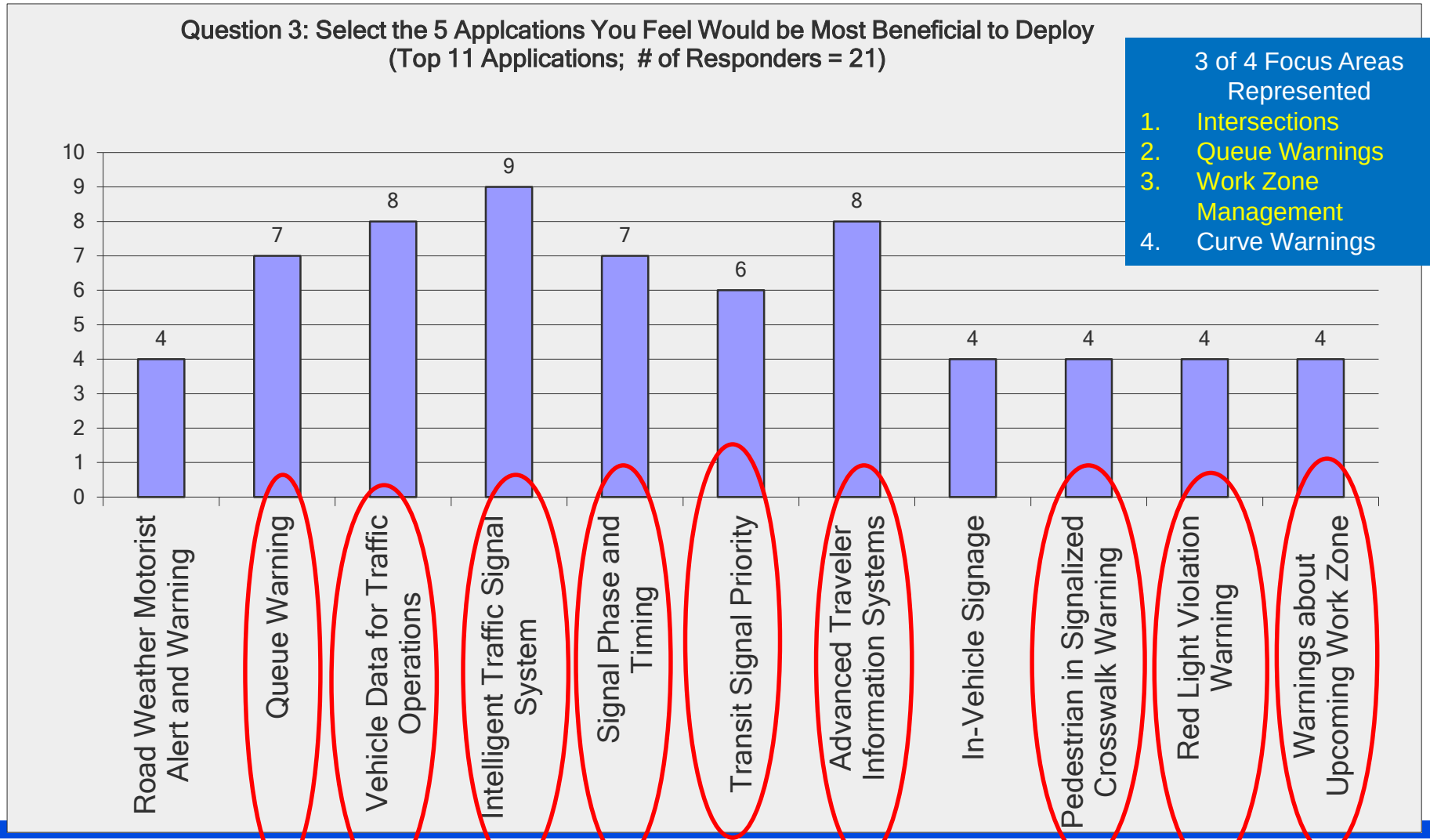


CV Applications Most Beneficial to Deploy

11 Most Selected Applications



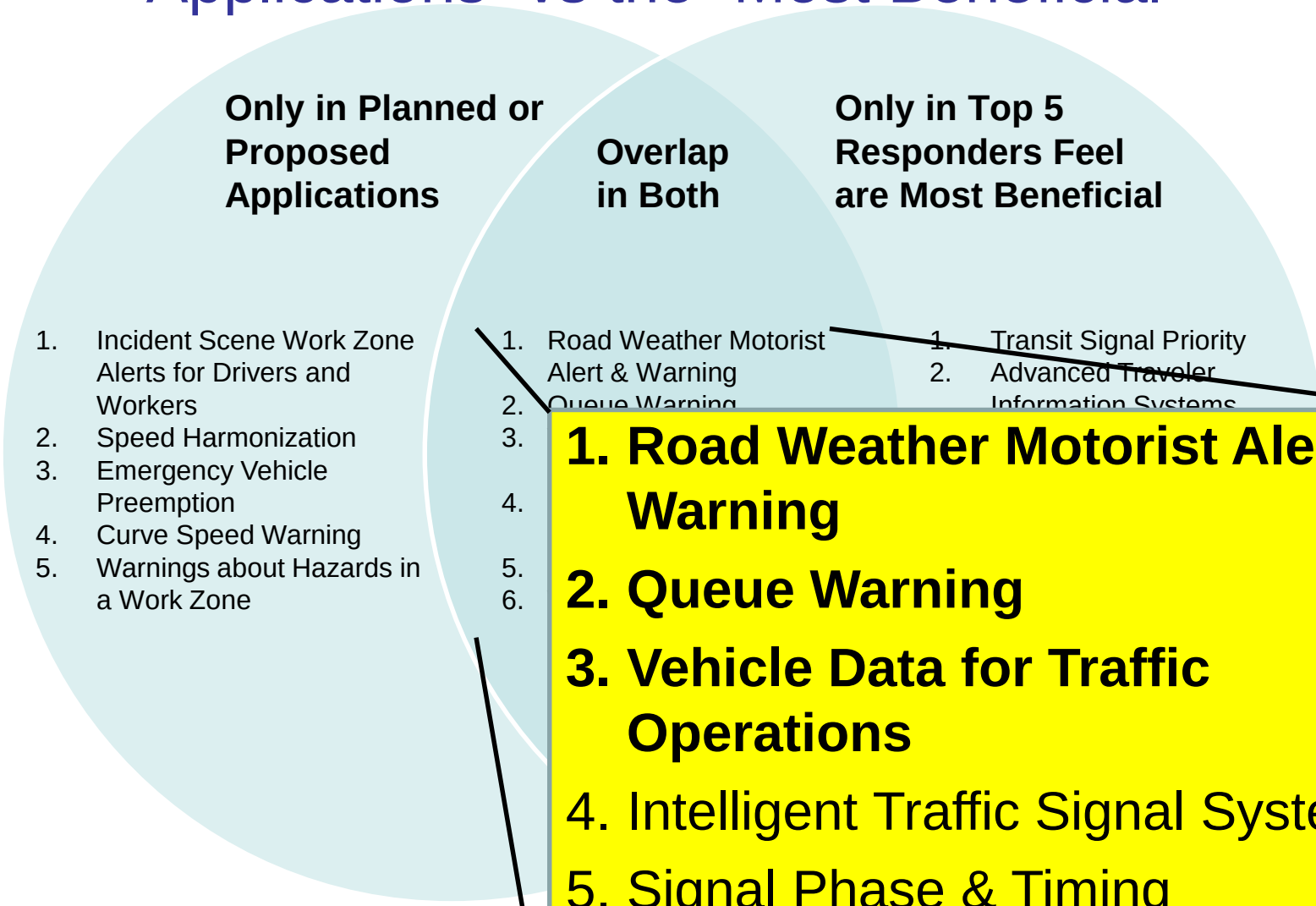
How do the Applications selected as most beneficial map to the focus areas?



AASHTO ITS AMERICA ite

Comparing the Most Selected "Planned/Proposed Applications" vs the "Most Beneficial"

Comparing the Most Selected "Planned/Proposed Applications" vs the "Most Beneficial"

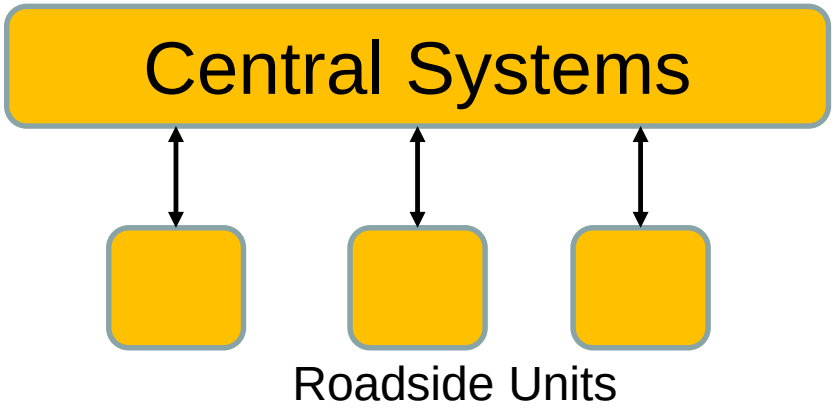


1. **Road Weather Motorist Alert & Warning**
2. **Queue Warning**
3. **Vehicle Data for Traffic Operations**
4. Intelligent Traffic Signal System
5. Signal Phase & Timing
6. **Warnings About Upcoming Work Zones**

Maintenance Operations Related Connected Vehicle Applications

- **Vehicle Data for Traffic Operations**
- Enhanced Maintenance Decision Support System
- Road Weather Information for Maintenance and Fleet Management Systems
- **Road Weather Motorist Alert and Warning**
- Variable Speed Limits for Weather-Responsive Traffic Management
- Warnings about Hazards in a Work Zone
- **Warnings about Upcoming Work Zone**

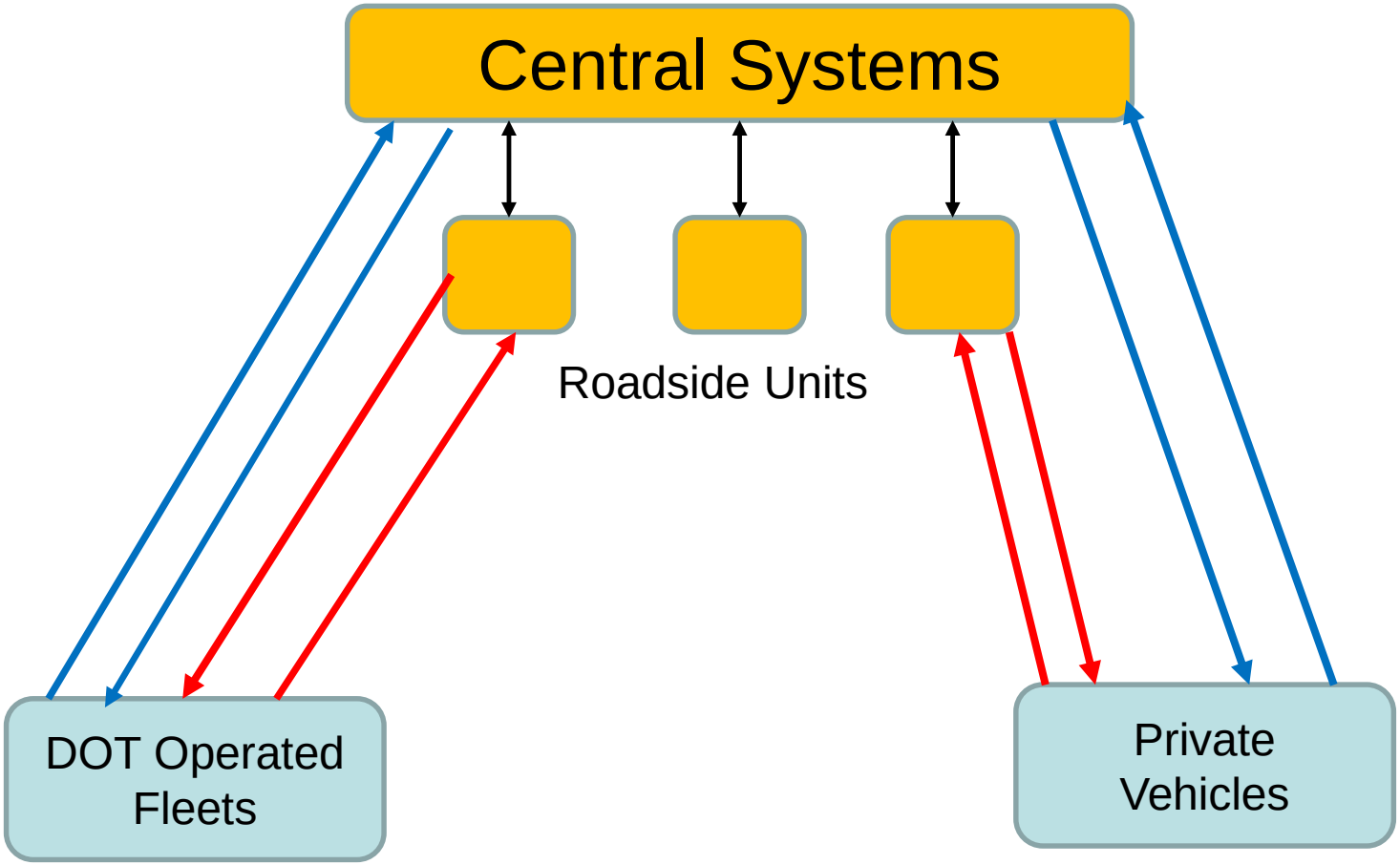
High Level Connected Vehicle Diagram



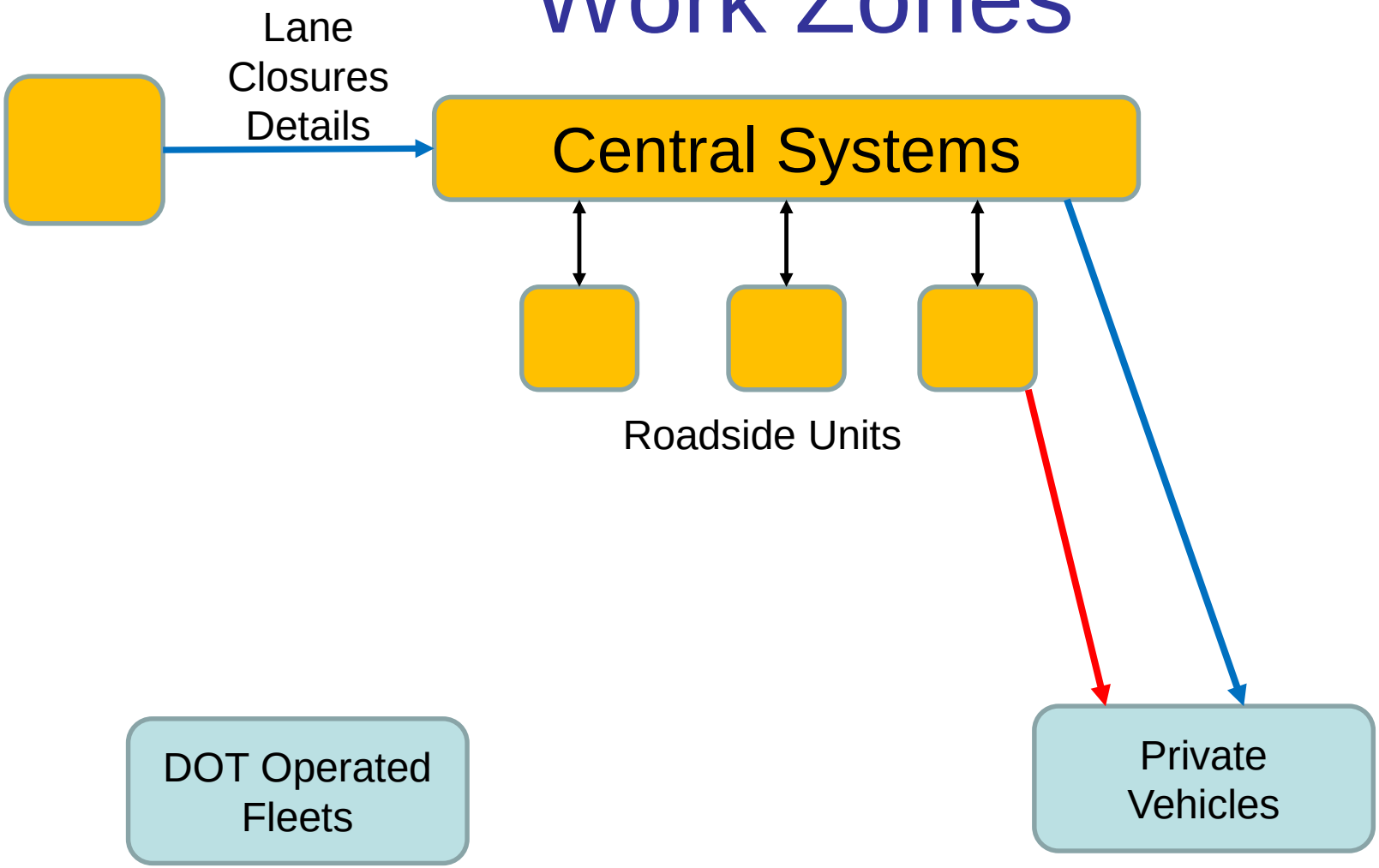
DOT Operated Fleets

Private Vehicles

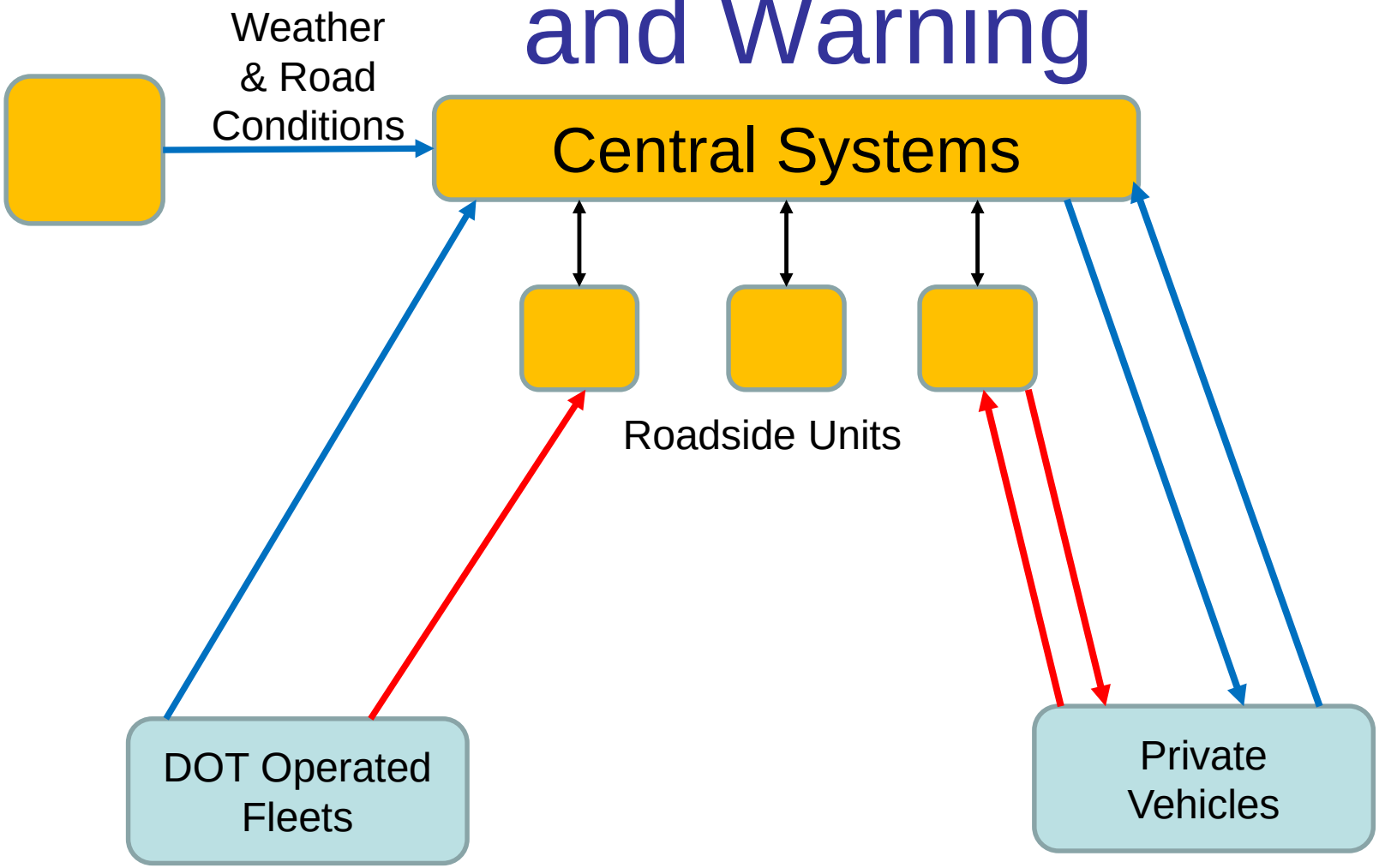
Maintenance Operations Data/Information Flows



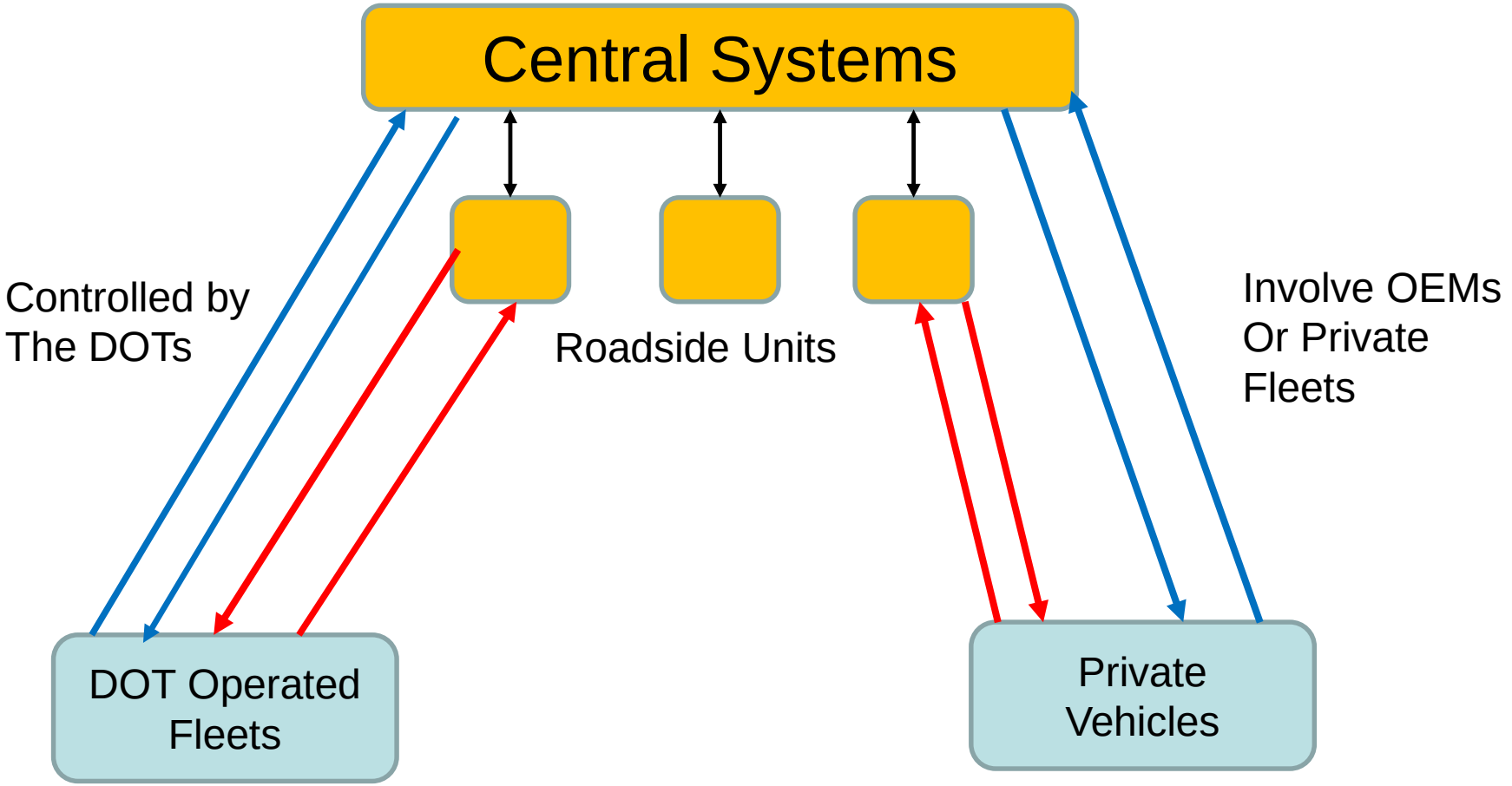
Warnings About Upcoming Work Zones



Road Weather Motorist Alert and Warning



Maintenance Operations Data/Information Flows



16 Issues Considered by the V2I DC

Issue	TWG 1 Initiatives	TWG 2 Research	TWG 3 Partners	TWG 4 Guidance	TWG 5 Standards
Issue 1: V2X Applications	P	S	S	S	S
Issue 2: Complementary Communications to DSRC	N	P	N	N	N
Issue 3: V2I Data	N	S	P	N	S
Issue 4: Patents-Intellectual Property	N	P	N	N	N
Issue 5: Security	No action planned at this time				
Issue 6: V2I Outreach	N	S	N	P	S
Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation	S	S	P	S	N
Issue 8: V2I Standards	N	N	N	N	P
Issue 9: Understanding V2I Liability Assignment	N	P	N	S	N
Issue 10: V2I Synergies with Other Emerging Technologies	No action planned at this time				
Issue 11: V2I Consumer Messaging	N	N	N	P	N
Issue 12: V2I Multimodal Applications	No action planned at this time				
Issue 13: Infrastructure Processes as V2I Obstacles	P	N	N	S	N
Issue 14: Federal V2I Policy Statement	P	N	N	S	N
Issue 15: Maintaining V2I Infrastructure	P	N	N	N	N
Issue 16: Operator and OEM Goals for V2I	N	N	P	N	N

Upcoming V2I DC Activities Related to Maintenance Operations

- **OEM Workshop**
  - Opportunity to present vehicle & Infrastructure data needs and discuss availability
- **Maintenance Costs of Roadside Equipment**
  - September (tentative) Webinar
- **SPaT Challenge**

The SPaT Challenge

A challenge to achieve:

- Deployment of Signal Phase and Timing (SPaT) DSRC transmissions operating on a corridor of at least 20 intersections in each state in the coming 3 years
- Commitment to operate for at least 10 years

24

The SPaT Challenge

Why would we do this?

- It will give DOTs an entry into V2I deployment and operations (valuable experience with procurement, installation, operations)
- It will help promote future (more advanced) V2I deployments
- It will show a commitment to OEMs

25

The SPaT Challenge

What is needed to achieve this?

Anticipated Resources:

- Guidelines for selecting corridors
- Procurement guidance
- DSRC licensing information
- Installation guidance
- Estimated costs
- Identification of existing funding sources that agencies may consider

26

Questions?