

BTO Traffic Tech Talk – December 2023

UW TOPS Lab

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Civil and
Environmental Engineering

UNIVERSITY OF WISCONSIN-MADISON

Presentation Outline

- About the TOPS Lab
- The WisTransPortal
- Emerging Research
- LTAP / TTAP
- Questions



Traffic Operations and Safety (TOPS) Lab

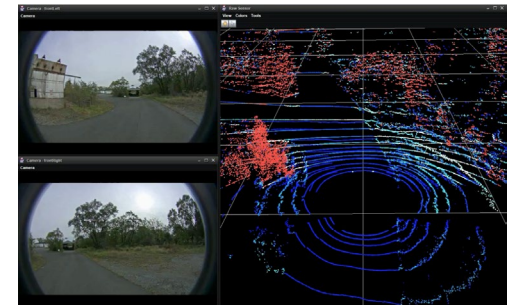


- Formed in 2003
- Part of UW-Madison College of Engineering
- WisDOT Partnerships (BTO, BOTS, BSHP)
- Research / Government Collaboration
- Professional Organizations



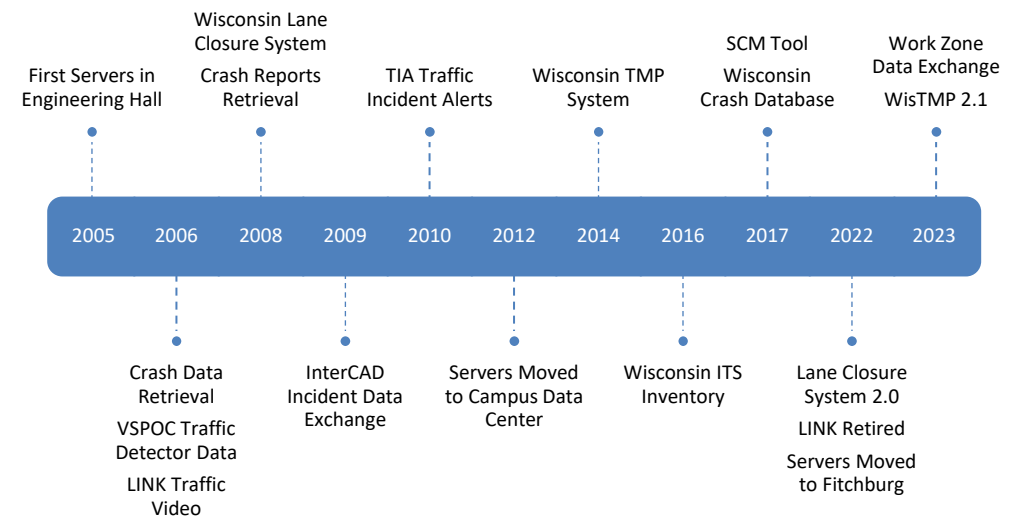
UW TOPS Lab – Core Areas

- Data & Analytics (WisTransPortal)
- Transportation Safety
- Traffic Management Systems
- Work Zone Safety and Mobility
- Digital Infrastructure and Technology
- Connected, Automated & Electric Vehicles
- Technical Assistance and Training



The WisTransPortal

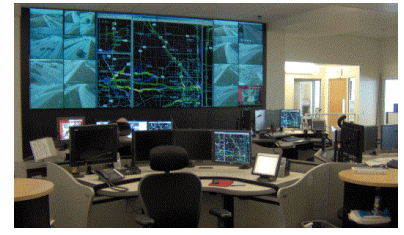
- Large scale computing, data management, and applications development platform
- Supports combined university research and transportation agency data needs across multiple areas
- Maintained through partnership between TOPS Lab and BTO since 2005
- Housed in the UW-Madison Fitchburg data center
- Combination of physical and virtual servers and storage
- Direct connection to TMC via the ITSNET fiber network



WisTransPortal Functional Areas



Wisconsin Department of Transportation



Wisconsin Department of Transportation



USDOT Federal Highway Administration



Wisconsin Department of Transportation

BTO / DTSD Crash Data Systems

Crash Data Retrieval Facility, Version 2.0.7, June 6, 2021

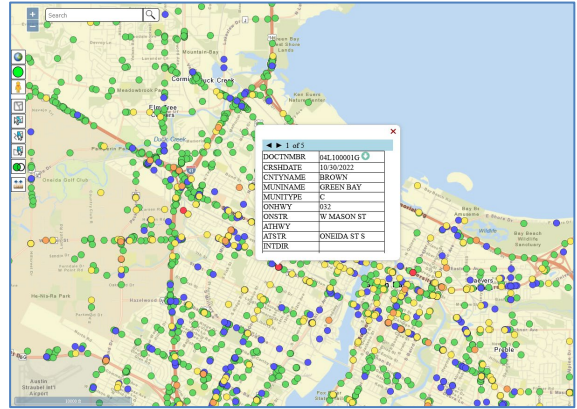
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The total number of records for this query is 7923.

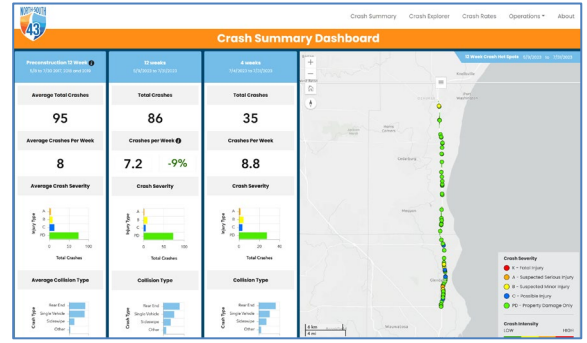
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1	0111000073	014000	0100002020	7	DANE	WISCONSIN	C	I	151	USH	NB	
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3	0110005350	014000	1010000000	1	DANE	WISCONSIN	C	N				
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16	0110008700	014000	0120000000	9	DANE	WISCONSIN	C	N	151	USH	SB	
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HWYCLASS	INNSVR		INNSVR		INNSVR		INNSVR	
	K	A	B	C	O			
R CITY	--	6	32	10			246	
R CTY	2	13	43	22			469	
R H	1	12	30	29			315	
R ST	6	15	89	62			762	
R TOWN	1	9	48	20			392	
U CITY	0	78	315	243			2310	
U CTY	1	2	2	4			35	
U H	1	7	22	23			202	
U ST	6	27	144	175			865	

Crash Data Retrieval Facility

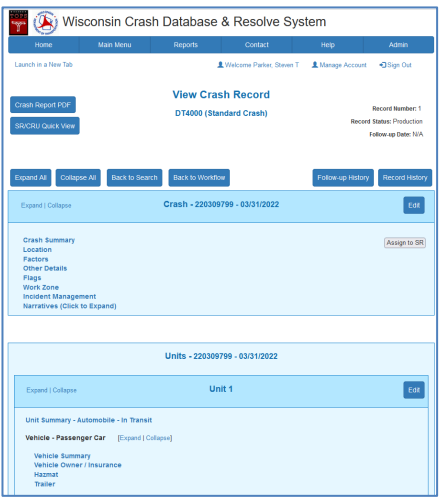


Crash Mapping and Analysis

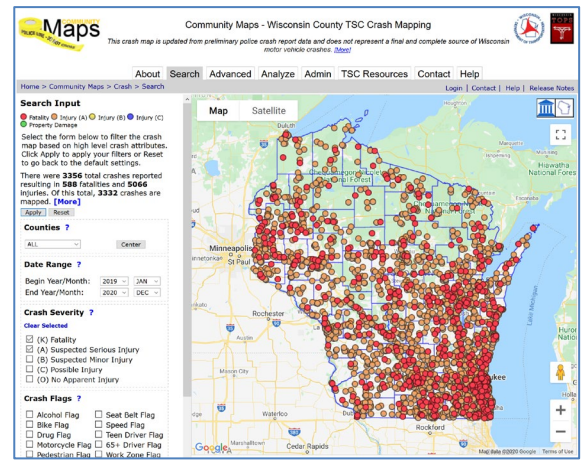


HNTB I-43 N-S Project Dashboard

BOTS / DSP Crash Data Systems



Crash Database and Resolve



Community Maps

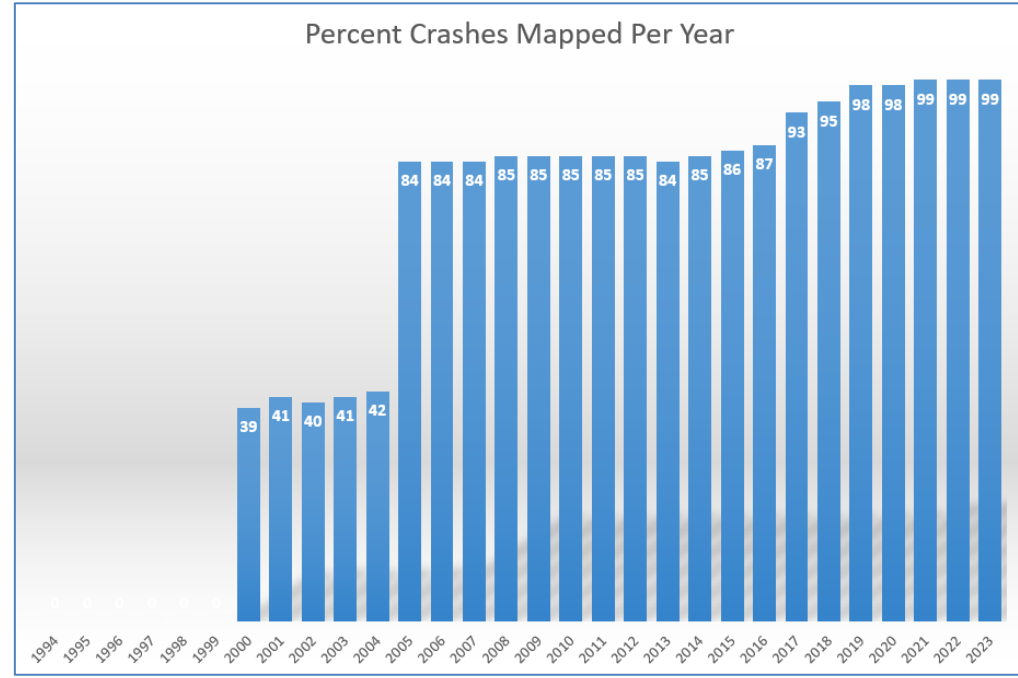


WISTAR Data Warehouse

Crash Data Quality Improvements

Safety Data Performance Attributes:

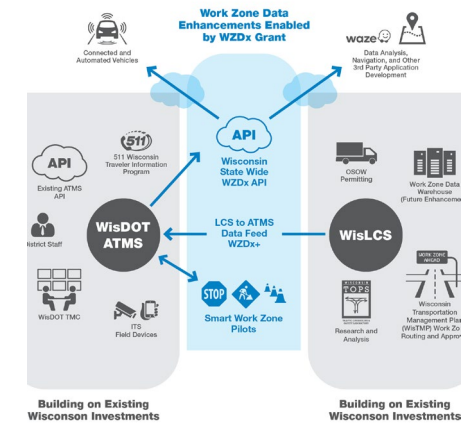
- Timeliness
- Accuracy
- Completeness
- Uniformity
- Integration
- Accessibility



WisDOT Work Zone Systems

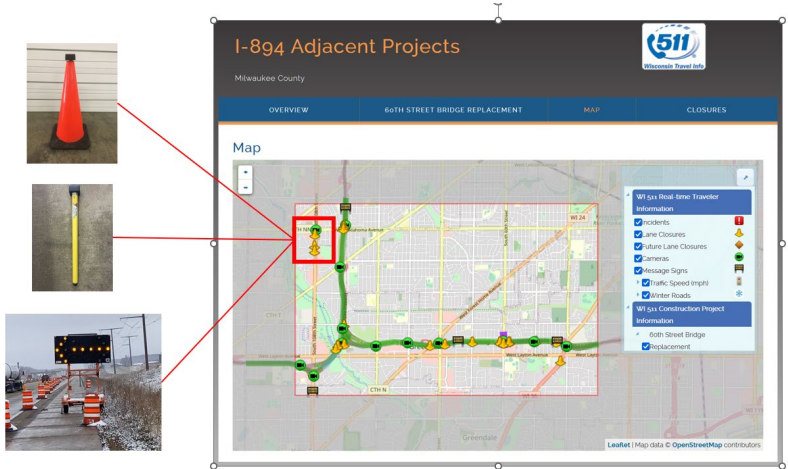
Wisconsin TMP System

Wisconsin Lane Closure System



Work Zone Data Exchange

SMART Work Zone Safety Grants



WZDx Local Road Work Zone ITS Integration

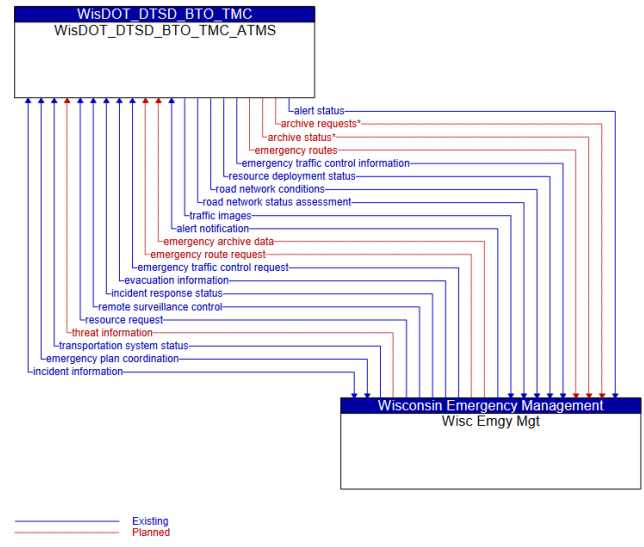
Pilot integration project to incorporate local road Smart Work Zone ITS into the new Wisconsin Work Zone Data Exchange.



Automated Truck Mounted Attenuator

Multi-state pilot testing of ATMA capabilities. Collaboration with Colorado (lead), Minnesota, Oklahoma, and Wisconsin.

ATMS / TSMO Systems Integration



Wisconsin ITS Architecture

The screenshot shows the 'InterCAD Traffic Incident Data' web interface. It includes a header with logos and navigation links, a system status section with a table of incident counts, and two tables for active and cleared incidents.

System Status:

Agency-Post	Active	Cleared	Filtered	Total	Last Message	Elapsed Time
<input type="checkbox"/> BWN Brown	0	3	22	25	21:44:29 -0500	17.8 min
<input type="checkbox"/> DNE Dane	1	55	64	119	21:59:52 -0500	2.4 min
<input type="checkbox"/> MKE Milwaukee	2	26	3	39	21:14:46 -0500	47.5 min
<input type="checkbox"/> WKE Waukesha	1	17	1	18	21:58:39 -0500	3.6 min
<input type="checkbox"/> WSP State Patrol	2	94	579	673	22:02:10 -0500	0.1 min

Active Incidents:

Agency	InterCAD Incident ID	COUNT	Event Type	Location	Issue Time	NIE Time
View	DNE-2752076-20231212	46	O other	Baltes Rd / Ush 12 Eb	12/12/2023 8:41 PM	12/12/2023 4:59 PM
View	MKE-2023243696-20231213	7	disabled vehicle	NE Zoos;MW;Ne Zoos;MW	12/12/2023 9:14 PM	12/12/2023 8:07 PM
View	MKE-2023243701-20231213	3	disabled vehicle	I94 Eb/84th St;MW	12/12/2023 8:32 PM	12/12/2023 8:15 PM
View	WKE-WKE-P22299481-20231213	7	accident	SB I43/ROCHESTER ST MUKW_V;ND	12/12/2023 9:58 PM	12/12/2023 9:53 PM
View	WSP-WSP-000267-8095-20231213	25	70 fire	I-39/90 NB MP 138 [Dane]	12/12/2023 10:01 PM	12/12/2023 9:20 PM
View	WSP-WSP-000267-8101-20231213	2	disabled vehicle	I-94 EB MP 065 [Eau Claire]	12/12/2023 9:40 PM	12/12/2023 9:40 PM

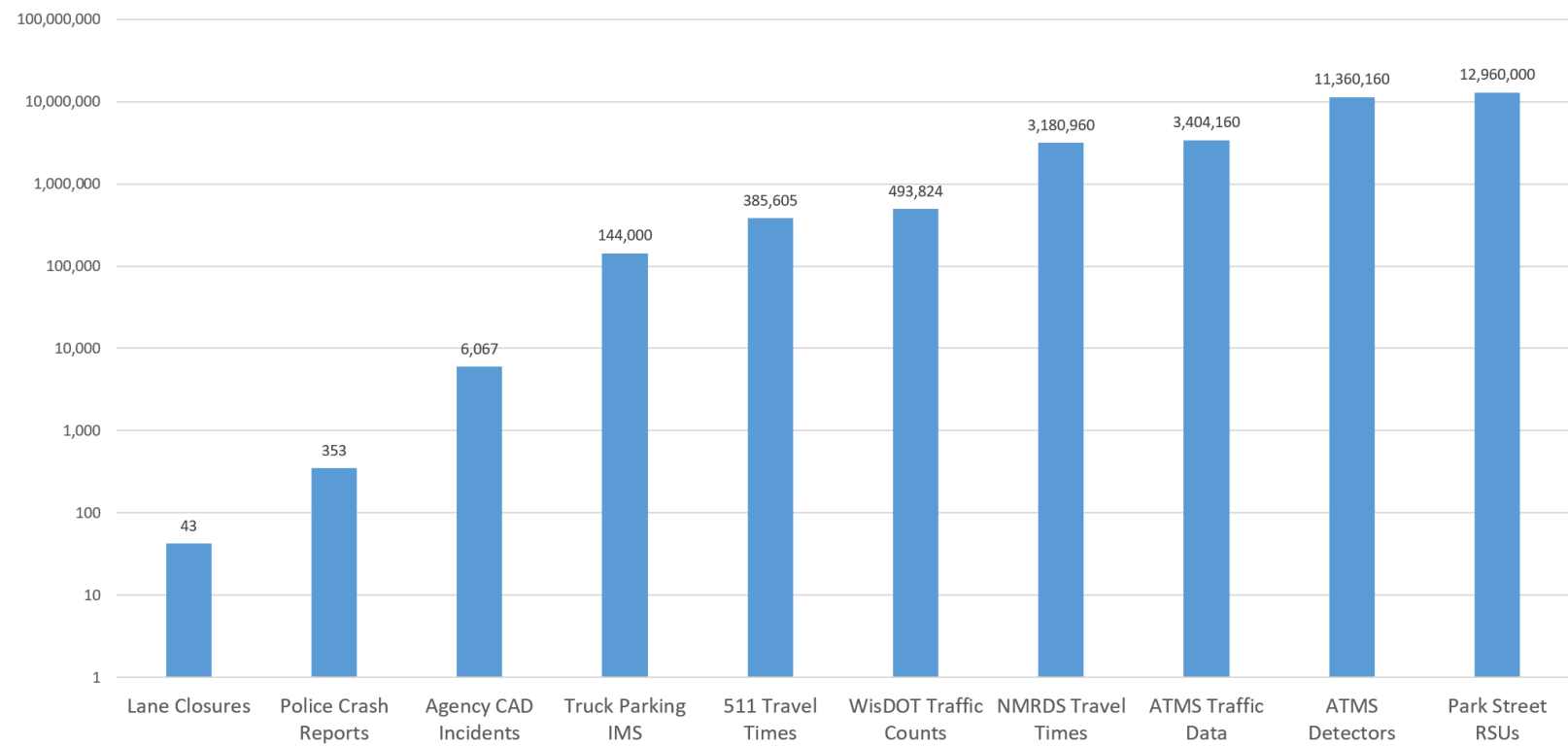
Cleared Incidents:

Agency	InterCAD Incident ID	COUNT	Event Type	Location	Issue Time	NIE Time	CIE Time
View	BWN-BWN-4906081-20231212	9	incident	W MASON ST & SB I-41 (under Mason St)	12/12/2023 11:39 AM	12/12/2023 11:13 AM	12/12/2023 11:39 AM
View	BWN-BWN-4906319-20231212	8	incident	W MASON ST & SB I-41 (under Mason St)	12/12/2023 6:44 PM	12/12/2023 5:39 PM	12/12/2023 6:44 PM

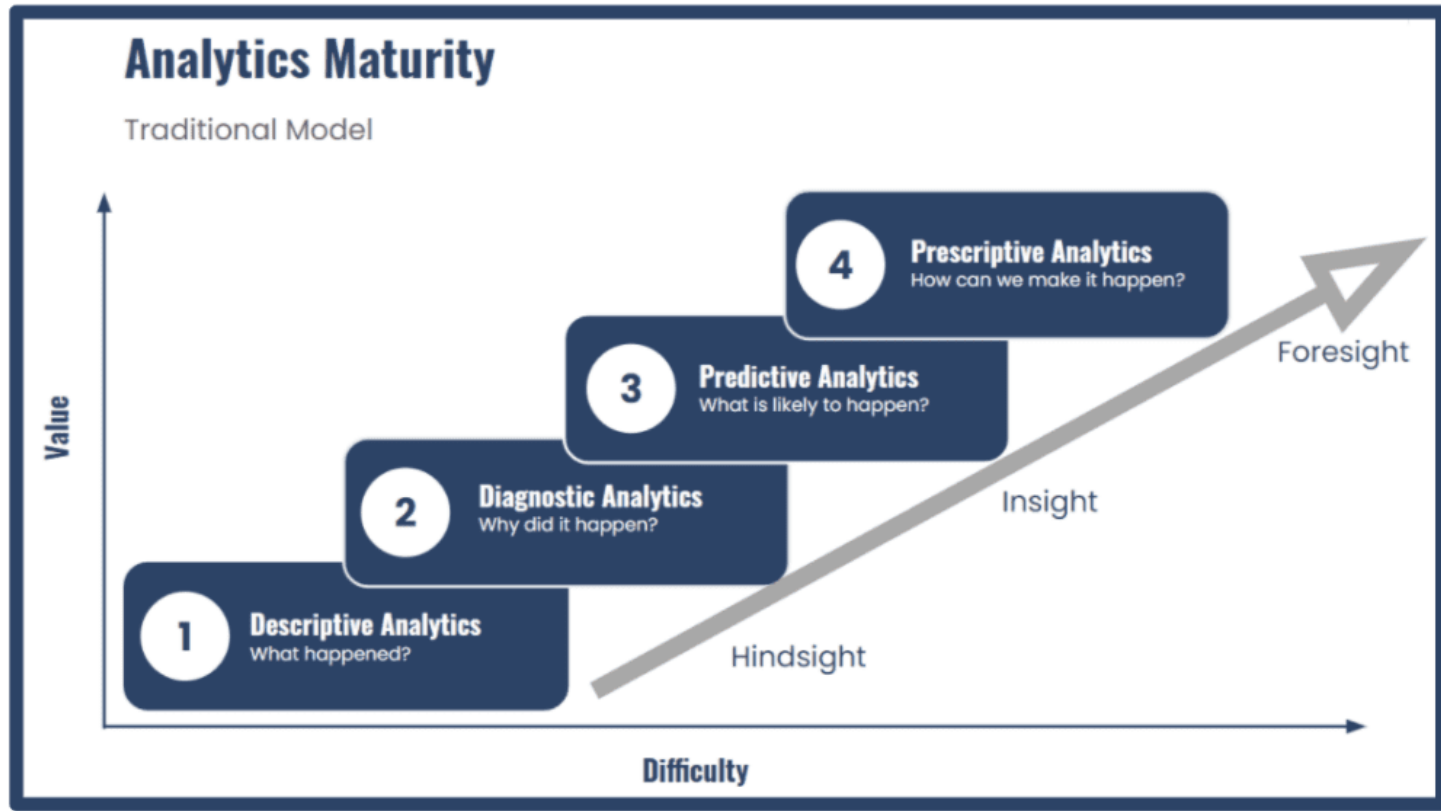
InterCAD Traffic Incident Data Exchange

The TOPS Lab Data Journey

WisTransPortal Data Archiving - Daily Totals
(Logarithmic Scale)

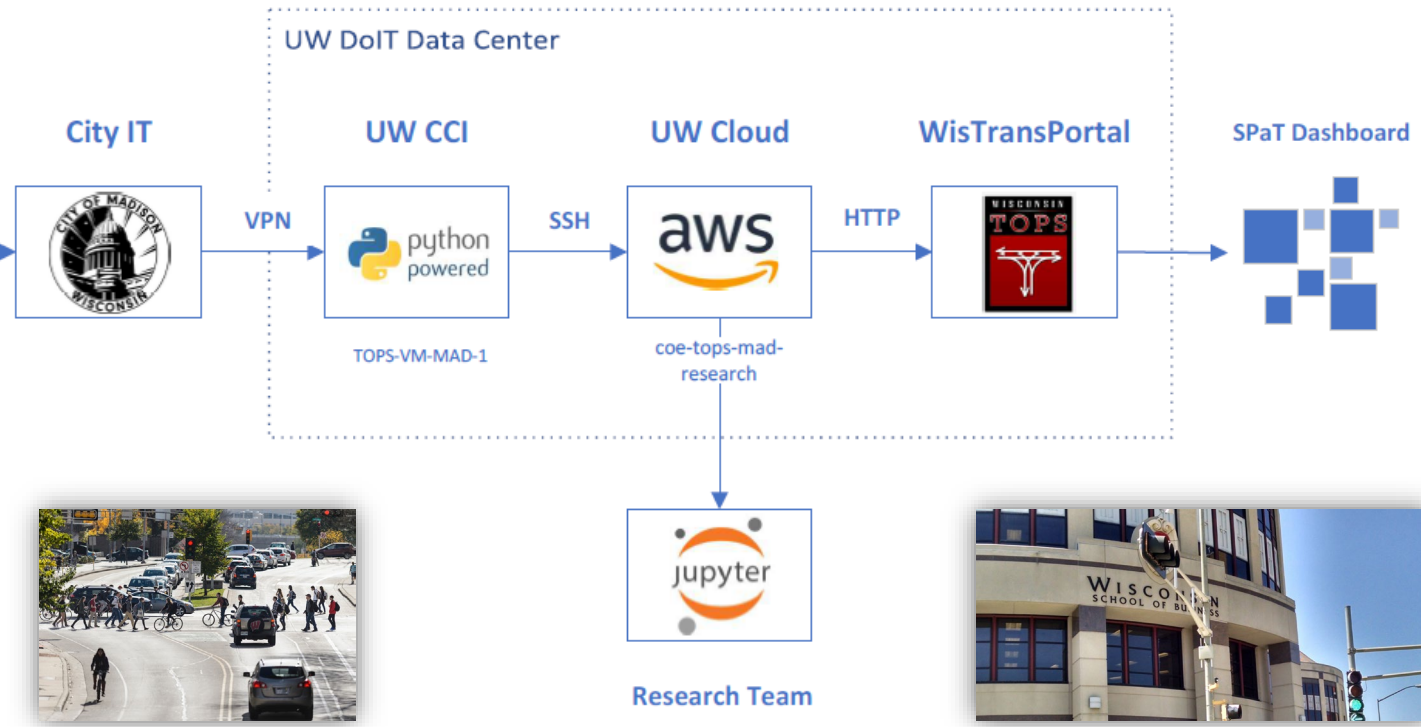
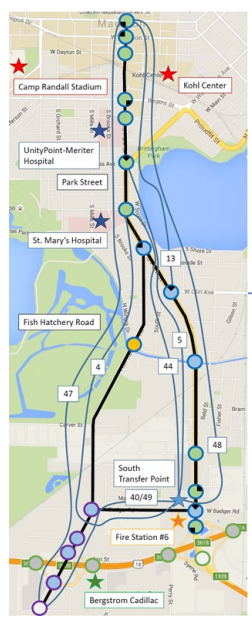


The Analytics Maturity Model



<https://www.phdata.io/blog/what-is-analytics-maturity-framework/>

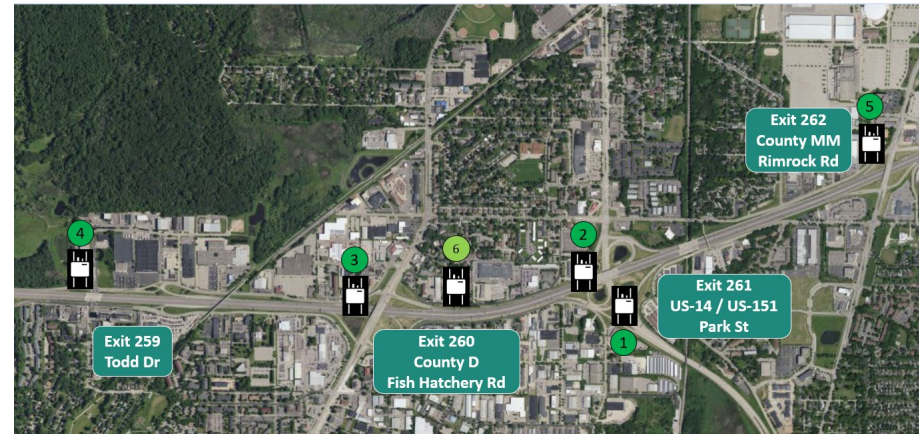
City of Madison CV Corridor – Data Pipeline



CAEV Systems



The “Badger” Automated Vehicle

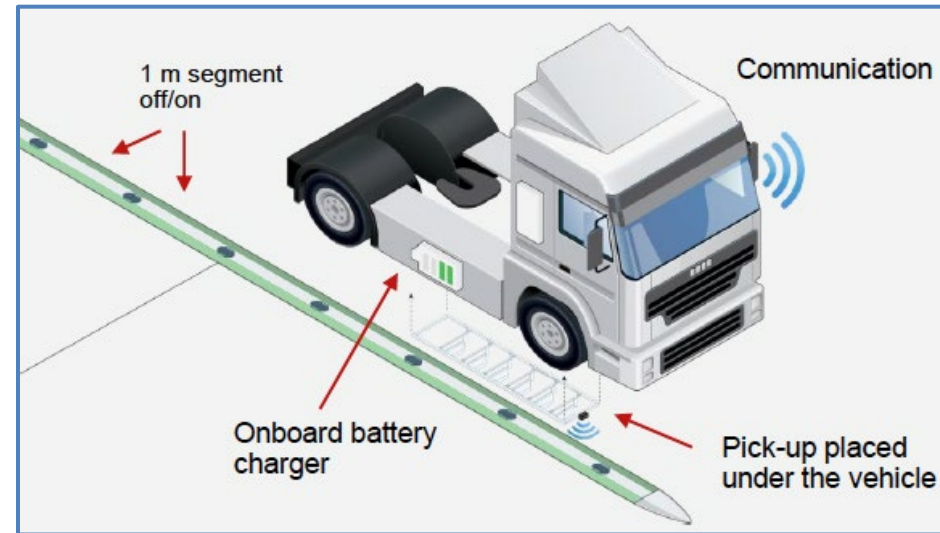


Connected Vehicle Pilot



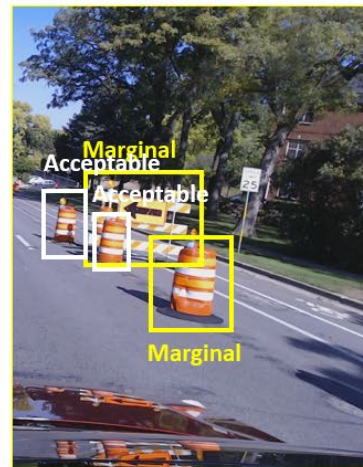
Connected, Automated, Electric Vehicle Demonstration Corridor

- Congressional Discretionary Spending Opportunity
- Conductive Charging
- Living Lab
- Demonstration and Evaluation



Work Zone Inspection – Dynamic

- Visual-based inspection
 - Missing warning signs, arrow board, etc.
 - Warning signs quality
 - Barricade quality
 - Channelizing devices quality



Work Zone Inspection Potentials – modeling with dynamic cruising vehicles

WI LTAP & TTAP

- Started in 1982, FHWA to support local and rural road agencies
- 51 LTAPS funded by FHWA CLAS (Center for Local Aid Support)
 - <https://www.fhwa.dot.gov/clas/ltap/>
- National Local Technical Program Association (<https://nltapa.org>)
- Formed in 1991 (LTAP and TTAP)
- Two conferences

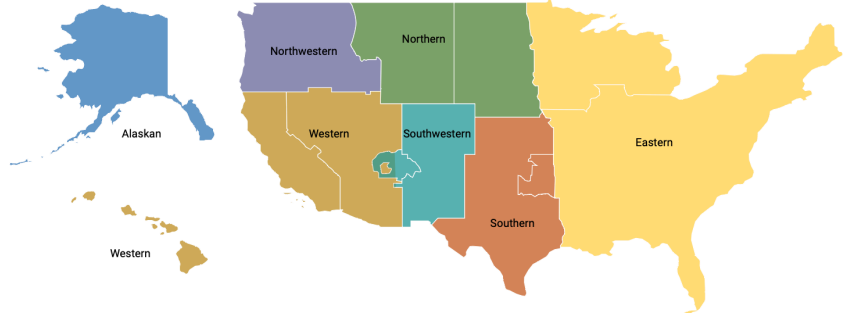
Six Program Tasks

- Administration and Management
- Communication and Marketing
- Training
- Technical Assistance
- Technology Transfer
- Coordination and Partnership



FIND A TTAP CENTER

Select a Region from the map below to get TTAP center information.



BIA Regions

Eastern and Midwest

Thirty States

Seventy-Five Tribes

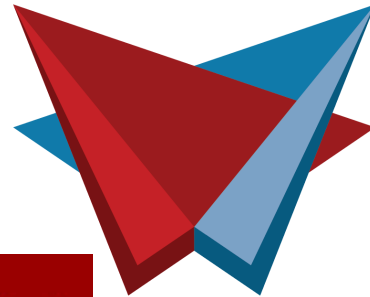


- City of Madison HIN
- Madison MPO HIN
- Other Vision Zero data and plans
- Various safety and operation data sources
 - Wejo
 - Naturalistic
 - SHRP2
 - Others
- Mobility and Food Hubs- what does the future look like to improve safety, equity, health





**CONNECTED & AUTONOMOUS
TRANSPORTATION SYSTEMS**



Wisconsin Transportation Center





Thank You!

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