

## My Background



#### 10 years+/- in \* 10 years +/- \* 10 Construction/ as the State Tra Utility Relocation ITS Engineer "Sp

 10 years +/- in Traffic & Safety "Special Projects"







## I also do these... w/ Tracey







orange is

#### Agenda



ID	WZMSL Dimension	Prajøct	Таріс	Tark/Activity	Rospansible Party	ato Arrigno	iløzt Updat	Tarqot Cumplotiun Dato	Actual Camplotian Date	Commonte and Statue	Prinri ty 1-Hiq	Nine I
57		Support Continued Effort to Integrate TCP Efforts	Narrow Bridge Traffic Control	Tarkforco to addroxysituation	Bon Huckor	9/24/2021			7/28/2022	Prorontation to Charlio Purcoll on cortr and alternatives. Focur uill be on individual bridges. Tark Force established 7/28/2022		- Gillion
58	Organization and Work Force	Support Continued • Effort to Integrate TCP Effortr	Narrou Bridgo Traffic Control	Prozont tark forco Updato	Bon Huckor	7/22/2022		12/31/2022		Prozontation to W2 Council on 10/20/2022 Add uhito papor to zpocial zituationz uhon comploto 9/29/22: In prograzz		
69	Organization and Work Force	Support Continued • Effort to Integrate TCP Efforts	Spocial Situations	Develap quidance far full clarers ta camplete uark	Bon Huckor			4/30/2023		Examples are I-35 routed around Bevington/Martin Hickman Road 10/23/20220 narked for Jone Theory Televington Bonto del who e path foru		
25	Culture	Promoto Work Zono Innovation	Guardian Angol	Provide additional information on the Dirtrict 5 experience.	BradLauderman	1/20/2022			10/13/2022	Fry W2Council San Skate site Classifier and the same skale vices	1	
17	Porformanco Moaruros	W2 Production	Identify W2 Production Outcome Measures	Ertablish autcamo moasuros	Clayton Burko	7/1/2022		7/ 1/23	6	Arrow 27 and date 287, an aytax are and a sqn.further discussion 1872, a spin		
18	Porformanco Moaruros	W2 Production	Identify W2 Production Outcome Mearurer	Pravide information to the Work Zone Process Review Team	Clayton Burko	11/2022		1a International		4 to plan July 2022 Update Aur.22: Claytan update and reazign. further dircuzion 10/18/22: lau priority, nextrtep of above		
21	Culture	Pramato Wark Zano Innavation	Identify Isua DOT personnel thatserve on industry committees and	Pravido thom with W2M information to sharo with the industry.	Clayte	1/ 22				Fram CMF Warkshap Dan Sprendquler far facur an canzultantr and ATSSA 9/20/22: koop? romavo? Updato? Ro-uzriqn? furthor dir currian 10/ 12/22: lau priarity, uzrk kan athor industry safety ada ATSSA que fritist dan ava nat hoed this o stainnikam.		
22	Culture	Pramato Wark Zano Innavatian	Roonqaqo tho RISC ta invaluo inductry in zalving W2Mizzuor (38)	10	Cit Burks	1/12/2022			11	The CMF Warkshap and with industry groups to promote WZM, safety and shull the issue with flagger APAI VZL Company		
34	Collaboration	WZMExtornal Stakoholdorz	RR Claruror	Investigate a plant with road	Clayton Burke	94 121			HE	722: Card to work with industry groups Arcs722: Campleto		
35	Collaboration	WZMLau Enfarcon Stakoh	Lau Ernen tin fundin.	indically review processes for WZM for law onforcement.	Clayterko	171-11			י ע	Fram W2 CMF Warkshap 9/29/22: Up date an pragrozz and reazzign? Daez the dage woment: Create a maintenance margary Camplete		
36	E.	n n ra Sta	splon 14VE in Wark Zanoz	Incorporate decirion pointr receiving MVE needr and wre WZM within the T development and implementatic secs.	Claytan Bu	2022				Fram WZ CMF Warkshap 9/28/22: Nood and the set of the s		
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55	ian and Wark Farce	Support Continued Effort to Integrate TCP Efforts		n iga romo roa cod un horra han azyztom na ph. azo.	Claytan Burko	1/12/202	20			Parto Layoritom 9/29/22: Samo ar lino 49/50 sambino ulth 49/50		
62	Organization and Work Force	Support Continued » Effort to Integrate TCP Efforts	Standardr and Guideliner	Area neuring shoulder derign to orden invide shoulders to facilitate MVE and maintenance operations as well as providing additional capacity during work zone operations.		6	U			Fram Information Sharing Warkshop Neo La considerstrengthening shaulders for additional capacity 9/29/22: Clayton up date or romove? Move to Design? discurs 10/19/22: Karign to Dant of uscurs sink Mike Kannerfs to determine if there is rupperfixed \$ for expectation. May be a bardeall.		
63	Organization and Work Force	Support Continued » Effort to Integrate TCP Effortr	Standardr and Guidelines	Infarm MASH committee of the label time to conversion of the contribution devices and the large the contribution	Cla Burko	1/12/2022				Fram Information Sharing Warkshop 9/29/22: Dan and Clayton Updata? discussion 10/19/22: need for quidance on quardrail repair. Complete for TTC ConstraIDevices. Check with Dan.		
64	Organization and Work Force	Support Continued Effort to Integrate TCP Efforts	Standardr and Gui	vortigato an un de ar pink idont gao na far MVE	Claytan Burko	1/12/2022				Fram Information Sharing Workshop 9/29/22: Jim Armstrong completed this. Remove, discussion.		
53	Organization and Work Force	Support Cont	Entry SI	Canzidor pravidiną loftzido wark zano ziąniną an ontranco rampz	<del>Claytan Burko</del> Dan Sprongolor	1/12/2022		2/18/2022		improve driver detection when watching over leftshoulder Report due to Work Zone Council 4721/2022 9729/22: Assign to Dan		
52	Buriners Process	Improvo Procozzoz Implomont Data Dri Docirionz	ll and Mitigations	Track Projects that add mitigations mid- searon	<del>Clayten Buelus</del> Willy Saronzan	1/12/2022				Leave it like it ir thir ir a care by care baris - Campleto 9/29/22: In pragress. Mave ta Mitigatian Team ar respansible party TSMO Engineer dircussian, IW2 urap up meeting informatian.		
10	Systems and Technology	Cannoctod Dovicos	Smart Arrou Board	Camploto tosting and intogration with Cypross for maintonanco	Craiq Barqfrodo	1/7/2021				2 SAB connoctod 6/29/2022 Continuod ovaluation ir noodod. Tarqot complotion dato Spring 2023		
11	Systems and Technology	Connected Devices	Smart Arrou Board	Purchare and install maint retrofit kits	Craiq Barqfrodo	7/16/2021				Decision to purchase and install setsofit kits will be based on testingfevaluation sesults.		
19	Culture	Promoto Work Zono Innovation	Maving dauble lane clarure layaut.	Publish now TC	Dan Sprengeler			9/30/2022		On Wark Zano Safoty Cammittoo Aqonda Fobruary 2022 9/28/22: Camploto? Octabor ar april - camploto TC435		
24	Culture	Promoto Work Zono Innovation	Collect results of recent and ongoing innovative WZM offerts throughout the agency	Distributo to coro W2Mstaff to raiso awaroness and on courage further innovation.	Dan Sprongolor	1/12/2022			On qain q	rouso Fran CMF Warkshap W2 Gauncil 9/28/22: Updato fram Dan? Cauncil Agonda. Caardinata duith Stratorgic Cammunicatians normal procedure		IR I CU
<	▶ In Pre	ogress Cor	nplete 🕀							was an even as a second or open owners and an and proceeding		
		-										

4



## So, I'm only going to talk about the ones that use electricity...





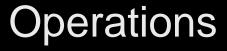
#### What Drives Iowa DOT Work Zones?

Management Policy Innovations Industry Training Research









WHAT

DRIVES

YOU









### What Drives Iowa DOT Work Zones?

#### Lane Closure Planning Tool

#### **BIG Data**







Free

Landsat / Copernicus

#### The Work Zone Players....

#### **Design Side**



Sprengeler, Dan

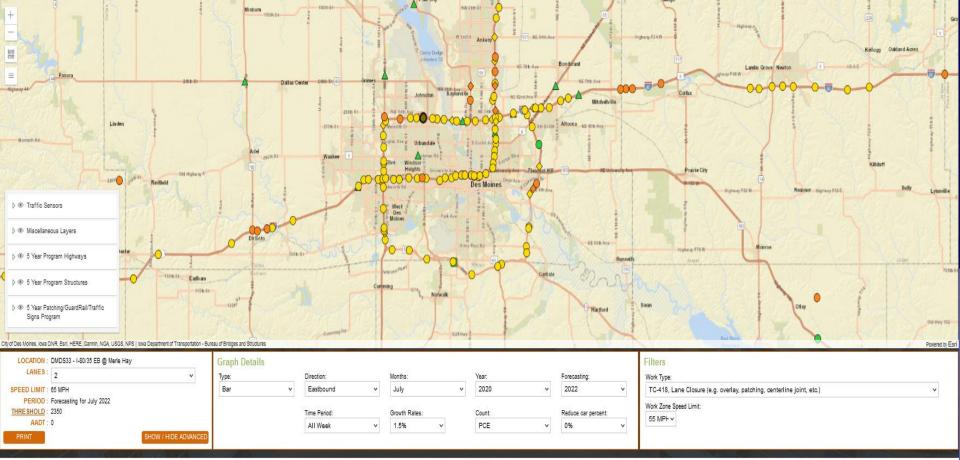


Promotion to Construction Side

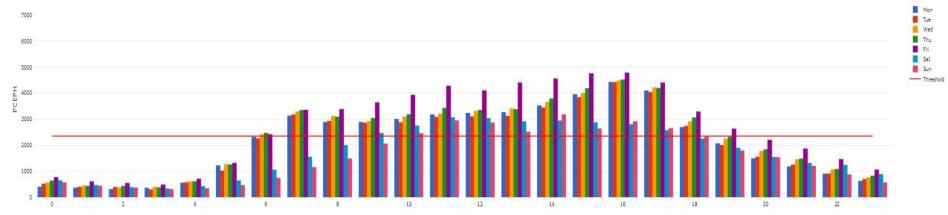
r Mississippi River National Wildlife an

Oelw





All Week





LCPT



# Quickly & Easily Determine if a work zone will cause queueing. It spurred the following: Traffic Critical Projects Non-Construction related lane closures Lane Closure System (permitting system)









### **Intelligent Work Zones**



## Intelligent Work Zones



To plan for the "above average" traffic, or incidents
And/or Situational Awareness
We add cameras, Portable DMS and Sensors

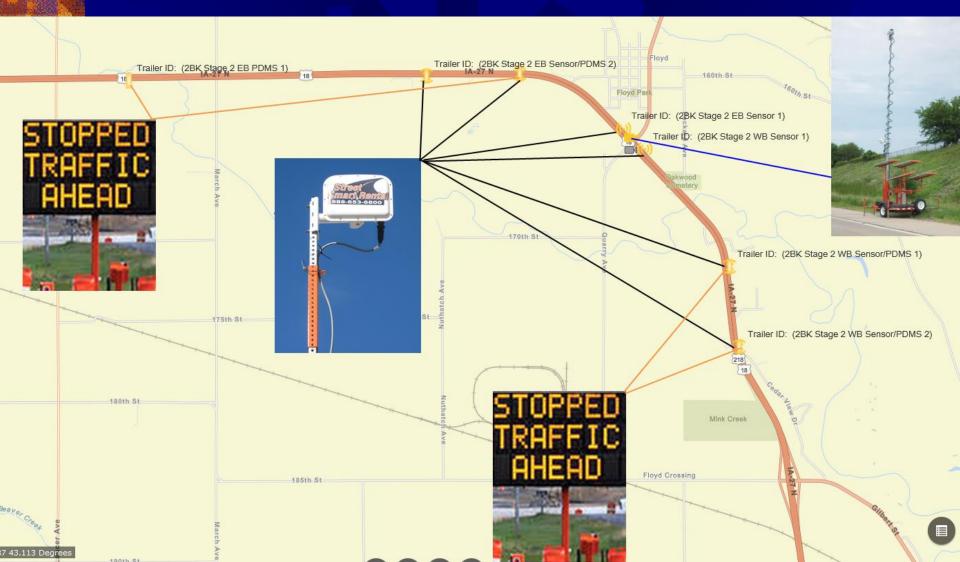








## "Typical" Intelligent Work Zone





## Portable DMS Before Work Zone

Primary Use
 Slow/Stopped Traffic
 Secondary Use
 Incident Management



When variable speed limit signs such as this one are used to alert motorists to slowed or stopped traffic, the incidence of rear-end collisions occurring in work zones is reduced.





## **TMC Intregration**





## Past \$\$





## Spec Change



Interstate – October 2020 (Done)

All other primary Roads – Add in October 2021





#### What makes an Arrow Board "Smart"?



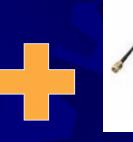




#### What is it?













Cellular Modem w/ GPS Antenna



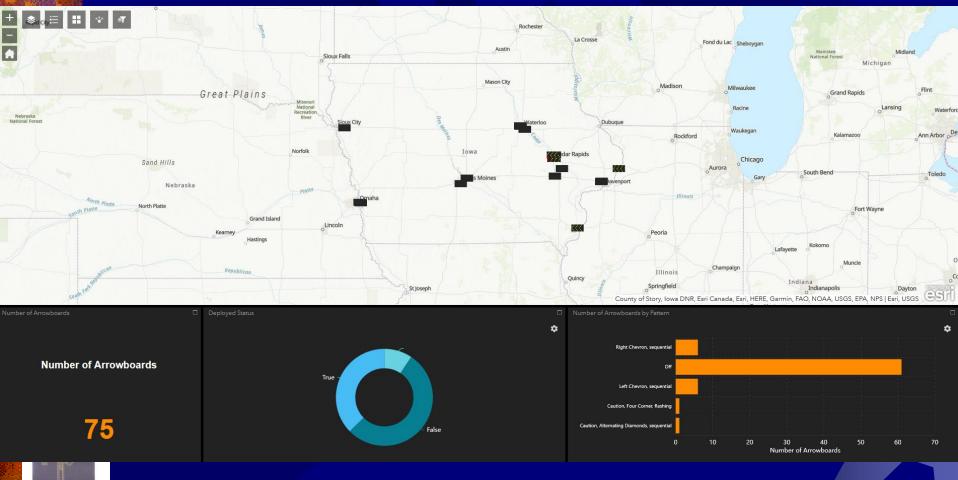


Blackbox Controller



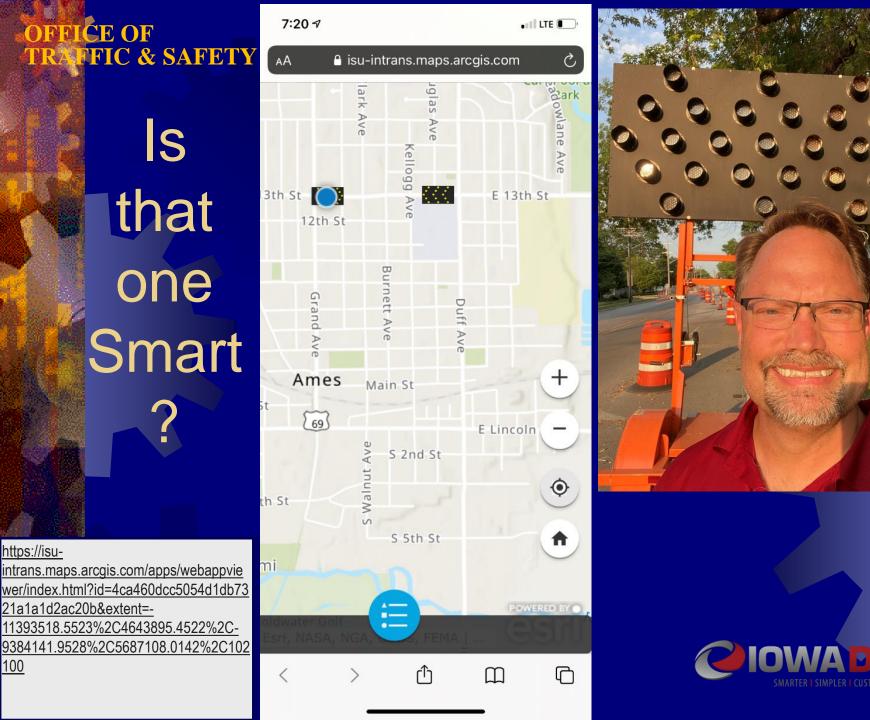


#### **Smart Arrow Boards**





COWADOT SMARTER I SIMPLER I CUSTOMER DRIVEI 20

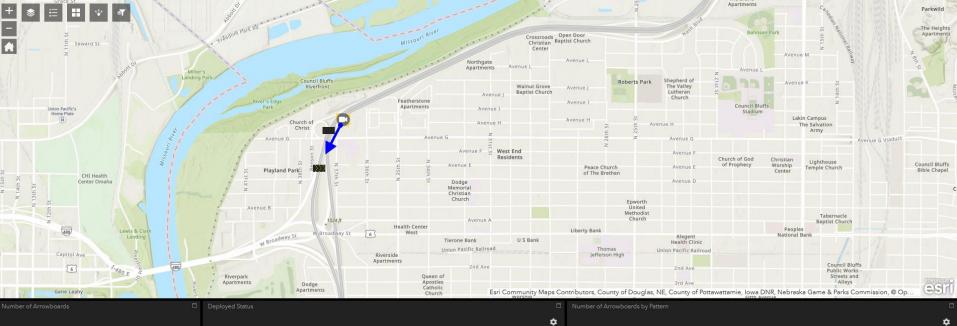


W

21



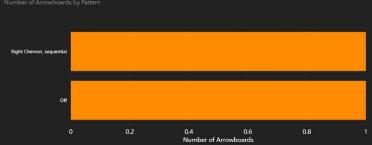
### **Example in Council Bluffs**



True

Number of Arrowboards

2









∩ ↔

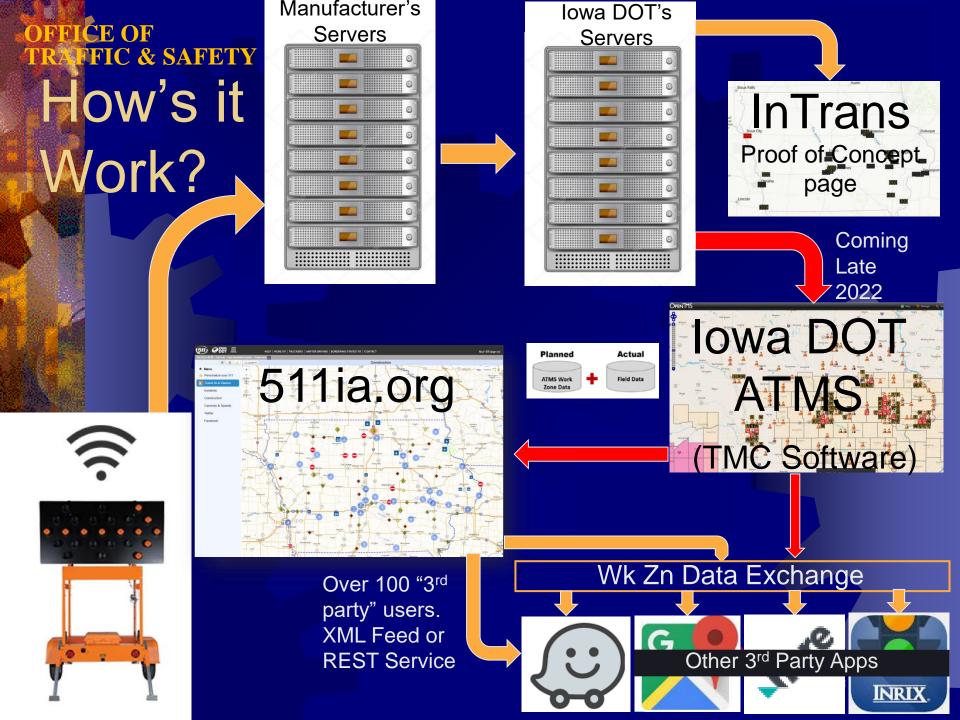
#### Can you see the 2 Arrow Boards?

South I-29 @ Ave G (IWZ3138) 03/01/2022 11:00:43













## Add a few slides showing intregration into 511 (if possible)









#### Next Item we are working on

#### Connected Temporary Traffic Signal Deployment Plan







Same General Concept Add GPS Antenna Add Cellular Modem Develop Communication Protocol Wait for a National Communication Protocol July 2022 voting Will not be a DOT requirement until Late'23/Early'24









## **CTTS** Timeline





## Intermission... More from Tracey & me







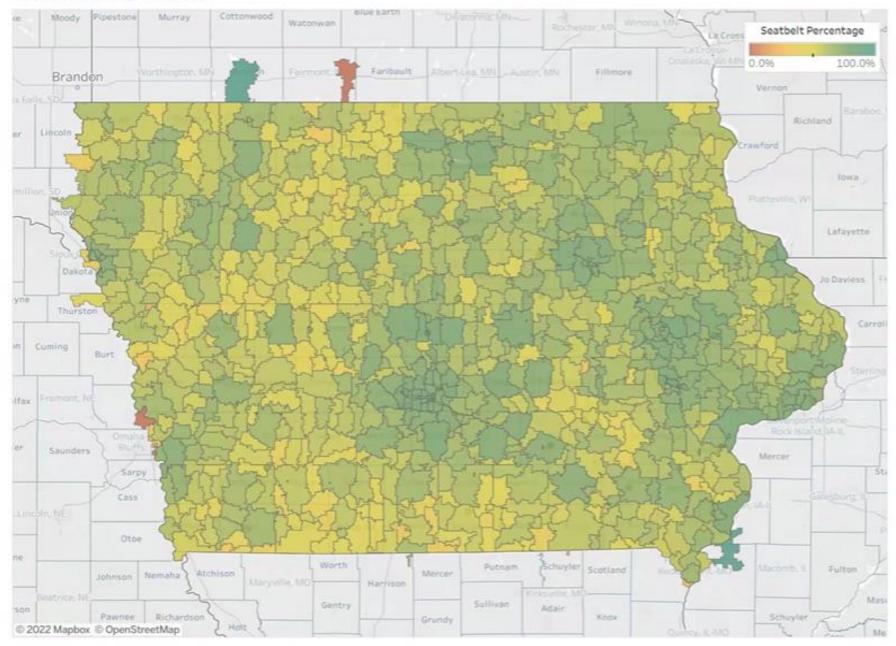


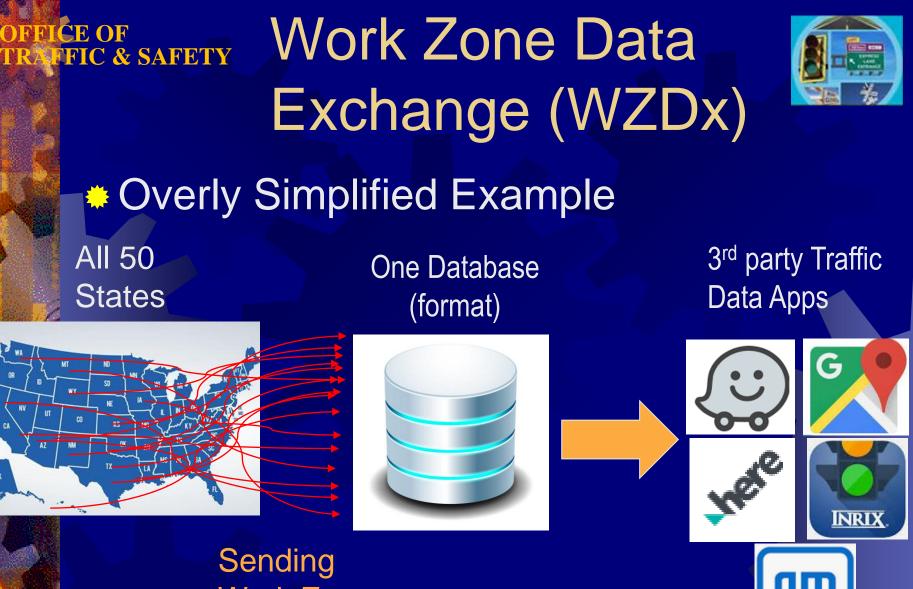






#### Seatbelt Usage in Iowa





31



Sending Work Zone Information

#### CE OF FIC & SAFETY



#### road event feed info publisher: "IOWB DOT" version: "4.0" data sources: ▼ Ø: data source id: "IOWaDOT-WZDX" organization name: "IOWB DOT" update date: "2022-10-21T13:13:46Z" "FeatureCollection" type: features: **v** 0: id: "OpenTMS-Event1383180079" "Feature' type: properties: core\_details: event\_type: "work-zone' data source id: "IOWEDOT-WZDX" road names: 0: "US-69" "southbound" direction: description: "D1[C] - Grimes - US-69 SB @ MM91 - Opposing. B@ 31, 5:00PM Comment: Grimes RCE (800-251-2707) update date: "2022-08-23T16:47:04Z" start\_date: "2021-04-21T10:00:00Z" end date: "2022-10-31T22:00:00Z" start\_date\_accuracy: "verified" end date accuracy: "verified" beginning accuracy: "verified" ending\_accuracy: "verified" beginning milepost: 92.6

ending milepost:

89.5

#### Raw Data JSON Headers

Save Copy Pretty Print

{"road event feed info":{"publisher":"Iowa DOT","version":"4.0","data sources":[{"data source id":"IowaDOT-WZDx", "organization\_name": "Iowa DOT"}], "update\_date": "2022-10-21T13:13:46Z"}, "type": "FeatureCollection", "features": [{"id":"OpenTMS-Event1383180079","type":"Feature","properties":{"core\_details":{"event\_type":"workzone", "data\_source\_id": "IowaDOT-WZDx", "road\_names": ["US-69"], "direction": "southbound", "description": "D1[C] - Grimes - US-69 SB @ MM91 - Opposing, Between Oralabor Road; IA 160 (Ankeny) and I-80 (Des Moines), Road construction work is in progress. The roadway is shared with opposing traffic. There is a height limit in effect. There is a width limit in effect. Height limit 15'0\". Width limit 12'0\". Until October 31, 2022 at about 5:00PM CDT. Full schedule below: • April 21, 2021, 5:00AM - October 31, 5:00PM Comment: Grimes RCE (800-251-2707) - Polk County", "update\_date": "2022-08-23T16:47:04Z"}, "start\_date": "2021-04-21T10:00:00Z", "end\_date": "2022-10-31T22:00:00Z", "start\_date\_accuracy":"verified","end\_date\_accuracy":"verified","beginning\_accuracy":"verified","ending\_accuracy":"v erified", "beginning milepost":92.6, "ending milepost":89.5, "event status": "active", "vehicle impact": "all-lanesopen", "restrictions": [{"type": "reduced-height", "value": 457.0, "unit": "centimeters"}, {"type": "reducedwidth", "value": 366.0, "unit": "centimeters" }], "types\_of\_work": [{"type\_name": "surface-work" }], "lanes": [{"order":1,"type":"shoulder","status":"open"},{"order":2,"type":"general","status":"open"}, ["order":3, "type": "general", "status": "open"}, {"order":4, "type": "general", "status": "open"}, "order":5,"type":"shoulder","status":"open"}],"location\_method":"sign-method"},"geometry": ("type":"MultiPoint", "coordinates":[[-93.68071,41.695567],[-93.680542,41.650416]]}},{"id":"OpenTMS-Event5008804347", "type": "Feature", "properties": {"core\_details": {"event\_type": "work-zone", "data\_source\_id": "IowaDOT-WZDx","road\_names":["US-30"],"direction":"westbound","description":"D6[C] - Cedar Rapids - US-30 WB @ MM259. Between US 151 and County Road W8E (near Bertram). Both shoulders closed due to road construction work. The roadway is shared with opposing traffic. There is a weight limit in effect. There is an axle load limit in effect. No vehicles over 156,000 lbs. Axle weight limit 20,000 lbs. Until November 11, 2022 at about 5:00PM CDT. Full schedule below: . March 15, 7:00AM - November 11, 5:00PM Comment: Cedar Rapids RCE (877-226-8110) - Linn County", "update\_date": "2022-08-22T20:30:192"}, "start\_date": "2022-03-15T12:00:002", "end\_date": "2022-11-11T23:00:002", "start\_date\_accuracy":"verified","end\_date\_accuracy":"verified","beginning\_accuracy":"verified","ending\_accuracy":"v erified", "beginning\_milepost": 259.5, "ending\_milepost": 258.7, "event\_status": "active", "vehicle\_impact": "some-lanesclosed", "restrictions": [{"type": "axle-load-limit", "value": 9072.0, "unit": "kilograms"}, {"type": "reducedweight","value":70760.0,"unit":"kilograms"}],"types of work":[{"type name":"surface-work"}],"lanes": [{"order":1,"type":"shoulder","status":"closed"},{"order":2,"type":"general","status":"open"}, {"order":3,"type":"general","status":"open"},{"order":4,"type":"shoulder","status":"open"}],"location method":"signmethod"},"geometry":{"type":"MultiPoint","coordinates":[[-91.539802,41.926445],[-91.554372,41.926045]]}}, {"id": "OpenTMS-Event5382562681", "type": "Feature", "properties": {"core\_details": {"event\_type": "work-(Ankeny) and I-80 (Des Moines). Road constructic zone", "data\_source\_id": "IowaDOT-WZDX", "road\_names": ["US-18"], "direction": "westbound", "description": "D2[C] - Mason is shared with opposing traffic. There is a heig City - US-18 WB @ MM211 - Opposing. Between IA 14 and County Road T38 (near Floyd). Road construction work is in progress. The roadway is shared with opposing traffic. Look out for temporary traffic lights. There is a height width limit in effect. Height limit 15'0\". Widt limit in effect. There is a width limit in effect. Height limit 15'0\". Width limit 11'0\". Until November 22, 2022 2022 at about 5:00PM CDT. Full schedule below: . at about 4:00PM CDT. Full schedule below: . April 21, 12:00PM - November 22, 4:00PM Comment: Mason City RCE (800-373-7344) - Floyd County \*\*No local road access\*\*", "update\_date": "2022-08-23T16:35:22Z"}, "start\_date": "2022-04-21T17:00:00Z", "end\_date": "2022-11-22T22:00:00Z ", "start\_date\_accuracy": "verified", "end\_date\_accuracy": "verified", "beginning\_accuracy": "verified", "ending\_accuracy": "verified","beginning\_milepost":211.4,"ending\_milepost":209.0,"event\_status":"active","vehicle\_impact":"all-lanesopen", "restrictions": [{"type": "reduced-height", "value": 457.0, "unit": "centimeters"}, {"type": "reducedwidth", "value": 335.0, "unit": "centimeters" }], "types\_of\_work": [{"type\_name": "surface-work" }], "lanes": [{"order":1,"type":"shoulder","status":"open"},{"order":2,"type":"general","status":"open"}, ("order":3,"type":"general","status":"open"},{"order":4,"type":"shoulder","status":"open"}],"location\_method":"signmethod"}, "geometry":{"type":"MultiPoint","coordinates":[[-92.725646,43.10292],[-92.753969,43.127473]]}}, {"id": "OpenTMS-Event5382333028", "type": "Feature", "properties": {"core\_details": { "event\_type": "workzone", "data\_source\_id": "IowaDOT-WZDx", "road\_names": ["US-18"], "direction": "eastbound", "description": "D2[C] - Mason City - US-18 EB @ MM209 - Opposing, Between County Road T38 and IA 14 (near Floyd). Road construction work is in progress. The roadway is shared with opposing traffic. Look out for temporary traffic lights. There is a height limit in effect. There is a width limit in effect. Height limit 15'0\". Width limit 11'0\". Until November 22, 2022 at about 4:00PM CDT. Full schedule below: • April 21, 12:00PM - November 22, 4:00PM Comment: Mason City RCE (800-373-7344) - Floyd

County", "update\_date": "2022-08-23T16:35:07Z"}, "start\_date": "2022-04-21T17:00:00Z", "end\_date": "2022-11-22T22:00:00Z", "start date accuracy":"verified","end date accuracy":"verified","beginning accuracy":"verified","ending accuracy":"v



## WORK ZONE DATA EXCHANGE

#### **JANUARY 2022**

Work Zone Data Working Group Newsletter

#### New WZDx Feed from North Carolina

The WZDWG has some exciting news to share! The North Carolina DOT has recently begun providing a state-wide WZDx feed through its work with traffic management platform <u>one.network</u>. The North Carolina feed joins existing feeds from Arizona, Iowa, Massachusetts, and Texas on US DOT's <u>WZDx feed registry website</u>. Keep an eye out in the coming months for more new feeds from the WZDx Demonstration Grant Awardees.







Iowa DOT & WZDx We the same information that is on 511ia.org to WZDx every 15 minutes. (Regardless if it is accurate) Smart Arrow Boards (and other "smart" or "Connected" devices) will improve the accuracy. Other States are starting to do this.







## TSMO





### TSMO



TSMO Efforts involving Work Zones			
Integrating TSMO into Project Delivery (7 tasks)			
Add Operational Considerations to Planning Studies	(OLE)		
Narrow Bridge Traffic Control Task Force	Ben Hucker, Dave Evans, Jeremey V		
Add TSMO Engineers to PMTs	Jeremey V		
Paved Shoulder Standards	(Kevin P?)		
Improved Project Coordination	(ADEs)		
End-of-Season Work Zone Traffic Operations Workshops Pre-analysis by InTrans, Skylar Participation of WZMTO members? Tie in to FHWA Process Review efforts?	TSMO Engineers Dan S		
Median Crossover Coordination			





# TSMO Award

https://www.srfco nsulting.com/iowa -department-oftransportationwins-2021nationaloperationscenter-ofexcellence-award/







# **MOVITE** Award

https://iadot.share point.com/sites/W orkZoneManage ment/Shared%20 **Documents/Form** s/AllItems.aspx?id =%2Fsites%2FW orkZoneManage ment%2FShared %20Documents%  $2\Sigma Mark 0/207ana$ 





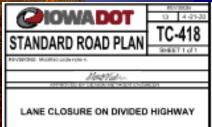


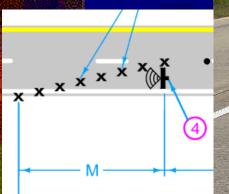


# **CEFFIC & SAFETY** Speed Feed Sign on Lane Closures



## Started in April 2020





OFFICE OF TRAFFIC & SAFETY

### Adding Automation for Audible Attenuator



https://www.yo utube.com/wat ch?v=jOwom1 p-5d8

41



# And the fice of Audible Attenuator (Manually Activated)







## **Testing Automation Below**



### OFFICE OF TREFFIC & SAFETY Straight Road – Static Truck









# Straight Road – Static Truck



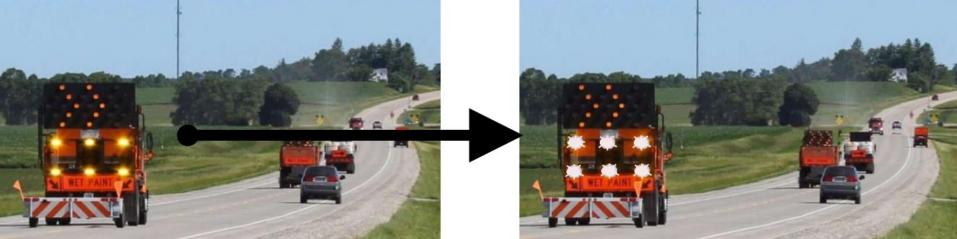
RESERVOFAND URLAU Radar - Straight Road – Rolling Truck

scene

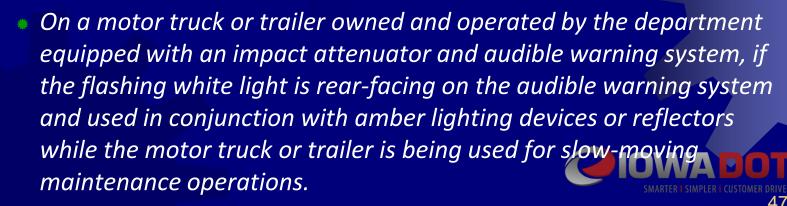


# **PREFIC & SAFETY** Use of White Lights in Work Zones (pt 1 of 2)





# Iowa Code 321.423(7) Flashing White Light Subsection (a)(5) adds:





# **PREFIC & SAFETY** Use of White Lights in Work Zones (pt 2 of 2)





### Olowa Code 321.423(7) Flashing White Light

### Subsection (a)(6) adds:



• On a vehicle or other equipment not owned and operated by the department when used in road work zones on state or local highways as authorized by the department. The department shall adopt rules pursuant to chapter 17A regarding the vehicles or equipment eligible to use a flashing white light under this subparagraph.

# Work Zone Crashes



Is a camera within ½ mile?



Normal storage = 7 days



### Dispatch



EIN Incident I

ATMS Creach Video Der

Crash











IMC







# Why is this useful?

Awareness
Quick & easy access to data
Look for patterns
Able to address issues faster!





# design for no queueing due to recurring (known) average traffic

Applies to Multi-Lane Highways of 55 MPH or higher





It's not a written policy (PPM).
It's not in the Design Manual.
It's just part of our culture.



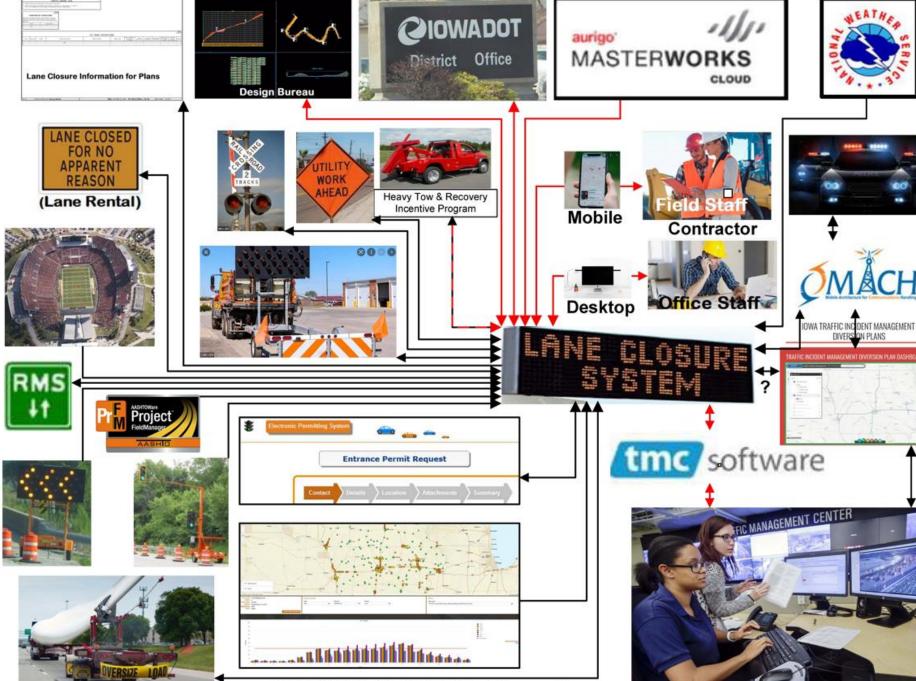




#### 2. Improve Work Zone Safety

The Iowa DOT will identify and implement a statewide lane closure system (LCS) and implement policies that safely keep lanes open as much as possible. The concept of a LCS has been in development, and in 2022 we will implement the best system for our use case.

Executive Sponsors: Mitch Dillavou and Dave Lorenzen Project Leaders: Willy Sorenson, Tim Simodynes, Mitch Wood, Sinclair Stolle



v4 2/16/2022 (Added RMS & FieldManager)





# **Our Goal**

 Make the software extremely powerful and connected to all databases that contain work zone information.

BUT..... It MUST be simple and easy to use for a user to enter information using a smart phone in about one minute.









#### 2. Improve Work Zone Safety

We will implement a pilot project that uses smart Internet of Things (IoT) technologies to help notify workers, supervisors, TMC personnel, and drivers when workers are too close to moving traffic, that provides real time work zone conditions and alerts to travelers/vehicles, and that outfits our equipment with advanced technologies for crash avoidance and mitigation.

Executive Sponsors: Mitch Dillavou and Dave Lorenzen Project Leaders: Willy Sorenson, Tim Simodynes, Mitch Wood, Sinclair Stolle

### OFFICE OF TREFIC & SAFETY Overall Worker Safety Initiative

### Construction Safety Light

Minimize struck-by incidents and other jobsite hazards so our road crews can get home safe.





Starting Point...





# Ending Point???

E

WORKERS

AHEAD

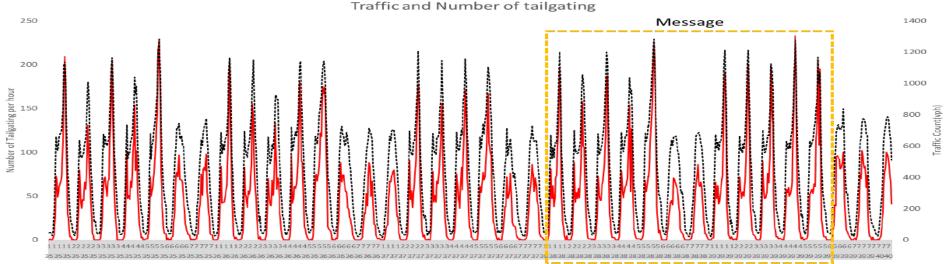
### OFFICE OF TRAFFIC & SAFETY

### Research

• Difference messages on different day of week



Evaluation of Messaging Techniques to Increase Vehicle Spacing at Work Zones



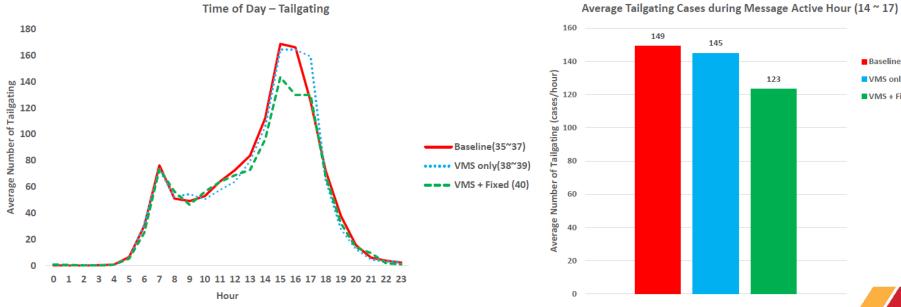


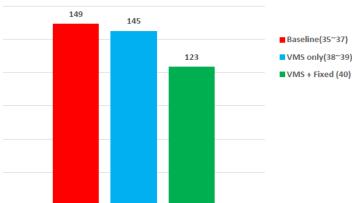


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### Results – VMS + Static Signs (Weekday)





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"Work Zone Reference Library"
Work Zone related for Information
Just google "WRL Iowa DOT"



WORK ZONE REFERENCE LIBRARY (WRL)

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Development of the Work Zone Management Service Layer engaged and enabled lowa DOT staff to envision the future of work zone management. The WRL is a direct result of this effort and has been created to centralize all of lowa's work zone resources and documentation.





Go





# Roadside Chat (last Friday)











# Roadside Chat (Tomorrow)









# **Questions?**





