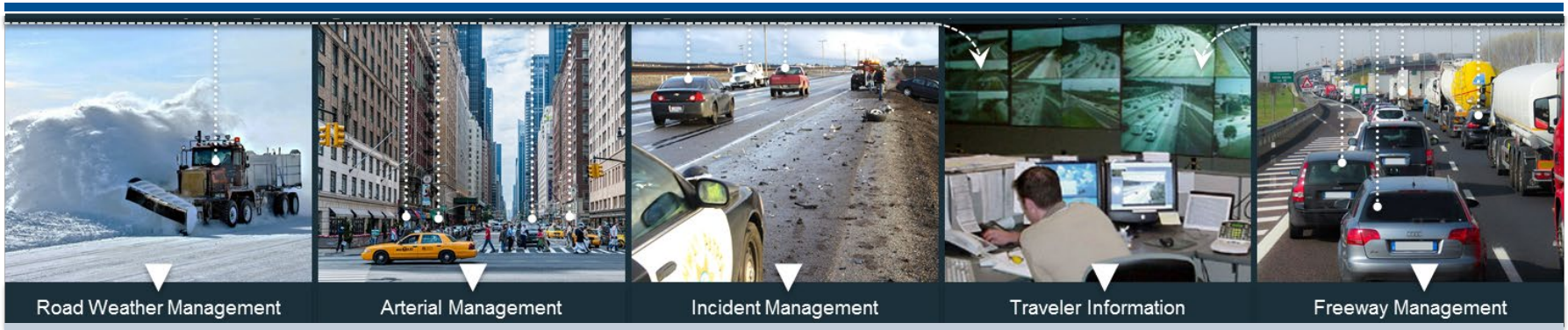
Center for Accelerating Innovation

On-Ramp to Innovation every day counts

U.S. Department of Transportation
Federal Highway Administration



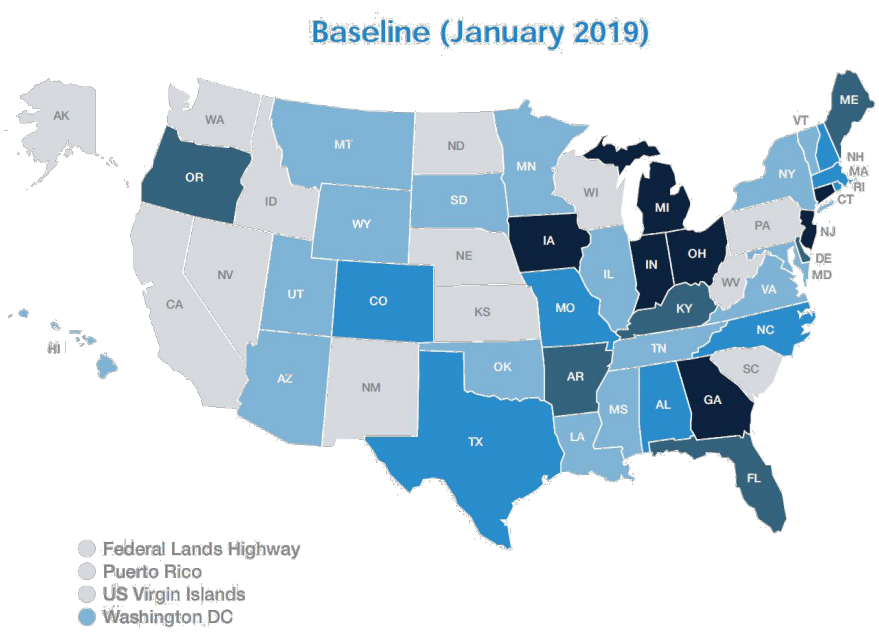
Improving Transportation System Management and Operations by Tapping the Potential of Crowdsourced Data

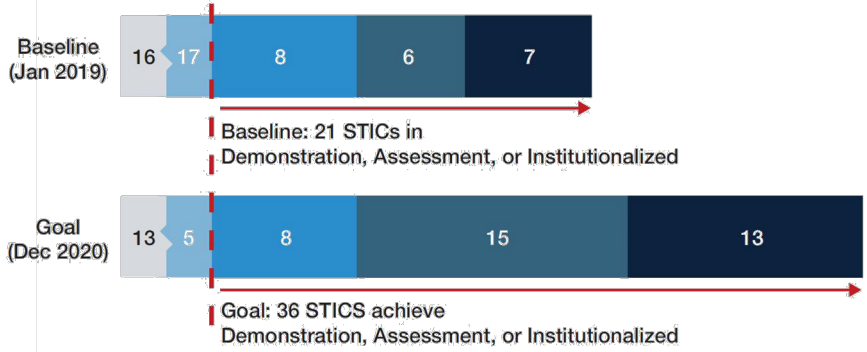
Source: Pixabay

Using Crowdsourced Data for Traffic Incident Management

FHWA Every Day Counts Round Five (EDC5) Crowdsourcing Innovation Goal

To increase the number of agencies that use crowdsourcing to better operate the transportation system through new, cost-effective, and proactive operational strategies and applications.





Source: FHWA

Real-Time Monitoring: A Weakness in Incident Management

There are 4 primary limitations in our typical approach to real-time monitoring:

- Big gaps in geographic coverage.
- Lags in timeliness of information.
- Cost to build-out and maintain field equipment.
- Jurisdictional stovepipes.

These limitations reduce the ability to efficiently and (cost) effectively detect and respond to incidents.

Source: FHWA

Crowdsourcing Overcomes Monitoring Challenges

Because data is sourced whenever and wherever people travel, crowdsourcing…

Eliminates Geographic Gaps

- find out what happens between sensors
- find out what happens in rural regions, arterials, and other streets with few sensors
- find out what happens beyond jurisdictional boundaries

Improves Information Timeliness

- Data can be pushed real-time to TMC

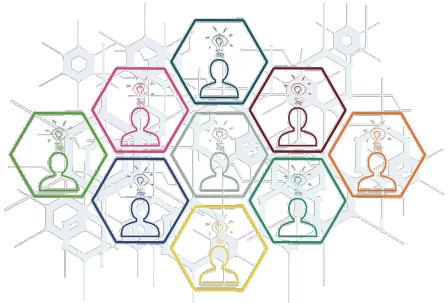
Improves Cost-effectiveness

- some data is free, little cost to 'ingest' data
- some data at cost point better than new monitoring infrastructure outlays

Sources of Data

- Extracted from social media platforms.
- Acquired from third-party crowdsourced data.
- Collected from specially developed mobile apps or mobile infrastructure.

Data is sourced whenever and wherever people travel



Source: Pixabay

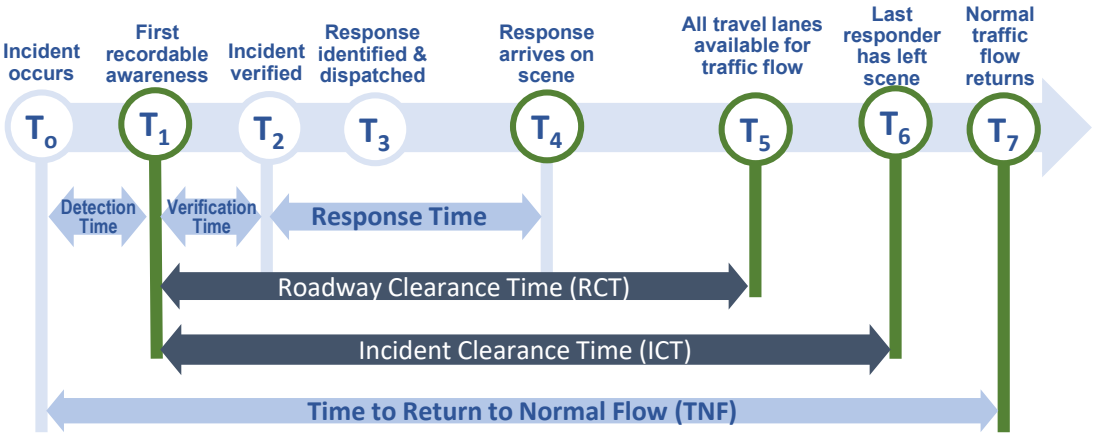
Types of Data

Source: Pixabay

Crowdsourcing for Traffic Incident Management

Real time and archived crowdsourced data as ***a stand alone data feed*** or ***integrated with other data*** and ***ideally integrated within agency processes*** can help with:

- Incident detection
- Incident response
- Manage end of queue
- After action review
- Traveler information
- Safety Service Patrol planning
- Future expansion of CCTV and other ITS Technologies



Crowdsourced data can shift T1, T4, T5, T6, and T7 to the left, thereby reducing DT, RCT, ICT, and TNF and also reducing the likelihood of secondary crashes.

Examples of Crowdsourcing for TIM

- Kentucky Transportation Cabinet use of Waze and HERE for Incident Detection and After Action Reviews
- Indiana Department of Transportation use of INRIX for end of queue warning and incident detection.
- Utah DOT and Delaware DOT State-developed apps for traveler information and event/road weather reporting
- SSP Planning for Maryland DOT and other Agencies
- DC DOT using probe vehicle data to assess strategic locations for additional CCTV camera installation.

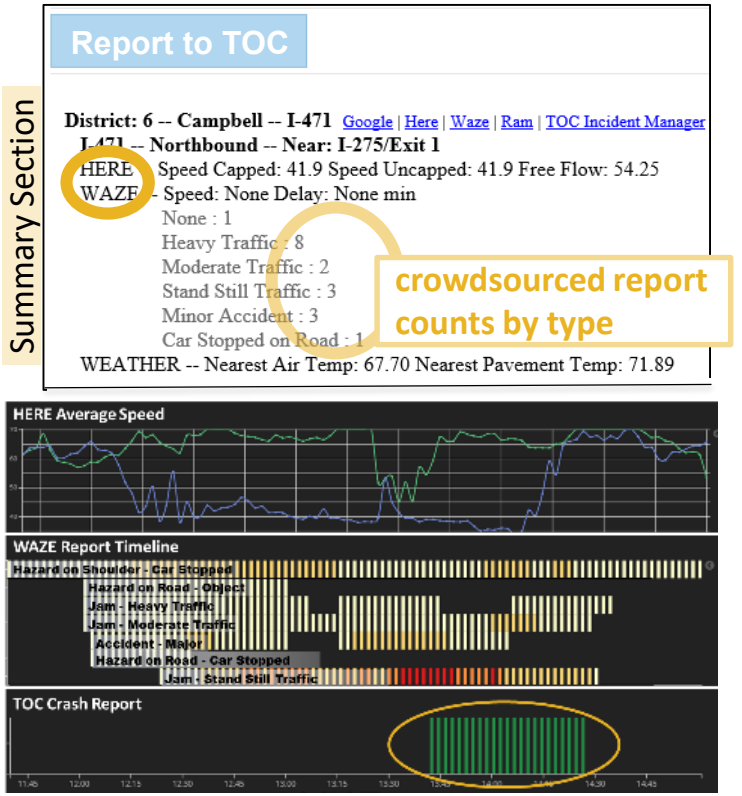
KYTC – Incident Detection & After Action Reviews

Goal: Kentucky Transportation Cabinet (KYTC) needed more timely incident detection across more roadways.

Action: Created email alerts for use by TOC staff using combination of HERE and Waze data.

Outcome: Alerts clarify presence of events earlier than speed-based detection.

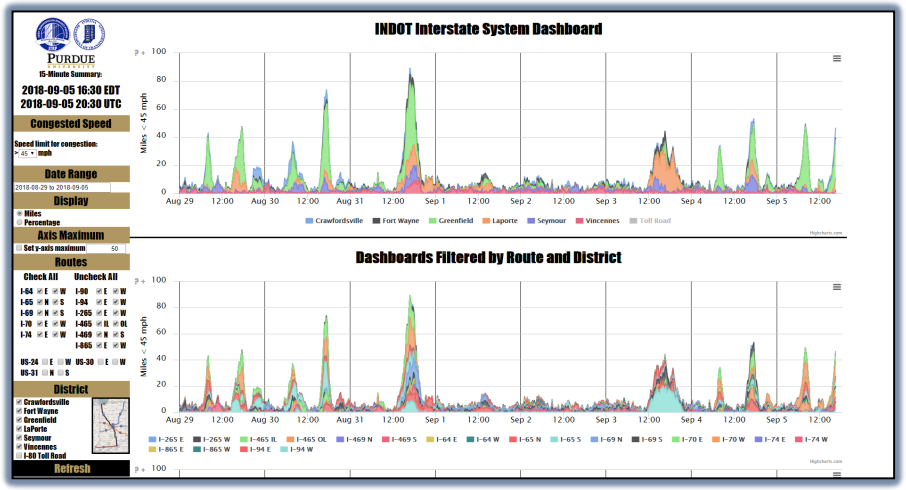
- Alerts enable TOC staff to craft a quicker response.
- TOC processes were improved to expedite/improve traveler information.
- Integrated visualization supports a more effective after action review.

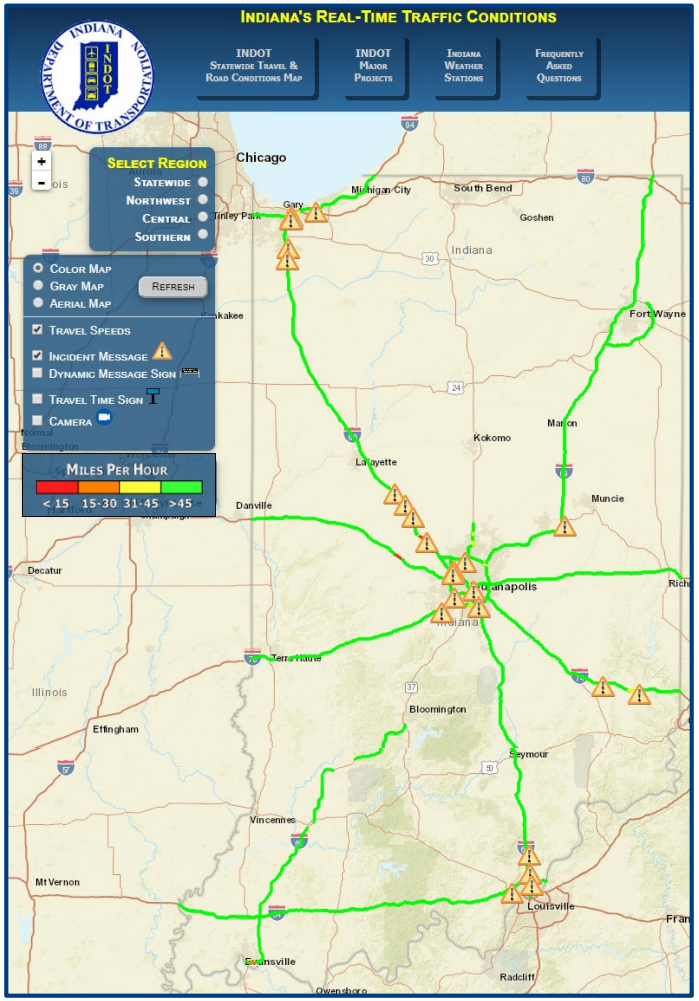


Source: Kentucky Transportation Cabinet

End of Queue Management & Incident Detection

- INDOT purchases real-time probe data
- Interstates made into 2000+ segments
- Download speed data every 60 seconds
- "Traffic Ticker" developed by INDOT & Purdue University to process, visualize and use data

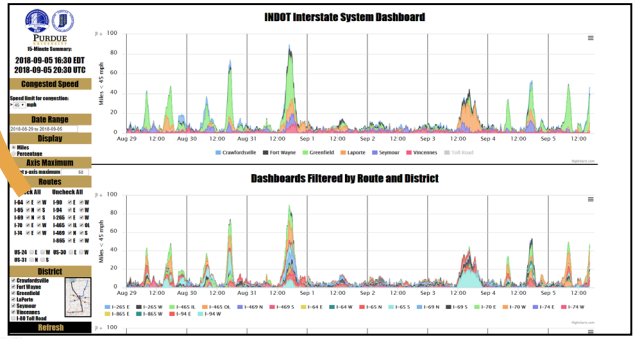




Source: Indiana DOT

Indiana DOT Live Traffic Ticker Tool

Tool ingests real-time data to offer Visual profile by segment, direction, district and other factors



PURDUE UNIVERSITY

15-Minute Summary:

2018-09-05 16:30 EDT
2018-09-05 20:30 UTC

Congested Speed

Speed limit for congestion:
> 45 mph

Date Range

2018-08-29 to 2018-09-05

Display

Miles
Percentage

Routes

Check All			Uncheck All		
I-64	E	W	I-90	E	W
I-65	N	S	I-94	E	W
I-69	N	S	I-265	E	W
I-70	E	W	I-465	IL	OL
I-74	E	W	I-469	N	S
			I-865	E	W

US-24 E W US-30 E W
US-31 N S

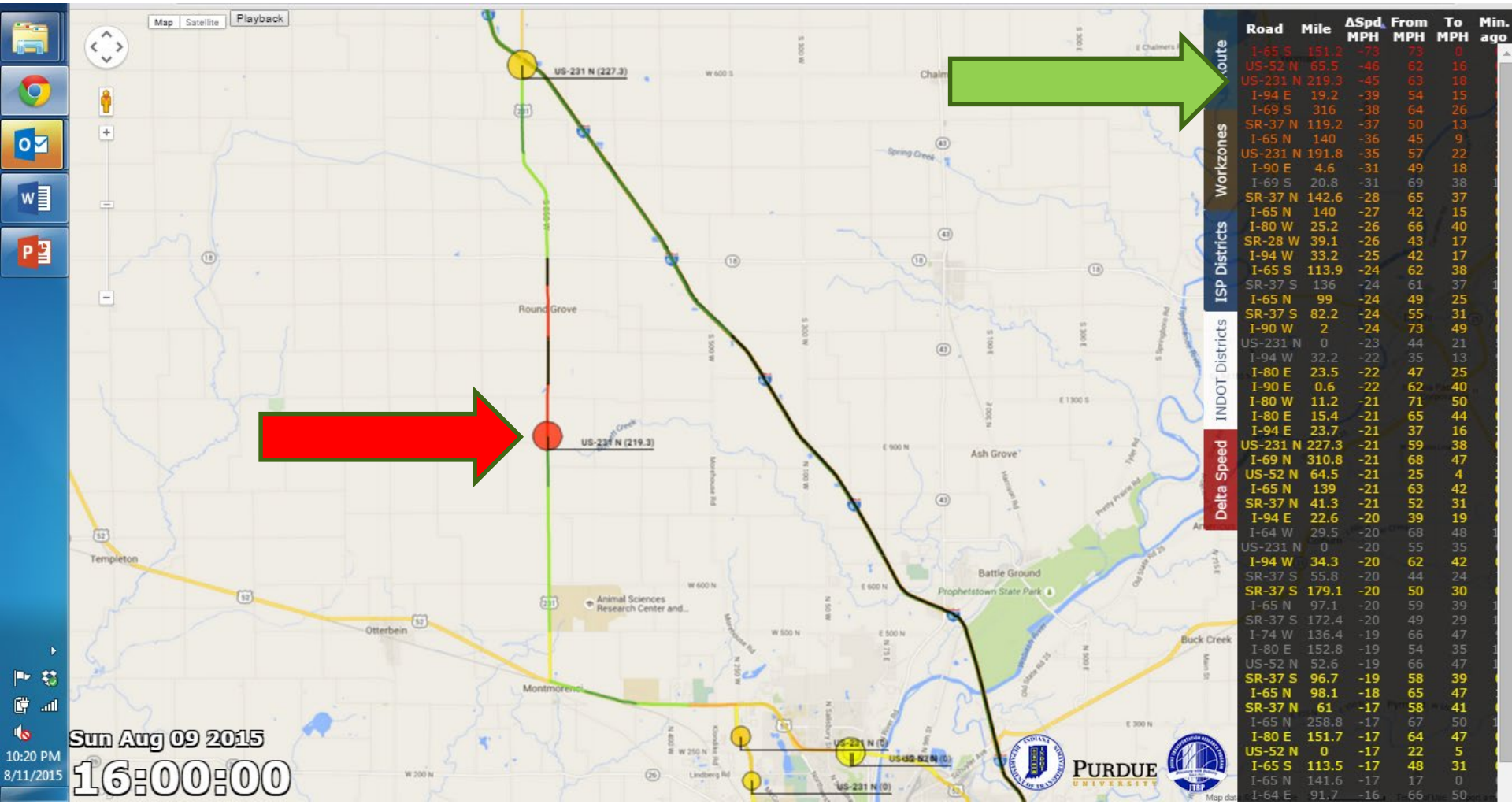
District

- Crawfordsville
- Fort Wayne
- Greenfield
- LaPorte
- Seymour
- Vincennes
- I-80 Toll Road

Refresh

Source: Indiana DOT

Traffic Ticker's Real-Time Delta Speed Function

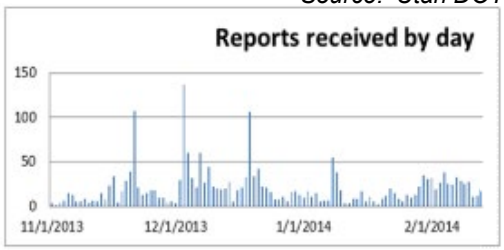


Source: Indiana DOT

Utah DOT Citizen Reporter App and the DelDOT App for Traveler Information

Utah DOT Created Citizen Reporting app in 2013

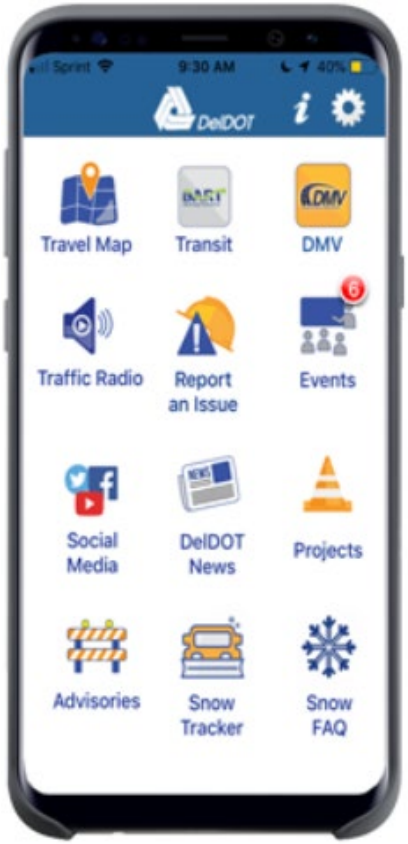
Source: Utah DOT



Outcome: highly accurate data on road conditions on highway and major arterial segments from 1K+ 'trained' reporters.

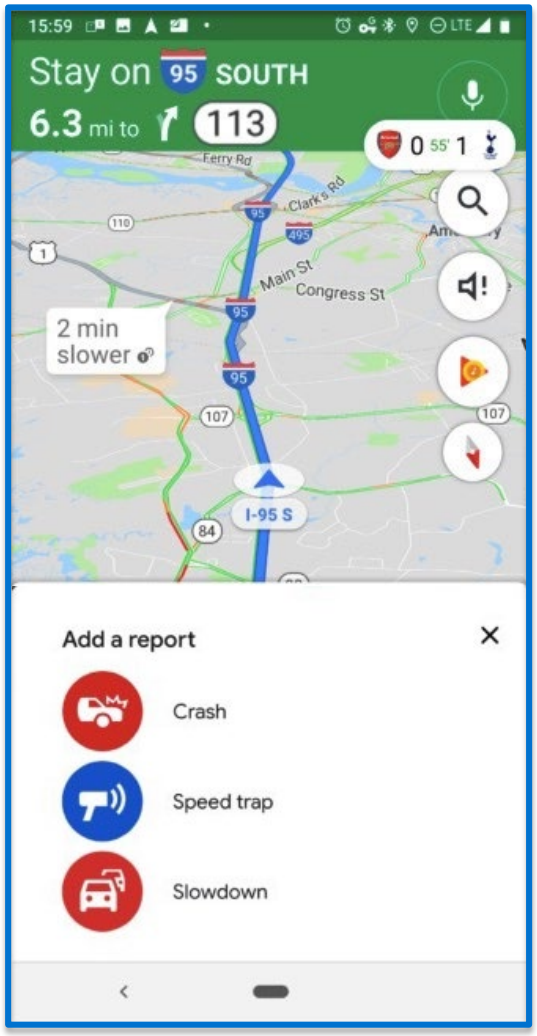
Information shared by multiple platforms

Delaware DOT created the DelDOT app as a single source for all things traffic related including reporting roadway issues and sharing real-time information



Source: Delaware DOT

New Technologies for Incident Detection & Response



Source: AndroidPolice.com

Google introduced Crash reporting similar to Waze

Waze partnered with RapidSOS, an emergency tech company, to provide both drivers and first responders real-time data about accidents.

Inrix partnered with Information Logistics (Ilog) for an emergency alert service supporting two-way communication with drivers during emergencies.

Crowdsourcing for Operations National Team & State/Local Support

The National Team will be helping 30+ States and local agencies with:

- Understanding operational gaps or needs
- Identifying the right application & data
- Fostering executive & technical buy-in
- Developing technical/programmatic skills
- Defining data management processes
- Navigating funding and procurement
- Assessing architecture approaches

National Team Expertise

- Traffic Incident Management
- Transportation Systems Management & Operations
- Active Transportation and Demand Management
- 5 State DOT & Local Experts in Crowdsourcing
- Data Scientists

For more information on the EDC5 Crowdsourcing for Operations Program, contact

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EDC5 Crowdsourcing Engagement:

AL	AZ	CO	DC	DE	HI	IL	KY	LA
MD	ME	MN	MO	MT	NC	NH	NY	OK
PR	RI	TN	TX	UT	VA	VT	WI	WY
OH	OR	MA	MI	MS	SC			

* States agencies in the bottom have not yet engaged with the National Crowdsource Team for support.

For more information on the EDC Program

www.fhwa.dot.gov/innovation/everydaycounts/

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