Intelligent Transportation Systems Joint Program Office (ITS JPO) Professional Capacity Building (PCB) Webinar Series

Crowdsourcing for Operations Course

May 16, 2023

U.S. Department of Transportation
Federal Highway Administration

Every Day Counts
Innovation for a Nation on the Move

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Today's Host and Presenters

Source: FHWA.

Greg Jones, Host
Every Day Counts 6 (EDC-6) Crowdsourcing Colead

FHWA Office of Operations and Resource Center

Source: FHWA.

James Colyar, Presenter
EDC-6 Crowdsourcing Colead
FHWA Office of Operations

Source: NCTCOG.

Natalie Bettger, Presenter
Senior Program Manager
North Central Texas Council of Governments (NCTCOG)

Webinar Agenda

1:10 p.m. FHWA EDC-6 Crowdsourcing Innovation and Course

1:15 p.m. Introduction to Crowdsourcing Lesson

1:35 p.m. Applications of Crowdsourced Data Lesson

2:00 p.m. Question and Answer

Source: Unsplash.

Every Day Counts
Innovation for a Nation on the Move

U.S. Department of Transportation
Federal Highway Administration

What Is Every Day Counts?

State-based model

Proven but underutilized innovations

2-year cycles

EDC-6: Deeper Crowdsourcing Roots for a Bountiful Suite of Benefits

EDC-5 Crowdsourcing Innovation (January 2019–December 2020) continued as an EDC-6 Innovation (January 2021–December 2022), with focus on:

Adding data sources and applications

Improving archived data usage

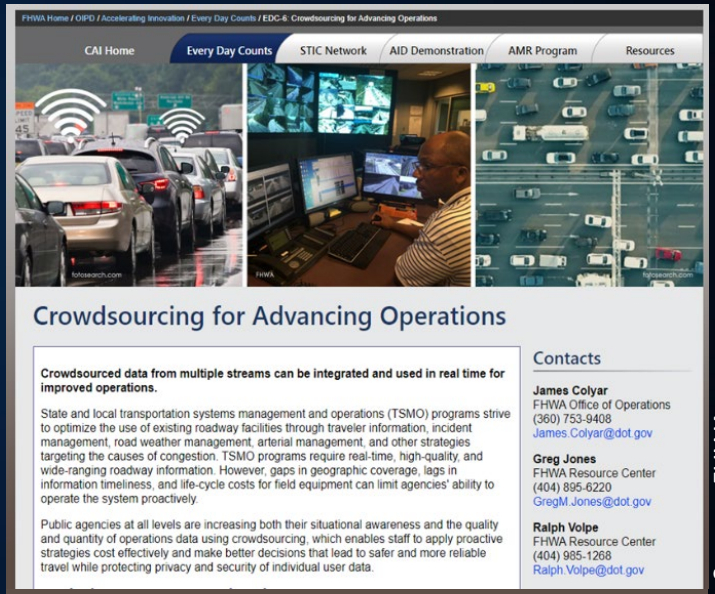
Improving data management

Sharing and integration of data

Source: FHWA.

EDC Crowdsourcing by the Numbers: January 2019 – December 2022

- 35+ States and many local agencies engaged
- 10+ workshops and peer exchanges
- 15+ conference and event presentations
- 20+ Adventures in Crowdsourcing webinars
- 20+ technical assistances or facilitations
- 12 crowdsourcing cohort sessions
- 10+ published articles and 5+ case studies
- Crowdsourcing Course-in-a-Box delivered to 3 regions



Source: FHWA.

FHWA EDC-6 Crowdsourcing for Advancing Operation
Resource Site

Crowdsourcing Course-in-a-Box

Course Goals:

- Broaden understanding and knowledge about how crowdsourced data can improve transportation operations
- Help participants consider whether specific applications of crowdsourcing may meet their organizations' needs

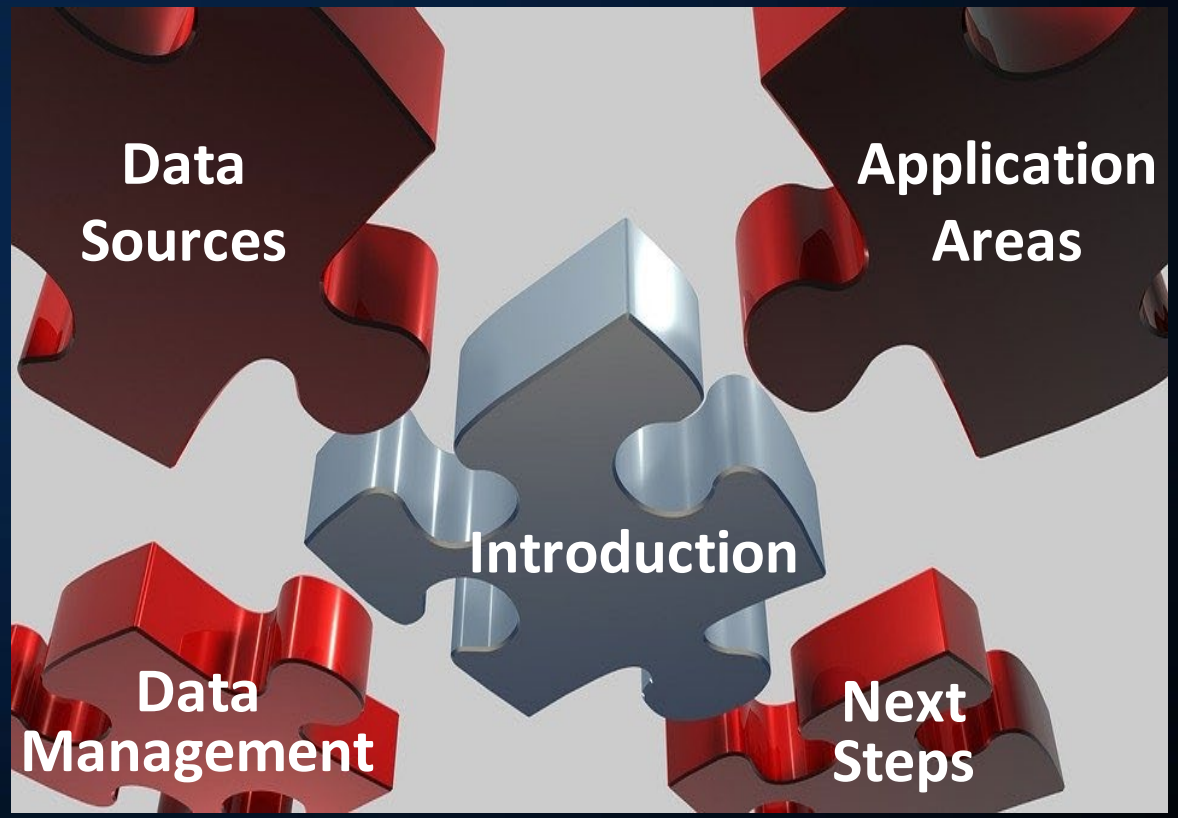
Course Tools:

- Editable instructor templates
- Instructor materials
- Course slide decks
- Student materials

Source: Pixabay.

Course Is Modular by Design

- **5 Lessons:** Introduction, Data Sources, Application Areas, Data Management, and Next Steps
- **6 Application Modules:** traffic incident management, traveler information, arterial management, work zone management, road weather management, and emergency management



Source: Adapted from Pixabay.

Whom Is the Course Targeting?
Transportation Groups

- Traffic management centers (TMCs)
- Traffic signal systems
- Operations
- Maintenance
- Public works departments
- Emergency planning
- Work zone
- Safety and planning

Consider nontraditional invitees such as policy makers, local elected officials, administrators, or other leaders.

Whom Is the Course Targeting?

Sample Job Titles

- Traffic engineer
- Maintenance manager
- Safety specialist
- Transportation systems and management (TSMO) manager
- Mobility engineer
- Intelligent transportation systems engineer
- TMC manager
- Performance manager
- Innovation manager
- Safety engineer
- Freeway operations manager
- Planner
- Traffic signal system manager
- Researcher
- Data steward

Source: Pixabay.

LESSON: INTRODUCTION

Introductions

- Please enter your name, agency, and title in the chat window.
- Please state a problem your agency faces to which crowdsourced data might offer a solution.

Source: FHWA.

Lesson Objectives

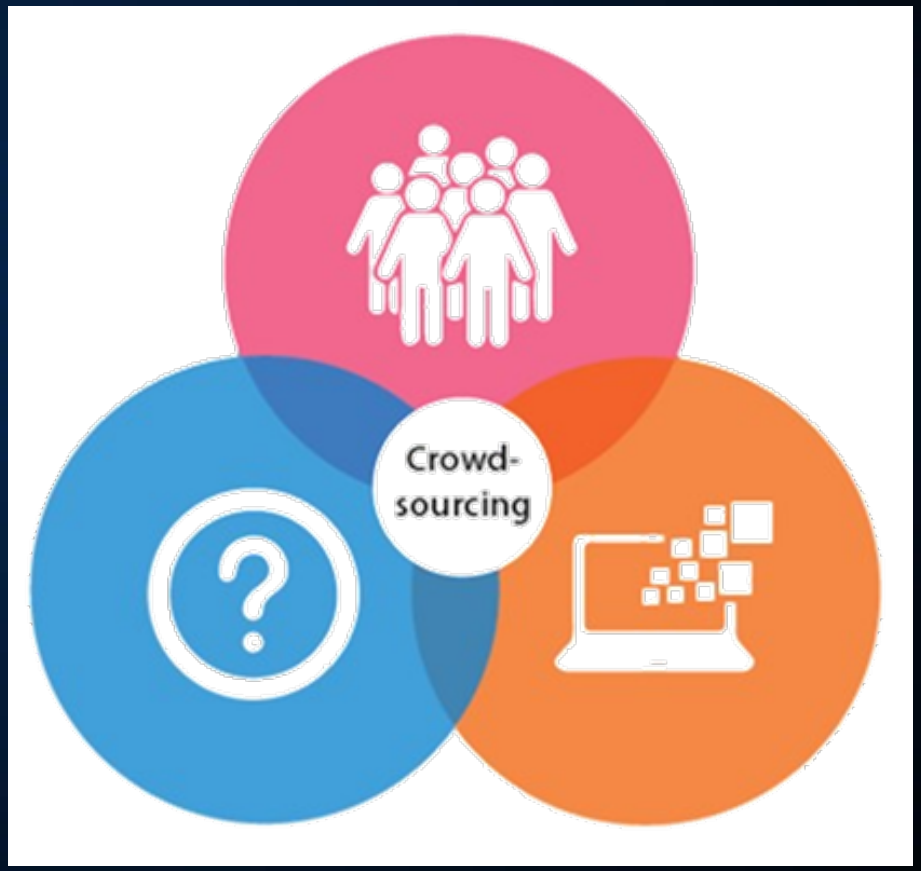
1. Describe crowdsourcing in general and for TSMO
2. Understand the benefits from crowdsourcing for TSMO

Source: Unsplash

All photos source: Unsplash.

What Is Crowdsourcing?

Addressing a need or problem by enlisting the services of a large number of people via technology



Source: FHWA.

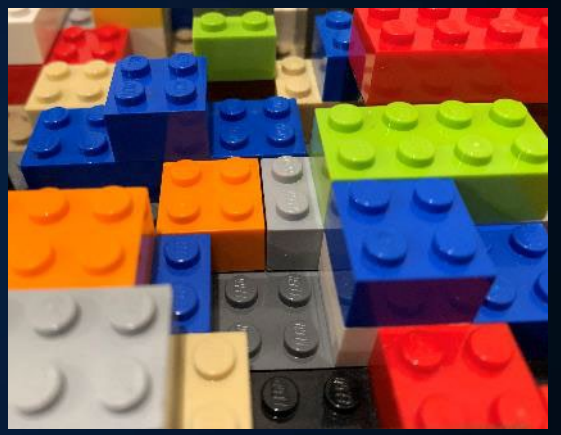
Source: Idea SV, El Salvador Milonario.

How often is the ask-the-audience lifeline correct in the game show "Who Wants to Be a Millionaire"?

- **A:** 95% of the time
- **B:** 50% of the time
- **C:** 30% of the time
- **D:** 75% of the time

Crowdsourcing Is Everywhere

- Airbnb
- Best Buy
- Citizenscience.gov (GSA)
- Department of Defense
- Facebook
- Federal Bureau of Investigation
- General Electric
- Google
- Harley-Davidson
- Kraft Foods
- Lego
- Mattel
- McDonald's
- Microsoft
- NASA
- Netflix
- New York City
- Procter & Gamble
- Starbucks
- Wikipedia



Source: FHWA.

Transportation Systems Management and Operations

- Optimize existing facilities
- Move people and goods
- Target causes of congestion
- Built on a foundation of monitoring current conditions

Source: Unsplash.

Source: Pixabay.

Transportation Systems Management and Operations Needs

Source: Unsplash.

- Monitoring the roadway network
- Detecting problems more quickly
- Providing better information for road users
- Making planning, operational, and maintenance decisions with data
- Improving safety and reliability

Real-Time Monitoring Limitations

- Gaps in geographic coverage
- Timeliness of information
- Jurisdictional stovepipes
- Cost to deploy and maintain equipment

Source: FHWA.

Crowdsourced data overcome the limitations of traditional ITS infrastructure-based traffic monitoring.

Types of Crowdsourced Data for Transportation Operations

- Vehicle probe
- Navigation app
- Social media
- Connected vehicle
- 311 and 511 apps
- Multimodal probe data

Source: Pixabay.

Integrating Crowdsourced Data

Source: FHWA.

APPLICATION AREAS

Traffic Incident Management

Source: FHWA.

Traffic Studies

Source: Pixabay.

Road Weather Management

Source: Pixabay.

Traveler Information

Source: Pixabay.

Performance Management

Source: Pixabay.

Arterial Management

Source: Unsplash.

Freeway Management

Source: FHWA.

Work Zone Management

Source: Unsplash.

Road and ITS Maintenance

Source: Pixabay.

Project Prioritization

Source: Unsplash.

Emergency Management

Source: FHWA.

Other Applications?

Source: Pixabay.

Why Crowdsourcing for Operations?

✓ Improve Operations

Source: FHWA.

✓ Increase Safety and Reliability

Source: FHWA.

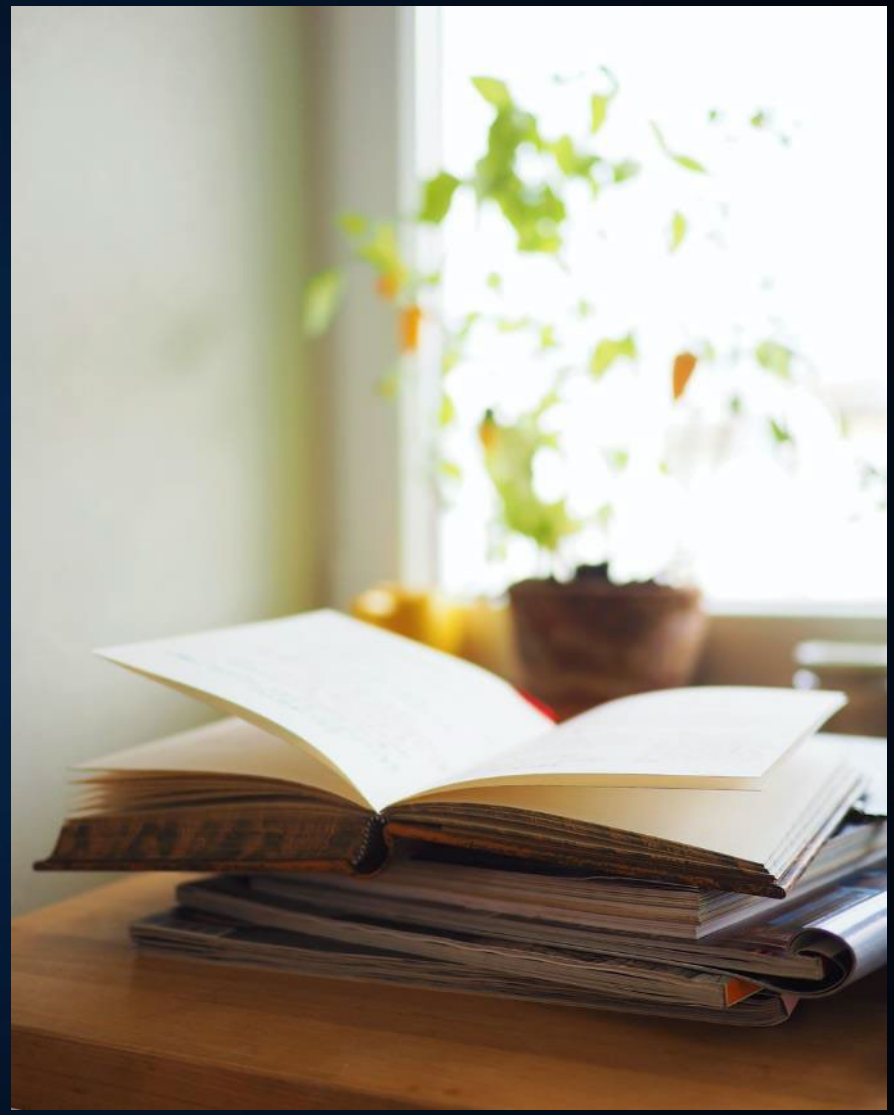
✓ Save Cost

Source: Pixabay.

Knowledge Check No. 1

What are the benefits from crowdsourcing for transportation operations?

A. Increase travel reliability
B. Improve traffic safety
C. Save cost
D. All of the above

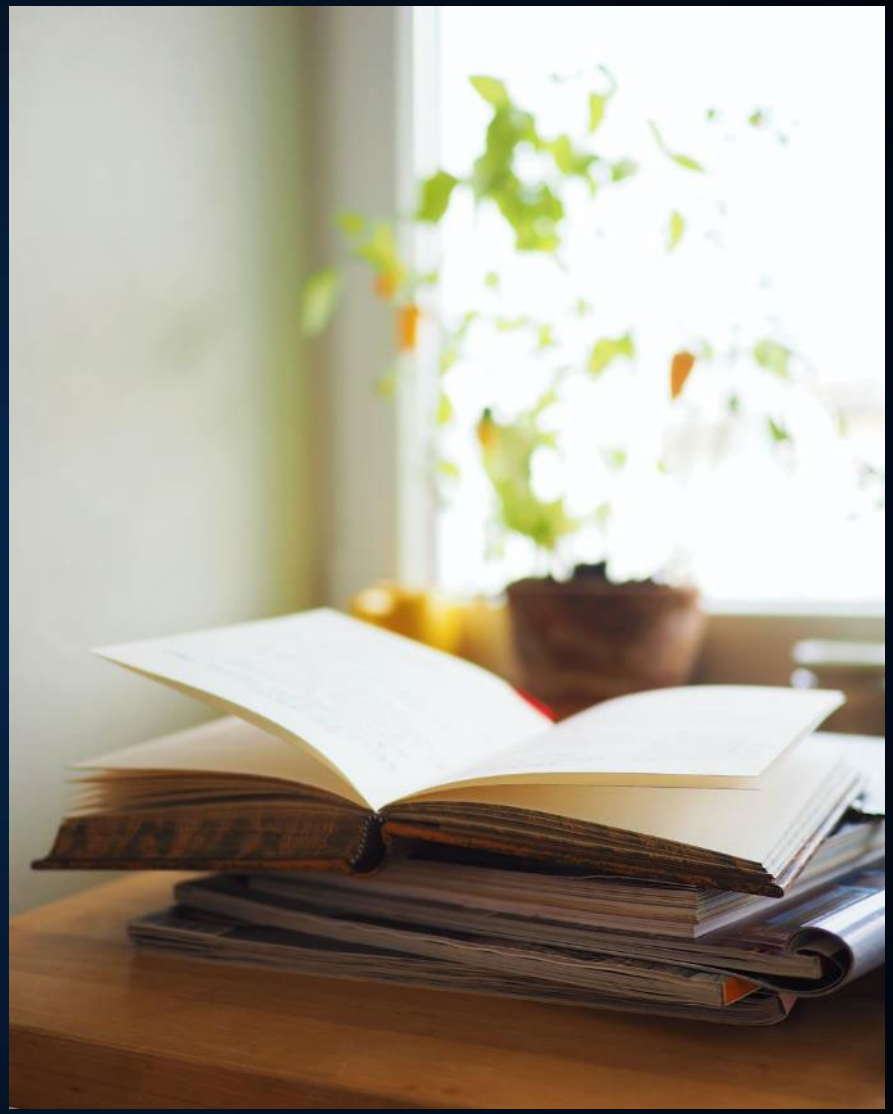


Source: Unsplash.

Knowledge Check No. 2

Which of the following are benefits of using crowdsourcing data for transportation operations?

A. Fewer gaps in geographic coverage
B. Better timeliness of information
C. Less cost to install and maintain equipment
D. Fewer jurisdictional stovepipes
E. All of the above



Source: Unsplash.

Source: Pixabay.

LESSON 3: APPLICATION AREAS

Lesson Objectives

1. Become familiar with State and local uses of crowdsourced data

2. Understand that the same data can support multiple uses

All photos source: Unsplash.

Many Applications for Operations

- Agencies typically begin with one source of crowdsourced data for a key need.
- They quickly find the “one source” has many reuses!
- And they find even greater value in integrating different data for real-time and archived uses.

Source (vertical): Unsplash. Source (vertical): Pixabay. Source (vertical): Pixabay.

Crowdsourcing in Dallas, Texas

North Central Texas Council of Governments (NCTCOG)

Natalie Bettger
Senior Program Manager
Congestion Management and System Operation
North Central Texas Council of Governments
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NCTCOG 911 Department

Goal: NCTCOG 911 needed to identify crashes early for emergency response.

Action: Waze integration into forty-two 911 centers.

Outcome: Quicker notification of crashes, quicker response to crashes to save lives.

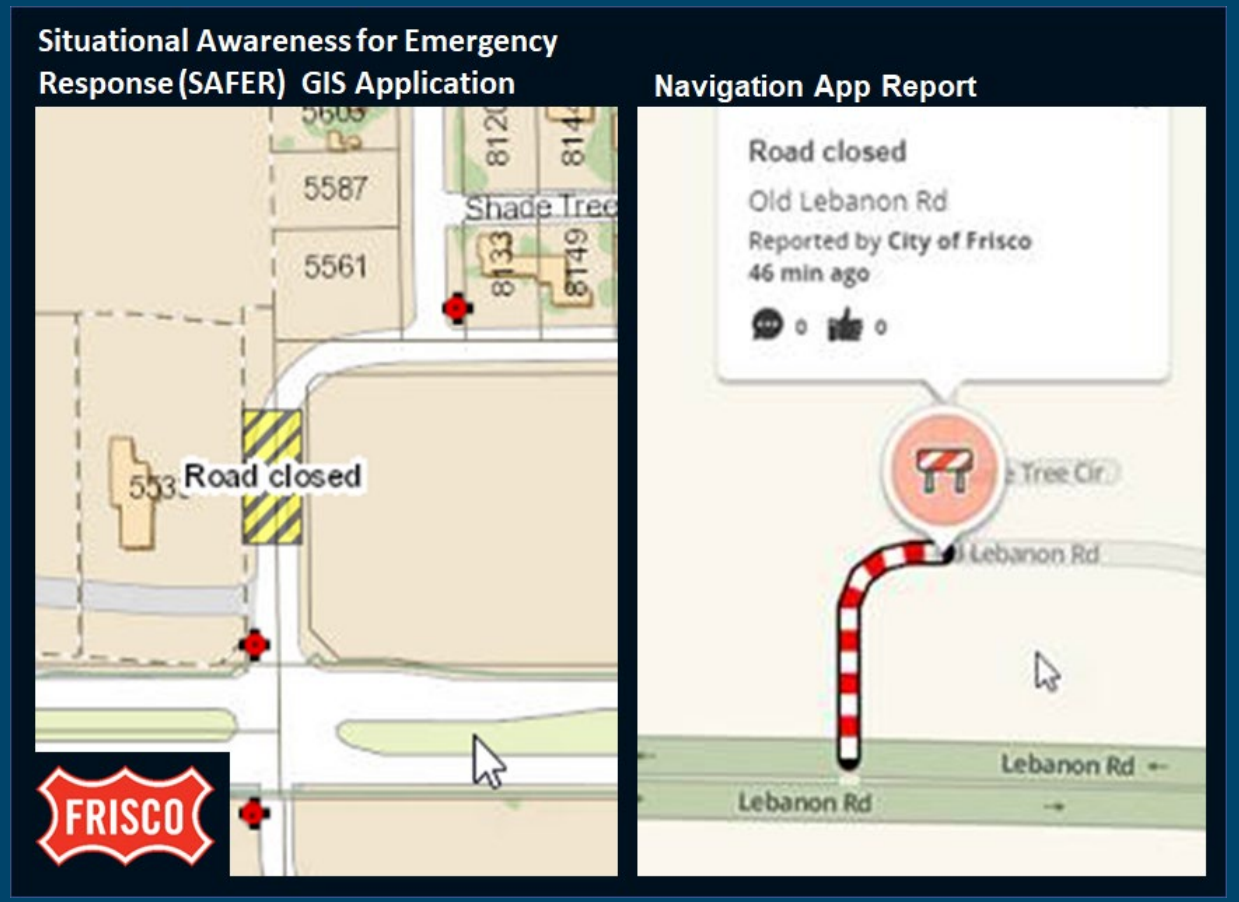
- 80% of the time, crashes reported to Public Safety Answering Point (PSAPs) 10 minutes earlier than WAZE, on average.
- Remaining 20% of crashes were reported to WAZE first, 9 minutes before PSAPs, on average.

City of Frisco, Situational Awareness for Emergency Response (SAFER) Platform

Goal: Help public safety dispatchers provide accurate information to the responder community and road users.

Action: SAFER interfaces with Waze to share information multiple incident response communities.

Outcome: Quicker incident detection and response, and more timely and precise traveler information.



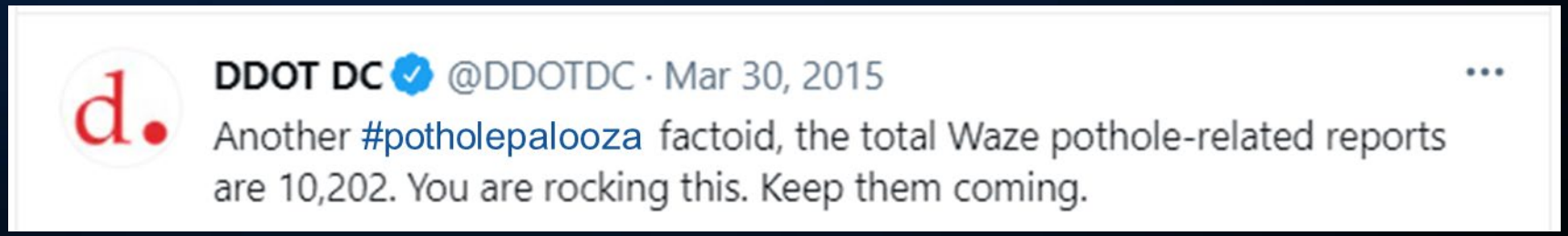
NCTCOG Traffic Signal Performance

Goal:	Evaluate performance of and better manage all 7,000 traffic signals within the NCTCOG region.
Action:	Purchase platform and data to analyze performance.
Outcomes: *(Intended)*	Identify non-performing signals, and whether additional capacity is needed. Quickly identify malfunctioning traffic signal equipment, Asses whether signal timing or coordination is needed.

Example: District Department of Transportation Crowdsources Pothole Detection

The District Department of Transportation (Washington, DC) launched a Potholepalooza campaign using social media.

- 11,000 potholes identified via crowdsourcing (e.g., 311 calls) and conventional, city employees' reports in 3-months
- 10,000 potholes reported by its 650,000 Waze™ users in a month



Source: District DOT.

Kansas City Scout Crowdsourced Pothole Report Tool

- Automated pull of potholes from Waze shared with maintenance
- Field-evaluated reports
- Expanding its use beyond Kansas City's boundaries
- Improvements in operations and safety

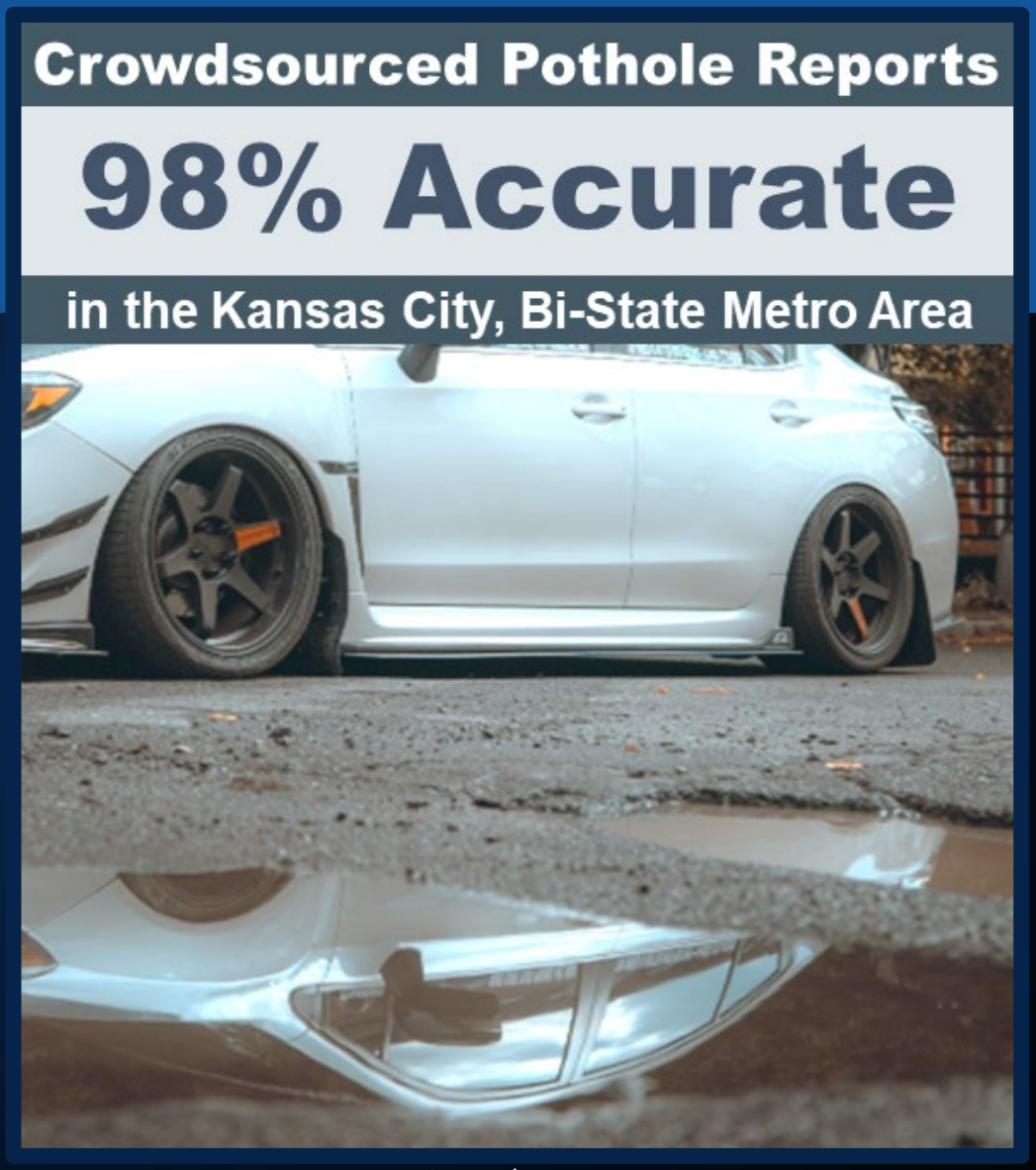
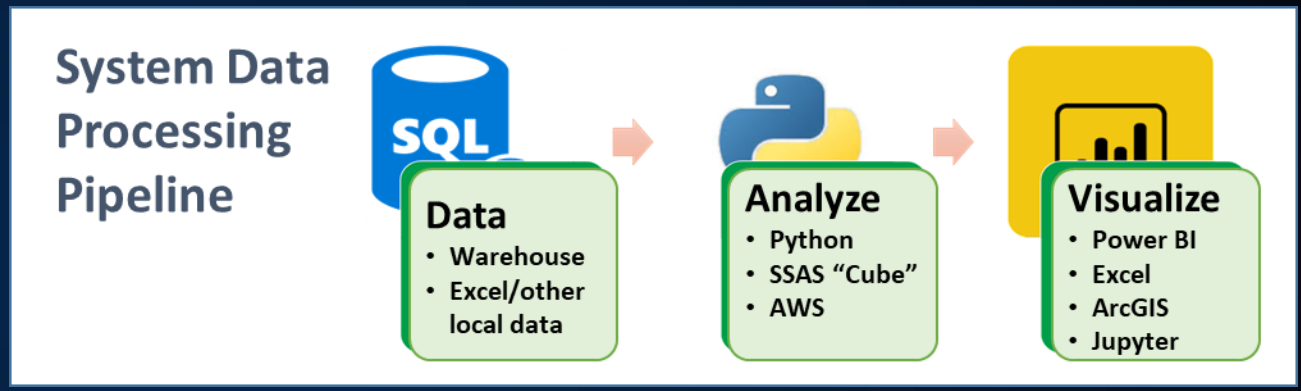


Image: Pexels.com/Kam Pratt, Data Source: Kansas City Scout.

Example: Ohio DOT Uses Vehicle Probe Data for Nine Different Applications!

Collects 27,000 center-lane miles of interstate, U.S., and State route probe data. The agency applies the data for real-time and archived uses.



AWS = Amazon Web Services; SQL = Structured Query Language; SSAS = SQL Server Analysis Services.

Source: Ohio Department of Transportation.

Traffic Incident Management	Traffic Studies	Work Zone Management
Traveler Information	Project Prioritization	Road Weather Management
Freeway Management	Performance Management	Arterial Management

Knowledge Check

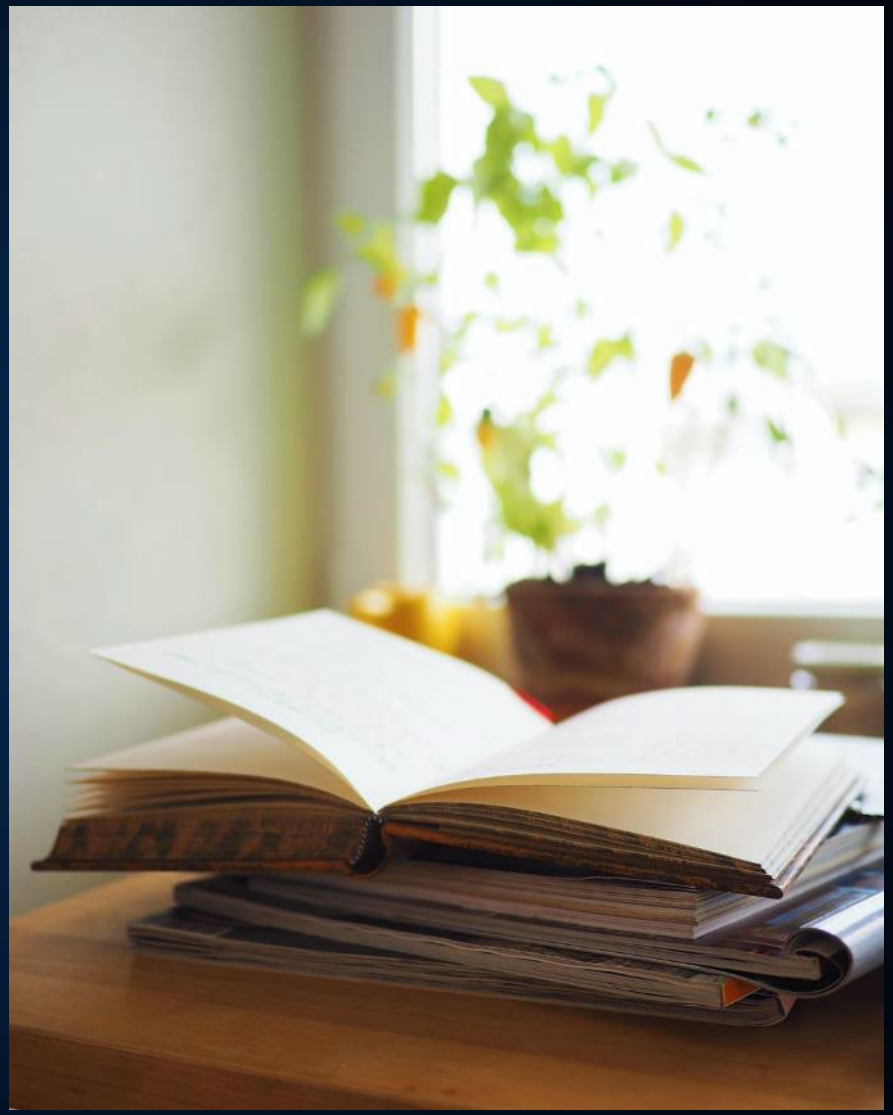
Ohio DOT uses vehicle probe data for how many applications?

A. One use

B. Five uses

C. Nine, that we know of

D. The agency does not use vehicle probe data.



Source: Unsplash.

Source: Pixabay.

Question, Answer, and Discussion

Application Example Resources

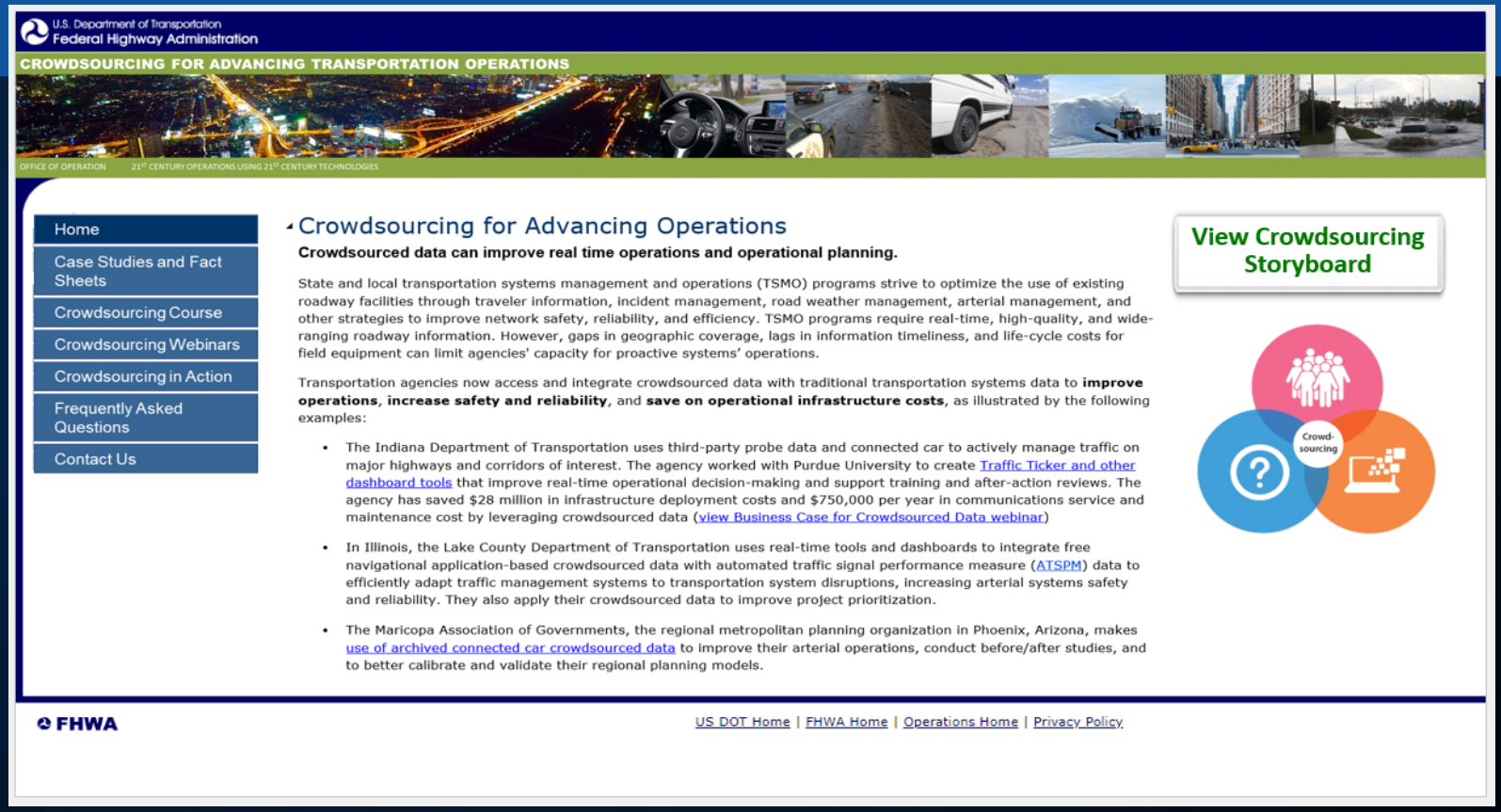
- **Adventures in Crowdsourcing Webinar:** Business Case for Crowdsourced Data
- **Crowdsourcing Case Studies:** City of Louisville, Indiana DOT, Lake County, IL, Kentucky Transportation Cabinet, and Utah DOT
- **Crowdsourcing Applications Table:** Lists and describes public agency applications of crowdsourcing to improve transportation systems management and operations

FHWA EDC-6 Crowdsourcing for Advancing Operation Resource Site (bit.ly/CS4Ops)

Source: FHWA.

Crowdsourcing Beyond EDC-6

- New web presence
- Continue course delivery
- Continue technical support
- Continue free access to the EDC-6 Adventures in Crowdsourcing webinar series hosted by the National Operations Center of Excellence



Source: FHWA.

Concept website in development and intended for FHWA Office of Operations.

Thank you.

Be sure to join the **next course webinar on Tuesday, June 20, 2023, at 1 p.m.** ET to learn about crowdsourcing data sources and management.

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Upcoming T3 Webinars

INTELLIGENT TRANSPORTATION SYSTEMS
PROFESSIONAL CAPACITY BUILDING

Webinar	Date	Time
Crowdsourcing for Advancing Operations: Data Sources and Management	Tuesday, June 20, 2023	1:00 P.M. - 2:30 P.M. ET
Crowdsourcing for Advancing Operations: Traveler Information and Traffic Incident Management	Tuesday, July 18, 2023	1:00 P.M. - 2:30 P.M. ET
Crowdsourcing for Advancing Operations: Road Weather and Arterial Management	Tuesday, August 15, 2023	1:00 P.M. - 2:30 P.M. ET
Crowdsourcing for Advancing Operations: Emergency and Work Zone Management and Next Steps	Tuesday, September 19, 2023	1:00 P.M. - 2:30 P.M. ET

Register: https://www.pcb.its.dot.gov/t3_webinars.aspx

To access the recording and past T3 webinars, visit:
https://www.pcb.its.dot.gov/t3_archives.aspx

Feedback

- A link to a feedback questionnaire is provided in the chat pod. Please take a few minutes to fill it out – we value your input

- To receive notifications of upcoming events, send an email to T3@dot.gov with "Add to mailing list" in the subject line

Thank you!

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PROFESSIONAL CAPACITY BUILDING