Crowdsourcing for Advancing Operations
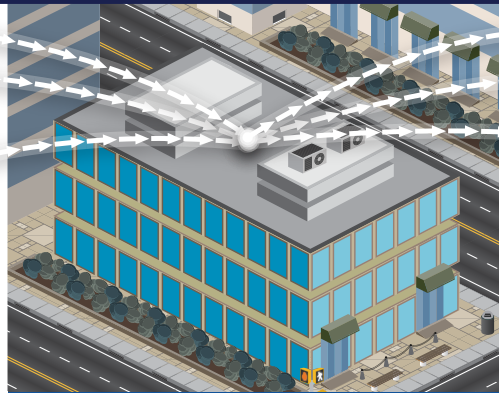
Every Day Counts
Innovation for a Nation on the Move

Crowdsourced data from multiple streams can be integrated and used in real time for improved operations.

Traffic Incident

Traffic Operation Center

Real-time Driver Data

Transportation systems management and operations (TSMO) programs strive to optimize the use of existing roadways through tools such as traveler information, traffic incident management, work zone management, and traffic signal management. TSMO solutions can help mitigate congestion due to special events, adverse weather, traffic incidents, work zones, and planned maintenance. However, these solutions require real-time, high-quality, and wide-ranging roadway information. Gaps in geographic coverage, lags in information timeliness, and life-cycle costs for field equipment can limit State and local agencies' ability to operate the system proactively.

Public agencies at all levels are increasing both their situational awareness and the quality and quantity of operations data by using crowdsourcing. Crowdsourced data helps agencies apply proactive strategies cost effectively and make better decisions that lead to safer and more reliable travel.

REAL-TIME, LOW-COST, VALUABLE DATA

Three common sources of crowdsourced data are social media platforms, third-party crowdsource providers, and specially developed mobile apps. These data can be passively or actively transmitted and may be quantitative or qualitative in nature. Included is information related to speed, travel time, incident type, travel behavior, public sentiment, vehicular operation, and more. Some data are free with little to no cost to process. Other data can be purchased at a more effective cost point than traditional traffic monitoring equipment such as roadway sensors and cameras and their associated maintenance costs.

Because crowdsourced data are obtained whenever and wherever people travel, agencies can capture in real time what happens between sensors, in rural regions,

Real-time crowdsourced data allows dynamic message signs like this one to automatically update travel times for motorists in Arizona. Source: Arizona DOT

along arterials, and beyond jurisdictional boundaries. Crowdsourced data can often be accessed by traffic management centers (TMC) with minimal or no time lags and is not subject to local sensor or system outages. Complementing crowdsourced data with data integration tools enables TMC operators to focus more quickly on managing emerging events, rather than reacting to them after congestion forms.

BENEFITS

▸ **Improved Operations.** Better traveler information and more proactive and effective operations strategies can lead to reduced traffic congestion.

▸ **Increased Safety and Reliability.** Crowdsourced data leads to faster and more accurate responses to traffic incidents and other congestion-causing events, reducing the likelihood of secondary crashes.

▸ **Cost Savings.** Crowdsourcing allows agencies to use their existing intelligent transportation systems infrastructure more effectively and could reduce the need for installing and maintaining additional roadway sensors.

STATE OF THE PRACTICE

Most States' current crowdsourcing efforts are focused on obtaining data from a specific source and applying it to a single application area, such as traffic incident management or traveler information. This can be transformed into a system that gathers multiple streams of data, integrates it, and uses it in real-time for improved operations, as in the following examples:

▸ The Indiana Department of Transportation (INDOT) uses third-party probe data to actively manage traffic on major highways and corridors of interest. The agency worked with Purdue University to create Traffic Ticker and other dashboard tools that improve real-time operational decision-making and support training and after-action reviews.
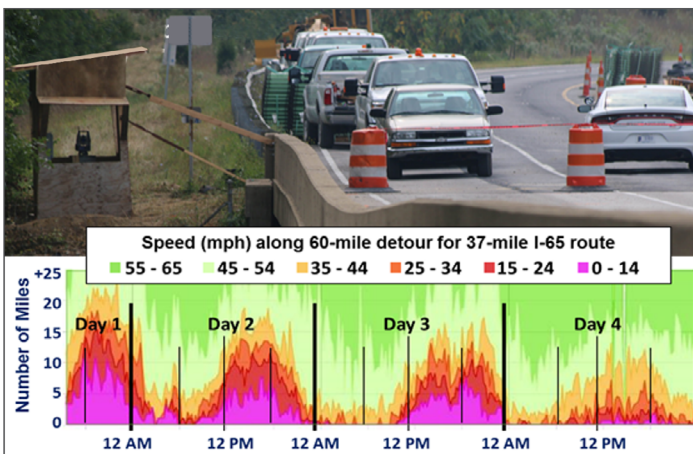
I-65 bridge closure and detour route speed visualization from INDOT's Traffic Ticker, a Web-based application that uses crowdsourced probe vehicle data and other tools to monitor Interstate conditions in real time. Source: Indiana DOT

▸ The Kentucky Transportation Cabinet integrates data from multiple sources, including third-party data providers, a mobile app, social media, and crowdsourced weather data, to improve operations and maintenance. Its Big Data System sends system-generated alerts that quickly inform TMC operators of incidents and events, allowing them to better plan their response.

▸ In Illinois, the Lake County Department of Transportation uses real-time tools and dashboards to integrate crowdsourced data with automated traffic signal performance measure (ATSPM) data to efficiently adapt traffic management systems to transportation system disruptions.

▸ The Colorado Department of Transportation's (CDOT) map-based traffic operations dashboard pulls in real-time crowdsourced data from multiple sources, allowing a more proactive response to even minor incidents. Operators have reported a 5- to 10-minute reduction in response times, which can go a long way toward preventing or reducing incident-related congestion and avoiding secondary crashes.

▸ The Maine Department of Transportation (MaineDOT) developed an app for its work crews to communicate weather and road conditions. Previously, crews radioed operators in MaineDOT's Traffic Management Center to share information about icy roads, etc. The app improves the temporal accuracy of road and weather data and allows operators to focus on incident identification and response during storms.

RESOURCES

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