

Potential Approaches for Wrong-Way Driving Applications – Phase 2

Background

Wrong-way driving (WWD) is a growing concern on roadways, as the resulting crashes tend to be severe and often result in fatalities and serious injuries.

On-road countermeasures that capture the attention of drivers who have made a wrong-way maneuver can only go so far to reduce wrong-way crashes. Advancements in cooperative automated technologies will enable significant possibilities to provide WWD warnings through in-vehicle navigation systems and smartphone-based mobile applications. These types of interventions could supplement on-road countermeasures by influencing wrong-way drivers to correct their wrong-way movements while also alerting other nearby drivers.

In-vehicle navigation systems, together with on-board GPS, are typically able to detect when vehicles are no longer traveling on the pre-defined route and initiate re-routing algorithms. A similar concept could detect wrong-way movements and provide alerts to drivers, especially on divided highways.

A 2015 survey showed that 64% of drivers reported using a smartphone application to assist with their travel.^{1,2} The most used applications were navigation and real-time traffic information, both that typically rely on underlying map tools that include directional travel. Mobile devices with applications providing navigation services could receive wrong-way driving information and alert drivers or passengers, potentially reaching more than half the drivers with wrong-way alerts.

Many transportation agencies have installed on-road sensors that detect wrong-way vehicle movements and communicate WWD events to traffic management centers. Public safety agencies also become aware of wrong-way drivers through calls from nearby motorists.

A national communication standard for incident data including WWD events would enable data from multiple sources (911 calls, on-road sensors, self-reporting mobile applications) to become available through a data feed for in-vehicle mechanisms to access and provide alerts to errant drivers and nearby motorists. See Figure 1.

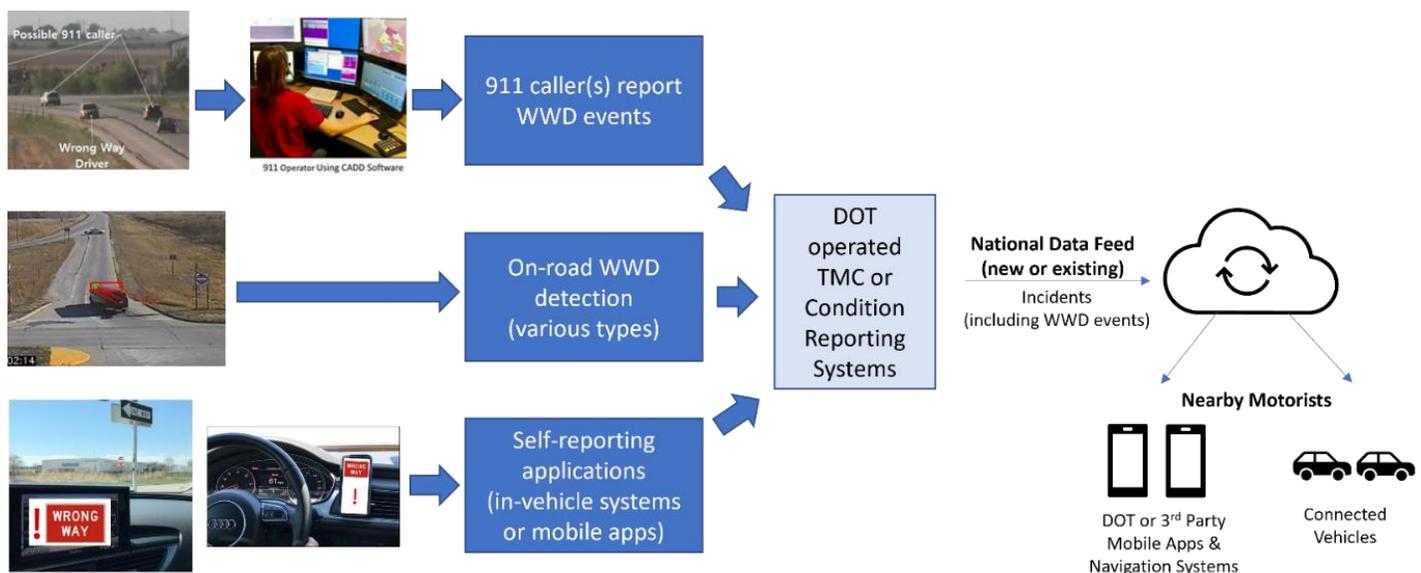


Figure 1: Wrong-way Driving (WWD) Events Communicated Through a National Incident Data Feed

¹ www.sciencedirect.com/science/article/pii/S2046043016300648 (Kamalanthsharma, et al., 2015)

² <https://money.cnn.com/2016/10/10/autos/car-navigation-frustration/index.html> (Valdes-Dapena, 2016)

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Industry Interest

The ENTERPRISE Pooled Fund Study *Potential Approaches for Wrong-Way Driving Applications* project conducted industry outreach to generate interest in and explore the potential for in-vehicle navigation systems and mobile apps to provide wrong-way driving alerts. Meanwhile, the following mechanisms for WWD detection and alerts are now on the market, indicating industry progress toward broader implementation:

- [Wrong Way Alert technology for Ford Focus vehicles](#) (announced in Germany in 2018) utilizes Ford’s Traffic Sign Recognition technology to detect “no entry” signs and provide alerts to the driver.³
- In 2021, European automobile manufacturer ŠKODA announced it will offer the [Bosch Wrong-Way Driver Warning System](#) in the infotainment system of several vehicle models.⁴
- The [Sygic GPS Navigation](#) mobile app uses GPS to determine whether the device is going in the opposite direction of traffic, then issues warnings to both the driver operating the app and other drivers in the vicinity who are also operating the app.⁵
- The [Wrong Way Driver Alert](#) mobile app detects wrong-way events and notifies the driver, persons within a 10 mile radius of the driver, and highway authorities of a potential wrong way driver. A corresponding PFR (Police Fire and Rescue) application monitors users of the app within a pre-set radius to pick up wrong-way driving activity.⁶
- The [HAAS Alert Safety Cloud® digital alerting service](#) integrates with existing WWD detection systems. When a WWD system detects a WWD event, a single API call into Safety Cloud® activates a pre-programmed and customizable “WWD Digital Alerting Zone” managed by the infrastructure owner/operator, and connected drivers within and approaching the “WWD Digital Alerting Zone” receive a safety alert in their vehicle infotainment screen or mobile application.⁷

While encouraging, these technologies are often limited to warning only the errant driver or require both the errant driver and nearby motorists to be simultaneously operating the same application to receive an alert that a wrong-way driver may be approaching. This suggests the need for a common communication standard and data feed for exchanging wrong-way event data, expanding the ability for WWD events to be communicated and received as they occur.

Why a National Standard?

A national communication standard for wrong-way driving data (or the inclusion of WWD event information in another national data exchange) would establish data parameters for the location and time of wrong-way vehicle reports received through multiple sources. This would enable WWD event data to become available through a data feed for in-vehicle applications to access and provide alerts to errant drivers and nearby motorists. Sources of WWD event data could include:

- Public Safety Answering Points / 911 call centers;
- On-road WWD detection devices; and
- Self-reporting mobile applications

The ENTERPRISE *Potential Approaches for Wrong-Way Driving Applications – Phase 2* project is continuing outreach and initiating discussions with USDOT to advocate for including WWD event data in one or more national data exchanges to enable contributors and recipient technologies of WWD data to operate with common parameters, advancing the ability for the traveling public to learn of WWD events as they occur.

Contacts

The following individuals are leading this effort on behalf of ENTERPRISE and can be contacted to discuss this effort.

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³ <https://media.ford.com/content/fordmedia/feu/en/news/2018/08/06/new-tech-for-all-new-ford-focus-could-help-prevent-the-nightmare.html> (Ford, 2018) (Accessed 3/17/23)

⁴ <https://www.aftermarketnews.com/boschs-wrong-way-driver-warning-system-now-on-skoda-vehicles/> (After Market News, 2021) (Accessed 3/17/23)

⁵ <https://www.autoevolution.com/news/how-a-google-maps-competitor-developed-a-wrong-way-driver-warning-feature-197738.html> (2022) (Accessed 5/4/22)

⁶ <https://apps.apple.com/us/app/wrong-way-driver-alert/id1356015696> (JV Marketing Technologies) (Accessed 3/17/23)

⁷ <https://www.haasalert.com/news/combating-wrong-way-drivers-with-digital-alerting> (HAAS Alert, 2023) (Accessed 5/5/23)