

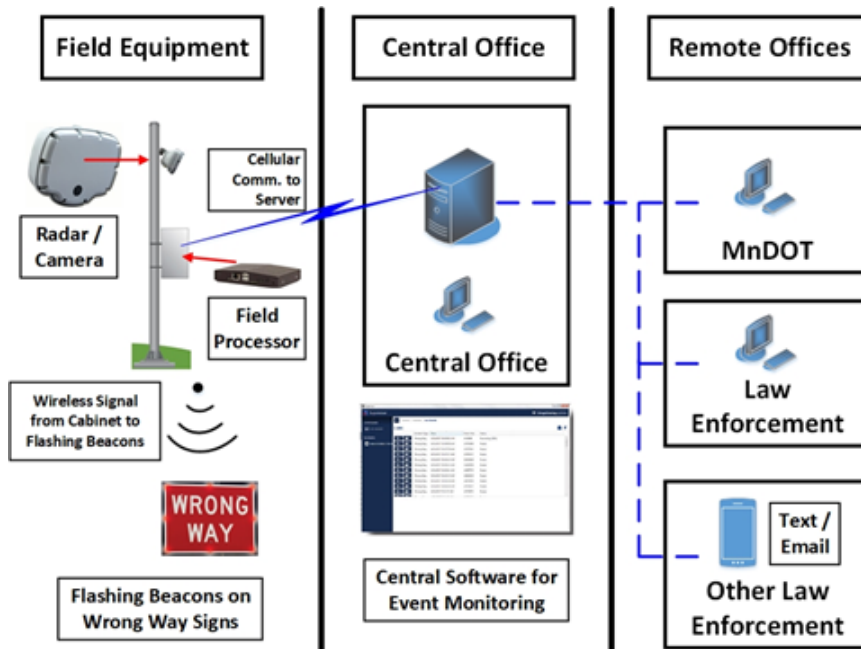
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Wrong Way Vehicle Detection & Alerting System

While a small percentage of crashes on highways are caused by wrong way drivers, these crashes have a very high likelihood of resulting in serious injuries and fatalities. Nationally, there are 360 wrong way driving fatalities per year, and two-thirds of these involve drivers impaired by alcohol, with the most likely times for crashes to be occurring on weekends and in the early morning hours. Research has also consistently shown that not all wrong way driving occurrences are reported from the public through 911 calls. This is largely because these events occur at night-time periods when traffic volume is at its lightest, and when wrong way drivers are not as visible to other motorists.

Project Overview

MnDOT and project partners tested and evaluated the operation of a Wrong Way Vehicle Detection and Alerting System for its effectiveness in reducing wrong way vehicle driving. The system detects wrong way vehicles in real time and provides flashing alerts on static wrong way signs to warn drivers immediately. This project included planning, design, installation and evaluation of the operation of the system.



The goals of the project were:

- Reducing wrong way driving occurrences by providing active warnings to wrong way drivers
- Reducing detection time of wrong way driving occurrences
- Reducing notification time of wrong way driving occurrences

The system hardware included detection and alerting equipment. The detection hardware utilized radar technology and included a small camera capable of recording images and video of wrong way events. Upon detection of wrong way vehicles, the system activated the alerting equipment – flashing beacons on the wrong way signage and sent email notifications to MnDOT and project partners.

The system was installed along the I-94 eastbound off-ramp at 4th St. N. and 2nd Ave. N. in Minneapolis in October 2020. A 12-month demonstration/field operational test was conducted to evaluate the system performance, accuracy and reliability. Key findings of the evaluation were:

- The system accurately detected all wrong way vehicles
- Other objects moving in the wrong way direction could be detected as well. Such objects included vehicles backing up in reverse on the ramp within the detection zone.
- Detection images and video clips helped verify and confirm wrong way vehicle events.
- The system was reliable and required minimal maintenance over the demonstration period.

Given the relatively small sample size of wrong way events, it is not possible to state with a measure of statistical significance that the system reduced the number of wrong way driving events throughout the demonstration. The impacts of the COVID-19 pandemic on driving behaviors in 2020 and 2021 would also have made it difficult to draw any conclusions on how the system impacted wrong way driving events.

Project Deliverables

- Project Plan
- Concept of Operations
- System Requirements
- System Installation Plan
- Verification and Validation Plan
- Verification and Validation Report
- Project Report
- Videos and photos of wrong way events
- Wrong way event data

Project Partners

- MnDOT Office of Traffic Engineering
- MnDOT Regional Transportation Management Center (RTMC)
- MnDOT Metro District
- AECOM
- Image Sensing Systems
- Quality Counts, LLC
- Egan Company