Influencing Human Behavior to Improve Wrong Way Driving

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Question

With more technology than ever on our roadways, what's preventing us from achieving our safety goals?

2021 vs. 2020: By The Numbers

Fatalities in Multi-vehicle Crashes: UP **16%**

Fatalities on Urban Roads: UP **16%**

Fatalities Among Drivers 65 and Older: UP **14%**

Pedestrian Fatalities: UP **13%**

Fatalities in Crashes Involving at least one large truck: UP **13%**

Daytime Fatalities: UP **11%**

Motorcyclist Fatalities: UP **9%**

Bicyclist Fatalities: UP **5%**

Fatalities in Speeding-related Crashes: UP **5%**

Fatalities in Police-Reported, Alcohol-involved Crashes: UP **5%**
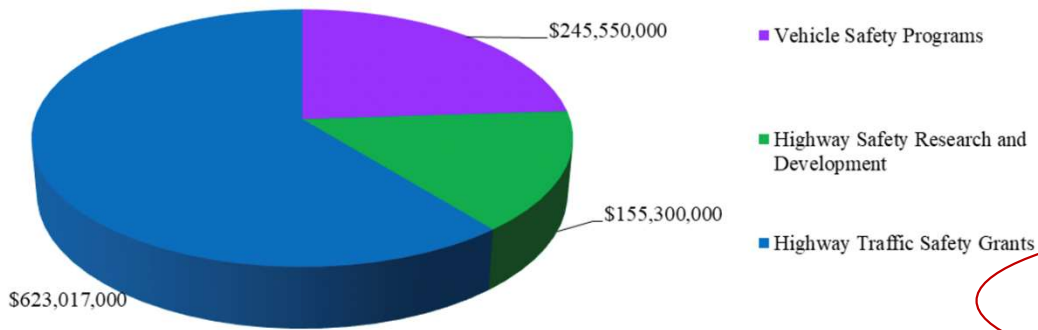
Source: NHTSA May 2022

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The Problem Variable

Human Behavior

Focus: National Roadway Safety

National Highway Traffic Safety Administration
FY 2022 Budget by Program
$1,023,867,000

- ■ Vehicle Safety Programs — $245,550,000
- ■ Highway Safety Research and Development — $155,300,000
- ■ Highway Traffic Safety Grants — $623,017,000

Detailed Justification for Operations & Research (TF)

FY 2022 – Research and Program Development – Budget Request

($49,150,000)

The mission of NHTSA's Research and Program Development is to design, implement, and evaluate traffic safety programs that reduce crash-related injuries and fatalities. Funding supports research, education, and technical assistance to national, State, and local stakeholders. Specifically, resources are intended to: prevent destructive behavior, such as driving while impaired by alcohol and/or other drugs; encourage positive behavior, such as using a seat belt; protect vulnerable road users, including pedestrians and bicyclists; support traffic law enforcement; and improve lifesaving emergency medical services (EMS) and 911 systems as part of a comprehensive highway and traffic safety system.

The FY 2022 budget request will support the following activities:

Human Factors Research
Conduct research to explore how people use and misuse vehicle technology to develop and evaluate countermeasures to reduce crash-related injuries and fatalities. Emphasis will be on protecting vulnerable road users, such as pedestrians and bicyclists, and exploring how to prevent distracted driving.

Equity Considerations in Safety Research
Research will place emphasis on equity in traffic safety as an overarching issue that informs the development of new projects and the direction of existing projects to increase our understanding and ultimately decrease inequities in traffic safety.

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The ISS Approach

Core Tenets of ISS Approach

Risk is Manageable — Wrong way drivers must be stopped as quickly as possible to reduce the risk to the public.

Strategy Requires Insights — An effective wrong way driving prevention strategy requires insights into specific human errors that occur repeatedly.

Correct Human Errors — Technology-alone is not the answer to all human errors and should only be deployed when required to correct observed human error.

TACTIC ONE

Focuses on data collection to characterize wrong way driving at locations across roadway networks and then uses a realistic approach to reduce wrong way driving activity through low-cost, quick-deploy countermeasures.
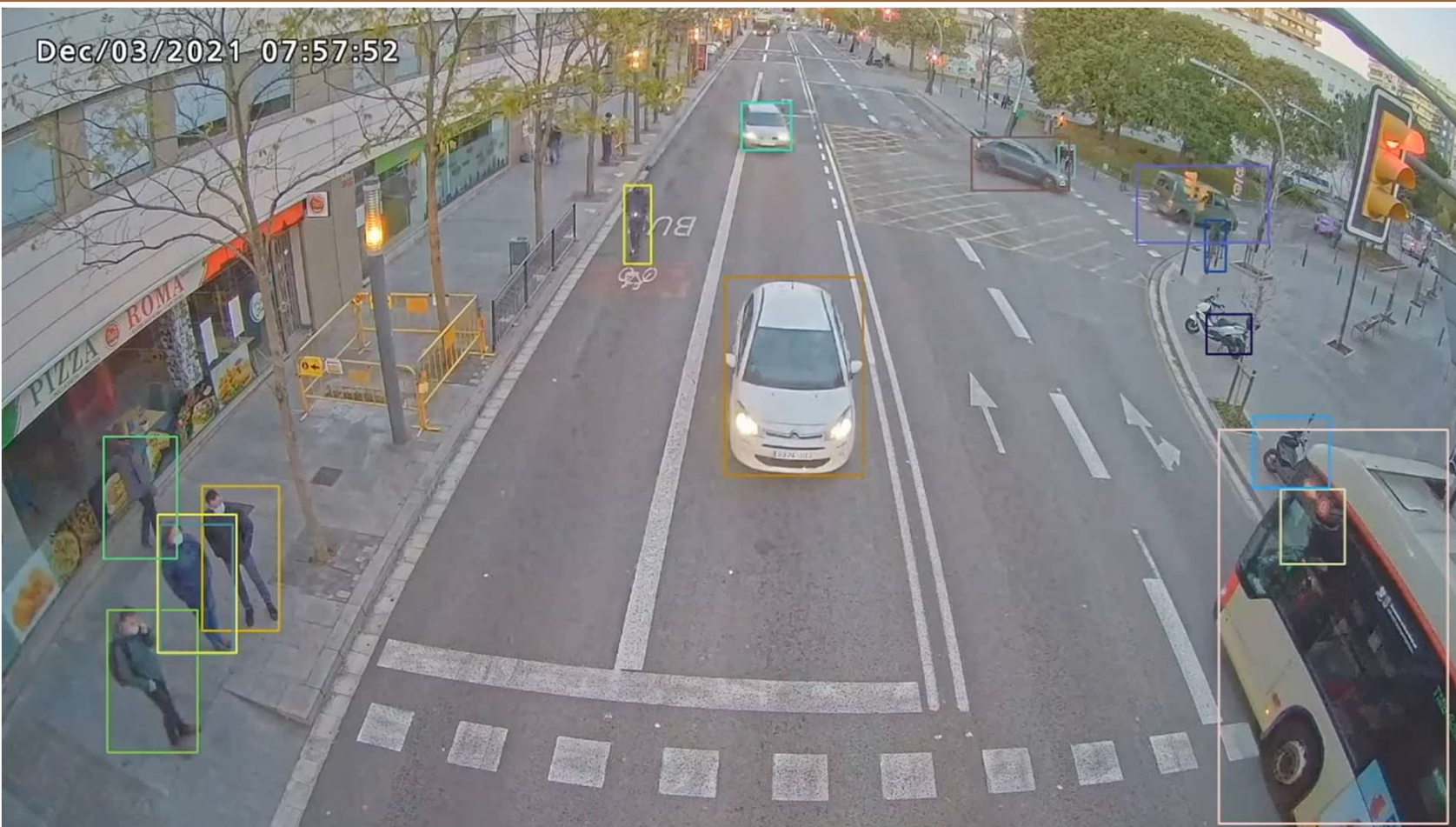
TACTIC TWO

Deployed where a significant risk of non-self-correcting wrong way drivers is observed. This strategy includes _monitoring_ for non-self-correcting drivers and systematically engages Traffic Operations and Law Enforcement when a valid wrong way driving event occurs.
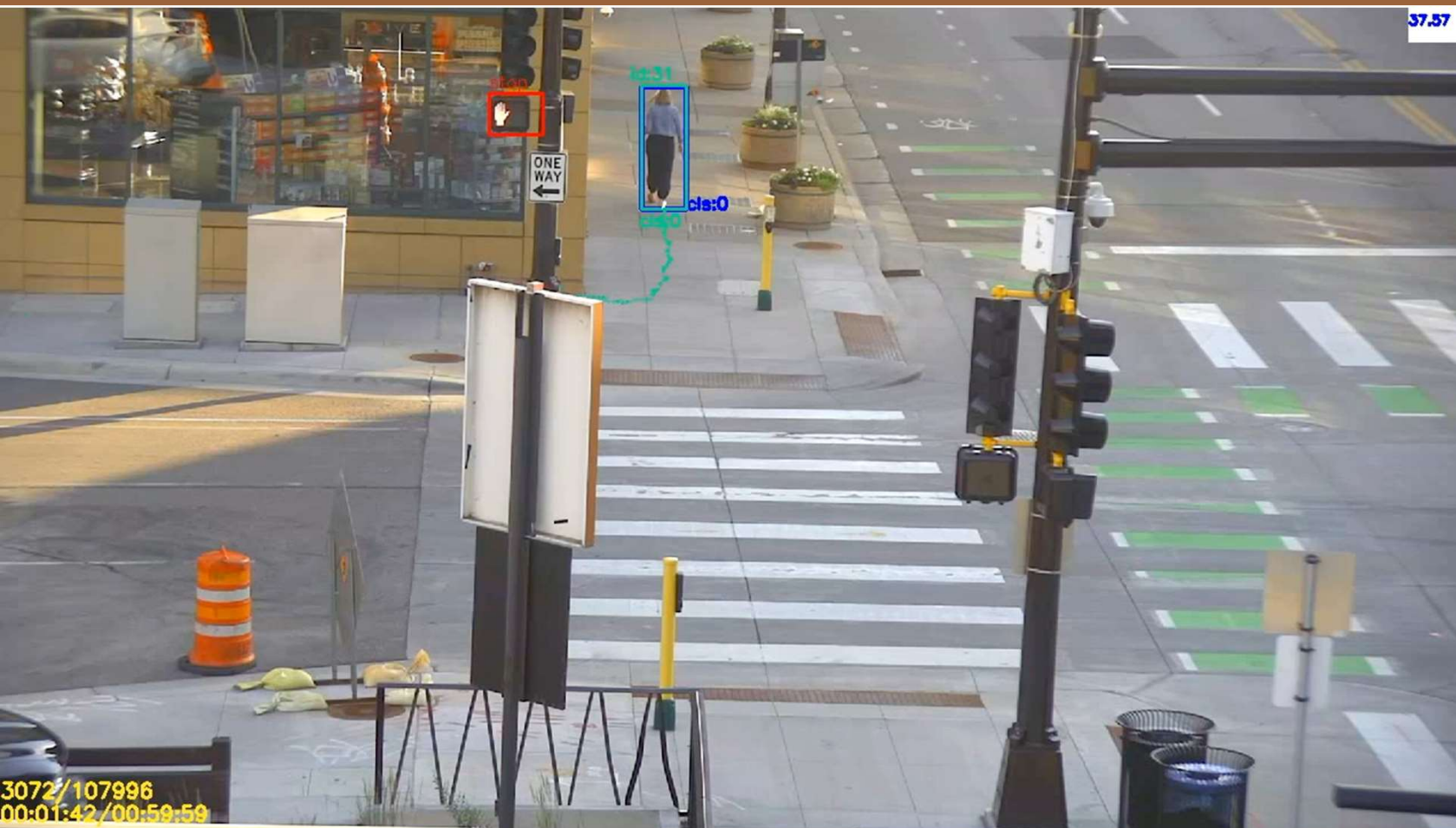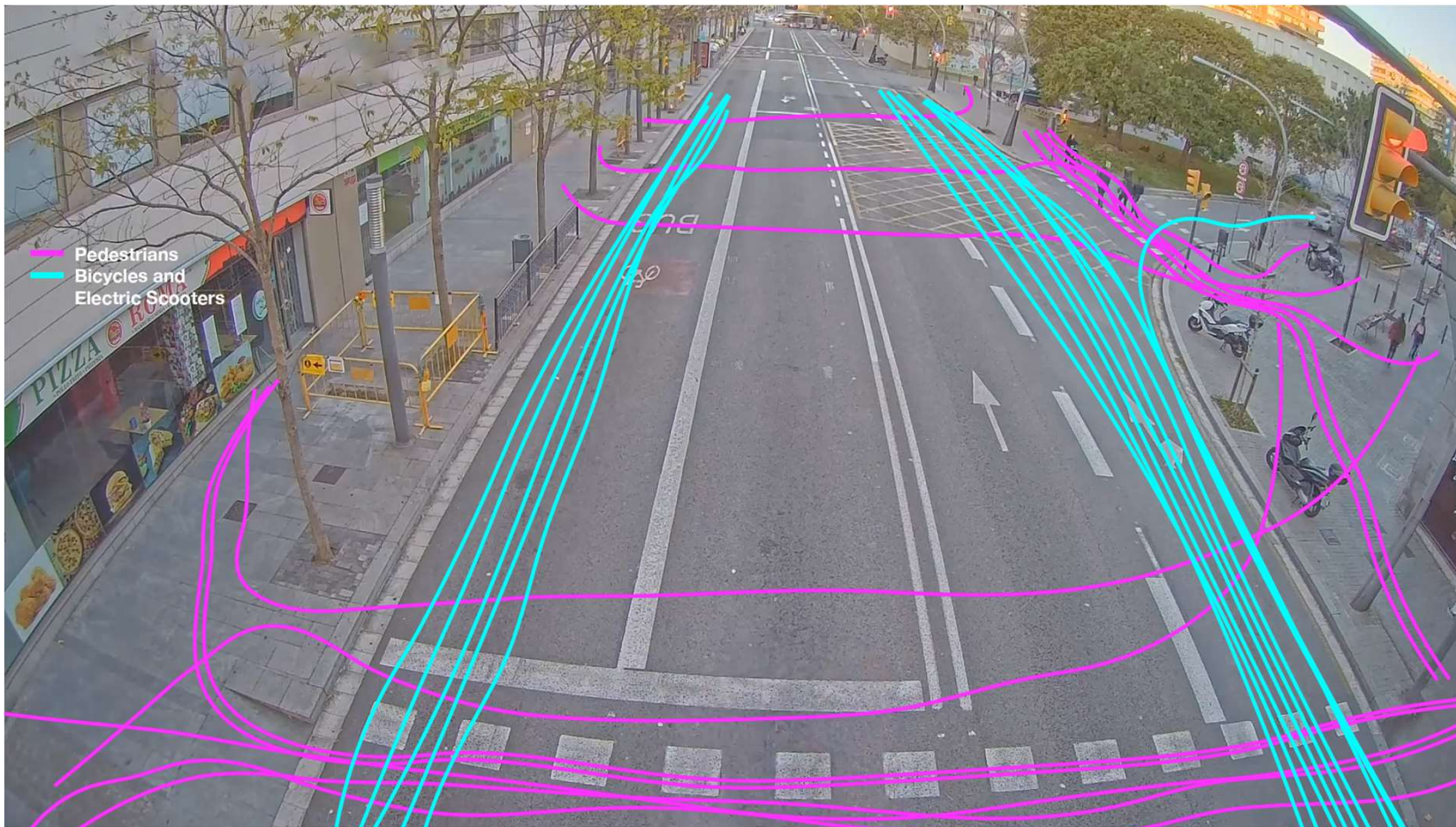
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Process

Detection – Pedestrians

Trajectory Identification

Behavior Analysis

Tactic 1: Characterizing & Influencing

Real World Measurement of Vehicular Traffic and Vulnerable Roadway Users

Quantity of exceptions?

Type of exceptions?

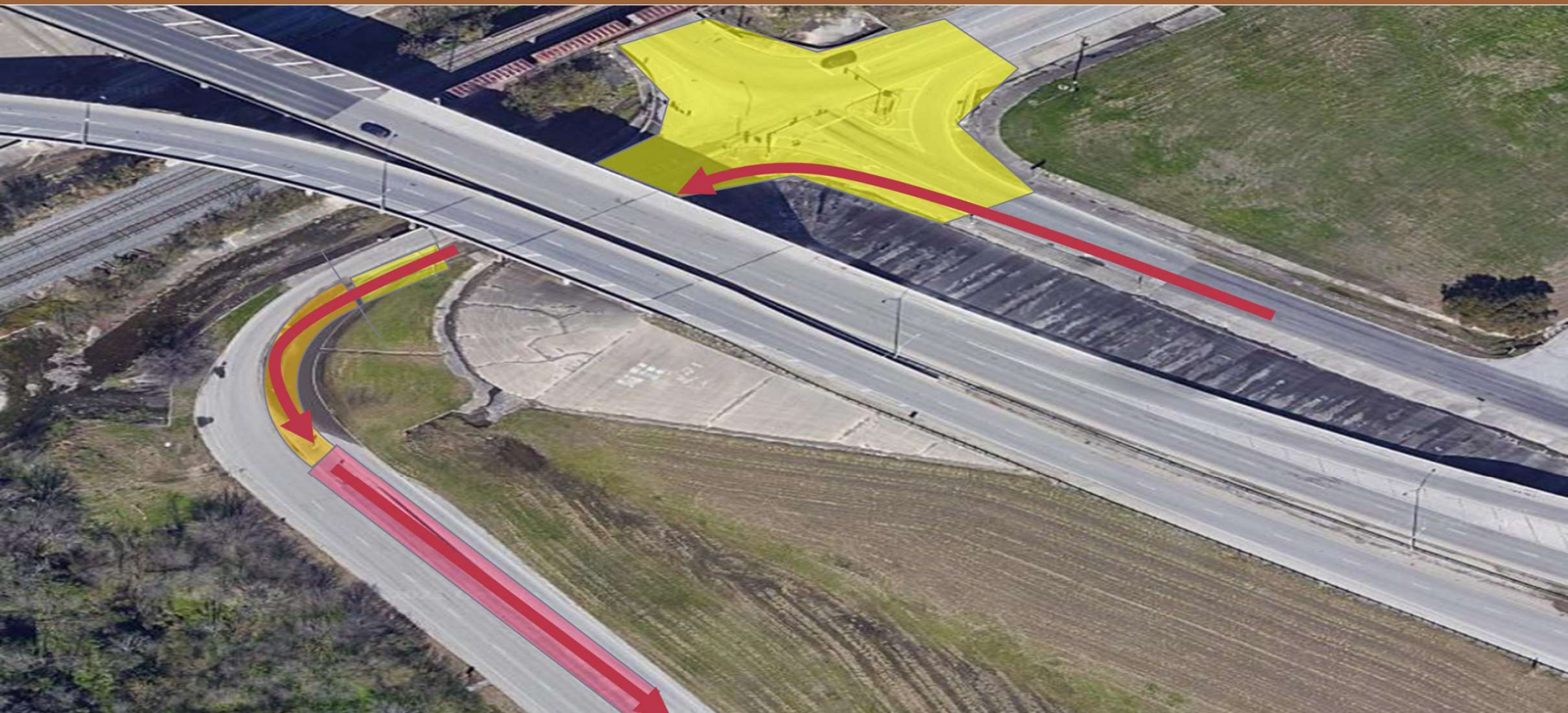Self-resolution of exceptions?

Where and When?

Prevention and Resolution Opportunities

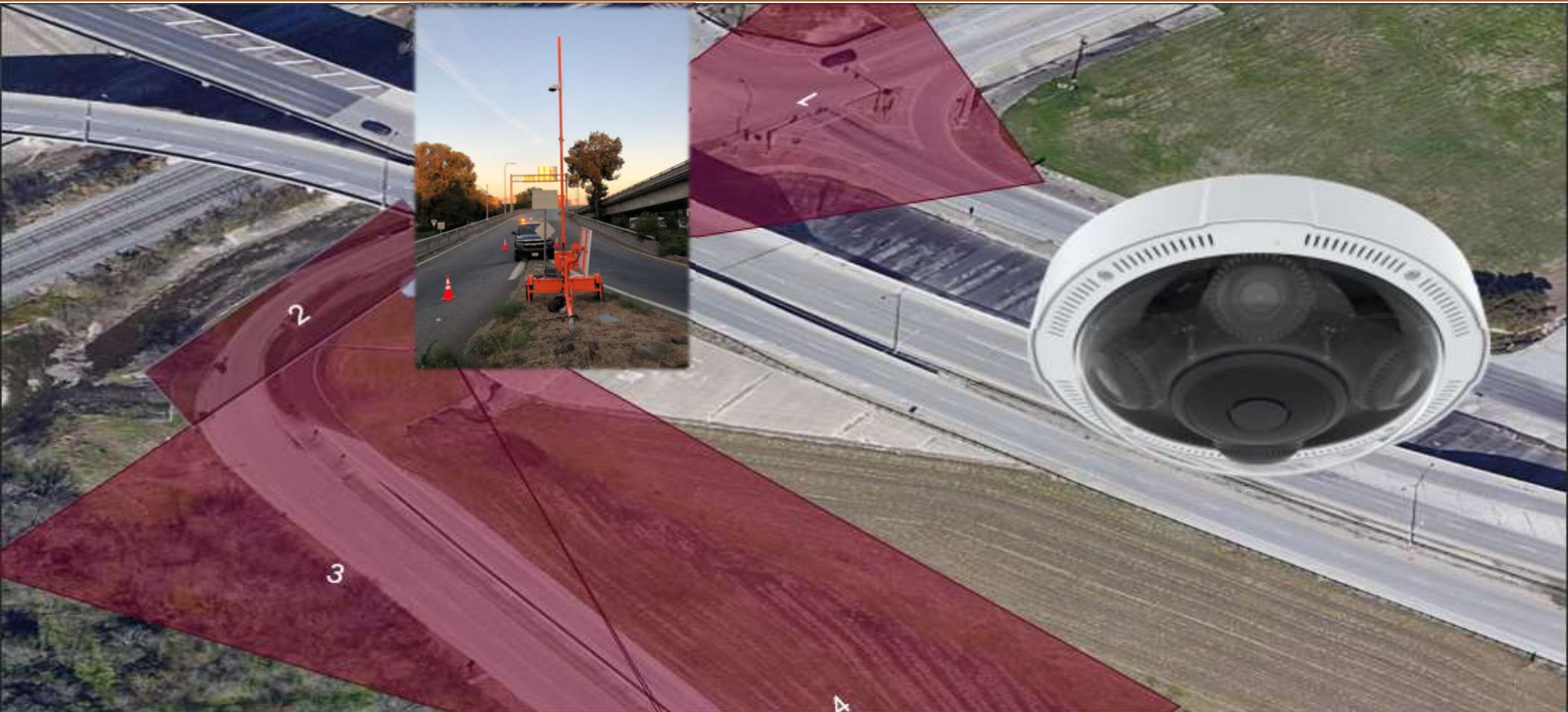How many can be prevented through technology "lite" methods?

How many can be resolved with a technology partner?

How many remain? Is that acceptable?

The Beginning – The Ramp

Extracting Behavior Data
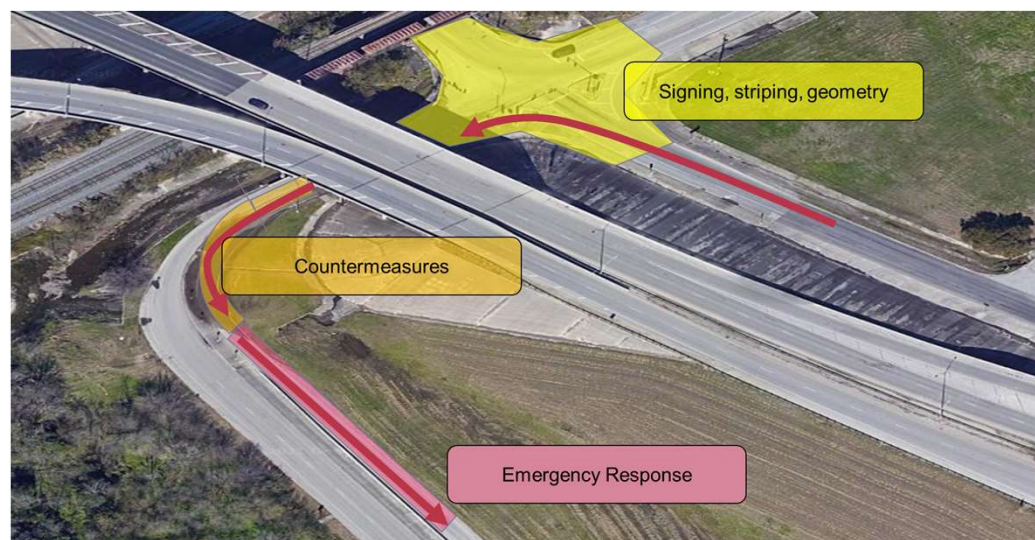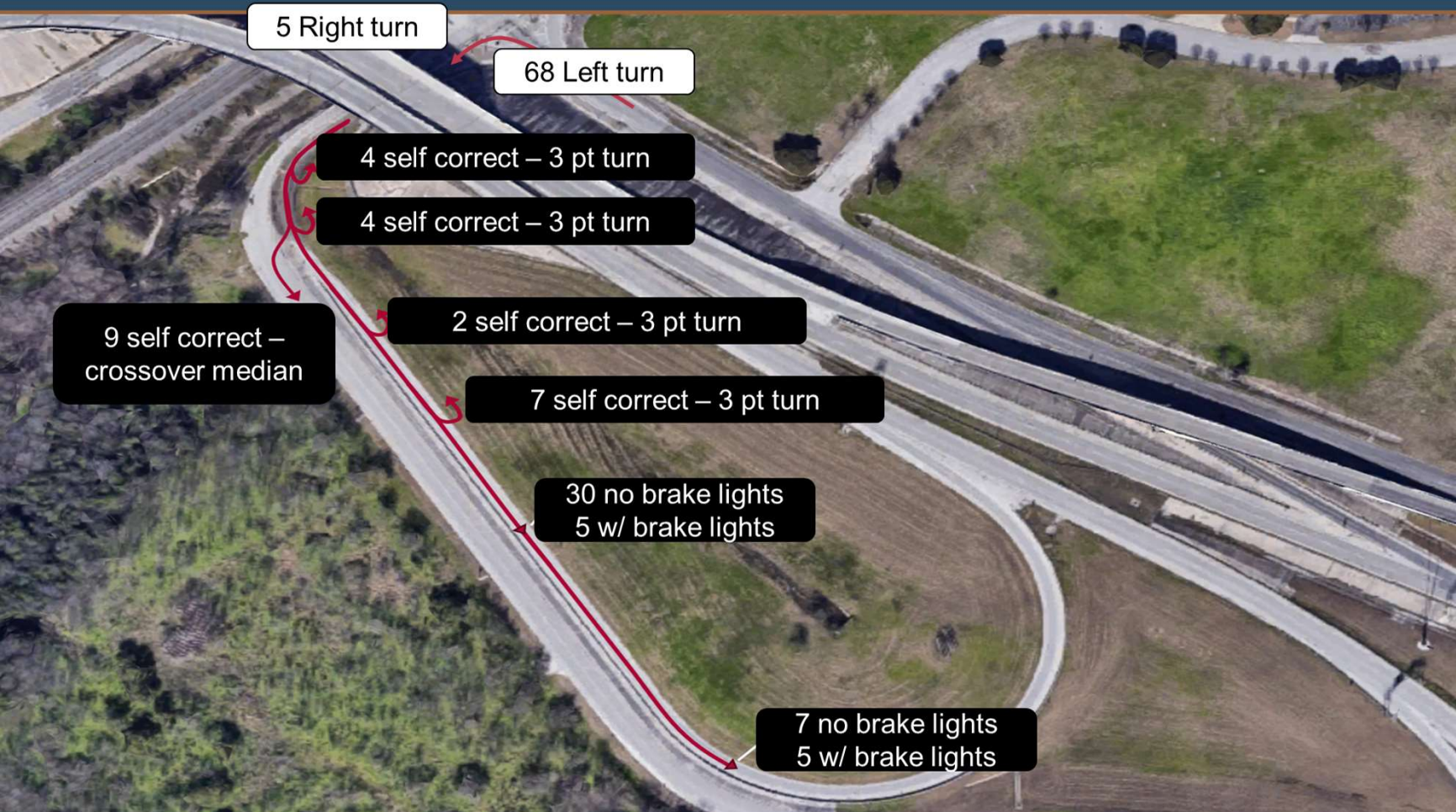
Opportunities to Influence

Signing, striping, geometry

Countermeasures

Emergency Response

Self Correction

WW Origin

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Stats – Pre-mitigation Optimization

Observed Behavior: Self Correction

Time of Day: Heatmap

| Day of Week	Hour of Day																								Daily Totals
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Sunday	2	0	3	1	0	1	0	0	1	0	1	2	1	0	0	0	1	1	0	1	2	4	4	1	26
Monday	2	1	0	1	1	0	1	1	0	2	2	0	3	0	0	0	0	0	0	1	3	4	0	2	24
Tuesday	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	8
Wednesday	0	1	1	1	0	2	0	0	1	1	1	1	1	0	0	0	0	1	0	1	1	0	0	1	14
Thursday	0	0	2	2	0	0	0	0	0	2	1	1	2	1	0	0	1	0	0	0	4	1	1	1	19
Friday	1	1	0	2	1	0	0	0	0	1	1	2	0	0	1	0	0	2	0	2	2	2	2	0	20
Saturday	2	0	0	1	1	1	1	2	0	0	1	0	1	0	1	1	3	3	0	1	1	0	2	1	23
Time Period Totals	24				14				21				12				18				45				134

Human Factors and WWD Prevention

What human factors studies tell us about effective WWD prevention:

"While traffic control devices such as signs and pavement markings may be effective at conveying to wrong way drivers that are confused, disoriented, or slightly intoxicated that they need to turn around, researchers do not believe that highly intoxicated wrong way drivers will be able to receive and process the same information from traffic control devices." Texas A&M Transportation Institute Study

"It is clear from this analysis that dynamic countermeasures … and the standard static sign were equally effective (at stopping wrong way drivers)." FSU Simulated Driving Studies

Not all wrong way drivers can be influenced in the same manner.
There is no conclusive evidence that active systems are more effective at reducing WWD risk.

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Tactic 2: Permanent WWD Monitoring
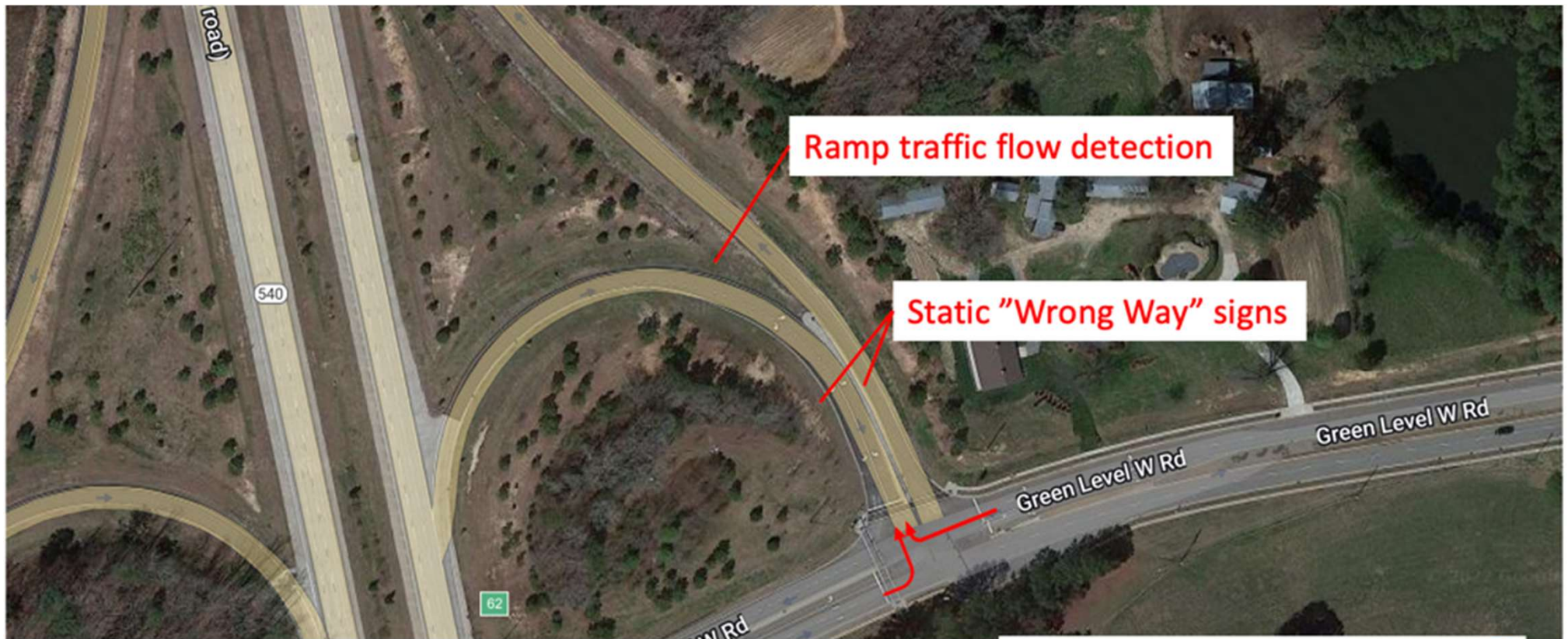
Resolution – The ISS Solution

ISS
Wrong Way
Solution with
Alert Trust
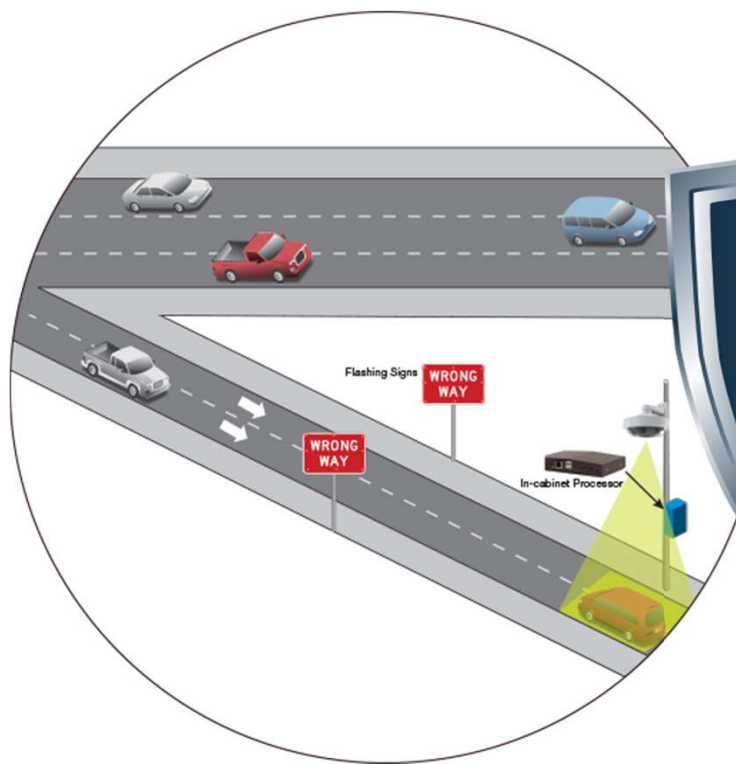
Saving Lives through
Human Behavior
Insights,
Modification, and
Resolution

Safety

Operation
Center

Law
Enforcement

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Working Together

STUDY
We understand the most significant wrong way issues

TECHNOLOGY
We determine the correct countermeasures

MEASURES
Real-time situational awareness

RESOLUTION
Verified alerting allows for the most effective response

PARTNERSHIP
We are your long term technology partner

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Our Expertise

30+ YEARS
machine vision and radar detection **experience**

155,000+
roadway sensors sold **worldwide**

SYSTEMS INSTALLED

80+ COUNTRIES

MISSION
Design, develop, and deliver solutions to make our **roadways safer** in every community we serve.

We aim to improve **safety** and **efficiency** with measurable and lasting effects.

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Thank you

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