Governments around the world have placed an increased focus on reducing and eliminating traffic crashes that cause serious injuries and deaths.

Known as Vision Zero, this traffic safety framework has a clear and ambitious aim: zero fatalities or serious injuries on roadways.

First devised in Sweden, it is based on the principle that the loss of human life in traffic is unacceptable. The Swedish Transport Administration writes: “Road safety in the spirit of Vision Zero means that roads, streets and vehicles must be much more adapted to human capacity and tolerance. The responsibility for safety is shared between those who design and those who use the road transport system.”

Vision Zero principles make safety the uppermost priority, meaning that other aspects of road transport systems need to be integrated into this safety-first thinking.

At its essence, Vision Zero-based thinking asks: how can we make road travel most survivable? What are the steps that can be taken to ensure that this thinking is inherent in all decisions made about our traffic systems? Solutions range from reducing speed limits to redesigning infrastructure and using technology to facilitate safer travel for all modes of transportation.

**MINIMIZING DANGER**

The thinking behind Vision Zero suggests that if a dangerous event cannot be entirely eliminated, its effects should be minimized, and the best guidance in this regard is what the human body can put up with:

"Human limitations are an important basis upon which to design the road transport system. This must be done through taking into account biological tolerance against external violence – in other words what the human body can stand. In this regard, there are scientifically established limit values based on the design of modern vehicles and roads."

Australian researchers Claes Tingvall and Narelle Haworth — in addition to discussing these guidelines around speed limits — also highlight the way infrastructure, such as intersections, presents a danger of side impacts between vehicles, and of conflicts between pedestrians and cars.

The potential for incidents at intersections is well-acknowledged. In the United States, 40 percent of all crashes involve intersections, and these account for in excess of 20 percent of traffic fatalities.

**VISION ZERO**

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe — and now it’s gaining momentum in major American cities.

Vision Zero aims to make roadways free of serious and fatal crashes. The project’s principles call for shared responsibility of serious traffic crashes between roadway users and designers.

In order to facilitate fewer crashes, road designers and traffic professionals have a variety of tools at their disposal, including new policies, designs and technological solutions. In particular, relatively low-cost and minimally-invasive solutions like signal priority can make intersections safer and more efficient.

Ultimately, these types of changes can reduce the number of serious and fatal crashes at intersections.
VISION ZERO LOCATIONS

Cities and towns around the world have embraced Vision Zero. Sweden, of course, has enshrined it into law. The Canadian Council of Motor Transport Administrators has selected Vision Zero as a primary focus in the release of their Road Safety Strategy 2025. Jurisdictions are encouraged to adopt the principles, develop a data-driven traffic safety strategy and implement best practice interventions. The Vision Zero Advocate Institute, based in Edmonton, Alberta, has been developed to support the accelerated adoption of Vision Zero both in Canadian municipalities and around the world. The Vision Zero Advocate Institute works with community teams, as well as thought leaders, corporations, researchers and industry experts to bring the best practice information directly to the public, through visionzeroal.com. The institute has a proven program that supports municipalities and organizations to implement Vision Zero in their own community. The Vision Zero Advocate Institute operates globally and is supported by Global Traffic Technologies’ partner, ATS Traffic.

In the United States, there are Vision Zero initiatives active in multiple states, cities, towns and communities, including New York City, Boston, Los Angeles, San Francisco, San Jose and North Dakota.

Vision Zero concepts have also been adapted for use in the Netherlands, and numerous towns and cities in the United Kingdom are working towards a Vision Zero-inspired road safety plan. There are further Vision Zero or zero fatality programs in more than 20 other countries around the world at the time of writing.

### VISION ZERO IMPLEMENTATION

The Vision Zero concept changes the emphasis in responsibility for road traffic safety,\(^4\) from one where the user is viewed as almost solely responsible for following road safety rules and thus avoiding accidents, to a shared responsibility between the traffic system designers and the road user:

1. The designers of the system are always ultimately responsible for the design, operation and use of the road transport system and thereby responsible for the level of safety within the entire system.

2. Road users are responsible for following the rules for using the road transport system set by the system designers.

3. If road users fail to obey these rules due to lack of knowledge, acceptance or ability, or if injuries occur, the system designers are required to take necessary further steps to counteract people being killed or seriously injured.”\(^5\)

How does this work in practicality? Vision Zero aims to guide strategy rather than enforce specific rules. A key aspect is in infrastructure design.

“The goal is to build roads and infrastructure that meet capacity and environmental challenges without compromising traffic safety. This is not as complex as it first might seem and doesn’t need to be more expensive than the traditional way of designing roads. On the contrary, it will reduce the total cost to society over time.”\(^6\)

In Sweden, this thinking has resulted in changes to the street environment, where “central median barriers and roundabouts have become much more common, as have different types of speed calming measures in built-up areas.”\(^7\)

But in a practical sense, the redesign of road systems takes time and money, and the changes needed to reduce crashes and accidents happen incrementally. Most cities and towns can benefit from an intelligent approach to adapting and evolving the existing traffic network before those major infrastructure investments and projects are possible.

### TABLE 1: Intersection crash and fatality rates for the United States based on Fatality Analysis Reporting System (FARS) data provided by the Federal Highway Administration.

<table>
<thead>
<tr>
<th>2007 INTERSECTION CRASHES</th>
<th>NUMBER</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fatal Crashes</td>
<td>37,435</td>
<td></td>
</tr>
<tr>
<td>Total intersection/intersection-related fatal crashes</td>
<td>8,061</td>
<td>21.5%</td>
</tr>
<tr>
<td>Total Injury Crashes</td>
<td>1,711,000</td>
<td></td>
</tr>
<tr>
<td>Total intersection/intersection-related injury crashes</td>
<td>767,000</td>
<td>44.8%</td>
</tr>
<tr>
<td>Total Property Damage Only (PDO) Crashes</td>
<td>4,275,000</td>
<td></td>
</tr>
<tr>
<td>Total intersection/intersection-related PDO crashes</td>
<td>1,617,000</td>
<td>37.8%</td>
</tr>
<tr>
<td>All Crashes</td>
<td>6,024,000</td>
<td></td>
</tr>
<tr>
<td>Total intersection/intersection-related crashes</td>
<td>2,392,061</td>
<td>39.7%</td>
</tr>
</tbody>
</table>

Nearly half of all serious collisions happen in intersections.\(^3\) Table 1 shows the U.S. intersection crash and fatality rate figures for 2007.

Based on the intersection crash rate data, it is clear that one way Vision Zero can begin to be implemented, and have a powerful impact, is through initiatives which make travelling through intersections safer for all vehicles, drivers, passengers and pedestrians.
That’s why there’s an increasing focus on the way that smart technologies can be harnessed to proactively assist with achieving safety goals. Cities and communities can leverage data provided by smart technologies to create new opportunities and effect change within their cities, enabling easier and often less expensive decisions for city officials.  

INTERSECTION SAFETY
A key safety point for road traffic collisions and accidents is at intersections. Here, driver inattention to traffic signals can prove fatal. And when emergency vehicles are attempting to navigate against the flow of traffic, through red light conditions, the danger to drivers, pedestrians, emergency personnel and patients is extremely high.

This is where the Opticom™ priority control system from Global Traffic Technologies (GTT) has proven its worth for more than 50 years. Opticom allows emergency vehicles to request a green light ahead of their approach to an intersection, allowing them to pass through swiftly and safely. Opticom Emergency Vehicle Preemption systems have been proven to reduce intersection crash rates by up to 70 percent.  

Opticom also works with public transit providers to help buses, light rail vehicles and streetcars adhere to schedules and avoid delays.

Through the evolving use of new and improved technologies, GTT’s solutions have helped to increase safety, minimize traffic congestion and reduce greenhouse gas emissions, while maximizing resource efficiency and performance.

Now, that proven intersection safety and efficiency is allied to a suite of data collection and analysis tools. These leverage connected devices and cloud-based computing to extract insightful analytics from the resulting data.

City and traffic managers are able to harness those insights to not only improve the functioning of their emergency and transit fleets and priority control systems, they are also able to use the data produced by these systems to inform their Vision Zero strategic planning.

RURAL ROAD SAFETY
GTT’s Canoga traffic sensing and driver warning systems offer one example of how technology can be used to make roads safer for all. And unusually, while most Vision Zero implementations are inevitably focused on cities and towns, Canoga has been adapted for use in remote rural settings.

In the United States, there are Vision Zero initiatives active in multiple states, cities, towns and communities, including New York City, Boston, Los Angeles, San Francisco, San Jose and North Dakota.

Intersection crashes can have deadly consequences. According to 2016 Federal Highway Administration data, more than eight percent of fatal crashes occurred at intersections. Using technology to improve intersection interactions could help to reduce or eliminate those deadly crashes.

In the United States, there are Vision Zero initiatives active in multiple states, cities, towns and communities, including New York City, Boston, Los Angeles, San Francisco, San Jose and North Dakota.

Rural roads account for a disproportionate number of all road fatalities and accidents. In the USA in 2012, for instance, just 19% of the country’s population lived in rural areas, but rural roads accounted for 54% of all road fatalities.

Driver warning systems — such as the Canoga-based Rural Intersection Conflict Warning System (RICWS) — have helped reduce deadly collisions by alerting drivers of approaching traffic at non-signalized intersections. The detector card sends a signal to a traffic controller, which triggers a set of flashing lights.
and a warning sign. Drivers on secondary roads can be alerted to traffic approaching on a primary road, telling them if it is not safe to enter or cross the roadway. The system uses the speed of the oncoming vehicle to calculate the estimated time of its arrival at the intersection.

Rural Intersection Conflict Warning Systems provide a simple but powerful—and cost-effective—rural and remote road safety option. The system is also adaptable to rural rail grade crossings, where limited warnings are in place.

**INSIGHTS FROM OPTICOM ANALYTICS**

Having a better understanding of how a traffic network is behaving can provide valuable insights into how it can be improved and made significantly safer. GTT’s Opticom Analytics collects and analyzes data based on the performance of EVP and TSP systems.

Both Opticom EVP and TSP systems—which provide emergency and transit vehicles with green lights at intersections on request—utilize GPS-enabled vehicle equipment which collects data as vehicles respond to emergency calls or travel their transit routes. This data provides valuable insights into where delays are occurring on a traffic network, and which intersections are most dangerous because of delays and volume of traffic.

It allows for the Opticom EVP and TSP systems to be adjusted to best optimize their performance, and it allows city planners to use the data to make decisions about, for instance, where the safest places to site bus stops are along a busy route, or where pedestrian activity will mean that longer lead times are required to allow them to move off the intersection before emergency vehicles pass through.

**SMARTER AND SAFER WITH VISION ZERO**

Vision Zero aims to make roadways free of serious and fatal crashes. The project’s principles call for shared responsibility of serious traffic crashes between roadway users and designers. In order to facilitate fewer crashes, road designers and traffic professionals have a variety of tools at their disposal, including new policies, designs and technological solutions. In particular, relatively low-cost and minimally-invasive solutions like signal priority can make intersections safer and more efficient. Ultimately, these types of changes can reduce the number of serious and fatal crashes at intersections.

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