

Reliable Speed Enforcement Solutions Enabled by Flash LiDAR Technology

How a speed enforcement solution manufacturer enables a precise, undetectable and affordable speed measurement system using [2D flash LiDAR sensors](#)



APPLICATION NOTE

Automated speed enforcement is one of today's most sought-after traffic management applications. Indeed, roadside speed enforcement systems which automatically detect vehicles, calculate their speed and enforce infractions—while having a calming effect on driving behaviors—are of great efficiency for city administrations and legislative bodies, which can now dispatch human resources where it matters the most.

However, reliable speed calculation still is a challenge, as many external factors can potentially jeopardize the exercise's validity. The technology used must provide very precise and consistent measurements to be enforceable in the eyes of the law. Such systems must also be energy-efficient and designed to withstand any weather conditions.

The Challenges of Automated Speed Enforcement

[LogixITS](#) is a company that specializes in the design and development of various traffic calming solutions that are capable of providing precise speed calculations of passing vehicles. When designing the [Enforcer™ Speed Camera System](#), the latest installment in their SafePace® product line, LogixITS wanted to take things to the next level and capitalize on the collected data to enable additional features, such as Wi-Fi connectivity and real-time reporting to nearby enforcement officers. For this reason, the core sensing technology selected had to provide rich and very accurate data.

The Enforcer Cam™ had to be able to detect incoming traffic at a distance of 35 m for vehicles (including motorcycles) traveling from 0 to 180 km/h and determine their actual speed with an error margin of less than 3%. Engineers at LogixITS also wanted the solution to be able to tell vehicles apart from each other, when clustered in dense traffic, for optimal enforceability. The Enforcer Cam had to withstand outdoor operation for extended periods of time, from several hours to days continuously, requiring the selected technology to be robust and remain unaffected by temperature changes, ambient light variations, vibrations caused by wind or passing vehicles and falling rain or snow.

In addition, LogixITS wanted a technology that was undetectable, in an attempt to counter the proliferation of radar detectors, which are getting more and more common among drivers. As such, radar technology was ruled out from the start.

About searching for the right technology for the project, LogixITS' software engineer and project manager stated: "Finding an accurate, undetectable technology that could be used to measure speed and pin-point which vehicle is the violator, thereby ensuring enforceability, was a game changer."

A Cost-Effective and Undetectable Solution to Address Speed Limit Violations

After a thorough business analysis and comparison of similar technologies, LogixITS selected LeddarTech's M16 multi-segment flash LiDAR sensor module as the best solution to meet the application's requirements.

The Leddar™ M16 Sensor Module is an advanced sensing solution that combines 16 independent active elements into a single sensor without any moving parts, resulting in rapid, continuous and accurate detection and ranging—including lateral discrimination—in the entire wide beam.



Figure 1 – Enforcer Speed Camera System by LogixITS

Contrary to radio waves used by radar-based traffic enforcement systems, the infrared light beam emitted by the M16 is virtually undetectable by common means. The M16 also benefits from a greater freedom of placement than radar when it comes to angular positioning in an operational context.

The Enforcer Cam was positioned diagonally at the rear of outgoing traffic, approximately 3 to 5 m on the roadside and at a height of 2 m. This positioning allowed the M16 sensor to monitor a 24° (horizontal) by 4.5° (vertical) zone, effectively detecting multiple vehicles simultaneously in each segment at ranges up to 35 m.

The M16's fast data acquisition rate and optimized signal processing algorithms provide precise speed calculations of all vehicles in the sensor's field of view, grouping and tracking several detection points as they move from one segment to another (e.g., side view mirror, license plate, body, etc.) for increased data reliability. The unparalleled richness of the data acquired in this manner allows the Enforcer Cam to identify vehicles that exceed a given speed threshold, providing nearby enforcement officers with the exact location, real-time photos and videos of the scene where a speed violation is detected.

LeddarTech: The Reference in Flash LiDAR Solutions

Many factors influenced LogixITS' decision to use the [Leddar M16](#). In addition to the undetectability of its infrared light signal, the M16's compact size and superior power and range were key features that motivated its choice. The service received from the supplier was also an element that was praised by LogixITS' project manager, mentioning LeddarTech as "very supportive on all fronts, with high levels of assistance and responsiveness during development and integration".

It is simple to start developing with the M16, which can easily be purchased and comes with an SDK.



Figure 2 – LeddarTech's M16 multi-segment flash LiDAR sensor module

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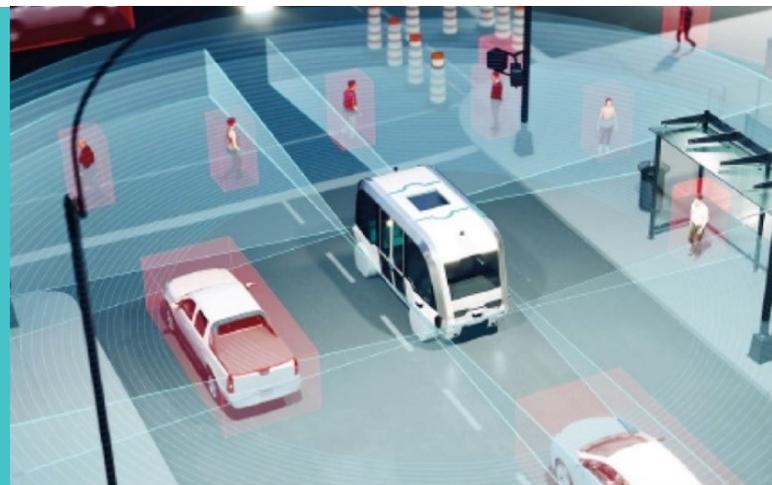
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About LeddarTech

LeddarTech is a leader in environmental sensing platforms for autonomous vehicles and advanced driver assistance systems. Founded in 2007, LeddarTech has evolved to become a comprehensive end-to-end environmental sensing company by enabling customers to solve critical sensing and perception challenges across the entire value chain of the automotive and mobility market segments. With its LeddarVision™ sensor-fusion and perception platform and its cost-effective, scalable and versatile LiDAR development solution for automotive-grade solid-state LiDARs based on the LeddarEngine™, LeddarTech enables Tier 1-2 automotive system integrators to develop full-stack sensing solutions for autonomy level 1 to 5. These solutions are actively deployed in autonomous shuttles, trucks, buses, delivery vehicles, smart cities/factories and robotaxi applications. The company is responsible for several innovations in cutting-edge automotive and mobility remote-sensing applications, with over 100 patented technologies (granted or pending) enhancing ADAS and autonomous driving capabilities.

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