

# ASX ANNOUNCEMENT

24 June 2019

Redflex Holdings Limited | ABN 96 069 306 216

Redflex

## Redflex Investor Presentation

Redflex Holdings Limited (**ASX:RDF**) is conducting various investor presentations this week for institutional investors and equity analysts.

**Attached** is a copy of Redflex's Investor Presentation.

### About Redflex

The Redflex Group has established itself as a world leader in developing and implementing intelligent traffic management products and services. Redflex develops, manufactures and operates a wide range of platformed based solutions including red light camera, speed camera, auto number plate recognition (ANPR) and school bus stop arm camera systems, all utilising advanced sensor and image capture technologies enabling active management of state and local motorways.

The Redflex Group runs its own systems engineering operations, system integration technologies and innovation centre for research and development. With our continuous development of new products, the Redflex Group has been helping to improve roadway safety, alleviate congestion and reduce the harmful impacts of vehicle emissions for more than 20 years.

Redflex Holdings Limited was listed on the Australian Securities Exchange in January 1997.

For further information:

Mark J. Talbot  
Group Chief Executive Officer  
Redflex Holdings Limited  
mtalbot@redflex.com  
T +61 3 9093 3324

Neville Joyce  
SVP - Group Chief Financial Officer  
Redflex Holdings Limited  
neville.joyce@redflex.com.au  
T +61 3 9093 3324

### Redflex Holdings Limited

31 Market Street (P.O. Box 720), South Melbourne, Victoria, Australia 3205 t: +613 9093 3324

e: redflexholdingslimited@redflex.com.au

[www.redflex.com](http://www.redflex.com)



# Investor Presentation

June 2019

Redflex<sup>®</sup>



# Traffic Management – The issues for safety and sustainability



World Health Organization (WHO)'s Global Status Report on Road Safety 2017, there were 1.25 million road traffic deaths, globally, in 2015



Despite existing strategies, congestion is increasing – at a rate of 1-2% p.a in Europe, 2-3% in US and faster in Asia and Middle East, causing very considerable and growing economic cost



Drivers in the UK spend almost 91 hours per year in search of parking space (M&M)



Road traffic injuries damage the growth and development of low and middle-income countries by draining at least 1% of their GDP or an equivalent of USD 65 billion annually



Economic costs of urban congestion and air pollution can range from 2-8% of a country's GDP



Increased number of vehicles on roadways due to higher affluence. 2006-15 saw a 38% increase in vehicles (926m to 1,282m) challenging road safety



Environmental impacts from pollutants are significant and include acidification of soils, eutrophication and crop damage



The number of road incidents is increasing and 9<sup>th</sup> leading cause of death across all age groups globally (expected to climb to 7<sup>th</sup> by 2030)



Traffic is ranked #2 as source of ambient air pollution causing 4m pre-mature deaths p.a.

## Industry Outlook

- Continued growth in congestion in major cities
- Rising consumer expectations for trip planning and journey information
- Increasing demand for initiatives that address the safety of commuters and road workers
- Rise of Clean Air Zones and Congestion charging programs due to levels of pollution breaching national laws
- Cities introducing comprehensive programs to maximise curb space
- IoT connectivity making everything in and around vehicles smarter
- Continuous movement towards convergence and automation
- Limited funding available to governments

### Key themes

Urbanization

Smarter Vehicles

Advanced Intelligence

Service Innovation





# Redflex Transformation

## Creating Smarter and Safer Journeys for every day

- Evolving our core safety offerings
- Reducing traffic congestion
- Reducing environmental footprint
- Smarter journeys leading to less emissions



## One Redflex

- Recruitment of new skills
  - Deep Learning, AI, Analytics
- Global Functional based organization
- Drive consistency in our planning, investment and service delivery
- Establish a performance-based culture

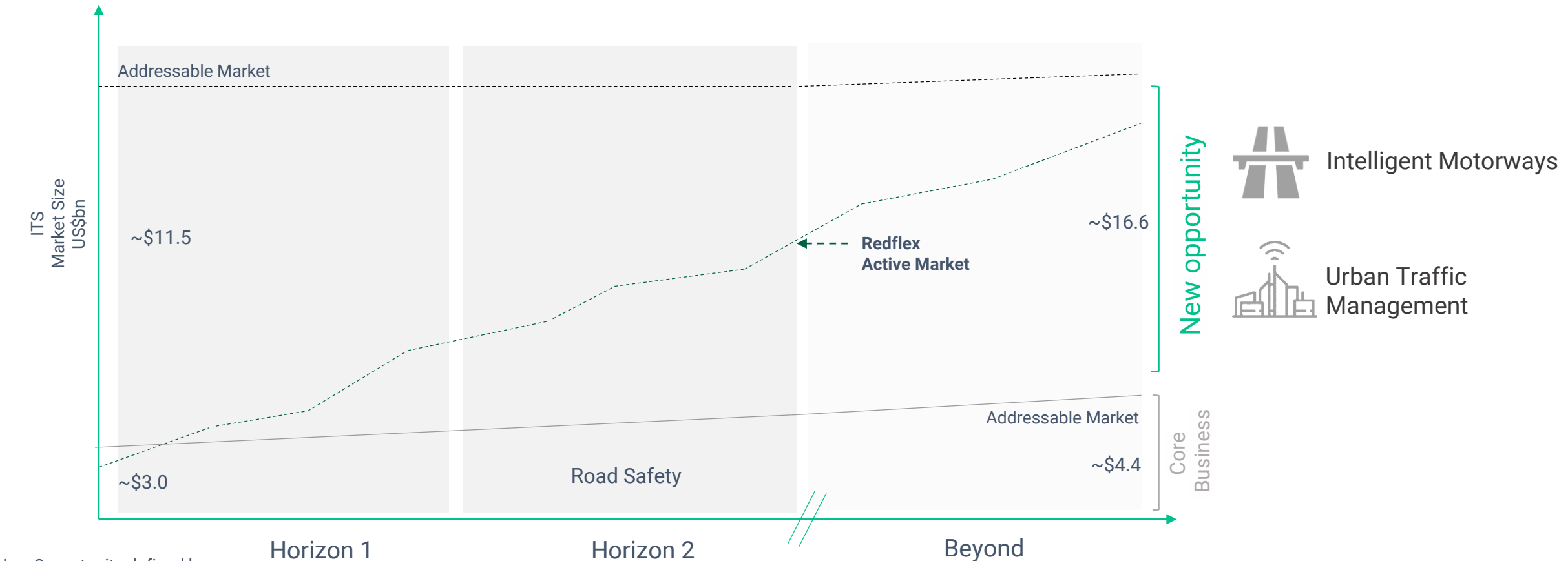
## Expand from the Core

- Expand from Road Safety into ITS
  - Intelligent Motorways and Urban Traffic Management
- Addressable market grows from US\$4.3b to US\$20.9b



# Expand Addressable and Active Market

Investment in Road Safety technologies over the past 18 months places us in a prime position to expand into ITS. Industry dynamics and customer objectives are fueling change and creates broader opportunities both in solutions (ITS) and geographies. By meeting our key horizon milestones, we will expand our active market size and capitalize on growth within the category.



New Opportunity defined by  
ATMS, Electronic Tolling and Parking Management Addressable Market  
Reference reports and dates  
Further market sizing being developed  
Active Market definition



# Big Market Trends

## Intelligent Motorways

Intelligent Motorways is a powerful, fully integrated, end-to-end motorway monitoring, management and enforcement system. It provides greater depth and richness of real-time data, enabling Motorway operators to:

- Make detailed, accurate real-time decisions
- Increase responsiveness to adverse events
- Reduce management costs and drive efficiencies increase public safety
- Improve driver behaviour
- Automate more efficient use of motorway infrastructure and personnel
- Assist transport planning through holistic intelligence and advanced data analytics
- Improve environmental conditions







# Highways England Smart Motorway Program






## HADECS3

The Redflex HACECS system is an integral part of Highway England's Smart Motorways program.

More than 110 speed enforcement systems are currently deployed in the UK covering lane closure and Red X Enforcement.

## The Red X Enforcement system

When a sign displays a Red X, the HADCES3 system identifies the lane/s displaying the Red X and enables lane closure enforcement.

-  Powerful, accurate and non-intrusive Average speed system
-  For highest levels of vehicle capture and automatic identification
-  Designed to detect & classify vehicles – detecting up to four lanes of traffic
-  Meets strict traffic enforcement industry requirements
-  Provides reports on traffic statistics in every lane of coverage  
vehicle counts, vehicle type, vehicle speeds



# Evolution of the Highways England network over the medium term

The current network, by road classification



## Classification

- Smart motorway
- Motorway
- APTR

- The country is connected through an established network of motorways
- The APTRs stretch across the length and breadth of the country, with widespread use of dual carriageways to provide capacity and connectivity
- There is an emerging presence of smart motorways, but they currently only count for a small amount of the overall network

The network at the end of the first Road Investment Strategy, by road classification

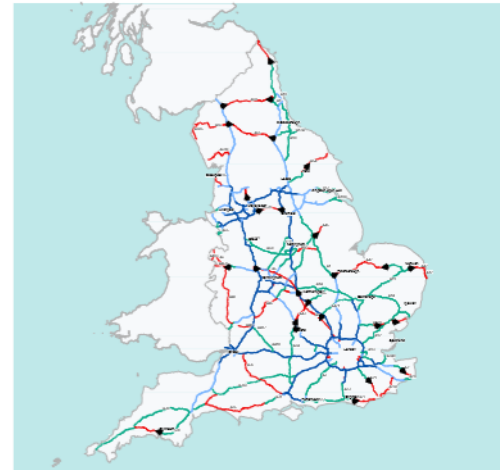


## Classification

- Smart motorway
- Motorway
- APTR

- Our programme of upgrades will begin to yield benefits, with the improvement of free-flow, particularly on the A-roads
- The smart motorway network will continue to expand to support the areas where demand is the highest, as per the commitments in the first Road Investment Strategy
- The APTRs will continue to play a vital role in connecting the country
- While not yet present on the network, the end of this period will see 'expressway-ready' stretches of the network

The network over the medium term, by road classification



## Classification

- Smart motorway
- Motorway
- Current, planned, and potential expressways
- APTR
- ◀ Options for further expressways

- The major development will be the presence of the expressway network across the length and breadth of the country – these will start their role from Road Period 2
- Expressways will 'feel' more like motorways, with comparable levels of information, monitoring, and response
- Possible new corridors will be investigated and potentially built to relieve congestion and improve connectivity

In the first Road Investment Strategy, government stated that its ambition for the next 25 years is "to revolutionise our strategic roads to create a modern SRN that supports a modern Britain".

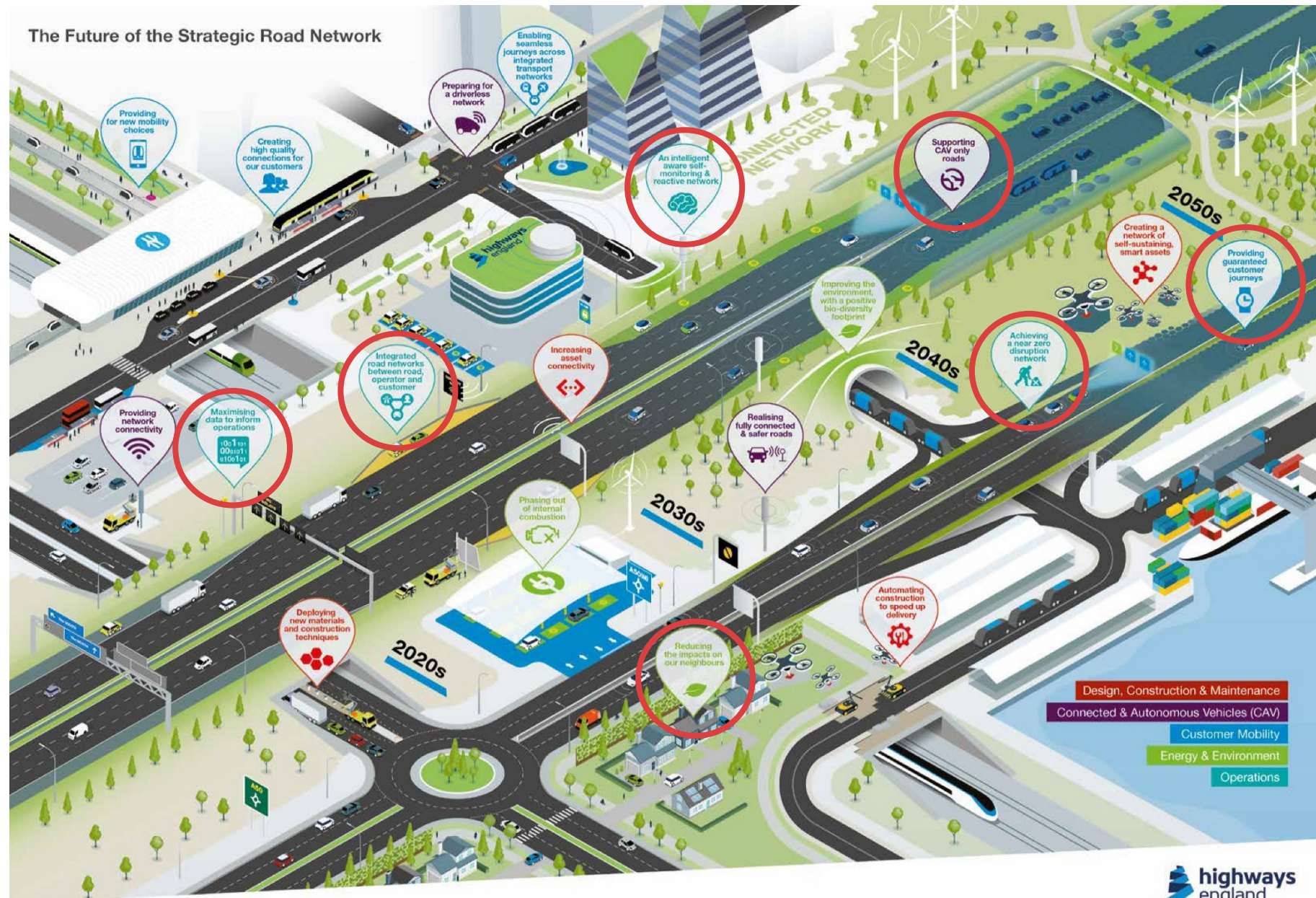
We believe that achieving this will require some element of harmonisation, with road standards converging to provide a common, high quality experience for our customers. Over this period our network will reflect 'four levels' of road:

- **Smart motorways** – which will service our highest demand areas and will continue to evolve, taking advantage of new technologies
- **Motorways** – which will continue to function in their current form, providing resilience and capacity to our network and customers
- **Expressways** – which will bring the safety and congestion advantages of our motorways to trunk roads
- **All Purpose Trunk Roads (APTR)** – which will continue to provide a vital service and connectivity to significant parts of the country, particularly more remote areas.

- There will be further extension and evolution of smart motorways, creating a smart motorway spine to the network that connects our largest cities, in line with the ambition outlined in the first Road Investment Strategy
- The APTRs still provide connectivity to more remote areas

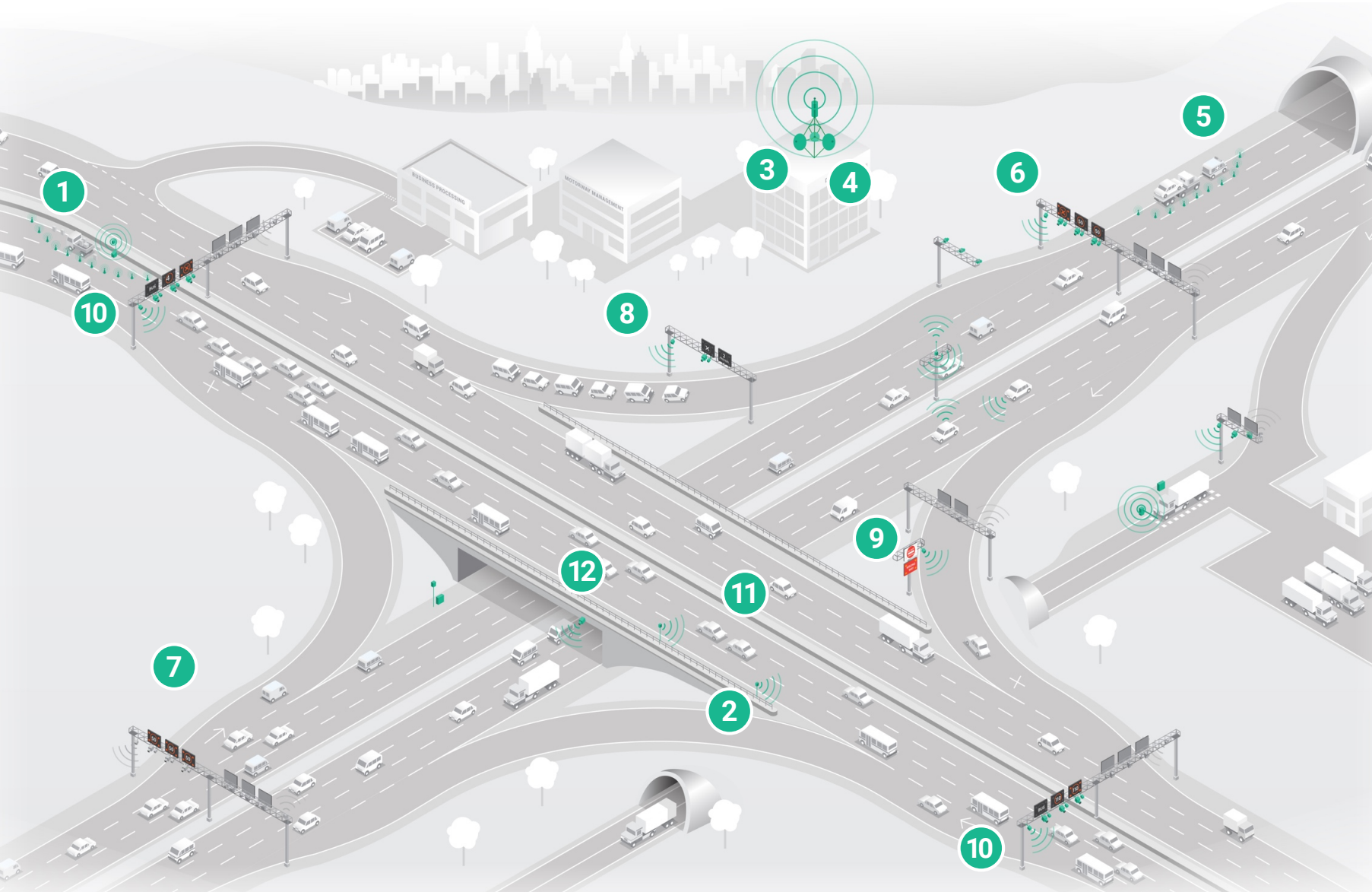


# The Future of the Strategic Road Network





# Intelligent Motorways Solutions



## Key

1. Roadworker Safety
2. Bus Lane Enforcement
3. Road Safety Enforcement Processing (BPO)
4. Intelligent Segment Management (ATMS)
5. Automatic Incident Detection (AID)
6. Lane Closure Management
7. Variable speed
8. Traffic Monitoring
9. Wrong way detection (feature)
10. Average speed (P2P)
11. Close following
12. Point speed







## Urban Traffic Management

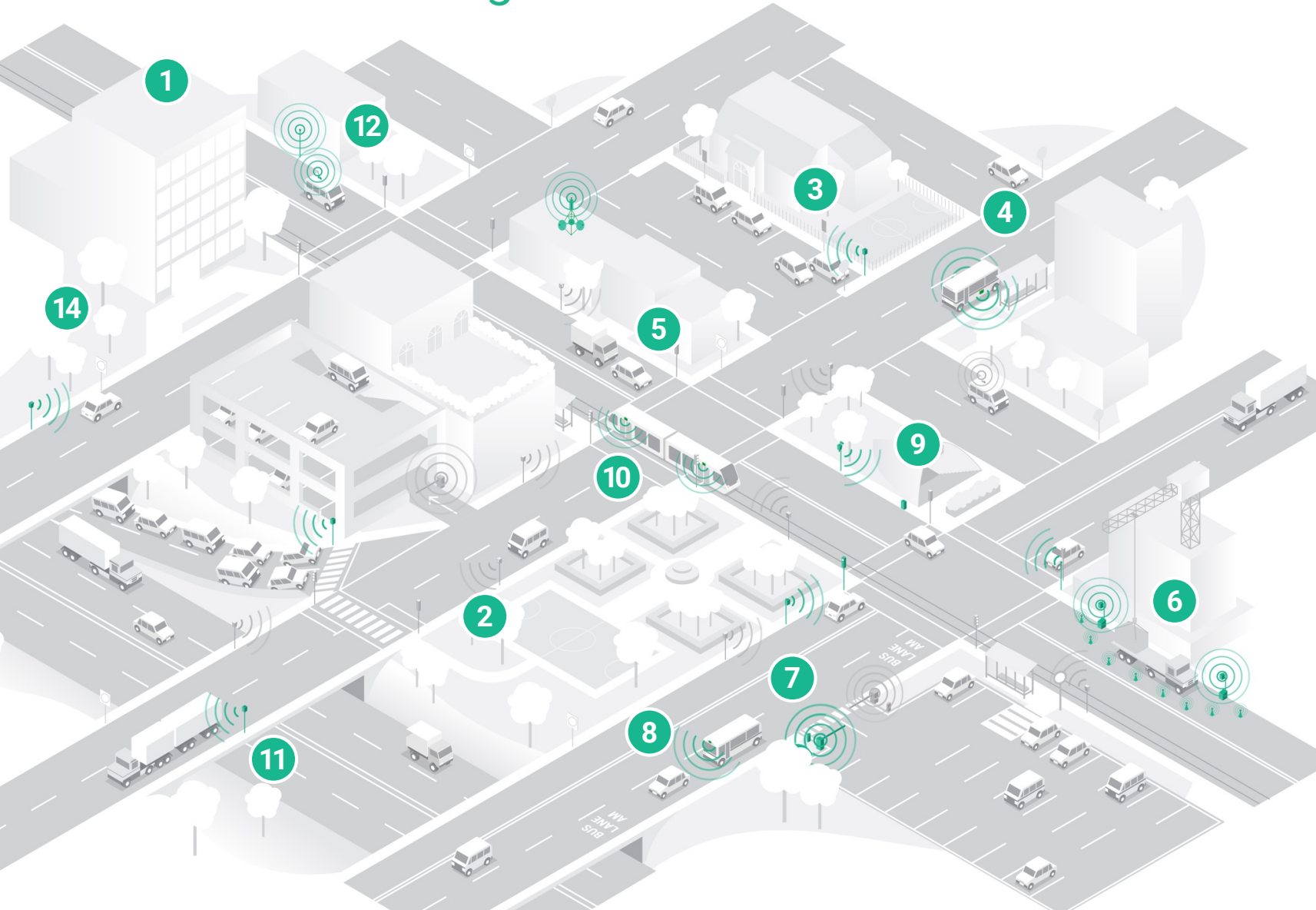
Urban Traffic Management is a powerful, fully integrated, end-to-end urban traffic network management and enforcement system. It provides rich, real-time data, enabling municipal road agencies to:

- Monitor and manage congestion
- Manage access to zones and payment
- Manage traffic signalling and variable signage
- Increase responsiveness to adverse events
- Manage curb side and lot parking
- Reduce management costs and drive efficiencies increase public safety
- Automate more efficient use of infrastructure and personnel
- Assist transport planning through holistic intelligence and advanced data analytics





# Urban Traffic Management Solutions



## Key

1. Business Processing Operation (BPO)
2. Speed monitoring and enforcement camera
3. Curbside parking management
4. Student Guardian
5. Hold the Red
6. Worker Guardian
7. Ticketless parking management
8. Bus lane enforcement
9. Red Light enforcement camera
10. Tram Guardian
11. Vehicle categorisation
12. Congestion/low emission zone

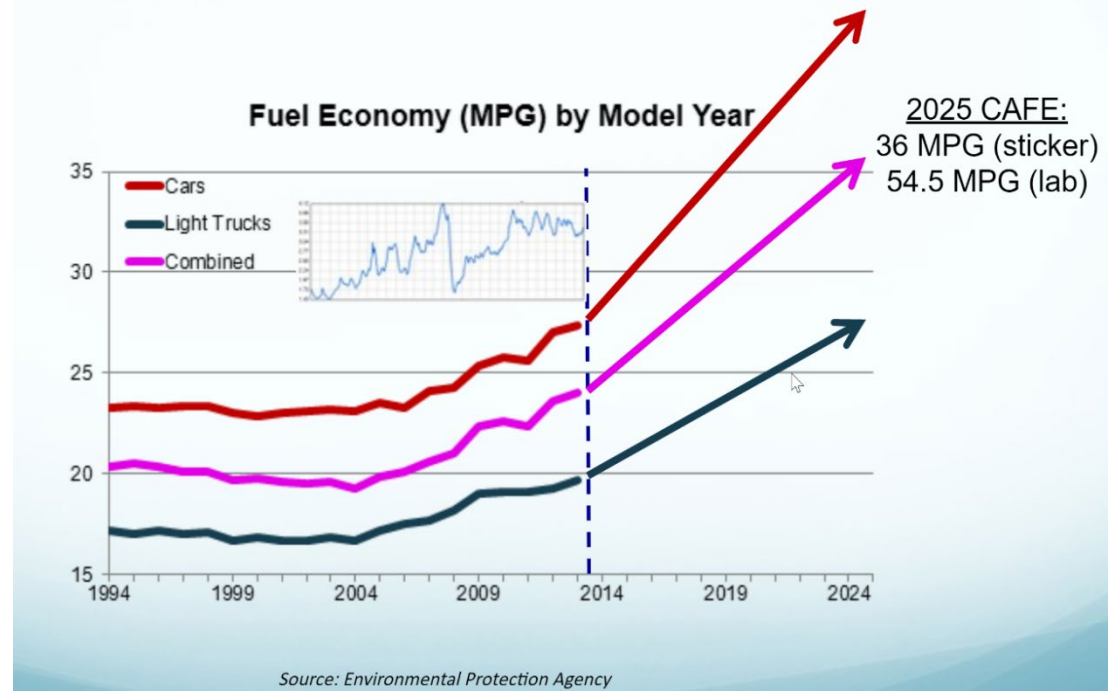




## Road Usage Charging

- Trend in the industry to charge on basis of use due to diminished funding from fuel tax
- Road usage charging already exists on major motorways in the form of road tolling
- Expansion of usage charging for a variety of reasons:
  - Parking management
  - Congestion management
  - Reduced emission zones
  - Noise management
  - Collect revenue to reinvest in road infrastructure and public transit

### The Business Case for RUC in One Chart



## The UK's Action Plan for Air Quality



UK government has committed more than £3.5 billion to tackle poor air quality through cleaner road transport and is working closely with local authorities and Local Economic Partnerships to make progress.



The UK government has revealed plans to improve air quality in cities, with the introduction of five Clean Air Zones (Birmingham, Derby, Leeds, Nottingham and Southampton), to be operational by 2020.



London is extending its current Low Emission Zone (LEZ) programme to Ultra Low Emission Zone (ULEZ), coming into force from April 2019.



The government is committed to cutting air pollution from all forms of transport.



# LOW EMISSION ZONE

## LONDON BENEFITS

**Problem:** Many cities in EU, exceed the guidelines for ambient air quality

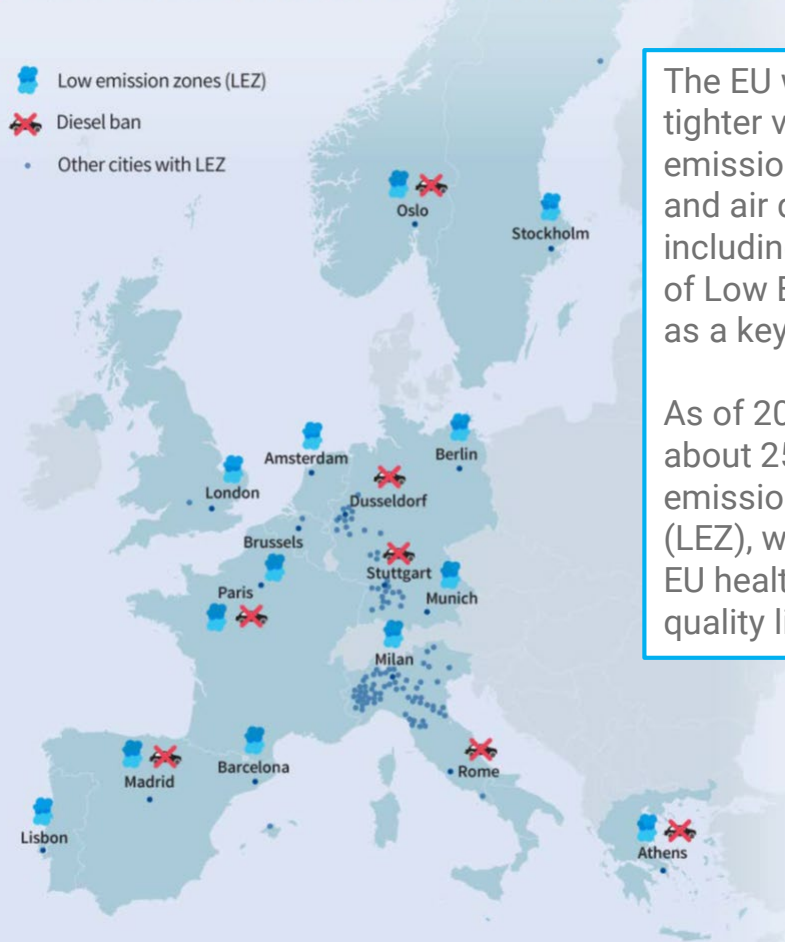
**Solution:** Restrict the use of older, more polluting vehicles (especially diesel) inside low emission zones (LEZ)

### London LEZ program benefits

- Black Carbon has been reduced by 40-50%
- NO<sub>2</sub>: Average concentrations were reduced by 0.12 µg/m<sup>3</sup>, peak concentration reductions up to 0.16 µg/m<sup>3</sup> on polluted streets
- PM<sub>10</sub>: Average concentrations reduced 0.03 µg/m<sup>3</sup>, peak concentration reductions up to 0.5 µg/m<sup>3</sup> on polluted streets
- Emissions of PM<sub>10</sub> were reduced by 1.9% (28 tonnes)
- Emissions of NO<sub>x</sub> were reduced by 2.4% (26 tonnes)
- The feasibility study predicted:
  - Gain of 5200 years of life,
  - 310,000 fewer cases of lower respiratory symptoms, 30,000 fewer cases of respiratory medication & 231,000 fewer restricted activity days
- The Cost Benefit Analysis gave a £250-670 million benefit, £90-250 of which are outside Greater London

## Low emission zones for cars in the EU

- Low emission zones (LEZ)
- Diesel ban
- Other cities with LEZ



The EU will pursue tighter vehicle emission standards and air quality targets including introduction of Low Emission Zones as a key strategy.

As of 2019 there are about 250 low-emission zones (LEZ), which help meet EU health-based air quality limit values.



New York City MTA to introduce Congestion Zone in 2021 below 61st – to include dynamic pricing e.g. distance travelled and dwell time.

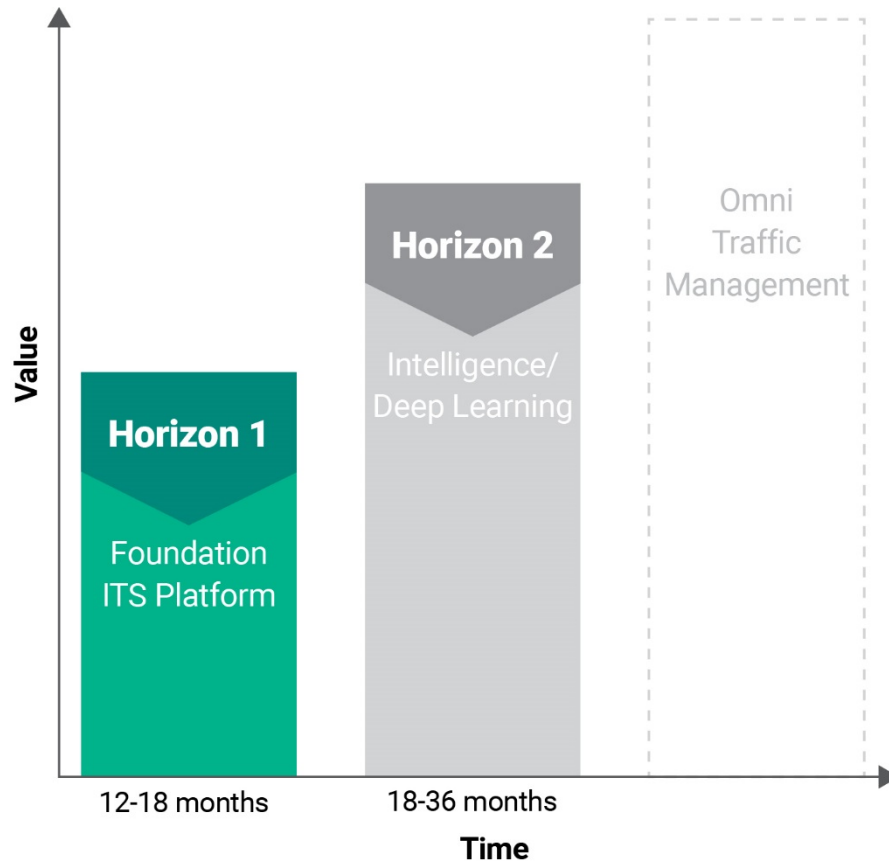
Potential  
Zone Pricing  
Boundary

Does Not  
Include  
FDR Drive  
North of the  
Brooklyn Bridge



# Next Steps

## Path to Success



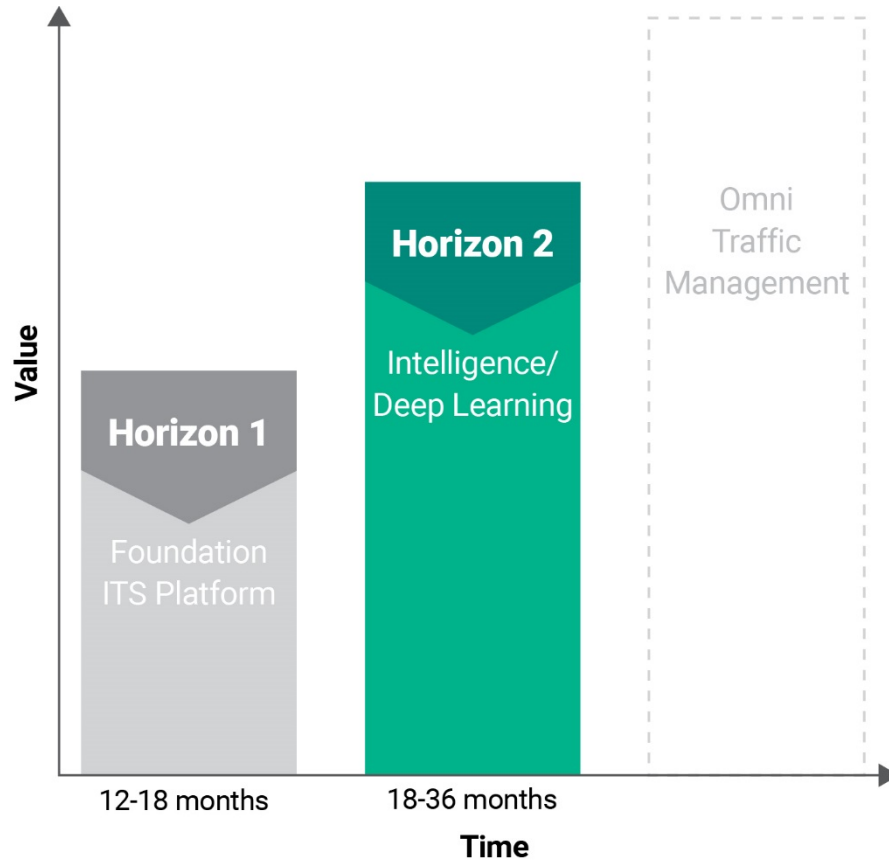
### Horizon 1 (0-18 months) - Foundation ITS Platform

Extend Halo Platform – including secondary enforcement solution

- Build ITS Services Platform
- Key pilots and POCs with major customers in every sector
- Build video and data analytics capability and IP
- Expand geographical footprint for Photo Enforcement
- Expand Managed Services capability
- Develop capability in priority 1 markets for new solution propositions
- Establish strong Alcyon footprint across priority markets

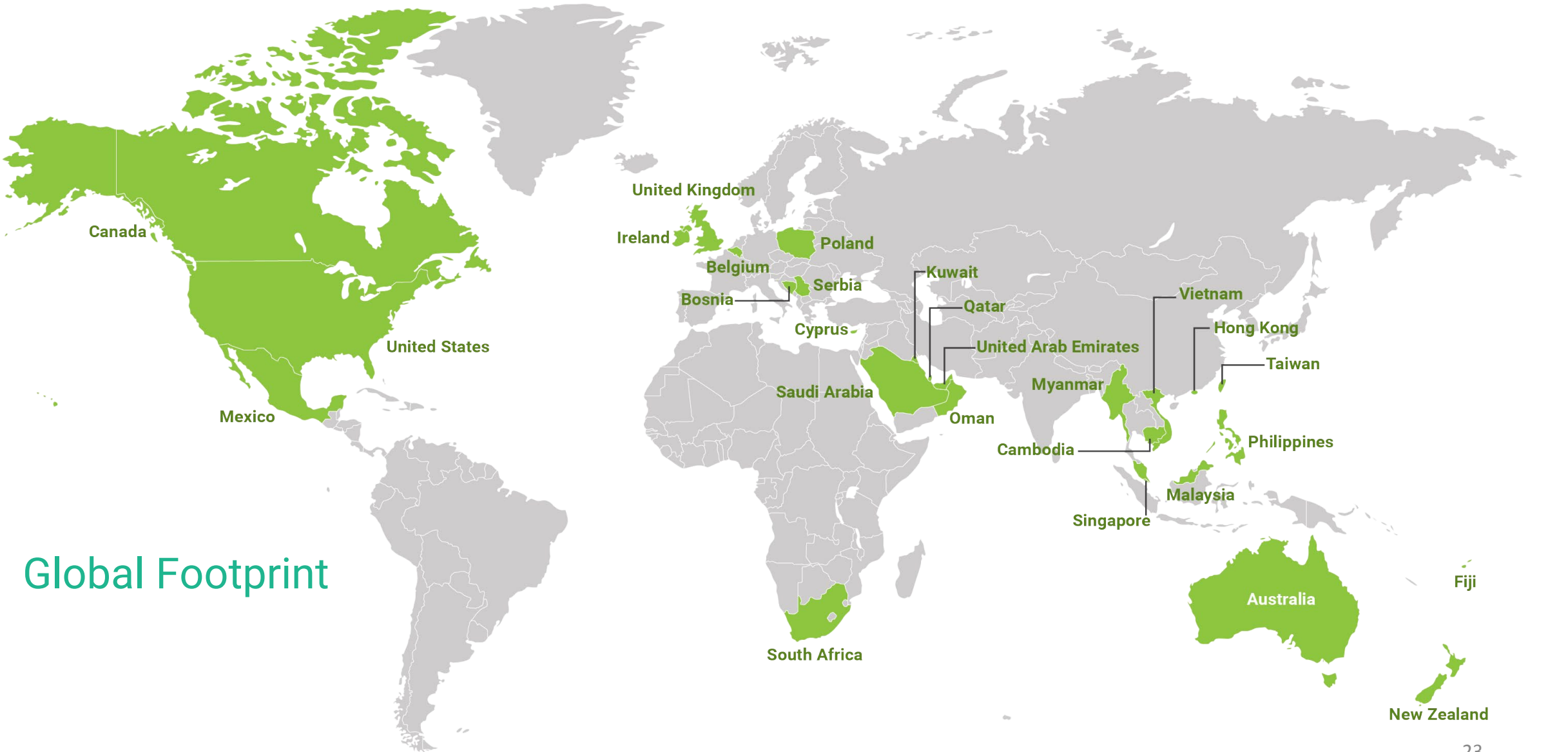


## Path to Success



### Horizon 2 (18-36 months) - Intelligence/Deep learning

- Expand data management and intelligence capability – progressing from deep learning to AI and automation
- New enforcement solutions based on Deep Learning and AI
- Direct to market in selected priority markets
- Expansion through new channel partners for Priority 2 markets (indirect - European Union, SE Asia)
- Convergence of technology onto reduced number of platforms
- Consolidation of global BPO services to major centres
- Advanced analytics for traffic flow management



Global Footprint



# New Propositions and New Markets

## Urban Traffic Management

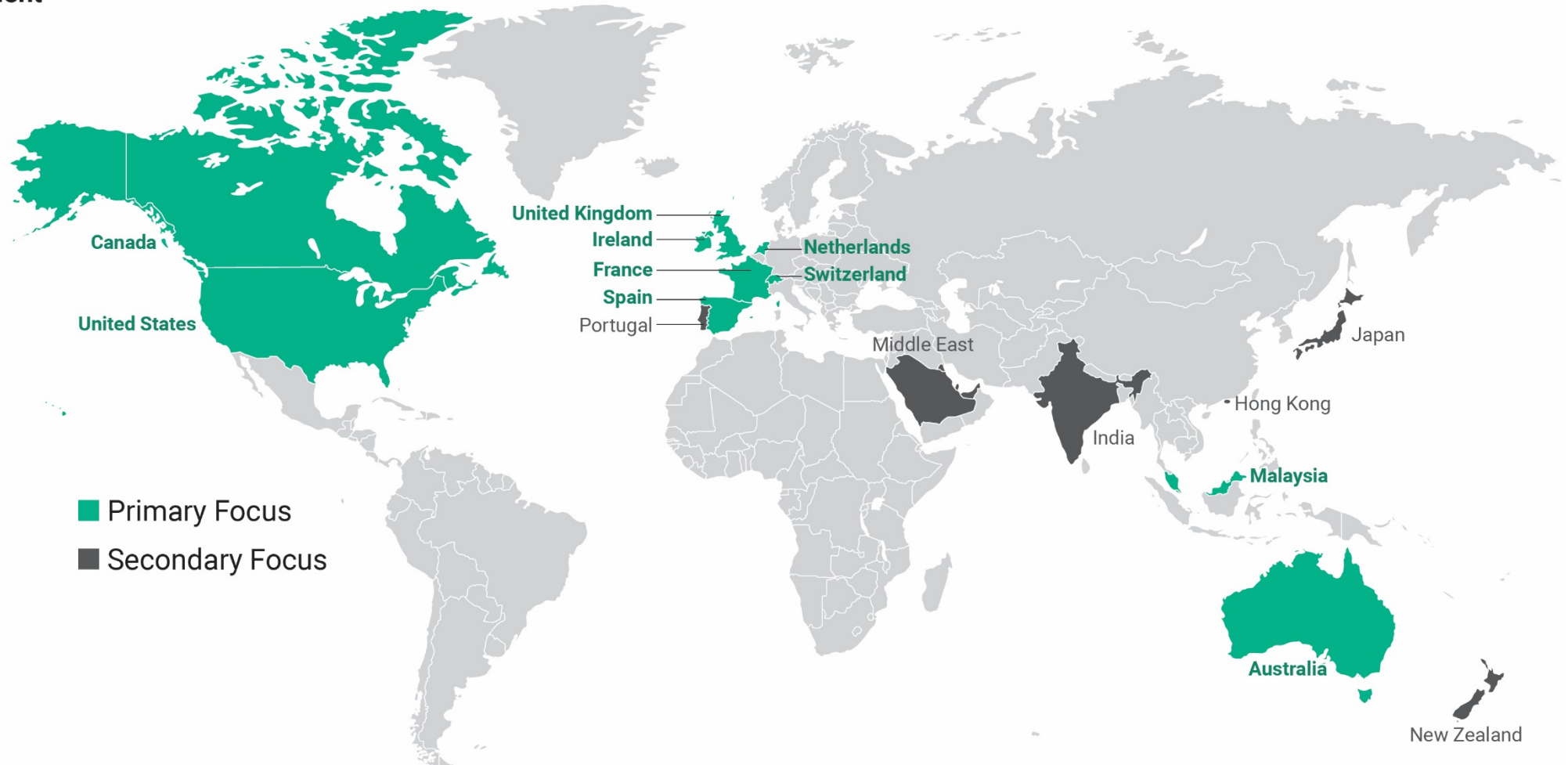
**United Kingdom**  
**Australia**  
**United States**  
**Canada**  
 Ireland  
 New Zealand  
 Hong Kong  
 Middle East

## Intelligent Motorways

**United Kingdom**  
**Ireland**  
**Australia**  
**United States**  
**Malaysia**  
 New Zealand  
 Canada

## Road Safety

**France**  
**Spain**  
**Netherlands**  
**Switzerland**  
 Portugal  
 India  
 Japan (Alcyon)



# Appendix



## Halo Platform

Halo was developed as multifunctional platform that provides enforcement and monitoring solutions for a diverse range of Intelligent Transport Systems (ITS) applications. Utilizing an HD Radar at its core, in combination with advanced proprietary software, it is capable of accurately and discretely detecting, monitoring and classifying vehicles.

The capabilities inherent in the platform can be deployed to provide the following solutions:

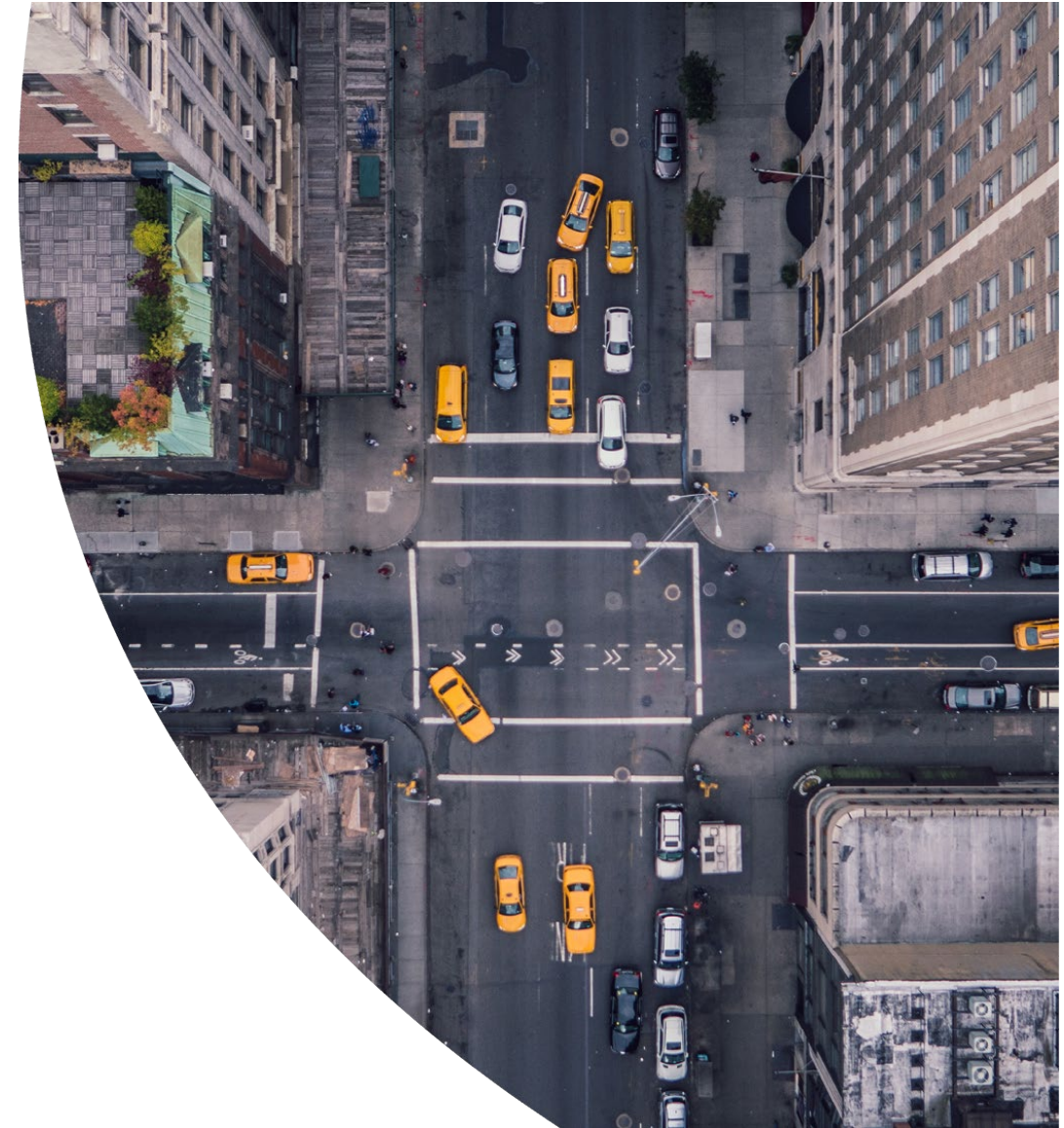
- Point Speed enforcement
- Average Speed Enforcement
- Close following enforcement
- Worker Safety
- Traffic monitoring alerts and statistics
- Lane monitoring and enforcement
- ALPR for multiple applications, including for vehicles of interest and congestion charging applications.

The platform provides flexible deployment options including side road mount, mid-block, over the lane gantry



## Halo Edge

- The intelligent video-based ANPR camera solution
- Supports government, police, and transport operators to meet Clean Air / Low Emissions Zones targets
- Integrating video analytics, object recognition and deep-learning technologies
- Redflex provides an end to end solution for cities that want to reduce carbon emissions:
  - **Halo Edge** cameras enforce Clean Air / Low Emission Zones by monitoring, capturing and validating vehicles class and plate,
  - **Alcyon Express** which identifies violations from advanced data matching and real time monitoring,
  - **Alcyon Back Office** for processing violations and case management.





# Alcyon Express

Our next generation solution for system monitoring and alerting. Alcyon Express enables real-time alerting, advanced monitoring, along with improved performance, scalability and reliability.

## Capabilities:

- **Ingestion service**  
Transport and processing of incident event data from cameras
- **Real-time Monitoring / Alerting**  
Provide real-time monitoring and alerting of events
- **Multiple Detection Micro-Services**  
Multiple detection micro-services process event information from all cameras / systems
  - Point-to-point offence matching
  - Unregistered / vehicle of interest alerting
  - Duration of stay (parking)
- **Hotlist management** for vehicles of interest
- **Analytics**  
All camera event information is stored for later BI processing
- **Extensibility**  
Ability to add additional event processors
- **Scalability**  
Event-driven architecture capable of processing millions of events per minute





## Alcyon

Alcyon is a unified photo enforcement processing platform that provides line of sight of cases from end to end.

Alcyon is a cloud-based platform that allows organisations to streamline, manage and handle photo enforcement cases more effectively—all through an intuitive user interface.

This allows you to confidently handle cases without affecting the user experience, easily scale to meet business needs, conform to compliance obligations, and have access to leading edge technologies to reach out to new markets.



A powerful, dynamic and scalable platform for managing and processing cases end to end



A platform developed to meet your changing business and compliance needs today and tomorrow



Delivering an optimal end user experience





## Red X

The Red X system operates exactly as the current approved system for speeding offences

- When a sign displays a Red X, the Redflex system identifies the lane/s displaying the Red X and enables lane closure enforcement
- Upon detection of a Red X violation, a new incident type is created and processed as a violation

### Features:

- **Non-intrusive detection of sign status** across up to four sign controlled traffic lanes
- **Can be used with multiple gantry-mounted signs** or single message signs mounted at the roadside
- **Recognises flash lantern rates** or broken sign aspects



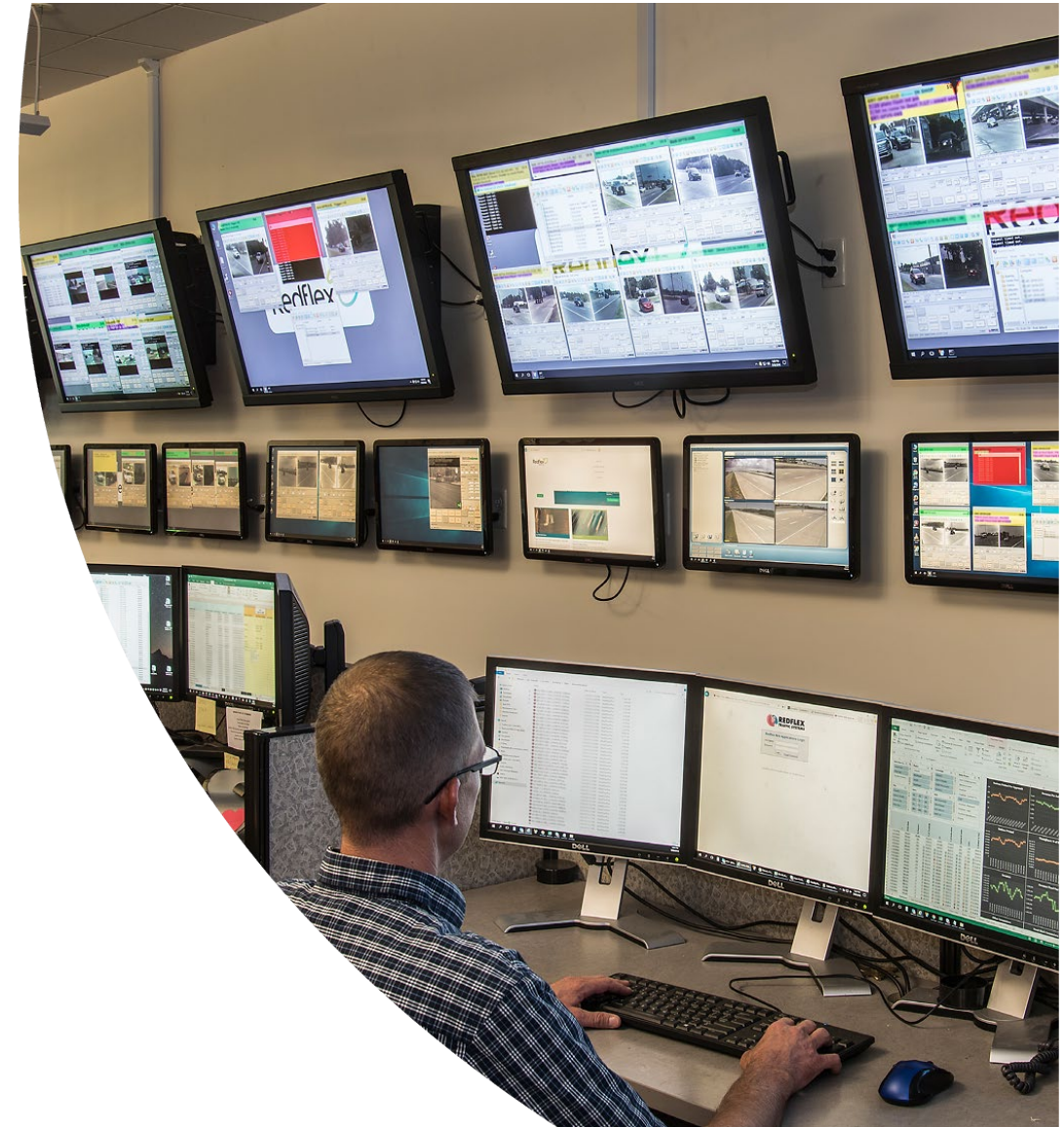


## Operational Model

For more than twenty years, we have run a Build Own Operate Maintain (BOOM) model traffic camera programs in the United States for 140+ municipalities.

- Front-end photo enforcement equipment
- Installation and maintenance of the program
- Three-step violation review
- Printing, mailing and payment processing of infringements
- Customer call centre and court support,
- Online reporting
- Web-enabled citation authorisation services
- Customised public outreach and community engagement activities

All these services are processed in-house to maintain a strict chain of evidence, confidentiality and quality control.





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## Overview

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