



*A Modular, Scalable, Easily Deployable
"Visual Advance Warning System"
for Road, Rail, Tram and Pedestrian applications*

Rail Crossings



Rail SPAD



Pedestrian Crossings



SLOW DOWN! YOU'RE IN A SAFEZONE

School Zones



Fire, Ambulance Station &
Car Park Exits



Black Spots



ABOUT SAFEZONE

What is SafeZone?

SafeZone is a 'Supplementary Advance Warning System' designed to more effectively warn train drivers, motorists, pedestrians or cyclists of a danger condition that requires them to stop. It overcomes the behavioural tendency to ignore static signs or flashing lights in the periphery of the field of vision, by placing multiple bright, flashing warning beacons where they're almost impossible to miss – directly in a person's direction of travel, in the centre of their field of vision.

What makes **SafeZone** unique is that the beacons are battery-powered, radio-controlled and compact, meaning they can be installed faster and more cost-effectively than externally-powered systems, as well as in places solar systems can't be.

The primary element of the **SafeZone** system is a flashing warning beacon called an IRAD (In-Road/In-Rail Alert Device), which is a compact, ruggedised, radio-controlled, battery-powered, ultra-bright flashing LED array. Rows of IRADs are installed where they're more likely to be seen, for example, in a road along the lane dividers, across a pedestrian crossing, or along a railway track between the sleepers. Even if road-side or track-side signs aren't seen, SafeZone IRADs deliver an effective warning message, and do it well in advance of the danger condition.

SafeZone beacons are not intended to replace mandatory road-side or track-side signs or warning lights, simply to ensure that the danger they warn of isn't ignored. While this is not a new concept, it's the way **SafeZone** delivers these messages that is.

Why is SafeZone unique?

SafeZone is unique because the IRADs do not require any external power or control cabling. The secret is the long life storage cell technology used to power them, and the wireless (radio) control system that both activates them and monitors their performance. Further, **SafeZone** IRADs are very robust (designed to withstand 9 tonne impacts repeatedly), very compact (they protrude only 2cm above the surface they're installed in), and can be programmed (even remotely) so that their flashing patterns are matched to the



specific application for which they're being used (eg flashing in unison on the approaches to a crossing, or flashing in a sequential pattern along a railway track).

Combined, these features mean that a **SafeZone** system is:

- far easier and faster, and hence less expensive, to install than hard-wired systems
- able to be installed in locations hard-wired or solar powered lights can't be (eg due to absence of external power, or inadequate incident solar radiation)
- adaptable to a wider range of applications with minimal modifications or additional installer training
- able to be retrofitted into applications where other systems can't be (eg down the centreline of a railway track, attached to the sleepers)
- is a 'smart' microprocessor controlled system with sophisticated in-built management and 'fail safe' features
- is available with White, Amber or Red ultra-bright flashing LEDs, making it suitable for different alert conditions (SLOW DOWN or SLOW DOWN AND STOP)

And because it's made by a company with more than two decades creating advanced control and warning systems, **SafeZone** ADCs can be integrated with almost any existing rail or road management system, including Rail SPAD (Signal Past At Danger) activation systems, traffic light control systems, or railway crossing warning lights or boom gate controls.

A typical SafeZone installation:

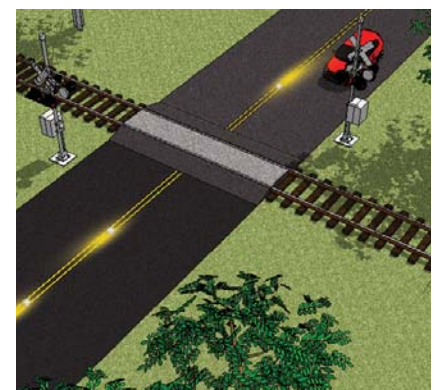
SafeZone IRADs (In-Road/In-Rail Alert Devices)

Because they're battery-powered and radio-controlled, IRADs are far easier to install than hard-wired (externally powered and controlled) lights; and can go places solar can't.



SafeZone ADC (Alert Device Controller)

ADCs provide the radio signal that activates the IRADs, as well as receive performance information about the IRADs used for remote management and diagnostics by the controlling road or rail authority.



USING SAFEZONE

Where can SafeZone be used?

SafeZone is ideal for improving pedestrian and driver awareness and thereby reducing the risk of injury, death or property damage, in applications as diverse as:

- Warning cars approaching a railway or pedestrian crossing that the crossing is active
- Warning commuters on a railway station platform to stand clear of the edge because a train is approaching or departing
- Warning drivers that a tram is coming to a stop and passengers are about to alight and cross the road ahead
- Warning pedestrians on a footpath that crosses a car park exit that a car is about to use the exit
- Warning drivers approaching an ambulance or fire station that a vehicle is about to exit the station
- Warning drivers on an unlit stretch of road with poor visibility (eg in heavy rain or fog) in which direction the road ahead curves; or of an unmarked driveway around a corner

In general, **SafeZone** is an ideal solution for any application where other warning systems:

- are not easily seen (eg too high up, or too far to the side of the road)
- might be obscured by another vehicle or train
- might be too close to a danger spot to provide adequate advance warning; or too far ahead, such they are forgotten by the time the danger is encountered
- are too expensive to install, using existing systems, because of the associated works to make ready and make good the site
- are too noisy to use (eg sirens or buzzers on a car park exit, in a residential area)
- have a poor record of effectively, consistently advising that a danger condition exists and eliciting a response TO STOP!

How does SafeZone work?

SafeZone is comprised of two primary elements:

- a primary road or track side control and monitoring system (the 'SafeZone Wireless "Alert Device Controller" or 'ADC') that is sign or light pole mountable, or mountable on the side of a building
- the visible warning element (the SafeZone 'In-Road/In-Rail Alert Device' or 'IRAD') that is installed into a recess in a roadway, pavement or railway sleeper

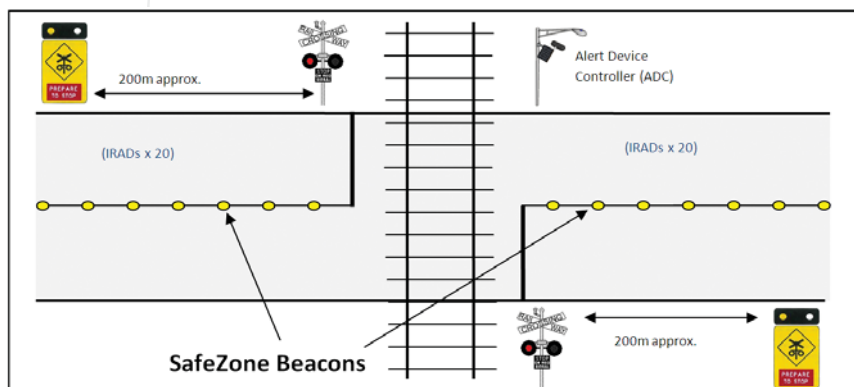
A typical installation comprises at least one ADC, and several IRADs (typically 10 to 100). IRADs are installed every 5 to 10 metres (depending on the application); for example:

- along the centre line and/or lane markers of a road
- along the edge of a railway station platform
- down a railway track, in the centre of the sleepers
- parallel to a pedestrian crossing as well as down the lane markers on the approaches to the crossing

ADCs are post or building mounted, adjacent to the section of pavement, road or railway track where the **SafeZone** IRADs are installed. The exact position and number of ADCs is determined by the physical parameters of that locale (see 'Designer's & Installer's Guide to Creating SafeZones' for more information).

SafeZone IRADs, which are very compact (15cm across and 12cm deep) and highly ruggedised (rated to withstand 9 tonnes), are available with Red, Amber or White LEDs. They come sealed, ready for installation, and can be deployed by a works crew after minimal training.

When installed, only the top 2 centimetres of the dome (which houses the ultra-bright flashing LEDs and antenna) are visible. In the case of railway platforms, a flush mounting model is available, so as not to create a trip hazard.



The Rail Level Crossing SafeZone to the left illustrates how the system may typically be installed. The IRADs are synchronised with existing systems, creating a seamless and extremely advanced warning to drivers that the rail crossing is in use. IRADs are placed at regular intervals down the centre line of the road. Flash patterns can be programmed and the colour of each LED beacon can be customised to suit any application.

CREATING RAILWAY AND TRAMWAY 'SAFEZONES'

Railway Level Crossings:



Positioned on the approaches to a railway crossing, **SafeZone** in-road lights ensure drivers are advised that the crossing is in use, irrespective of whether they saw the roadside signs on approach, or the lights at the crossing itself.

SafeZone lights provide improved advance warning for drivers approaching an active railway crossing, especially on stretches of road where the roadside warning signs and/or the track itself might not be highly visible from their perspective.

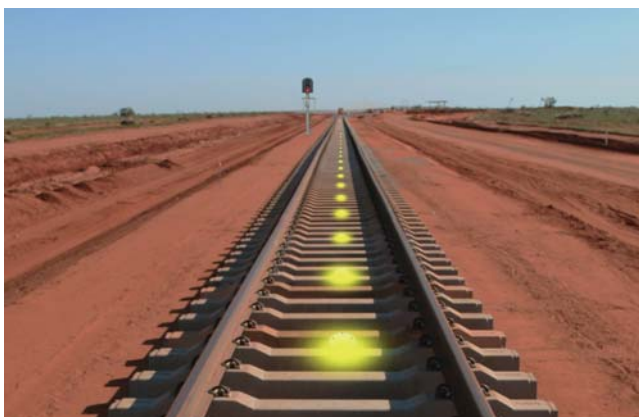
Positioning lights in the road along the centre line and lane markers (if more than a dual carriageway), starting at the roadside warning sign on the approaches to the track, and continuing up to the gates or the track itself, provides greatly improved awareness of an approaching train, even to drivers who might have missed the roadside signs, or who see the signs but do not slow because they can't see the tracks.



***SafeZone** addresses basic human behaviour to elicit a more reliable response to a danger condition. Better still, it's easier to install and less expensive than other systems.*

From improving driver awareness that a railway crossing is in use, to advising drivers that passengers are alighting from trams at a tram stop, to warning passengers on a railway platform of an incoming train, SafeZone works!

SPAD (Signal Past At Danger) Systems:



SafeZone supplementary lights are down the centre of the track, in the sleepers, such that, even if a driver misses the primary trackside signs, they can't miss the SafeZone beacons!

Railway signalling relies heavily on lights. However, due to speed, inattentiveness or signs being obscured by other trains, single track-side or over-track lights often are not enough. Missing a danger light can result in considerable damage to rolling stock and infrastructure, and serious injury or loss of life.

SafeZone very effectively addresses the need to make SPAD systems more effective, by ensuring that, day or night, locomotive drivers are more effectively advised that they should look out for these primary track-side signals.

Placed along the railway sleepers (using custom brackets), **SafeZone** IRADs are activated by the SPAD signalling system, which is connected to an ADC (Alert Device Controller). Once activated, lights can be programmed to either flash synchronously, or in a sequence, creating a runaway effect. Lights will also dim at night, or become brighter at day.

Railway Station Platforms:

Commuters suffer many distractions, from others on a railway platform, to mobile phones or personal audio devices, and can easily miss visual or audio alerts that a train is arriving at the station. Impacts can result in serious injury or death.

SafeZone IRADs can be deployed along the edge of platforms to provide a hard-to-miss visual alert that a train is approaching. As a train approaches, sensors relay a signal to the **SafeZone** ADC, which activates the IRADs. What makes **SafeZone** ideal for this application is that it's an easily retro-fittable system, in a range of paving types.

Standard **SafeZone** IRADs have a raised dome, but for rail platform applications, the IRADs are fitted with a flush top that sits level with the platform, so as not to pose a trip hazard. A translucent top and high power LEDs ensure the flashing signal is visible in all ambient light conditions, providing a high visibility supplementary warning.



Even when not facing a platform edge or the direction of an approaching train, and even with overhead warning signs obscured and audio alerts blocked by personal audio devices, **SafeZone** effectively warns of an in-bound train and clearly marks out the area to be avoided.

SafeZone AWS (Advance Warning Sign)

In addition to the **SafeZone** IRADs (In Road Alert Devices) and the ADCs (Alert Device Controllers), roadside, solar powered, wireless control units & signs make up part of the **SafeZone** system for a number of rail and tram applications. They provide signals that activate the sign lamps & the in-road beacons. They operate as an advanced warning sign & as a site repeater allowing communications redundancy.



Tram Stops:

SafeZone very effectively advises drivers to keep the roadway between the a tram and the footpath clear, so that passengers may alight or disembark safely.

Activated by the tram driver as a tram approaches a stop, **SafeZone** IRADs mark out a 'no go' section of roadway between the tram and the footpath. Optionally, lights can be installed right across the road to warn drivers on the other side of the road to be aware of pedestrians that might come from behind the tram.

Being wireless and compact, **SafeZone** is an option that is effective and affordable, and can be installed with minimal disruption to traffic.



SafeZone beacons are activated as a tram approaches, alerting drivers travelling behind the tram that it's about to stop. The beacons then mark out a safe passageway between tram and footpath. Simple!

CREATING ROADWAY 'SAFEZONES'

Pedestrian Crossings:



Nominal positioning of **SafeZone** in-pavement lights on approaches to pedestrian crossing. Lights are recommended to be installed 20-50 metres before the crossing.

Wherever pedestrian crossings are located, but where drivers need better advance warning that they're in use, **SafeZone** is an ideal solution, as it's easily retrofitted and integrated with existing traffic light control systems. And where traffic lights are not installed, and might not be affordable, **SafeZone** can be installed as a stand-alone system that is very cost effective.

Pedestrian crossings that are concealed by parked vehicles, near blind corners, or on high speed sections of roadway, can especially benefit from the installation of **SafeZone**. **SafeZone** even provides a cost effective solution to cycle ways.

Whether manually activated, or automatically activated by a 'smart activation pad' (eg Traffic Tech's Smartpad system), an ADC located atop a pole activates the IRADs, which are positioned across the road, as well as down the lane marker lines for a distance of between 10 and 50 metres.

*From improving driver awareness of a pedestrian crossing or cycle way in use, to warning drivers of an ambulance or fire engine about to exit a station, **SafeZone** lights are a cost effective solution that greatly enhances the advisory effect of existing signs by addressing the basic human behavioural tendency to respond to flashing lights. By placing a series of lights where they're hard to miss, **SafeZone** delivers the 'SLOW DOWN AND STOP' message far more effectively.*



School Zones:



SafeZone IRADs can be automatically triggered by a local timer, or manually by the local school; or they can be remotely activated by the road authority via a wide area control network.

SafeZone is the ideal supplementary warning system for School Zones. **SafeZone** IRADs are placed along the centreline of the road for the entire length of the zone, thereby clearly indicating not only that the zone is active, but where the zone starts and finishes.

Irrespective of whether a driver sees the road-side signs or not, they can't miss that they're in an active zone and need to SLOW DOWN. Better still, in long zones or zones along a winding section of road, where drivers are prone to forget they're in a zone, **SafeZone** delivers the reminder they need to drive safely and be on the lookout for school kids.

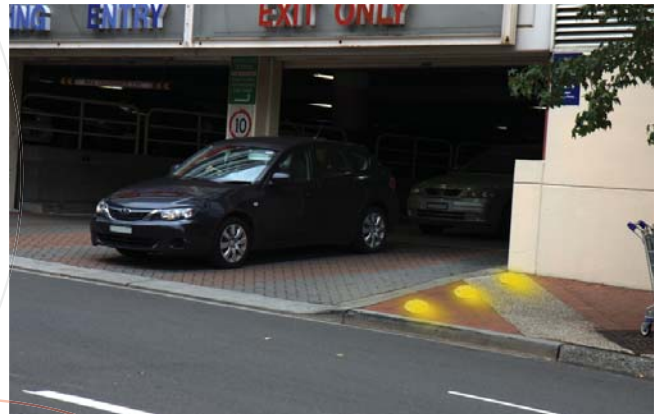
Car Park and Ambulance/Fire Station Exits:

Car park exits, particularly from building basements in built up areas (eg city centres) are often problematic because pedestrians simply do not see vehicles exiting, or do not see lights mounted up high under awnings, out of their general field of vision.

SafeZone IRADs, when used in conjunction with a 'smart vehicle activation pad', can be automatically activated; or manually activated from a cashier's booth.

The IRADs are positioned across the footpath from the exit to the road, creating a highly effective visual barrier, alerting pedestrians and cyclists that the exit is active and that vehicles have right of way.

As a variant, using a manual activation system, **SafeZone** lights can be used as a highly effective warning that a fire or ambulance station exit is in use. Installation of lights and radio controller would be as per a car park installation.



SafeZone IRADs can be placed at car park or emergency vehicle exits, to more effectively provide a warning that a vehicle is exiting. The beacons can be triggered in a number of ways and can be integrated with existing warning systems.

Why Battery-Powered IRADs?

After much study, we resolved that both externally and solar powered IRADs would suffer considerable limitations with respect to where they could be installed, as well as with regard to the reliability and affordability of an installed system. We opted for a new class of storage cell technology which, when combined with our proprietary power management and energy-efficient communications systems, means that **SafeZone** IRADs will not only perform (on average) for between three and four years before needing to be replaced, but are far more compact and therefore less expensive to install, and also more reliable.

Road Black Spots:

Sections of road notorious for black ice, or for sections of road where there are blind spots, or where fog makes road edges or curves difficult to see, or where there is periodic flooding that is not easily seen well in advance by a driver, allowing them to slow down, **SafeZone** can easily be retrofitted, along with self contained sensor and activation systems.

Wireless advanced warning beacons are installed in the road or on the side of the road depending on the requirement and level of low, medium and high risk. As the driver approaches the zone, the "the runway affect" is triggered and captures the drivers' attention, by switching the driver from a semi aware/alert state to a conscious alert state upon approach to a risk zone or change in traffic or pedestrian conditions.



SafeZone markers can help delineate lanes and road edges on sections of road prone to heavy fog, with sharp bends, with concealed side entries, etc.

ABOUT INVENTIS TECHNOLOGY

Inventis Technology (a division of ASX listed company, Inventis Limited) is a Sydney based electronic control systems designer and manufacturer that was established in 1985. Inventis Technology has been creating and delivering innovative control, management and safety solutions to electronics OEMs, emergency services, police, defence and many enterprise and government customers for more than 20 years. Primary Inventis Technology brands include PNE (electronic control systems for OEMs), Impart (motor vehicle control systems), and Opentec (rugged portable computers and computer based solutions).

With a significant history of developing IP with global applications, dating as far back as the development of the safety cut-out switch for the steam iron (a technology now endemic around the world), the company differentiates itself by integrating innovative engineering capabilities with high quality local and cost-effective offshore manufacturing, to deliver customers a complete turnkey 'design and construct' package. From electronic sub-systems, to complete end-to-end engineered solutions and finished products, our innovative abilities set us apart.



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