



greenmesh

Advanced IoT and Video Analytics for

Rail Safety and Operations

Continuous and rapid mobile deployment solutions for anytime, anywhere and always on monitoring

POWERED BY
365mesh

Advanced IoT and Video Analytics for Rail Safety, Security, Operations & Maintenance

Greenmesh Rail Safety and Operations is a complete end-to-end IoT solution developed in Australia for use within rail environments to improve safety and security, and to provide operational efficiencies to the rail industry. Greenmesh can provide a rail operator with the following benefits:

- **Level crossing safety** utilising advanced AI and IoT sensors with early warning detection to reduce level crossing safety incidents
- **Security, theft & vandalism control** to detect and notify of unauthorised security threats or vandalism to existing railway locomotives or track side signs or theft of cargo associated rail assets
- **Maintenance & Operations** to assist with monitoring and operational status of rolling stock and other track and rail assets
- **Train locomotive tracking & telematics** with fleet management to provide rich information relating to locomotive operations and real-time tracking of rolling stock and associated maintenance assets

Anywhere, Anytime Connectivity

- Ethernet → IP
- LoRa → MB-IoT
- Wifi → 4G/5G
- Satellite

Managed Services Provider operating

24x7

Managed Services
Provider operating 24 x 7
across Australia with NOC
centres in Sydney &
Melbourne

100%

coverage

of earth's land and water
surface areas

Rapidly Deployable Remote Solution

Greenmesh monitoring and detection solutions can be deployed anywhere with mobile trailers, cameras and sensors that can be mounted onto telescopic poles, vehicles and onsite depending on the railwork site's surroundings, level crossing architecture and/or assets.

These remote solutions are self powered and can operate on a completely separate network, so they won't impact any existing services or network.

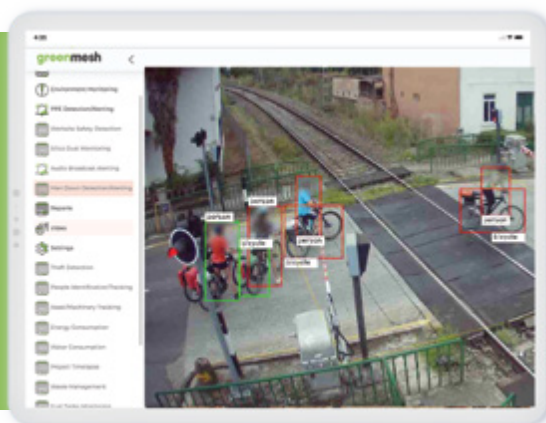
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Level Crossing Safety





Greenmesh utilises advanced AI and machine learning, as well as purpose built sensors to monitor rail level crossing safety.



- Detect if a vehicle doesn't stop at a level crossing and if so then capture vehicle details including license plate.
- Capture footage of an approaching locomotive to verify if the locomotive forward facing lights are displaying correctly.

- Determine if there are any obstacles en route that could impact locomotive and provide early warning notification to driver and motorists
- Utilises advanced Ai architecture to monitor and predict near miss events before they happen.

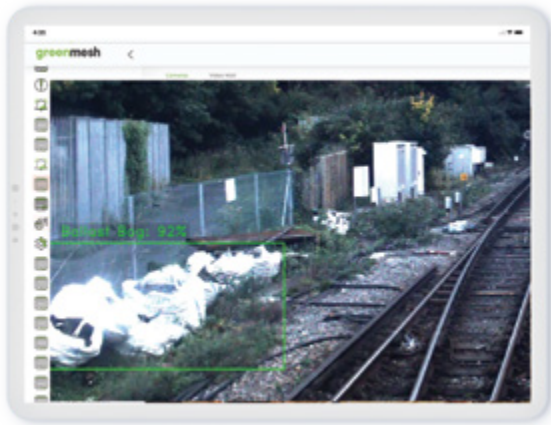


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Maintenance & Operations

Greenmesh is capable of aiding with maintenance and operations tasks by providing:



- Monitor on both sides of tracks and detect any illegal dumping or dumping of general discarded items such as litter, waste, trolleys, furniture, etc
- Monitor and detect animals on tracks or any other obstacles that could impede the safety of the locomotive
- Monitor for any damage or defects to train and trackside train assets, tracks, overhead lines etc

- Provide AI analytics on vegetation growth. This would be complemented with 365mesh remote sensing satellite imagery that provides users with a heat map of the exact location where the pest plants and weeds are located



- Real-time information relating to racks and trackside assets conditions

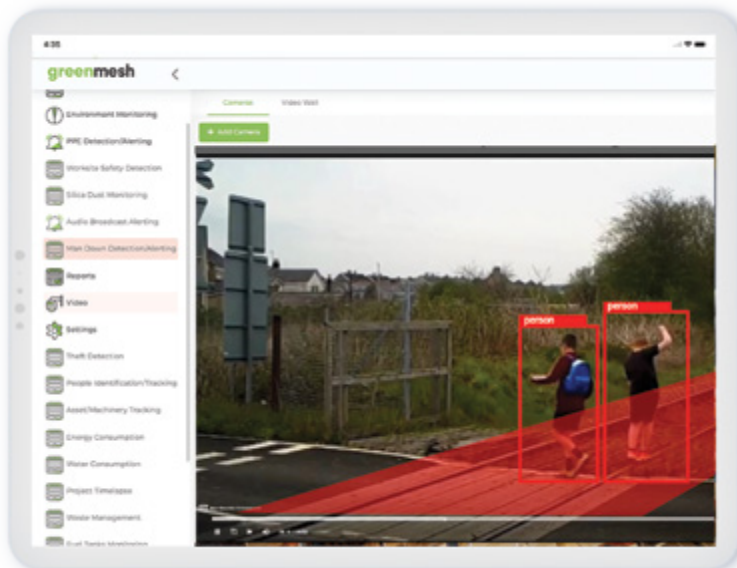
- Monitor Cargo loads and help with determining load amounts (size/ volume / type of load – ie coal, sand etc) or count qty of logs loaded/unloaded and provide driver with a confirmation inventory digital ticket

broadsecure

Security, theft & vandalism control



Greenmesh's Broadsecure module can provide real-time information relating to security, theft detection & vandalism.



- Greenmesh utilises advanced AI for security, theft detection
- Detect vandalism of signs/assets
- Monitor for theft of cargo or other valuable assets/materials
- Monitor for after-hours theft or activity around the trains (this feature can be activated for different times of the day and can be turned on manually or switched off as required)

- Monitor for breaking glass or other similar noises within locomotives or surrounding trackside buildings
- Detect intruders, vehicles or wild animals inside unauthorised areas
- Monitor outbuildings and transformer or distribution boards / cabinets for intrusion detection and theft.

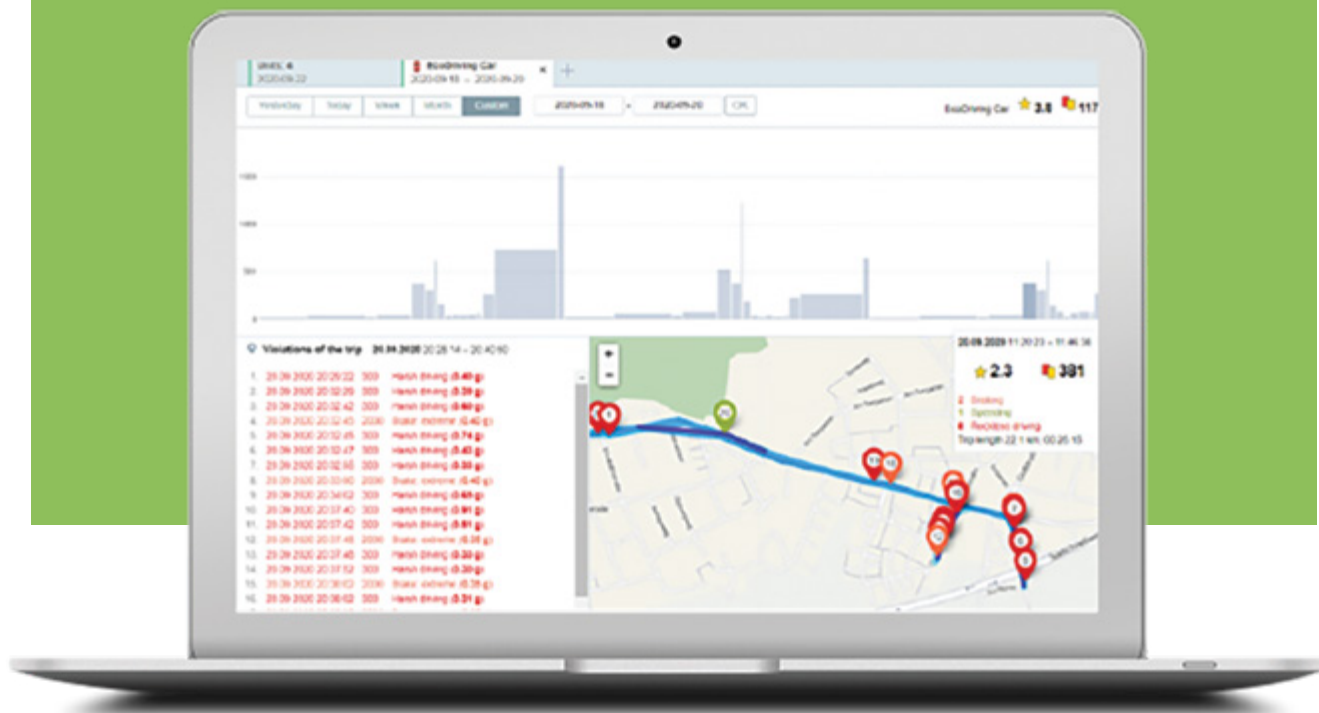


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Train Locomotive Telematics and fleet management

Greenmesh integrates with locomotives for Rich telematics and Fleet tracking & management to provide the following:



Provide real-time tracking of rolling stock (wagons/Locomotives and other mechanical and maintenance assets such as trailers or maintenance generators etc)



Provide time of day locomotive occupancy – Sends alerts to security if movement is detected after hours within the locomotive cab.



Provide counting information and provide the in-cab driver with safety data such as clean air and air working environment



Monitor for smoke and differentiate between air quality and atmospheric contaminants – Measures ambient temperature, humidity, pressure, various hazardous gases x 12



Provides rollover detection and real-time alerting



Integration with vehicles for maintenance schedules/logs



Measure light levels for both vision safety and also in the event that a light is left on after a certain time etc, (either send a notification to the relevant contact or the solution could switch the light off automatically)



Measure/alert on noise levels/thresholds for safe noise levels. Microphones are off and do not record, but has an AI built within that can recognise noises such as:

- Windows breaking
- Gunshots
- People fighting and aggression

These can be installed into outhouses and remote bathrooms and will report on counting/environmental conditions but will also listen for running water if someone leaves the tap in the bathroom running.



Detects audible indicators of aggression, distress, damage, rowdy noise, running water (if tap is left turned on/alert)



Managed with cloud based browser based dashboards (view Anywhere/any time) – Software does not need to be installed onto user's devices



Anti theft / Anti tamper proof: will alert if tampered with or removed



People Counting



Monitor temperature on tracks



Monitor vibration on tracks and other assets

All of the above use cases are available for indoor and also external use/detection

Other rail operations benefits include:



Greenmesh's Workplace safety rich AI capabilities and PPE detection solution aid's rail operators to reduce worksite incidents and fatalities by providing early detection and warnings of potential high risk accidents before they occur.



Greenmesh monitors for the correct use of protective equipment to help rail operators comply with industry health and safety standards, while also monitoring work habits to gain intelligent insights

The Greenmesh solution is a full end to end solution made up of hardware and software to improve rail safety at Rail level crossings. The greenmesh solution will provide deeper insights via sensors, AI and machine learning into various areas such as:



Rail safety at level crossings:

A multitude of algorithms to predict and reduce incidents before they occur.



Safety:

PPE monitoring and detect workplace unsafe conditions,



Safety:

Environment monitoring such as air quality and hazardous gases, silica dust , fire, unsafe smoke levels and other



Security:

Theft detection and identification/ detection of unauthorised persons/ vehicles within a specific zone/area



Monitoring and tracking of locomotives and other rolling stock assets



Provide real time analytics of speed correlation to track temperatures to ensure safe speeds and improved efficiencies

Greenmesh sensors are manufactured within Australia and operated by an Australian workforce.

Use Cases



Intelligent, cloud based video surveillance solution

With advanced AI/ML capabilities



Compatible with users' existing cameras

No need to replace cameras



Single dashboard with floor MAP

Shows all camera locations with one-click access to live video feeds



Streaming backup to cloud

Multiple storage durations for footage: 30, 60, 90, 120, 180 Days (custom)



Image Detection and Identification

Advanced AI/ML capabilities to accurately process and detect items off footage



Object Identification

AI capabilities to accurately identify objects



Animal Identification

AI capabilities to accurately identify species of animals



Identify and classify by people demographics

AI capabilities to identify age, gender, colour and type of clothing



Identify only people of interest

Protect the privacy of people outside the watch list with a no biometric data saving enabling option



Behavioural analysis capabilities

Manage and analyse people's behaviours to optimise standard operating procedures



Allow Motion Search

Search and filter through a library of motions within specific area of interest in the video stream. Set an alert for any activity within a particular area of interests.



Face Search with integration into AD

Pull up a library of faces detected and select one to see all the times and dates of when they were identified in footage



Motion heat maps

View the way people or objects move around areas, including Push events/triggers



Person tracking based on facial or electronic tag Utilise tags and facial

Recognition to implement site safety monitoring and auto-mate time attendance



Create custom zones

Narrow down areas of interest on a field of view. Collect data and set up alerts that occur only within this zone



Create virtual fences and boundaries

Create landscape boundaries on a digital map and contain people/animals using tags



History View

View the history of data collected which updates every hour, up to 120 days



ONVIF compliant

Remotely control the cameras' zoom, focus etc




Real time camera surveillance

With intelligent detection directional pan, tilt and zoom capabilities



Share access

Send incident alerts to anyone via sms and email

A woman wearing a white hard hat with a headlamp, safety glasses, and a high-visibility safety vest over a light-colored shirt. She is holding a tablet computer and looking off to the side. The background is an industrial setting with various pipes and structures. The entire image has a green color overlay.

**MONITOR.
DETECT.
ANALYSE.
AUTOMATE.**

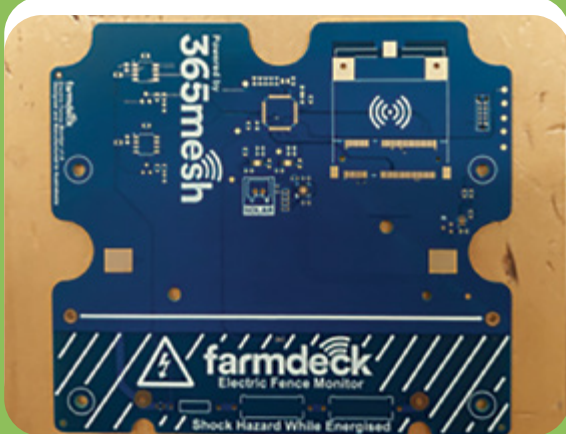
POWERED BY **365mesh**

Designed and Manufactured in Australia / New Zealand.

Aimed at withstanding local weather conditions in snow, high heat, rain and extreme wind environments.

Locally manufactured in Australia for fast shipping and local support

- › Rapid prototyping
- › Injection moulding
- › Assembly and shipping
- › Electronics PCB
- › Hardware testing
- › Manufactured by experienced engineers



Managed Services Provider operating

24x7

NOC (Network Operations Centre) in Sydney and Melbourne.

**Gain real time
visibility over your
railway operations
and projects with
365mesh IoT
portal.**



WE ARE FOUND GLOBALLY

Australian based, owned & operated with local manufacturing capabilities



Contact us

Visit our Website: www.365mesh.com

Email us: sales@365mesh.com

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POWERING 365mesh greenmesh broadsecure

Greenmesh can be utilised in many industries

- ⇒ Heavy machinery
- ⇒ Earth moving
- ⇒ Construction
- ⇒ Mining
- ⇒ Tunnelling and excavation
- ⇒ Warehouse and factories
- ⇒ Manufacturing
- ⇒ Healthcare and Aged care
- ⇒ Supermarket and Retail
- ⇒ Ocean and Marine
- ⇒ Airports
- ⇒ Railways
- ⇒ Transportation
- ⇒ Cold storage Logistics