



Shire of Dardanup

**ADDITONAL  
INFORMATION**

**LOCAL EMERGENCY  
MANAGEMENT COMMITTEE  
MEETING**

Held on

**Wednesday, 11 May 2022**

At

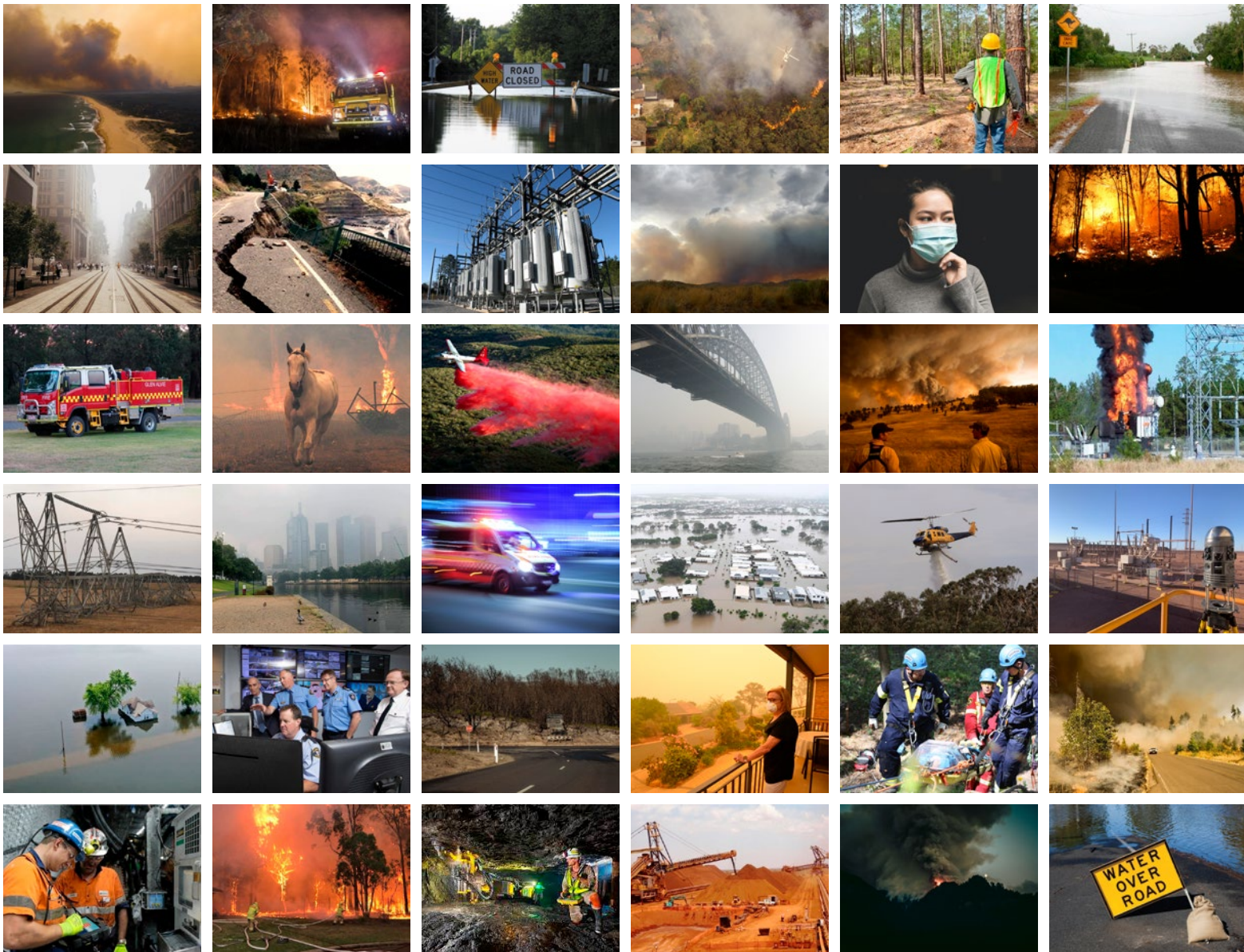
**Shire of Dardanup  
Administration Centre Eaton**



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~ Large Print  
~ Electronic Format [disk or emailed]  
Upon request.

# [LEMC Additional Information: 3.1A]

Attentis®



## INTELLIGENT NETWORKS

Incorporating real-time fire ignition and flood detection, live air quality, micro-climate weather, soil moisture, ground movement, remote visibility, security and safety, in a single integrated, intelligent network.

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# Attentis® is an Australian company that pioneered real-time integrated intelligent sensor networks, globally.

and composition, 360° thermal and visual cameras, artificial intelligence and active machine learning are incorporated to provide a complete understanding of the local environment.

The ultra-rich data captured from our multi-sensors travels seamlessly through our high-speed wireless, integrated networks, enabling a continuous real-time picture at a location, accessible from anywhere in the world.

Registered users can create individual threshold alerts for a range of key elements including escalating weather conditions, air quality concentration levels and equipment operating temperatures.

Our simple-to-use websites and Apps provide a new level of insight to deliver improved prediction, risk reduction, rapid mitigation and response.

Attentis® began designing and manufacturing intelligent multi-sensors, high speed data networks and interactive interfaces in 2009 to address the need for greater information, insight and understanding to enable rapid, informed and strategic decisions.

Attentis® pioneered real-time situational awareness through its range of intelligent multi-sensors that deliver a continuous stream of environmental and operational measurements to determine fine scale changes that indicate the onset of current or future impact.

Attentis® multi-sensor technology incorporates 24-hour unmanned detection of fire ignition, spark, arcing, water height, airborne pathogens and gases, trespass, equipment stress, future component failure, noise, vibration and ground movement. Live micro-climate weather, air quality



Smart City of the Year 2019 (Regional)



Best Government IoT Project (2019)



Best Overall IoT Project (2019)



**Multi-sensors**

Attentis® manufactures a range of real-time, multi-communication, self powered sensors that combine vast sensing capabilities into a small (30cm x 15cm) compact unit.

Attentis® R Series multi-sensors enable 24-hour remote monitoring, detection and notification of events, changes, impacts, movement, encroachment, ignitions and conditions at a specific location. Continuous measurement of multiple environmental factors provides a clear understanding of the interactions that lead to an event, helping to identify the cause (aiding prediction and prevention) and maintain a record of all factors during an event (report).

The addition of artificial intelligence and active machine learning enables accurate prediction, early detection and improved management.

**Construction**

Attentis® R Series multi-sensors are constructed using a complex composition of fire, shock and UV resistant polymers, incorporating multilayer protection to enable continuous operation in the harshest of environments. Ex series multi-sensors incorporate further features to ensure operation in temperatures of -40°C to 400°C.

**Power supply**

All Attentis® multi-sensors are available with a range of power options including stand alone solar powered units with a built in backup power supply to ensure operation during extended periods without sunlight, rechargeable battery models, mains powered 110V/240V and portable plug pack units.

Attentis® multi-sensors incorporate proprietary multi-communication capabilities, combining licensed radio, unlicensed radio, cellular, satellite and Wi-Fi into a single device to provide redundancy and ensure data delivery.

Individual multi-sensors also receive, store, process and transmit information, operating both autonomously and as an integrated network sending information through other multi-sensors. Multi-sensors are self-aware and will operate autonomously controlling equipment or processes when local communication networks are impacted or no longer available.

**Maintenance**

Attentis® multi-sensors feature a range of key elements to minimise in-field maintenance including proprietary lenses, dual operating systems and a complete internal status check every 30 seconds. Any fault is transmitted to Attentis® administration for remote fault diagnosis. Backup system engagement is autonomous. Software and system upgrades are performed remotely.

**Resilience**

Attentis® uses solid-state and ultrasonic components, eliminating the unacceptable risk of moving parts that can fail as a result of conditions, impact, encroachment or fatigue.

**R Series multi-sensor capabilities**

Detection of flame / spark / arcing / flooding / impacts

Air composition levels of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> / CO<sub>2</sub> / CO / SO<sub>2</sub>, NO<sub>2</sub>, smoke, gases, dust

360° temperature measurement, thermal imaging and machine learning to detect future faults

360° visual images, time lapse, video

A.I and Image recognition - encroachment, trespass, vehicles, vehicle types, animals, people

Wind speed, wind direction and gust speed measurement (ultrasonic)

Relative humidity, precipitation, rainfall measurement

Barometric pressure, dew point, fire rating index

Audio monitoring for frequency, voice and sound

Structural, footing, tower and ground movement

Instant notification of threshold breach via email and SMS with live conditions and images





## Intelligent, integrated, intuitive

R Series intelligent patented multi-sensors deliver 24-hour, unmanned, continuous measurement, edge data processing and live streaming of real-time integrated information; providing users a greater understanding of events and impacts as they unfold. Enhanced by artificial intelligence, R Series multi-sensors deliver unparalleled detection, notification, information and the ability to rapidly respond.



No trenching



No cabling



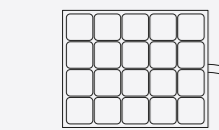
### Gases

Multiple air quality sensors detect and disseminate particles based on size and shape – PM 0.3, 1, 2.5, 10, CO, CO2, NO2, SO2 etc.



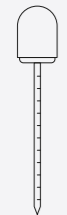
### Pollen

Type recognition through laser measurement of size and shape to detect and notify asthma sufferers



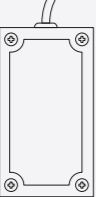
### Solar powered

Mains powered and 110V/240V portable plug pack units are also available



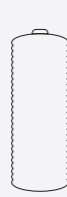
### Soil moisture

Self-powered, wireless communication, intelligent



### Vibration

Measured in multiple data formats to comply with all Global standards



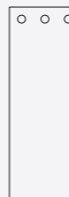
### Movement

Ground & Structural movement (towers, bridges, buildings, structures, etc) to 0.1 of a degree via remote sensors



### Audio

Fine scale recording and playback via individual MP3 files



### Floods

Ultrasonic measurement of river depth and height in real time



### Fire detection

Visible and non-visible flame recognition detection



### Weather

Ultra sonic measurement of barometric pressure, relative humidity, wind speed and direction, rainfall – detailed micro-climate weather World Meteorological Standards approved



### Thermal imaging / temperature

Measuring up to 80,000 individual points of surface temperature, delivered as individual readings



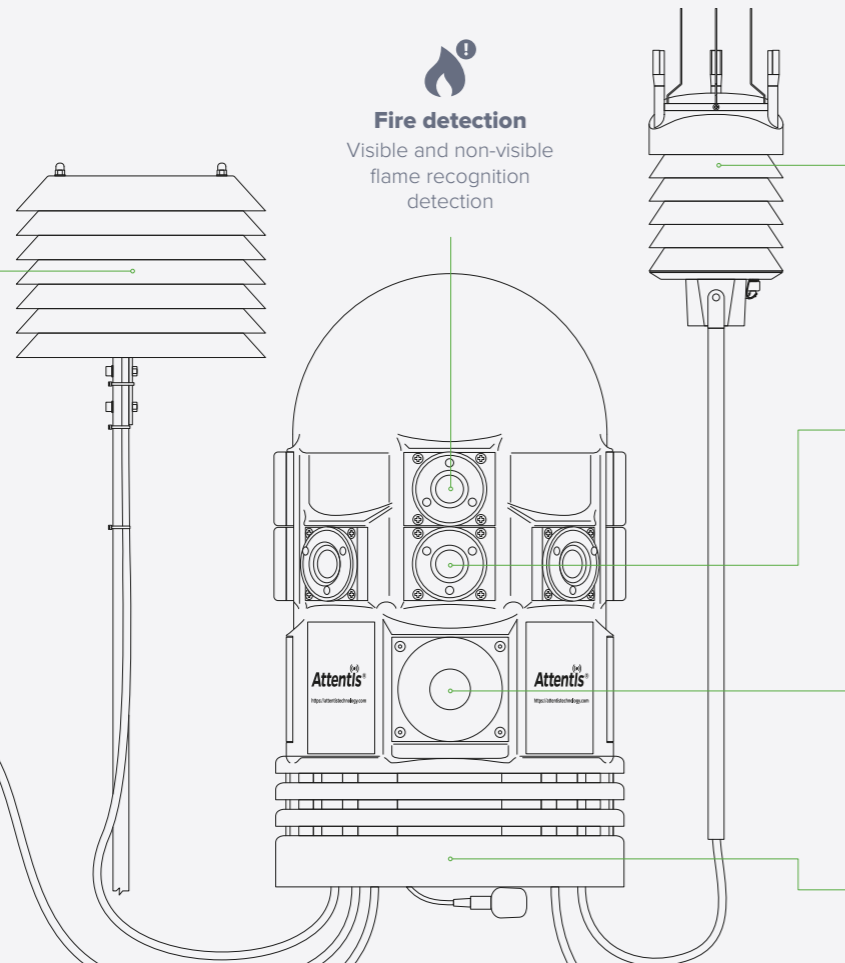
### Visual

Ultra high definition video and still imaging, image overlay technology



### Compact

15 x 30 cm in size



Stand alone installations are unobtrusive, small footprint and self powered - no cabling or trenching. Available in pole, bracket attachment, skid mounted and portable tripod.



Mobile



Mobile



Mobile



NB-IoT



Satellite



Radio - Licensed / Unlicensed



pLTE



Wi-Fi



# An App for all seasons

## Access to information during any event is a critical element in decision making.

The Attentis® App delivers live, continuously streamed information into the palm of your hand, displaying ever changing local conditions and critical information around air quality, weather, fire locations, flood zones, rainfall and access to images to ensure that users are well informed.

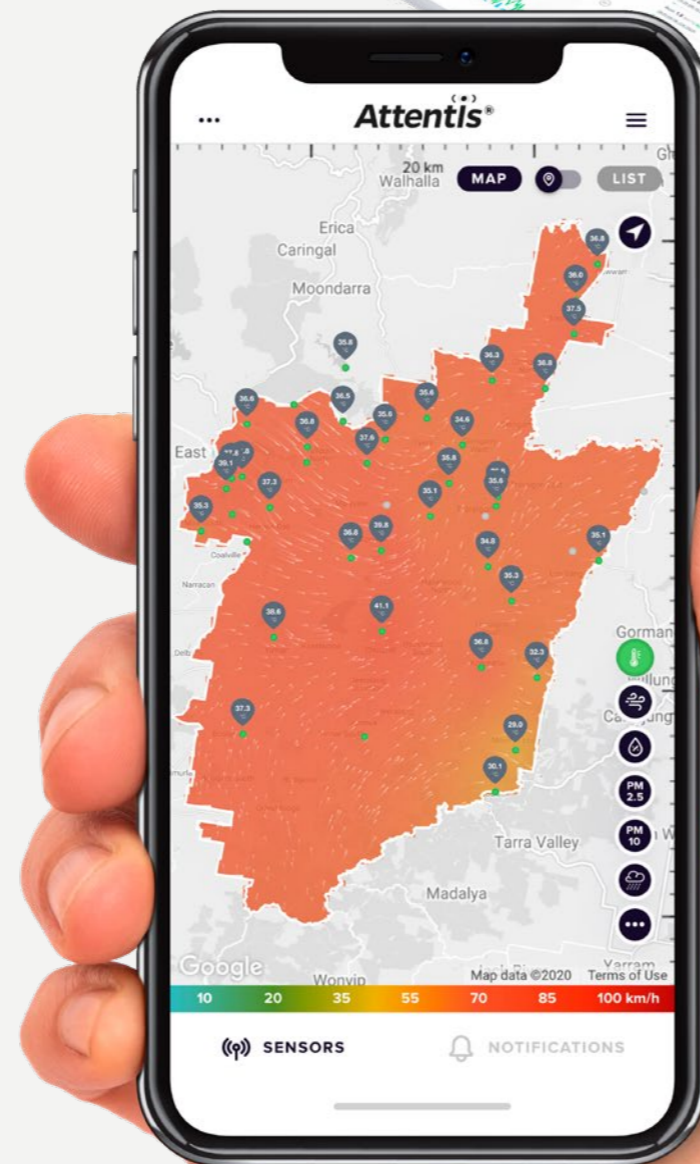
Users can access individual Attentis® multi-sensor locations to view 360° images and live conditions at each location to gain a clear understanding of an event as it unfolds.

The App provides individual customisable alert notifications to notify the user when air quality or weather conditions are unhealthy or unfavorable. Alert notifications can be viewed on any smart device, wearable, fixed or portable device.

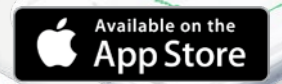
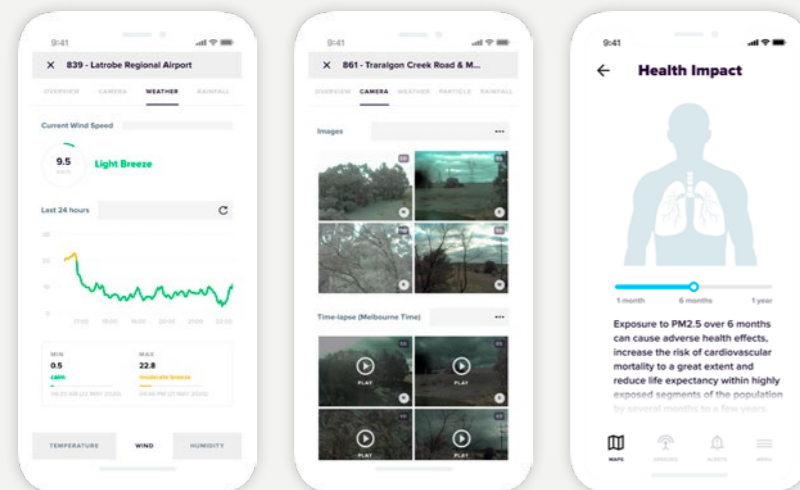
A clear user-interface accompanies real-time measurements to explain the impact of various air quality contaminants and ways to reduce or avoid exposure.

The visualisation of information on our live maps delivers greater comprehension of an event, creating an informed community, reducing calls to emergency call centres and local agencies.

The App is accessible by all emergency services, agencies and the general public.



The Attentis® main map details all live wind movements, event locations, air quality conditions and information about the event.





# Supporting public health and safety

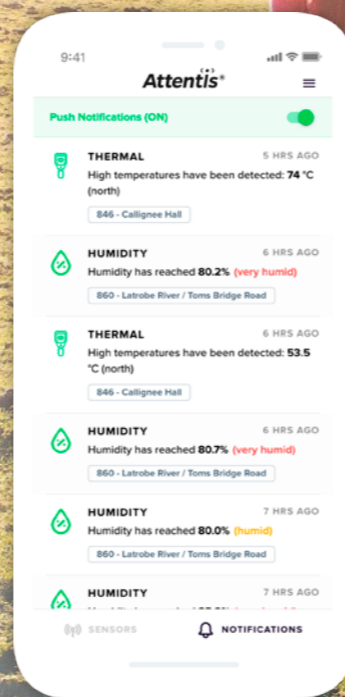
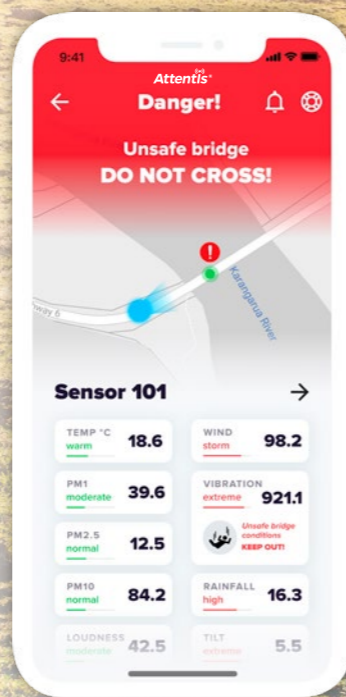
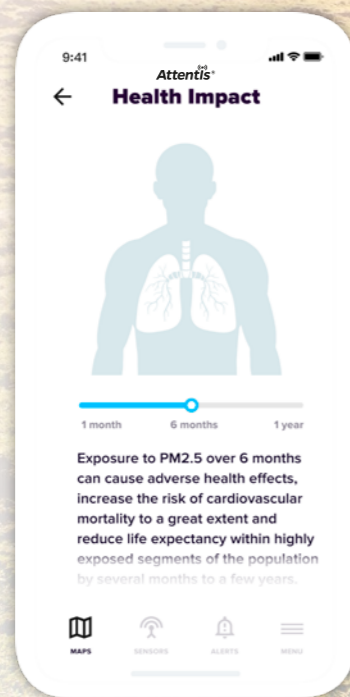
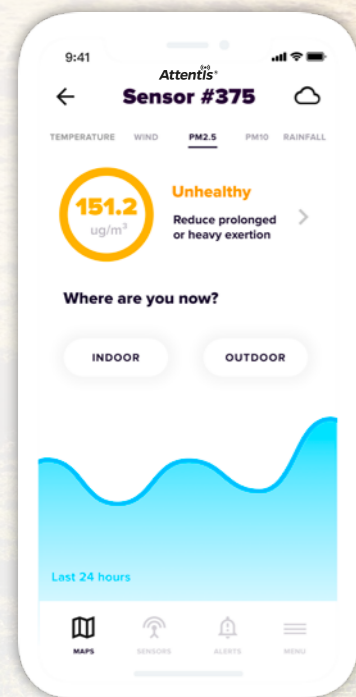
The Attentis® App connects you to your local environment in real-time.

The value of real-time / live local information lies in the ability for people to respond to an event.

Attentis® provides a comprehensive interactive App to support local governments, agencies, emergency services, industries and communities - providing access to live local conditions and information to support greater awareness, safety and health.

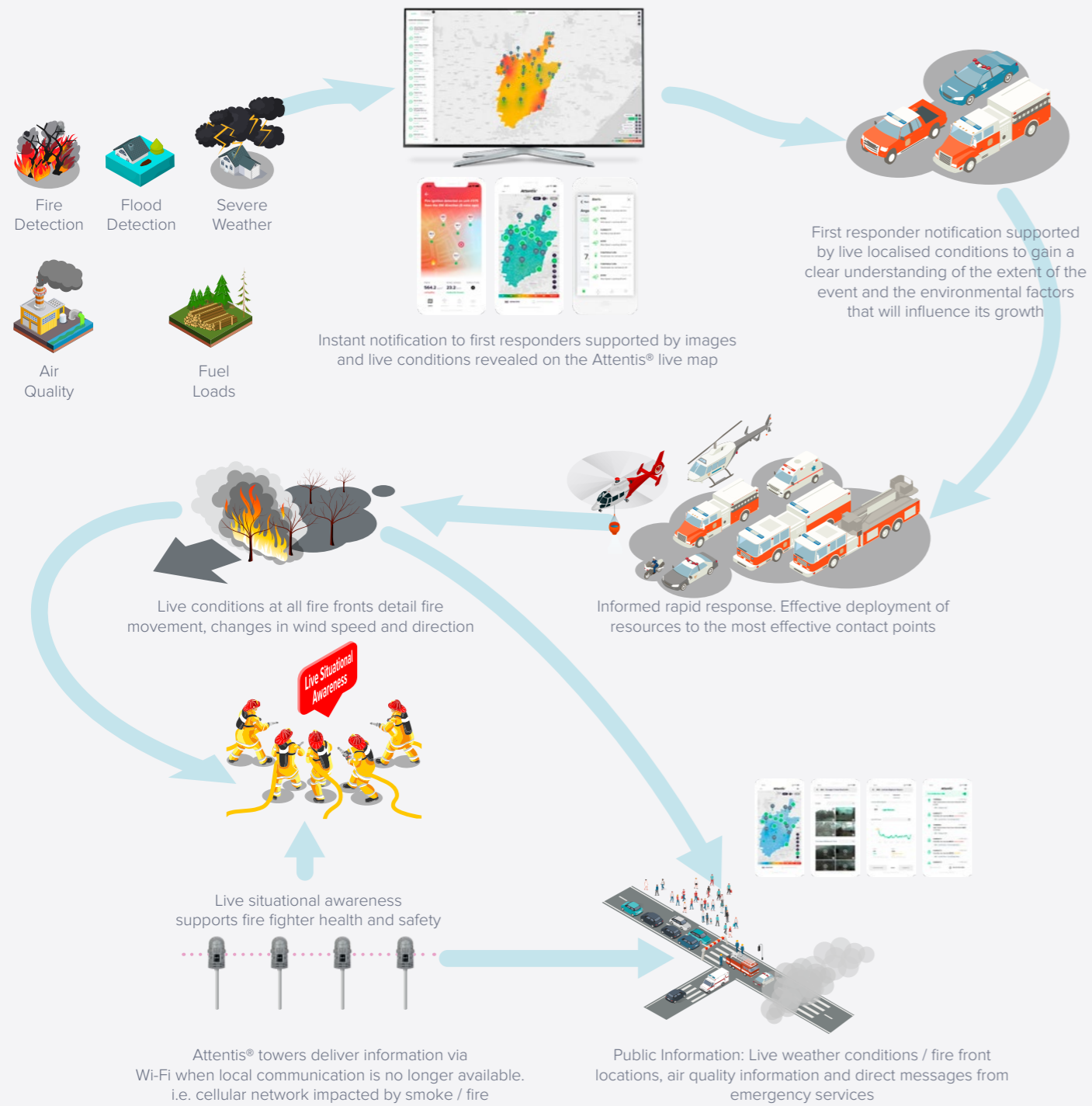
Live local micro-climate weather, air quality readings, river heights, rainfall information and images are supported by warnings, notifications and live conditions to aid rapid, informed decisions.

Local agencies and emergency services can send messages directly to local residents detailing events, updates and information to reduce impacts.



**Attentis® technology delivers critical elements for the future of fire, flood and natural disaster management**

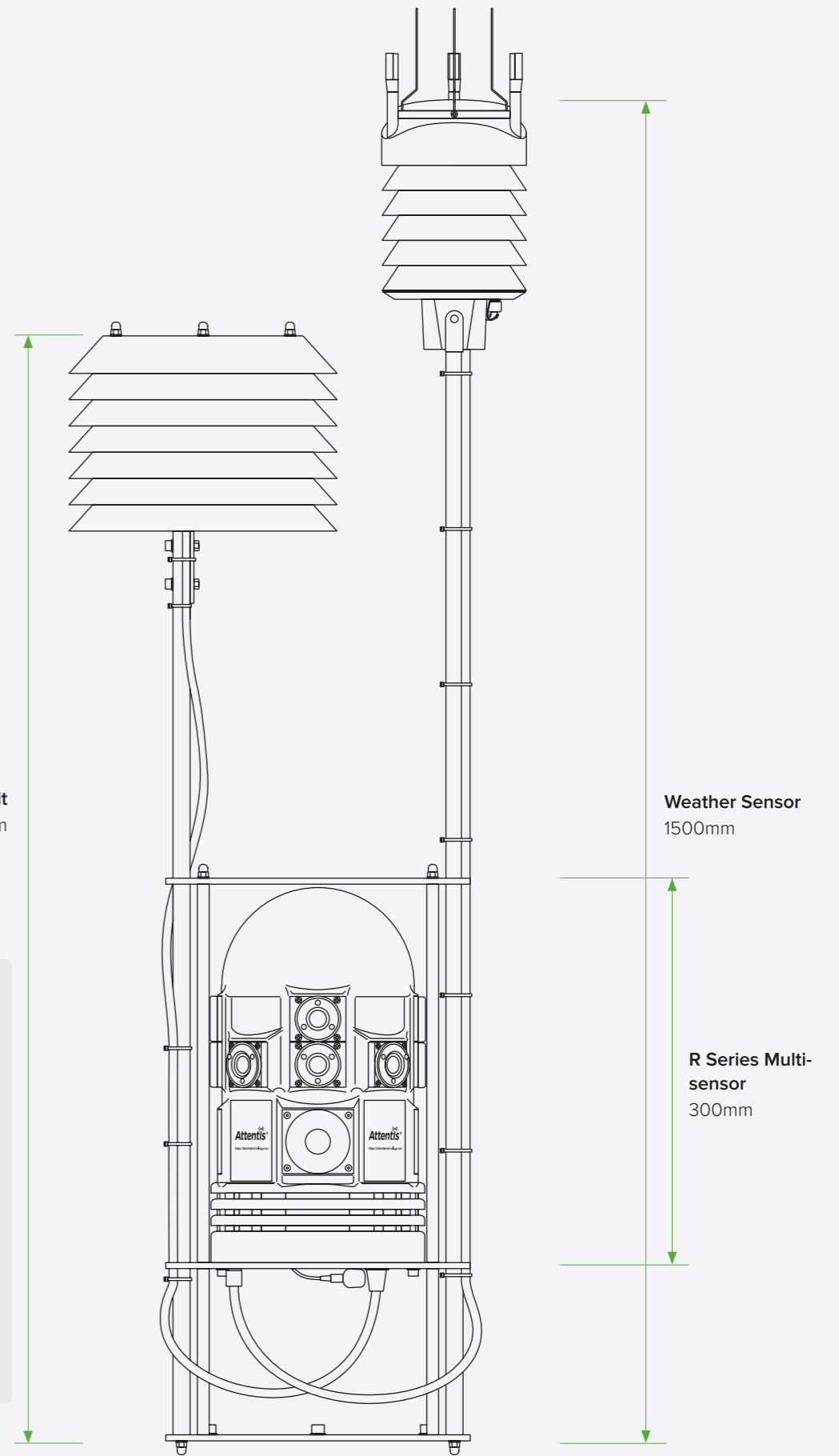
**Early detection, live situational awareness and access to information to make informed decisions**



**Attentis® combines early detection, live information, tracking, notification and communication systems in a single high speed network.**

**The Attentis® Latrobe Valley Information Network (LVIN) demonstrated the capabilities of our technology to provide early warning of fire ignition and floods. This technology will be key in the future to support resilient informed communities in natural disaster prone areas.**

- Air Quality Unit** 950mm
- Multi-sensor:** 3.8kg
- Stainless Cage:** 7.4kg
- Air Quality Station:** 1.7kg
- Weather Station:** 1.6kg
- Power Options:**
  - PoE
  - -48V
  - 110V
  - 240V
  - Internal Battery
  - Solar







# Thermal and Visual Imaging

Fire ignition in remote locations can occur at anytime, day or night, from a range of sources.

### Protecting critical infrastructure and resources

Attentis® thermal imaging enables 24-hour remote monitoring of critical infrastructure, remote assets (i.e. forests, substations, coalmines and powerlines) and high fire risk locations to detect ignitions, monitor risk levels and provide the ability to rapidly respond.

Attentis® offers a vast range of pre-calibrated thermal imagers and temperature measurement sensors, available in single point (90°) format measuring between 4,000 to 10,000 individual surface temperature measurements through to 360° sensors providing 32,000 to 80,000.

Attentis® designs and manufactures a range of short, medium and long distance lenses to tune the capabilities of thermal imagers to specific customer requirements.

### Non-visible flame detection

Attentis® provides non-visible flame detection through wavelength transmission measurement. Coupling this capability with thermal imaging and air quality measurement, enables rapid detection across a vast range of ignition types including non-visible fire starts.

Undetected ignitions coupled with high winds and dry conditions can soon create fires that are difficult and sometimes impossible to contain. Early detection and rapid response are key elements to managing fire.

Attentis® pioneered unmanned 24-hour instant detection creating intelligent multi-sensors that provide 360° real-time thermal and visual imaging to detect fire starts (e.g. arson, lightning strike, powerline and accidental), re-ignitions, hot spots, movement and changes in thermal temperatures that lead to fires, faults, failures and outages.

### 90° to 360° real-time, live thermal and visual imaging

#### Still image resolution capabilities

Low bandwidth: 640x480 (480p)

Low resolution: 1280x720 (720p)

Standard resolution: 2592x1944 (1080p)

High resolution: 3280x2464 (8MP - 4K equivalent)

Ultra high resolution: 4912x3684 (18MP)

### Video resolution

Standard resolution: 480p at 30fps

High resolution: 1080p at 30fps

### Thermal imaging

10,000 points (90°)

80,000 points (360°)

Information type: thermal

Minimum and maximum measurements

GO BACK OVERVIEW AIR QUALITY THERMAL AUDIO SYSTEM

MIN 19.5 °C (08:19 AM, 09 SEP 2019)

MAX 49.5 °C (03:39 PM, 08 SEP 2019)

11:12 AM (08 Sep 2019) Max Temp: 36.0 °C

PAST THERMAL IMAGES

13 minutes ago 10:59 AM (08 Sep 2019)

26 minutes ago 10:33 AM (08 Sep 2019)

40 minutes ago 10:07 AM (08 Sep 2019)

an hour ago 9:41 AM (08 Sep 2019)

an hour ago 9:15 AM (08 Sep 2019)

LOAD MORE

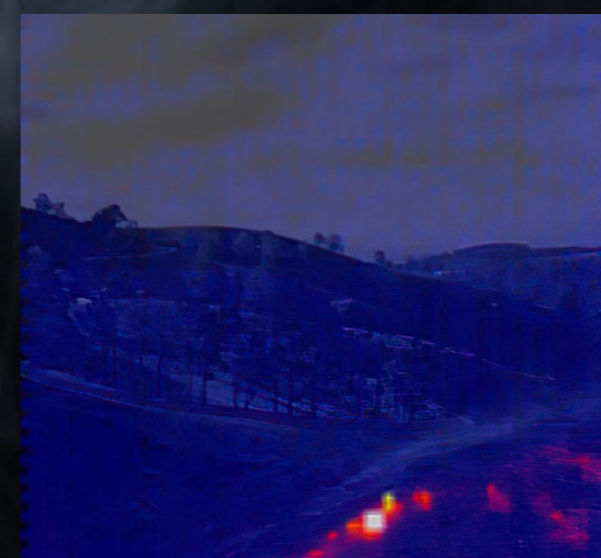
View Correlated Data

Historic thermal images

Hovering over the thermal image reveals the temperature measurement of each surface as individual readings

Hovering over the temperature graph reveals the temperature and time of each reading

Selecting Min/Max timestamp reveals all conditions and images at that time



Thermal image shows heat sources detected. This autonomous detection sends an alert to first responders including thermal and visual images and live conditions at the location



First responders can attend the exact location to extinguish the ignition

# Water monitoring

Attentis® networks measure electrical conductivity (an indicator of salinity levels), water flow rates, water levels (ground and well) and water pressures.

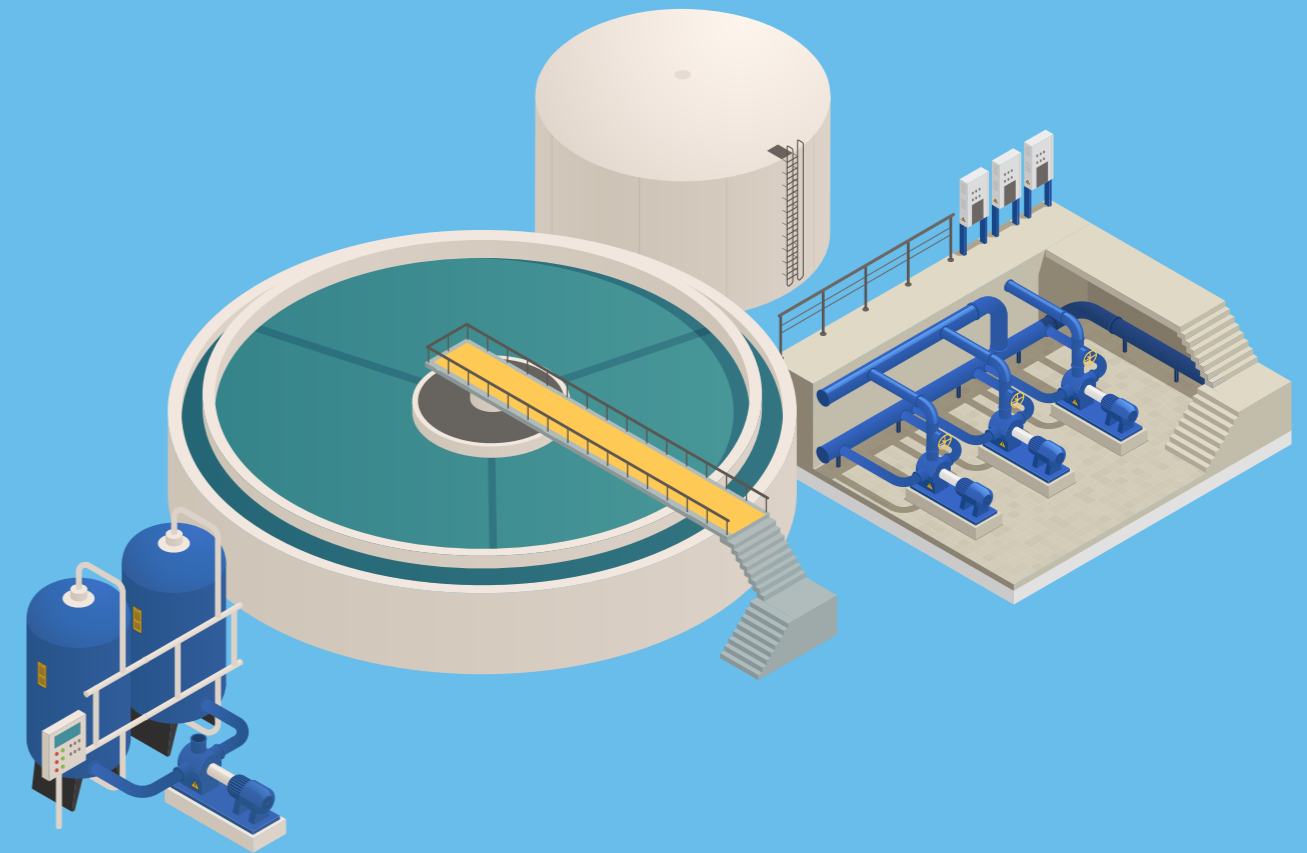
Attentis® designs and constructs fully integrated networks providing real-time continuous monitoring of all critical elements including water. Monitoring of water flow, condition and levels play an important role in maintaining operations, health and safety, efficiencies and quality of production. Identifying key changes in water quality and flow in real-time leads to identification of future impacts before they occur.

Continuous real-time monitoring provides live situational awareness, reduces site attendance and improves maintenance schedules as the system provides indicators to trigger on time maintenance rather than scheduled maintenance, reducing operational costs.

A network can incorporate the ability to automatically operate pumps, valves and components via the existing PLCs delivering an automated intelligent operating system.

This level of awareness, reaction and response reduces risk and improves outcomes.

Attentis® networks are modular in design and construction allowing the incorporation of existing systems and future expansion of new capabilities to maintain the highest standard of operational visibility, insight and control.



Maintain a clear understanding of water movement, usage and quality.

**Attentis® real-time water height and quality sensors provide:**

Water heights in storage facilities, wells and local rivers and streams

Water quality information

Water movement at facilities and in regional eco-systems

**When operational information is coupled with environmental conditions and rainfall throughout a region, a clear picture of water movement is revealed; in fine scale**

This feature supports greater understanding of localised water elements

Enables improved usage

Delivers greater insight for industries with heavy reliance of water for production

Improved monitoring and information for conservation and environmental management



# Air quality

Air composition is important for the health of every environment.

Attentis® multi-sensors feature fine-scale continuous real-time air quality measurement of a vast range of particulates and gases. Standard measurements include PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, carbon dioxide, carbon monoxide, sulphur dioxide and nitrogen dioxide. Further specific gas type detection is also available.

Measurement is performed by nephelometer optical particle counters using the scattered light principal.

Our world standard air quality measurement and reporting provides immediate notification of a threat, allowing first responders to engage mitigation measures to reduce exposure.

When multi-sensors are combined as a network, Attentis® delivers a unique capability to actively track live air movement and composition throughout a location or region, providing notification of threat type, impact time and concentration level. This early warning capability reduces exposure and the scale of impact.

During a fire event, live streamed air quality information allows first responders and the general public the ability to view live concentration levels across a region, understand the health risks and seek refuge to reduce exposure.

All air quality concentrations are presented live on the Attentis® dashboard with analytics, correlation and AI interpretation available through Attentis® Analytics.

**Fine-scale air-quality for continuous real-time and accumulative levels of PM<sub>1</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> and other particulates**

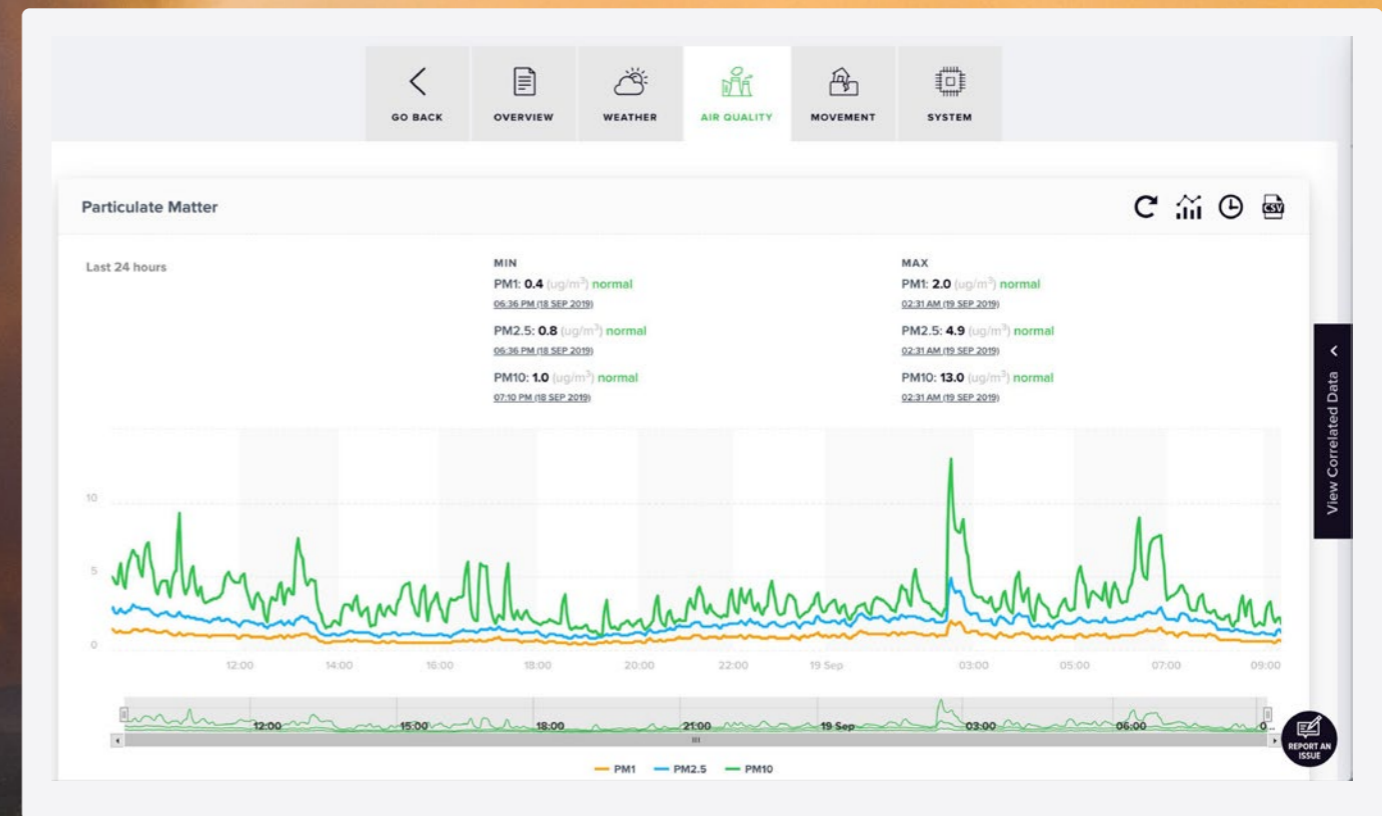
### Particulate measurement

- Ozone
- Carbon dioxide
- Carbon monoxide
- Sulfur dioxide
- Nitrogen dioxide
- Hydrogen sulfide
- Methane

**Tracking air quality concentrations allow emergency services to scale resources inline with future impact prediction**

### Compliant to AS/NZS 3580

Methods of sampling and analysis of ambient air determination of particulate matter





# Micro-climate weather

Attentis® networks provide continuous live correlated weather intelligence.

Attentis® live micro-climate weather information includes wind speed, wind direction, gusts, wind vectoring, temperature, rainfall, relative humidity, barometric pressure and soil moisture sensing. Dew, frost, Delta-T, Fire Danger Index (FDI) and spray drift calculations are also available.

Continuous measurement of river heights, rainfall and soil moisture provides early flood warnings, live water movements, identifies flood zones and details access routes and road impacts in real-time.

During a fire event, live streamed weather (combined with fire movement) allows the deployment of appropriate resources to key locations to minimise impact.

Due to the multi-communication and high speed data transmission capabilities of Attentis® multi-sensors, all information is continuously measured and displayed.

Attentis® weather sensors deliver world standard weather measure in line with the World Meteorological Organisation.

The application of A.I. learning capabilities to Attentis® data provides a new level of insight into changes in the local environment, enabling mitigation, improved planning and risk management.

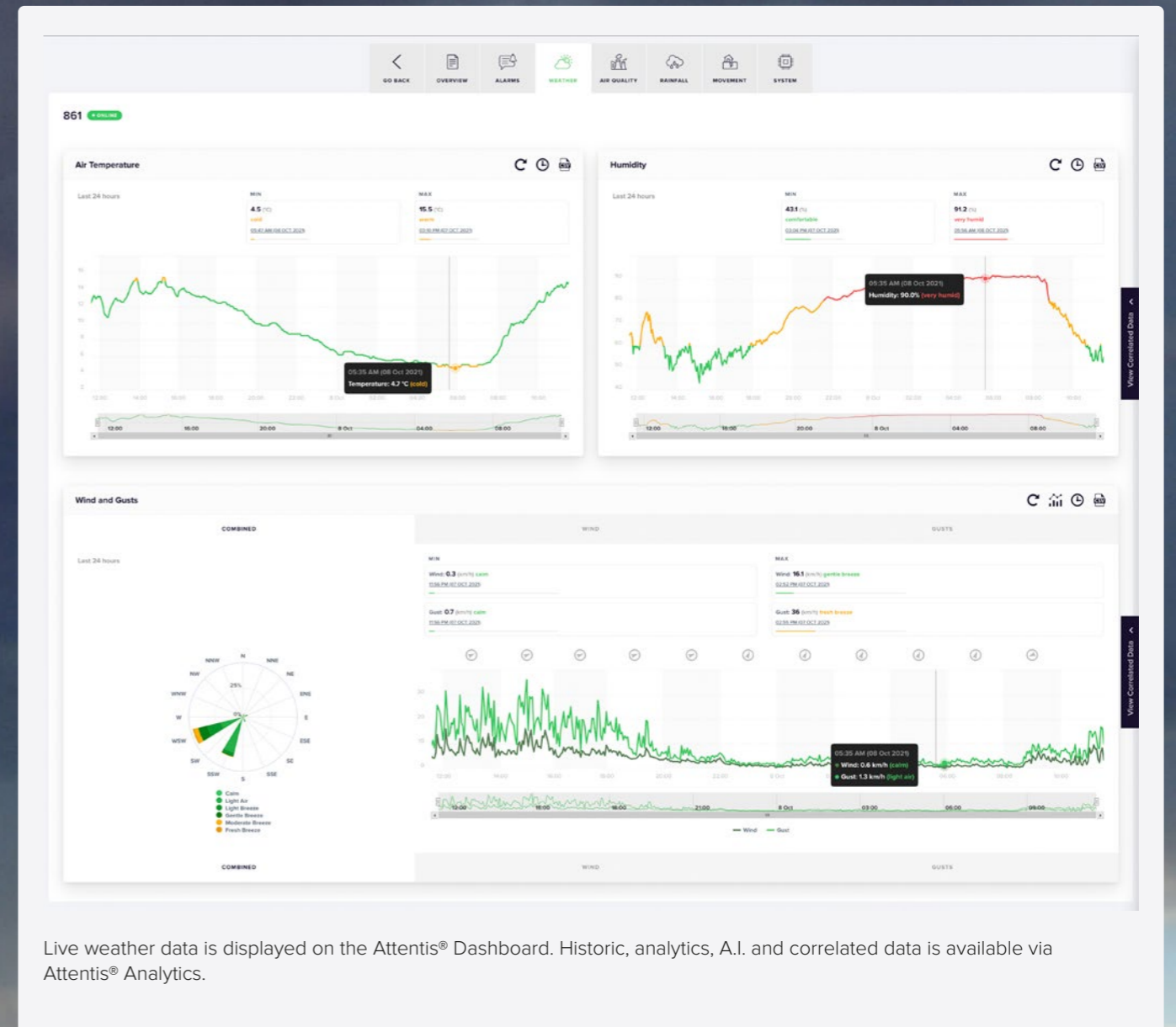
### Provides continuous fine-scale localised weather data

- Wind speed
- Wind direction
- Wind gust and vectoring
- Temperature
- Rainfall
- Relative humidity
- Barometric pressure
- Soil moisture sensing
- Delta-T
- Fire Danger Index

### World Standards compliance

- WMO (World Meteorological Organisation)
- BOM (Bureau of Meteorology)

Attentis® is a trusted provider of weather data to the Bureau of Meteorology through the TPAWS (Trusted Private Automated Weather Stations) Partner Alliance.



Live weather data is displayed on the Attentis® Dashboard. Historic, analytics, A.I. and correlated data is available via Attentis® Analytics.

# Lightning detection

Attentis® combines local and global lightning tracking.

Combining live data from Attentis® multi-sensors in the field with Vaisala's global network of lightning sensors (GLD360) provides the most comprehensive live localised lightning tracking available today.

This network feature allows you to track approaching thunderstorms and lightning activity in real-time and provide an alert detailing the location of the lightning.

An API can also push alerts to an existing notification system (i.e. broadcast SMS or flash message on a DMR radio) notifying all on-site personnel. Warnings detailing approaching severe weather and lightning discharges maintains personnel safety and the ability to track fire ignition locations.

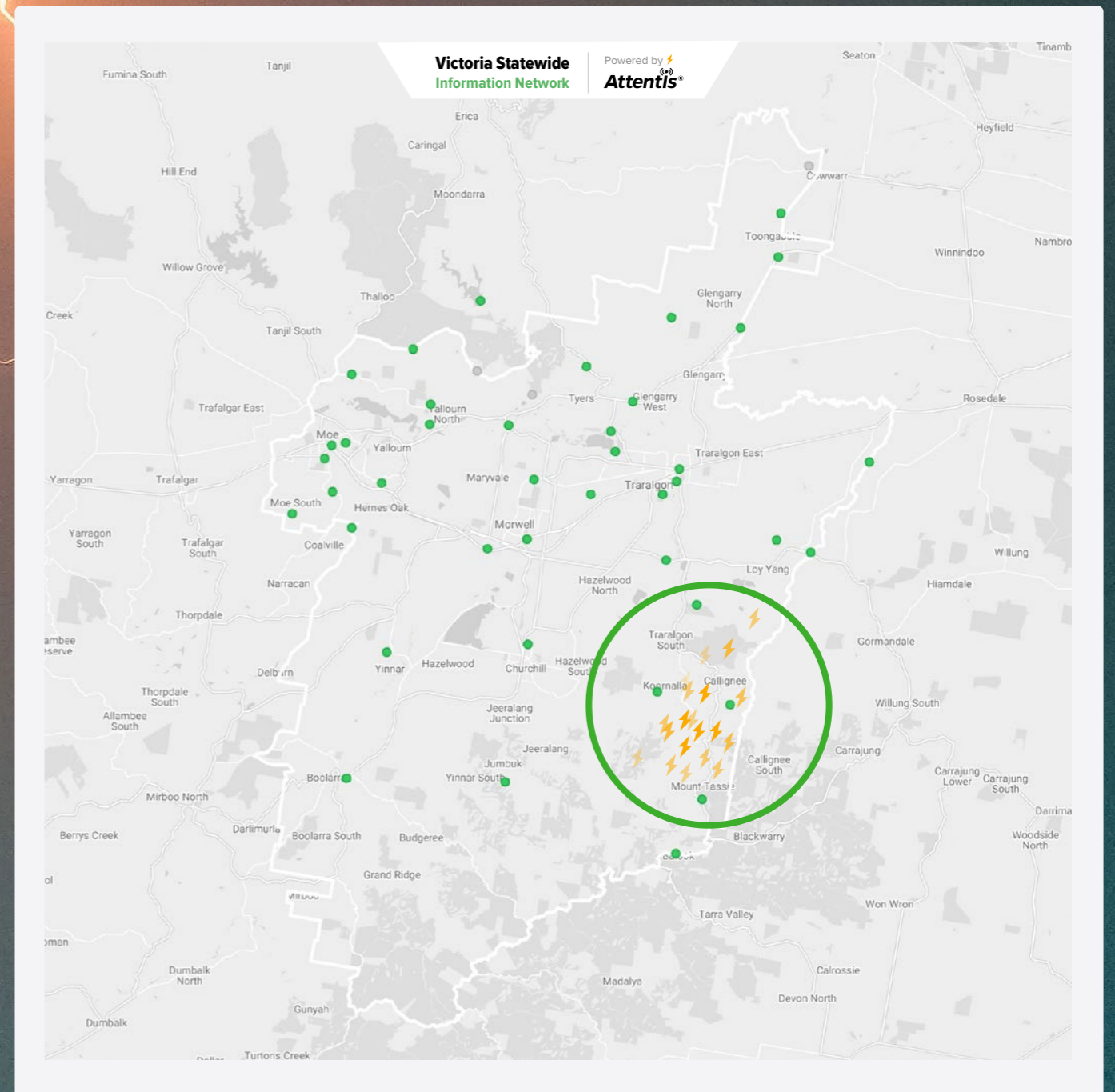
**Combines local and global lightning tracking**

**Live data from Attentis® multi-sensors in the field with Vaisala global network of lightning sensors (GLD360)**

**Track approaching thunderstorms and lightning in real-time**

**Alert captures current location of lightning activity**

**API can push notifications to other notification systems (broadcasts SMS, to DMR message channel)**



# Movement

Attentis® constructs ground, tower and structural movement sensors to detect fine scale movement.



Attentis® R Series multi-sensors are available with continuous vibration and movement sensing (measured in RMS) to determine structural integrity issues in both real-time (sudden onset) and aggregated time (long-term structural degradation of the structure itself).

Applications include equipment, transmission towers, powerline monitoring, structural footings, walkways, structures, dam and mine walls.

Lightweight applications employ our small 0.55kg cigar sensors, wirelessly transmitting data to a main R Series multi-sensor (3.8kgs). Multiple cigar sensors can be used in any installation to measure multiple elements.

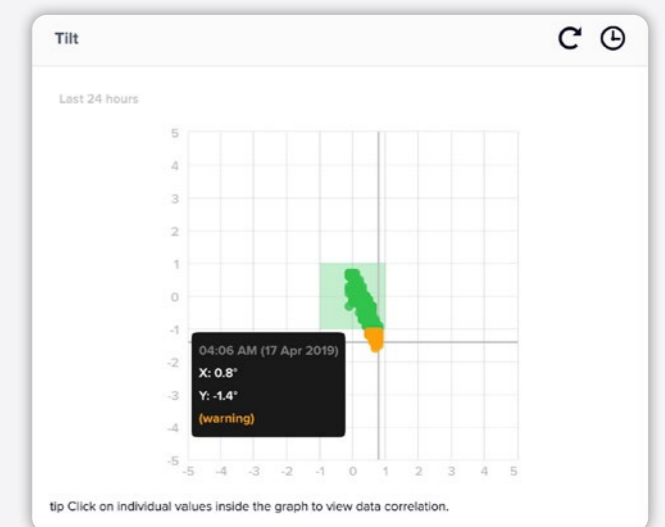
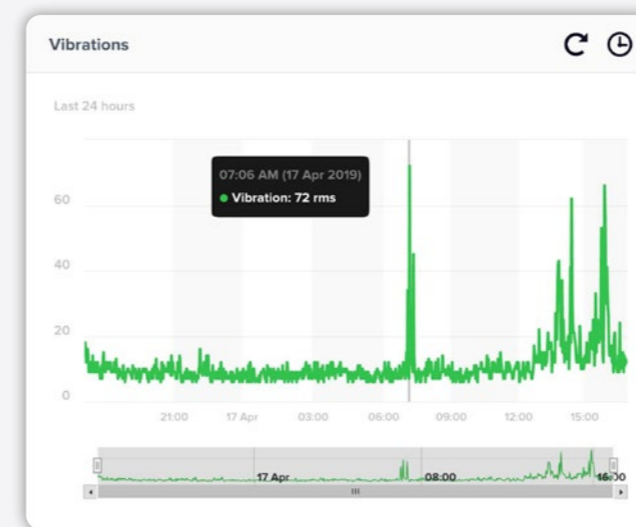
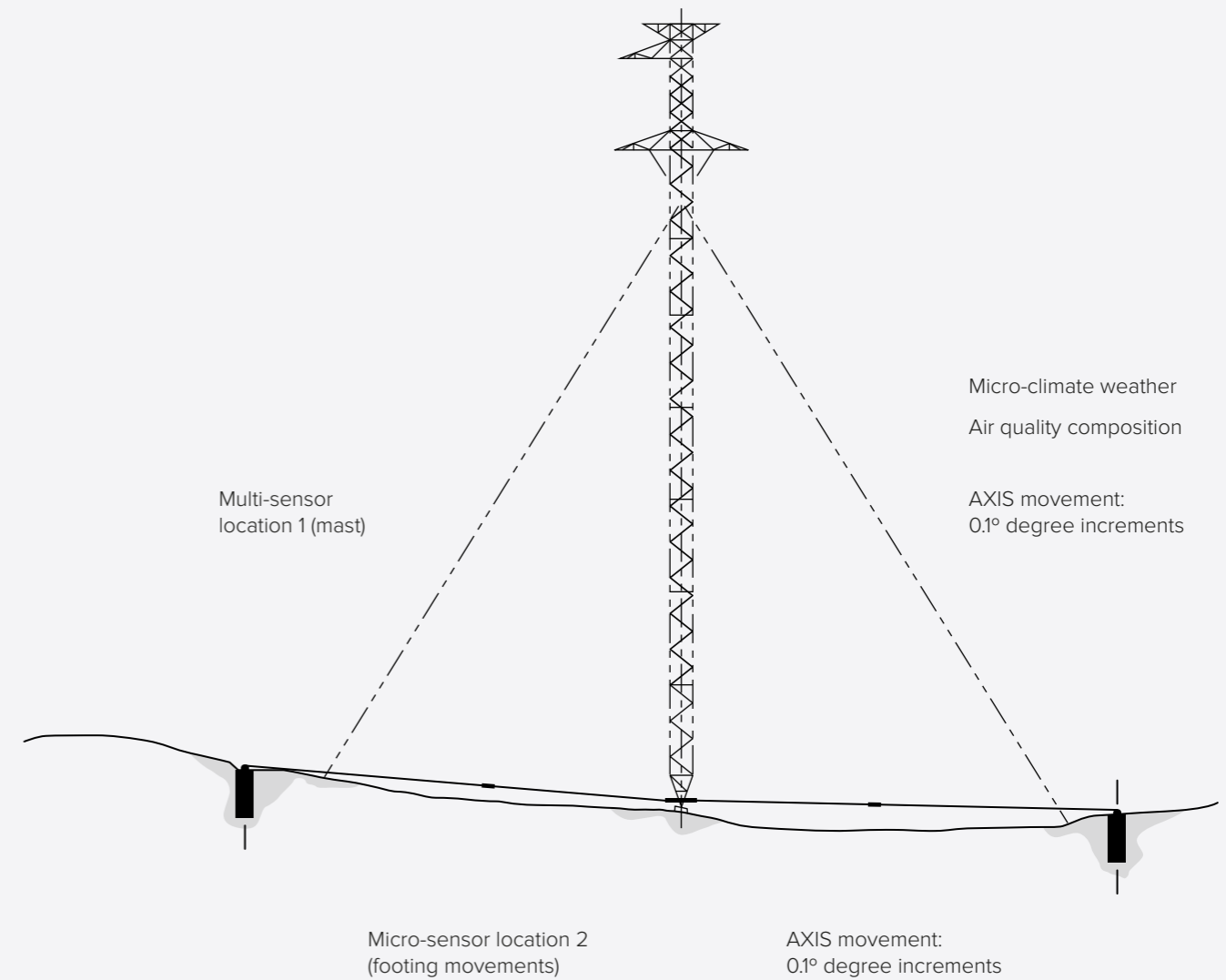
Optional noise, air quality sampling, harmonic balance, frequency tracking, micro-climate weather, 360° visual cameras, flame, arc and spark detection and thermal imaging capabilities can also be incorporated to pinpoint an issue or concern.

## Movement – multi-axis and GPS assisted

### Vibration

### Correlation with other influencing data

- Wind speed
- Wind direction
- Air quality
- Audio
- Thermal imaging and detection
- Visual imaging - still, video, A.I. enhanced
- Harmonic balance
- Frequency tracking



Vibration is reported in real-time and over-time analysis. Tilt maintains a visual reference to movement of a structure (sway) providing notification when outside normal parameters.

# Powerline

Attentis® provides real-time monitoring of energised and de-energised lines through small wireless sensors, referred to as cigars.

Wireless cigar units are small lightweight (0.55 kG) sensors used to measure minor movements and line proximity, transferring data to a central R Series multi-sensor.

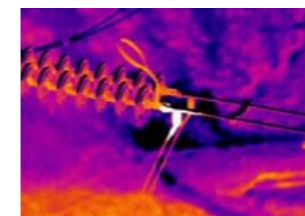
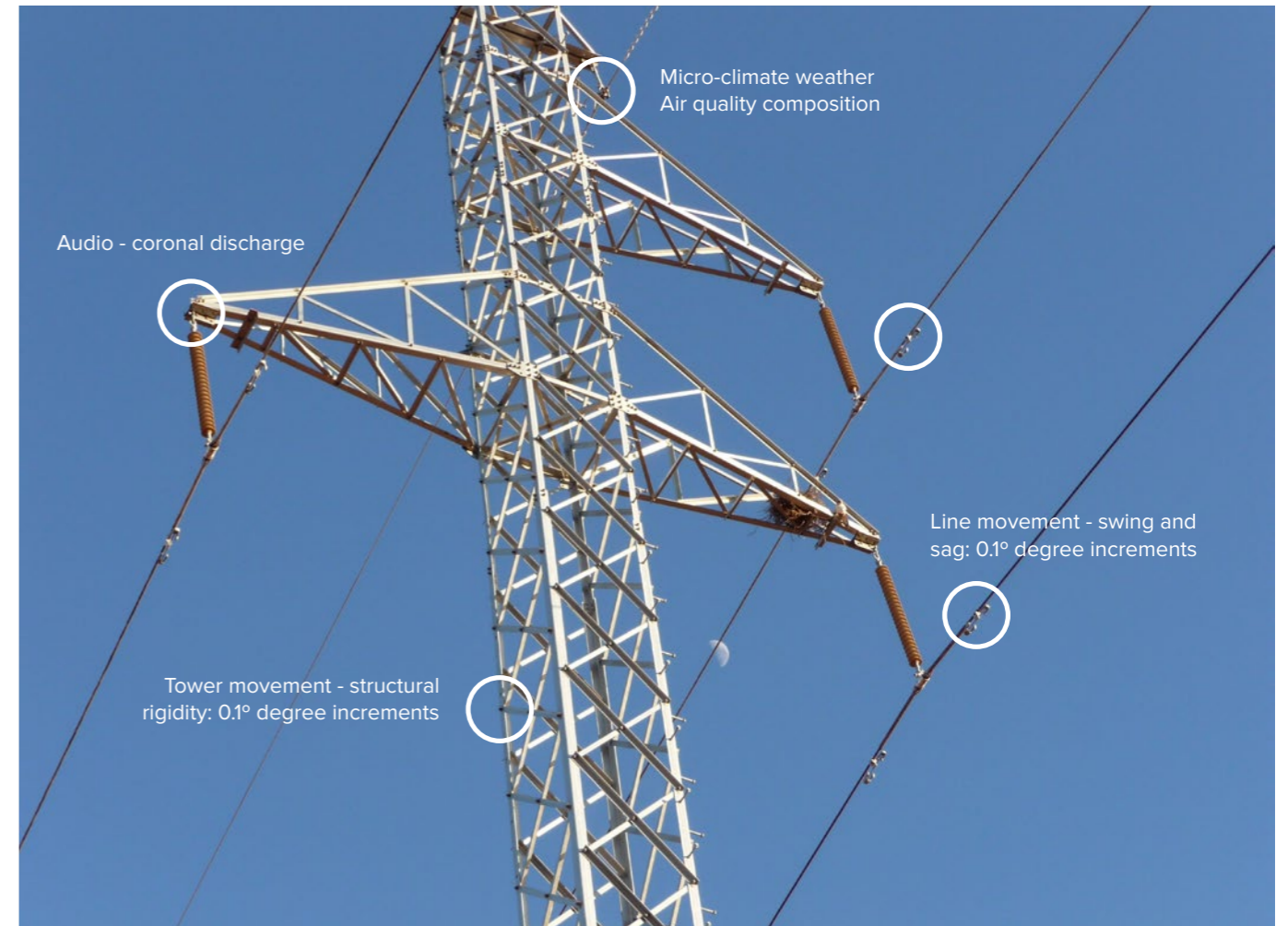
### Wireless Cigars:

- Monitor swing and sag of each powerline to enable pinpointing of sections of vulnerability
- When coupled with live wind information from the main R Series multi-sensor, weather related impacts on individual powerlines can be identified
- Monitor impacts and effects of increased voltage / load through the lines (line sagging)
- Provide early warning of line integrity issues (clashing / movement) to enable rapid response; site attendance / power shutdowns
- Can incorporate smoke detection to identify the presence of smoke at each location - a low cost early detection network for fire starts

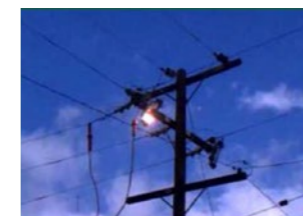


### An integrated network, supported by A.I. and analytics:

- Detail air and wind movements throughout line spans to increase resilience throughout high risk areas
- Enable informed decision making regarding level of risk, need for shutdown and visibility when lines are to be re-energized
- Average wind speed throughout each zone is recorded and analysed
- Long term maintenance mapping to identify lines and locations that experience increased weather and environment impacts
- Correlation of wind and tower movement data to identify FMEA (Failure Mode and Effects Analysis)
- Creation of an environmental baseline of conditions to aid future planning and powerline construction objectives



24-hour thermal inspection for arc, flame and fatigue



24-hour ignition detection, line swing and sag monitoring



360° remote visual inspection

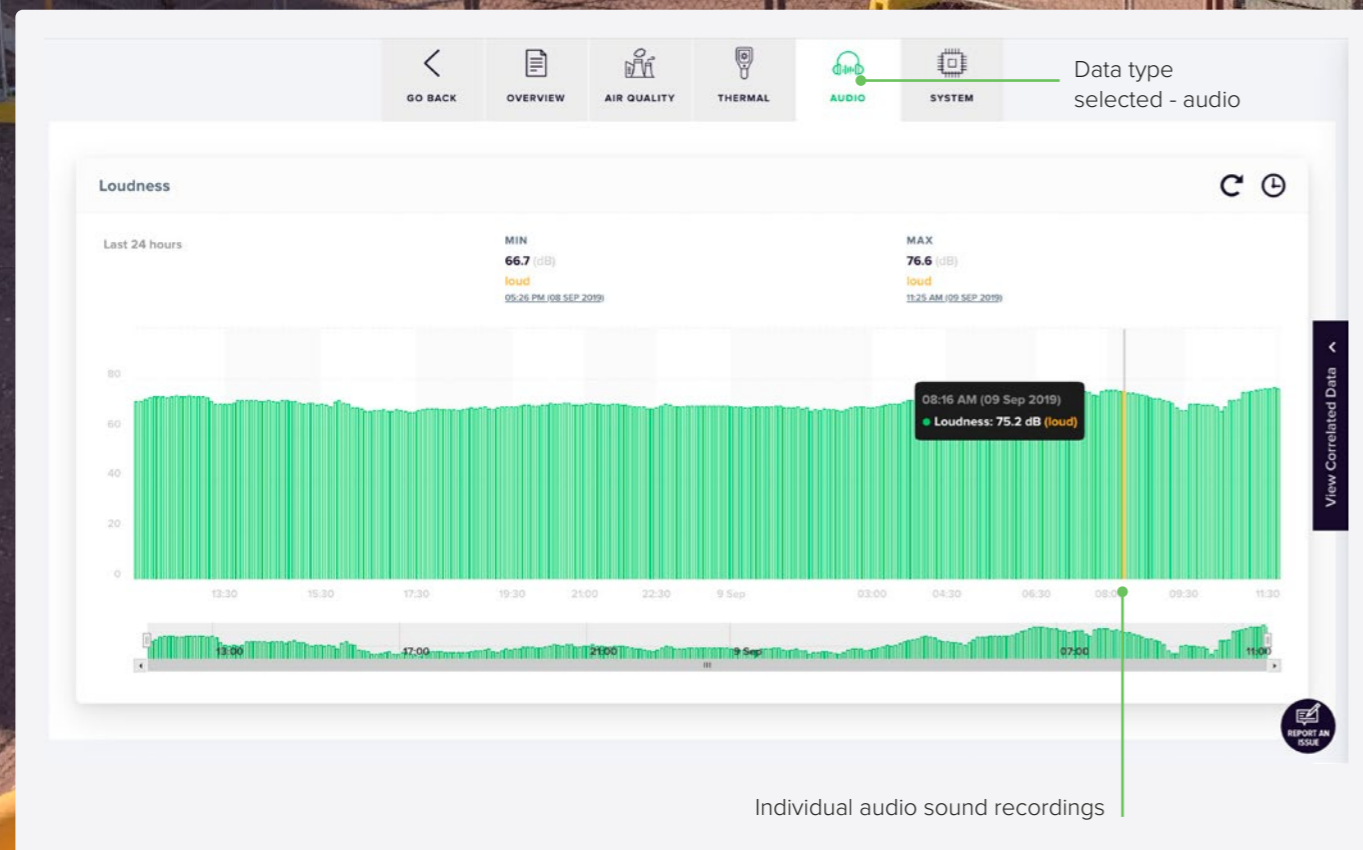


24-hour structural movement monitoring

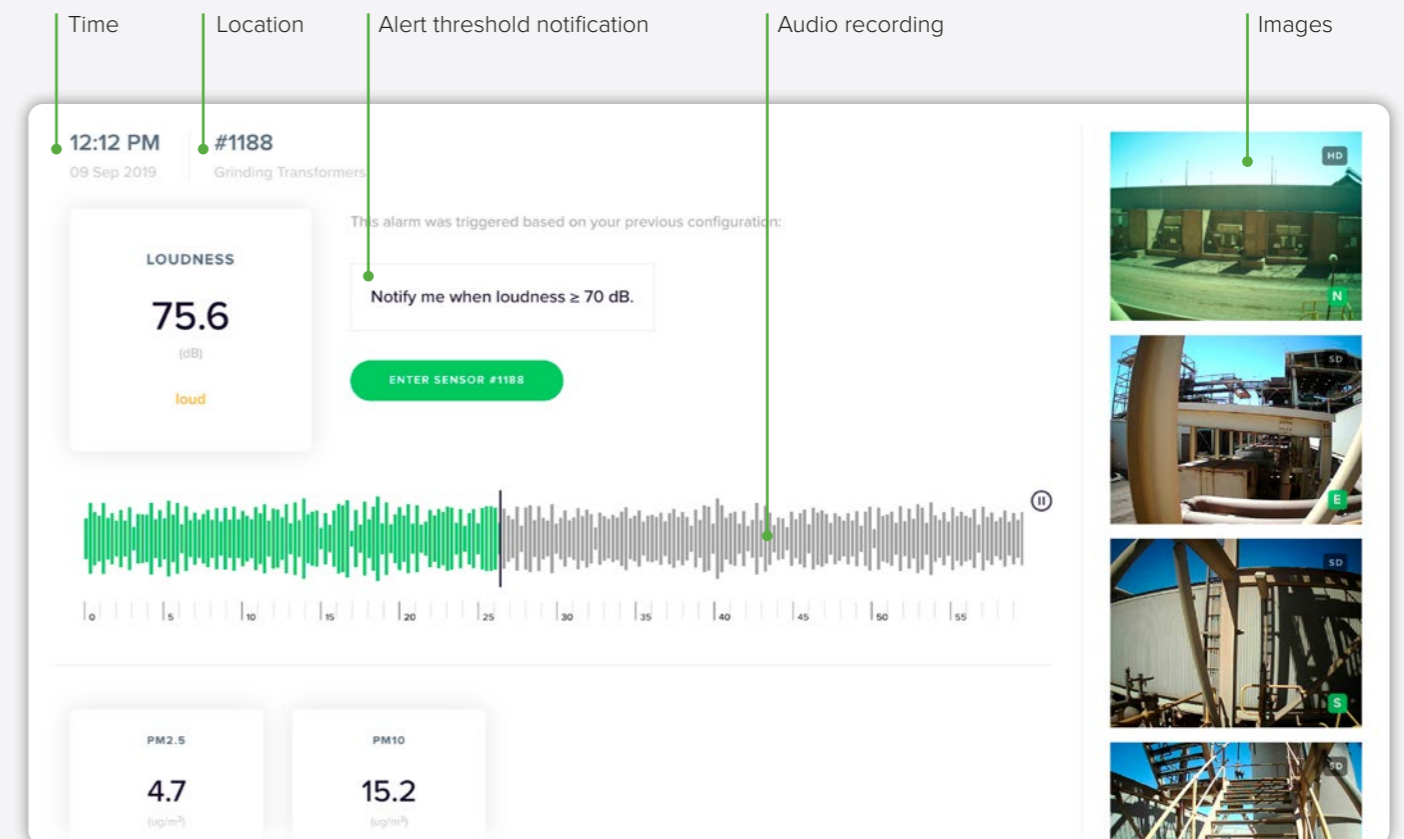
# Audio

Attentis® R Series multi-sensors are available with audio recording and playback.

Audio monitoring provides an additional layer of insight highlighting minor changes that indicate future failure. Active monitoring and tracking of audio provides detection of operational impacts including component wear and end of life. Combining audio tracking with visual and thermal imaging can identify current and future faults, prior to outage, shutdown or catastrophic failure.

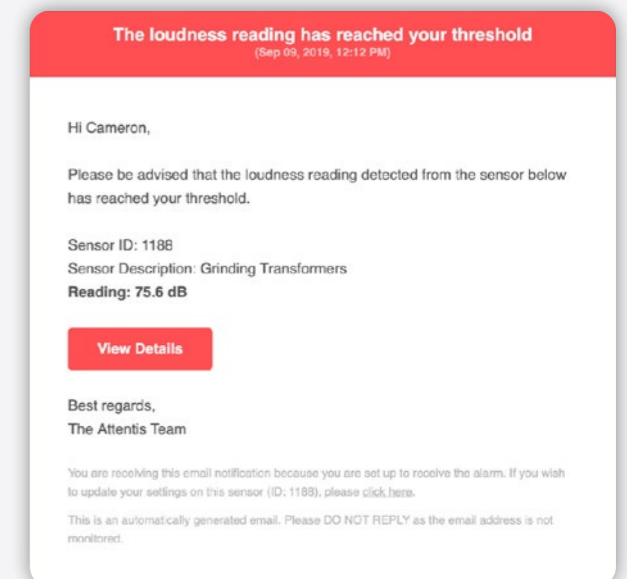


# Audio alert notification



Noise levels exceeding the preset threshold trigger an instant alert notification, sent via SMS and/or email.

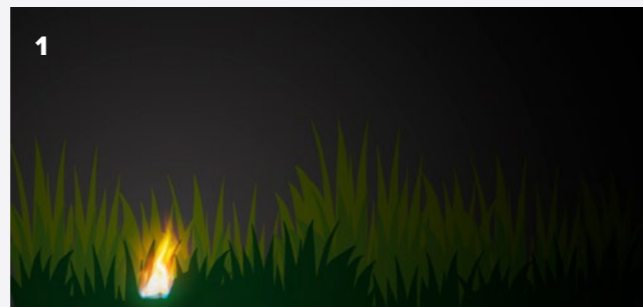
Audio alerts detail the time, location, highest reading, on site images and feature an accessible MP3 audio file to identify the source of the noise.



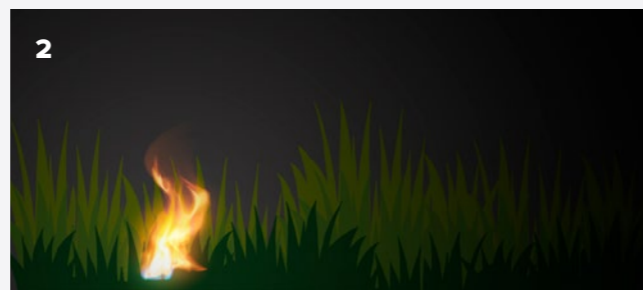


# Artificial Intelligence

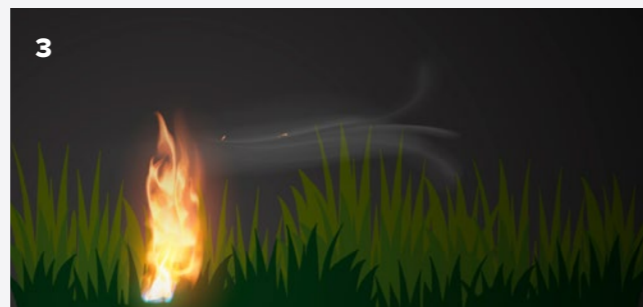
Attentis® multi-sensors incorporate artificial intelligence to determine variations and changes in images and environmental factors to reveal trends, growth rates and indications of future failures.



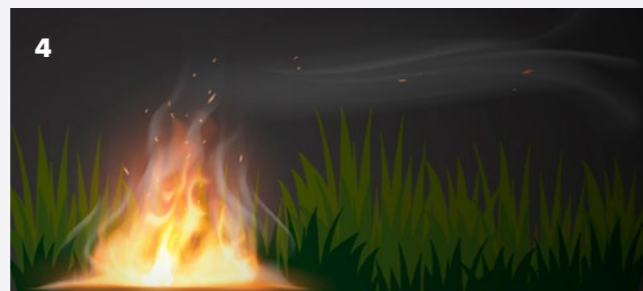
1 Continuous image capture identifies ignition



2 Alert sent detailing changes (presence of flame) and conditions



3 A.I identifies growth rate and direction



4 Continuous imaging reveals movement, intensity and growth

Actively tracking minor changes in surfaces, terrain and landscapes can identify early signs of future impact, allowing mitigation measures to be engaged prior to catastrophic failure. Attentis® incorporates Artificial Intelligence into every multi-sensor, measuring multiple elements at each location to provide unparalleled insight into environmental factors that influence events, operations, maintenance and management.

Attentis® patented technology delivers fine scale continuous measurement, correlation, analytics and A.I. processed in the device (edge computing) as well as the cloud, maintaining all capabilities when connectivity is interrupted.

Defined preset alert parameters (e.g. growth rates, surface changes, increased equipment operating temperature) trigger an alert once the threshold is reached, delivering notification, mitigation and scheduled maintenance crews to attend.

Applying A.I. vastly improves asset and operations management, is a low cost / high value resource and identifies conditions that would normally go unnoticed and in many cases only becoming apparent through physical attendance or failure.



Active processing of images highlights variations, changes, object visualisation and determination

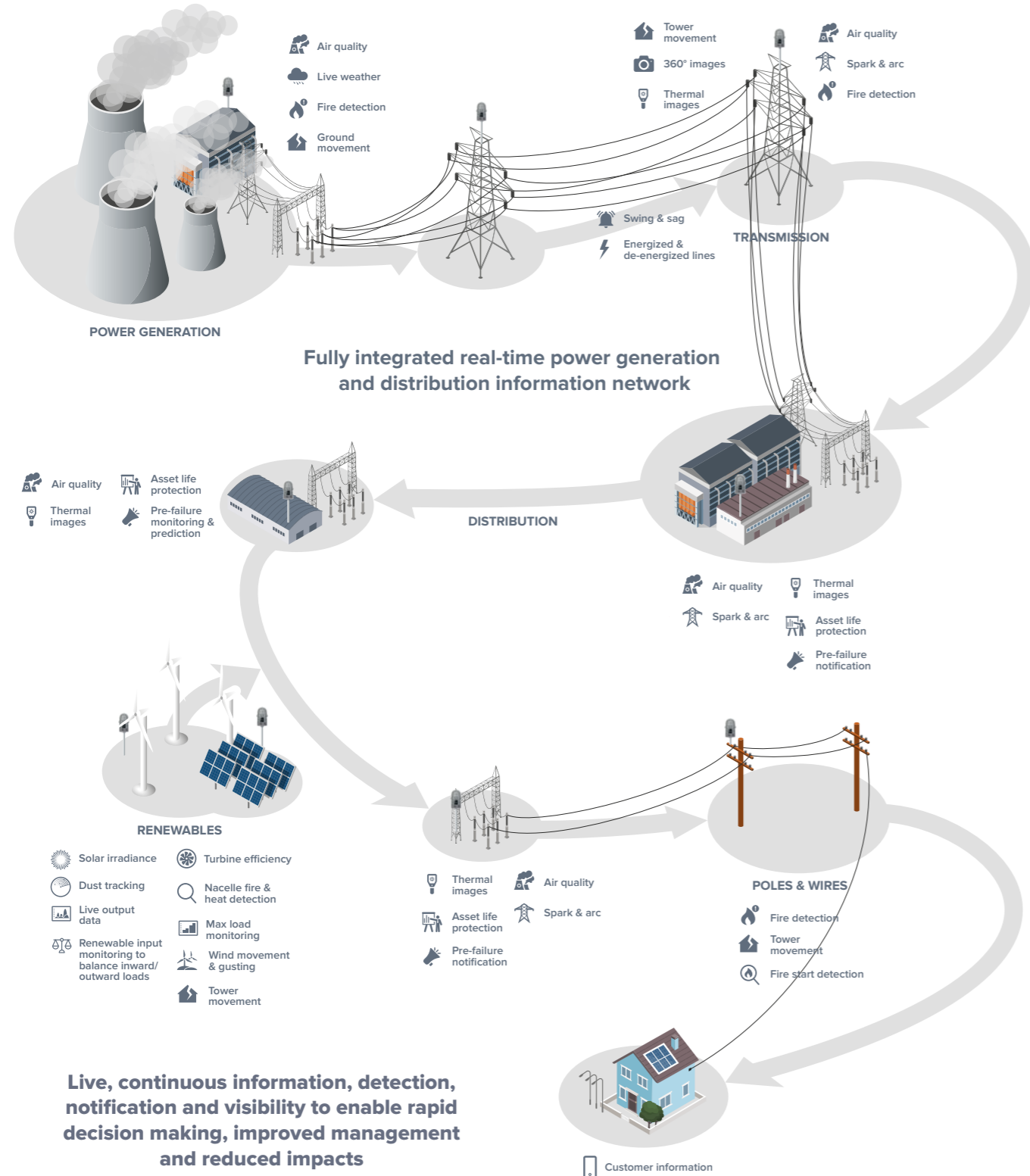


Remote gearbox monitoring to predict probability of failure/rate of decline. The ability to have complete visibility of processing operations with only skeleton staff present

## Active monitoring of critical infrastructure

Attentis® R Series multi-sensors and accompanying micro-sensors work in unison to actively monitor a range of critical assets and infrastructure to provide improvements in:

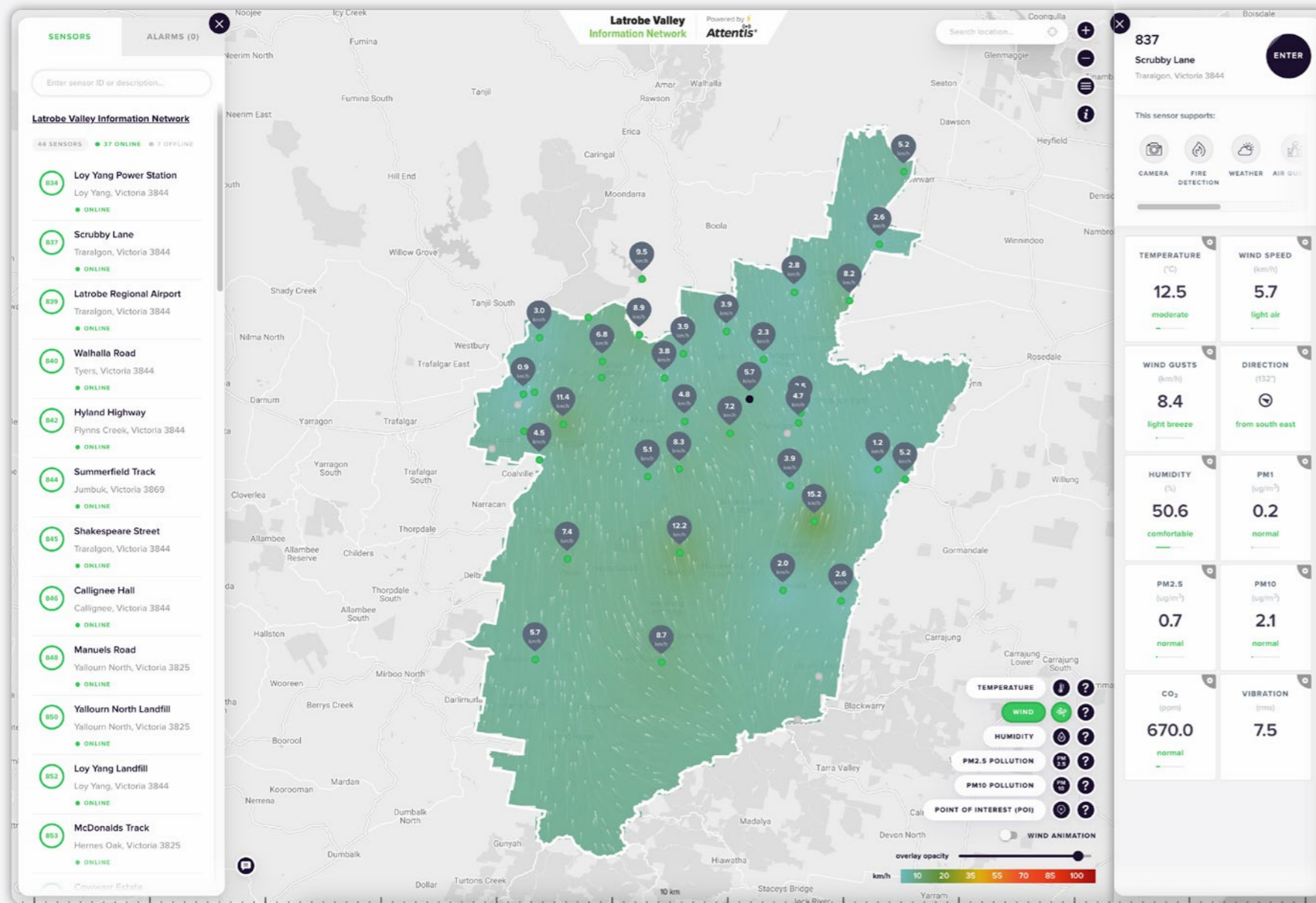
- Visibility
- Mitigation
- Early detection
- Remote asset management



## Mining Use Case



# Real-time information



## Attentis® Network interface

Attentis® constructs a range of interactive interfaces and Apps combining all site specific data into a single intelligent interface with navigational ease and information accessibility a priority.

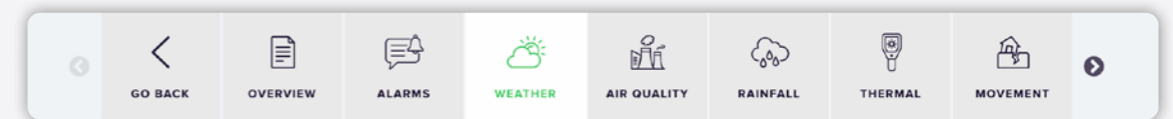
Information is provided in real-time, correlated and historic formats to provide new levels of insight and understanding.

Selecting temperature, wind, thermal, humidity, air quality, accumulation or rainfall readings instantly reveals historic information, minimum and maximum recordings, access to

previous alerts and comparison data to enable analysis to reveal correlations, trends and prediction.

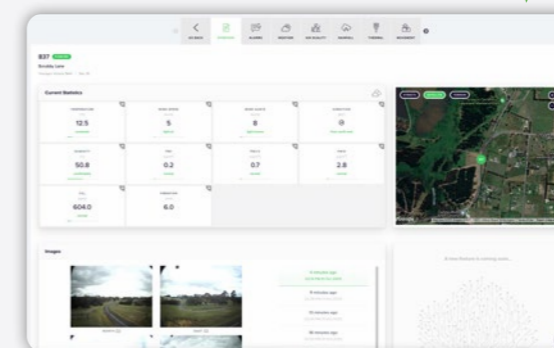
All Attentis® interfaces are designed to gain the confidence of the user, enabling greater interaction and understanding of factors that impact operations, assets, locations and environments.

An entire range of customisable features, alerts, highlights and notifications enable individual users to combine integrated features to suit their individual requirements.

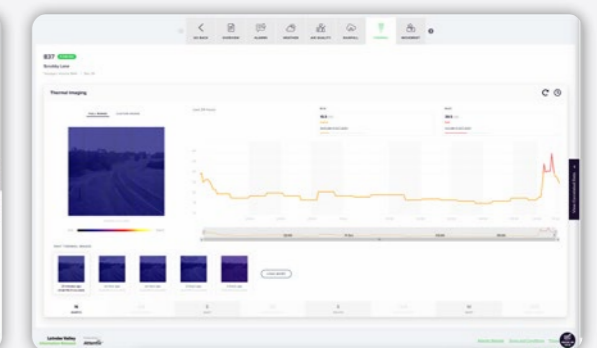


Interface tabs provide the ability to drill down into each sensor capability.

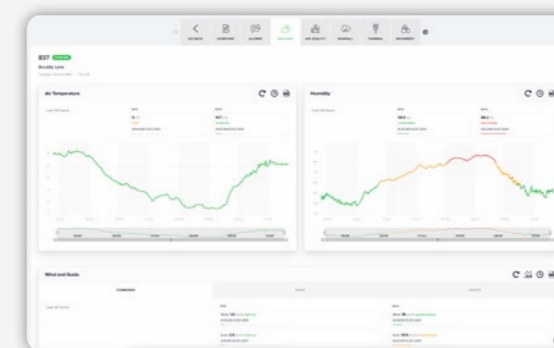
Historic information, minimum and maximum recordings, access to previous and comparison data for correlation, trends and prediction.



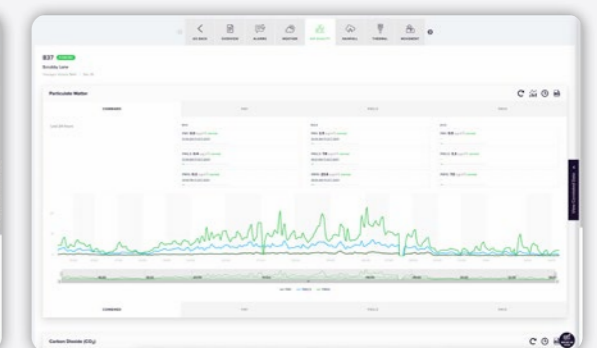
Individual site screen - all information



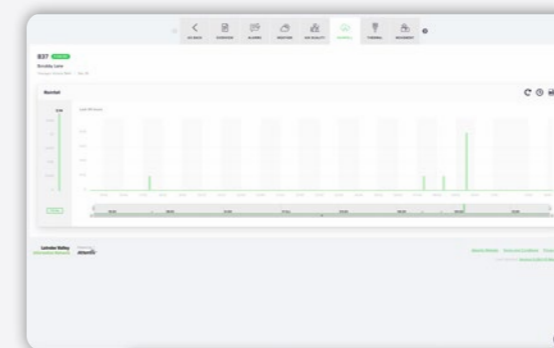
Thermal imaging and tracking - 360°



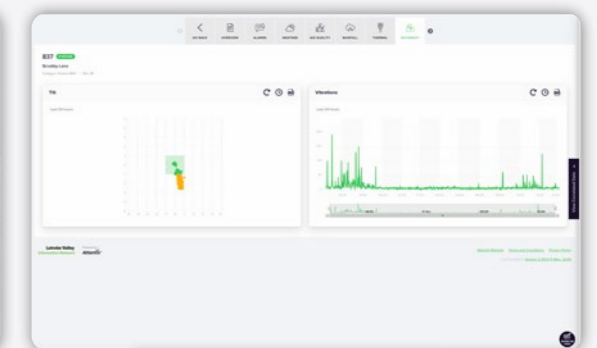
Weather - graphed conditions for 24-hours



Air quality monitoring - multiple particulates and gases

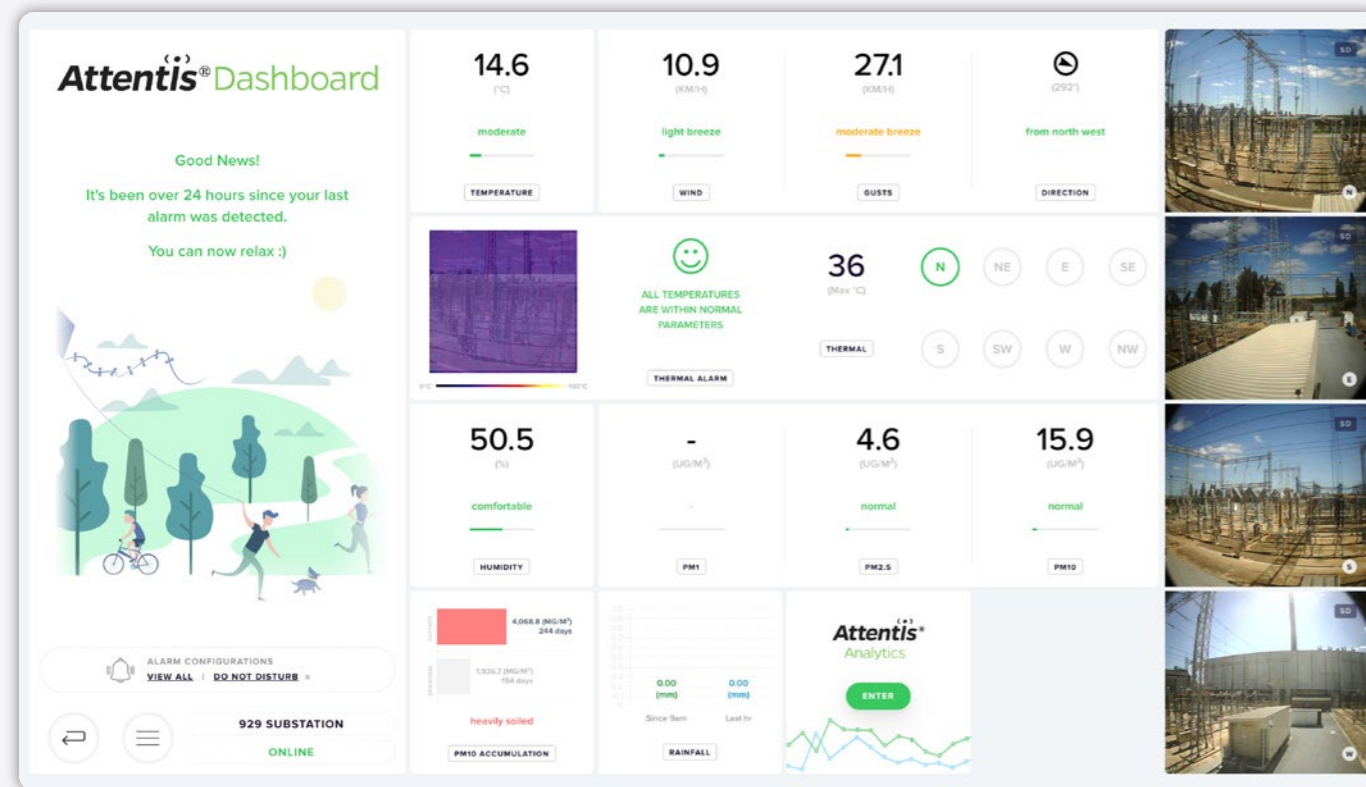


Rainfall tracking at the location



Movement - vibration / tilt / safe parameters

# Dashboard



Attentis® Dashboard enables users to view all conditions at a specific location including visual and thermal images.

Selecting a current condition reading tab reveals historic information with selectable timeframes. Alert thresholds for every parameter can be established through the Alarm menu.

The Dashboard allows users to interrogate a location to view all real-time conditions, images and correlations supported by access to detailed historic information.

Attentis® Dashboard provides the ability to rapidly investigate an event or changes at a specific location to enable improvements in operations, maintenance and site management.



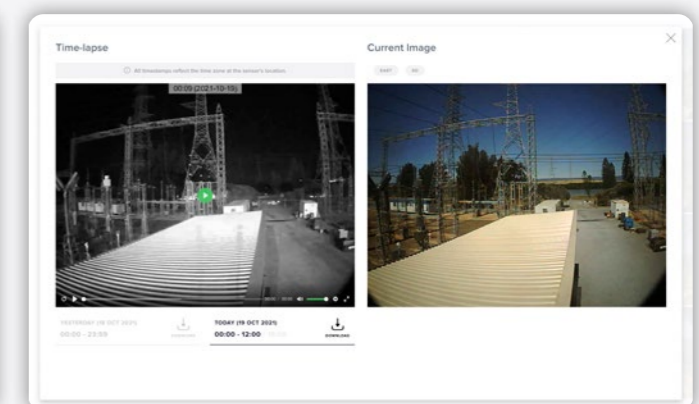
Temperature monitoring



Air quality monitoring - multiple particulates and gases

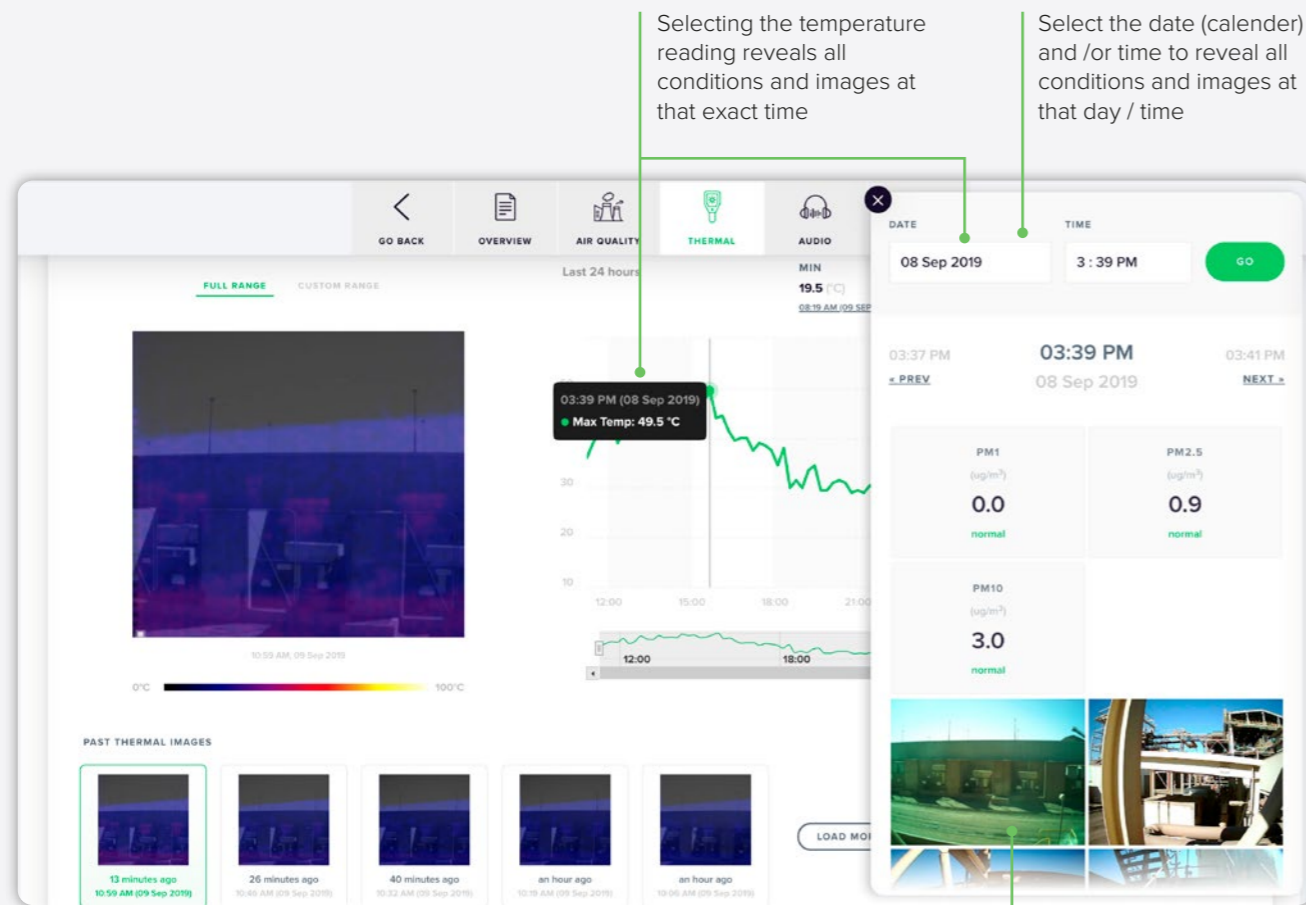


Wind monitoring



Time-lapse imagery

# Data Correlation

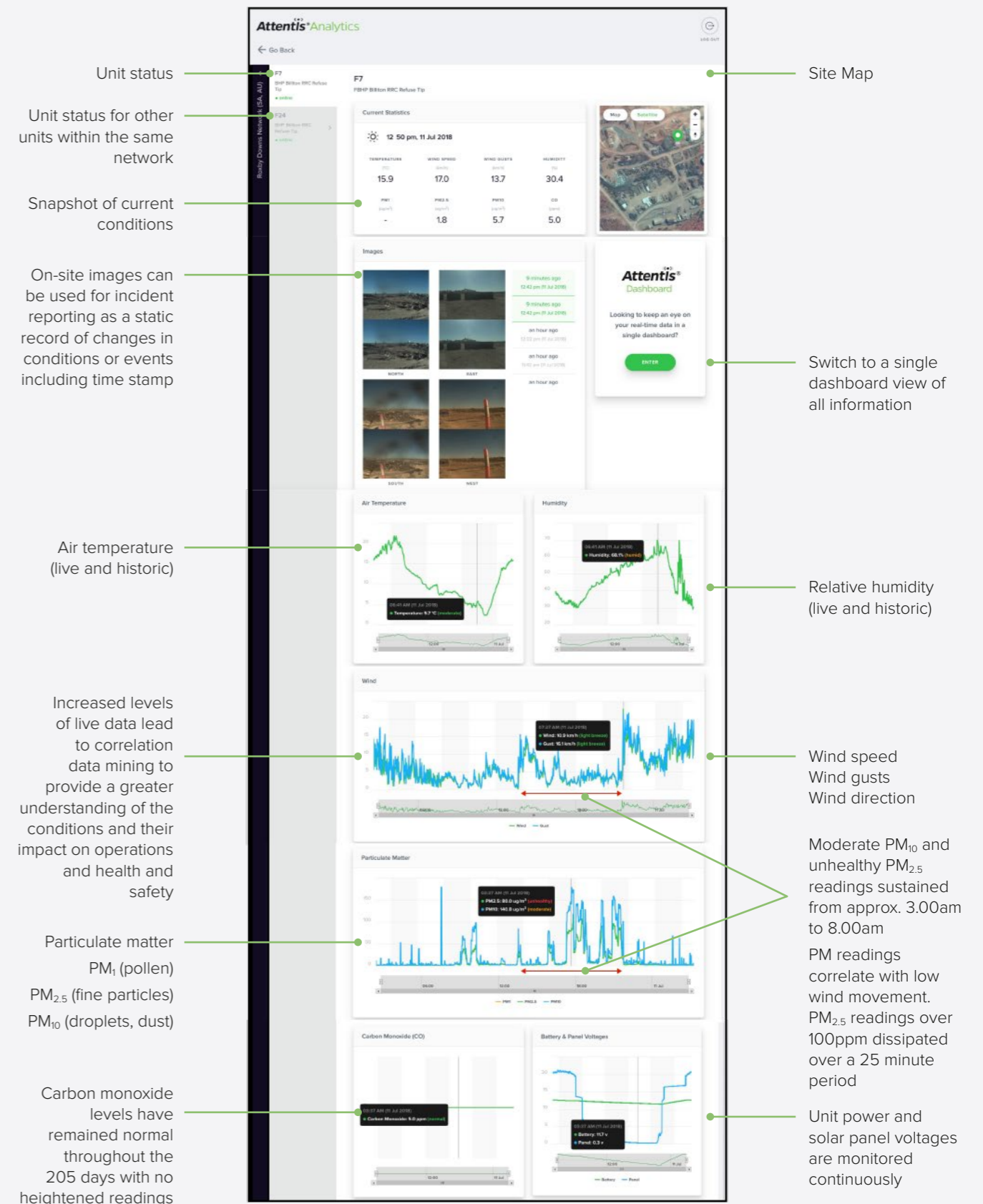


Images on 8th Sept at 3.39pm

## Correlated data from a specific day / time

Correlated data is designed to reconstruct an event or determine a future component failure.

# Analytics Dashboard



In 2019, Attentis® validated the local community and industry need for live, relevant, reliable, localised information through the construction of the Latrobe Valley Information Network.

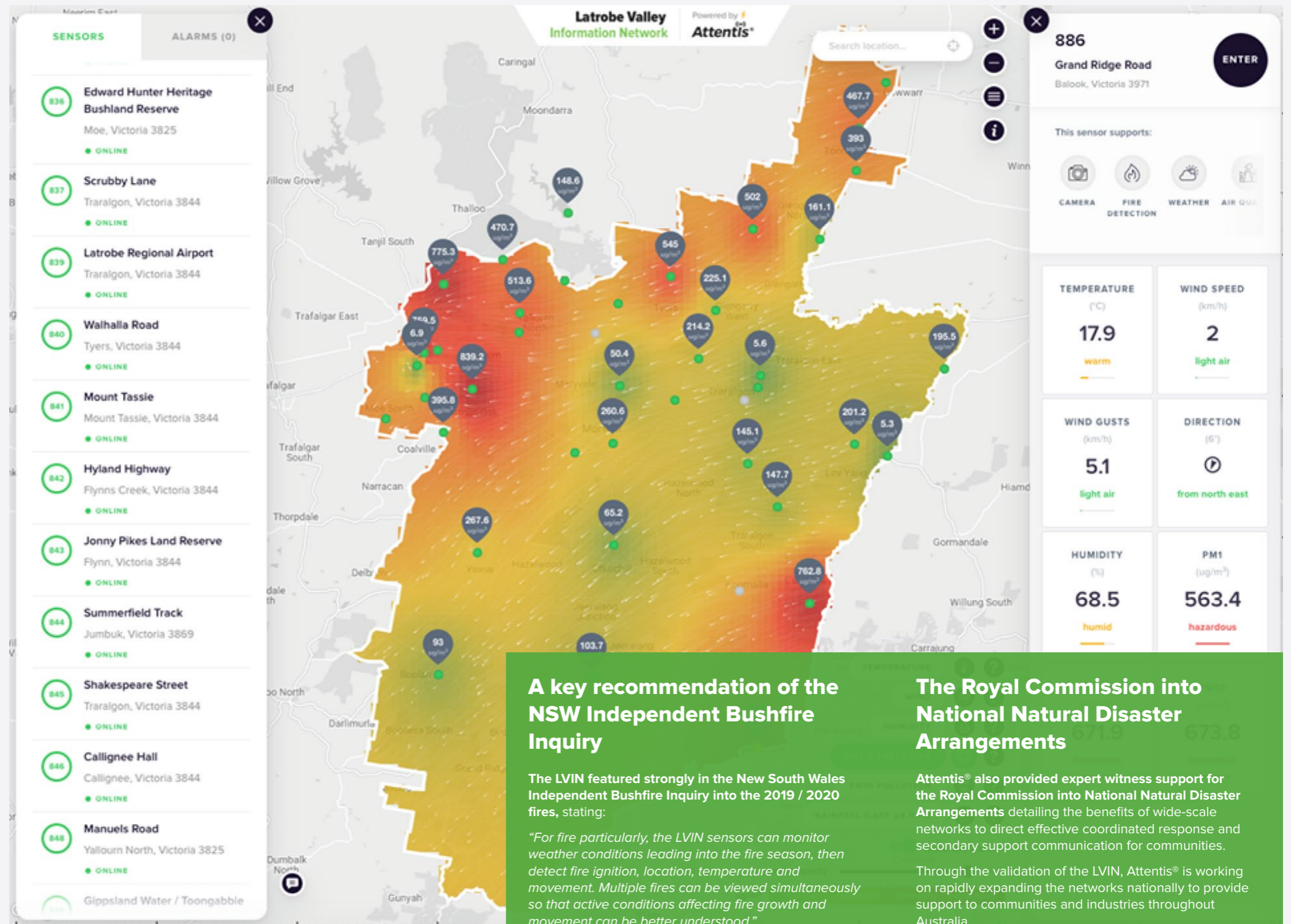
Incorporating real-time micro-climate weather, air quality monitoring, fire start, smoke and flood detection, soil moisture, ground movement, active rainfall and multiple communication into a single intelligent data network, Attentis® created the largest environmental monitoring network ever constructed, globally.

The Latrobe Valley Information Network (LVIN) is a live regional support system providing early detection of critical events (fire ignition, floods, air quality), uninterrupted situational awareness and access to real-time information for the entire local community, supporting public health, safety, and community confidence, everyday.

Access to both live and historic data enables local industry and businesses to assess trends, make informed decisions, engage mitigation actions, improve productivity and yield, contributing to regional GDP, local job growth and community resilience.

The LVIN has delivered operational improvements for local agriculture, utilities, forest industries, health services and emergency management, employed local contractors and businesses during construction and restored public confidence in the wake of the Hazelwood mine fire.

This network has become a staple for local industries, government agencies, utilities, local government and thousands of local and neighboring residents, accessing the network on a daily basis.



[www.lvin.org](http://www.lvin.org)

### A key recommendation of the NSW Independent Bushfire Inquiry

The LVIN featured strongly in the New South Wales Independent Bushfire Inquiry into the 2019 / 2020 fires, stating:

*“For fire particularly, the LVIN sensors can monitor weather conditions leading into the fire season, then detect fire ignition, location, temperature and movement. Multiple fires can be viewed simultaneously so that active conditions affecting fire growth and movement can be better understood.”*

*“Installations such as this in high-fire risk areas of NSW, especially near towns and cities, would be an important, relatively cheap and relatively quick development.”*

Forming the basis for recommendations 4, 34 and 35.

### The Royal Commission into National Natural Disaster Arrangements

Attentis® also provided expert witness support for the Royal Commission into National Natural Disaster Arrangements detailing the benefits of wide-scale networks to direct effective coordinated response and secondary support communication for communities.

Through the validation of the LVIN, Attentis® is working on rapidly expanding the networks nationally to provide support to communities and industries throughout Australia.

The benefits of the technology will provide the platform for proactive disaster mitigation, public safety, critical infrastructure protection, agricultural yield improvement and community resilience.



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Creating intelligent sensor networks is a major step in understanding environmental factors that impact our daily lives.

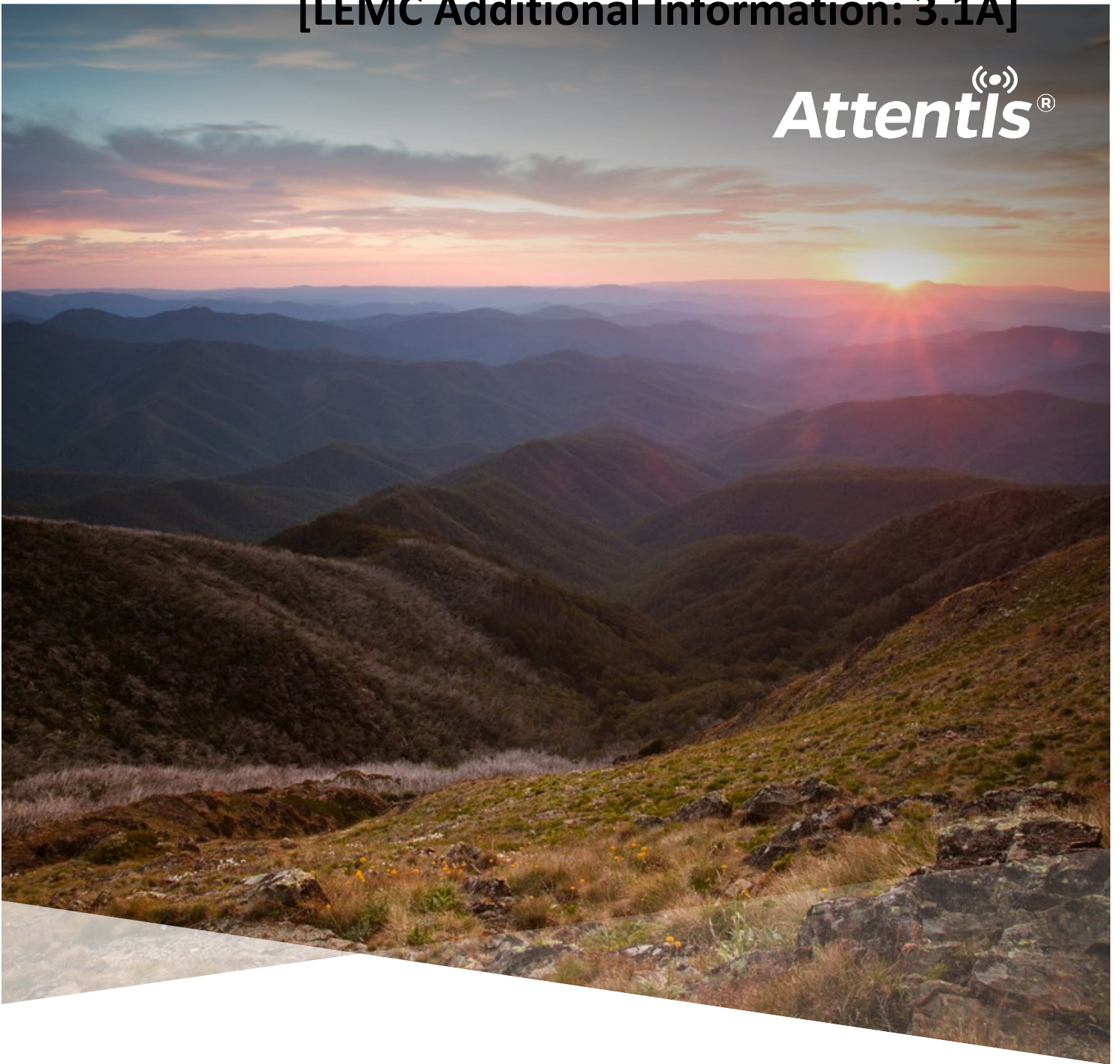
Attentis® Technology has invested years of research and development, testing our networks in extreme conditions to ensure reliability.

Attentis® intelligent networks transform life through improved human understanding of, interaction with and response to, the environment we live in.

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## Latrobe Valley Information Network

### LVIN.org


An award-winning intelligent live sensor network measuring all environmental elements, delivering early detection, proactive disaster mitigation, public health and safety, critical infrastructure protection, industry visibility, resource protection and community resilience.

July 2021

**STRICTLY COMMERCIAL IN CONFIDENCE**

The enclosed contents can only be disclosed to a third party with the express written approval of Attentis<sup>®</sup> Pty Ltd.





**“Access to real-time information on this scale will assist to build community resilience and confidence, and lead to an informed understanding during events that impact lives throughout the region.”**

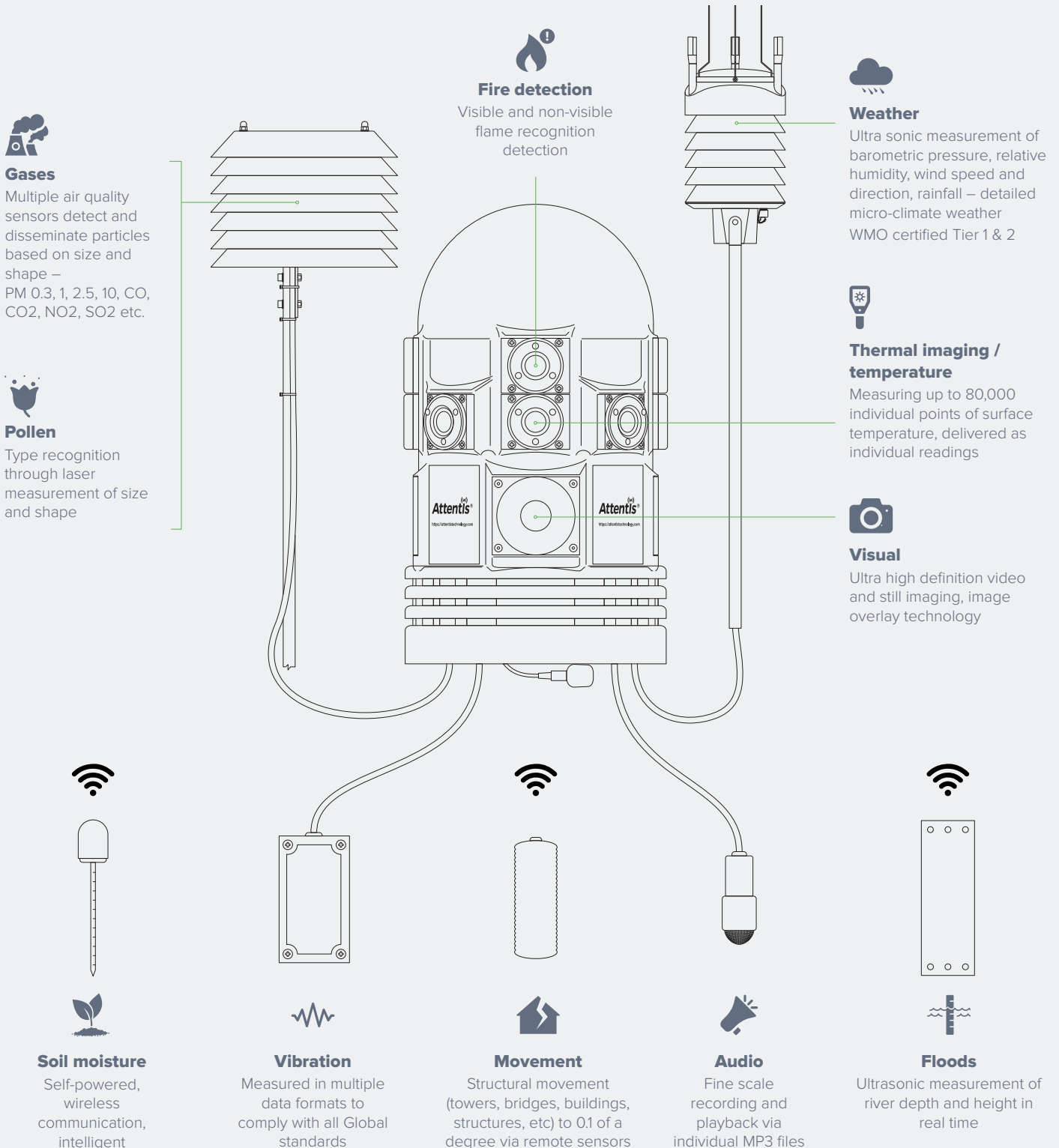
**“Expanding this network will bring greater benefits to all communities and agencies increases the level and breadth of real-time information available.”**

Lance King AFSM

Latrobe City Council - Emergency Management

## Intelligent, integrated, intuitive sensors 44 locations, 1,470 sq klms - real time information

The Latrobe Valley Information Network combines 44 intelligent patented sensors into a high speed, continuous information streaming service for emergency services, agencies, businesses and communities to maintain awareness of live conditions, events and impacts as they unfold - the LVIN.org



# [LEMC Additional Information: 3.1A]



## The Latrobe Valley Information Network powered by Attentis®

In 2019, Attentis® constructed the Latrobe Valley Information Network (LVIN.org): 44 key locations featuring our patented, self-powered Attentis® R-series sensors, integrated to form an intelligent network that continuously streams real-time environmental information coupled with unique detection capabilities.

Funded jointly by the Australia Federal Government and Attentis®, the LVIN was constructed to demonstrate the ability of this Australian developed technology to address community, industry, agency and local government need for real-time, integrated, intelligent information throughout the region.

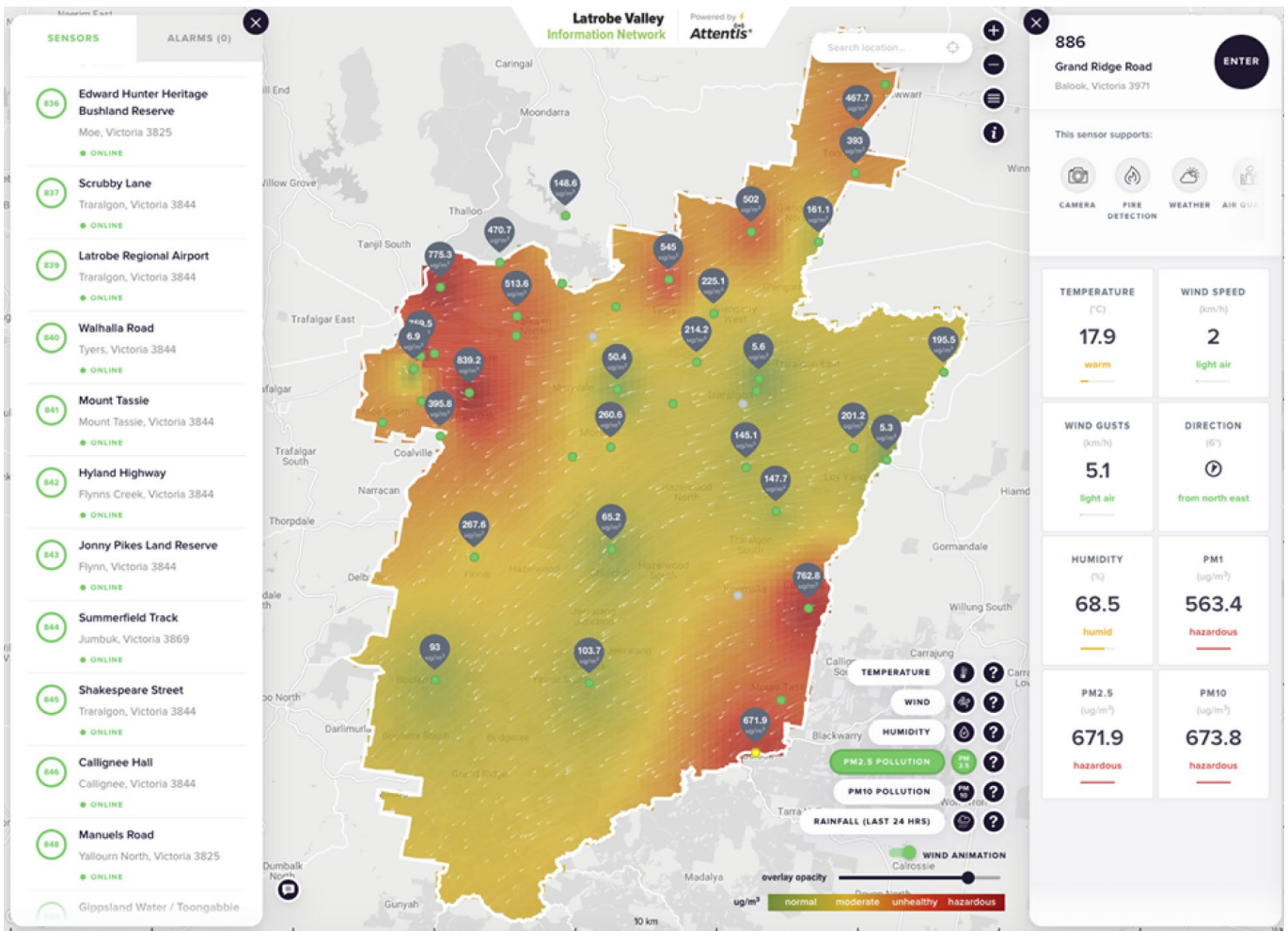
The Latrobe Valley region is home to large scale power generation and distribution, plantations, reservoirs, national parks, coal mines, paper and timber mills and a wide variety of agriculture and farming. The area is also a high fire and flood risk region with previous air quality impacts from several large scale bushfires and a mine fire.

**“We are excited (about the LVIN) because it actually gives the normal person on the street the ability to see what is happening, live.”**

**Wendy Farmer – President, Voices of the Valley**

The LVIN was designed to return confidence to the community and local industry through the construction of the world's first integrated real-time environmental monitoring and early detection and notification network.

Today, the LVIN is a live regional support system providing early detection of critical events (fire ignition, floods, contamination, airborne pathogens), live situational awareness and continuous real-time information to support public health and safety, protect resources and strengthen community resilience through access to timely, reliable information. Access to live and historic information enables local industry and businesses to assess trends, make informed decisions, engage mitigation actions, improve productivity and output contributing to local GDP and employment growth.



# [LEMC Additional Information: 3.1A]

## The new staple for the region

The LVIN has delivered operational improvements for local agriculture, power generation, water utilities, forestry, health services and emergency management, employed local contractors and businesses during construction and restored public confidence in the wake of the Hazelwood mine fire.

This network has become a staple for local industries. Snowy Mountain Hydro, RTL Mining, Thiess, government agencies (CFA, VICSES, VicRoads, Ambulance Vic, DHHS), utilities (AGL, United Energy, AusNet Services, AEMO), local government (Latrobe City Council, Baw Baw Shire) and thousands of local and neighbouring residents, accessing this data on a daily basis.

The network is used for air quality monitoring, localised weather, prediction, mitigation, detection and remote viewing

across the region; described by the CFA as invaluable during the Yinnar bushfires in Gippsland.

During the East Gippsland fires over 11,000 daily public users used the LVIN to understand smoke concentration levels throughout the region to make travel route decisions to reduce exposure. Ambulance Victoria also used the site for smoke concentration levels in towns to gain an understanding of the possible future patient numbers attending hospital with respiratory issues and also sent out public warnings.

The Latrobe Valley Information Network is a valuable resource for the region. It provides unparalleled access to a wide variety of live information to aid informed decisions that reduce impact. Real-time community confidence and resilience.



In 2019, Attentis® networks were recognised as the most technologically advanced data transmission networks in Australia, receiving the 2019 Australian Smart Cities Award - Regional, the Best Government IoT Project 2019 in the Australian IoT Awards as well the Best Overall IoT Project for the Latrobe Valley Information Network.



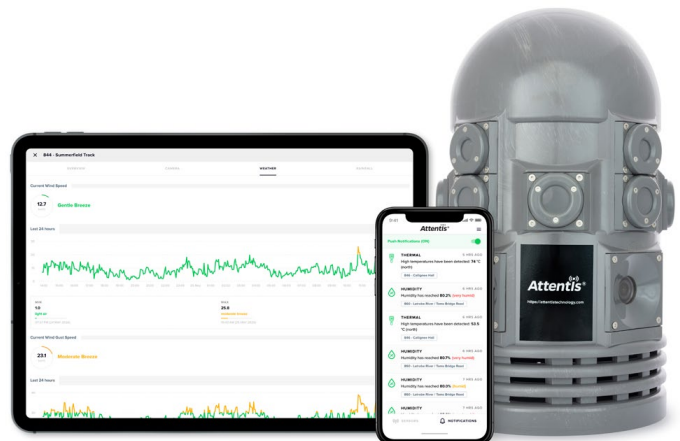
Smart City of the Year 2019 (Regional)



Best Government IoT Project (2019)



Best Overall IoT Project (2019)



## Nationally recognised as the technology to support every community

The LVIN featured strongly in the New South Wales Independent Bushfire Inquiry into the 2019 / 2020 fires, stating:

*“For fire particularly, the LVIN sensors can monitor weather conditions leading into the fire season, then detect fire ignition, location, temperature and movement. Multiple fires can be viewed simultaneously so that active conditions affecting fire growth and movement can be better understood.”*

*“Installations such as this in high-fire risk areas of NSW, especially near towns and cities, would be an important, relatively cheap and relatively quick development.”*

The LVIN formed the basis for recommendations 4, 34 & 35.

During the 2019 Gippsland fires the CFA accessed LVIN daily, leading to the following quotation from Glenn Pröbstl, Operations Manager, Specialist Response, Fire & Emergency Management, CFA Headquarters:

***“Firstly congratulations to the Latrobe City Council for supporting a network of atmospheric monitoring stations throughout the council footprint. I recently had the opportunity to utilise this service during a recent fire in Gippsland. The ability to monitor weather, for fire operations and pollution for firefighter and community health was a huge advantage over previous campaigns. The advantage of real time information cannot be over emphasised and this was of great benefit to the management of these fires”.***

## Royal Commission recommendations

Attentis® was subpoenaed to provide technology expertise to the Royal Commission into National Natural Disaster Arrangements presenting the benefits of wide-scale real-time sensor networks to deliver coordinated effective response and secondary communication support for communities.

The technology provides the platform for proactive disaster mitigation, public safety, critical infrastructure protection, agricultural yield improvement and community resilience. It is a key technology for all high risk fire and flood affected regions.

### The Royal Commission into National Natural Disasters stated:

“23.48 Australian, state and territory governments should take steps to facilitate **engagement with the private sector to maximise utilisation of ideas and technologies**.

“23.49. “Our hearings highlighted **examples of private sector and individual initiatives which are pursuing innovative research and technology to assist disaster management**. These included:

**Attentis, a company designing and manufacturing patented multi-sensors providing a range of capabilities, including: fire ignition and flame detection; 360° cameras; time lapse and high definition video; air quality sampling; flood detection with water heights; lightning detection; and vibration and structural and ground movement.”**

p496, Final Report: Royal Commission into National Natural Disaster Arrangements, October 2020

## LVIN supports local industry and communities everyday

### Agriculture

The LVIN incorporates a range of continuously streamed real-time information that provides the local farming industry with the ability to better understand local conditions, engage accurate automation and drive productivity and yield through awareness, prediction and trends. Continuous fine-scale measurement of micro-climate weather, air quality and composition, rainfall, soil moisture, fog, frost and dew from 44 locations throughout the region delivers this ability.

Farmers can make precise informed decisions about crop investment, type, automation, forecasts and risk mitigation.

Further capabilities including the integration of thermal imaging, early detection of airborne, waterborne and soil contaminations to elicit immediate response to reduce impacts.

The LVIN introduces the ability to incorporate inexpensive automation facilitation for all farms, regardless of size, utilising the network to determine ideal conditions to operate.

The network also allows individual farms to add thermal imaging to monitor cattle health and animal tagging to actively track livestock. All information is accessible through the LVIN network.

The LVIN provides the basis for improved information and automation, reducing farm engagement time, increasing efficiency and production, and allowing increased family time for improved mental health.

### Viticulture

Attentis® actively worked with the University of Adelaide and E.J Gallo in California, to provide a greater understanding of how smoke taint can impact wine quality. A solution was also developed incorporating smoke detection and automated misting to eliminate smoke absorption.

Micro-climate weather, mildew and frost detection, continuous soil moisture measurement, soil nutrients maintenance and automated mitigation systems are all features contained within the LVIN capability, all designed to protect grape health and support consistent yield objectives of local viticulture.

### Resource protection

The LVIN has sensors located at key resources including reservoirs, rivers and streams detailing water heights and movement. Live monitoring provides instant notification around potential flooding, ground movement, dam wall integrity and trespass. Attentis® has sensors throughout timber plantations to detect fire ignition and protect timber resources for the local timber industry.



## Community health

A publicly accessible mobile App developed by Attentis® connects the Latrobe Valley community to the local environment 24-hours per day, providing information around air quality, micro-climate weather, flood and fire warnings and local community information.

The App also serves as a secondary communication capability during large scale events to ensure complete situational awareness of the event as it unfolds. Local government agencies and emergency services can send messages directly to local residents to inform them of an event and notifications advising of possible impacts, evacuation routes and how to limit exposure.

This App is particularly valuable for asthmatic individuals and those who experience respiratory ailments by providing a mobile platform for early warning of airborne pollutants that details concentration levels, timeframes and safe routes to avoid exposure.

The App offers a vast range of alerts and notifications that are customisable for individual users. The alerts are also available on the Attentis® website.



## Critical infrastructure

Critical communication infrastructure located in the Latrobe Valley is monitored by Attentis® using thermal and visual imaging, vibration, ground and tower movement and noise monitoring. Protection of communication towers is key to maintaining communications throughout communities and regions during catastrophic events. The LVIN also provides a secondary communication network for emergency communications when cellular and internet communication is impacted.



## Unmanned fire detection and notification

The Latrobe Valley is a high fire and flood risk location. The region hosts large scale plantations, coal mines, power generation and national parks, increasing the risk of large scale fires. Fire ignition at these remote locations can occur at anytime, day or night, from a range of sources. If undetected, ignitions coupled with high winds and dry conditions can soon create fires that are difficult and sometimes impossible to contain. Early detection and rapid response are key elements to combat bushfire in these high risk locations. The LVIN features strategically located sensor towers in all high fire risk locations; plantation access roads, refuse sites, coal mine plateaus, rivers, reservoirs, national parks, communication platforms and key information gathering sites.

The Attentis® LVIN network delivers 24-hour unmanned detection of fire ignition using our intelligent patented sensors that incorporate 360° real-time thermal imaging, visual imaging, flame detection, noise and environmental changes to detect fire starts, re-ignitions, hot spots and changes in conditions that lead to fire ignitions. Through real-time awareness, multiple detection capabilities and intelligent processing, our sensors provide the most effective detection capabilities available, with no reliance on a single method.



## Emergency services

The LVIN is a staple for local emergency services, providing unparalleled level of real-time information and live situational awareness and safety. The LVIN network map details fire location, current conditions, fire movement and personnel location, delivering crucial fire management information.

Live intelligence to inform, improve response, reduce impact and provide better outcomes.

Attentis® technology delivers an invaluable tool to enable first responders to:

- rapidly respond with a clear understanding of the fire, flood or potentially catastrophic event as it unfolds;
- strategically position ground and aerial resources at the most effective combat points;
- maintain real-time awareness of changes in wind speed and direction to remain a step ahead of the event;
- reduce the risk of burn over and health impacts to first responders by continuous tracking of personnel, conditions, the fire front and key assets;
- measure air composition for smoke, particulates and gases to reduce health impact on first responders and the general public.





## LVIN: delivering the objective

### The Yinnar fires - re-ignition incident

During the Yinnar fires in Gippsland, Victoria on March 2019, the sensor located at HVP Plantations in Jumbuk detected a fire re-ignition after the main fire was extinguished.

A slow increase in ground temperature was detected and series of thermal notifications (far left) displaying the increasing temperature at the ignition source was send to first responders to return to the location. The investigation revealed an early-stage re-ignition that was then properly extinguished.

The value of this technology is demonstrated in this capability. If you review the visual images that accompany the thermal images, it clearly reveals the low lying smoke that is not visible above a metre from the ground, making it impossible to detect using solely camera and visual methods. The use of multiple intelligent methods to detect are a feature of our patented technology and proven in real world applications.

### Remote ignition detection and response

Site 866 is located along Rifle Range Road in Glengarry North, a dirt access road adjacent to pine plantations owned by Hancock Victoria Plantations (HVP). This particular site was selected due to its propensity as a high fire risk location, in part due to the plantation, the roads use for stolen car fires, its remote accessibility and its frequency of trespassers.

This site features weather, air quality, rainfall, movement and thermal and visual imaging.

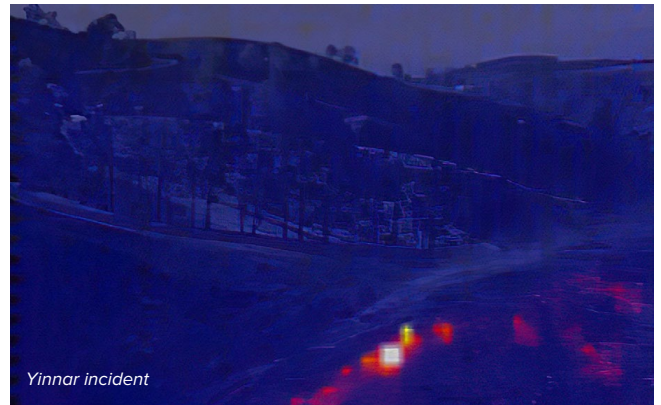
At 5.33pm on Friday 23rd October, several alert notifications were received detailing high readings of  $PM_{10}$  and a higher than normal readings of  $PM_{2.5}$ .

A key feature of Attentis® networks is the ability to rapidly investigate any alert through visual confirmation via the Attentis® interface and App. The investigation confirmed light thermal increases and visual signs of light smoke accentuated by the ability to time-lapse the location.

The alert was also received by Hancock Victoria Plantations and the local emergency services first responder team, whom rapidly investigated the cause. The investigation revealed a property adjacent to the plantation was undertaking small fuel reduction burning (see image) of a fire approximately 2x2 metres (6 foot x 6 foot). The fire was extinguished.

This event had the hallmarks of a larger scale event. Friday evening, increasing winds, dry conditions and an adjacent fuel load. If this fire failed to be extinguished properly or a re-ignition occurred, embers could have blown into the plantation causing a fire that gains strength throughout the night to reveal an intense fire in the morning that is difficult to extinguish and threatens the local community.

This immediate detection, notification and investigation capability of the LVIN network reveals the value of the technology to provide resilience for the region.



Thermal



Visual



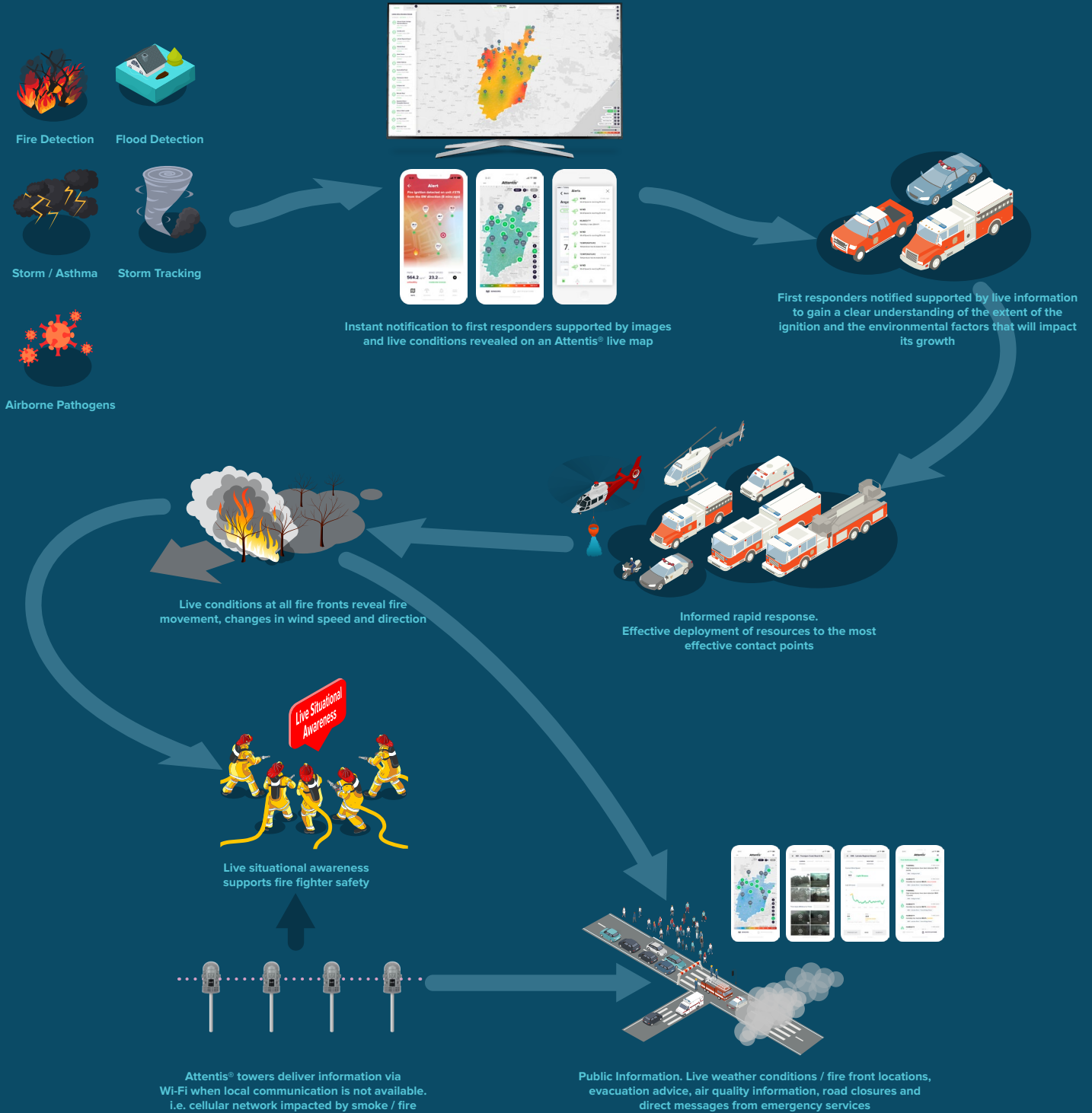
Camera view



On-site visual

How Attentis® technology delivers a critical piece for fire, flood and natural disaster management

Early detection, rapid response, and live situational awareness saves lives



**Attentis® combines early detection, live information, tracking, notification and communication systems in a single high speed network.**

The Attentis® Latrobe Valley Information Network (LVIN) demonstrated the capabilities of our technology to provide early warning of fire ignition and floods. Our technology will be key in the future to support resilient informed communities in national natural disaster prone areas. Attentis® delivers community confidence everyday.



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# [LEMC Additional Information: 3.1B]



## SAFETY CIRCULAR 02/2022

File: D24302

May 2022

### POTENTIAL EXPOSURE TO CHROMATED COPPER ARSENATE (CCA)

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#### Key Message

Potential Exposure to Chromated Copper Arsenate (CCA), Occupational Physician information sheet released.

#### What happened?

During the Bridgetown Fire (Inc 559961) from 5 to 8 February 2022, there was potential for personnel working within the Timber Treaters Mill to be exposed to CCA resulting from the burning of multiple piles of treated timber leaving contaminated ash.

DFES engaged contractors to stabilise the piles of CCA ash to prevent them from being blown in and around the Hester area. This was achieved by spraying a bonding agent over the ash piles, easily identified by its tinted colour.

Following reports of potential exposure, HSS engaged Occupational Physician Dr Andrew Thomson from OSHGroup to review the known data, determine if health monitoring was required and provide advice on potential risks.

#### What do I need to do?

Personnel who believe they may have been exposed to CCA and have concerns should review the information provided by Dr Thomson which can be found below.

Task Force leaders and CESMs are requested to ensure all units (CFRS, VFRS, VFES, LG BFB and Farmer Response) and local government representatives are aware of the attached information.

#### Further information

For additional information regarding this, contact [hss@dfes.wa.gov.au](mailto:hss@dfes.wa.gov.au)

Whilst medical opinion does not indicate the need for testing or further investigation, if individuals have concerns about the potential exposure, they should contact **OSHGroup on 08 6298 8400** for consultation with an Occupational Physician.

**CRAIG WATERS AFSM  
DEPUTY COMMISSIONER OPERATIONS**

Target Audience:				
A	B	C	D	Vol
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OC-02-22	Issue Date:	Valid Until:	Contact:	Health and Safety Services
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# [IFEMC Additional Information: 3.1B]



Government of Western Australia  
Department of Fire & Emergency Services  
Operations



ABN: 56 124 944574

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## Chromated Copper Arsenate (CCA)

CCA treated wood was involved in a recent exposure event during operations in the township of Hester as part of the Brunswick Junction bushfire. Most firefighters attending the area were wearing N95 or greater respiratory protection and briefings were given on management of smoke, ash and concerns. There were two reports of gastric upset which settled but no other symptoms reported that associated with CCA exposure.

Chromated Copper Arsenate (CCA) is a chemical mixture of salts used to preserve wood from rot caused by insects, microbes, and fungi. The use of CCA has been regulated since 2004 due to the slow release of CCA components into the surrounding environment from weathering and leaching. This slow-release overtime increases the level of arsenic, copper and chromate in topsoils and nearby water sources.

Acute exposure to the arsenic component can cause symptoms such as nausea, vomiting, diarrhoea, and abdominal pain. Neurological changes such as numbness and altered consciousness can occur in high doses and with long-term chronic exposure. Chromate and copper exposures at high enough levels generally cause irritation of the skin, eyes, mouth, nose, and respiratory system.

Many available studies have looked at long term chronic exposure to CCA in wood workers and residents in high exposure areas such as in second and third world countries through skin and ingestion. Several studies have looked at chronic inhalation exposure from wood burning fires used for cooking. These studies looked at the neurological changes and risk of cancer from chronic long-term exposure. Very few studies have assessed isolated short-term risk from inhaled smoke and burnt ash of CCA treated wood products.

The components of arsenic, copper and chromate are released during burning and are present in residual burnt ash. Studies have shown that higher temperatures of burning, > 800°C causes higher levels of arsenic release. The fire at Hester is estimated to have reached temperatures of 500°C. Soil and ash sampling of the affected areas showed levels of exposure below the environmental limits. No sampling occurred during the fire and as such a direct correlation of fume exposure is unable to be made.

**SPECIALISTS IN CORPORATE HEALTH AND SAFETY**

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# [LEMC Additional Information: 3.1B]



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CCA exposure can be assessed in blood, urine and hair sampling for those who have ongoing exposure in the workplace or home environments. Blood and urine sampling for chromate, arsenic and copper levels is not effective in assessing levels after 1-2 weeks after an acute exposure because of the rapid metabolism by the body. Hair sampling has shown to have a variable efficacy in assessing those with acute symptomatic poisoning and in chronic exposure. At this stage of the review process, no further testing is indicated.

If anyone is apprehensive about their exposure, OSH Group can assess individuals at a group or case level if there are ongoing concerns.

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