365mesh

Enterprise Asset Management with Advanced IoT sensors & AI Video Analytics for

Airports

Solutions for anytime, anywhere and always on monitoring
Enterprise Asset Management with predictive/ preventative maintenance to reduce downtime

IoT solutions with Advanced sensors & AI Video Analytics for Airports

365mesh Advanced IoT and AI Airport Solution is a complete, end-to-end IoT solution designed specifically for airport environments. Developed in Australia, it features Enterprise Asset Management capabilities that deliver deeper insights, and predictive & preventative maintenance, which reduces operational downtime. This solution also enhances safety and security while driving operational efficiencies to the airport industry.

This solution integrates the use of various physical IoT sensors, specifically designed and tested to withstand Australian outdoor weather conditions. Complemented with a range of Lidr, Laser and 3D video cameras to provide deeper insights into various aspects of Airport operations and assets, both indoors and outdoors, within and beyond the airport premises.

The 365mesh platform offers a variety of feature modules that can be activated based on the specific needs of different airport operational teams, delivering the following benefits:

- **Improved worksite and personnel safety** through advanced AI and Machine Learning, combined with physical IoT sensors, providing early warning detection to improve safety and reduce site accidents/incidents.
- **Environment Monitoring** of noise and air quality, generating heatmaps highlighting areas that require remediation, and detecting up to 12 various hazardous gases.
- **Person of Interest** detection and real-time location tracking, including historical path analysis and dwell times.
- **Lost person** identification assisting airport security and operations teams in identifying, locating and tracking lost individuals, providing real-time updates on their movements and location.
- **Security, behaviour and threat control** to detect and alert on unauthorised security threats to perimeter boundaries or restricted areas. 365mesh integrates with existing airport CCTV systems, or can be installed with new cameras, to aid with rich AI analytics.
- **Core Foundation for Digital Twin (Web4.0)** with live sensor data, to provide 3D remote insights and automation, enhancing daily operations and streamlining airport workflows.
- **Seamless integration** with airport systems and other operational systems such as SCADA or other ICT solutions, to automate processes and share collected data across existing airport systems.
- **Cost savings** through automation, improved operational efficiencies and minimised operational downtime.
- **Enterprise Asset Management** with predictive and preventative maintenance capabilities to deliver deeper insights into the operational status of various indoor and outdoor airport assets.
- **Maintenance and Operations** to provide detailed insights through monitoring key aspects, such as detailed power and water usage breakdown and carbon footprint tracking. It also enables real-time tracking of airside assets such as luggage trailers, dollies, pushback tugs, airstairs, de-icing vehicles, maintenance sweepers, belt and container loaders, follow-me cars and much more.

Key benefits:

- Higher operational efficiency and lower cost of operations
- Reduce excess maintenance expenses and avoid costly downtime with optimised maintenance schedules.
- Enhance passenger satisfaction and boost airport star ratings through seamless operations.
- Access real-time data from multiple sources to predict asset failure or quality issues, and minimise unnecessary maintenance.
- Automate tedious tasks with remote-controlled operations and access deeper insights.
- Improve Worksite Safety and reduce accidents/incidents to personnel.
- Monitor, maintain, and optimise assets for better availability, utilisation, and performance.
- Unlock cost reduction strategies of switching from traditional preventative maintenance to IoT-enabled CBM.
- Leverage CBM (Condition Based Monitoring) and IoT technology for real-time monitoring and precise maintenance scheduling.
- Gain insights into how edge computing and AI contribute to the early detection of equipment faults.

DELIVERING END-TO-END IOT SOLUTIONS

PHASE 1	PHASE 2	PHASE 3	PHASE 4
Sensors/ Devices Installing sensors to collect data from your environment	**Network and Connectivity** Connect from anywhere. 100% earth surface coverage.	**Data Processing** Converting Raw Data into meaningful information with rich AI	**User Platform** User dashboards and integration with existing systems/ applications

End-to-end Security | Analytics and Artificial Intelligence | Predictive Behaviours | Automation

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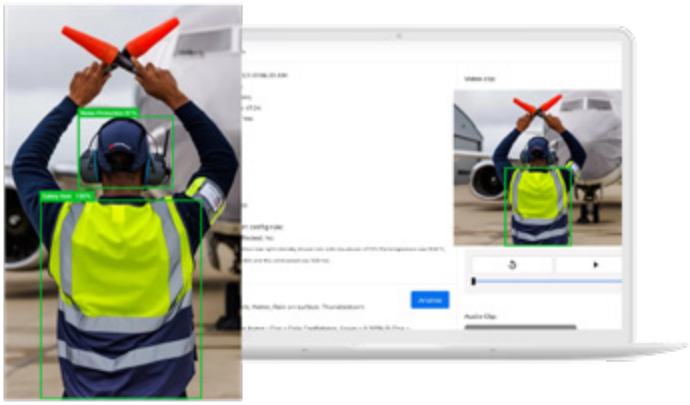
Worksite and Personnel Safety

Monitor and reduce people, plant and equipment incidents/accidents.



Safety PPE Detection

Identify PPE items such as safety headgear, glasses, and vests, and monitor whether workers are properly wearing them on-site. Additionally, monitor whether workers are using the correct tools and equipment, such as airport marshalling wands and similar items. The system can restrict workers from entering job sites if all the safety wear required is not detected.

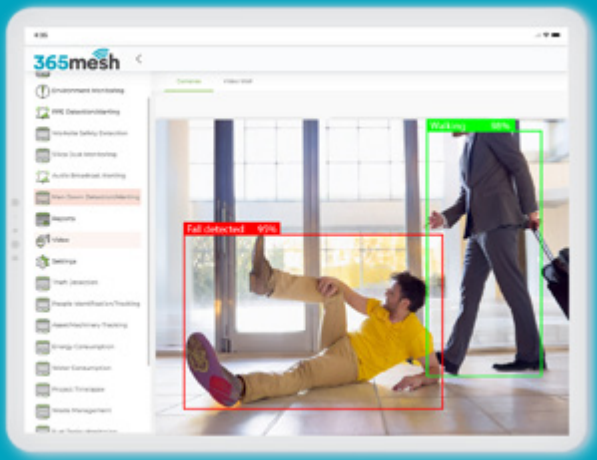
365mesh can identify workers in real-time who do or do not comply with PPE standards, increasing the implementation of site safety monitoring around exclusion zones and machinery safe distancing.

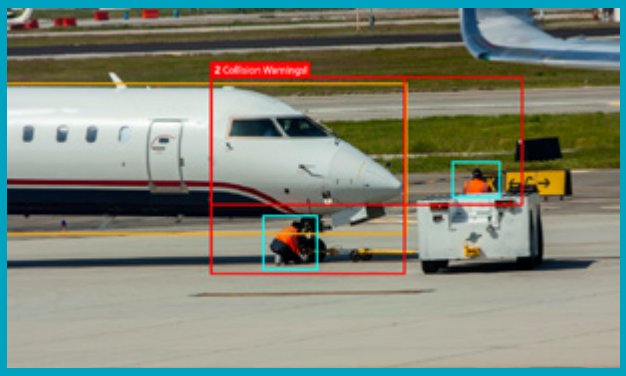
Man Down detection/alerting

Uses machine perception and video analytics to detect a single person or people who have fallen or slipped, and triggers instant alerts to authorised personnel so they can take immediate action.

Reports on trip and fall detection

With the use of man-down alerting, we keep a record of areas that have repeated trips and fall incidents, giving users an accurate record of accident occurrences (if they are not reported by workers).





Detect potential workplace incidents between workers and moving vehicles

Determine safe distances between workers and moving machinery/equipment with exclusion zones.

This involves the installation of strategically placed blind-spot detection and driver monitoring cameras onto vehicles to give drivers real-time warnings of hazardous collision risks, such as other objects or people who are close by.

Create virtual boundaries/GEO fencing and receive boundary intrusion alerts

Our algorithms in the cameras allows users to create a virtual safety and exclusion zone radius around potentially dangerous machinery, monitor these areas and receive real-time alerts when an unauthorised worker or other vehicles enters the exclusion zone, indicating that they are too close and may be in the way of danger.

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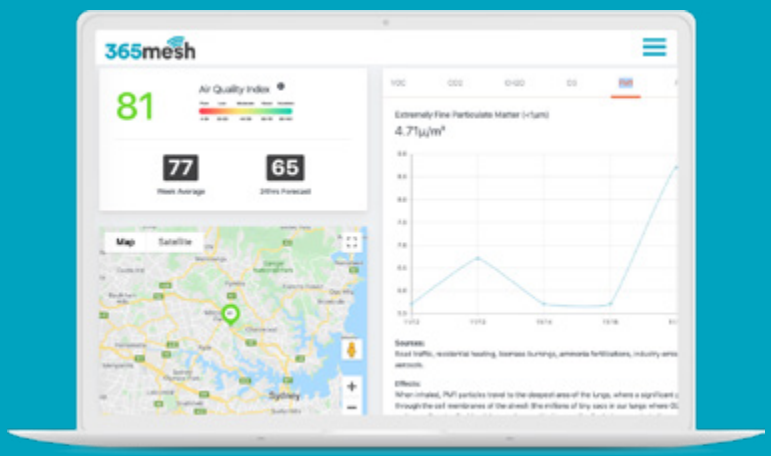
Environment Monitoring

Ensure a clean, safe and secure, indoor and outdoor, environment.



Environment monitoring

Gaseous and particulate emissions like UFP contribute to respiratory and cardiovascular issues, affecting both workers and nearby residents. Advanced air quality monitoring systems can identify, measure and automatically alert control rooms when abnormalities are detected. With precise data on pollutants, airports can better assess their impact on nearby communities and take actionable steps to improve air quality and protect public health.

Ventilation units monitoring and alerting

Monitor in real-time the condition of flow-through ventilation units, receiving data on airflow, heat stress, gas, dust, silica, mine flies and diesel particulate. Alerts can be customised to be sent to authorised personnel when units are faulty or not active, to ensure the ideal air quality levels are maintained.

Ensuring safe noise/sound levels

Our algorithms in the sensors allows users to create a virtual safety and exclusion zone radius around potentially dangerous machinery, monitor these areas and receive real-time alerts when an unauthorised worker or other vehicles enters the exclusion zone, indicating that they are too close and may be in the way of danger.

Aether Sensor

The all-in-one security device

Our Aether Sensor is a purpose-built sensor to with various functions such as air quality, smoke and vaping detections with security and safety features of private and public spaces, that works with user friendly dashboards with customisable alerts and notifications and can be integrated with existing systems and applications. Our solution has been developed in Australia and New Zealand, with manufacturing facilities across both countries with teams of engineers providing installation and support services nationally and internationally.

Sense air quality and atmospheric contaminants

Australia has witnessed a threefold increase in the use of vapes and e-cigarettes. Studies show how indoor vaping results in the accumulation of large amounts of particle matter on surfaces and products.

Our Aether sensor a solution to ensure a smoke-free indoor and outdoor environment. Identify gas signatures for vaping, THC smoking, tobacco smoke, methane and other fumes. All while remaining secure against physical and digital exploits.

Sense audible indicators of damage, distress and aggression

Uses AI/ML noise detection technology to detect and differentiate alarming audio such as glass windows breaking, gun shots, screaming, etc. Customise alerts and notifications for a prompt action on your property safety.

Sense and report ambient temperature, humidity, pressure

Measures and monitors the spaces temperature, relative humidity, VOC, NOx, PM1, 2.5, 4, 10, and alerts when readings exceed a certain range. Device is actively ventilated with a built-in fan.

Detect. Analyse. Automate.

Save water by d**etecting water leakages** from water audio extracted

Matches audio characteristics against our library of audible objects

Identifies gas signatures and **differentiates types of smoke**

Utilises **Machine Learning technology** to reduce the number of false alarms

Customise criteria and **adjust parameters to your operations needs**

Anti-tamper backup battery to deter intentional tampering

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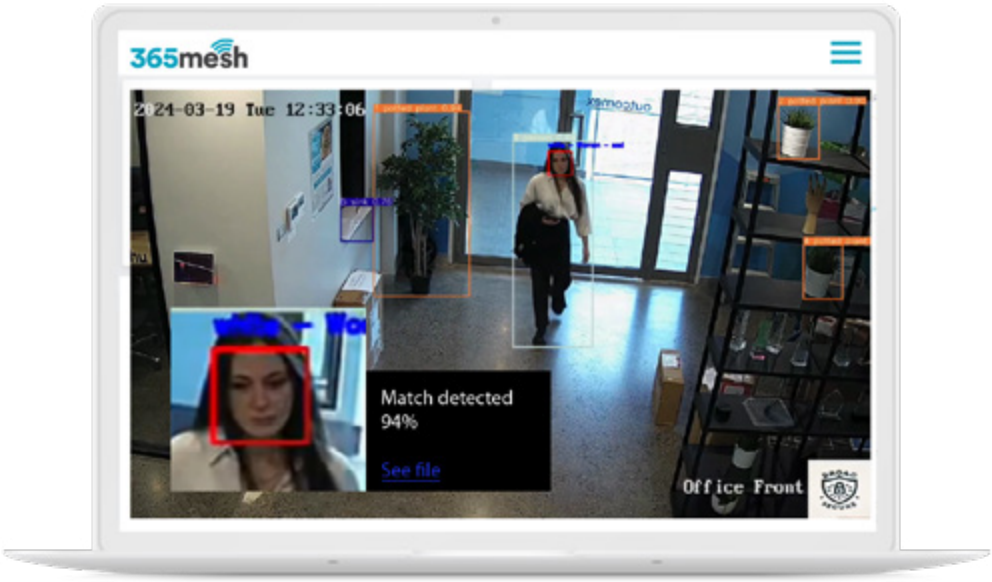
Person Tracking and Location Insights

Real-time tracking and advanced detection for a secure airport.



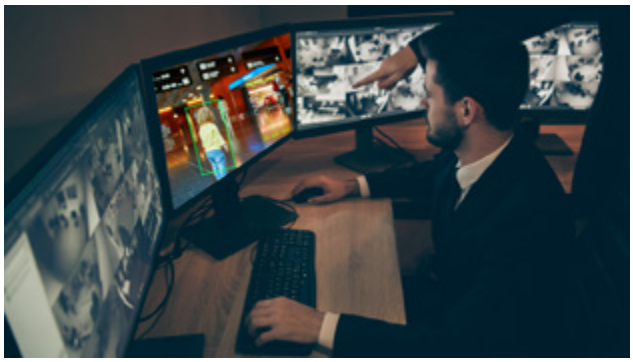
Face Search with integration into AD

Unlock powerful insights with our Face Search feature, seamlessly integrated into your Active Directory (AD) system. Access a comprehensive library of detected faces, select individuals and view detailed logs of their appearances across footage.

Enhance security protocols and streamline investigations with precise tracking of personnel movements, empowering you to maintain a safe and secure environment.

Lost Person Identification and Tracking

Powered by the 365mesh BroadSecure module, the system can detect lost or missing people and identify details like clothing to pinpoint the person's real-time location within the airport. Additionally, our Bluetooth tag feature provides another layer of tracking, enabling airport staff to monitor individuals' movements accurately. Together, these technologies enhance safety, streamline operations, and ensure a smoother experience for travelers and airport staff alike.



Person of interest detection

Using advanced AI-powered technology, 365mesh identifies individuals of interest and tracks their precise location in real-time. This system can also provide detailed insights into their historical movements and dwell times within the airport. Monitor flagged individuals and get unparalleled visibility and control over all surveillanced areas.

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Maintenance & Operations

Real-time tracking and advanced detection for a secure airport.

Airports manage an extensive asset base and oversee highly complex, round-the-clock operations (24/7/365), with little scope for error. Despite challenges such as aging infrastructure and constrained revenue streams, airports must consistently deliver exceptional passenger experiences to maintain their competitive edge.

365mesh Smart Airport solutions provide the following asset management and predictive maintenance benefits:

Real-time location tracking of airside assets and vehicles such as pushback tugs, airstairs, de-icing vehicles, sweeping/maintenance, belt & container loaders follow-me cars, apron buses and various other landside and airside assets - Group your assets and measure their location in real-time, with different dashboard views available for different teams.

Deep integration with the onboard computers of airport airside vehicles and buses, providing detailed insights for predictive maintenance, vehicle health alerts, and maintenance reminders—all accessible through a centralised platform or integrated with existing airport systems.

Dashboard views are customisable, ensuring teams access only the vehicles and information relevant to their operations. This tailored approach streamlines workflows and enhances efficiency across departments. Monitor efficiently:

- Fuel usage and efficiency
- Errors, logs and vehicles diagnostics in real-time
- Driver behaviour
- Collision detection

Carbon footprint tracking through the monitoring and measurement of carbon emissions from airport operations and airside vehicle activities.

Monitor and track mobile luggage containers and dollies with real-time location updates, historical movement data, and location heat maps for enhanced operational visibility and efficiency.

Security, behaviour & threat control

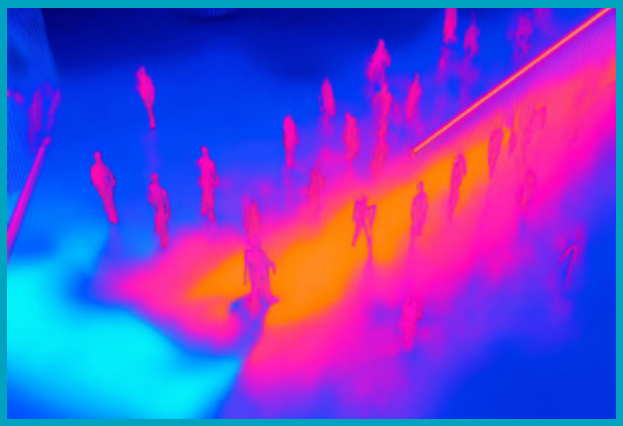
Real-time tracking and advanced detection for a secure airport.

Behavioral Analysis for Enhanced Airport Security

Enhance airport safety by monitoring passenger behaviour to identify suspicious activities. Leveraging advanced analytics, our system distinguishes between typical patterns and behaviours associated with potential security threats, such as theft or unauthorised access. Real-time alerts and actionable insights enable airport security teams to respond swiftly, preventing incidents and ensuring a safer environment for all travellers and staff. The **365mesh broadsecure security module** works as a standalone or integrated within existing airport security systems, and it can use existing airport CCTV security camera systems.

Proactive Recognition of People in Watch List

Our solution is designed to effectively identify persons of interest, such as individuals flagged for previous security breaches or suspicious activities. Leveraging advanced facial recognition and data analytics, airport security can recognise these individuals as they enter or move through the facility. This proactive approach enables immediate action and strengthens security measures.



Movement and Activity Analysis: Heatmaps of Customer, Staff, and Crowd Dynamics

By visualising movement paths and stationary locations, airports can easily identify high-traffic zones and areas of inactivity. This data helps operationals understand how travelers navigate the space, enabling them to optimise airport layout and enhance the overall customer experience. Moreover, optimise staff deployment and make data-driven decisions that enhance customer satisfaction.

Restricted areas monitoring and alerting (indoor and outdoor areas)

Keep unauthorised passengers and staff safe and distant from caution/restricted zones by creating virtual boundaries/GEO fencing and receiving boundary intrusion alerts. Our algorithms allow users to create a virtual safety and exclusion zone radius around potentially dangerous machinery, monitor these areas and receive real-time alerts when an unauthorised person, worker or vehicles enter the exclusion zone. Enhance oversight of critical areas with our features designed to improve your monitoring capabilities.

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Enterprise Asset Management

with predictive & preventative maintenance for reduced downtime.

The **365mesh Asset Management solution** provides a comprehensive platform designed to configure, onboard, and monitor airport assets seamlessly. From ground support equipment and HVAC systems to runway lighting and baggage handling systems, our solution ensures robust management and oversight of critical infrastructure. With rapid advancements in technology across the aviation sector, airports must adopt innovative best practices to enhance operational efficiency, ensure safety, and reduce costs.

The 365mesh platform empowers maintenance teams to efficiently:

- ➔ Track asset conditions;
- ➔ Detect anomalies;
- ➔ Respond proactively through advanced remote monitoring capabilities.

By leveraging AI and IoT, the solution enables predictive maintenance and facilitates real-time insights, ensuring uninterrupted operations even across legacy systems. This data-driven approach allows teams to foresee potential failures, schedule preventive actions, and optimise the lifecycle of airport assets, minimising downtime and maximising ROI.

Asset Performance Management with **Condition-Based Monitoring (CBM), powered by 365mesh IoT**, offers a cost-efficient alternative to conventional preventative maintenance, utilising real-time monitoring through IoT sensors. This method not only cuts downtime and operational expenses but also leverages edge computing and AI for immediate data analysis and early fault detection. The approach employs a variety of sensors, including those for vibration, pressure, temperature, and oil analysis, to effectively monitor machinery, vehicle and asset health with the following benefits:

Enhanced Maintenance Efficiency:
allows for real-time monitoring and precise maintenance scheduling. This reduces unnecessary maintenance, saving time and resources while extending the lifespan of machinery.

Cost Reduction Strategies:
economic advantages of switching from traditional preventative maintenance to IoT-enabled CBM, minimising downtime and reducing operational costs through targeted maintenance can significantly impact your bottom line.

Advanced Fault Detection:
Gain insights into how edge computing and AI contribute to the early detection of equipment faults. Understand the role of various sensors in identifying potential issues before they lead to system failures, thereby enhancing operational safety and reliability.

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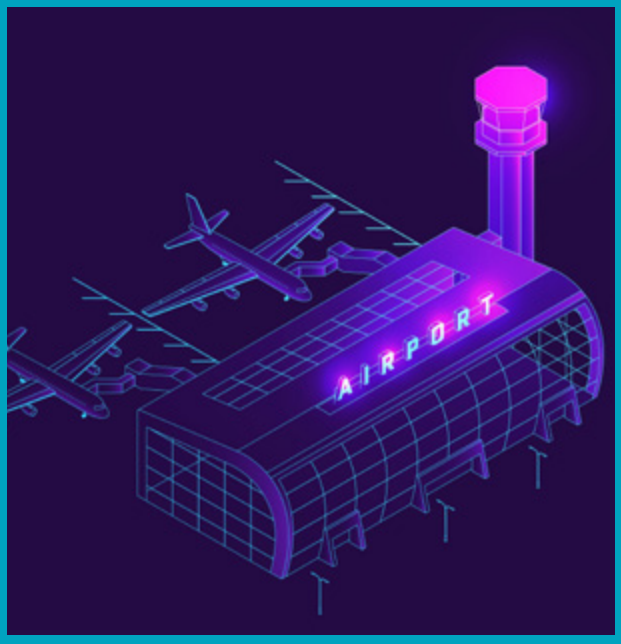
Digital Twin WEB

Version 4.0

While the concept of a **Digital Twin** has a very futuristic ring to it, it is rapidly becoming a practical and essential tool in daily airport operations. By integrating predictive virtual simulations, it enhances operational visibility and can serve as a 'single source of truth' for monitoring and controlling assets. Airports can simulate strategies risk-free, gaining valuable insights to optimise performance and drive smarter decision-making.

Digital Twins create virtual models of physical objects, such as assets or facilities, serving as digital counterparts to their real-world equivalents. These virtual models offer the opportunity to better understand and predict outcomes, utilising real-time data to inform decision-making, optimise products, and reduce operational costs. This cost-saving technology adopts a proactive approach to maintenance, minimising downtime and enabling teams to address potential issues before they become critical and costly.



Safety simulations and employee training: allowing employees to train in a safe, controlled environment or familiarise themselves with sites before physically visiting. Employees can use the digital model to learn safety protocols and gain a thorough understanding of their tasks.

Real-time Insights with Live Sensor Data: by integrating live sensor data, Digital Twins provide 3D remote monitoring and automation, streamlining daily operations and enhancing efficiency across the board.

Forecast scenarios: mirroring of a physical equivalent, enabling simulations to ensure system performance and optimisation, and visualising strategies on the screen.

Predictive maintenance: predicting potential issues within the system, identifying problems before they escalate. The digital twin will highlight specific elements of the system needing attention, directing the focus of maintenance staff, and ultimately, reducing overall system downtime.

Complete visibility: replicates the real system in 3D, providing real-time, dynamic views both locally and remotely. This ensures critical decisions are made quickly, offering transparency into system operations, such as baggage handling, and enabling operators to monitor performance seamlessly.

Improved Decision-Making: By offering full system visibility, the Digital Twin enables faster, more informed decisions. It eliminates siloed, slow, or reactive approaches, fostering collaboration among all stakeholders with a unified, holistic view of the system.

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Other Airport use cases

Queue and Asset Monitoring

Monitor queue lengths and optimise various airport asset utilisation.

Indoor Environment Quality Monitoring

Measure air quality, noise levels, and lighting for enhanced passenger comfort

Aircraft Tracking and Event Logging

Log aircraft registrations, take-off/landing times, and location details.

Passenger Flow Analysis

Count and track passenger movements for improved operational insights.

Crowd Management and Dwell Time Analysis

Monitor crowds to optimise space utilisation and passenger flow.

Real-Time Asset Tracking

Track indoor assets such as wheelchairs, people carts, and caddies

Sensor-Driven Cleaning and Maintenance

Deploy sensors to streamline cleaning schedules and maintenance workflows.

Retail Analytics and Optimisation

Enable retail use cases from the asset brochure for improved customer engagement.

Landside Asset Monitoring

Manage baggage systems, elevators, escalators, lighting, HVAC, security, and power systems.

Carbon Footprint Tracking

Monitor and reduce environmental impact across airport operations

Detailed Energy and Power Usage Monitoring

Analyse electricity consumption at the appliance and machine level.

Fire and Smoke Detection

Ensure safety with real-time alerts for fire and smoke incidents.

smart citydeck Integration for Regional Airports and Local Government Councils

Elevating Regional Airports with Smart Solutions

Regional airports are vital gateways to remote communities, facilitating transport, tourism, and economic growth. However, managing these assets comes with challenges such as operational efficiency, safety, and sustainability. Our integrated approach ensures seamless collaboration across teams, delivering unmatched visibility and control.

Local Government Councils + Airports Module

Bringing together 365mesh, SmartCityDeck, and TransportDeck, this module supports councils in managing diverse assets, services, and teams.

- **Integrated Monitoring:** Centralised dashboards offer a consolidated view of airport and city operations.
- **Cross-functional Collaboration:** Seamless communication and task assignment across council departments.
- **Scalable Solutions:** Extend functionality to other council-managed services like waste management, street lighting, and parking systems.

SmartCityDeck and TransportDeck Features Overview

Smart Water Management

Usage Tracking:
Real-time monitoring of water meters and tanks to ensure efficient water usage and reduce wastage.

Water Quality Analysis:
Track water quality in pools, tanks, and/or rivers, ensuring safety for both human and ecological needs

Smart Public Amenities

Traffic and Pedestrian Flow:
Sensors provide data on traffic and pedestrian patterns, helping to adjust infrastructure for better flow and safety.

Sustainable Energy Usage:
Smart lighting dims or brightens based on pedestrian activity, minimising energy consumption.

Comprehensive Security and Asset Monitoring

Advanced Surveillance:
AI/ML-powered video monitoring detects unauthorised activity, theft, and even noise indicators like breaking glass.

Asset and Vehicle Tracking:
Real-time GPS tracking and diagnostics ensure efficient fleet and equipment management.

Other Features

Crowd Detection and Alerting
Count people in large event spaces, track queue lenghts and movement to estimate waiting times and manage capacity.

Digital Twins (Interactive & Real-time)
Virtually gain visibility of a physical space or object with accurate data collection, environment simulations and educated predictions.

Traffic Flow Monitoring
Count vehicles and people in key locations during peak/off peak times and detect traffic congestion.

BBQ
Track public BBQ usage and availability via the council website and public dashboards and signage.

Security
Count and monitor how many people are using the space during certain times.

Waste Management in Rubbish Bins
Tracks litter level in bins and receive alerts when bins reach a specific level or are full.

Measurement of Soil Moisture and Irrigation
Measure the moisture of sport grounds or parks and turn irrigation on and off automatically when necessary

Hazard Gases Detection
Detect gas levels and leakages in councils and public environments.

Illegal Dumping and Monitoring
Monitor waste sites and detect unauthorised dumping in private and public properties.

Sun Untraviolet Radiation
Detect UV radiation levels at beaches or similar public locations and display them onto information kiosks and signage to advise safety level.

Temperature Monitoring
Monitor temperature of indoor/outdoor, fridges and similar, with real-time alerting and reporting.

Asset Tracking
Manage indoor and outdoor asset and location advice (vehicles, machinery, inventory).

Forest Fire Detection
Monitor smoke and other combustion gases and detect preemptive fire conditions.

Smart Parking
Monitor individual car park availability and usage. Understand occupancy and trends.

Information Kiosks and Digital Signage
Delivers content from council like advertising, information services and weather or road notifications.

Driver Behaviour and Alerting
Monitor driver's face and eyes to detect and determine if they are distressed or fatigued.

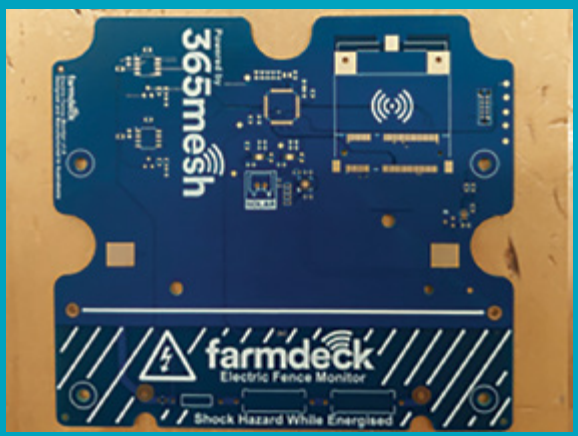
Explore the full range of features by requesting our SmartCityDeck and TransportDeck brochures for a detailed overview.

Designed & Manufactured in Australia & New Zealand

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

Locally manufactured in Australia for fast shipping and local support

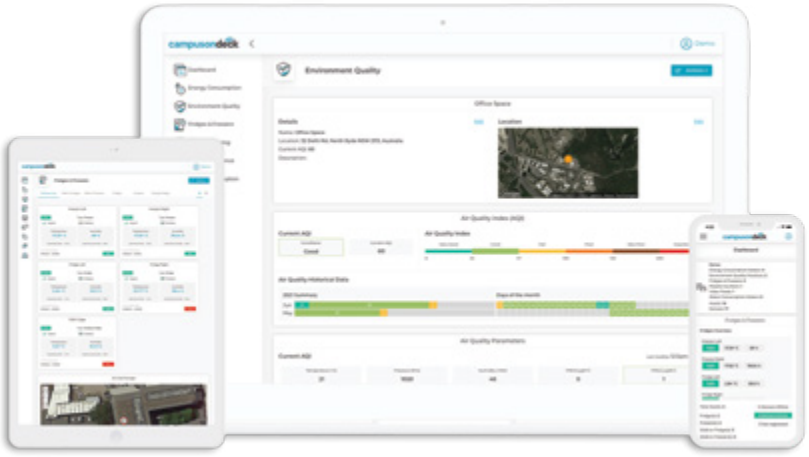
- Rapid prototyping
- Injection moulding
- Assembly and shipping
- Electronics PCB
- Hardware testing
- Manufactured by experiences engineers



Ongoing maintenance with local in country support hosting network monitoring centres in Sydney and Melbourne

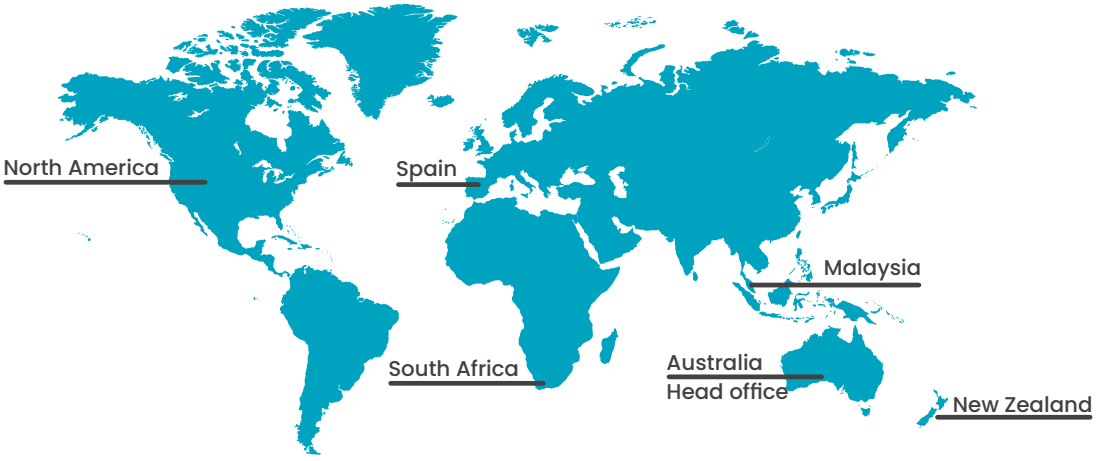
24x7x365 days

Gain real time visibility over your airport operations and assets with 365mesh IoT portal.



WE ARE FOUND GLOBALLY

Australian based, owned & operated with local manufacturing capabilities



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Direct customer enquiries welcome
or alternatively, we will introduce you to a relevant skilled 365mesh integration partner in your region.

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