SCATS

Move Smarter

SMUG - SCATS Research and Development: Manly Wharf Trial

Mark de Kock
Senior Manager Research and Development

NSW GOVERNMENT

Research and Development: Manly Wharf Trial
Adaptive Pedestrian Green Light Control

SCATS
Move Smarter

NSW GOVERNMENT

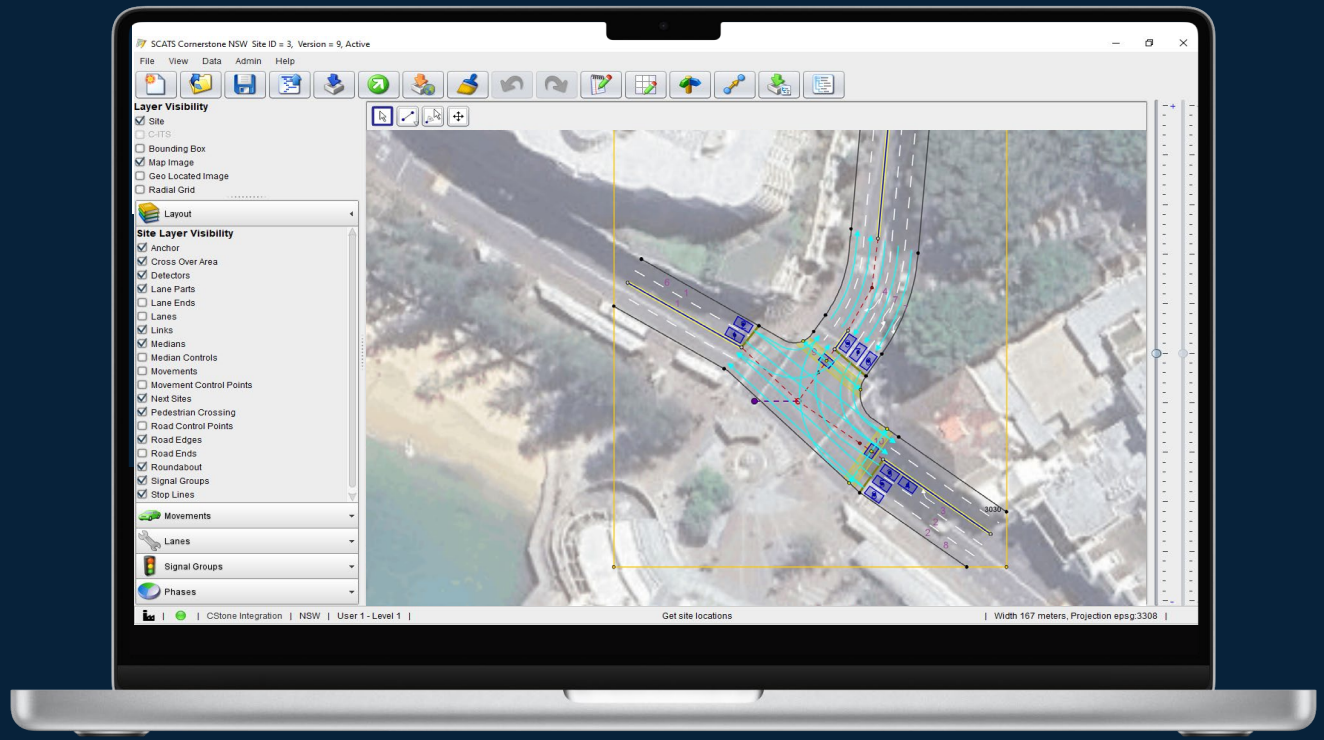
Background & challenge

Manly Wharf is a busy transport hub where ferry arrivals cause unpredictable surges in pedestrian traffic.

The existing traffic signal system struggled to adapt to these fluctuations, leading to safety concerns - particularly with pedestrians crossing during the flashing red phase.

Recognising this challenge, the SCATS R&D team identified Manly Wharf as an ideal location to trial adaptive pedestrian sensing technology, leveraging Smart Sensors to improve both safety and traffic flow.

Launched in August 2024, the trial focuses on integrating modern sensor technologies using FLIR TrafiOne camera sensors and scalable data architecture into the SCATS ecosystem.



Manly Wharf spatial model in Cornerstone

Trial objectives & design

Key components include:

Adaptive signal timing: Dynamically extends pedestrian green time using a four-threshold model based on real-time occupancy.

Responsive to ferry arrivals: Adjusts to large, variable pedestrian volumes during disembarkation.

Sensor accuracy evaluation: Assesses real-time pedestrian and traffic data quality.

Trial architecture: Tests a sensor-agnostic messaging framework for future SCATS development.

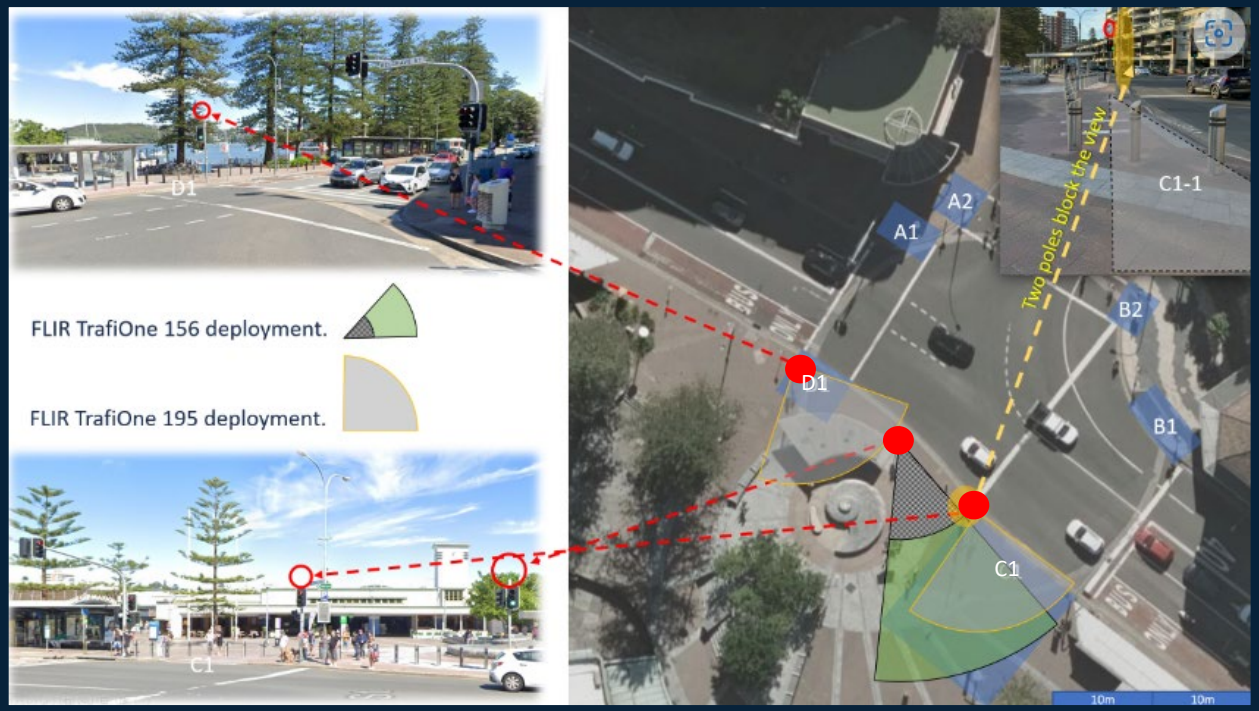
Multi-sensor comparison: Deploy multiple sensor types at a second site to compare performance across varied conditions.

Future trials are designed to incorporate AI-driven logic to interpret sensor data and adapt signal timing in real time.

This includes:

- Machine learning-enhanced thermal imaging is used for privacy-preserving detection in low-light, rainy, and various challenging environmental conditions.
- Advanced AI-powered cameras (planned for Early 2026) to detect all traffic modalities — pedestrians, cyclists, motorbikes, cars, buses, and trucks — and measure queue lengths.

Deployment of camera detection sensors



Red dots indicate FLIR TrafiOne camera sensor deployment at Manly Wharf intersection

3 TrafiOne cameras have been installed to monitor pedestrian activity at the intersection:

- TrafiOne 195 monitors D1 (standard-size waiting zone)
- TrafiOne 195 and TrafiOne 156 monitor C1 (large-size waiting zone)

These sensors detect waiting pedestrians and collect traffic data to support signal timing decisions and pedestrian safety improvements.

Preliminary results & insights

The system processes **over 1,000,000 data points** daily by monitoring pedestrian occupancy through sensor technology.

Thermal cameras demonstrate reliable detection capabilities under diverse conditions - including low light and rain - with occupancy (Occ) percentage displayed in the top-right corner of the image as an indicator of pedestrian presence in the zone.

This method ensures identity privacy by avoiding the capture of personally identifiable features.

Thermal imaging in rainy conditions

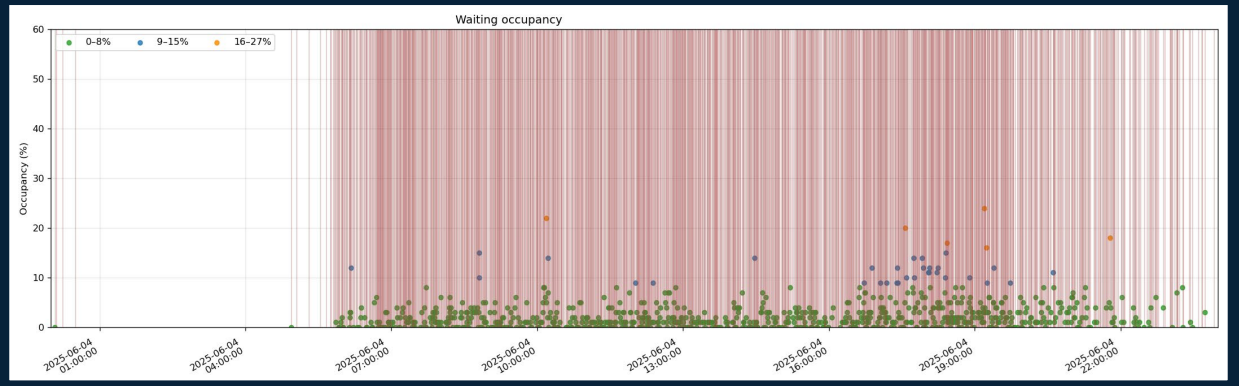
Thermal imaging in night conditions

Additional sensor types will be evaluated in the next trial phase.

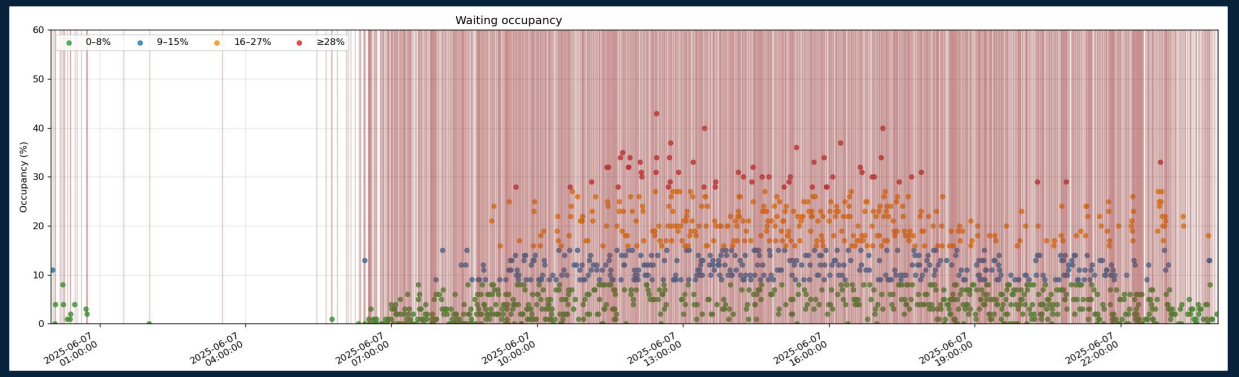
Preliminary results & insights

Visualisations generated from occupancy data captured by cameras show higher pedestrian occupancy on weekends, indicated by the red points.

These peaks, especially during ferry arrivals, reinforce the need for dynamic green signal phases.



Occupancy data on a weekday



Occupancy data on a weekend

Results and next steps

The updated system went live in June 2025.

Field results showed an initial reduction in violation instances (one of more people commencing crossing during flashing red) by 34%.

The next phase, launching in Parramatta in early 2026, will introduce AI-powered cameras capable of detecting all traffic modalities, classifying vehicles and speeds, testing virtual stop line detectors and measuring queue lengths and congestion levels.

Manly implementation details

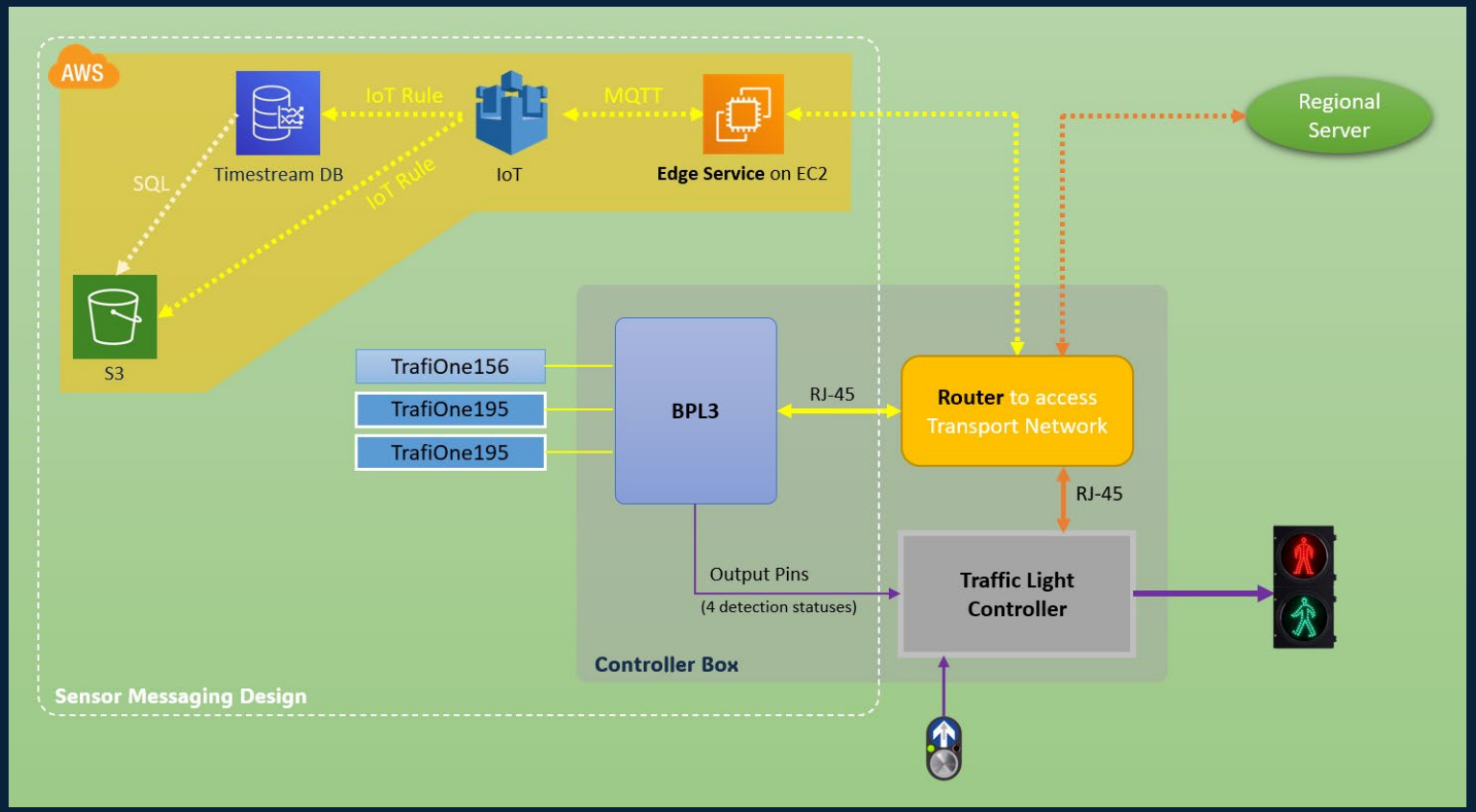
The Pedestrian pressure thresholds and initial walk time extensions were as per the table below:

East Status	Pedestrian Pressure	Occupancy	Walk Time (sec)
Level 1	Very low	0 - 8%	6
Level 2	Low	8 - 15%	9 (6 + 3)
Level 3	Medium	15 - 27%	12 (6 + 6)
Level 4	High	27 - 100%	15 (6 + 9)

The personality at the intersection was augmented to incorporate the responses to the thresholds via the use of SCATS MSS and XSF flags, where the walk time is extended according to the binary inputs to the detector cards from a FLIR BPL3 device to which the TraffiOne cameras are connected.

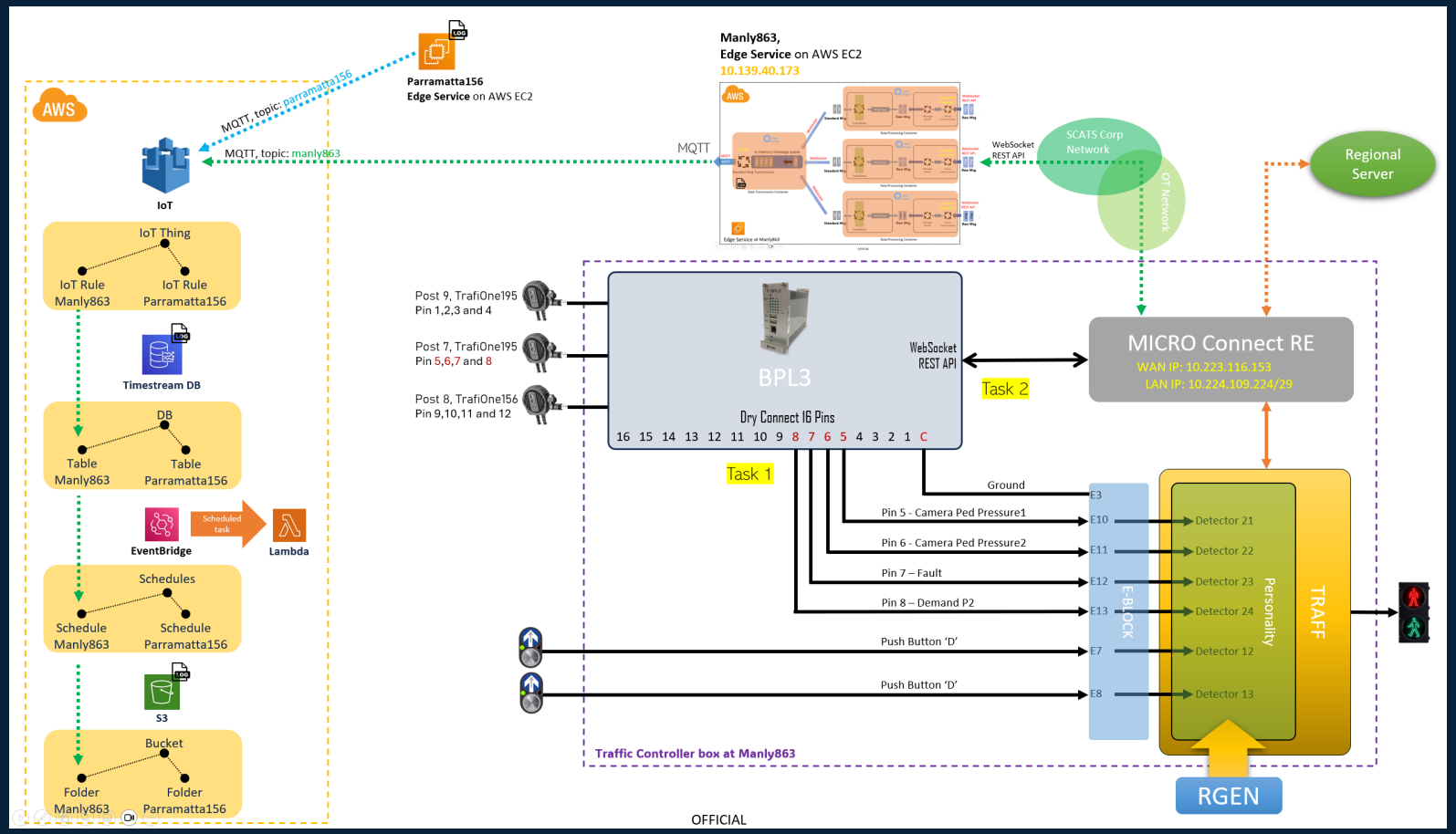
SCATS Edge Detection and Messaging Architecture (SEDM) POC

The following architecture for data acquisition and adaptive control was implemented:



SCATS Edge Detection and Messaging Architecture (SEDM) POC

The following architecture for data acquisition and adaptive control was implemented:



Thank you

For more information or a deep dive into any of today's topics, please contact SCATS Help at scatshelp@transport.nsw.gov.au

SCATS
Move Smarter