

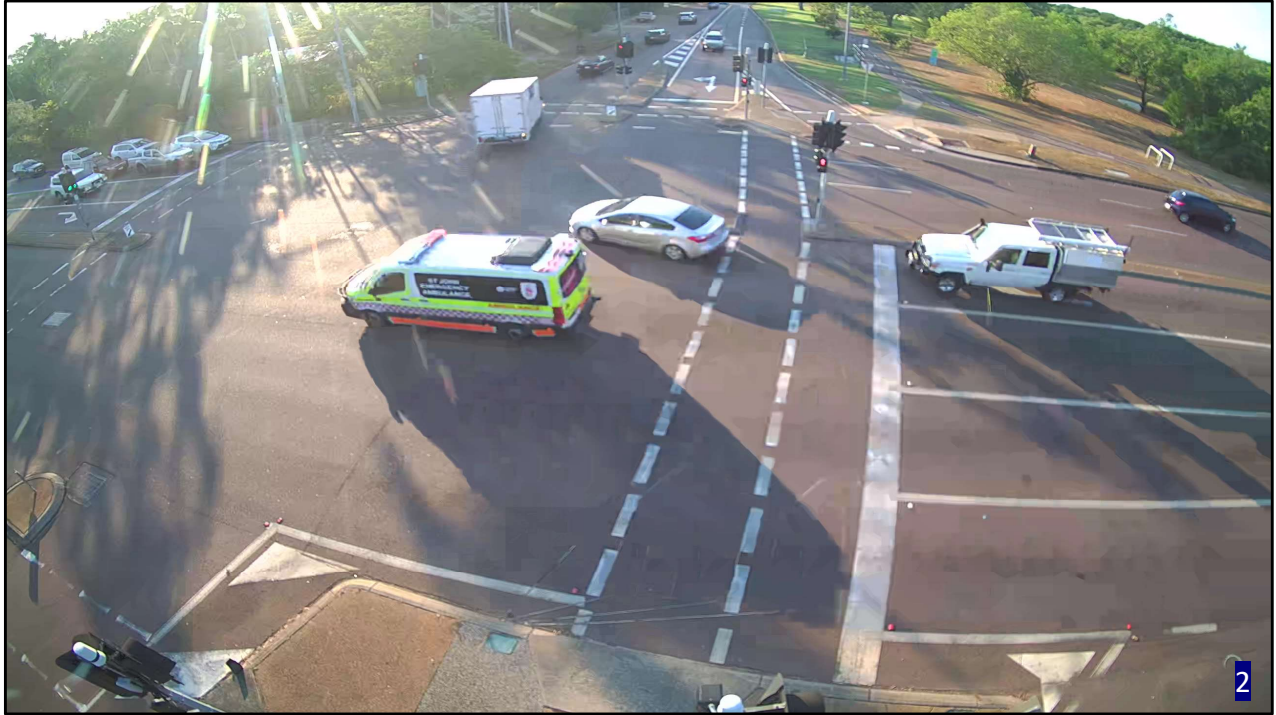
An Integrated Traffic Signal Priority Solution for Emergency Vehicles in Darwin.

Vpriority case study.

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1. Welcome to an overview of an “Integrated Traffic Signal Priority Solution for Emergency Vehicles in Darwin”. My name is Jamie Smith and I’m from Micro Connect.



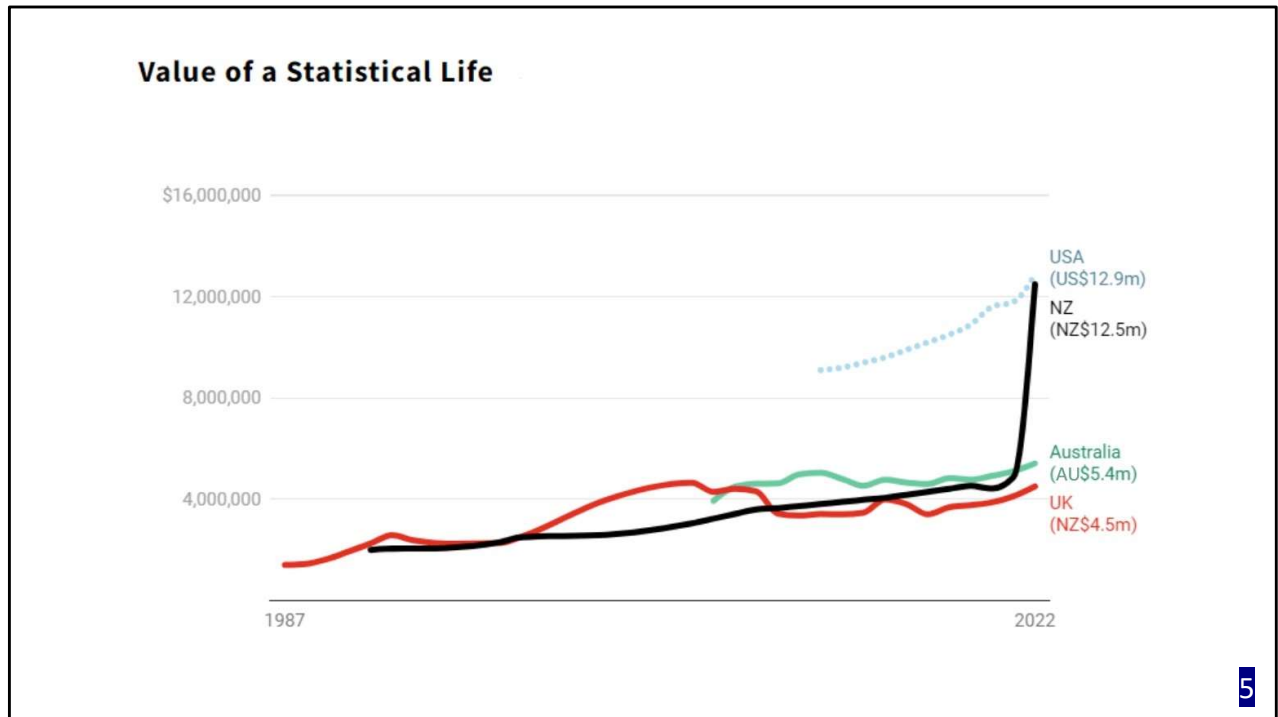
2. Road operators aim to optimise travel times and reduce congestion, but also to provide safe and efficient journeys for emergency services vehicles.



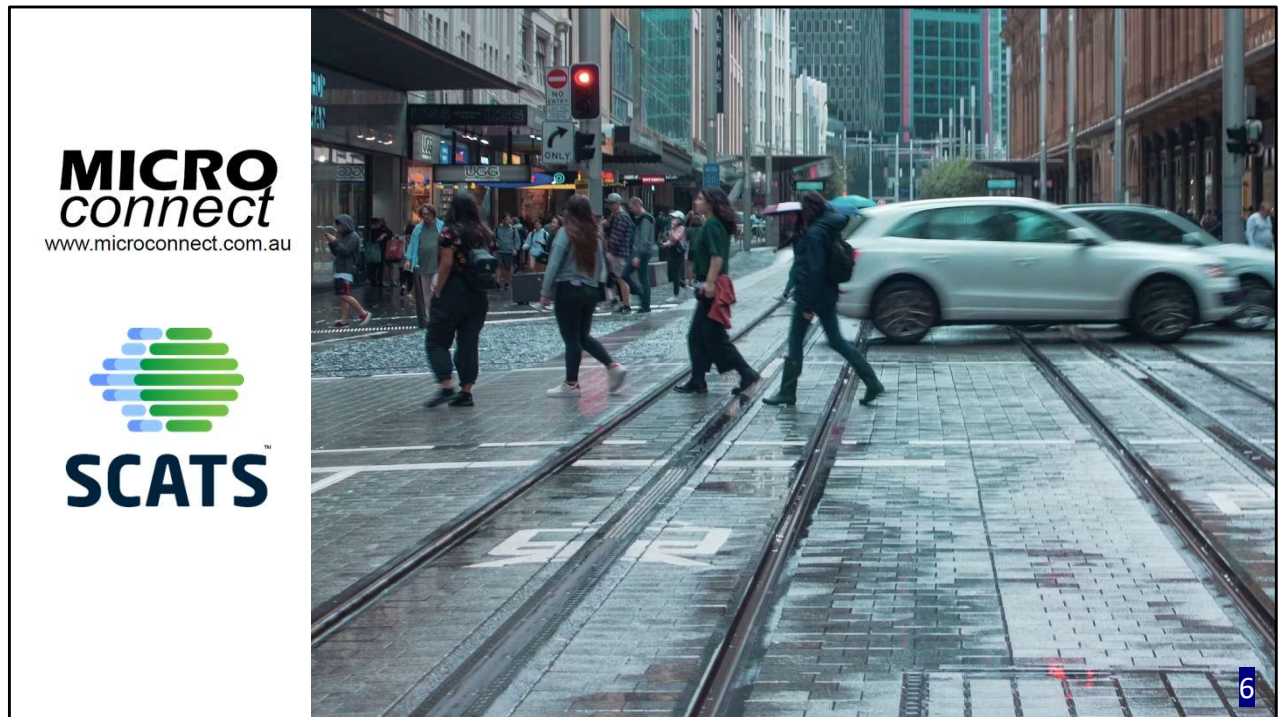
3. The traffic signal manager's challenge is to enable safe green light priority for unplanned emergency vehicle trips, while minimising disruption to the usual traffic flow.



4. Delays of just a few minutes in ambulance crews providing medical intervention for traumatic road accident injuries can result in death or debilitating injuries for life.



5. The Northern Territory Government traffic management team understood the real value of saving lives through a secure and effective Emergency Vehicle traffic signal priority solution in the city of Darwin.



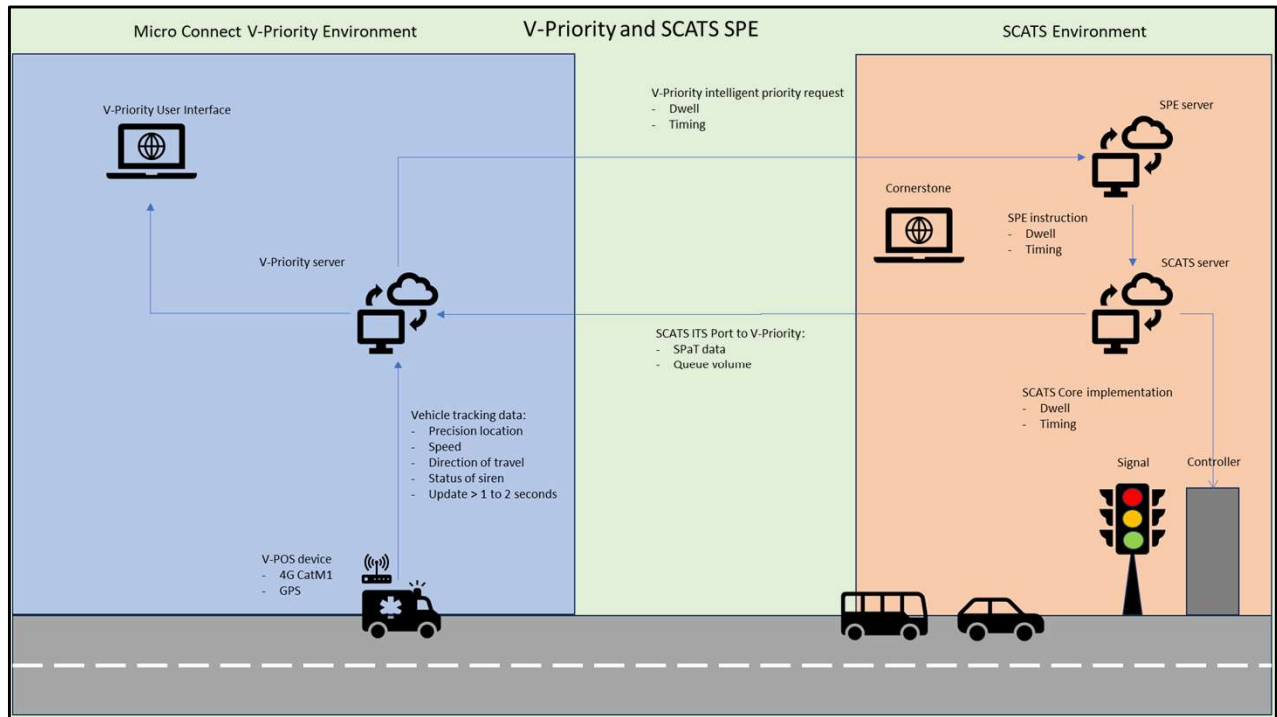
6. The NT traffic management team consulted their trusted ITS partners - Micro Connect and Transport for NSW SCATS - and described the aims and objectives of the project.



7. Micro Connect proposed the development of a new V-Priority solution which was endorsed by the NT Traffic Management team.



8. Multiple benefits were envisaged by all stakeholders including faster time to reach the scene of an incident, resulting in more rapid medical intervention for patients, as well as improved safety for ambulance crews travelling on the signalised road network in Darwin.



9. Once the project was approved, the NT traffic management team and Micro Connect developed an overall solution architecture design.

This architecture provided clear guidance around what each party needed to deliver using the existing traffic signal infrastructure as well as new hardware and software components.

Secure & reliable vehicle priority with the VePOS hardware module. Supports extended range CAT M1 network. Redundant cloud managed with flexible pricing models

Vehicle Position hardware module
 Compact size 64x76x25mm
 Design and manufactured in Australia
 Flashing lights/Brake light input
 Simple installation
 Zero touch configuration
 4G CAT M1
 Accurate GPS

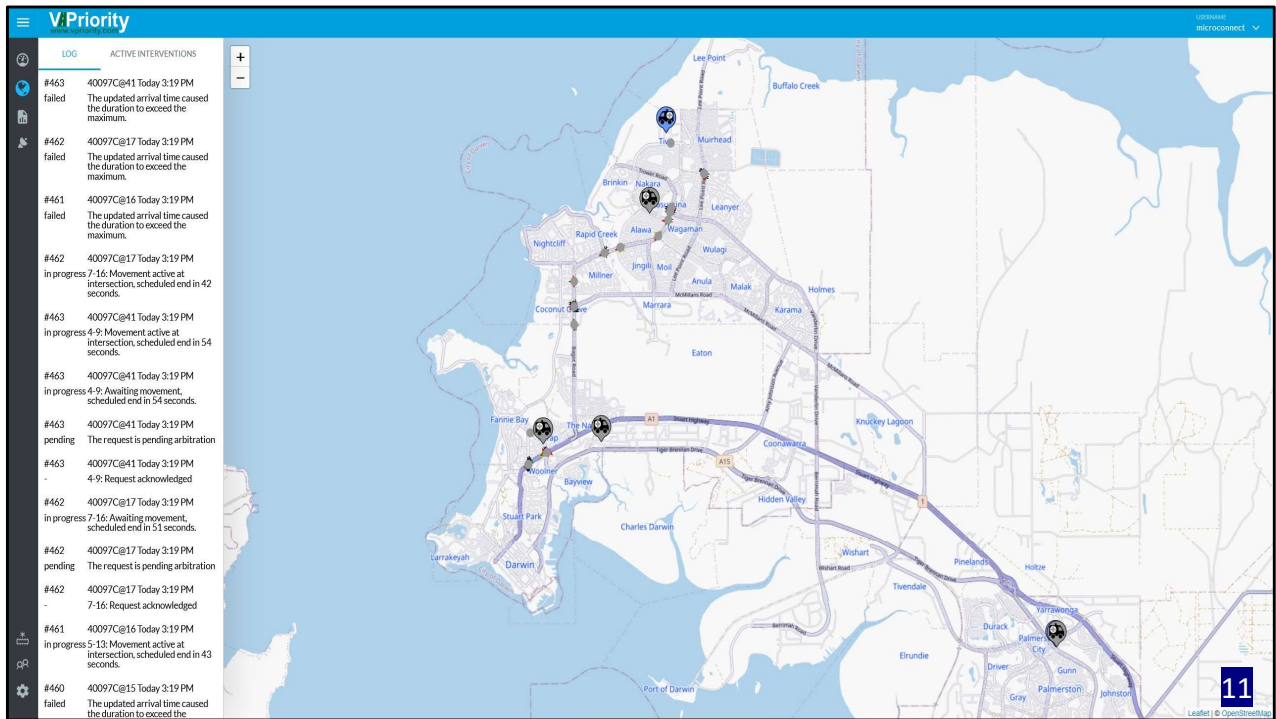
Supply voltage	9-48V DC
Supply current	150mA
Mobile technology	4G CATM1
Mobile antenna	Internal
Sim	Micro SIM (Internal access only)
GPS antenna	Internal
GPS channels	22 (Tracking)/ 66 (Acquisition)
Horizontal Position Accuracy	Autonomous: <2.5m CEP
Velocity Accuracy	<0.1m/s
Acceleration Accuracy	<0.1m/s
Operating temperature	0-70 °C
Max altitude	10,000 FT

VAPriority www.vpriority.com

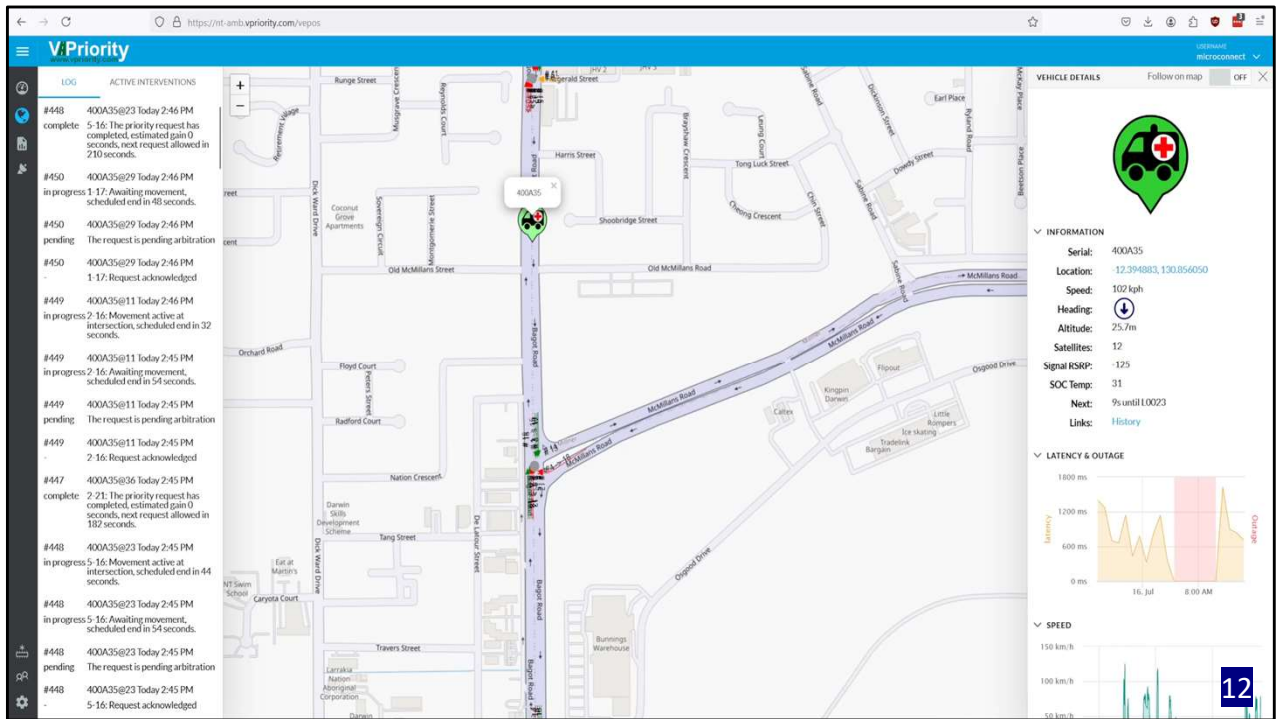
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10. Micro Connect set about designing, engineering and prototyping the new in-vehicle V-POS device. The V-POS device provides for easy vehicle installation by non-technical staff, vehicle battery powered (9 to 48V), inbuilt precision GPS chip, 4G CAT M-1 wireless modem, and is Australian made under Micro Connect’s ISO9001 certification.

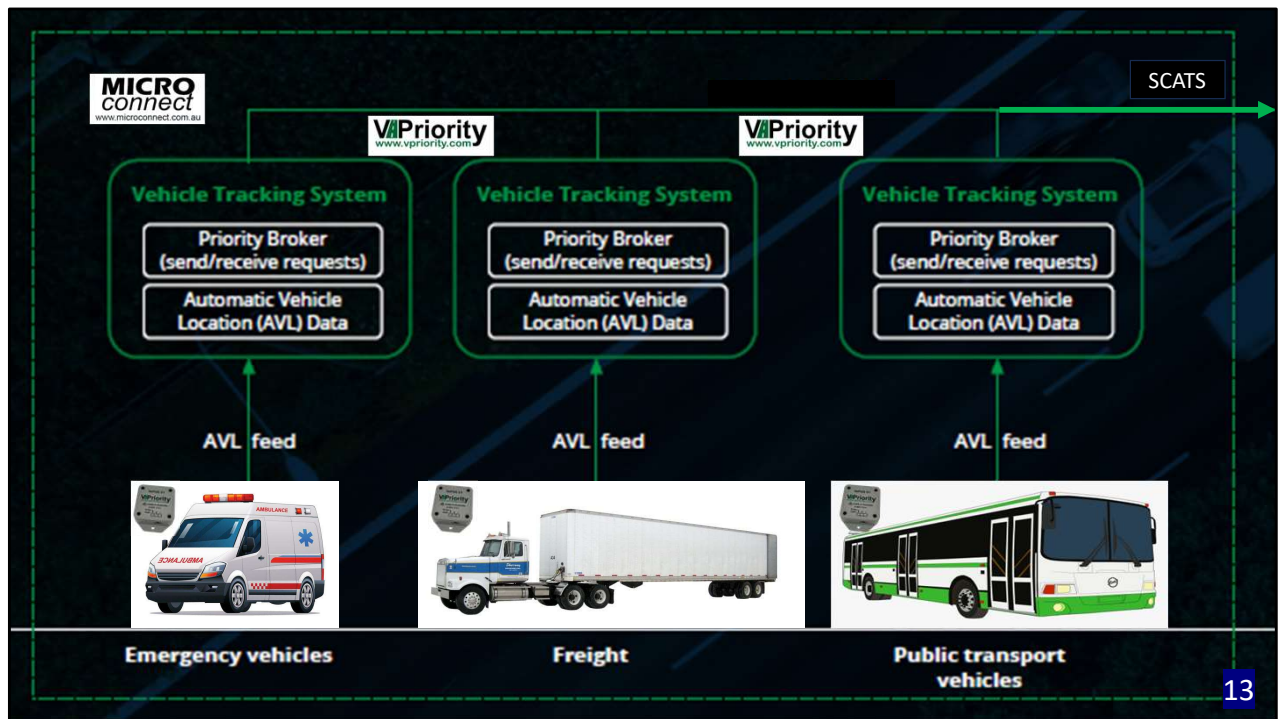


11. Micro Connect then designed and developed the new Vpriority server software to capture, ingest and process input data from the active V-POS devices which would be installed in the Emergency Vehicles.



12. Vpriority software intelligently determines the parameters for an optimal traffic signal green light / green arrow priority request. This intelligent request is sent to the SCATS Priority Engine software.

Vpriority is fully aware of the status of the Darwin Road Network SCATS traffic signal infrastructure including the real-time SPaT status of each intersection via the SCATS ITS port interface.



13. Vpriority acts as Vehicle Tracking System priority request broker for the SCATS Priority Engine software providing the necessary data about the vehicle location, direction of travel and target intersection.

SCATS Priority Engine

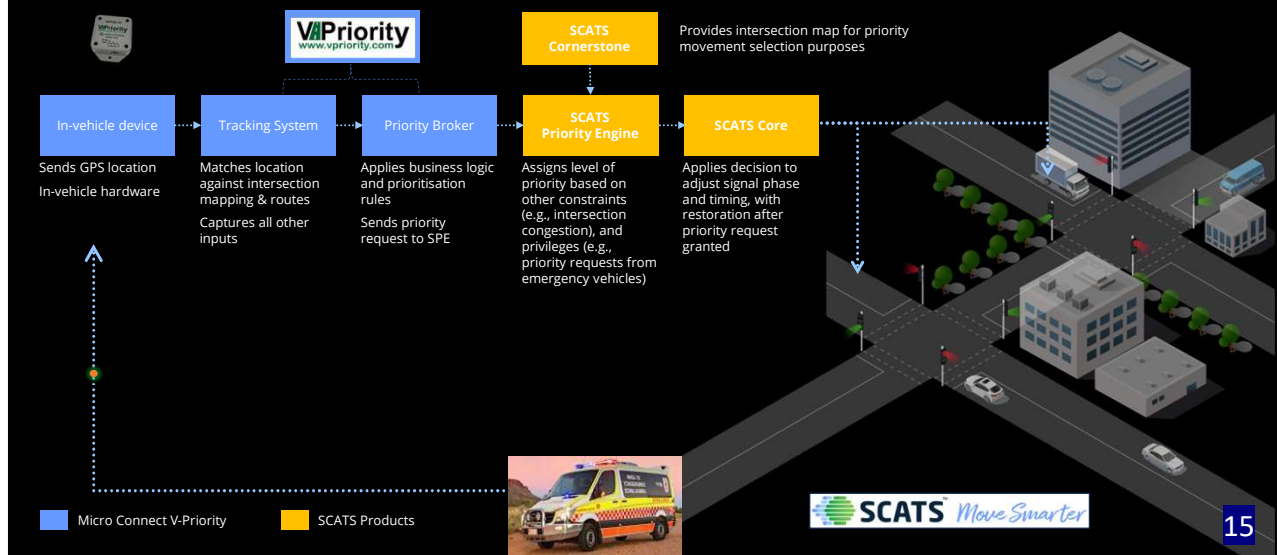
SPE provides unified signal priority to:

- Emergency vehicles
- Freight vehicles
- Mass public transport vehicles – i.e. buses, trackless trams, and light rail
- VIP vehicles



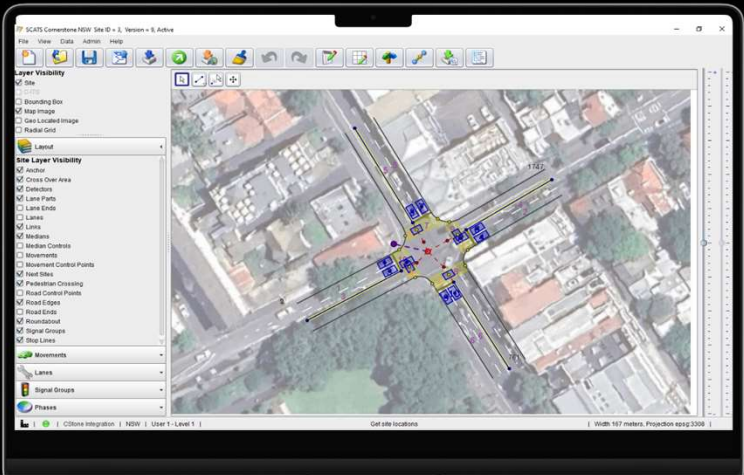
14. SCATS Priority Engine (SPE) enables the prioritization of designated vehicles within SCATS controlled traffic networks (intersections).

How S.P.E. works



15. SCATS Priority Engine (SPE) assigns level of priority based on other constraints such as intersection congestion and vehicle type privileges – e.g. emergency vehicles. SPE then instructs the SCATS Core system to adjust the SPaT and then restore the flow after the signal priority was granted.

SCATS Cornerstone



The screenshot displays the SCATS Cornerstone software interface. The main window shows a satellite-style map of an urban intersection with overlaid digital data. On the left, there is a 'Layer Visibility' panel with a tree view of layers such as 'Site', 'Bounding Box', 'Map Image', 'Grid', and 'Lanes'. Below this is a 'Site Layer Visibility' panel with a list of specific site elements like 'Cross Over Area', 'Crossovers', 'Lane Phases', 'Lanes', 'Movements', 'Road Edges', and 'Signal Groups'. The map itself shows a central intersection with various colored markers and lines representing these elements. At the bottom of the software window, there is a status bar with information like 'Width: 167 meters' and 'Projection: epsg:31466'.

- Intelligent Traffic System (ITS)**
Graphical data for intelligent traffic control systems like SCATS
- Traffic modelling**
Spatial data for Geographic Information System, traffic modelling and simulation systems
- Priority system**
Graphical data for traffic priority management systems like SCATS Priority Engine (SPE)
- Connected and automated vehicles (CAVs)**
MAP messages for location intelligence and connected & autonomous vehicles
- Network analysis**
Historical data for use by traffic network analysis applications
- Network management and optimisation**
Visual representation of an intersection layout with lane direction and phases

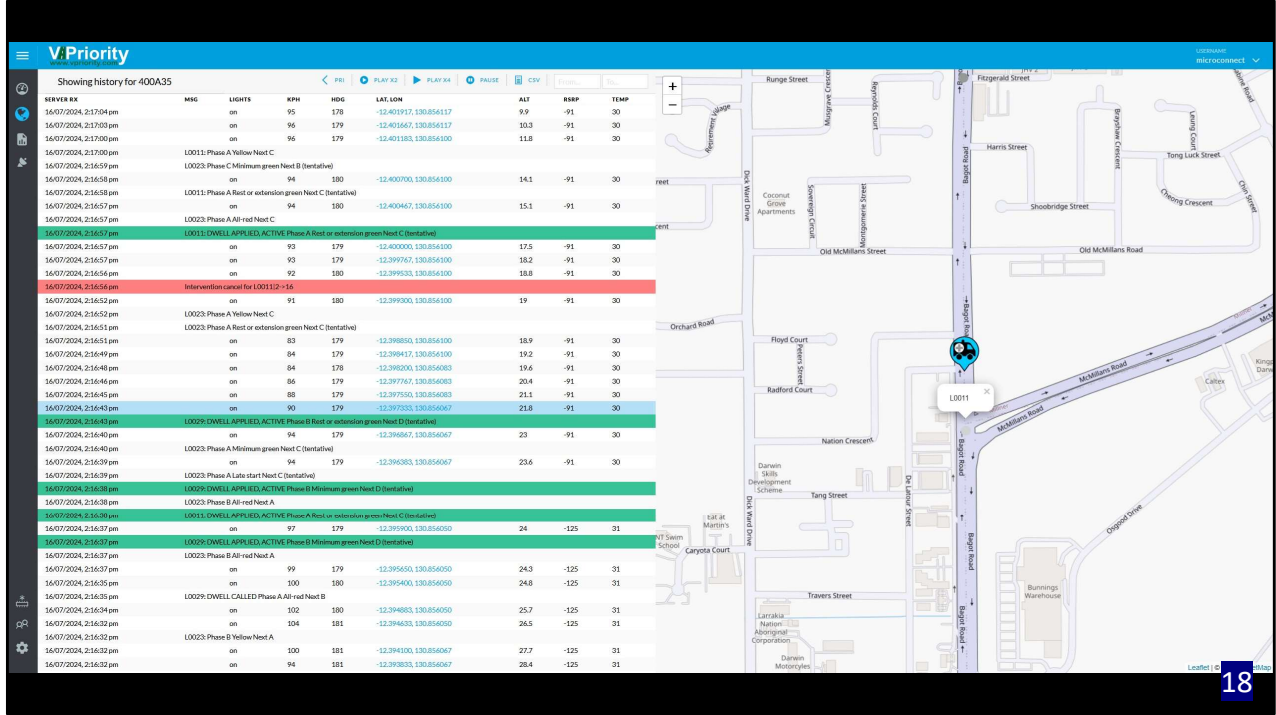
SCATS Move Smarter 16

16. SCATS Cornerstone is a software application that allows cities to create a digital source of truth of an intersection's spatial and behavioural layout.

Cornerstone provides the digital intersection map to enable vehicle priority movements to be implemented.



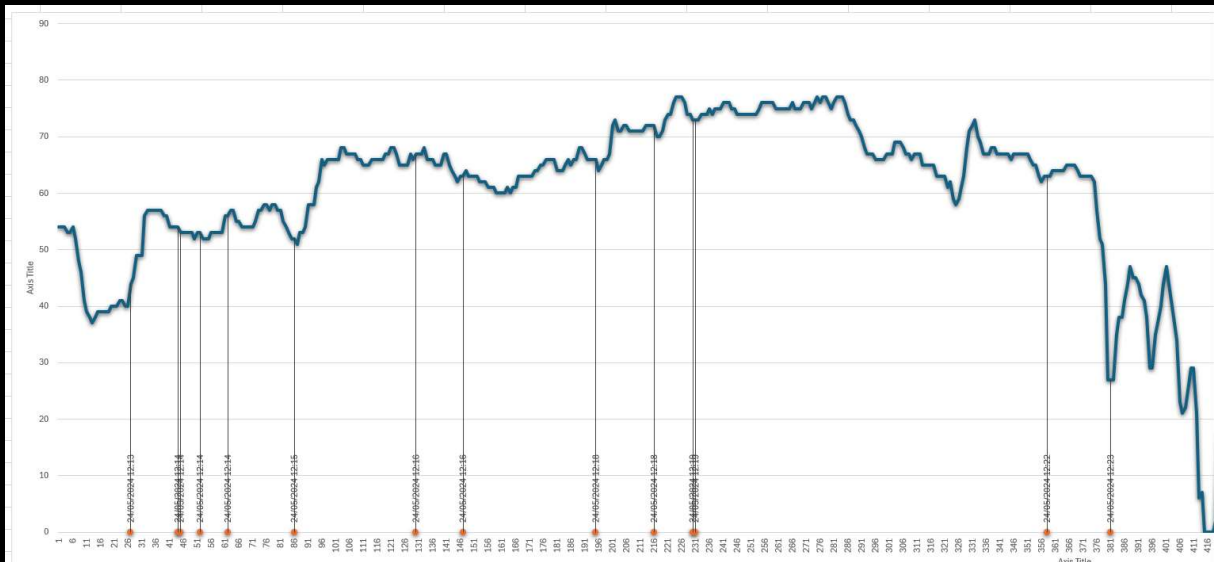
17. By early 2024, the Emergency Vehicle Vpriority solution was working in Darwin in pre-production test mode with V-POS devices in five (5) St John's ambulances.



18. In May 2024, the Vpriority server software was receiving vehicle location input data from the five St John's Ambulances in Darwin and began issuing signal priority requests to the Transport for NSW SCATS Priority Engine software.

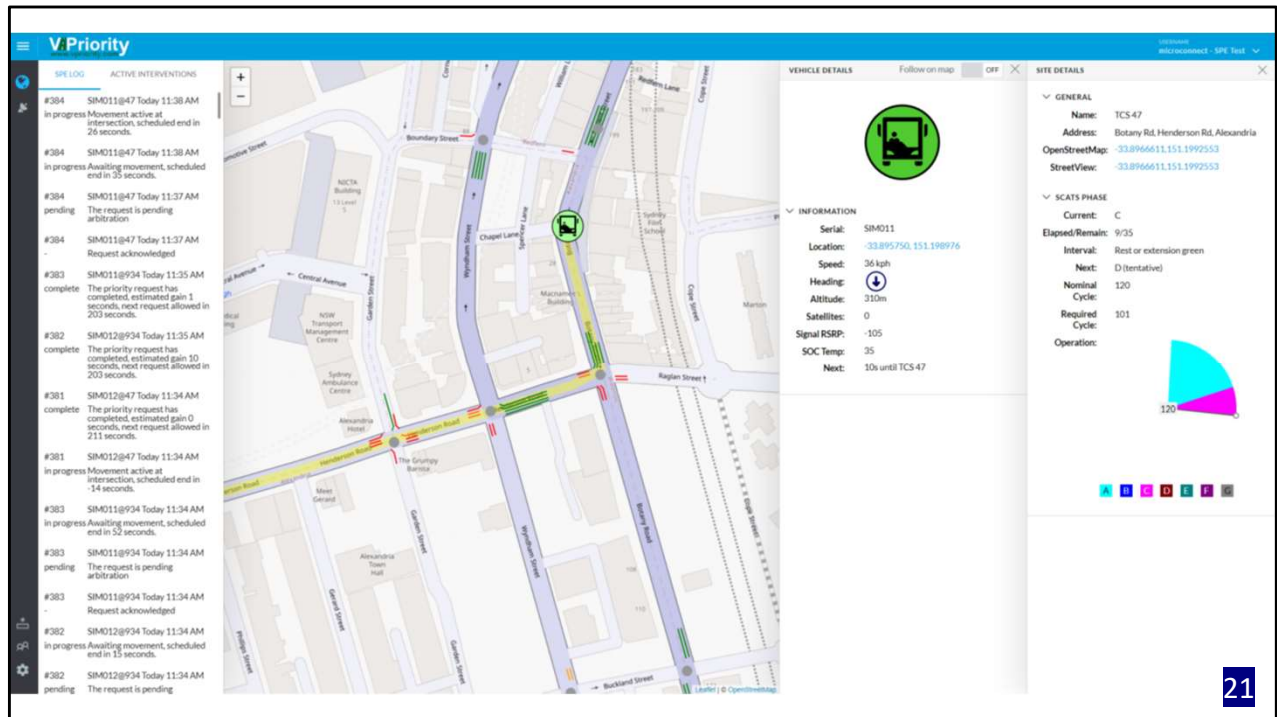


19. The Emergency Vehicle priority solution has been undergoing on-road trials since then. These live on-road tests have provided valuable feedback which had led to further enhancements and fine-tuning of all of the components in the complex ecosystem.

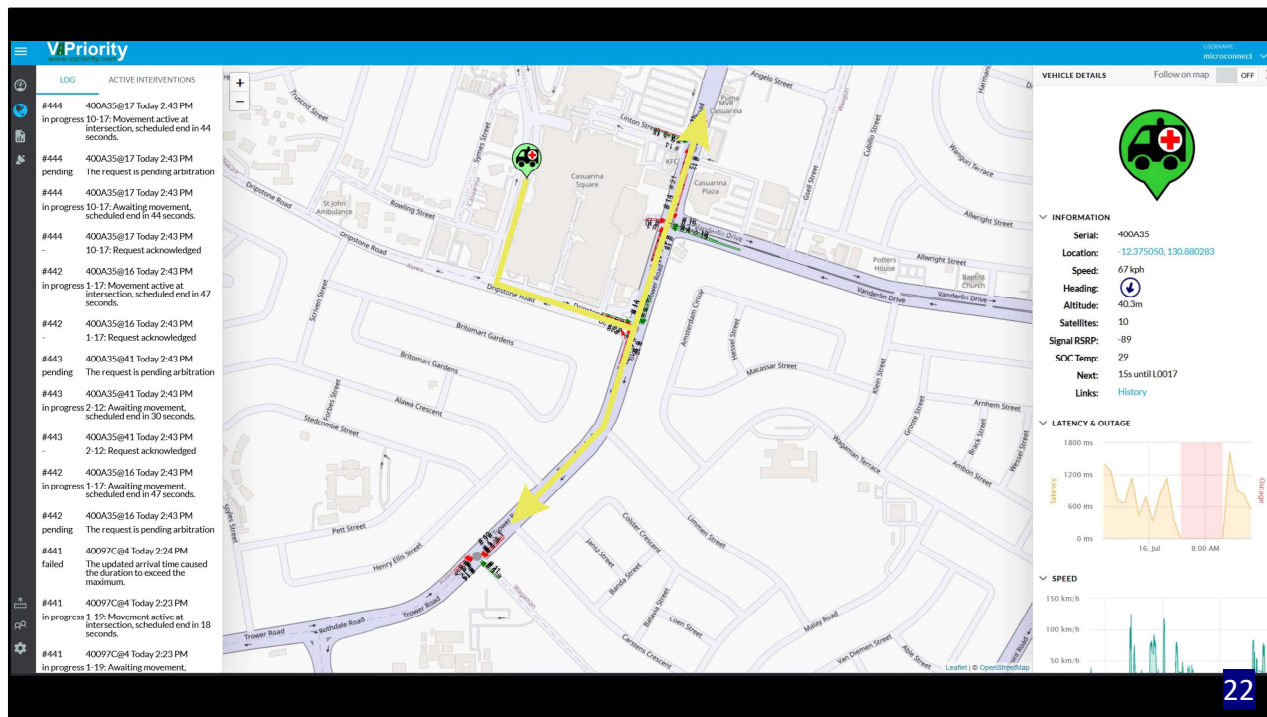


Travel time of an ambulance, priority calls active, transiting multiple intersections.

20. This actual data plot from the trials shows that the ambulance was able to maintain a speed above 50 kph along the route through a total of 14 signalised intersections.



21. Originally the concept was to use a pre-defined 'route' as the foundation for intelligent traffic signal priority request decision making. It was found that ambulances did not always follow the dispatch route during the journey, and the Vpriority design had to go back to square #1.



22. Vpriority software was then modified and enhanced to cater for real-time dynamic vehicle routing, so that the traffic signal priority request strategy could be adapted on the fly for the new anticipated route.

This change was implemented in June 2024 for further on-road testing and has proven to work much better.



23. The existing Transport for NSW SCATS traffic signal network management system in Darwin did not need to be modified as the SCATS Priority Engine software drives the implementation of specific intersection signal dwell changes in response to the Vpriority request.



24. The SCATS Priority Engine software had not previously been implemented for an emergency vehicle signal priority solution, but had been successfully implemented for public transport (NSW buses & in Qatar) and also for heavy freight vehicle signal priority trials in NSW.



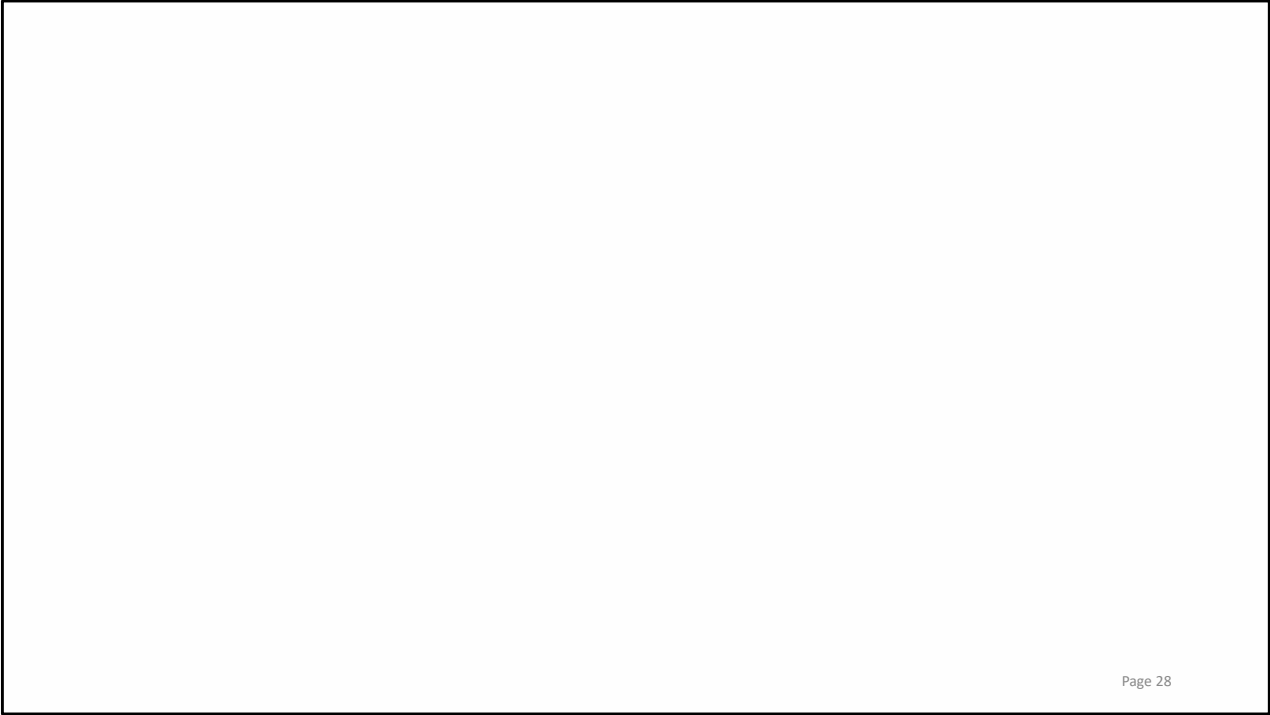
25. The Northern Territory Government Traffic Management team will review the results of the current Vpriority and SCATS Priority Engine trials and will ascertain how to make the Ambulance priority system operational in Darwin.



26. The Northern Territory Government traffic management team is also running a pilot implementation for a Heavy Freight Vehicle Signal Priority solution in Darwin using Micro Connect Vpriority connected to the Transmax STREAMS Heavy Vehicle Priority system.



27. The Northern Territory Government Traffic Management team supports innovative projects such as the Emergency Vehicle signal priority with industry partners Micro Connect and Transport for NSW SCATS. Contact Micro Connect for demonstrations of the traffic signal priority solution.



Vpriority VIDEO

An Integrated Traffic Signal
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29. Thank you.