

Auracast Transport Pilot Technical Report

Technical Findings from Multi- Environment Passenger Information Pilots

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Glossary

Acronym	Expanded term
iMOVE	iMOVE Cooperative Research Centre
MADT	Multi Application Driver Terminal
PA	Public address
PID	Passenger Information Display
PTV	Public Transport Victoria
QR	Quick Response
T4	Terminal 4
TTS	Text-to-speech

Terms and Conditions

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1 Executive Summary

This report documents the technical implementation and findings from a series of Auracast passenger information pilots conducted across three transport environments: Melbourne Airport Terminal 4, CDC Melbourne bus services, and Transport Canberra light rail / bus interchange and onboard bus environments.

The pilots were undertaken as part of an iMOVE-funded initiative involving NEC, La Trobe University and Get Skilled Access. Get Skilled Access is separately reporting on the human factors, accessibility and participant experience aspects of the pilots. This report focuses on the technical implementation, operational behaviour, device compatibility, passenger information logic, deployment readiness and productisation implications.

The pilots demonstrated that Auracast can operate as a supplementary passenger information channel in both fixed-location and onboard transport environments. The same basic technical pattern was used across the pilot locations: an audio or passenger information source, an Auracast transmitter, defined broadcast channels, and passenger receiver devices such as Auracast-enabled headphones or hearing aids.

The most important conclusion is that Auracast is no longer only a future concept for transport. In selected contexts, particularly onboard buses and fixed interchange or platform environments, it is ready for controlled early deployment as a complementary passenger information channel. These deployments should be positioned as additive to existing passenger information systems, not as a replacement for hearing loops, public address systems, onboard announcements, mobile applications or visual passenger information displays.

The pilots also confirmed that broader deployment will require further maturity in several areas. Receiver compatibility is uneven, hearing aid and cochlear device support is still emerging, reconnection behaviour varies across devices, and some passenger devices described as Auracast-ready are not yet Auracast-enabled in practice. This means the infrastructure can be deployed ahead of full consumer device maturity, but the service must be introduced carefully, with clear communication and appropriate fallback channels.

Key findings include:

- **Auracast was technically feasible across all tested environments.**

The pilots showed that Auracast broadcasts could be used for airport departures, mobility assistance, bus stop announcements, bus connections and route-specific passenger information.

- **Auracast is ready for controlled early deployment in selected contexts.**

Onboard bus and fixed interchange/platform use cases are suitable candidates for early deployment because they are bounded, operationally understandable, and do not require seamless roaming across multiple transmitters to provide value.

- **Auracast should initially be deployed as a complementary channel.**

It should not yet be positioned as a full replacement for existing hearing loops, PA systems, onboard audio, visual information displays or mobile apps. A dual-system transition is necessary while consumer device support matures.

- **Receiver behaviour varied materially between devices.**
Some hearing aid implementations behaved differently, including shorter effective range, less reliable reconnection and different handling of apparently identical broadcasts.
- **Device readiness remains a practical adoption constraint.**
Many participant devices were not Auracast-enabled, even where users expected compatibility or where the devices were described as Auracast-ready. This created a gap between the promise of the technology and actual user availability during the pilots.
- **Broadcast channel naming is a key product design issue.**
Shorter names were easier to read in receiver apps. Route-specific names made it easier for participants to identify the correct broadcast, but dynamic route-specific naming may require transmitter reconfiguration and may reduce the usefulness of fixed QR code signage.
- **Passenger information logic needs to be transport-aware.**
Bus stop announcement logic requires refinement. Simple time-based repetition can become annoying or unhelpful during congestion. Arrival announcements should only be made when the bus is actually stopping, and route / destination confirmation should be considered to help passengers confirm they are on the correct vehicle.
- **Audio quality depends on source generation and signal handling.**
Text-to-speech was generally acceptable, but pronunciation, emphasis, volume levels and silence handling require further design. The pilot also identified test setup noise between announcements, indicating the need for production-grade audio muting and signal termination.
- **Production value depends on integration.**
The long-term value of Auracast in transport will come from treating it as an output channel of the passenger information system, rather than as a standalone audio broadcast. Integration with real-time passenger information, vehicle state, route data, disruption messaging and monitoring systems will be required for a scalable service.

NEC's recommendation to the market is that the next step should not be further abstract research alone. The pilots have demonstrated that Auracast is technically feasible and ready for controlled early deployment in selected transport contexts. Auracast should now be progressed toward controlled early deployment in onboard bus and interchange environments, while continuing technical development in receiver compatibility, dynamic channel configuration, announcement logic, audio quality, monitoring and transition planning.

2 Report Scope

2.1 Purpose of this report

The purpose of this report is to document the technical findings from the Auracast pilots conducted as part of the iMove IEP2 program and to set out NEC's view of the impact of those findings for

- transport operators,
- transport authorities
- delivery partners

who are considering Auracast as a passenger information channel and accessibility technology.

It is intended to support:

- technical assessment of Auracast in transport environments;
- customer and market discussions on potential deployment models;
- business case development by transport operators and authorities;
- future white papers, conference material and industry dialogue;
- identification of suitable early deployment candidates; and
- alignment with the human factors findings being prepared separately by Get Skilled Access.

This report does not attempt to provide a full accessibility evaluation or participant experience assessment. Those matters are being addressed separately by Get Skilled Access.

2.2 Areas covered

This report covers the technical aspects of the pilots, including:

- pilot technical setup;
- pilot configurations;
- broadcast channel structure;
- receiver and device behaviour;
- range and reconnection observations;
- audio and text-to-speech observations;
- bus stop announcement logic;
- fixed-location and onboard use cases;

- deployment readiness;
- technical constraints and risks;
- productisation implications; and
- recommended next steps.

2.3 Areas excluded

This report does not provide a detailed assessment of the following matters, which are outside its scope:

- participant lived experience;
- broader human factors outcomes;
- disability-specific usability conclusions;
- accessibility policy conclusions;
- detailed participant recruitment methodology;
- formal statistical analysis; or
- full production solution design.

Participant comments are included only where they highlight a technical, integration, deployment or operational design issue.

3 Industry Context and Adoption Drivers

The Auracast pilots should be read alongside the earlier industry perspectives work conducted as part of the broader initiative.

That work indicated that transport industry stakeholders are broadly positive about Auracast but remain cautious about adoption.

Several themes from the industry perspectives work are relevant to this technical report.

- First, accessibility is a high priority for transport organisations, but accessibility investment competes with other operational and financial priorities. These include cost control, safety, asset renewal, operational continuity and integration with existing systems.
- Second, Auracast is viewed positively because it can provide inclusive and flexible audio delivery to a broad range of passenger devices. It is not limited to traditional hearing aid users using a hearing loop and may also benefit the wider passenger cohort using Auracast compatible earbuds, headphones or other consumer devices.
- Third, adoption decisions are not driven by cost alone. Transport organisations are likely to place significant weight on compliance, technology maturity, reliability, future-proofing, integration complexity and evidence from real-world deployments.
- Fourth, industry stakeholders show a strong preference for a dual-system transition. Existing hearing loops and other passenger information channels should continue to operate while Auracast is introduced. This reflects the long replacement cycles of hearing aids and cochlear devices, as well as the practical reality that not all passengers will have Auracast-enabled devices in the near term.
- Fifth, there is a need for practical evidence. Operators and authorities are more likely to consider adoption where there are real-world examples, documented findings, clear deployment models and evidence that the technology can be supported operationally.

The pilots directly respond to these industry concerns. They provide early technical evidence across airport, bus and interchange environments. They also show that Auracast has moved beyond conceptual promise, while confirming that deployment in the public transport domain must be carefully targeted and supported by a managed transition model.

4 Pilot Overview

4.1 Pilot environments

The pilots were conducted across three distinct transport environments.

Pilot location	Environment	Primary technical scenario
Melbourne Airport	Terminal 4 food court and gate area	Fixed-location broadcasts for departure information and mobility assistance
CDC Melbourne	Onboard bus services	Stop announcements and mobility assistance during live bus journeys
Transport Canberra	Dickson light rail platform, bus interchange and onboard route 9 bus	Bus connection information, accessibility / mobility help, and onboard stop announcements

These environments were selected because they represent materially different passenger information contexts:

- a fixed, high-noise airport terminal;
- a moving public transport vehicle operating route service;
- an interchange environment involving transfer between transport modes; and
- route-based passenger information within a live bus journey.

4.2 Pilot objectives

The technical objectives of the pilots were to:

- assess whether Auracast could be used as a supplementary passenger information channel in transport environments;
- test broadcast discovery and connection using supported receiver devices;
- observe reconnection behaviour as participants moved through spaces or between transmitters;
- assess onboard bus stop announcement use cases;
- understand receiver differences across headphones, hearing aids and hearing aid apps;
- identify technical requirements for future production deployment;
- assess which contexts may be suitable for early deployment;
- identify integration requirements with existing passenger information systems; and

- inform future productisation of Auracast within NEC's Smart Transport portfolio.

5 Technical Solution Used in the Pilot

5.1 Conceptual architecture

The pilot solution followed a simple architecture, supported by a lightweight, self powered field-trial setup. Each pilot setup supported two broadcast channels and typically included two Samsung tablets, two Flairmesh Auracast transmitters, one four-outlet powerbank, associated cabling, tablet-based audio or announcement applications, and Auracast receiver devices.

HomeSpot JM320 headphones were used as the reference receiver and were also made available to participants who did not have their own Auracast-enabled device or their device was not functioning correctly during the trial

- The tablet generated passenger information audio.
- Audio was provided to an Auracast transmitter.
- Each transmitter broadcast one defined Auracast channel.
- Participants used compatible receiver devices or associated apps to discover and join the broadcast, following the QR scan workflow.
- Participants listened to the broadcast through their hearing aid, headphones or supplied reference headphones.

For bus scenarios, announcement content was linked to stop announcement logic generated through pilot-specific driver app / PID app configurations.

For fixed-location scenarios (airport and light rail interchange), content was generated through announcement applications such as departure information or mobility assistance scripts.

5.2 Channel model

Each setup provided two channels. The channel model varied by pilot environment.

At Melbourne Airport, the channels were used for:

- Terminal 4 departure announcements; and
- Melbourne Airport mobility help.

For CDC Melbourne, the channels were used for:

- bus stop announcements; and
- PTV mobility help.

For Transport Canberra, the platform setup supported:

- Dickson interchange bus connections; and

- Transport Canberra accessibility / mobility help.

The onboard Transport Canberra bus setup supported:

- Active route stop announcements; and
- Transport Canberra accessibility / mobility help.

5.3 Receiver models

The pilots included several receiver scenarios:

- HomeSpot JM320 headphones used as the reference receiver;
- participants' own Auracast-enabled hearing aids where available;
- hearing aids described as Auracast-ready but not enabled;
- hearing aids without Auracast capability; and
- hearing aid apps used to scan for or connect to broadcasts.

This provided useful insight into the difference between theoretical device compatibility and practical field usability.

5.4 Pilot-specific software

The pilots used a combination of announcement apps, text-to-speech software, pilot-specific PID app builds and driver app configurations. These were suitable for pilot validation but are not the final model for production deployment.

A production implementation would need a more integrated approach, including centralised configuration, monitoring of Auracast transmitters, real-time data integration, audio governance and operational support tooling.

6 Pilot Configurations and Observations

6.1 Melbourne Airport Pilot

6.1.1 Scenario

The Melbourne Airport pilot was conducted in Terminal 4. The pilot commenced in the food court area. After connecting to a broadcast, participants moved to the departure gate area and then returned to the food court.

The pilot was designed to observe:

- broadcast discovery;
- audio quality;
- range;
- disconnect and reconnect behaviour;
- movement between transmitter coverage areas; and
- user interaction with airport-specific information channels.

6.1.2 Configuration

Two setups were used:

- setup 1 located at the Terminal 4 food court;
- setup 2 located near Gate 12 in Terminal 4.

Each setup used two channels:

- Channel 1: Terminal 4 departure announcements;
- Channel 2: Melbourne Airport mobility help.

The initial configuration used longer channel names. During the pilot, shorter names such as "T4 Departures" and "Mobility Help" were found to be clearer in receiver apps.

6.1.3 Observations

The Melbourne Airport pilot demonstrated that Auracast can support fixed-location passenger information broadcasts in a terminal environment. Participants could connect to broadcasts and receive departure or mobility assistance information.

Range was variable. Mild audio breakup was observed at approximately 30 metres, although this varied across devices and conditions. Participants expressed interest in longer range and more seamless transition between transmitter locations.

The HomeSpot reference headphones handled reconnection well.

However, hearing aid behaviour differed. Some hearing aids did not reliably reconnect after dropping out, and handover from one transmitter to another was not seamless. In some cases, users needed to rescan and reconnect manually.

The pilot also identified display limitations in receiver apps. Some longer broadcast names were truncated, reducing clarity. In one case, the receiver app displayed “Auracast Information Not Available,” suggesting that additional broadcast metadata may be available within the standard or receiver implementation but was not being populated by the pilot setup.

Some participants with Cochlear implants and / or hearing aids were disappointed that their devices did not have enabled Auracast capability. This highlighted a gap between consumer expectation, device marketing, manufacturer enablement and actual field readiness.

The text-to-speech voice used for announcements was generally considered acceptable. The pilot used a Google Australian female TTS voice.

6.1.4 Technical implications

The airport pilot indicates that fixed-location Auracast broadcasts are technically feasible. However, airport-style environments may require more testing before broad deployment, particularly where passengers are expected to move between overlapping transmitter zones.

Future airport deployment would need to address:

- transmitter coverage planning;
- overlapping coverage and handover behaviour;
- short and meaningful channel names;
- broadcast metadata;
- QR code content and signage;
- compatibility with hearing aid manufacturer apps;
- volume calibration; and
- passenger information integration with airport systems.

6.2 CDC Melbourne Pilot

6.2.1 Scenario

The CDC Melbourne pilot was conducted on a bus service from Highpoint Shopping Centre in Maribyrnong, Victoria.

Participants boarded the selected bus, scanned for broadcasts or used a QR code, and then listened to stop announcements during outbound and return journeys.

The pilot was designed to test onboard Auracast delivery of stop announcements and mobility information during a live bus journey.

6.2.2 Configuration

One setup was installed onboard the selected bus for each pilot run.

The channels were:

- Channel 1: CDC stop announcements, including “Next Stop” and “Now Arriving at Stop” messages;
- Channel 2: PTV mobility help.

The pilot used a driver app and a special PID app build configured for the Auracast pilot to generate the stop messages as the bus moved along the route, so it correctly replicated normal bus announcement behaviour.

6.2.3 Observations

The bus pilot demonstrated that Auracast can be used for onboard route and stop-based passenger information. Participants were able to connect to the onboard broadcast and receive stop announcements.

One participant noted the value of the solution being local to the bus. Because the announcement source was onboard, the participant did not need to rely on mobile connectivity or continually track bus location in a third-party app. This is an important technical and product consideration: Auracast can provide a local passenger information channel that does not require each passenger to maintain an active data connection.

Several announcement improvements were identified:

- route number and destination should be announced at the departure point or after boarding;
- the end of trip should be announced;
- stop sequence number may be more useful than stop ID;
- pronunciation of stop names requires improvement;
- emphasis should be placed on the meaningful part of a stop name, such as the street name rather than the word “Street”; and
- route name announcement after leaving stops should be considered.
- Some pronunciation errors were observed, including stop names such as Milleara and Moffat. Airport announcements were perceived anecdotally as clearer than bus stop announcements.

Audio noise was observed between stop announcements. This was believed to be a pilot setup issue, as the noise was not heard when tablet power was disconnected from the powerbank. A final solution should ensure that the audio signal is properly muted or terminated when audio is not being generated.

Channel naming was also tested. The channel name was changed from the generic "CDC Stop Announcements" to "Route 407 Stop Announcements." Participants indicated that the route-specific name made it easier to confirm that they were joining the correct broadcast for the bus they were travelling on.

However, this creates a production trade-off. Route-specific naming improves clarity, but it may require the transmitter to be reprogrammed at the start of each trip and may limit the practicality of fixed QR code signage.

6.2.4 Technical implications

The CDC Melbourne pilot indicates that onboard bus Auracast broadcasts are technically feasible and suitable for controlled early deployment.

The onboard bus environment is a strong early deployment candidate because:

- the broadcast zone is naturally bounded by the vehicle;
- passengers are joining a service with a specific route and destination;
- the audio content can be directly linked to the onboard passenger information system;
- the service can provide value without relying on passenger mobile data connectivity; and
- there is limited need for seamless roaming between multiple transmitters.

Production deployment would still need to address:

- route-specific versus generic channel naming;
- dynamic channel configuration;
- QR code strategy;
- stop announcement timing;
- route and destination confirmation;
- text-to-speech pronunciation management;
- audio muting between announcements;
- power and audio signal quality;
- receiver reconnection; and
- integration with any existing onboard passenger information logic.

6.3 Transport Canberra Pilot

6.3.1 Scenario

The Transport Canberra pilot commenced on the Dickson light rail platform. Participants joined a broadcast for bus connections at the adjacent Dickson bus interchange, then moved to the bus interchange and boarded a bus.

The bus travelled on a section of route 9 from Dickson interchange to Watson shops and back. Participants monitored stop announcements on the outbound and return journeys.

This pilot tested a more complex multi-modal scenario involving:

- light rail platform information;
- bus interchange connection information;
- onboard bus stop announcements; and
- mobility / accessibility help information.

6.3.2 Configuration

Two setups were used:

- setup 1 on the Dickson light rail platform;
- setup 2 onboard the route 9 bus.

The platform setup used:

- Channel 1: Dickson interchange bus connections;
- Channel 2: Transport Canberra accessibility / mobility help.

The onboard bus setup used:

- Channel 1: Active Route stop announcements;
- Channel 2: Transport Canberra accessibility / mobility help.

6.3.3 Observations

The Transport Canberra pilot showed that Auracast can support both fixed-location interchange information and onboard bus stop announcements.

Platform announcements were considered useful. However, the pilot highlighted the need for contextual clarity. For example, the bus connection announcement should state that the information relates to buses, not light rail, because the participant was initially located on a light rail platform.

On the bus, repeated “next stop” announcements were considered too frequent. This was particularly evident in congested traffic, where simple time-based repetition resulted in repeated announcements even when the bus had not moved far. Distance-based repeat logic or time-based back-off should be considered.

Participants also noted that:

- arriving-at-stop announcements were useful but not always essential;
- arriving-at-stop announcements should not be made if the bus is not actually stopping;
- route confirmation is needed when boarding so that passengers know they are on the correct bus;
- an announcement at the end of the route would be useful;
- at interchanges, it would be useful to announce which bus is arriving; and
- phone notifications may temporarily interrupt the Auracast broadcast on user devices.

Several participants did not have Auracast-enabled hearing aids, despite having hearing aids or cochlear implants. Some were disappointed that their devices were not compatible.

For profoundly deaf participants, the supplied headphones were of limited value because speech understanding through those headphones was not sufficient for their needs. This matter is primarily a human factors issue, but it also highlights a technical and product issue: Auracast availability through the user’s own hearing device is materially different from providing generic headphones as a fallback.

6.3.4 Technical implications

The Transport Canberra pilot indicates that Auracast is suitable for controlled early deployment in fixed interchange, platform and onboard bus contexts, provided the deployment is carefully scoped.

The interchange/platform use case is a strong early deployment candidate where:

- the physical broadcast zone is fixed;
- the information being broadcast is local and contextual;
- channel names and signage can be designed around a known location;
- fallback visual and audio information remains available; and
- the service can be introduced as an additional passenger information channel.

Production deployment would need to address:

- context-sensitive announcements;
- distinction between light rail, bus and interchange information;
- route and destination confirmation;
- bus arrival announcements at interchanges;
- next-stop repetition logic;
- arrival announcement conditions;

- final destination announcements;
- device interruption behaviour; and
- compatibility with users' own assistive listening devices.

7 Cross-Pilot Technical Findings

7.1 Finding 1: Auracast is technically feasible across multiple transport environments

The pilots showed that Auracast can be used to broadcast passenger information in a variety of transport environments. It was successfully tested in:

- an airport terminal;
- onboard buses;
- a light rail platform;
- a bus interchange; and
- route-based live bus operations.

The same broad architecture was able to support fixed-location broadcasts, mobility assistance information and onboard stop announcements.

This supports the conclusion that Auracast is technically feasible as a supplementary passenger information channel.

7.2 Finding 2: Selected use cases are ready for controlled early deployment

The pilots support a stronger conclusion than technical feasibility alone. In selected contexts, Auracast is ready for controlled early deployment.

The strongest candidate environments are:

- onboard buses;
- fixed bus interchanges;
- fixed light rail platforms;
- station or terminal areas where the broadcast zone is bounded; and
- mobility assistance or connection information points.

These environments are suitable because the passenger context is clear, the broadcast zone can be managed, and the service can provide value even while consumer device adoption is still developing.

Controlled early deployment should be distinguished from broad production rollout. It does not imply that Auracast is ready to replace existing systems. It means that the technology is sufficiently mature to be deployed in specific bounded environments, with clear operational scope, fallback channels and defined success criteria.

7.3 Finding 3: Consumer receiver technology is still catching up

The pilot demonstrated that the Auracast transmission infrastructure can work, but passenger receiver maturity remains uneven.

The distinction between Auracast-ready and Auracast-enabled devices is important. An Auracast-ready device may include the necessary hardware capability but may still require a firmware update, app update, manufacturer enablement or audiologist configuration before it can join Auracast broadcasts.

An Auracast-enabled device is capable of using Auracast without any updates.

This means that early deployments may benefit some users immediately, while other users will need to wait for manufacturer updates, device replacement cycles or user education.

This should not prevent early deployment. Instead, it should shape how early deployment is positioned. Auracast should be introduced as an additional passenger information channel that becomes more valuable as compatible hearing aids/cochlear implants, headphones, earbuds and phones become more widely available.

7.4 Finding 4: Auracast should initially complement, not replace, existing systems

The pilots and industry perspectives both support a dual-system transition model.

Auracast should not yet be positioned as a full replacement for:

- hearing loops;
- public address systems;
- onboard audio announcements;
- visual passenger information displays;
- mobile applications;
- staff assistance; or
- existing accessibility channels.

Instead, it should be deployed as an additional channel that provides clearer, more personalised audio access for users with compatible receivers.

This is particularly important because some participants' own devices were not Auracast-enabled in practice. A replacement approach would risk excluding users who currently rely on hearing loops or other channels. A complementary approach reduces that risk and allows operators to gain experience while the consumer device ecosystem matures.

7.5 Finding 5: Receiver behaviour varies significantly between devices

Receiver behaviour was one of the most important technical findings.

The HomeSpot JM320 headphones performed well as the reference device. They were able to detect, connect and reconnect to broadcasts more reliably than some hearing aid implementations observed during the pilots.

By contrast, some hearing aids and hearing aid apps:

- did not reliably reconnect after losing the broadcast;
- required manual rescanning;
- showed shorter effective range than the HomeSpot headphones;
- displayed truncated broadcast names;
- did not support QR code connection in the relevant app;
- treated two apparently identical pilot setups as different sources (in the airport pilot); and
- required device power cycling in at least one case to restore audio.

This suggests that receiver implementation differences are material. Auracast behaviour in the field is not determined only by the transmitter. It also depends on the receiver hardware, receiver firmware, mobile app, manufacturer implementation, battery management behaviour and user settings.

A production Auracast transport solution should therefore include a formal receiver compatibility program. This should test headphones, earbuds, hearing aids, cochlear implant accessories, mobile phones and relevant manufacturer apps.

7.6 Finding 6: Broadcast channel naming is a product design issue

Broadcast naming had a significant effect on usability and operational feasibility.

Longer names were truncated in some receiver apps. Shorter names such as "T4 Departures" and "Mobility Help" were easier to understand.

For buses, the pilot showed a trade-off between route-specific and generic naming.

A generic channel name, such as "TC Stop Announcements," is simple and may support fixed QR code signage. It may also be easier for passengers changing buses, because the same joining method could apply across services. However, generic names may create confusion when multiple buses are present at an interchange.

A route-specific channel name, such as "Route 9 Stop Announcements" or "Route 407 Stop Announcements," gives the passenger greater confidence that they are joining the correct service. However, route-specific naming may require the transmitter to be reconfigured dynamically at the start of each trip. It may also make fixed QR code signage less practical.

This suggests that channel naming should be treated as a core product design issue, not merely a configuration detail.

A future product should support channel naming rules for:

- airports;
- bus routes;
- bus interchanges;
- light rail platforms;
- stops;
- disruption messages;
- mobility help channels; and
- general service announcements.

7.7 Finding 7: QR code and broadcast assistant materials need more context

QR codes can help users connect to the correct broadcast, but the pilot identified that QR code printouts need more context.

A QR code should not simply provide a technical connection mechanism. It should clearly explain:

- what information is available;
- which channel the user is joining;
- where the broadcast applies;
- whether the information relates to buses, light rail, airport departures or mobility help;
- whether headphones, hearing aids or an app are required; and
- what to do if the broadcast is not available.

This is particularly important in multi-modal locations, where a user may be physically located at one mode but listening to information about another mode, such as bus connections from a light rail platform.

7.8 Finding 8: Announcement logic needs to be transport-aware

The bus pilots showed that announcement logic is critical.

The pilot used simple repeat logic for “next stop” announcements. In practice, simple time-based repetition can become annoying or unhelpful when traffic is congested or when there is a long distance between stops.

Future logic should consider:

- time-based repeat with back-off;
- distance-based repeat based on vehicle movement;

- suppression of repeated announcements where no meaningful progress has occurred;
- route and destination announcement after boarding or after leaving a stop;
- final destination/end of trip announcement;
- stop sequence number where useful;
- avoidance of internal stop IDs in passenger-facing announcements; and
- “arriving at stop” messages only where the bus is actually stopping.

The arrival announcement logic should use vehicle and operational state. For example, a “this stop” announcement should only be generated if the system determines that the vehicle is at the stop and has slowed or stopped sufficiently to indicate that passengers can alight.

This may require integration between the Passenger Information Display, driver app, vehicle location, stop state and vehicle speed data.

7.9 Finding 9: Audio quality requires active management

Audio quality was generally acceptable, but several issues were identified.

The Google Australian female TTS voice was generally well received. However, stop name pronunciation and emphasis require improvement. This is particularly important for street-based stop names where the meaningful word may be the street name rather than the road type.

Examples include:

- pronunciation correction for specific stop names;
- emphasis on key street or location names;
- volume calibration across different devices;
- silence or muting between announcements;
- avoidance of buzzing or noise during idle periods; and
- consistent audio quality between airport, mobility help and bus stop announcements.

A production implementation should include a pronunciation dictionary or override mechanism, audio level standards, TTS voice governance and pre-release testing of common stop and location names.

7.10 Finding 10: Production value depends on integration with passenger information systems

The pilots demonstrate that Auracast is not simply a Bluetooth audio technology. In transport environments, its value depends on the quality, accuracy, context and timing of the information broadcast.

For production, Auracast should be treated as an output channel of the passenger information ecosystem. It should integrate with:

- real-time passenger information systems;
- route and trip state;
- vehicle location;
- stop sequence data;
- Passenger Information Display logic;
- driver console or MADT systems; (Multi
- interchange departure information;
- disruption and alert systems;
- airport departure and gate systems;
- text-to-speech services;
- customer information governance; and
- monitoring and support tooling.

Without integration, Auracast can provide useful static or semi-manual broadcasts. With integration, it can become a scalable real-time passenger information channel.

8 Deployment Readiness Assessment

8.1 Readiness categories

The pilot findings support three levels of deployment readiness.

Readiness level	Meaning
Technically feasible	The use case has been demonstrated in pilot conditions, but more work is required before deployment.
Ready for controlled early deployment	The use case can be deployed in a bounded environment as a complementary channel, with clear constraints and fallback systems.
Requires further maturation	The use case needs further technical development, broader compatibility testing or market maturity before deployment.

8.2 Readiness by context

Context	Readiness assessment	Rationale
Onboard buses	Ready for controlled early deployment	Bounded environment, strong stop announcement use case, local broadcast, limited need for roaming between transmitters.
Fixed bus interchanges	Ready for controlled early deployment	Localised passenger information use case, fixed signage possible, useful for connection and arrival information.
Light rail platforms / station areas	Ready for controlled early deployment	Suitable for contextual information and mobility assistance where channel naming is clear.
Airport terminal fixed points	Technically feasible; further deployment design required	Useful for fixed announcements, but large terminal environments require careful coverage and handover design.
Dense multi-transmitter roaming	Requires further maturation	Handover and reconnection behaviour varied by device and needs broader testing.

Context	Readiness assessment	Rationale
Full replacement of hearing loops	Not currently recommended	Consumer device readiness is uneven and a dual-system transition is required.
Full replacement of public address or visual displays	Not currently recommended	Auracast should complement, not replace, other passenger information channels.

8.3 Recommended early deployment position

Auracast should be positioned as ready for controlled early deployment in selected transport contexts where the risk is manageable and the service can deliver immediate value.

The strongest candidate use cases are:

- Onboard bus stop and route announcements**
Auracast can provide local, route-specific audio information directly to compatible receivers. This is particularly useful where passengers do not want to rely on mobile data, third-party apps or visual tracking.
- Interchange connection information**
Auracast can provide localised information about connecting services, bus arrivals, mobility assistance and wayfinding.
- Platform or stop-based mobility assistance**
Fixed locations can provide contextual help information, provided the channel name and signage make the scope clear.
- Controlled demonstration deployments with selected operators**
Early deployment can help build evidence, refine support models and create customer-facing case studies.

These deployments should be introduced with clear constraints:

- they are complementary channels;
- users require compatible receivers;
- existing information channels remain available;
- deployment is limited to defined locations or vehicles;
- monitoring and support arrangements are defined; and
- success measures are agreed before deployment.

8.4 Consumer technology maturity

The pilots indicate that Auracast infrastructure can be deployed ahead of full consumer device maturity. This is a common pattern with emerging transport technologies: infrastructure, standards and operational capability often mature before universal passenger device adoption.

However, the gap must be managed carefully.

Early customer messaging should make clear that:

- Auracast-enabled receivers are required;
- not all hearing aids or cochlear devices currently support Auracast;
- some devices may be Auracast-ready but not yet enabled;
- device behaviour may vary by manufacturer, app and firmware version; and
- the value of the installed infrastructure will increase as compatible devices become more common.

This supports a staged deployment model: deploy in high-value controlled environments now, retain existing channels, and expand capability as the receiver ecosystem matures.

9 Productisation Implications

9.1 Reference architecture

NEC's recommendation to the market is that transport operators and authorities should adopt a reference architecture for Auracast in transport environments. This should define how Auracast integrates with existing passenger information systems, including data sources, audio generation, channel management, transmitter configuration, monitoring and support.

The reference architecture should cover at least three deployment types:

- fixed-location airport or terminal deployment;
- onboard bus or vehicle deployment; and
- interchange / platform deployment.

9.2 Managed channel configuration

A production service will need a managed approach to channel configuration.

This should include:

- channel naming standards;
- broadcast IDs;
- channel metadata;
- location-specific channels;
- route-specific channels;
- generic fallback channels;
- QR code generation;
- dynamic update rules; and
- operational controls.

For buses, a key product decision is whether channel names should be generic, route-specific, vehicle-specific or dynamically generated based on trip state.

9.3 Receiver compatibility testing

NEC's recommendation to the market is that a compatibility test program should be established before broader deployment.

The test program should include:

- reference headphones;
- consumer earbuds;
- Android and iOS device pathways where applicable;
- Auracast-enabled hearing aids;
- Auracast-ready but not enabled devices;
- hearing aid manufacturer apps;
- cochlear implant accessories;
- reconnection behaviour;
- QR code support;
- app display behaviour;
- range;
- handover between transmitters;
- volume controls; and
- interruption behaviour from phone notifications or other audio sources.

The compatibility program should produce a practical matrix that can be used in customer deployment planning.

9.4 Passenger information integration

Auracast should be integrated as a passenger information output channel.

For buses, this means integration with:

- route;
- trip;
- next stop;
- current stop;
- destination;
- vehicle movement;
- stop sequence;
- vehicle speed;
- service disruption state; and
- final destination state.

For airports, this may mean integration with:

- flight information;
- gate information;
- departure status;
- mobility assistance content;
- terminal-specific announcements; and
- disruption messaging.

For interchanges, this may mean integration with:

- connecting services;
- mode-specific information;
- bay or platform assignments;
- service arrival information;
- disruptions; and
- wayfinding content.

9.5 Audio content governance

A production service will require rules for what is broadcast, when it is broadcast and how often it is repeated.

Governance should include:

- message priority;
- repetition rules;
- route confirmation;
- final stop announcements;
- disruption and alert precedence;
- pronunciation rules;
- approved TTS voices;
- language options where required;
- volume and loudness standards;
- message length limits; and
- testing and approval before deployment.

9.6 Monitoring and support

A production system should allow operators and support teams to know whether the service is working.

Monitoring should include:

- transmitter online / offline status;
- current broadcast channel name;
- current content source;
- audio output health;
- configuration version;
- last successful update;
- failure alerts;
- device inventory;
- firmware version;
- location or vehicle association; and
- operational logs.

For onboard deployments, monitoring should be integrated with fleet device management and existing service management processes.

9.7 Dual-system transition model

Auracast should be introduced through a dual-system transition model.

This means maintaining existing passenger information and accessibility systems while adding Auracast as a supplementary channel. The dual-system model should remain in place until there is sufficient evidence of receiver availability, operational reliability, customer acceptance and accessibility continuity.

A dual-system model reduces risk by ensuring that passengers without Auracast-enabled devices continue to receive information through existing channels. It also allows operators to build experience with the technology before making any decisions about replacing or reducing legacy systems.

9.8 Deployment models

Different environments will require different deployment models.

For fixed locations such as airports or interchanges, the deployment model can be based on planned transmitter coverage, fixed signage, fixed QR codes and location-specific channels.

For buses, the deployment model must account for route changes, vehicle allocation, trip state, dynamic information, depot operations and maintenance.

For interchanges, the deployment model must account for overlapping vehicles, multiple services, mode transfers and passenger confusion risk.

Installation details should be developed further as part of a production deployment guide, but the key product issue is not installation alone. The more important issue is how the service is configured, monitored, maintained and integrated into passenger information operations.

10 Limitations

The pilots provide useful technical insight, but several limitations should be recognised.

- **Limited pilot duration**

The pilots were conducted over a short period. They do not represent long-term operational testing.

- **Limited number of environments**

The pilots covered three useful environments, but they did not cover all possible transport deployment scenarios. Additional testing would be required for rail stations, ferry terminals, depots, large interchanges, outdoor environments and high-density event conditions.

- **Limited receiver sample**

The receiver sample was valuable but limited. Receiver behaviour varied significantly, so broader testing is required before firm compatibility conclusions can be drawn.

- **Pilot-specific configuration**

The pilots used trial configurations, pilot applications and specific hardware arrangements. These are not equivalent to a fully designed production system.

- **Limited production integration**

The pilots demonstrated important integration concepts, especially for stop announcements, but they were not a complete production integration with all operational passenger information systems.

- **Consumer device maturity**

Passenger access to Auracast depends on compatible and enabled receiver devices. Device readiness remains uneven. Some devices may be Auracast-ready but not enabled, while others may require firmware updates, app updates or configuration by the device supplier or audiologist.

- **Human factors covered separately**

This report does not present the full participant experience assessment. Human factors, accessibility outcomes and lived-experience findings are being reported separately by Get Skilled Access.

- **Industry evidence remains early-stage**

The industry perspectives work was based on a small but informed sample. Its findings are useful for directional insight but should not be treated as statistically representative of the whole transport sector.

11 Recommended Next Steps

Priority	Recommended action	Purpose
1	Select controlled early deployment candidates, with onboard buses and fixed interchange/platform locations as the initial focus.	Move from pilot demonstration to bounded real-world deployment where the service can provide immediate value while existing channels remain available.
2	Define the reference architecture, including data sources, audio generation, channel management, transmitter configuration, monitoring and support.	Establish a repeatable deployment model rather than treating Auracast as a standalone audio broadcast.
3	Establish a formal receiver compatibility program covering headphones, earbuds, hearing aids, cochlear implant accessories, phones and manufacturer apps.	Create a practical compatibility matrix for customer planning and reduce deployment risk caused by uneven receiver behaviour.
4	Define standards for channel naming, QR code context, bus announcement logic, audio quality and dynamic channel configuration.	Improve usability, reduce passenger confusion and prepare the solution for operational use across different transport environments.
5	Prepare the customer transition model, including monitoring, support, staff guidance, fallback channels and customer-facing evidence from the pilots.	Support adoption while maintaining a dual-system transition and ensuring passengers without Auracast-enabled devices continue to receive information through existing channels.

12 Conclusion

The Auracast pilots demonstrated that the technology has credible potential as a supplementary passenger information channel across transport environments.

The pilots showed that Auracast can support fixed-location airport information, onboard bus stop announcements, interchange connection information and mobility assistance content. The solution was technically feasible across the environments tested.

The findings support a positive but carefully bounded deployment position: Auracast is ready for controlled early deployment in selected contexts, particularly onboard buses and fixed interchange or platform environments. These use cases are suitable because they are bounded, operationally clear and able to provide immediate value without requiring seamless roaming across multiple transmitters.

However, Auracast should not yet be positioned as a replacement for existing hearing loops, public address systems, visual passenger information displays, onboard announcements or mobile applications. Consumer receiver technology is still catching up. Some users will benefit immediately where they have Auracast-enabled devices, while others will depend on future manufacturer enablement, device replacement cycles or fallback receiver options.

The most important finding is that Auracast deployment is not simply a matter of installing transmitters. A useful production service requires careful design of receiver compatibility, channel naming, discovery, announcement logic, audio quality, dynamic configuration, monitoring and integration with passenger information systems.

NEC's recommendation to the market is that the next stage should focus on controlled early deployment, reference architecture, compatibility testing, integration, monitoring, support model and customer transition planning.

Auracast should be positioned as an emerging, high-potential passenger information channel that can complement visual displays, onboard announcements, mobile apps and existing accessibility systems. With further development and a managed transition approach, it has the potential to become part of a broader, more inclusive passenger information environment.

Appendix A — Pilot Equipment Summary

Each pilot setup supported two broadcast channels and included:

- 2 x Samsung tablets;
- 2 x Flairmesh Auracast transmitters;
- 1 x four-outlet powerbank;
- cabling;
- tablet-based announcement applications;
- HomeSpot JM320 reference headphones; and
- participant receiver devices where available.

Appendix B — Pilot Channel Summary

Pilot	Setup	Channel 1	Channel 2
Melbourne Airport	Terminal 4 food court	T4 departure announcements	Melbourne Airport mobility help
Melbourne Airport	Gate 12 area	T4 departure announcements	Melbourne Airport mobility help
CDC Melbourne	Onboard bus	Stop announcements	PTV mobility help
Transport Canberra	Dickson light rail platform	Dickson bus connections	TC accessibility / mobility help
Transport Canberra	Onboard route 9 bus	Route 9 stop announcements	TC accessibility / mobility help

Appendix C — Receiver Observations Summary

Receiver type	Observed status	Key Observations
HomeSpot JM320 headphones	Auracast-enabled	Used as reference receiver; reconnection behaviour was generally strong
Beltone hearing aid	Auracast-enabled	Worked during pilot but reconnection was not always automatic
Resound hearing aid	Auracast-enabled	Worked during pilot but had app display limitations and reconnection issues
Cochlear Nucleus 8	Auracast-ready	Not available for practical Auracast use during the pilot
Some Phonak hearing aids	Not Auracast-enabled or Auracast-ready depending on model	Not all participant devices could access Auracast
Generic Bluetooth headphones	Not Auracast-enabled	Standard Bluetooth capability is not sufficient for Auracast reception

Appendix D — Candidate Future Work Items

- Reference architecture for Auracast in transport.
- Receiver compatibility matrix.
- Early deployment candidate selection.
- Dynamic channel naming prototype.
- QR code and broadcast assistant design standard.
- Bus announcement logic improvements.
- TTS pronunciation dictionary.
- Audio quality and muting standard.
- Transmitter roaming / handover test plan.
- Monitoring and service management model.
- Dual-system transition model.
- Customer readiness checklist.
- Larger-scale controlled deployment.

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