nnounce

Airport Audio System

The nnounce ecosystem gives every airport terminal clear, dependable Public Address (PA), from the quietest night to the busiest boarding rush.

Distributed by design, every device queues, processes, and routes its own audio locally, with **no single point of failure** that could cause a system-wide outage. **Ambient noise compensation** keeps audio clear in every zone as crowd levels fluctuate, ensuring seamless delivery of all announcements from routine boarding calls to critical **life-safety alerts.**

This guide covers the architecture, hardware, and software needed to design and deploy nnounce - tailored for system integrators and airport operations teams.



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THE CHALLENGE

MASTERING AIRPORT ACOUSTICS ACROSS EVERY ZONE

Every airport carries the same PA requirements, whatever its size. Gate calls, boarding, security and emergency announcements all have to reach passengers clearly.

Terminal acoustics are unforgiving. Concrete, metal, and glass create **acoustic challenges** such as reverberation that blurs speech, while background noise swings from **55 dB SPL** on a quiet night to **85+ dB SPL** at peak boarding. Keeping announcements clear across that whole range is a matter of measurement, not opinion. EN 50849 sets the benchmark for voice alarm systems: a **Speech Transmission Index (STI) of at least 0.50**, measured per IEC 60268-16. Fall below it, and passengers face added stress, missed flights, and safety risks.

By removing central bottlenecks, processing power is **distributed directly to the edge** — ensuring **continuous operation** without total system outages. Each acoustic zone automatically adapts to shifting crowds through **real-time ambient noise compensation**, helping maintain intelligibility as noise levels change. From a single interface, operators gain pinpoint **control over volume, priority, and content** for every individual area across the airport.

*SPL (Sound Pressure Level)



STANDARDS

STANDARDS & INTEROPERABILITY

EN 54-16
Voice alarm system designed to meet requirements for life-safety deployments. Certification in progress.

IEC 60268-16
Speech intelligibility, measured by STI.

AES67 / AES256
Audio networking & encryption.

IPv6, secure boot
Network security hardening.

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SYSTEM ARCHITECTURE

Two-Concourse Airport Example

Legend:
- 70/100 V
- LAN
- Analog Mic Cable
- Speakers
- Ambient Noise Mic

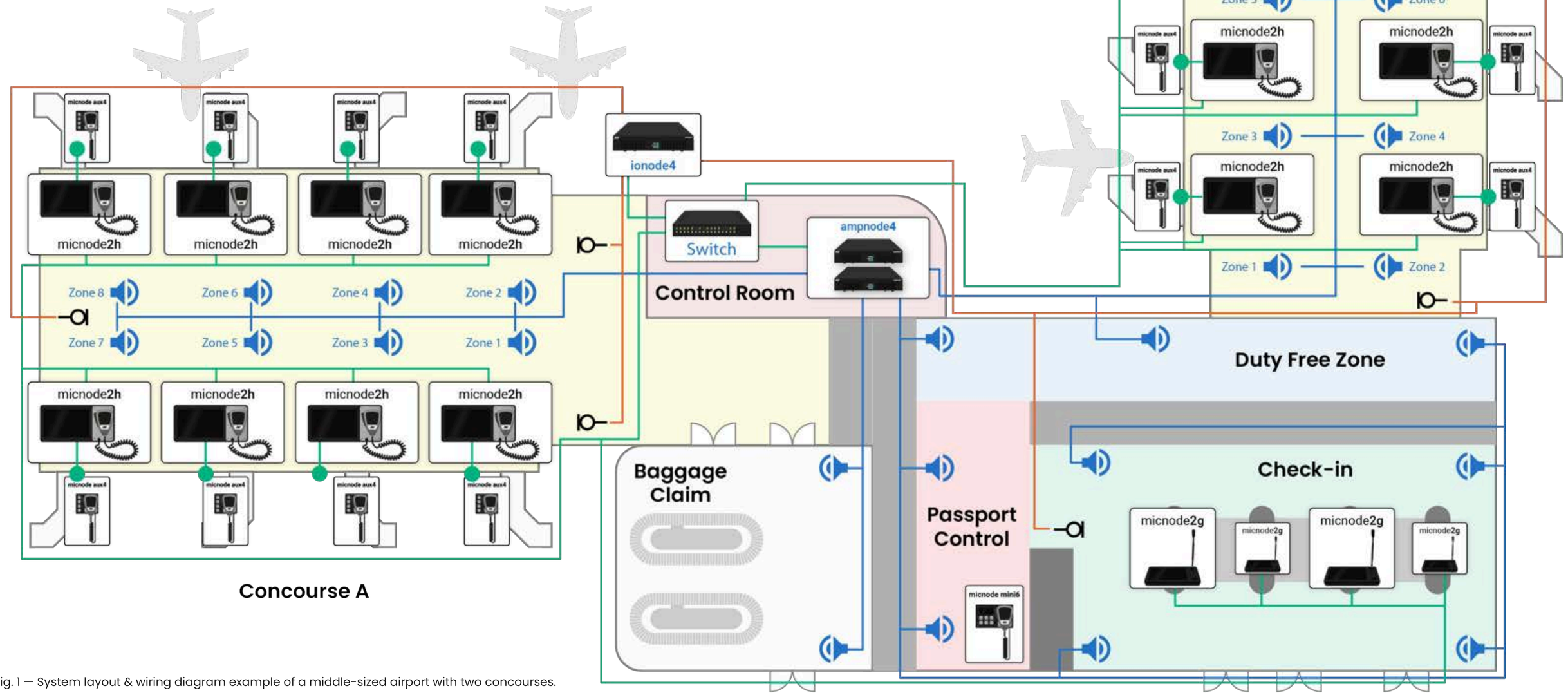

Fig. 1 — System layout & wiring diagram example of a middle-sized airport with two concourses.

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PRINCIPLES

Ambient Noise Compensation

Sensors continuously monitor ambient sound levels in every zone, allowing the ampnode4 amplifier to dynamically adjust output power on the fly. Speech stays crystal-clear.
Requires: ambient sensing microphones and ampnode4 amplifier.

Background Music Management

Scheduled background audio plays per zone between announcements. Music automatically mutes for any incoming page and restores when it ends.
Requires: ampnode amplifier and audio source (stream/file).

Dynamic Audio Routing

Built on a distributed paging architecture, the system creates dynamic audio routes only when an announcement is active. This keeps network overhead to a minimum by consuming bandwidth only during active broadcasts.
Requires: ampnode amplifier with zone configuration in the nnounce Platform.

Automated Announcements

Airport CX triggers gate calls, boarding, and status updates directly from operational data, freeing staff to focus on passenger service instead of manually triggering routine announcements.
Requires: Airport CX platform with AODB data feed.

Live Translation with Speech-to-Text

Record once, reach everyone. Operators record a message in one language, Airport CX transcribes, translates and announces it in every selected language, with matching text on FIDS displays.
Requires: Airport CX with a STT license.

Live Paging from Any Station

Broadcast terminal-wide or to selected zones from any micnode station. Smart priority logic automatically manages multi-user paging without audio conflicts.
Requires: nnounce microphone stations

Emergency & Life-Safety Override

Emergency messages immediately take top priority across all zones. Fully compatible with Q-SYS and Bosch PRAESENSA ecosystems. ampnode4LS is designed to meet EN 54-16 / EN 50849 (certification in progress).
Requires: nnounce amplifier ampnode4LS.

Third-Party Integration through Open Standards

Connect nnounce hardware directly to Q-SYS and Bosch PRAESENSA systems or leverage open standards like AES67, RTP, and VoIP. Easily upgrade your system without replacing the existing AV infrastructure.
Requires: compatible third-party system and LAN connectivity.

Multilingual Text-to-Speech

A dynamic neural TTS engine automatically converts real-time flight data into natural-sounding spoken announcements across multiple languages while eliminating the need for pre-recorded audio.
Requires: Airport CX with a neural TTS license.

Paging Archive

Comprehensive audit logging tracks every announcement and live page with precise timestamps and searchable transcripts, making compliance verification and dispute resolution effortless.
Requires: Airport CX.

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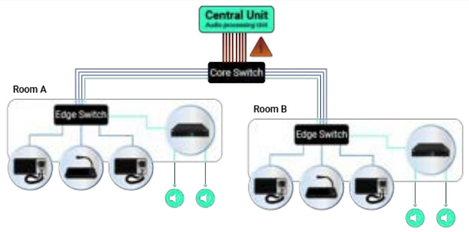
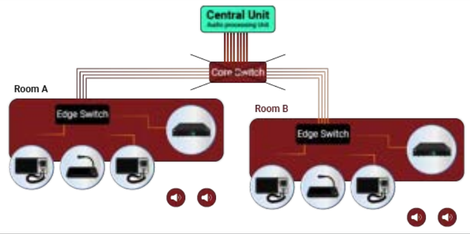
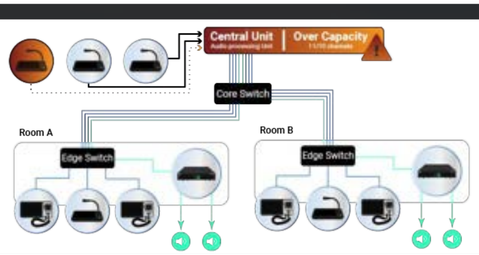
DISTRIBUTED PAGING ARCHITECTURE

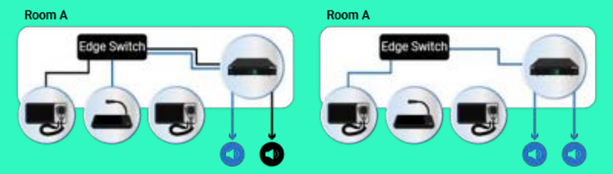
Public address technology is moving toward a more robust, distributed future. Where traditional systems place all functionality and risk in a single central processor, nnounce distributes intelligence across the network. Each amplifier, microphone station, and audio integration device independently manages its own queue, processes its own audio, and makes routing decisions locally. Managed as a unified platform, workload and reliability are shared across every intelligent endpoint.

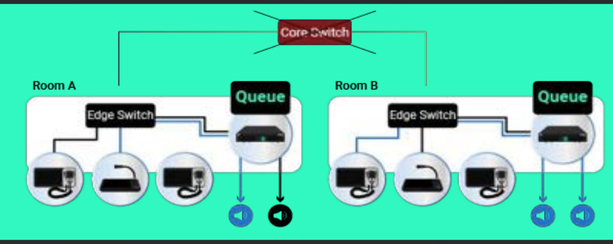
CENTRALIZED PAGING	vs	DISTRIBUTED PAGING
Audio Streams Routing every stream through a single central unit creates a bandwidth bottleneck for simultaneous announcements and typically forces reliance on proprietary networks.		**Audio Streams** Audio flows directly between devices over standard IP, eliminating central funnels, proprietary network dependencies, and constraints on simultaneous streams.
Routing & Queuing The central unit manages the announcement queue and system-wide priorities. If this central core fails or reboots, all audio goes silent.		**Routing & Queuing** Each device holds its own queue and handles routing decisions locally. If a single device fails, the rest of the system continues paging without interruption.
Audio Processing & Scaling DSP is tied to a central unit with a fixed processing ceiling. Expanding the system with more zones requires replacing the entire central appliance.		**Audio Processing & Scaling** Every device runs its own DSP independently, making total capacity the sum of all devices. System expansion requires simply adding devices - nothing more.

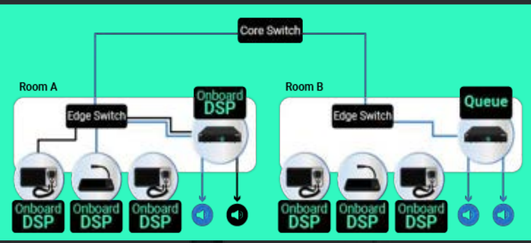












THE STRENGTHS OF DISTRIBUTED PAGING:

No Single Point of Failure
Each device holds its own queue and operates independently. The system keeps paging even if one device fails or reboots.

No Bandwidth Bottleneck
Audio flows directly between devices. No central unit constraining how many simultaneous announcements the system can handle.

No Processing Ceiling
Each device runs its own DSP. Total capacity is the sum of all devices, not the fixed ceiling of one central appliance.

No Scaling Limit
The system grows by adding devices. One terminal or ten, fifty zones or five hundred. No redesign, no replacement of anything already installed.

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DESIGN CONSIDERATIONS FOR AIRPORT PA

Standards & Compliance

Airport PA systems are subject to overlapping fire-safety and voice alarm standards that vary by jurisdiction and building classification.

+ **Know applicable norms before design begins.** Relevant standards: EN 54-16 (voice alarm equipment), EN 50849 (voice alarm), NFPA 72 (US). Integrate with certified life-safety ecosystems (Bosch PRAESENSA, Q-SYS).

— **Assuming AV knowledge covers fire-safety requirements.** General AV experience does not qualify an integrator to certify a fire-safety PA system. Each applicable standard must be verified independently for the specific jurisdiction and building type.

Acoustics

Large open volumes with hard reflective surfaces (concrete, metal, glass) produce severe reverberation that degrades speech intelligibility.

+ **Conduct acoustic analysis at the design stage.** Identify problematic surfaces before installation. Excessive reverberation from hard surfaces is the leading cause of low STI scores in airport terminals and is extraordinarily costly to fix post-installation.

— **Skipping acoustic analysis.** Systems that pass STI testing in an empty terminal during commissioning may still fail intelligibility standards once fully occupied.

Redundancy & Reliability

PA system failure in a life-safety environment is unacceptable. Any single hardware fault must not silence the terminal.

+ **Deploy N+1 ampnode amplifiers with automatic failover.** Local processing on each device ensures autonomous operation if the network is interrupted. Continuous telemetry triggers instant fault alerts.

— **Single-point-of-failure architecture.** Plan N+1 redundancy from the start. Retrofitting it after installation is costly and disruptive. Critical for life-safety compliance.

Strategic Speaker Placement

Speaker position and density directly determine intelligibility. High-mounted, widely spaced speakers place listeners beyond the reverberation radius and reduce direct sound at ear level.

+ **Mount speakers low and close to passengers.** Maximize direct-field sound and minimize ceiling reflections. Maintain sufficient density so every listener position receives adequate coverage without relying on distant, high-mounted units.

— **High-mounted speakers with low density.** Ceiling-mounted speakers in reverberant terminals leave most listeners beyond the reverberation radius and typically fail to meet STI ≥ 0.50 even at high drive levels.

Localized Zone Design

Poorly scoped zones cause announcements to bleed into irrelevant areas, creating confusion and raising the noise floor.

+ **Define narrow, purpose-specific zones.** Boarding calls should reach only passengers at the relevant gate. Zone boundaries must be planned precisely so audio does not spill into adjacent gates or concourses.

— **Oversized, coarsely defined zones.** Wide zones make it impossible to target announcements to the correct audience. Passengers at other gates hear irrelevant calls, increasing confusion and PA fatigue.

Speech Intelligibility

PA intelligibility must meet a minimum measurable standard, not just sound acceptable to the installer on the day of commissioning.

+ **Design and commission to STI ≥ 0.50 (IEC 60268-16 method).** Measure and document STI across all zones at commissioning. This is the objective pass/fail criterion for passenger communication.

— **No STI measurement at commissioning.** Subjective listening checks are not a substitute for IEC 60268-16 testing. Failing to document STI creates liability exposure for the integrator.

Remote Monitoring

Large terminals cannot be monitored by physical inspection alone. Speaker line faults may go undetected until a passenger complaint or a life-safety event.

+ **Install speaker line monitoring.** Cover every line, and use nnounce continuous telemetry for real-time endpoint health and immediate fault alerts across all devices.

— **Missing endpoint telemetry.** Visual inspection in large terminals is impractical. Without monitoring, faults in speaker lines or amplifier channels go undetected, which is a critical risk in life-safety scenarios

Noise Compensation (ANC)

Background noise fluctuates between quiet early-morning hours and peak boarding rushes. A fixed PA output level will be either inaudible or intrusive.

+ **Deploy ambient sensing microphones per zone.** The nnounce ampnode adjusts output dynamically to maintain a constant signal-to-noise margin with no manual operator intervention required.

— **No ambient sensing — manual level adjustment.** Operators cannot react fast enough to rapidly changing conditions. Without ANC, the PA is either too quiet during busy periods or too loud at quiet times.

Cabling

Parallel power and signal cabling generates electromagnetic interference, causing noise and intermittent faults in audio circuits.

+ **Keep power and signal cables fully separated.** Use dedicated trays or conduits for power and signal runs, crossing at 90° only where unavoidable. Proper physical separation ensures compliance and prevents electromagnetic coupling.

— **Routing power and signal cables in shared containment.** Running high-voltage and audio/data cables together causes induced hum, and failed compliance audits that are extraordinarily costly to remediate post-installation.

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BOM / SHOPPING LIST

EQUIPMENT — NNOUNCE HARDWARE REFERENCE



ampnode4
amplifier | AMP4

Quantity: 1+
Role: A 600W four-channel amplifier with smart power allocation, auto-setup, and neural processing.
Location: Control room

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ampnode4LS
amplifier | AMP4LS

Quantity: 1+
Role: Life-safety amplifier delivering 4x500W with redundant power and spare-channel switching. Emergency override across all zones. Designed to meet EN 54-16 (certification in progress).
Location: Control room

Learn More



ionode4
audio integration device | IO4

Quantity: as requested
Role: Bridges analog audio equipment and the IP network.
Location: Secondary positions

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micnode2h
mic station | MICH2

Quantity: varies
Role: Handheld PTT microphone station with touchscreen UI, zone selection/action buttons, and neural TTS/STT.
Location: Gate counters

Learn More



micnode2g
mic station | MICG2

Quantity: varies
Role: Gooseneck microphone station with touchscreen UI, zone selection/action buttons and neural TTS/STT.
Location: Gate counters, Check-in counters

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micnode mini3
mic station | MICHM3

Quantity: varies
Role: Compact 3-button PoE paging station for info desks and secondary staff positions.
Location: Info desk, check-in

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micnode mini6
mic station | MICHM6

Quantity: varies
Role: Compact 6-button PoE paging station with OLED user interface for info desks and secondary staff positions.
Location: Info desk, check-in

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micnode aux4
accessory | MICHA4

Quantity: as requested
Role: Extends any micnode station to a secondary paging position.
Location: Secondary positions

Learn More

Ambient sensing microphone

Quantity: per zone
Role: Measures background noise per zone in real time and based on the measurement, the ampnode adjusts its output level automatically.
Location: High-traffic public areas

LAN switch (managed) - 3rd party

Quantity: 1+
Role: Managed IP switch connecting all nnounce devices and the Airport CX server over 1 Gbps Ethernet.
Location: Comms room

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AIRPORT CX

UNIFIED AIRPORT COMMUNICATIONS PLATFORM

Airport CX is Simpleway's airport communications platform, the software layer that adds automation to the nnounce ecosystem. It connects to live flight data and turns it into coordinated audio and visual messaging: what to announce, when, in which zone, and in which language. Staff define the rules once, and Airport CX applies them automatically.

The nnounce ecosystem handles physical audio routing, queuing, priority, and playback at the edge. Live paging and zone control continue operating directly on the hardware, keeping the distributed architecture completely resilient. Airport CX manages content and scheduling on top. Developed together by a single vendor, both layers operate as a unified solution rather than two separate products bolted together.

Digital Signage & CMS

FIDS is just the start. Manage gate displays, wayfinding, and advertising from one CMS.



Voice Announcement System

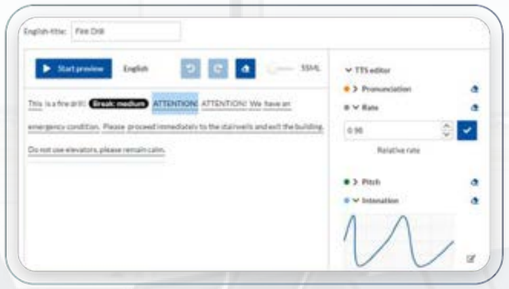
Announcements in 80+ languages, generated from real-time flight data. Neural TTS adapts automatically when the schedule changes.



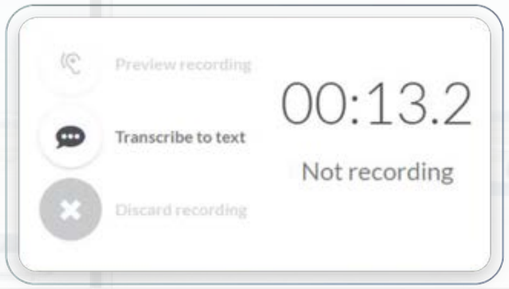
AODB & Flight Management

Real-time flight data synchronization, with manual override the moment a situation changes.

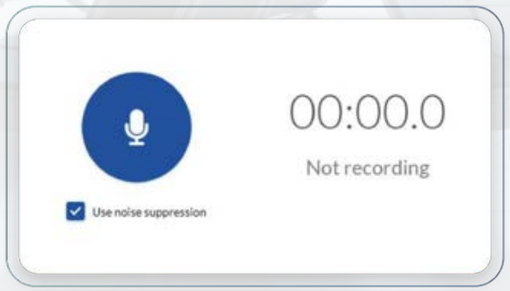




Text-to-Speech



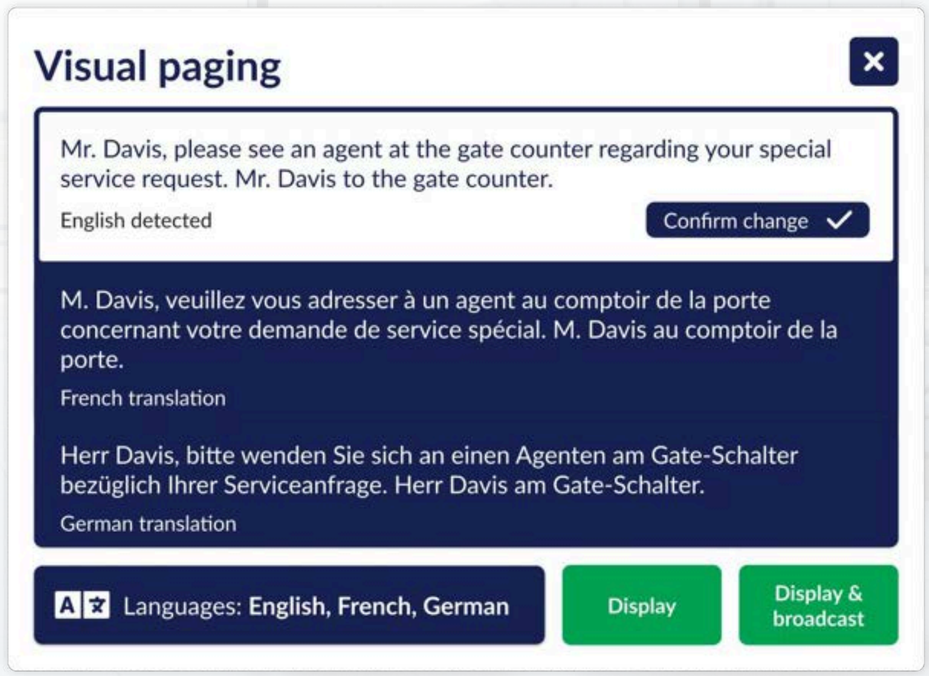
Speech-to-Text



Noise Suppression



Multilanguage



Live Translation

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KEY BENEFITS

WHY AIRPORTS CHOOSE NNOUNCE

- ✔ **Single vendor:** hardware, software, and integration from one partner
- ✔ **IP-native:** standard LAN, no proprietary audio cabling
- ✔ **Decentralized and resilient:** no single point of failure, N+1 redundancy
- ✔ **Scalable:** add zones without replacing core hardware
- ✔ **Automated:** Data feed integration eliminates manual paging
- ✔ **Secure:** AES-256 encryption, secure boot, IPv4/IPv6
- ✔ **Interoperable:** Q-SYS, Bosch PRAESENSA, AES67, VoIP
- ✔ **Life-safety ready:** designed to meet EN 54-16 / EN 50849 (certification in progress)
- ✔ **Intelligent audio:** real-time ambient noise compensation and neural TTS for clear multilingual announcements

MORE INFORMATION

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SUMMARY

An airport's public address system is three things at once: a life-safety system, a passenger experience differentiator, and an operational tool. It must remain fully functional when the terminal is full and keep running when a device fails.

The nnounce ecosystem fulfills all three. There is **no single point of failure**, and the **system scales by adding devices** instead of replacing a central unit. Ambient noise compensation holds clarity in every zone. It is distributed and **IP-native**, so intelligence sits in every amplifier, microphone station, and audio integration device rather than a single central unit. It runs over standard network infrastructure and integrates with existing AV and life-safety systems through open standards.

Paired with Airport CX, the platform adds automation on top: announcements triggered by live flight data, multilingual TTS, and live translation. Because nnounce and Airport CX are built by one company, **hardware and software work as a single system**.

Whether scaled for a regional terminal or rolled out across a major international hub, the platform grows alongside the facility. You can expand zones, add endpoints, and introduce new languages at any time - protecting your initial investment and keeping the total cost of ownership low across the entire system lifecycle.

To scope a system for your airport, contact us at customer@simpleway.global.

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