

The silent airport and the ambient soundscape

Why PA announcements go unheard or ignored
and why a smarter approach makes more sense



The terminal soundscape



“A soundscape is the aural [heard] equivalent of a visual landscape. It’s the sum of all sounds at a particular place and time... You can turn away from a landscape, but a soundscape completely surrounds you.”¹

The typical airport terminal is a cacophony of sound. Crying children, people talking, coffee machines, luggage trolleys, the beeping of motorised buggies, escalators, air conditioning systems, baggage belts, endless construction, traffic outside, the roar of aircraft engines... and, usually, never-ending and repetitive public address (PA) announcements.

It can be too much to deal with, especially for passengers and staff who are already feeling stressed and under pressure. Additionally, some people may have a diagnosed sensitivity to noise. Similarly, those with autism spectrum disorders “perceive certain sounds as more intense... loud noises can be painful... [or] overwhelming”.²

► Airports are poor acoustic environments

Airport terminals are huge areas, like hangars, with high ceilings, hard shiny surfaces, and sharp edges. The acoustic properties are terrible and there’s little to absorb sound. Although departure areas often have noise-absorbing mechanisms which soften the acoustic environment, this may be offset by the noisy bustle of hospitality and retail activity, and gate calls over the PA system.

“A loud PA signal can be unintelligible if the space is too reverberant. Reverberation is the persistence of sound in a space, and a highly reverberant space is one with hard surfaces and little acoustical absorption. The result is sound that continually reflects around the space, rather than being absorbed quickly at the room surfaces.”³



▶ People find ways of dealing with unacceptable noise

The human response to overwhelming sensory input is to reject it – whether actively or unconsciously. We may choose to replace it by listening to music through earbuds; doing something distracting, like reading or playing a game; or simply tuning it out.

Airport passengers may not even realise that they've tuned out and might be horrified to hear it, given their anxiety about missing their flight. In one study, passengers in a busy airport check-in area were frequently found to be completely unaware of any of the public announcements that had been made in the preceding 10 minutes.⁴

▶ Hearing is not the same as understanding

Even when customers are aware of announcements, they may struggle to understand them. Surrounding noise, distractions, the quality of the PA system, and the language or dialect in which the announcement is made can all hinder passenger comprehension.

A weak audio plan at an airport can lead to poor speaker coverage, and therefore inaudible announcements. Installing an ambient noise controller (ANC) makes it

possible to alter the PA signal according to the time of day or the airport's level of operations, and that can influence speech intelligibility and the speech transmission index (STI).

Additionally, many airports will default to English for announcements for less common languages, or if there are no available agents who speak a particular language. But only 400 million of the world's 7 billion people are native English-speakers⁵ – that's fewer than 6%.

*"Speech intelligibility is an important consideration... Just being able to hear speech is not sufficient; it needs to be understood too, bearing in mind that many people will not be native speakers so speech clarity is critical."*⁶

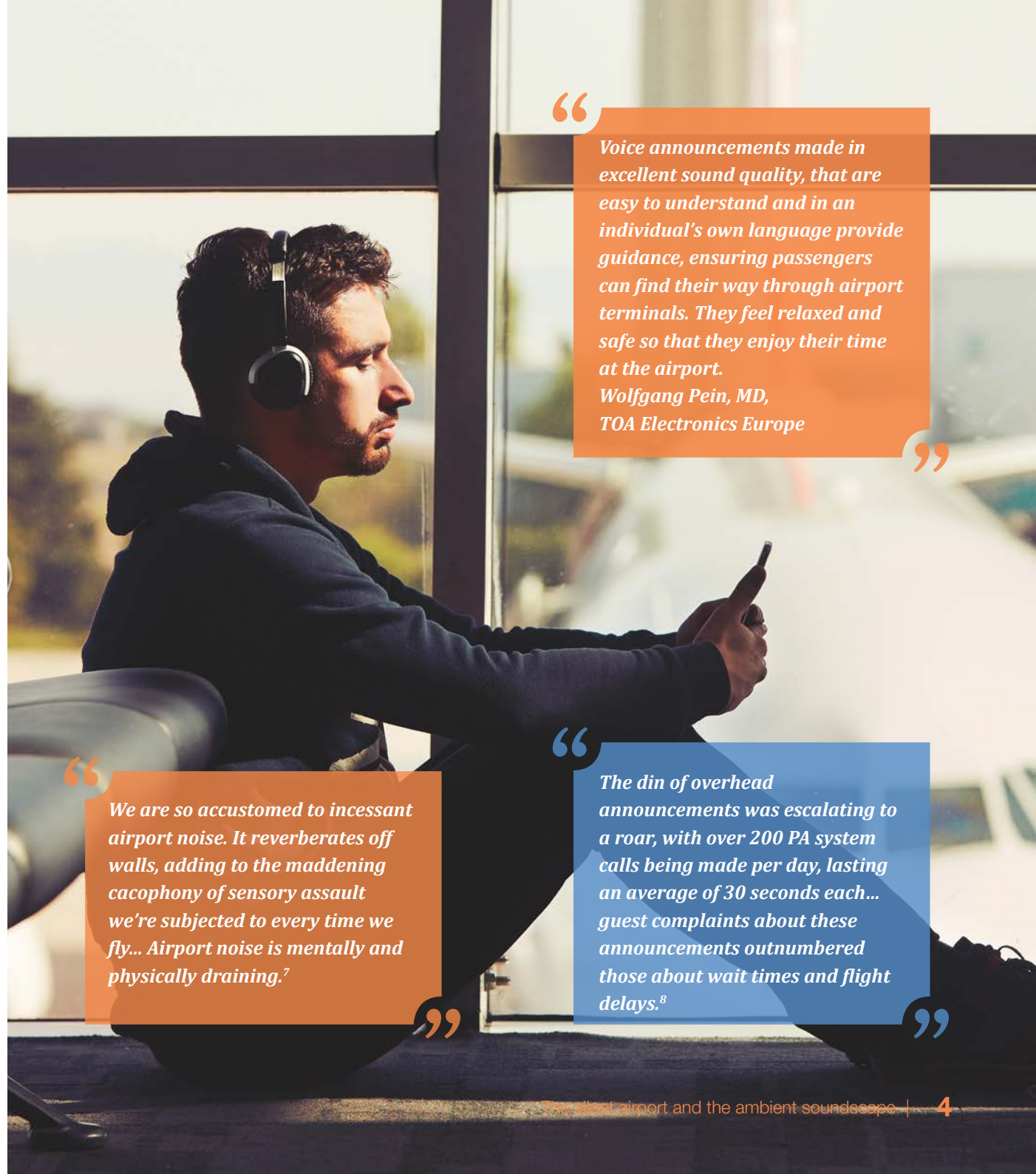
Of course, even clear announcements in the right language will be let down by a low-quality PA system and/or badly positioned speakers, a bad acoustic, or poor sound design. Effective audio communication with passengers depends on joined-up thinking across all aspects of the soundscape. A well-informed passenger is a happy passenger, so it's important to ensure intelligibility and relevance at every step.

▶ Hearing is not the same as compliance

As air travel becomes more familiar to people, some will want to feel more in control. Believing themselves to know how things work, they may disregard announcements – thinking they don't need them, or delaying their response to them. Such passengers may stay longer in hospitality or retail areas, only heading for their gate at the last minute.

▶ Is anyone even listening?

All of this presents airports and airlines with a challenge in ensuring that passengers hear, understand and comply with announcements. And yet these announcements may be of primary importance to the passenger, such as a last call for boarding, and for the airport/airline, for getting departures out on time. Unheard or disregarded announcements may be even more significant for everyone if they involve safety, security or evacuation announcements – yet no one's listening.



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Voice announcements made in excellent sound quality, that are easy to understand and in an individual's own language provide guidance, ensuring passengers can find their way through airport terminals. They feel relaxed and safe so that they enjoy their time at the airport.

*Wolfgang Pein, MD,
TOA Electronics Europe*

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We are so accustomed to incessant airport noise. It reverberates off walls, adding to the maddening cacophony of sensory assault we're subjected to every time we fly... Airport noise is mentally and physically draining.⁷

”

“

The din of overhead announcements was escalating to a roar, with over 200 PA system calls being made per day, lasting an average of 30 seconds each... guest complaints about these announcements outnumbered those about wait times and flight delays.⁸

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The vicious cycle of announcements and stress

Most passengers are anxious about flying and this, plus the many distractions, may prevent them from hearing announcements. The knock-on effects can be significant for passengers, who may miss a flight, and for airlines – which may incur fines if their aircraft don't push back on time.

► Stress levels affect understanding

According to the report *Human Factors Affecting PA System Intelligibility*, stress affects attention levels by reducing focus and attentiveness to external stimuli such as PA announcements. In other words, stressed passengers are passengers who aren't listening – and the majority of passengers are stressed. Most would rather go to the dentist or file their taxes than fly.⁹

“Air travel can be stressful because it often involves a long journey to the airport, curtailed sleep and the need to walk long distances in the terminal building... instructions are likely to change at the last minute... Fear and stress can grow when passengers cannot understand the relevant public announcements.”¹⁰

Passengers are often anxious before they even arrive at the airport. Mixed in with the hard deadline of their flight time can be complications like bad planning, difficult journeys to the airport, or even arguments with their companions. So although none of this is the airport or airline's fault, it's important to recognise the condition that passengers may arrive in, and that it wouldn't take much to escalate their stress to significant levels.

STRESS: What part of traveling to or through an airport do people find the most stressful?

Baggage collection	49%
Passing security	47%
Transfers (waiting)	47%
Checking in	44%
Packing for the trip	43%
Travelling to the airport	42%
Getting to the boarding gate	38%
Arrival at the airport	38%
The aircraft landing	35%
Storing hand luggage	34%
Boarding the plane	32%
During the flight	31%
Finding the seat	31%
Time in the departure lounge	28%

WORRY: What are people most worried might happen before they travel or while at the airport?

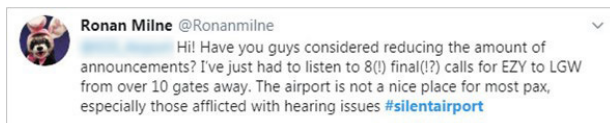
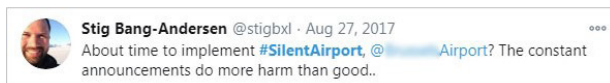
Getting stuck on the way to the airport	63%
Losing baggage	61%
Missing boarding	57%
Misplacing passport	57%
Delays	53%
Making a connecting flight	49%
Needing to pay for excess baggage	45%
Getting separated from a friend	43%
Getting stopped at security	42%
Losing a child	41%

Airport Anxiety: research conducted by Censuswide on behalf of Priority Pass, 2019.¹¹

Stressed passengers can turn to alcohol, medication or sleeping tablets as coping strategies, but this may simply fuel their frustration, anxiety, fear and loss of control. According to IATA, alcohol or drugs were a factor in a third of unruly passenger incidents.¹² That's why passengers need all the help they can get to de-stress, and airports need all the help they can get to communicate with their passengers.

▶ Too many announcements can increase stress

Passengers have historically relied on announcements to deal with the anxiety of worrying about missing their flights, yet at the same time they may also complain about too many announcements. *That's because the only announcements they want to hear are those that are relevant to their own journey.*



▶ Staff can get stressed, too

Airport and airline staff can find noise just as challenging as passengers – but they're surrounded by it *all the time*. This can lead to a permanent undercurrent of anxiety, which is increased when they must deal with the effects of passenger stress. That can include repeated enquiries from confused passengers, having to make a high number of manual announcements, late push-backs, and dealing with frustration and even aggression.

▶ De-stressing passengers is a role for airports and airlines

It's important to deal with the root causes of anxiety, one of which can be overwhelming noise in the airport; another is the fear of missing a flight.

Better management of PA announcements is one way to reduce both passenger irritation and complaints while also ensuring that passengers know what they need to do, and when – thus lowering their stress levels and helping to ensure compliance.

Other communication methods can also help passengers to stay informed and feel calm. Besides the PA system, this can include a fully integrated approach to the FIDS, information kiosks, and push notifications to personal devices.

An airport's announcement policy can directly affect passenger stress levels. That's why we help our clients to define their policy, based on global best practice, and then help them with the technical implementation, too.

– Johan Godin, CEO, AviaVox

Effective air-travel stress management is increasingly crucial in determining tourist satisfaction and travel choices, particularly in a time of intensive fear about virus, terrorism, and plane crashes.

– Tourism Management, 2021¹³

The announcement legacy

Air travel was once an adventurous luxury. Fewer flights meant fewer passengers, who didn't always know what to do. So the airport told them.

Flying for leisure wasn't all that common until package holidays took off in the 1960s¹⁴, and novice flyers depended on passenger announcements to help them catch their flights. The luxury element of air travel also meant that high levels of customer service were expected, so late passengers would be called by name to board their flight, and anyone could ask the airport to page a family member who'd wandered off.

Of course, this picture has changed beyond all recognition. In 2019, the last time we saw normal operations pre-COVID, the number of passengers carried on scheduled services annually was 4.5 billion¹⁵ – the equivalent of one flight each, every year, for over two-thirds of the world's population. Flying is no longer a novelty. The vast number of flights makes it very challenging for airports to fit in all of their passenger announcements, and higher noise levels make those announcements increasingly hard to hear.

Many airports appear trapped by a history of announcement policies going back decades. They continue to relentlessly announce boarding calls and gate changes, and even call late passengers. And yet, as we've seen, these calls often go unnoticed, or are a passenger irritant.

► Whose responsibility is it?

The vast majority of passengers have a general understanding of procedures, but many will push it to the limit by going about their business until the very last minute. Aside from the logistical challenges presented by such behaviour, it can lead to greater stress for the passengers themselves when they realise they're cutting it too fine – which can also increase stresses and risks for staff.



Of course, it benefits airports and airlines to get flights out on time, or their reputations and their profits could take a hit. However, it's difficult to imagine any other mode of transport in which passengers are so heavily assisted and managed; train or ferry journeys, for example (even long-distance ones) don't make as many announcements, or put out named passenger calls, for example.

If aviation is to do the same, and encourage passengers to take greater responsibility for their own timely arrival at check-in and the gate, then ensuring that they are fully informed throughout their time in the terminal will help to achieve this goal.

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*Speech intelligibility is an important consideration... Just being able to hear speech is not sufficient; it needs to be understood too, bearing in mind that many people will not be native speakers so speech clarity is critical.*¹⁶

10%
*or fewer passengers felt that an announcement was relevant to their journey.*¹⁷

18%
*of passengers in a survey did not understand the announcement.*¹⁸
Other reasons for not hearing the message well:

- *high background noise*
- *poor sound quality (echoes/distortion)*
- *spoken too quickly*
- *volume too low*
- *outside noise*
- *message not spoken clearly*
- *audio clutter/multiple messages.*¹⁹

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The 'silent airport' solution

Of course, a silent airport isn't really silent. Some, like Sydney and San Francisco, refer to themselves as 'quiet airports'. Perhaps the right term could be 'ambient airport'?

Adopting a silent airport policy means making smarter passenger announcements, so that it *appears* that there are fewer. The goal is to calm the ambience, improve passenger flow, reduce complaints, and maintain safety.

► What's the point of a silent airport?

In a silent airport, the number of public address announcements that passengers experience is dramatically reduced. For example, there are no announcements to summon passengers to their boarding gates, no final calls, and rarely any named calls for late individuals. From the check-in desk to security, through shopping and hospitality and on to boarding gates and luggage belts, the goals are:

- to cut down on the overall volume of sound
- to de-stress passengers
- to increase passenger engagement with important announcements
- to reduce stress and relieve the burden on desk and gate agents
- to direct passengers in a more customised, focused way
- to enhance passenger flow and compliance, thereby enhancing operational performance and avoiding regulatory problems
- to reduce the number of passenger complaints and protect airport and airline reputations
- to increase revenue by ensuring passengers can spend in the right places, at the right times.

► What kind of announcements are made?

In a silent airport, there may be just as many announcements as before, but there *appear* to be fewer because they are limited to certain zones; they're less irritating (because they're clearer and in the appropriate language); and they feel helpful.

Airports should be able to choose whether to make calls across a zone group, the whole terminal or even the whole airport. For example, this would impact on calls concerning:

- lost children
- late gate changes
- Schengen/non-Schengen zones
- extreme weather announcements
- safety and security announcements
- emergency announcements, such as evacuations.

► How many silent airports are there?

The silent airport concept is not new, although the degree of implementation varies by continent. Silent airports are more common in Asia-Pacific and Europe than North America²⁰, for example. London City Airport may have been one of the earliest adopters, in 2008²¹. Some of the airports which have since followed include Dubai in 2010; Doha in 2012; Dublin in 2014; Helsinki in 2015; Hyderabad in 2016; Schiphol, Frankfurt and Johannesburg in 2017; Muscat, Cape Town, Singapore and Kuala Lumpur in 2018; Eindhoven and Punta Cana in 2019; and Venice, Dalaman and San Francisco in 2020. In 2021, Surat became the next in a list of Indian early adopters that already included Delhi, Mumbai, Chennai and Kolkata.

► How do passengers get the information they need?

The latest flight information for passengers is usually available via the flight information display system (FIDS). However, the source data from the airport operational database (AODB) can also be fed to other mechanisms used to provide passengers with correct, current information. For example by:

- using smart technology and zoning to continue to deliver announcements, but in a much more localised, targeted and relevant way
- directing push notifications to the airport or airline's mobile app
- offering live video chat with customer service representatives via kiosks
- offering information or virtual representatives via kiosks
- interactive signs offering directions and estimated walking times to gates
- Bluetooth and beacon technology to tell passengers where they are, how far it is to their gate, and when they need to be there
- clear messaging on airline and airport websites.



► What about visually or hearing-impaired passengers?

At some airports, passengers with limited vision may be able to use large print displays (including in kiosks) and Braille signage. Those with 100% vision loss may use screen readers to access mobile notifications, but are likely to already be making use of airport escort assistance for support in getting to and from check-in, gates, baggage claim, etc. However, an effective silent airport policy will continue to make announcements, but more appropriately – so visually impaired passengers *will* still hear announcements relevant to them.

Since announcements can't always help those with hearing loss, airports can adopt a range of telecommunications solutions for the deaf and hard of hearing. These include audio induction or hearing loops (possibly in conjunction with automated voice announcement systems) as well as teletypewriters – variously known in different regions as TTY telephones (USA), textphones (Europe) and minicom (United Kingdom). Airports can also improve their signage, include live FIDS data feeds on their websites, and video relay services in case passengers need sign language interpretation.



Richard Mills @richardmills18

At [redacted] such a lot of work to do before they are inclusive . Dreadful environment for autistic travellers. Just witnessed one young chap have a meltdown due to loud chimes and unintelligible flight announcements. No need guys. #Silentairport please @scottishautism

“

An estimated 14% of adults ages 20 to 69 have some level of hearing loss... Or, put another way, millions of us can't hear those darned airport announcements.

- LA Times and CDC²²

”

“

Most [airport apps] provide flight status updates, interactive terminal maps... So, as long as passengers have a (charged) device, all the information they need should be in the palm of their hands.²³

”

“

Terminal-wide exposure to public announcements has been reduced by 77% with no noticeable impact on the quality of service or awareness of information. In the International Terminal alone, we estimate that more than 90 minutes of unnecessary announcements have been eliminated each day.

- San Francisco International

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When is a silent airport not a silent airport?

Using the appropriate technology, announcements should still be made. However, they should be tailored, so the right people hear the right information at the right time and in the right place, rather than announcements being broadcast for all to hear.

As we've seen, an effective silent airport doesn't require a total removal of announcements. However, it does mean no longer flooding the airport with ceaseless, unintelligible announcements which are only relevant to a small number of passengers at a time. To go silent, an airport needs an announcement system that can intelligently handle the targeting of announcements and ensure that they are intelligible and language-appropriate. It also needs a quality PA system, which has been designed and installed correctly, to get the message across.

For example, predicting passenger flow according to the departures or arrivals schedule means it's possible to know which passengers are likely to be in which part of the airport at any given time, and which languages they are likely to speak. An intelligent announcement system can use smart triggers to ensure that only relevant announcements are broadcast in certain airport zones and at certain times – in the most appropriate language/s. This means that only passengers who need that specific information will hear the announcement. A smart announcement system can also deliver visual messaging (for example, in kiosks) and push notifications to personal devices via airline or airport apps.

Linking the airport's AODB and FIDS to an intelligent automated announcement system and the PA system means accurate, intelligible and stand-out announcements can be very specifically targeted. Here are a few examples of the benefits:

- Passenger behaviour and compliance during security checks can be better managed. Ahead of a flight to Moscow, for example, announcements can be made in Russian in the security area concerning what to do with electricals, laptops, belts and shoes.
- Where sensors are used to monitor passenger numbers, announcements can be tailored within zones experiencing overcrowding. For example, a COVID-related 'keep your distance' announcement can be made in one specific PA zone.
- Customer service or revenue-generating messages can be delivered wherever passengers may have spare time or a particular need – such as special offers within dining operations, discounts within retail outlets, or facilities like quiet lounges.
- Baggage claim areas can avoid overcrowding around entry points or information screens if PA announcements can be delivered in the appropriate language or dialect on the apron shuttle bus, or during the walk to the baggage hall.



Dr. Chloe Wells @raitapaia

#QuietAirport is such a good idea. I'm now at Airport and the constant, booming announcements are driving me mad!

▶ Languages, dialects and accents

Sometimes passenger announcements are static (canned), and sometimes they're dynamic. Both canned and dynamic messages can be generated by the human voice, but they can also be created automatically by an intelligent announcement system. Automated systems are preferable, since they remove the need for manual intervention by staff and gate agents. This in turn means that agents are freed up to deliver an enhanced passenger experience. Additionally, a successful announcement depends on the availability of someone who speaks the language or dialect, preferably as a first language, and in an intelligible accent.

Dialects can vary hugely; for example, between Egyptian Arabic and Modern Standard Arabic, or American, Australian and British English. So it can be difficult to ensure comprehension even when a passenger's attention has been engaged. Fortunately, technology now exists which can react to triggers by automatically making announcements in over 40 languages and dialects, in real time, using data taken directly from the AODB. So passengers waiting for a flight to Cairo at one departure gate may hear an announcement in Egyptian Arabic, while those waiting at a gate nearby may hear their flight to Jeddah called in Modern Standard Arabic.

▶ Meeting operational goals

Once this possibility is recognised, it's easy to see how a silent/ambient airport policy can also be used to help meet the airport or airline's own operational goals, for example:

- The passenger experience is enhanced when staff are freed up from making announcements and can instead be hands-free to deliver more personal care and attention.
- Passengers who may have previously been over-anxious gate-huggers will have more confidence and time to use retail and hospitality offerings, therefore contributing to passenger spend.
- Operational performance efficiency can be improved, with smoother handling of last-minute gate changes, passenger flow, greater gate capacity, and on-time departures.
- Reducing travel-related stress and anxiety, thereby also helping to ensure passenger compliance and potentially reducing incidents of aggression.
- Intelligible announcements in a native tongue will reduce passengers' needs to interact with staff – helping to optimise staff efficiency and headcount while reducing their stress and frustration.
- Airports can be more flexible with airline customers by enabling them to use their own bespoke announcements (which could include a single, familiar voice around the world).
- Intelligent announcement systems can support automated boarding procedures while maintaining the silent airport policy.

Ambient

Creating a relaxing atmosphere.

– Collins Dictionary

“While the silent airport concept is not entirely new, advances in technology are allowing airports to more easily adopt the practice.”²⁵

“At Mumbai airport, an official said, the 'on-time performance of flights' has improved after it became a silent zone.”²⁶

Checklist:

Implementing a silent airport policy

Airports and airlines can develop an effective strategy for relaxing passengers, ensuring compliance, and achieving their operational objectives.

1 Develop a robust announcement policy

The policy should cover which announcements will be dropped or retained. It should use the latest technology to permit announcements to be delivered in relevant zones and languages. There should be clear strategies for events like gate changes, severe weather, lost children, late passengers, major delays and cancellations, and emergencies. Integration with future technology, such as facial recognition (to track the location of any passenger in the terminal) could also be incorporated – enabling passenger announcements to be very specifically and effectively targeted.

2 Consider all of the objectives

Although it can be challenging, it's important to balance all of the most important needs around operational goals, compliance requirements, passenger expectations and insurance. In particular, sensitivity around legislation relating to security, safety and evacuations can make airports feel compelled to make unnecessary numbers of announcements.

3 Communicate the policy

A silent airport policy should be announced well in advance and through as many channels as possible – with the support of the airlines. Websites, social media channels, ticketing confirmation, boarding passes and the airport terminal should all offer obvious, clear information about the policy. There should be guidelines for how passengers can help themselves to stay flight-aware; for example, how much in advance of their departure time should they arrive at their gate?




4 Use live data

Since conflicting messages aren't helpful to anyone, a successful silent airport will depend on the most accurate, up to date flight information. This means taking it directly from the AODB and/or the FIDS.

 **Pushkar** @Pushkarr
Boarding pass says gate 1, screen shows gate 7 and one guy comes screaming gate 9. #silentairport

5 Adhere to the policy

Whether passengers love or hate a silent airport, they will notice – and may complain – if they feel it isn't being adhered to. They will be confused and irritated if unexpected announcements are made, and especially if they're more frenzied than a standard announcement or when contradicting existing information.

 **Cheryl Pereira** @seeknsave
And it's supposedly a #silentairport but every few seconds there's someone screaming on the loudspeakers about some change in gate etc. After that stopped, now people are walking around shouting about a final call - at least 20 times already.

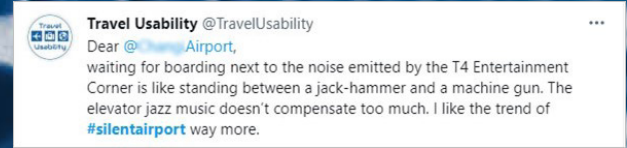
6 Designing and managing the soundscape

If the goal is to create a better ambience, then simply reducing the number of announcements won't be enough. Poor zoning, or badly planned soundscapes, can lead to potentially irritating sounds such as background noise and machinery. This could involve muting or removing some sounds, or implementing sound absorption. It could also mean *introducing* sounds and music in certain appropriate areas, as a stress-relief mechanism.

“

*If it is done right, the passenger experience is vastly improved, delays are reduced with passenger communication achieved, and the airport is a much nicer, easier and less stressful place to be.*²⁹

”



7 Be prepared for complaints

Not every passenger is going to love the silent airport, or at least until they've learned to take responsibility for staying informed about their own flight. It's important to deal with complaints while at the same time understanding that they don't mean that the policy was a mistake.

*"I missed my flight to Kolkata, because there was no PA announcements to board this flight... I missed my flight and had to buy another ticket for \$616 to Kolkata. [The airline] told me that it was my fault to miss this flight and had to pay for another ticket."*²⁷

8 Improve the acoustic

Even a silent airport will have some announcements, and – as we've seen – announcements are pointless unless they can be understood. That means a quality PA system with close attention paid to the positioning of speakers, and taking every opportunity to improve the acoustic (for example, during scheduled works). The following advice comes from the 2017 research report *Improving Intelligibility of Airport Terminal Public Address Systems*:²⁸

- "Ensure that acoustically absorptive treatment is adequate (nominally 15% to 25% of surface area) – proper reverberation time is critical to speech intelligibility."
- "For spaces with ceiling heights higher than 24 feet, get professional input for acoustics and PA system design; ceiling-mounted loudspeakers are generally discouraged for these types of spaces."
- "Ensure that the PA system provides at least 10 to 15 dB signal-to-noise ratio (SNR) in the presence of typical daytime ambient noise conditions." (Benchmarking and monitoring the speech transmission index, or STI, will help to ensure an effective PA system.)

9 Sculpt an alternative soundscape

Airports are increasingly implementing passenger de-stressors by providing more ambient environments, such as:

- quiet rooms where passengers can rest
- 'nap pods' which offer the choice of silence or a soothing soundtrack
- playing natural background sounds, such as gentle birdsong
- installing waterfalls and fountains within the terminal.

10 Continue to review the policy

Some aspects of the policy may work better than others, so regular audits will allow for fine-tuning. More announcements could be dropped over time, for example, or improvements made to the way it is communicated.

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About this briefing

AviaVox's customers are airports and airlines around the world, from the biggest and busiest to ones you may never have heard of. We are dedicated to the advancement of operational efficiency and passenger satisfaction.

TOA has over 85 years of experience manufacturing and designing PA/VA systems to keep people safe and well informed in acoustically challenging environments - like airports - worldwide.

This briefing is in response to the misinformation and misunderstanding we've observed in the aviation industry about what a 'silent' airport means, what the benefits are, and how to achieve it.

We hope to contribute to a wider and clearer discussion about this important subject. Our shared goal is a more enjoyable, less stressful terminal environment for both passengers and personnel.

