

## ACOUSTICS FORUM

### DISCUSSION ON HEARING AUGMENTATION SYSTEMS

Chris Dodds – MAAS

The P.A. People, Sydney, Australia

[www.papeople.com.au](http://www.papeople.com.au)

#### Introduction

Hearing augmentation systems are regulated under the relevant Australian Standards AS60118.4 and AS1428.5. Applicable standards for certain venues and public spaces are defined in the Building Code of Australia. Their provision is mandatory in many public spaces, including educational institutions, places of business, auditoria, rooms used for legal proceedings and some reception areas.

They are also a vital public service. The purpose of these systems is to assist those with hearing difficulties to both comprehend and enjoy audio content that is being amplified through an installed PA system

#### Current Hearing Augmentation Technologies

There are currently three differing technologies that are widely used to provide hearing augmentation and a fourth variant is emerging. Each have their own advantages and drawbacks that need to be taken into account in the design stage of the building or refurbishment of existing building.

The most common hearing augmentation system is the Audio Frequency Induction Loop (AFIL), where wiring is laid into the floor or ceiling. This type of system creates a magnetic field that couples directly with the patron's hearing aid via its T switch (telephone setting). The AFIL effectively emulates a field similar to the field created by a telephone and couples the sound being broadcast by the PA directly to the hearing aid. AFILs are commonly found in train stations, theatres, lecture halls, meeting rooms and any other public space where it's possible to lay the cable during new construction, or during a retrofit.

From the venue's point of view, AFILs are ideal as they require little ongoing maintenance or staff attention. The patron experience is also excellent, as they are already carrying the device they need to access the broadcast and it can be heard within the loop area in the venue's floorplan. In fact, the Building Code of Australia specifies that any AFIL must cover 80% of the space that it is installed in. However, AFILs are not ideal in every application. They are rarely suitable in spaces built with large amounts of metal, they don't provide security from unauthorised access and they can be costly and challenging to install in extremely large venues such as stadia.

An example of a challenging AFIL installation by the PA People was at Terminal 1 at Sydney Airport, as part of the upgrade of the facilities. This terminal services all inbound and outbound international flights and it is a complex space incorporating shopping, dining and airline lounges, along with the boarding and arrivals gates. Clear communication for all those in the terminal is critical for the safe operation. Well over 100 induction loops are needed to cover all of the public spaces. With such a large installation there are many aspects that need to be considered. For example, an induction loop cable cannot be installed over an expansion joint, as the movement at the joint will either stretch or crush the cable as it expands and contracts. For a large sequenced project, the project requires good collaboration with builders, electricians and floor tilers. The testing and commissioning of such a major system needs to be undertaken in stages and requires good cooperation with all the parties involved in the construction project.

Where an AFIL is not practicable, a broadcast system is commonly installed. Two technologies currently dominate in this space; infra-red (IR) and FM radio. Infra-red is suitable for small spaces such as meeting rooms and requires the user to wear a specific receiving device and be in line-of-sight of the transmitter. Unlike an AFIL, an infra-red system offers excellent privacy in confidential applications, as it cannot transmit through a wall or floor into another space. In larger spaces, like a sports ground, a low-powered FM transmitter can broadcast cheaply and efficiently to a crowd. However, the venue must provide and maintain a minimum number of receiving devices for the patrons needing the augmentation and this can be costly and logistically challenging. Both infra-red and FM solutions can be a burden to both the venue and patron; the patron must physically collect and return the receiving device and must be comfortable with wearing it. The venue must keep batteries charged and the receivers in service, as well as staffing the collection points.

#### Emerging Hearing Augmentation Technology

A fourth technology is starting to emerge, but as yet it has not seen wide acceptance. This is the use of local WiFi streaming systems, coupled with the use of personally-owned smart phones as the receiver. Whilst potentially promising in principal, and overcoming some of the problems with AFIL and broadcast systems, there are a number of issues that this type of technology will need to overcome. These include the practicality of downloading a suitable app, the suitability of a smart phone to be used as the receiver, especially in noisy or live environments, and the potential latency and buffering times of a network-based system. Clearly these systems may develop to become practical systems but for the time being they are an interesting alternative rather than a mainstream solution.

### Acoustics 2018 Adelaide



6 to 9 November 2018  
Adelaide Convention Centre

#### Annual Conference of Australian Acoustical Society

Plenary speakers  
Keynote speaker  
Contributed Papers  
Technical Exhibition

[www.acoustics2018.com](http://www.acoustics2018.com)