America's Getting in the Hearing Loop

Presenter: Stephen O. Frazier

Chair: Advisory Committee for Hearing Loss Awareness in New Mexico
Co-Chair: Committee for Communication Access in New Mexico
Hearing Loss Support Specialist
Director: Loop New Mexico
Freelance Writer

Committee for Communication Access in New Mexico

GETTING YOU IN THE LOOP

- Some facts about hearing loss
- What's an assistive listening system?
- The story of electromagnetic induction
- What's a hearing loop?
- What's a telecoil?
- Hearing loops are happening in America
- Hearing loops abroad

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About questions...

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Some facts about hearing loss

There are 48 million in US with a measurable hearing loss

65% of people with hearing loss are under age 65.

20% of school age children have a hearing loss.

Hearing aids are an only an "aid"

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Some facts about hearing loss

Cause of Hearing Loss	Percent Due to Cause
At birth	4.4%
Ear Infection	12.2%
Ear Injury	4.9%
Loud brief noise	10.3%
Other Noise	23.4%
Getting Older	28.0%
Other	16.8%

Source: Ntnl. Center for health statistics, data from the National Health Interview Survey Series 10, Number 188, Table 16, 1994.

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Why is an ALS needed

Sound level of speech

Speech to noise ratio

Ambient noise

Reverberation

Unfriendly PA system

Covid 19 mask

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Sound level of speech

Normal speech is 60-65 decibels

Most HA mics only effective 6 to 8 feet out

Distance decreases sound level

Sound pressure level decreases 6 dB every time distance is doubled.

High pitch sounds have less strength

Consonant sounds needed to understand speech are high pitched

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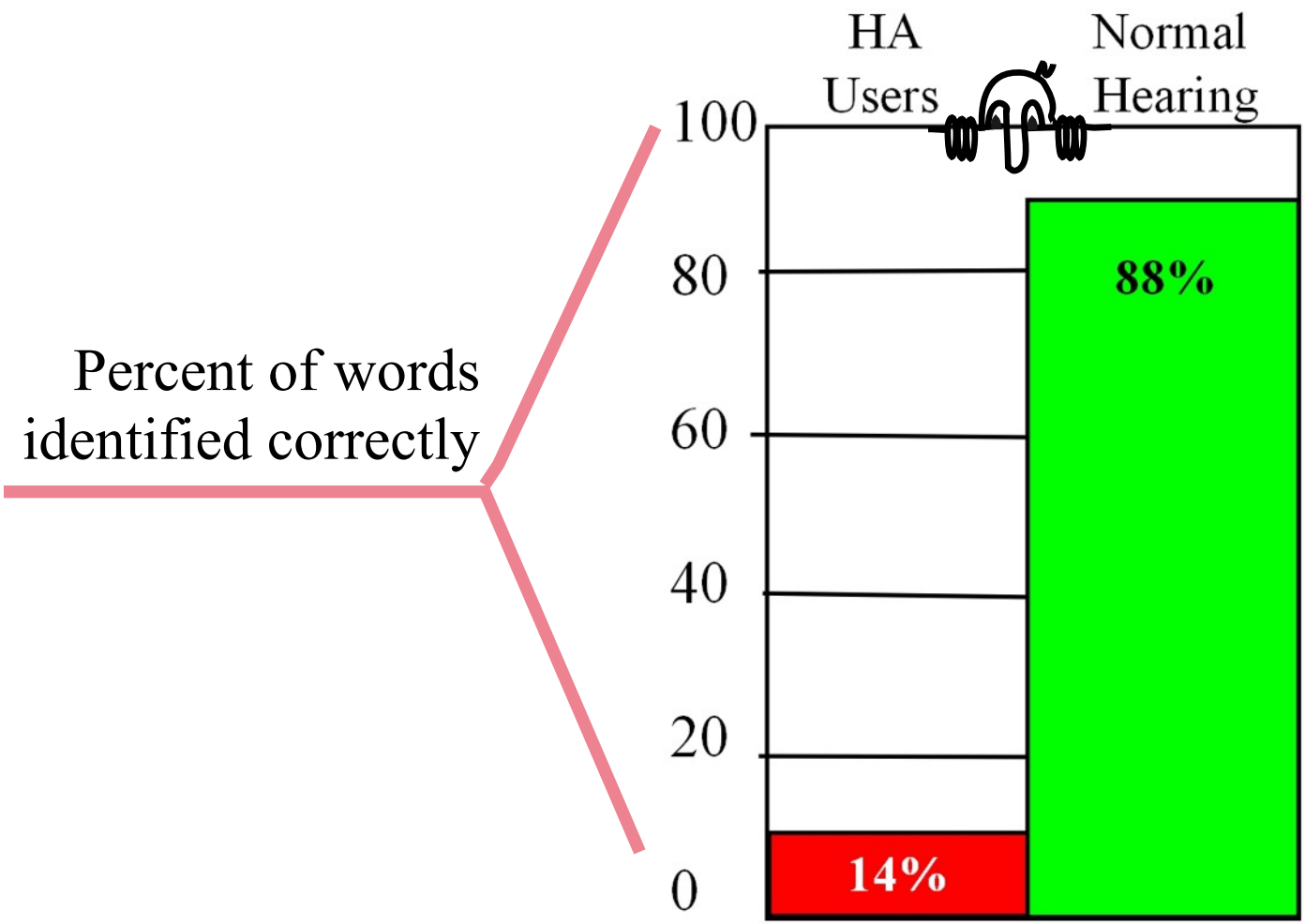
Sound level of speech



Average scores for hearing aid users and normal hearing listeners under identical conditions

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Speech to Noise Ratio

Normal hearing 10 dB difference OK

Speech 70 dB - noise 60 dB (Window AC)

70 dB perceived as twice as loud as 60 dB

Some HOH 20 TO 25 dB needed

70 dB - noise 45-50 dB (3 ft. From running refrigerator)

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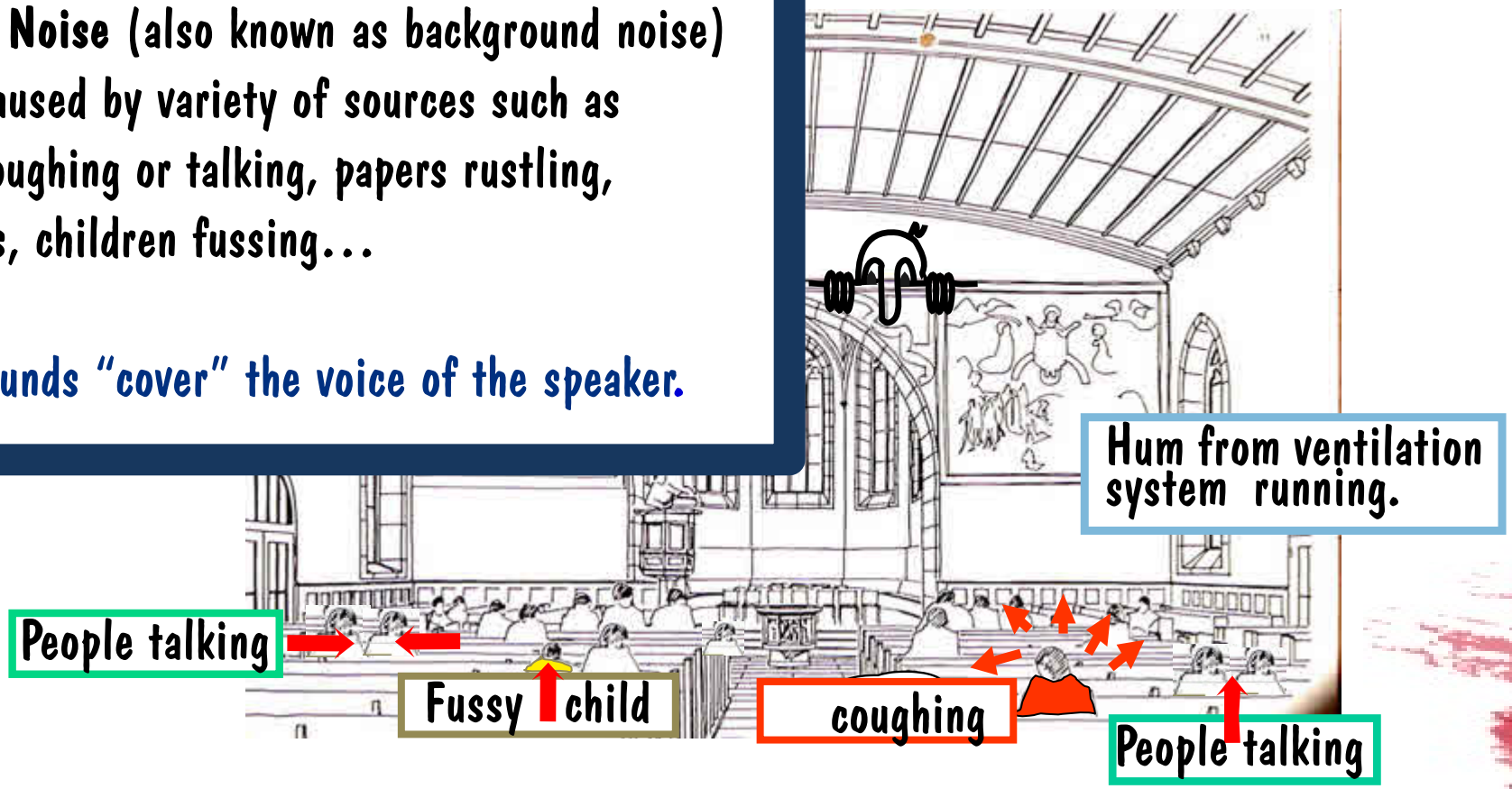
Issue of Ambient Noise

Ambient Noise (also known as background noise) can be caused by variety of sources such as others coughing or talking, papers rustling, footsteps, children fussing…

These sounds "cover" the voice of the speaker.



Artwork courtesy of Heinz Nafzger .

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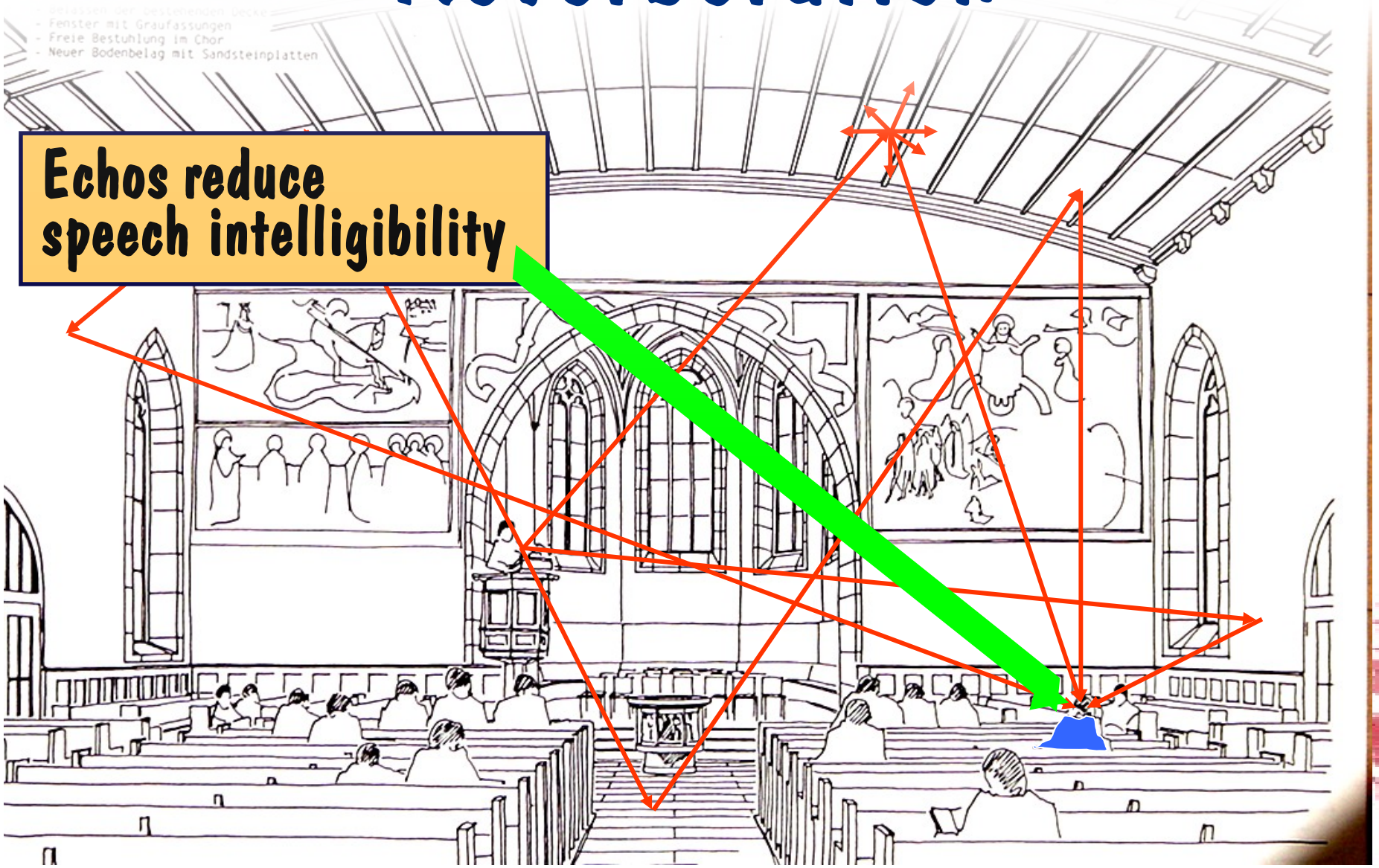
Reverberation



Unaided or hearing aid assisted sound in such settings is problematic.

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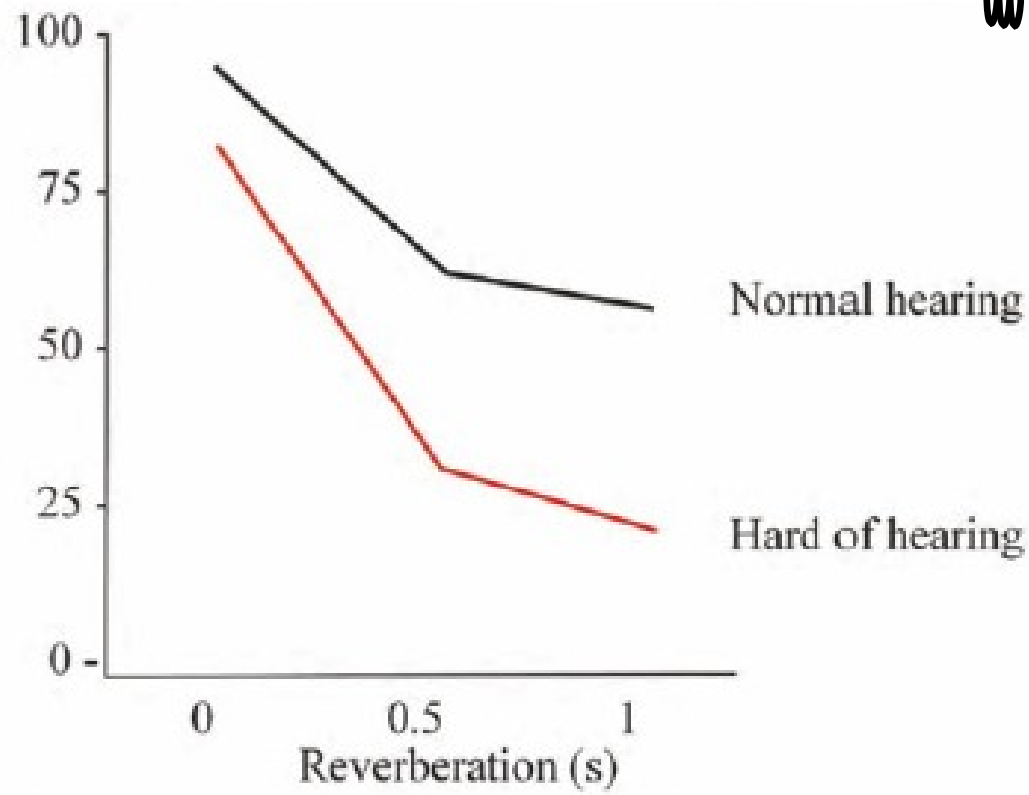
Reverberation



Mean percent correct word recognition score as a function of listening condition and reverberation time (n = 12).

Recognition of Temporally Distorted Words/Stuart and Phillips

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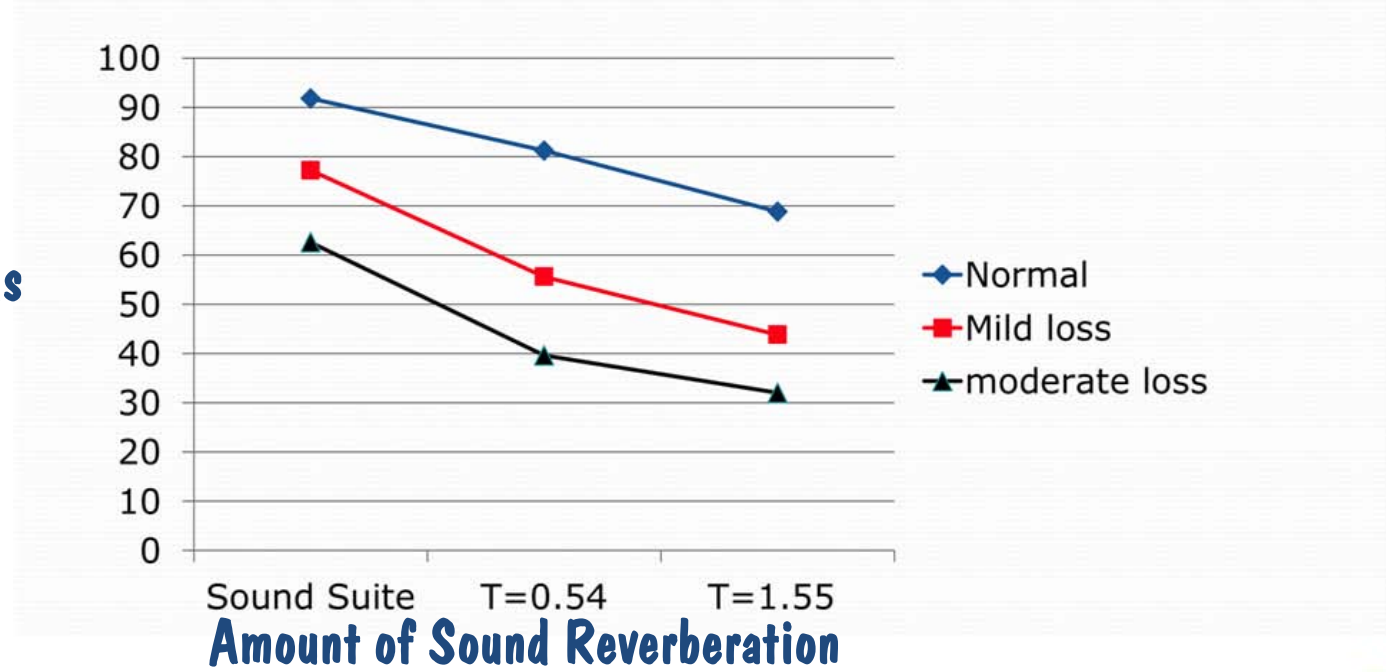
Reverberation plus ambient sound

Speech recognition by degree of loss with reverberation plus background noise (+10dB SNR)

(R. Harris & D. Swenson 1990)



Source: R Harris & D. Swenson 1990

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Unfriendly PA system

Too much bass

Too little treble

www.sofnabq.com

"Louder Isn't Necessarily Better"
Sound and Communications

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What's the solution?

An assistive listening system (ALS) will overcome many of these problems

So…what's an ALS?

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The ADA defines an Assistive Listening System as "an amplification system utilizing transmitters, receivers, and coupling devices to bypass the acoustical space between a sound source and a listener by means of induction loop, radio frequency, infrared, or direct wired equipment."

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Types of large venue asistive listening systems

✓ RF - radio frequency aka FM
Requires borrowing a receiver and headset/neckloop

✓ Infra Red - AKA IR uses light beams to transmit sound
Requires borrowing a receiver and headset/neckloop

✓ AFILS - audio frequency induction loop system (hearing loop)
No receiver needed for users with telecoils

✓ Wi-Fi - signal is transmitted using radio waves and digital signal processing (DSP)
No headset needed for users with a receiver or smart phone and app using Bluetooth® or a neckloop

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Why a hearing loop?

Serves 1 or 100

Discrete

Simple touch of a button

No borrowed equipment

No hygienic concerns

No last minute rush

No dead batteries

Survey - 3 times more likely to be used

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"Loops and telecoils are old technology..."

Well, so what?

The wrist watch

Electric cars

The Telephone

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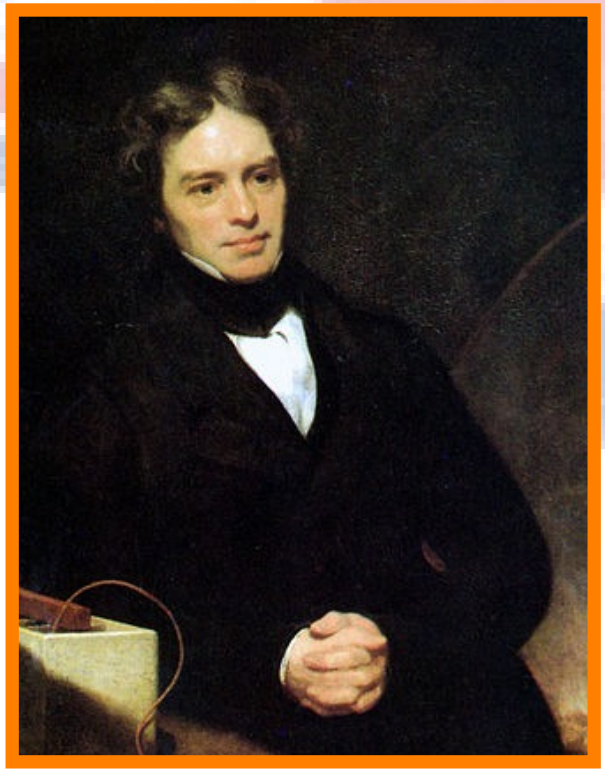
The beginning



1831 British scientist Michael Farraday discovers <u>electromagnetic induction</u> that, as time passed, came to be used in electrical components such as transformers, generators, electric motors and....induction (hearing) loops.

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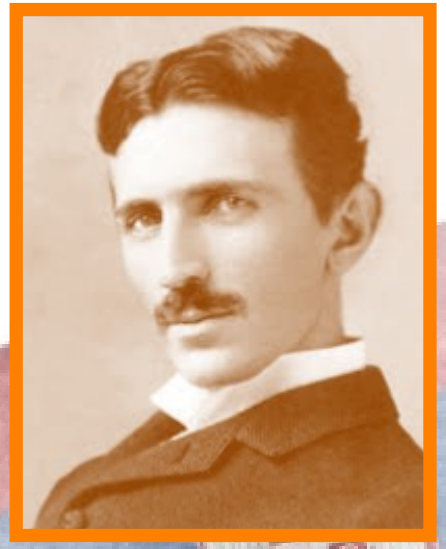
The beginning

1885 - Italian Galileo Ferraris invents the first <u>electromagnetic induction</u> motor and then Serbian American Nikola Tesla re-invents it in 1888. Old technology that's still in use.



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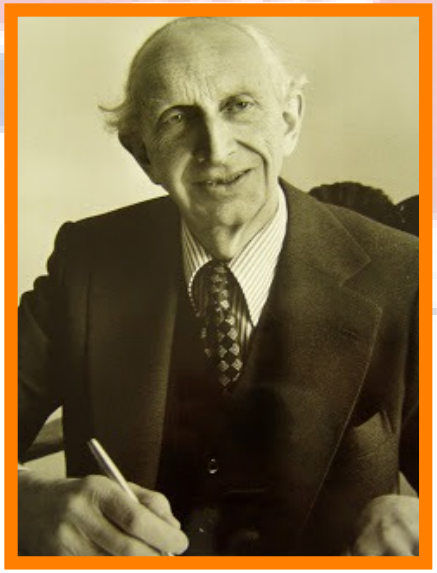
The beginning



1937 - The electromagnetic induction loop system was invented by Russian born British telephone and sound engineer Joseph Poliakoff, the founder of Multitone Electric Company in Great Britain.

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The beginning

The first wearable hearing aid that worked with a hearing loop was worn in a chest pocket.

It was made by the Multitone Electric Co. in England in 1938.

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Not surprisingly, telecoils and hearing loops are a primary assistive listening technology in the UK.

"Over the last 30 years induction loops/hearing loops have become the default assistive listening solution in Europe, Scandinavia and Australasia, and are now becoming increasingly prevalent in America."
Ampetronic

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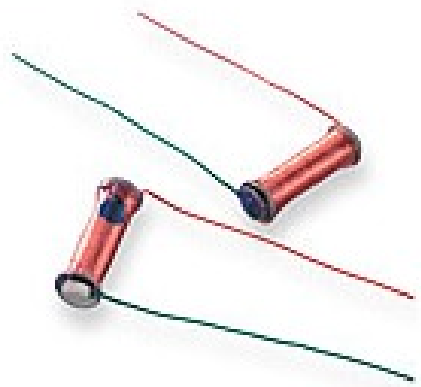
What's a Telecoil?



Telecoils are tiny copper receivers for sound transmitted as an electromagnetic signal.

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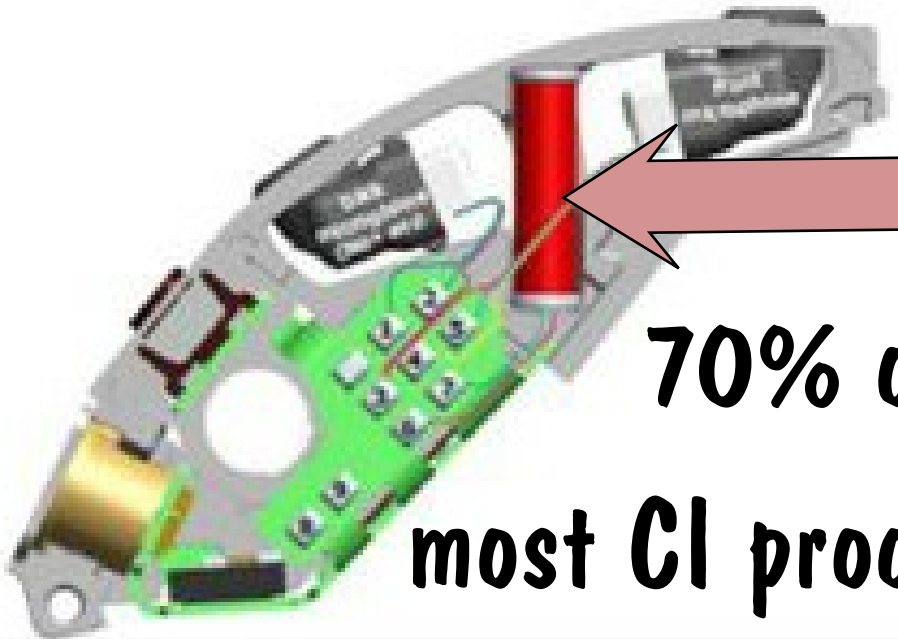
Telecoils in the UK



T-coil

70% of all HA models

most CI processors

95% of HAs in England

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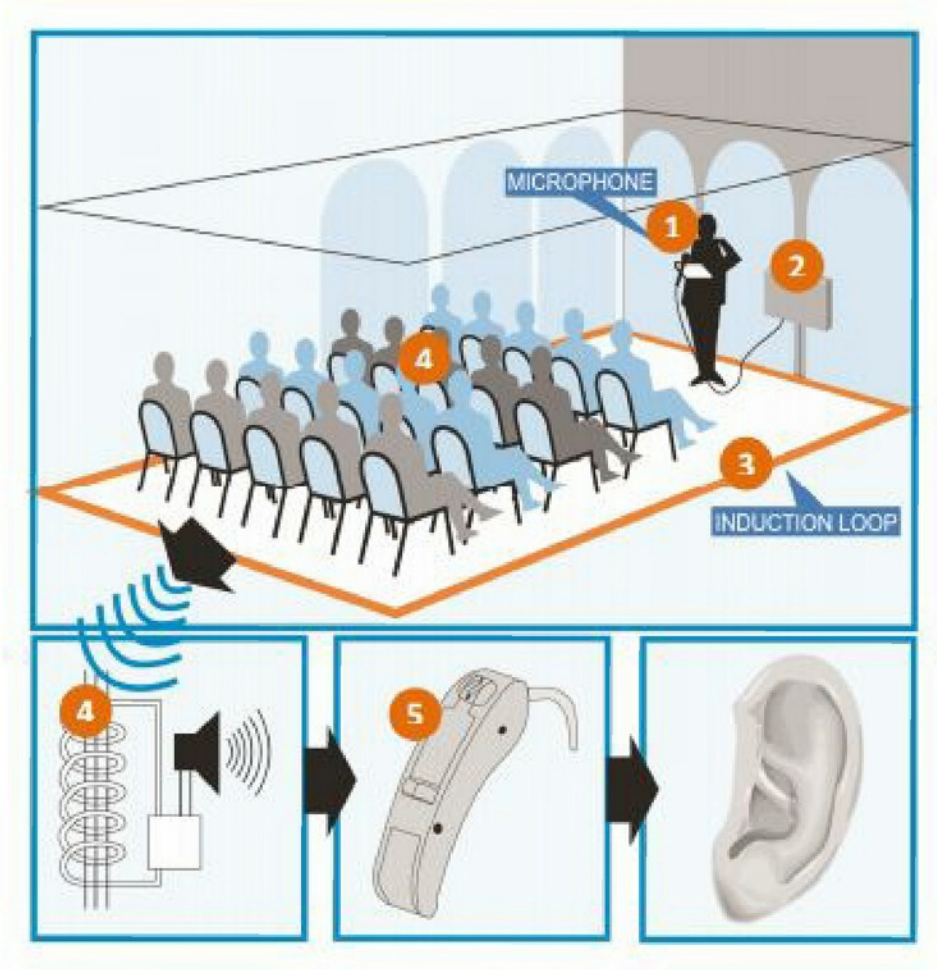
What's a Hearing Loop?



Perimeter Loop

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Why Not Bluetooth?

Does not serve 1 or 100

Why Not FM or IR?

- Must borrow a receiver and return it.
- May need to remove hearing aids to use earphones or ear buds.
- Sound not customized to match audiogram pattern

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Many types of loops

- ✓ Perimeter room loops
- ✓ Phased array loops
- ✓ Portable loops
- ✓ Neckloops
- ✓ More…

Let's look at some of them…

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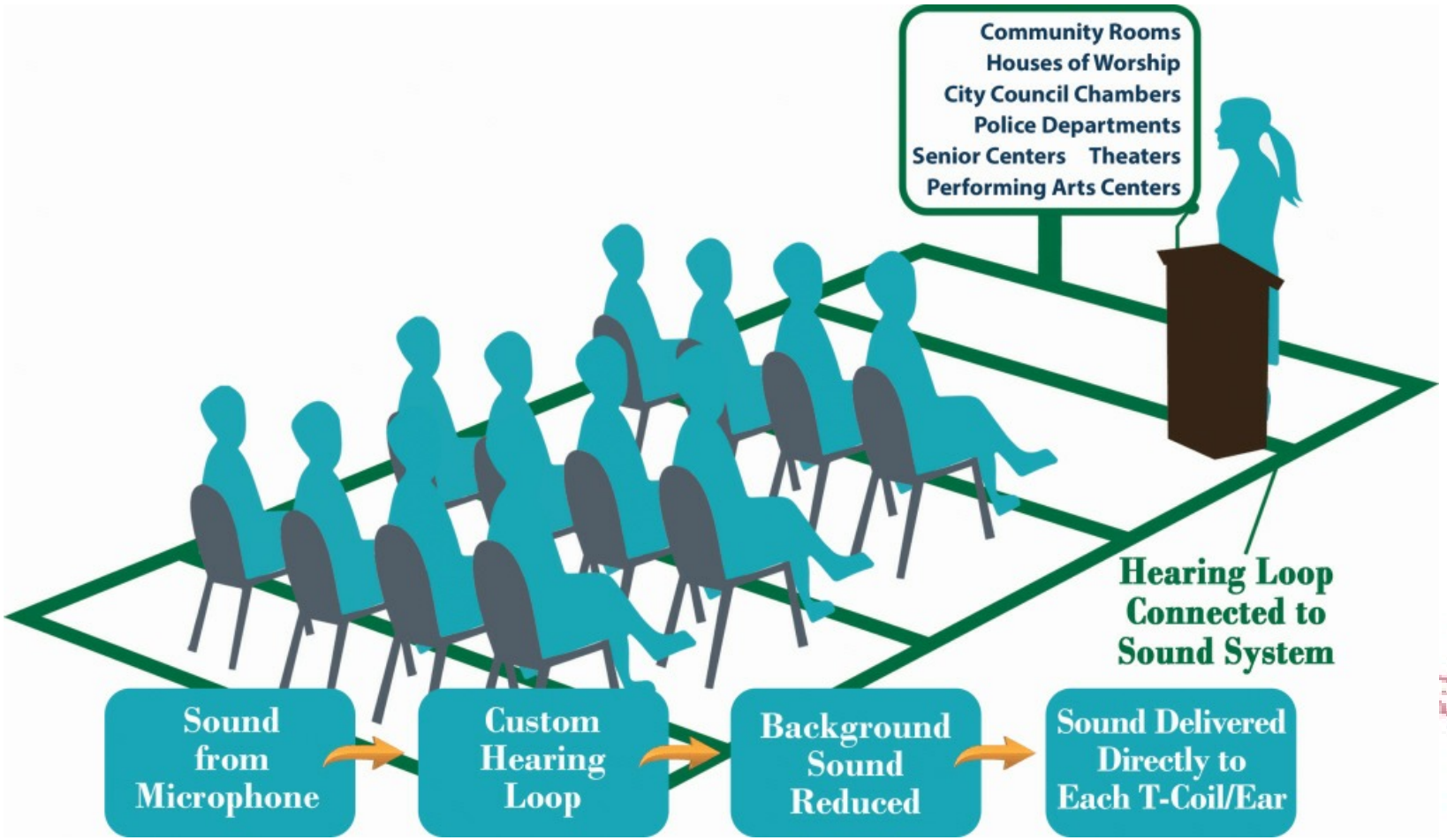
The Phased Array Loop



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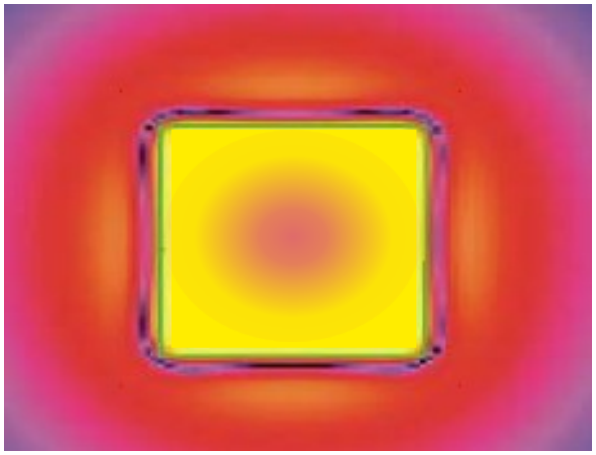
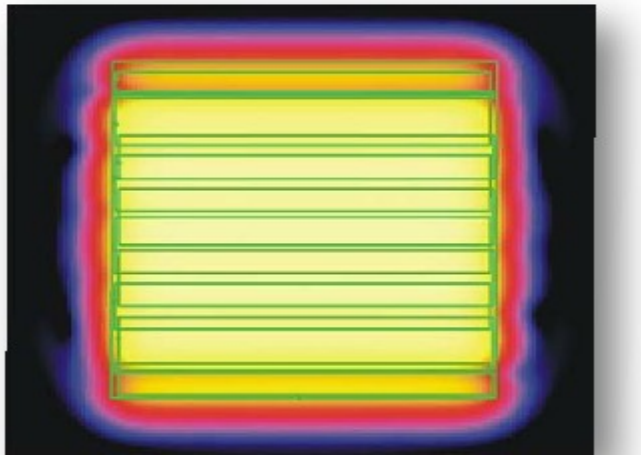
Benefits of a phased array



Perimeter loop has spillover and weak center.



Phased array contains signal and consistent strength.

Both must meet IEC 60118-4 standard.

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IEC 60118-4

International Electrotechnical Commission

This standard specifies requirements for the field strength of hearing loops for hearing aid purposes, which will give adequate signal-to-noise ratio without overloading the hearing aid. The standard also specifies the minimum frequency response requirements for acceptable intelligibility. Methods for measuring using a magnetic field strength meter are specified.

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Trained Installers

Questions to ask:

Where/how was installer trained?

What loop systems has he/she designed and installed?

Will installer provide Certificate of Conformity to IEC 60118-4?

See "Best practices" sheet at HLAA/GITHL

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What else is a Hearing Loop?

Counter Loop

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What else is a Hearing Loop?

Portable Loop

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What else is a Hearing Loop?

Window Intercom with built in loop

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What else is a Hearing Loop?

Loop Mat

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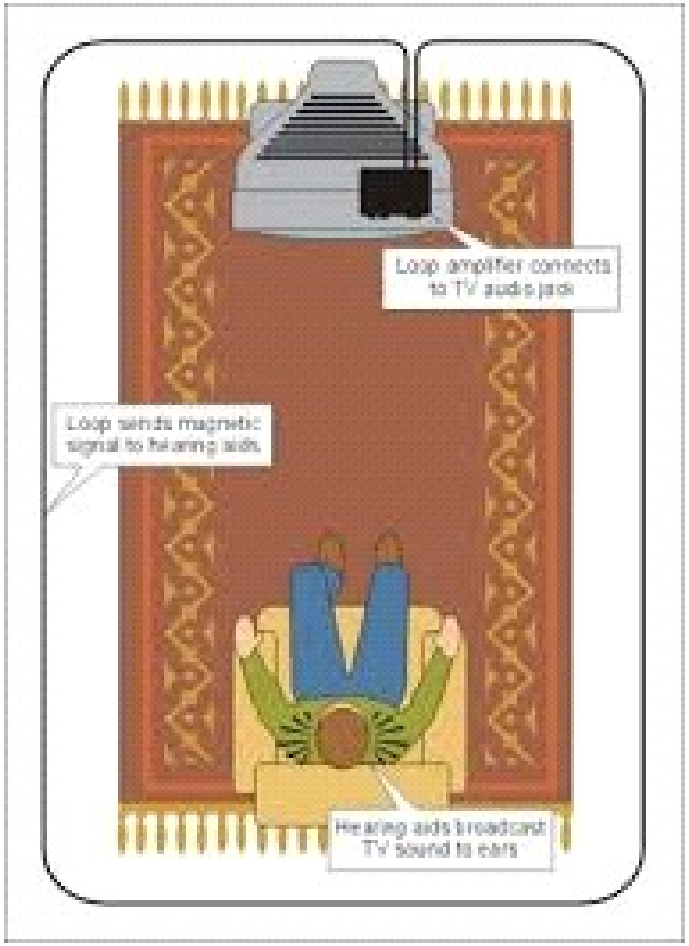
What else is a Hearing Loop?



Home TV Loop

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What else is a Hearing Loop?

Amplifier plugged into TV just like a room loop with a wire discreetly strung to TV viewing chair and hooked to loop pad that goes under the chair's cushion (can also be used under the mattress in a bed).

Chair Loop

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What else is a Hearing Loop?

Microphones

Looped card table

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What else is a Hearing Loop?

Looped clipboard

Think of it as a personal amplifier for use on the job…

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What else is a Hearing Loop?

Looped cars

Some people have actually had their car looped in order to hear conversations while traveling...

Tesla Model S

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What else is a Hearing Loop?

Amplified with microphone

Unamplified

Neck Loop

Think of it as a headset

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A few of the uses of the neckloop…

- ✓ Stereo and Surround Sound systems
- ✓ Computers or tablets
- ✓ Phones (Cell and home)
- ✓ MP3 Players
- ✓ On a TV equipped treadmill at the gym
- ✓ On your TV at home or while traveling

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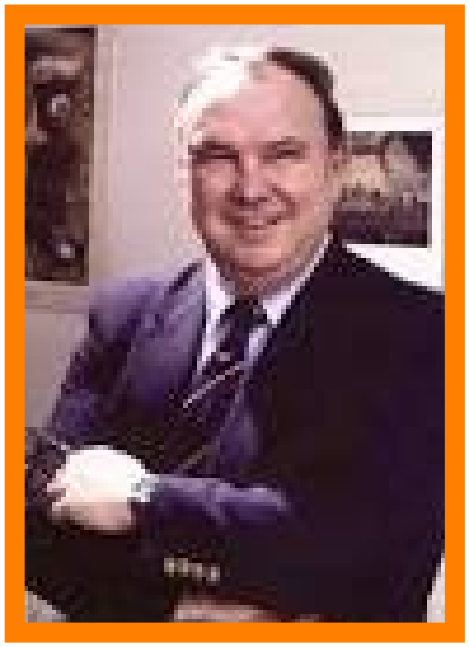
Loops in America-the beginning



Rocky Stone, retired CIA agent and founder of HLAA (then known as SHHH - Self Help for Hard of Hearing People) first introduced hearing loops to SHHH chapter leaders in the early 1980's.

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The beginning

The Albuquerque SHHH chapter acquired a a loop in the early 1990's and used it for well over a decade, setting it up and taking it down each month.

Christ United Methodist Church, looped shortly thereafter, was the only other known loop in operation in Abq. for many years.

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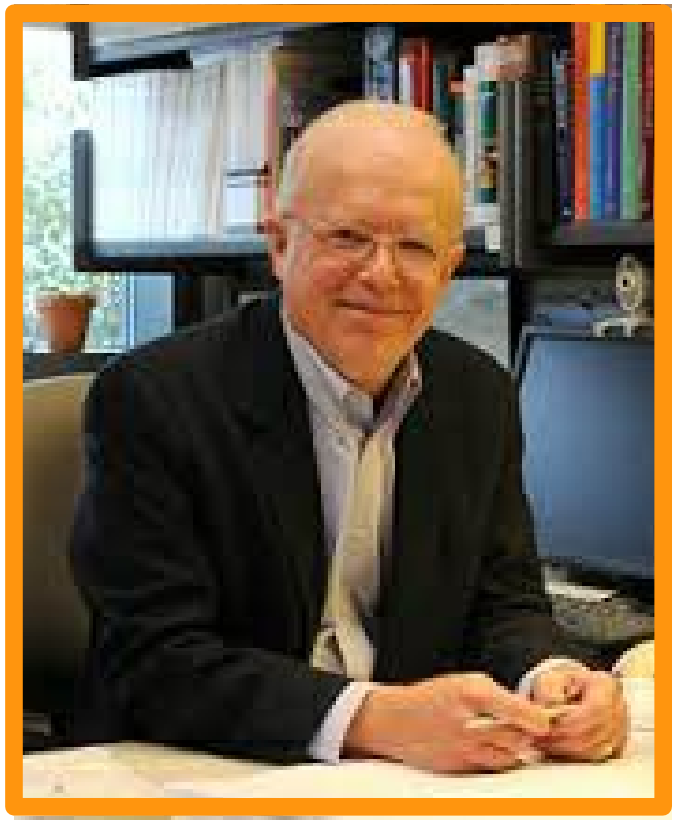
The beginning



Prof. David G. Myers

Professor of Psychology at
Hope College in Holland, Michigan.

Author of 17 books, including popular textbooks entitled *Psychology, Exploring Psychology, Social Psychology* and of books dealing with such issues as scientific psychology, Christian faith and hearing loss.

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Iona Abbey, Scotland

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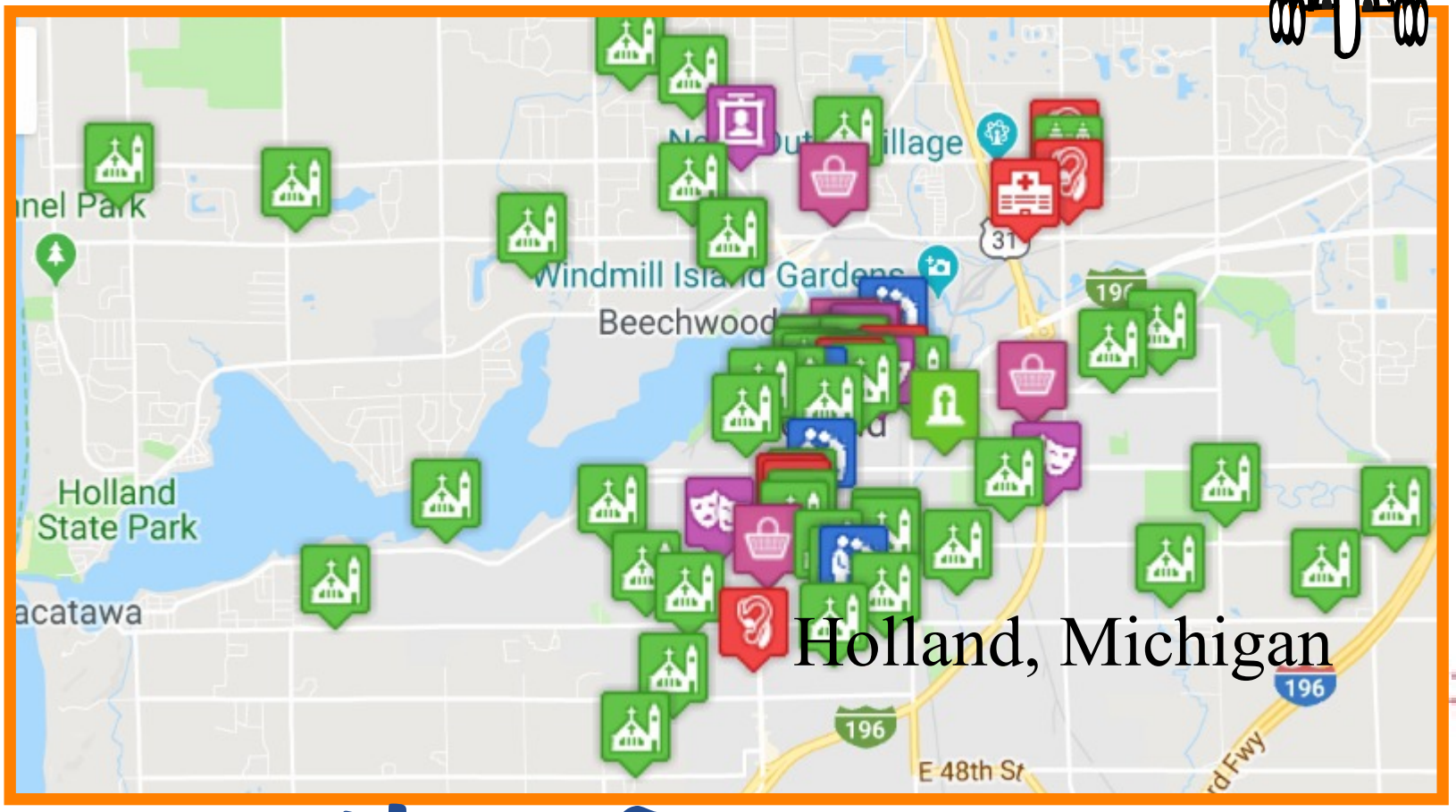
The looping of Michigan



Holland, Michigan

Now Over 900

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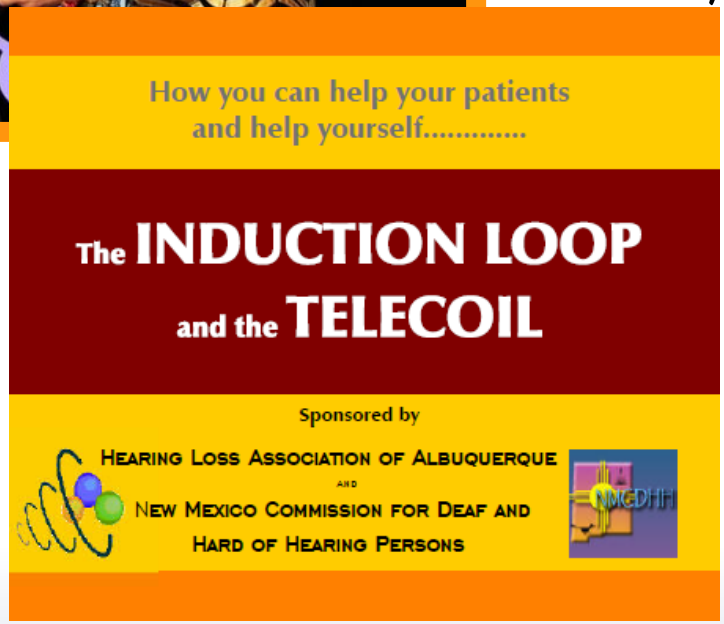
Loops in America-the beginning

Receiving award for community service from the Academy of Doctors of Audiology



Another Looping Pioneer

Dr. Bill Diles, Santa Rosa, CA bundles small home hearing loops with each pair of HAs sold. He has looped more than 3000 homes, dozens of churches, and 9 movie theaters.

In 2006 he presented at all day Loop NM loop/telecoil workshop for providers in the state at his own expense.

Was US distributor for Danish HA maker's Phonic Ear® Field Teleloop System

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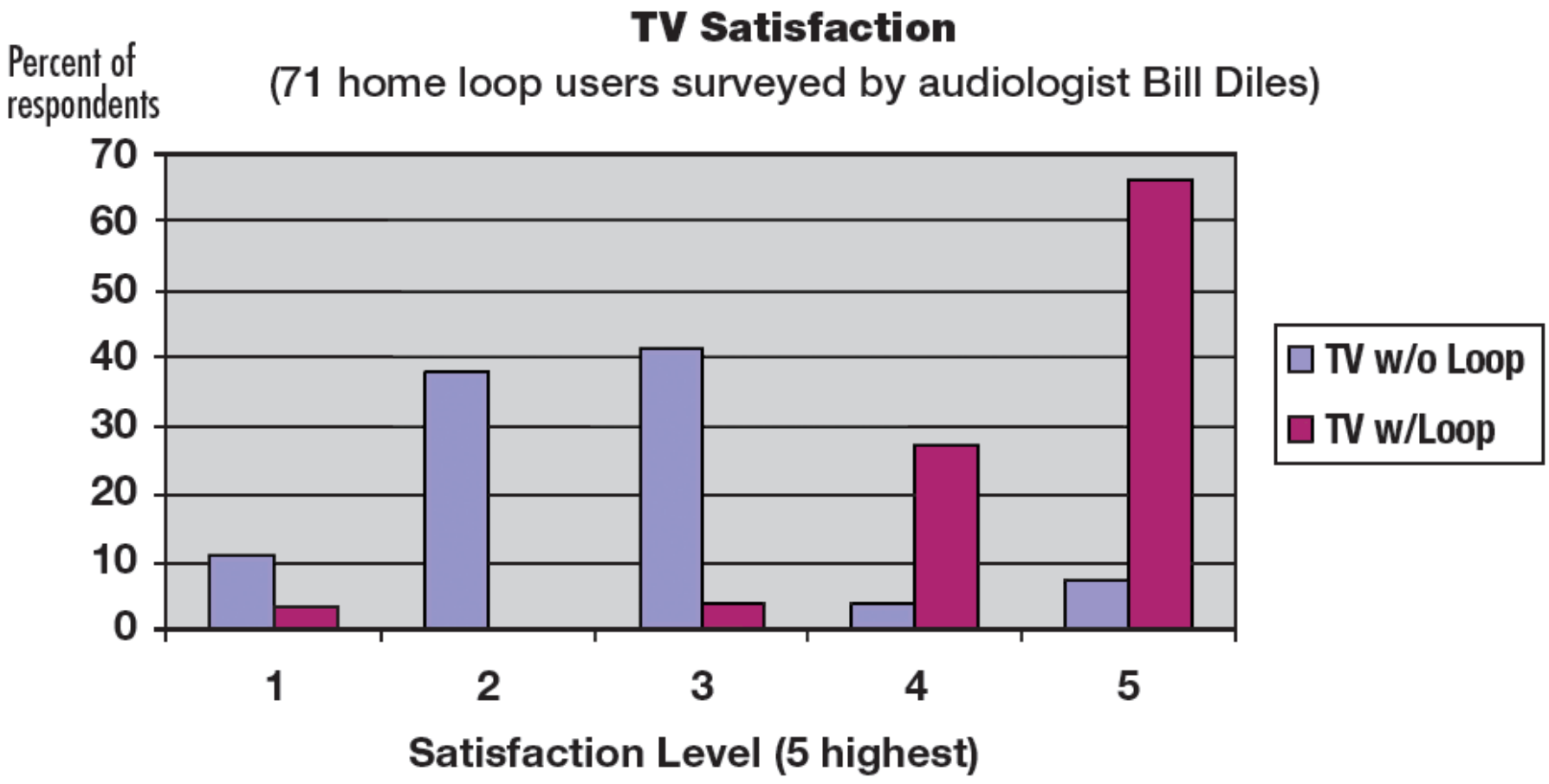
Diles' 2008 Client Satisfaction Survey as reported in Hearing Journal.



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Loop New Mexico Formed

An initiative of Albuquerque SHHH

Loop New Mexico
An initiative of the Hearing Loss Association of Albuquerque, NM
www.HLAAbq.com/LoopNM.html

Created 2005 by Jim Ogle
Los Alamos Engineer, HLAAbq member

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Let's Loop Tucson Formed

An initiative of the Adult Loss of Hearing Association that has, since then, become

Let's Loop Arizona

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Loop Wisconsin Formed

In 2008 Audiologist Juliette Sterkens attends hearing loss expo and hears Dr. Myers tell about the looping of Western Michigan.

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2010 -

A watershed year for looping

The ADA

The Americans with Disabilities Act

GITHL

Get In the Hearing Loop

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In 2010

- Assistive Listening Systems Required
- Hearing Aid Compatible Required
  (Defined as must work with telecoils)
- Neckloops Required
- Adequate Signage

HLAA Hearing Loss Association of America
GET IN THE HEARING LOOP

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In 2010

Get in the Hearing Loop

GET IN THE HEARING LOOP

Hearing Loss Association of America

Proud supporter of

Get in the Hearing Loop

A Joint Project of the Hearing Loss Association of America and the American Academy of Audiology

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In 2011

HLAA hosted 2nd International Looping Conference in Washington, DC

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In 2011

Looping campaigns started up all over the U.S.....

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Today

Over 3 dozen HLAA Chapter/State campaigns

Arizona
Delaware
California
Colorado
Florida

Michigan
New Mexico
New Jersey
New York
North Carolina

Oregon
Rhode Island
Washington
Wisconsin
Utah

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Today

Other Looping Campaigns

LOOP MINNESOTA

Let's Loop SANTA BARBARA

SERTOMA

Let's Loop Baltimore!

America's Hearing Land LOOP WISCONSIN

Let's Loop Orange Country The Hearing Well Club

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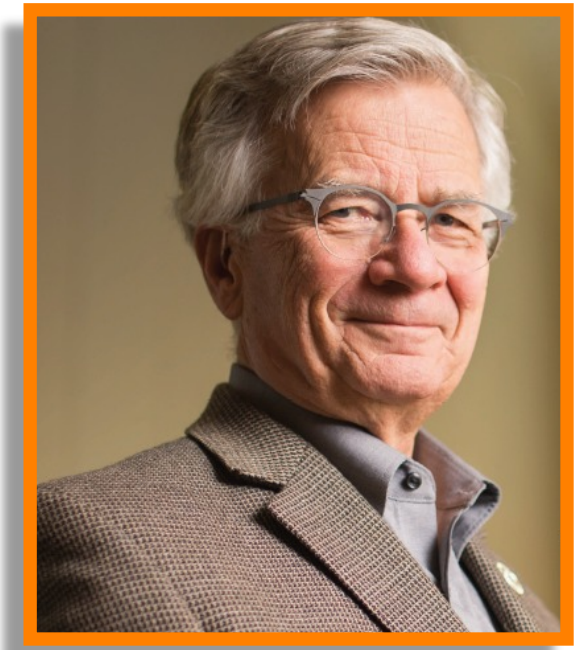
Today

Individual advocates



Dr. Richard Meidinger
Lawrence, KS

Prof.Carol Lomicky
Kearney, NE

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Hearing Care Providers

Arizona Hearing Specialists

KENWOOD HEARING CENTERS
Simply. Better. Hearing.

Lafayette Hearing Center
Audiology & Hearing Aids

Ko'olau Audiology & Hearing Aid Services
Your Goal Is Our Goal "Better Hearing"!

ALBUQUERQUE HEARING AND BALANCE

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State and city governments

9 states mandate telecoil counseling

plus efforts in CA, CO, IO, WI

NYC mandates loops in city buildings

Minnesota mandates loops in state buildings

Maryland and Indiana pending

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Where will you find loops?

Places of worship

Room Loops and Neckloops

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Where will you find loops?

Movie Theaters

REGAL ENTERTAINMENT GROUP

CINEMARK
CENTURY THEATRES. CineArts Tinseltown

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Where will you find loops?

Performance Spaces

Oshkosh Grand Opera House

Albuquerque Little Theater was the first of 6 local theaters to loop their auditorium

Van Wezel Auditorium Sarasota

HLAA has compiled of list of over 300 performing arts venues known to have loops and many more feature neckloops.

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Where will you find loops?

Offices and waiting rooms

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Where will you find loops?

Banks and retail stores

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Where will you find loops?

A growing number of drug and grocery stores

Wegmans

Wegmans Food Markets has begun installing induction hearing loop stations at pharmacy counters and check out lanes in all 88 of their stores in the Northeast.

Kinney DRUGS™ Experience the Difference

Each of the 101 Kinney Drug store locations have been equipment with a counter-top or point of service hearing loop and a specifically designed directional microphone that eliminates back ground noise.

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Where will you find loops?

Transportation hubs

Gerald Ford Airport

Union Station, Washington D.C.

Milwaukee Intermodal Station

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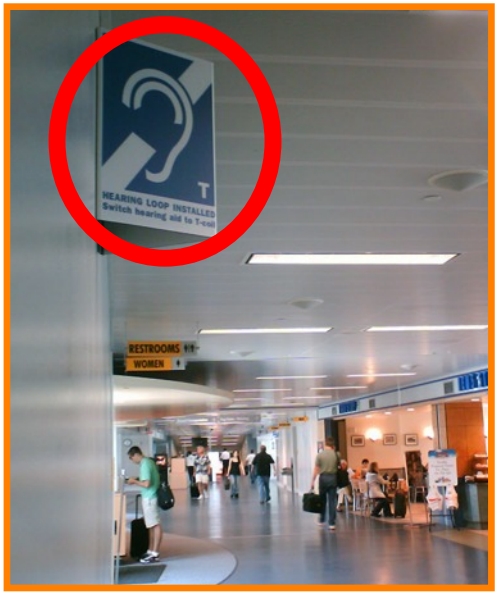
Where will you find loops?

Airports



A concourse at Gerald Ford airport, Grand Rapids,MI

Delta Airlines gate at Detroit Metropolitan Wayne County

Information counter at Hartsfield–Jackson Atlanta

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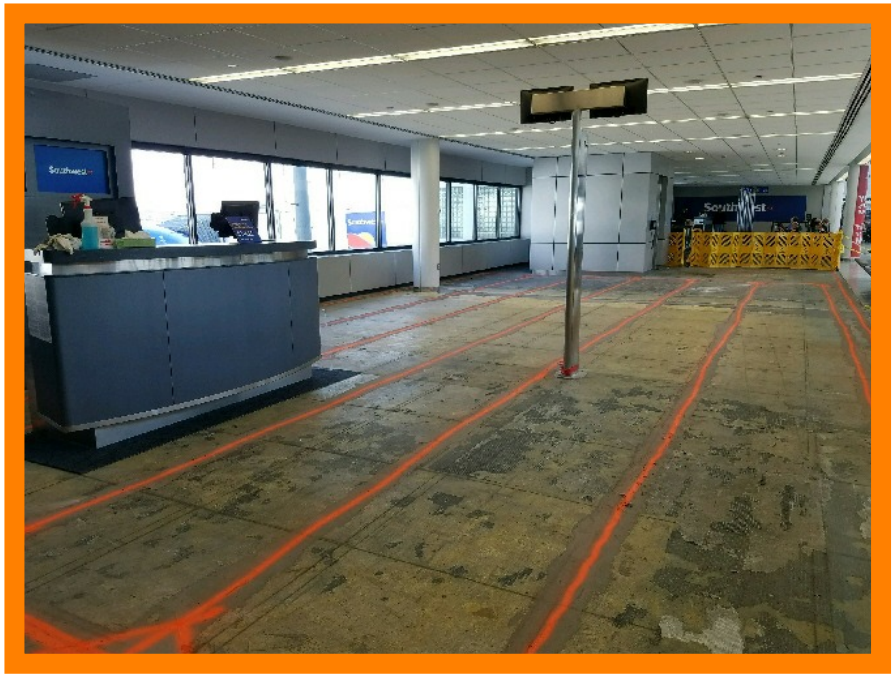
Where will you find loops?

Airports



This is a departure gate marked for the installation of a loop at the Rochester, NY airport.

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Where will you find loops?

Airports

This is a portable loop at a counter in the Seattle/Tacoma, WA airport.

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Where will you find loops?

Airports

Here's a counter loop built into the car rental counter at the Eugene, OR airport.

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20 US Airports

Atlanta, GA .

Austin , TX

Charlotte, NC

Detroit, MI

Eugene, OR

Ft. Wayne, IN

Grand Rapids, MI

Kalamazoo/Battle Creek, MI

Los Angeles, CA (LAX)

Memphis, TN

Minneapolis/St. Paul, MN

Muskegan, MI

New York City, NY (LaGuardia)

Oshkosh, WI

Phoenix, AZ

Rochester, NY

Sarasota/Bradenton, FL-

Seattle, WA

South Bend, IN

Syracuse, NY

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Where will you find loops?

Neckloops and airplanes

Virgin Atlantic now offers their international travel passengers a choice of ear buds or a NECKLOOP.

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Neckloops and airplanes

No need for bad sound from poor quality earbuds, your own neckloop will work on many airliners.

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Where will you find loops?

San Francisco BART

#1 of 45 possible looped stations

1,081 new train cars,

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Where will you find loops?

Unexpected places

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Where will you find loops?

Unexpected places

FIRST IN THE NATION

Breslin Center at Michigan State University

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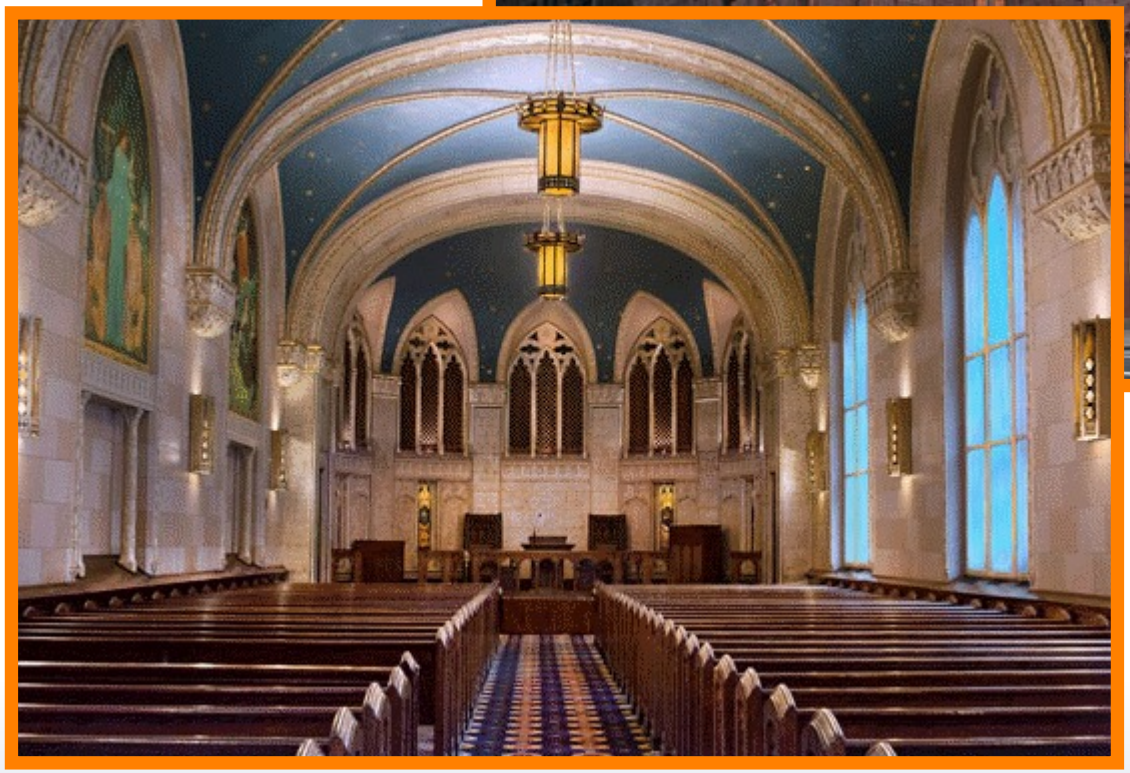
Where will you find loops?

Unexpected places



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New York City - In the loop

All new/renovated city financed assembly areas to be looped.

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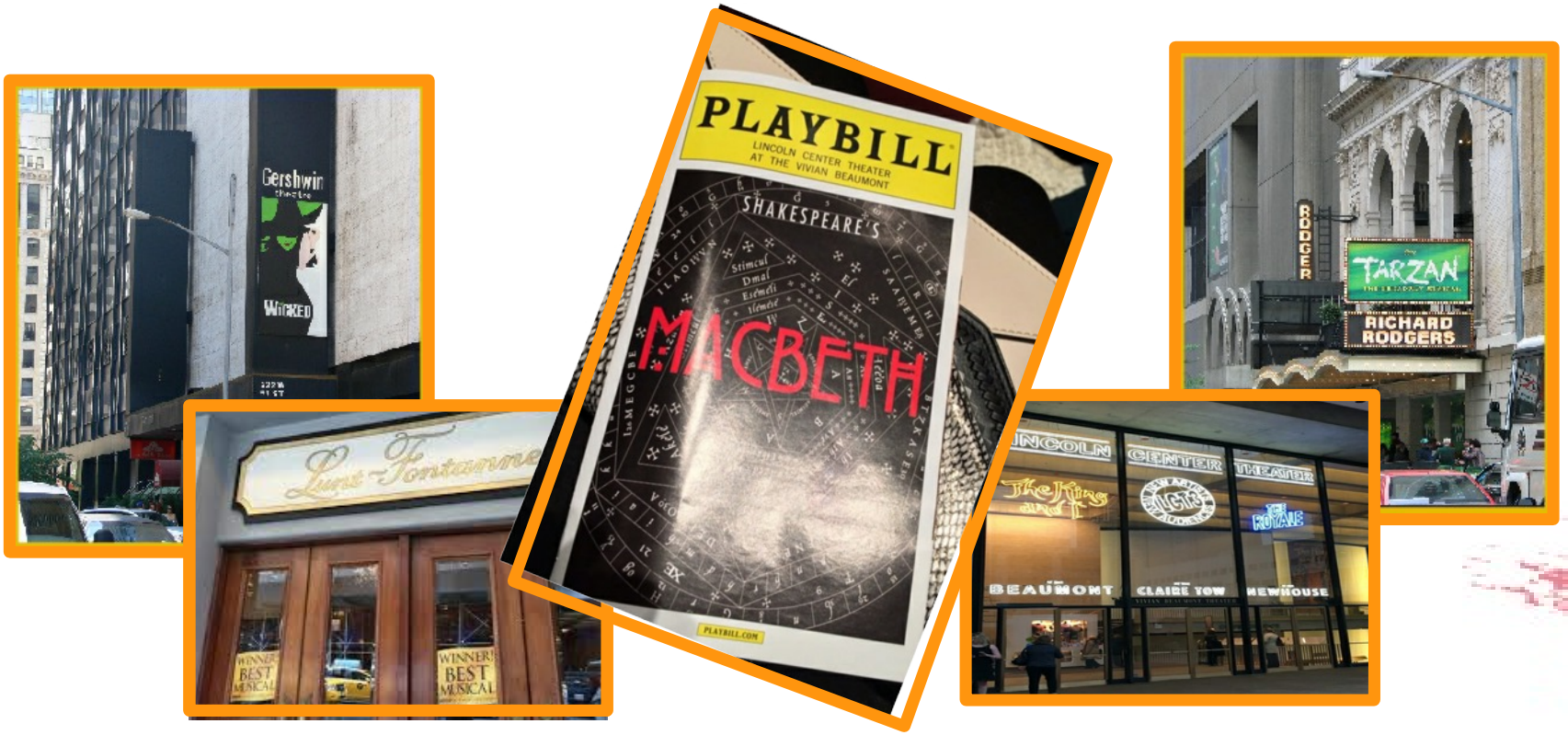
Broadway Theaters



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New York City Taxi Cabs

By law…all new NYC taxis must be hearing loop equipped like this "Taxi of Tomorrow".

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Grand Central Station - NYC

With help from the NYC Human Rights Commission loops have been installed at some ticket windows.

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Lincoln Center
for the Performing Arts

Mitzi Newhouse and Vivian Beaumont Theaters

Geffen Hall (Avery Fischer hall) promises loops as part of current complete renovation.

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Madison Square Garden

Hearing loops are installed at the box office and guest services.

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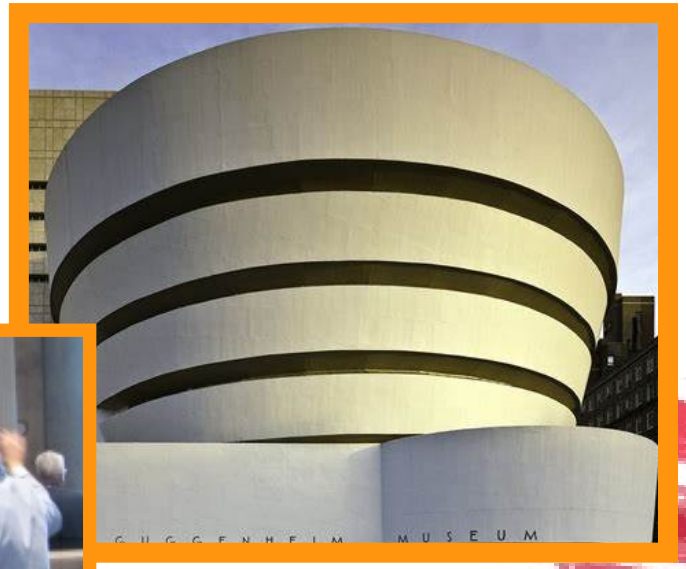
Other New York City looped venues

Penn Station information booth

Bronx Botanical Gardens

Metropolitan Museum



Guggenheim Museum

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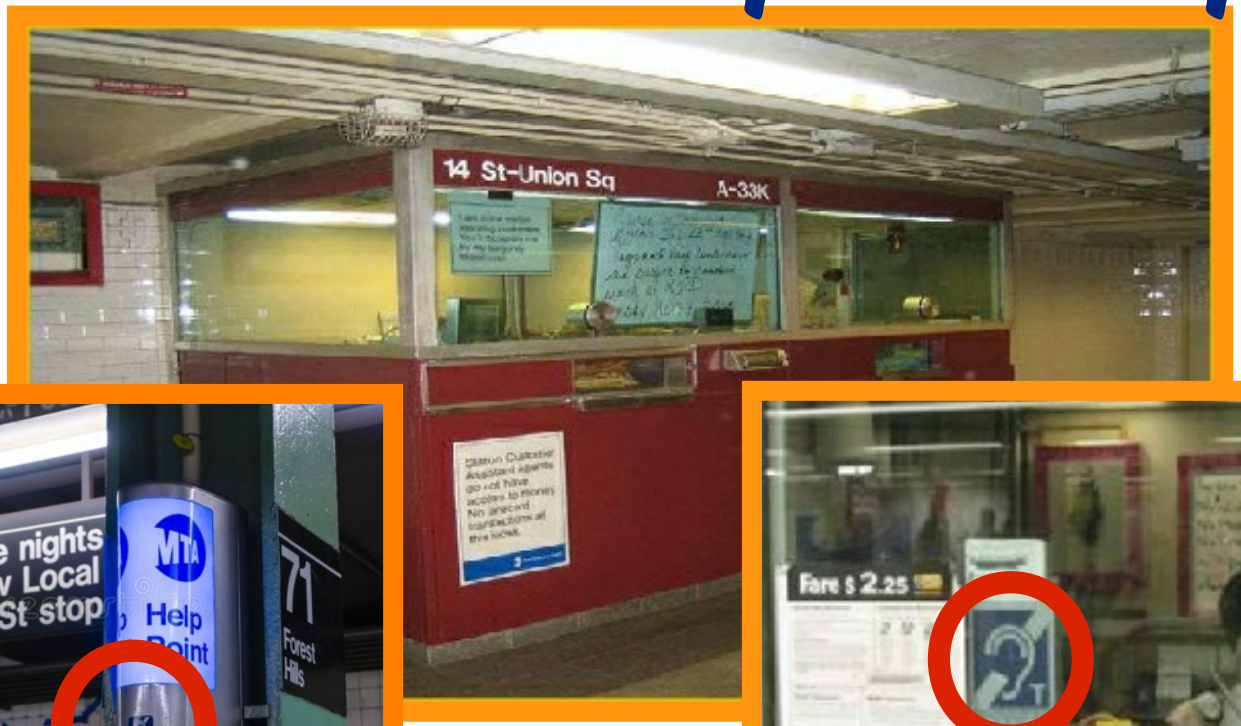
New York City subway



Over 600 NYC subway fair/information booths looped, emergency help point on platform.

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New York City MTA

1000 looped subway cars

Testing on buses

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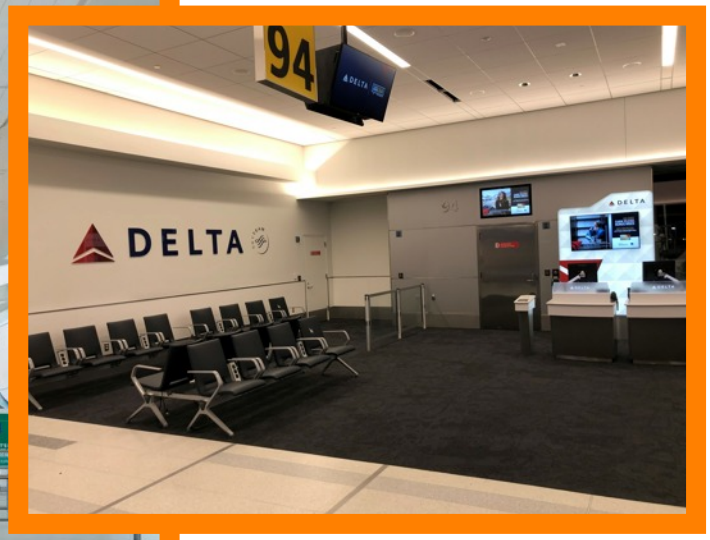
LaGuardia Airport
New Delta Airlines Terminal

All gates looped



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PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

NEW Accessibility Requirements

All new or significantly renovated airport terminals must have hearing loops at departure gates and at information counters.

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Information counters at all bus, train and ferry terminals

PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

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Amtrak

83 "trainsets" (500 cars) on order with option for 800 more cars - all with loops

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More examples of hearing loops in transportation

Seattle city bus terminal information counter.

Entire fleet of Indian Trails buses looped.

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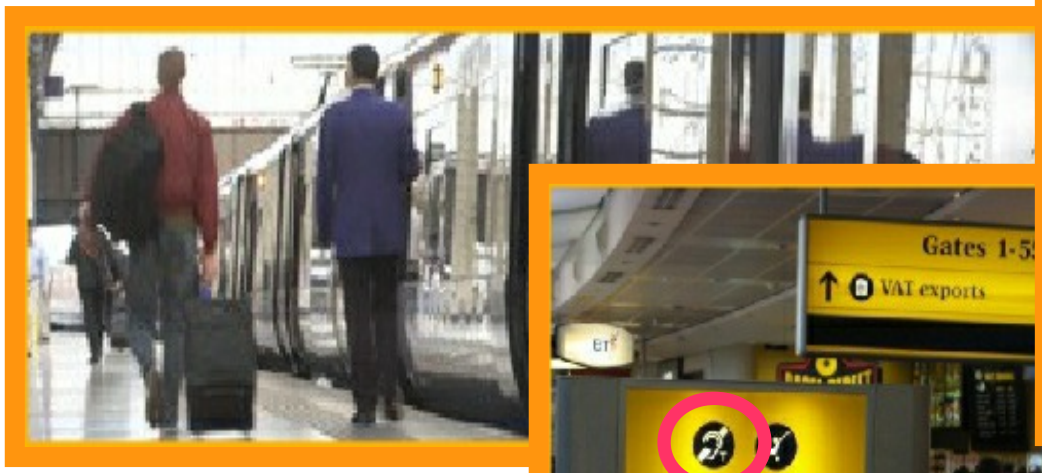
Loops abroad…

Loop technology in England



Heathrow Express Sign: "For users of hearing aids, we've fitted our on board PA system with an induction loop."

Heathrow waiting area

Newcastle airport in England

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Loops abroad...

Train travel in England

Looped waiting room in a London suburban station

Loop on train platform

Looped emergency help point in parking

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Loops abroad...

Looped buses in England

London Metroline buses with hearing loop and text to speech digital signage technology.

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Loops abroad…

Looped taxicabs in England

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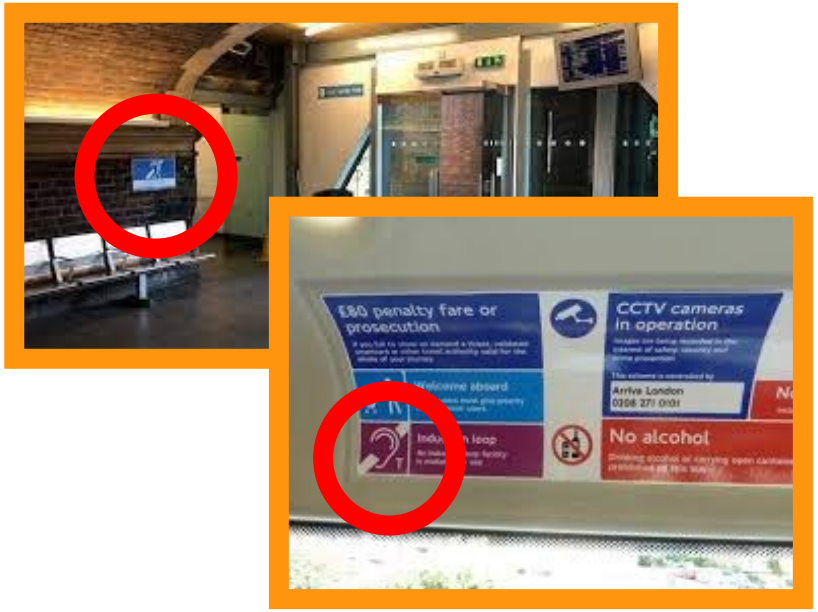
Loops abroad...

The London Underground



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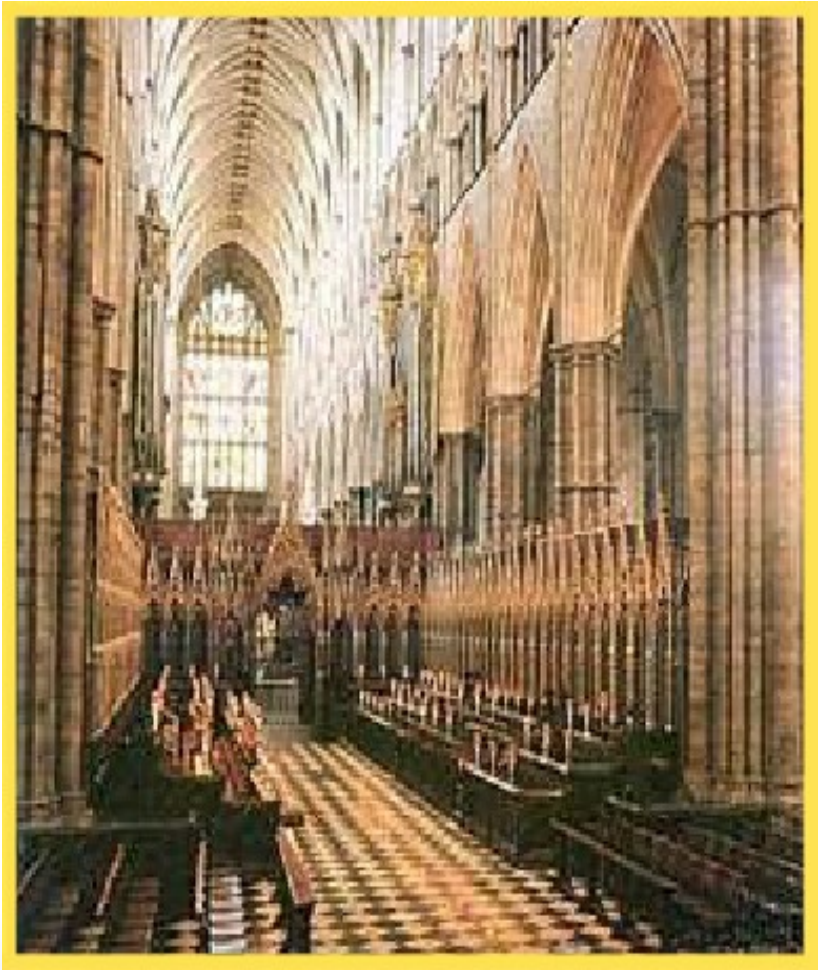
Loops abroad…

Westminster Abbey



~The very first sentence in the program for the 50th anniversary celebration of Queen Elizabeth's coronation in 2003~

The whole of the church is served by a hearing loop. Users should turn their hearing aid to the setting marked T."

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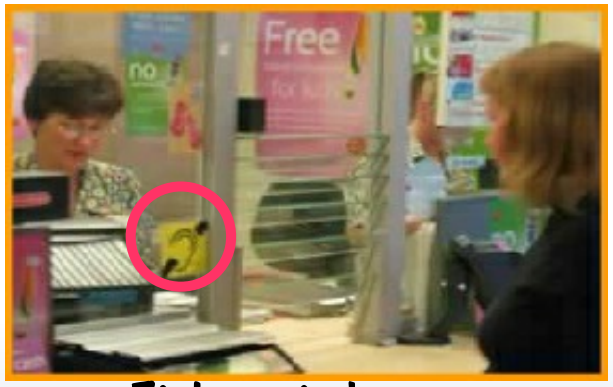
Loops abroad...

Loop technology in England

Canterbury Cathedral

Bank teller



Ticket window

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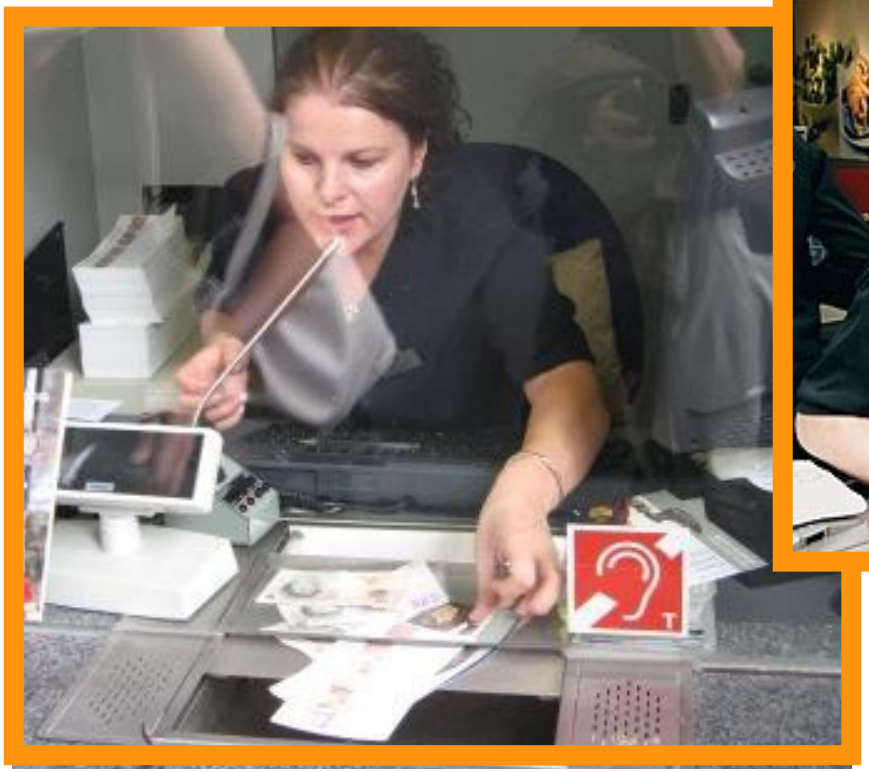
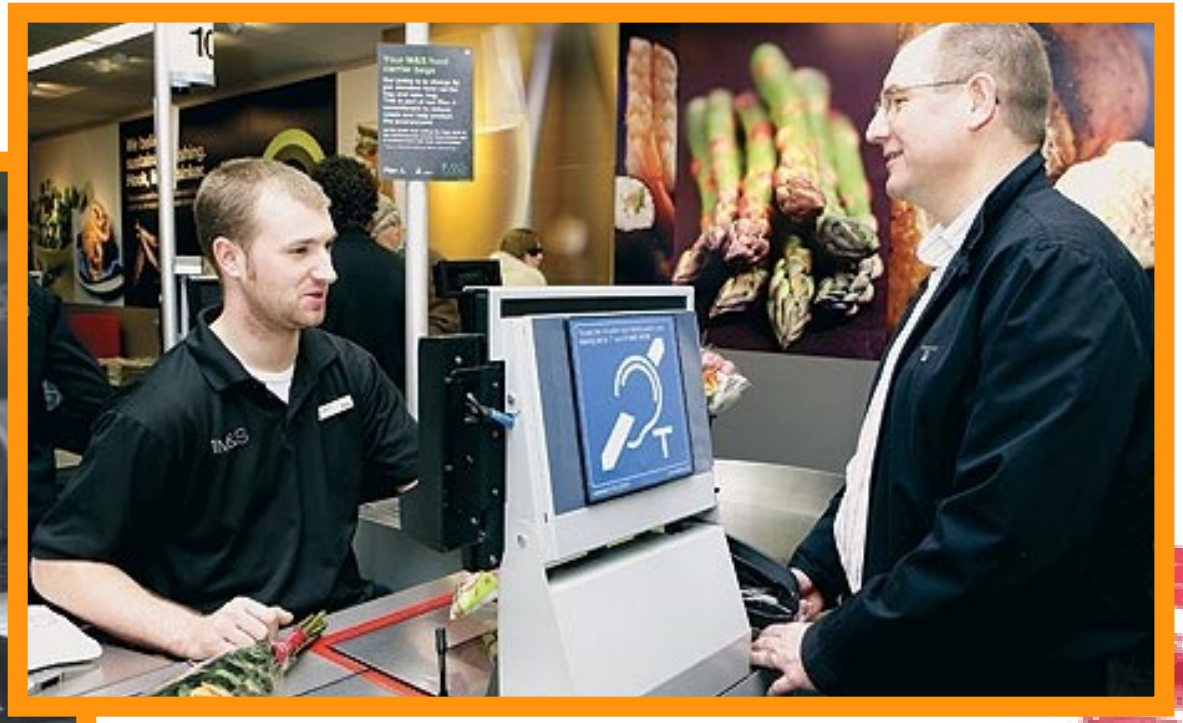
Loops abroad...

Loop technology in England



Ticket window at the Tower of London



Hearing loop at Marks & Spencer - it reads, "To use the induction loop facility, switch your heaing aid to "T" and stand here."

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Loops abroad…

Unusual loop installations in the UK

The Lord Nelson

Iona Abbey, Scotland

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Loops abroad…

Loop technology in France

The Louvre

Notre Dame

Les Eyzies

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Loops abroad…

Loop technology in Germany and Austria

Der Kölner Dom, Cologne

The Danube boat tours

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Loops abroad… Foreign airports

Domodedovo airport, Moscow

Stockholm-Arlanda Airport

Suvarnabhumi Airport, Bangkok

Christchurch, New Zealand Airport

Dublin airport in Ireland

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Loops abroad… Foreign airports

Incheon Airport, Seoul, South Korea

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Loops abroad…

Loop technology in Australia

All major airports feature hearing loop technology

Melbourne train platforms

Sydney commuter trains were recently looped.

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Loops abroad...

Loop technology in Australia

Sydney Opera House

Sydney Observatory

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Loops abroad…

Loop technology in Australia

Bus stop totem with route schedule plus announcements via loudspeaker and hearing loop.

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Loops abroad…

Loop technology in Australia

A sampling of other installations

- Australian Taxation Offices – various sites
- Melbourne Cricket Ground (Melbourne)
- Brisbane City Council Town Hall (Brisbane)
- La Trobe University – Bendigo Campus, Victoria
- Cochlear Global Headquarters (Sydney)

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How can you find loops when you're traveling?

www.time2loopamerica.com/loop-locator/

www.aldlocator.com

Europe:

www.letshear.ihlma.org/

GOOGLE ???

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Where will you find

INFORMATION AND ADVOCACY MATERIAL FOR LOOPS?

www.hearingloss.org/programs-events/get-hearing-loop/

GET IN THE HEARING LOOP

Hearing Loss Association of America

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MORE RESOURCES FOR INFORMATION

www.hearingloop.org

www.sofnabq.com

www.loopnm.com

www.ampetronic.com

www.contactainc.com

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In case you thought I was never going to stop...

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Time's up... thanks for attending this presentation on hearing loops.

Unanswered Questions?

Send them to me at:

CCAnm@juno.com

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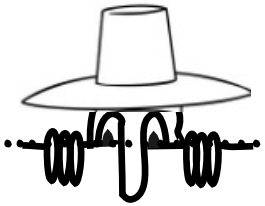
KILROY WAS HERE.....



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