

WHITE PAPER

2ND INTERNATIONAL HEARING LOOP CONFERENCE
JUNE 18-20, 2011
CRYSTAL CITY AT REAGAN NATIONAL AIRPORT



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**2nd International Hearing Loop Conference
June 18-20, 2011
Crystal City at Reagan National Airport
Brenda Battat, Executive Director, HLAA**

Foreword

While attending the First International Hearing Loop Conference in Winterthur, in 2009, a lovely town just outside Zurich in Switzerland, I decided that if there were to be a second conference it was going to be in the United States; and the Hearing Loss Association of America was the logical organization to host it.

My other conviction was that we had to get the audiology profession on board otherwise we would not achieve our goal of expanding the use of telecoils and hearing loops. Timing and opportunity were on our side. The president-elect of the American Academy of Audiology (Academy) happened to be Patricia Kricos, Ph.D., a strong advocate of telecoils and looping. She also is someone who truly understands consumer issues. Dr. Kricos agreed to make this her platform for her tenure as president. Thus, “Get in the Hearing Loop” became a combined project of HLAA and the Academy.

We were both further motivated by the gracious and persistent advocacy of Dr. David Myers, a professor of psychology at Hope College in Holland, Michigan, who was converted to hearing loops after his experience using them in Europe. His personal goal was and is to “Loop America.”

HLAA constituents are avid users of technology of all kinds and especially telecoils. In 2007, an HLAA survey showed that 80 percent of HLAA members stated that they have telecoils in their hearing aids, which was considerably more than the national average of 33 percent at that time. For years HLAA has advocated for hearing aid compatibility with phones – the ability to use phones together with a hearing aid or cochlear implant without the need for attachments or other devices. Extending that philosophy to assistive listening systems was a natural and another reason for us to spread the word about hearing loop technology as it is an example of hearing aid compatible assistive listening systems.

A maxim of our organization is that we don’t do anything unless we can guarantee full hearing access: no video on our website is allowed without captions, all our convention events are fully accessible through captioning, assistive listening systems and interpreting; and our monthly webinars are captioned.

We carry full communication access through in our national office where 30 percent of our employees have hearing loss. Many of our volunteers also have hearing loss, and according to the HLAA bylaws, two-thirds of the national Board of Trustees must have a hearing loss. Our conference room has a hearing loop installed for board and staff meetings. Employees and volunteers are provided with whatever type of telephone they need to work productively and we arrange for teleconference meetings to be captioned. For safety we have visual fire alarms installed in our office suite. Many of our chapters have portable hearing loops or meet in facilities with rooms with

installed loops to ensure that attendees at their monthly meetings can understand the speakers.

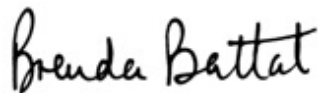
Assistive technology and telecoils are in our members' DNA. We know the benefits first hand and want that to be imparted to other hearing aid and cochlear implant users. However, there are issues such as programming and orientation of telecoils and installation and standards of hearing loops. That is why the conference was so valuable to raise these issues and make recommendations for future improvements.

Our goal was to make the conference truly international to share experiences and learn from one another – especially from those in Europe where hearing loops are more prevalent than here in the United States. To make it easier for people to travel to the conference from afar, we kept it affordable. That was made possible by a generous grant from the David and Carol Myers Foundation and The Richard and Helen DeVos Foundation. We were delighted to have representation finally from eleven countries and exceeded our prediction of the number of attendees by more than 100.

Another goal was to have high-quality presentations by experts in the field from all over the world. To capture this for those unable to attend we videotaped the sessions that are now available for all to see on our website, www.hearingloss.org. During the coffee breaks, conference attendees were able to browse the seven companies that exhibited their products and services.

The conference was rounded out with some fun events – the award-winning comedy troupe, *The Capitol Steps*, a Washington tradition, performed at the opening welcome banquet – looped of course, and captioned so that everyone could get the punch lines. There was also a Spirit of Washington cruise on the Potomac River to give our international and out-of-town attendees a view of how beautiful Washington and its illuminated monuments look at night from the water. For those who came early to take advantage of the overlap of the Loop Conference with the annual HAAA Convention there was a memorable performance of *Wicked* at the Kennedy Center for the Performing Arts that was fitted with a hearing loop and Infrared systems, captioning, and sign language interpretation.

Thanks to the companies that looped the facilities as in-kind donations, to the presenters who took time to make this a truly outstanding conference, to all the attendees who came from near and far and to the family foundations who sponsored the conference and enabled it to happen.



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**2nd International Hearing Loop Conference
Crystal City, Virginia ♦ June 18-20, 2011
Dana Mulvany, MSW, Consultant**

Introduction

The 2nd International Hearing Loop Conference was co-hosted by the Hearing Loss Association of America (HLAA) and the American Academy of Audiology (Academy) in Crystal City, Virginia, from June 18 through June 20, 2011.

The conference was a culmination of the year-long “Get in the Hearing Loop” campaign spearheaded by HLAA and the Academy. The event offered an international, highly public platform “to enlighten and excite consumers, as well as audiologists and other professionals who dispense hearing aids or provide services to individuals with cochlear implants, about telecoils and hearing loops and their unique benefits.”¹

The conference was noteworthy in many ways:

- The first joint conference co-hosted by a national organization of consumers with hearing loss and a national organization of audiologists
- A comprehensive overview of systemic issues affecting the status quo of hearing loops (audio induction loop systems, or audio-frequency induction loop systems)
- In-depth information about telecoils, magnetic interference (aka EMI), and audio
- Free online resources, including captioned videos of many sessions along with synchronized presentations
- The first international loop conference to provide CEUs from the American Speech-Language-Hearing Association (ASHA) and the Academy for audiologists
- Held in conjunction with the HLAA Convention, which tapped into a large base of HLAA attendees and also attracted more international attendees
- Sound files were used in several presentations to illustrate the acoustic effects of interference, noise, good and poor audio practices, and the international standard for loop systems

This white paper was commissioned to communicate how the educational program for the conference was developed, to provide an overview of the educational sessions, and to communicate recommendations for the future.

¹ Program Guide, 2nd International Hearing Loop Conference, pg. 3

Methodology

The following actions were taken in preparation for developing the program and recruiting speakers:

- HLAA publicized the Call for Papers through www.hearingloss.org, *Hearing Loss Magazine*, and email alerts.
- The consultant hired to develop the program emailed English-speaking attendees from the first international conference and solicited their feedback about the first conference and recommendations for the second conference. The input received provided valuable direction for the conference.
- The consultant reviewed available information about the first conference, including CART files, and sought out additional information about telecoils and loop systems
- A letter was developed for and signed by HLAA and the Academy which was sent to hearing aid manufacturers to invite them to participate in the conference and the telecoil panel
- The HLAA executive director directly invited several experts to speak at the conference
- The International Federation of Hard of Hearing People (IFHOH) and the European Federation of Hard of Hearing People (EFHOH) cooperated in publicizing the loop conference to encourage international attendees to submit proposals for the conference
- After receiving proposals for workshops in early December 2010, the consultant and the HLAA executive director decided to recruit and develop additional sessions and panels with the following goals in mind:
 - ♦ Broader international representation
 - ♦ Follow-through on promised topics
 - ♦ Education about problem areas, such as magnetic interference (aka EMI) and audio
 - ♦ How to provide effective communication access for all people with hearing loss
 - ♦ Representation and involvement of different stakeholder groups
 - ♦ Developing and improving strategic efforts for improvement
 - ♦ Recommended experts

The program for the conference was developed in a sequential order to strengthen the audience's understanding of basic issues, thereby laying the foundation to understand more advanced topics. Early presentations sequentially covered the user perspective, effective communication access, loop systems, and how to provide good audio for people with hearing loss. Misconceptions about magnetic interference were also deliberately addressed early to help minimize their effects as soon as possible.

One track (T1) focused on the technical aspects of hearing loop systems while another track (T2) provided workshops of particular interest for consumer advocates and audiologists. After the entire audience had the opportunity to learn fundamental information about loop systems, the second day provided an overview of system issues, including technology, advocacy issues, and successful strategies for improving the status quo of loop systems. The conference concluded with a panel of organizational leaders who discussed recommendations for future actions.

All speakers were asked to provide complete presentation files before the conference, available at www.hearingloss.org. Computer Assisted Real-Time Transcription (CART) and hearing loops were provided for all sessions.

Overview of Educational Sessions

Sunday, June 19th

- In the introductory breakfast session, **“Getting into the Hearing Loop,”** psychologist [David Myers](#), Ph.D., (U.S.) addressed why hearing loops are a particularly effective assistive listening system for people with hearing aids. Hard of hearing himself, Myers described the welcoming effect of experiencing many looped places in England, beginning with Heathrow Airport and including the London Underground, Westminster Abbey, and London taxis. Myers pointed out the following user-friendly features of hearing loops over other current assistive listening systems: simplicity, immediacy, invisibility, power-effectiveness, and universality. He saw the ultimate aim being not to promote loop systems per se but directly hearing-aid-compatible (DHAC) assistive listening. He then described successful efforts to promote looping locally and in the United States via the “Let’s Loop America” initiative.
- To teach loop installers and proponents how to facilitate effective communication access, Matthew Bakke, Ph.D., (U.S.) discussed numerous, practical recommendations for **“Providing Effective Communication Access.”** Bakke revealed that current requirements by the Americans with Disabilities Act for a minimum signal-to-noise ratio (SNR) of 18 dB and a speech transmission index of 0.84 had been based on what was a minimally acceptable SNR for 75 percent of participating subjects with hearing loss. He clarified that the highest possible SNR with a comfortable sound pressure level should be the goal. Identified were these future research needs: listener acceptability of signals in noise in various conditions (speech babble, HVAC, traffic, etc.); listener acceptability of signals with different levels of background music or sound tracks; listener acceptability of various levels of reverberation; and, ratings of signals with systematically varied dynamic ranges.

- **“Understanding and Addressing Causes of Environmental Interference with Telecoils”** addressed misconceptions about magnetic interference (EMI) which cause many people to underestimate the value and usefulness of telecoils. Speakers [Doug Edworthy](#) (U.K.) and [Richard McKinley](#) (U.S.) explained common sources of interference, including ground loops, and how to identify and troubleshoot them. Frequent sources of EMI are lighting dimmers, cathode ray tube (CRT) televisions or monitors, fluorescent (strip) lighting, and improperly installed alternating current (AC) power cabling, AC power transformers, electric motors, and electric heating systems. Several real-life cases of magnetic interference were presented along with solutions. McKinley pointed out that poor wiring practices often cause interference but can often be detected by loop receivers. Edworthy recommended that building codes require inspectors to check for ground loops. The international standard for audio frequency induction loop systems, IEC 60118-4 (2006), recommends an A-weighted noise level of -47 dB L or better for optimal audio; magnetic noise at -32 dB L and worse needs a listening assessment to gauge acceptability. The standard does not permit magnetic noise at a level of -22 dB L or higher.²
- For **“Hearing Loops: The Basics”** (T1), [Ken Hollands](#), (U.K.), and [Andy Jankowski](#) (U.S.) provided an overview of how hearing loops work and how to install simple perimeter loops, including guidance about when more advanced loop configurations would be needed instead. Illustrated simulations of spill fields for six different loop configurations helped demonstrate when the configurations would be used for different environments. Specific instructions were given for how to connect a loop system to a television, including how to connect an audio digital-to-analog converter for a digital TV without an analog audio output.
- The **“Telecoil Panel”** (T2) highlighted the importance of the telecoil for use with loop systems:
 - ♦ Research audiologist [Linda Kozma-Spytek](#) (U.S.) provided an overview of the telecoil, showing how the frequency response of the telecoil interacts with the frequency response of loop systems, and emphasized the need to quantify objectively the real-ear performance of the hearing aid in telecoil mode when coupled with a standard inductive source.
 - ♦ Representatives of hearing aid companies then spoke about the telecoils in their companies’ hearing aids. Oticon and Starkey representatives said the telecoils could be

² http://www.hearingloss.org/sites/default/files/docs/3_DE_Environmental_Interference.pdf (slide #30)

programmed for use with loop systems upon request (as opposed to use with telephones).

- [Doug Beck](#), Au.D., of Oticon stated that the vertically-oriented telecoils in the Oticon Agil hearing aid can be programmed to provide a higher frequency response up to 5,000 Hz.
 - [Jason Galster](#), Ph.D., of Starkey discussed Starkey’s research on telecoils and commented that several years ago a hearing aid requirement was established for all Starkey products to have a telecoil. Starkey is now looking at maximizing telecoil performance by moving telecoils into external devices. Pictures of the frequency response for the Starkey telecoil showed a potential low frequency response more robust than that shown for other hearing aids (which tend to roll off the low frequencies to minimize magnetic noise).
 - Widex audiologist [Daniel Tibbs](#), Au.D., spoke of the separate gain available to program the sensitivity of Widex telecoils (useful for decreasing pickup of environmental interference (EMI), and discussed the integrated telecoil in the Widex M-Dex wireless multi-function device, useful for hearing aids too small to include a telecoil.
 - [Conny Andersson](#) (Sweden), chair of the International Electrotechnical Committee (IEC) on audio frequency induction loop systems, concluded with recommendations for hearing aid manufacturers to:
 1. Set telecoils to work with IEC standard 60118-4 so that switching between the telecoil and the microphone will provide the same output level as for a 70 dB SPL acoustic signal and for a standards-compliant hearing loop;
 2. Increase the low frequency response for the telecoil;
 3. Develop a “hum harmonics remover” to filter out the harmonics of the magnetic noise caused by environmental magnetic interference.
 4. Develop several channels for loop systems and telecoils to provide the option of stereo and more flexibility in dealing with spillover and electromagnetic interference concerns.
- Two free PowerPoint resources developed specifically for the conference were showcased during the conference’s only lunch session. [Conny Andersson](#) showed a PowerPoint presentation which acoustically demonstrated specific levels of compliance with IEC 60118-4 requirements. Many attendees were able to hear for the first time how these specific objective levels of compliance would affect sound quality for loop users. Afterwards,

[Dana Mulvany](#) showed another PowerPoint presentation with pictures of hearing loop installations around the world which can be used as a presentation or slideshow. She discussed how the presentation can be adapted by adding photos of local or regional places with hearing loops and updating information about each loop.

- Retired broadcaster and broadcast engineer [Mike Langner](#) (U.S.) gave a truly multimedia performance: **“Providing Great Sound for People Who Are Hard of Hearing: Optimizing the Audio for Assistive Listening Technology and Loudspeakers.”** In addition to explaining different types of microphones and showing their pickup patterns, Langner played sound recordings of good and poor audio, teaching the audience how to understand and recognize the impact of different kinds of audio processing and microphone techniques upon the quality of the audio. To educate the audience about the minimum signal-to-noise ratio (SNR) required by the current U.S. ADAAG, Langner also played numerous sound files showing the effect of an 18 dB SNR with different kinds of background noise. (The multimedia PowerPoint presentation available online has video and sound files embedded within it, useful for listeners to play as often as needed to improve their ability to recognize causes of poor audio.)
- The **“Dispensing Professionals Panel”** (T2) described how dispensing professionals can help their clients get “into the hearing loop.” Moderator [Patricia Kricos](#), Ph.D., (U.S.) then president of the American Academy of Audiology, was joined by Irish audiologist and consumer advocate [Emma McAuley](#), and [Juliëtte Sterkens](#), Au.D., from the United States. McAuley described how as an audiologist working at DeafHear.ie in Ireland, she takes a consumer-centered approach assessing and addressing the needs of the client, providing affordable hearing aids, and helping the client to use telecoils successfully with assistive listening technology. Sterkens provided valuable insights about and practical suggestions for optimal programming of the telecoil for use with loop systems. Kricos described the “Get in the Hearing Loop” Task Force and gave an overview of the extensive and varied materials it had developed to help dispensing professionals and consumers understand more about telecoils and loop systems.
- [Doug Edworthy](#) led the **“Beyond the Basics: Complex and Creative Loops and Other Issues”** (T1) session with his discussion of his survey of the London Underground. Commissioned to evaluate levels of magnetic interference and the effect of metal in order to find out whether loop installations were possible, he was able to make recommendations for effective placements of loops and minimization of interference; the London Underground administration subsequently installed loops and wrote a manual of good practice for

designing and installing loop systems. [Todd Billin](#), (U.S.), followed with a pictorial overview and discussion of the largest known looped fixed seating installation in the United States with 12,200 seats in the mezzanine and main arena levels of the Breslin Center of Michigan State University, East Lansing. Next, creative loop installations and applications were the subject of [Richard McKinley](#)'s presentation, including hidden installations in non-traditional places like buses, kiosks, tennis courts and online monitoring of multiple loop installations. [Paul Ingebrigtsen](#), (U.S.), concluded with "Integrating Loop Technology with FM or Infrared Assistive Listening Systems," addressing performance standards for receivers, neck loops and silhouettes to ensure effective use by telecoil users. He discussed practical issues and recommendations when using loop systems in conjunction with IR or FM systems.

- An extended "**Questions and Answers (Advanced Issues)**" period was held for one-half hour to allow people to ask additional questions about loop systems and get answers to unanswered ones from earlier in the day. In addition to the speakers for the session above, [Matthew Bakke](#) and [Mike Langner](#) also participated on the panel.
- To help more people work with facilities to improve the quality of installed loops, [Conny Andersson](#) and [Ken Hollands](#) developed "**A Systematic Approach to Evaluating and/or Validating Loop Systems**" (T1) to train non-technical consumer advocates how to formally evaluate the performance of a loop system. Trainees evaluated five different small loop installations with varying levels of performance, using checklists and loop receivers with field strength level indication provided by Ampetronic and Bo Edin/Univox. This training was repeated the next day for a different group of attendees. Each training session was limited to 25 pre-registered attendees.

Monday, June 20th

- "**The Technology Landscape for Loop Systems: Current and Future.**" To continue addressing the needs of people with hearing loss well, loop proponents need to be knowledgeable about relevant current and future hearing assistive technology.
 - ♦ [Jason Galster](#), Ph.D., began this session analyzing present and future wireless technology for hearing aids: the telecoil, Bluetooth, near field magnetic induction, and 900 MHz and 2.4 GHz radio. Although he concluded that the non-telecoil wireless technologies offer improved sound quality and improved consistency of connectivity, they lack standardization, and Galster, therefore, determined that the universality of telecoils makes them "the only standard option for wireless audio transmission to hearing aids," stating, "Telecoil is 'our' future."

- ♦ [Dana Mulvany](#) followed with an overview of how other hearing assistive technology can have an impact on loop systems, and vice versa. She encouraged the audience to focus on the higher goal of providing functionally equivalent communication access for people with various levels of hearing loss and/or disabilities, though the current legal standard in the United States is effective communication access. Hearing loops may often be required by law to be supplemented with visual communication access such as CART or captioning. Advocates can strengthen the case for loop systems by explaining how induction technology helps provide functionally equivalent communication access for telecoil users. To preserve the future of loop systems, loop proponents would do well to ensure that both induction technology and other hearing assistive technology, including personal assistive listening technology, can co-exist together as needed for effective communication access.

- **Industry Panel (T1).** Representatives of established loop manufacturers [Ampetronic](#) (U.K.), [Univox/Bo Edin](#) (Sweden), and [Oval Window Audio](#) (U.S.) gave sequential overviews of the history of their companies, the product design philosophy, services, new products, future technology, and their product line.

- **Consumer Advocacy Around the World: Status of Hearing Loop Installations in Different Countries (T2).** Because national consumer organizations for people with hearing loss play a critical role in advocating for the needs of consumers, representatives of these organizations were asked to give updates about hearing loops in their country:
 - ♦ [Knut Ellingsen](#), Norwegian Association of the Hard of Hearing (HLF), described the recently formed consulting company, “Universal Utforming” (Universal Design), created by three Norwegian consumer organizations for different disability groups, including HLF. Universal Utforming provides consulting and project management services to help make buildings accessible, and was created after the enactment of a law that requires planning for all ages and disabilities.
 - ♦ [Emma McAuley](#), representing the Irish Hard of Hearing Association (IHHA) and DeafHear.ie, described how a survey conducted by the IHHA found that most installed loops were not working or were not working properly. This survey appeared to be useful for the revision in 2010 of Building Code M, Ireland’s accessibility regulations for buildings.
 - ♦ [John Woodgate](#), (U.K.), speaking on behalf of the newly renamed Action on Hearing Loss (formerly known as RNID), briefly discussed the Equality Act of 2010 and an RNID survey of loop systems which found that only 14 percent of 1,500 facilities had loop systems

that were properly sign-posted and were working satisfactorily. A similar RNID survey done in 1985 had led to the first British Standard Code of Practice for loop systems in 1993; the Code will be revised again this year.

- ♦ [Siegfried Karg](#), Pro Audio (Switzerland), spoke of his organization's effort to improve the quality of loops through an online tracking system of loop installations. It subsequently developed a training program to certify induction loop measuring technicians. Karg emphasized that quality control is essential to ensure excellent speech intelligibility and inclusion of people with hearing loss.
- ♦ [Brenda Battat](#), executive director of the Hearing Loss Association of America, described how the first hearing loop conference had prompted her to realize the core need to involve audiologists in educating their patients about telecoils so that they could use loops. She and Patricia Kricos, Ph.D., president of the American Academy of Audiology (Academy), formed a joint national educational initiative, "Get in the Hearing Loop," which produced educational materials as well as this conference. HLAA and Sertoma (Hearing Charities of America) also a partner in the campaign, encouraged community outreach by their chapters to local businesses. Battat stressed the business imperative and quoted the chair of the downtown Sarasota Alliance, a business group in Florida: "If you need more business, the loop offers an affordable opportunity to reach a big part of the market you are probably missing. The loop system is highly effective, low cost and virtually maintenance free, so the payback is extremely attractive."
- **Strategies for Success: Leveraging Change (T2).** This panel discussed strategic or systemic efforts at a regional or national level to improve the status quo of loop systems.
 - ♦ [Emma McAuley](#) described an overall "path to success" for consumer organizations which obtains evidence based on survey, research, and/or individual service user feedback, makes a case for change, attempts to create or modify legislation, and if successful, then implements and monitors the legislation. She pointed out specific changes in the Building Regulations 2010, Technical Guidance Document M, which addressed problems documented by the earlier survey, such as lack of staff training, provided improved guidance for hearing access, and/or specifically mentioned hearing loops.
 - ♦ [John Woodgate](#), a member of the British Standards committee for loop systems, gave an overview of BS7594, the British Standards Code of Practice for Audio Frequency Induction Loop Systems, which specifies technical performance standards for loop systems and comprehensive guidance to owners and operators of loop systems. He

recommended that advocates obtain their own copy and support training of loop installers and electricians in both BS7594 and IEC 60118-4 (2006).

- ♦ To assist advocates in better understanding how to work on regulations to address magnetic interference caused by poor wiring, Woodgate also provided a short presentation on how to minimize magnetic emissions from power wiring
- ♦ [Doug Edworthy](#) discussed two one-day training courses on loop systems developed by the Institute of Sound and Communications Engineers (ISCE), with one being on the design and installation of loops, and the other on measurement. Both use competence assessment and provide certification. He found that audio professionals understand the need to take them, but it would also be beneficial if architects and electrical contractors would also take them.
- **Closing Session.** Key leaders were invited to participate on this panel to share their thoughts about recommendations for future action with respect to telecoils, hearing loops, and directly hearing-aid-compatible (DHAC) assistive listening technology. Moderator [Dana Mulvany](#) pointed out that the IFHOH World Congress in 2012 would be an opportunity to involve more people from other countries in looping efforts.
 - ♦ [Conny Andersson](#) reiterated his recommendation that hearing aid manufacturers digitally filter out magnetic noise and develop three channels for telecoils, using one standard channel and two coded channels.
 - ♦ [David Myers](#), Ph.D., suggested that states be encouraged to require the installation of DHAC assistive listening technology in new buildings. Also, that the Americans with Disabilities Act (ADA) requirements for neck loop-equipped receivers be relaxed, and that advocates look for ways to work with national media to publicize loops more.
 - ♦ [Patricia Kricos](#), Ph.D., proposed an international or national telecoils and loops association, which could centralize all looping initiatives on a single website and track loops by location and category. In addition, she saw a need to train more audiologists to get involved with induction technology, to continue encouraging state associations of consumers and audiologists to collaborate with each other, and to ask agencies like the National Institute on Deafness and Other Communication Disorders (NIDCD) for high-level research on hearing loops and telecoils.
 - ♦ [Brenda Battat](#) thought IFHOH is best positioned to help coordinate information on loops from member countries, and agreed with Kricos that state consumer organizations and audiology associations should collaborate together. She added that there needed to be more sharing of information about local and state looping initiatives, and vigilance

about making sure that hearing aid and cochlear implant manufacturers continue to provide telecoils. The Ida Institute should be encouraged to incorporate loops in their program.

- ♦ [Ruth Warick](#), Ph.D., stated that IFHOH was prepared to commit resources to disseminate information. She saw a need for loop proponents to work together to share best practices and to aim to have all hearing loops evaluated and to share the results. IFHOH can set up commissions, including one on looping issues. IFHOH has biannual meetings, which could be coordinated with a loop conference. Knut Ellingsen, chair of the World Congress in 2012, had agreed to entertain proposals about loop systems. She thought a policy paper on hearing accessibility would need to be re-evaluated and that IFHOH could work with the U.N. Convention on the Rights of Persons with Disabilities with respect to hearing access. After the conference, Warick stated: “IFHOH can pledge to provide information about hearing loops in its Journal, on its website and to include it in its Congress held every four years.... We are also hosting our first Asian forum in November 2011 in Bangkok and it would be timely to include in the agenda. Further to this we look forward to working with those involved in this initiative to continue the momentum from the Hearing Loops 2011 conference.”
- ♦ [Steven Murphy](#) (U.S.), executive director of Sertoma, spoke of the need to educate the professional community of audiologists about loop systems and to find people to work together on a grass roots level. During some Sertoma looping campaigns, critical statements from some audiologists about telecoils and loop systems being “old” technology had caused volunteers to be “unwilling to take a hit again,” thereby ending their campaigns. If he had confidence there was positive support from professionals in the community, he thought he would be able to find one to two million volunteers from other service organizations to work on loop campaigns.
- ♦ Battat asked for input from the audience about whether another loop conference would be desirable in two years. Audience members concurred, expressing appreciation for the conference. Marcel Bobeldijk, president of EFHOH, urged that he be contacted when there were ideas about the conference, inferring that the EFHOH would be willing to help with the conference planning.

Recommendations for the Future

Hearing loops can provide universal, virtually immediate, stress-free, and high-quality communication access for telecoil users. However, as Siegfried Karg stated in his presentation, “quality control is essential to ensure excellent speech intelligibility and inclusion of people with hearing loss.” In several European countries, surveys of hearing loops have shown that most

were non-operational or otherwise unsatisfactory. In the United States and many other countries, the lack of guidance or of a code of practice for programming telecoils has resulted in many people with hearing aids experiencing uneven results with hearing loops or not having telecoils activated within the hearing aid.

For people with hearing loss to receive reliable communication access from hearing loops, many system issues need to be optimized: the design and orientation of telecoils in hearing aids and cochlear implant processors; dispensing practices for telecoil; how loop installers are trained; how loop systems are installed and maintained; the management of magnetic interference; how audio is delivered to the loop system; television compatibility issues; and others.

As advocates for people with hearing loss, the national, regional, continental and international consumer organizations for people with hearing loss are encouraged to lead the way in addressing these system issues in order for their constituents to function as well as possible. However, they need access to accurate, up-to-date, and understandable information and to a synergistic, consultative team process to enable them to address these issues as well as possible. It is recommended that each consumer organization assemble a multi-disciplinary team of relevant experts, organizational leaders, knowledgeable consumer advocates, and other stakeholders to help determine how best to address the system issues at the level of the consumer organization and with the available resources at that level.

At an international level, there is a need for coordination and dissemination of relevant, in-depth information, best practice guidelines and other recommendations, and loop-related resources which would be useful worldwide. IFHOH could host or link to a website containing this information. Member consumer organizations that have developed loop-related programs would ideally share information online about these programs, particularly those using online resources, so that fellow consumer organizations can build upon their work. An IFHOH committee might evaluate similar programs, such as online tracking programs, to explore whether it is possible and advisable to develop an online tracking system that can be used by all countries. If successful, IFHOH could then encourage all its member organizations to use this system; the national organizations would then communicate to local affiliates how to implement the tracking program on a local level. (The actual data about the local loop installations would be managed by the local or national consumer organization; the operator of the international website would merely provide links to the national organizations.)

With IFHOH's ability to set up committees, we recommend that IFHOH form a committee to explore how best to use IFHOH's resources on behalf of telecoils, hearing loops, hearing-aid-compatible assistive listening technology, and possibly the status quo of hearing assistive technology in general. For example, ideally, each national consumer organization would be asked to provide information about loop installations, accessibility laws, other loop-related

resources and updates, and other information about communication access in a systematic way on a dedicated web page on their own website. The IFHOH committee might recommend a template to follow so that the IFHOH website could link intelligently to the information on each member organization's website.

At local or regional levels, it would be helpful for consumer organizations to set up web pages with information about loops in the area and related information, such as loop infrastructure programs, and to communicate these web pages and other looping activities to the national consumer organization.

Additional specific recommendations for the future are provided in [Appendix B](#).

Hearing loop proponents are urged to prioritize working on system issues affecting the performance of telecoils and loop systems so that people with hearing loss can reliably obtain the best communication access possible through hearing loops. For example, a systematic process needs to be developed to lay the groundwork for dispensing professionals to ensure that their clients can hear well through standardized loop systems. To program telecoils well, these professionals will need training and a standardized induction signal in their own offices. Additional work needs to be done with hearing aid and cochlear implant manufacturers on improving the frequency response and orientation of telecoils within hearing aids and cochlear implant processors.

We encourage loop proponents everywhere to collaborate on international, national and local levels. With many caring, motivated people sharing their ideas and working together, we believe much can be done to improve communication access joyously for people with hearing loss.

Dana Mulvany, MSW, author of this paper, was also the consultant contracted to develop the program for this conference. She uses hearing loops herself, has extensive knowledge of hearing assistive technology and had also been participating on an email list about loop systems and telecoils for several years.

Appendix A

1. Standards

- IEC 60118-4 ed2.0:2006 Electroacoustics – Hearing aids – Part 4: Induction loop systems for hearing aid purposes – Magnetic field strength. (Available from <http://www.iec.ch>)
- BS 7594 Code of Practice for Audio-Frequency Induction-Loop Systems. (BS 7594:2011 now available through <http://shop.bsigroup.com/>)

2. Links

- Program Guide:
http://www.hearingloss.org/sites/default/files/docs/2011LoopProg_0.pdf
(The directory of presenters starts on Page 8)
- Presentations:
<http://www.hearingloss.org/content/2011loop-presentations>

Appendix B

Specific Recommendations for the Future

These recommendations are a consolidation of recommendations from many participants in the loop conference, including the presenters.

Telecoils and dispensing professionals

- Obtain information about how each hearing aid and cochlear implant manufacturer supports use of telecoils with loop systems
- Ensure that a real-ear test is developed for measuring telecoil performance
- Gather expert recommendations about how to improve the telecoil, including increasing the frequency response, filtering out magnetic noise, etc.
- Develop recommended practices for dispensing professionals with respect to telecoils, loops and assistive listening technology
- Create and provide high-quality online courses for dispensing professionals about telecoils, including how to ensure the telecoils in specific hearing aids will work with standardized loop systems

Audio, Loop Systems, and Equipment

- Explore developing an "ALS (assistive listening system) Quality" standard for audio
- Explore providing higher-fidelity sound through loop systems (the current standard requires only 100 Hz to 5,000 Hz although wider band hearing aids and telecoils are possible)
- Address the need for television manufacturers to continue providing analog audio outputs (some have begun discontinuing them)
- Develop high-quality online courses for audiovisual professionals and loop installers

Advocacy (in addition to ideas already communicated)

- National organizations could create pilot projects at local level, such as:
 - ♦ Community Loop Infrastructure Initiative (to improve local infrastructure for loops)
 - Educate consumers about telecoils and loops
 - Recruit consumer volunteers for ongoing advocacy
 - Educate local audiologists and hearing aid dispensers
 - Recruit audiologists who will learn about optimizing telecoils and support hearing loops on local level
 - Educate and/or work with Sertoma and similar organizations to recruit supporters
 - Educate local audiovisual professionals about loops

- Recruit AV professionals who will work with loops
- Community Loop Infrastructure Team
 - Discuss current local infrastructure, resources, problems, etc.
 - Strategize about best way to improve local infrastructure for loops
- Maintain good flow of communication between national and local participants
 - National organization may need to develop or update informational materials, or find out more information

Appendix C

Directory of Presenters

Conny Andersson

Conny is the owner of Univox/Bo Edin in Sweden and in charge of engineering and product development. He has contributed to standards for hearing instruments and hearing loop systems and is currently the convener of the IED MT-20 committee (IEC 60118-4). He has over 30 years of electronic design experience related to hearing instruments, measuring equipment for hearing instruments, and assistive devices like loop systems.

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Matthew Bakke, Ph.D.

Matt is the director of the Rehabilitation Engineering Research Center (RERC) on Hearing Enhancement, a multi-center program of research and development in the area of technology and rehabilitation for people with hearing loss. Professor and Chair of the Department of Hearing, Speech and Language Sciences at Gallaudet University, Dr. Bakke received his Ph.D. degree in Speech and Hearing Sciences from City University of New York in 1999. Under his direction, the RERC produced the 1999 report, "Large Area Assistive Listening Systems (ALS): Review and Recommendations" for the U.S. Access Board.

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Brenda Battat

Brenda is the executive director of the Hearing Loss Association of America (HLAA). She has worked at HLAA for more than twenty years in a variety of positions including acting executive director, deputy executive director, and director of public policy and state development. For her work in advocacy she received the Robert H. Weitbrecht Telecommunications Access Award 2007, Oticon Focus on People Advocacy Award 2005, and Self Help for Hard of Hearing People National Access Award 2002. She believes in collaborating to get things done and invited the American Academy of Audiology to join forces with the Hearing Loss Association of America on the "Get in the Hearing Loop" campaign to educate consumers and professionals about the benefits of telecoils and hearing loops.

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Doug Beck, Au.D.

Doug is the Director of Professional Relations for Oticon Inc. and the Web Content Editor for the American Academy of Audiology (<http://www.audiology.org>). He advocates incorporating access to all sound sources via modern hearing aid dispensing protocols and technologies to maximize human communication and connectivity while increasing access to all sounds sources. Dr. Beck has authored hundreds of audiology, amplification and related science articles and he

often writes and lectures on the importance of maximizing the bottom-up (sensory) auditory signal so as to facilitate maximal cognitive processing.

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Todd Billin

Todd is the president of Hearing Loop Systems. He holds a Master/Contractor electrical license and certifications in boardroom design, loudspeaker design, and other related areas. His project profile includes over 600 churches, stadiums, airports, auditoriums, educational facilities, convention, banquet, and meeting centers.

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Joseph Duarte

Joe holds a degree in Biomedical Electronics Engineering from the University of Rhode Island. He has a profound hearing loss and is a bilateral cochlear implant recipient. Joe is the president of Duartek, Inc., a company which provides custom engineered audio and sound systems to help facilities and residences become more accessible to individuals who are deaf or hard of hearing. He began installing loops in 1991 and has looped such places as the meeting room of the U.S. Access Board.

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Doug Edworthy

Doug is the principal consultant at Edworthy Audio Engineering Consultants – an independent UK-based audio engineering consultancy. He has been an audio-electronics engineer since 1975 and active in consultancy and design of AFILS and in training for manufacturers, designers, installers, maintainers and owners of AFILS since 1981. Since 2007 he has designed and presented AFILS training courses on behalf of the Institute of Sound & Communications Engineers. Doug serves on eight UK and International audio engineering standards committees including AFILS-related BS 7594, IEC 60118-4, IEC 62489-1 and IEC 62489-2.

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Knut Ellingsen

Knut, who is hard of hearing, has been the president of HLF, the Norwegian Association of the Hard of Hearing, since 2006. He is also the vice president of EFHOH (European Federation of Hard of Hearing People). In 1986 he started to work as Secretary General for HLF (The Norwegian Association of the Hard of Hearing) and one of the main priorities for the organization was to get all its local branches to require hearing loops in all public offices and meeting rooms.

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Jeff Franzen

Jeff has been the production manager for Oval Window Audio for more than 20 years. Previously Jeff managed a third generation, family-owned audio manufacturing company in Illinois, which allied with Oval Window Audio in 1990 to design and produce a line of loop products. He is knowledgeable in all aspects of Oval Window Audio's product design and manufacturing.

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Jason Galster, Ph.D.

Jason is manager of clinical and comparative research with Starkey Laboratories. He investigates the clinical outcomes of modern hearing aid features. Dr. Galster has held a clinical position as a pediatric audiologist and worked as a research audiologist on topics that include digital signal processing, physical room acoustics, and amplification for pediatric populations.

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Johan Hakanson

Johan is the sales manager for Univox.

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Lise Hamlin

Lise is the director of public policy at the Hearing Loss Association of America (HLAA). Lise joined the staff of HLAA in April 2008 after being a long-time advocate and HLAA board member. She currently represents HLAA on advisory committees for federal agencies and on coalitions supporting greater communication access for people with hearing loss.

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Ken Hollands

Ken is the commercial director at Ampetronic (U.K.). He has a bachelor's in Electrical and Electronic Engineering from Middlesex University, London. He has presented papers on hearing loops at national and international conferences as well as technical seminars on the subject for industry and volunteer organizations.

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Paul Ingebrigtsen

Paul is the president and CEO of Williams Sound. He has been actively involved in the design, manufacture, and sale of assistive listening systems for over 30 years at Williams Sound.

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Andy Jankowski

Andy is the Business Manager at AssistiveAudio, the U.S. distributor for Ampetronic. He has worked at AssistiveAudio for five years. (Andy joined the company after he saw his two deaf grandchildren use their bilateral cochlear implants to hear through a newly installed audio loop system; he was overwhelmed by the pleasure the children derived from listening to TV, DVDs and music for the first time.)

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Siegfried Karg

Siegfried Karg became involved in hearing loop systems in churches in 1987. He holds or has held the following titles: President of Pro Audito Winterthur (since 2003), Vice president European Federation of Hard of Hearing People (2002-2010), board member Pro Audito Switzerland, member Swiss Acoustical Society, Convener and Presenter at the 1st International Hearing Loops Conference in Winterthur/Switzerland (2009), member of Hearing Loop task force of Pro Audito Switzerland. Siegfried is the pastor of the Evangelical Reformed Church of Switzerland.

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Linda Kozma-Spytek, CCC-A

Linda, who has a master's in Communication Sciences, has been a research audiologist in the Technology Access Program of Gallaudet University since 1998. She is the principal investigator on projects within the Rehabilitation Engineering Research Center (RERC) on Telecommunications Access related to hearing aid compatibility for telephones. She also consults with the RERC on Hearing Enhancement on their projects related to hearing aid compatibility. She actively participates in policy and standards development for hearing aid compatibility in digital wireless and cordless phones, and has published and presented extensively to consumer and professional groups alike on these and related topics. In 2005, she was recognized for her work in this area with an award from the Hearing Loss Association of America.

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Patricia Kricos, Ph.D.

Pat, Professor of Audiology, University of Florida, received her Ph.D. degree from the Ohio State University (1973). Dr. Kricos is currently President of the American Academy of Audiology. She also serves on the Advisory Council of the Better Hearing Institute and the Ida Institute, and as a Professional Advisor for the Hearing Loss Association of Florida Board of Trustees. Dr. Kricos has been an advocate of hearing loops and telecoils for a number of years and she serves as the co-chair, along with Brenda Battat, for the Let's Get in the Hearing Loop Task Force.

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Mike Langner

Mike has been a broadcaster and broadcast engineer his entire adult life. He has used his knowledge of microphone techniques and audio processing to broadcast clearly everything from a single voice speaking at a news conference to fully-staged grand opera with all its many voices and instruments. A member of the hard of hearing community with “cookie-bite” hearing loss, he donates, installs and/or “fine-tunes” loop installations in his community.

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Emma McAuley

Emma (Ireland) is both a hard of hearing consumer advocate and an audiologist. She served on the council of the Irish Hard of Hearing Association and has worked at DeafHear.ie (formerly known as National Association for Deaf People) since 1997. She has long advocated for the installation of loop systems and for the importance of fitting telecoils, and participated in the looping of the LUAS tram in Dublin, Ireland.

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Richard McKinley

Richard is the managing director and chief engineer of Contacta (USA), using his 30 years of experience in audio and engineering background to design loop installations in challenging situations. Among some of his achievements are loop installations in buses, touch screen displays, museums, drive-thru locations, airports and large venues including performance halls and sports arenas. Richard regularly conducts trainings in the United States to teach audio professionals how to sell, design and install loop systems in compliance with international standards.

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Dana Mulvany, MSW

A consumer advocate with lifelong bilateral hearing loss, Dana is the former director of the National Center for Hearing Assistive Technology at HLA. She works as a consultant specializing in hearing loss to optimize the fit between people with hearing loss, technology, and their environment. Dana has enjoyed the use of audio loop systems since the 1980s and had her 2002 Prius modified with an amplified turn signal, audio output feed, powered loop system, multiple close-talking microphones and video camera, thereby subjecting the car to the nickname, “the HATmobile.”

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Steven Murphy, MPA

Steven joined Sertoma as Executive Director in April 2001. Steven holds an MPA in Organizational Behavior and Non-Profit Management from the Bloch School of Business and Public Administration, at the University of Missouri-Kansas City. Steven began the [Sound Investment](#) campaign in the spring of 2010 to encourage Sertoma Clubs to participate in looping their communities.

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David Myers, Ph.D.

Hope College social psychologist David Myers is the author of seventeen books, which include psychology textbooks, and "A Quiet World: Living with Hearing Loss." He is the creator of hearingloop.org and, since 2002, the author of 30 articles that advocate assistive listening that is directly hearing aid compatible.

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Julian Pieters

Julian is managing director at Ampetronic, a global provider of induction loop solutions based in the UK. Julian's involvement in loops dates back over 20 years, to when he developed the original simulation software that has been a foundation for Ampetronic's design work. Trained as an engineer at the University of Cambridge, Julian has spent much of his career developing high technology products and services for health care. Julian succeeds his father Leon in this family business, a true pioneer of modern loop technologies and a vocal leader in the promotion and adoption of loop systems around the world.

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Juliëtte Sterkens

Juliëtte is an audiologist in private practice and co-owns Fox Valley Hearing Loop LLC with her husband/loop-engineer LeRoy "Max" Maxfield. She serves on the HLAA/Academy Hearing Loop Task Force. Her involvement has led to more than 90+ hearing loops in her community and other areas of Wisconsin, a number she expects will double in 2011.

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Brian Taylor, Au.D.

Brian is the director of Practice Development & Clinical Affairs at Unitron. A clinical audiologist with 20 years of experience fitting hearing aids, he co-authored the forthcoming book, "Selecting and Fitting Hearing Aids" by Plural Publishing. For the past few years, he has worked with organizations that install loops for Unitron customers.

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Daniel J. Tibbs, Au.D.,

Daniel is the education coordinator at Widex USA where he coordinates the Widex University Program, an outreach program for universities. Prior to joining Widex, Dan worked as a clinical audiologist in Southern California and Ohio as well as in the cochlear implant industry. He is currently based out of the Office of Research in Clinical Amplification (ORCA-USA) in Lisle, Illinois.

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Ruth Warick, Ph.D.

Ruth is president of the International Federation of Hard of Hearing People and treasurer of the International Disability Alliance. Ruth was born hard of hearing; her passion is education and among her publications is *Hearing the Learning, A Postsecondary Handbook for Students who are Hard of Hearing*. She completed her doctoral degree at UBC in 2003; her dissertation was titled *Voices Unheard: The Academic and Social Experiences of University Students Who are Hard of Hearing*.

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John Woodgate

John is hard of hearing and has had an interest in loop systems since the 1960s. He became an independent electronics consultant in 1984 after 25 years employment in the electronics industry. Since 1986 he has conducted private research into the refinement of the measurement and specification of loop systems. He chairs the British Standards committee responsible for BS 7594 Code of Practice for audio-frequency induction-loop systems and the International Electrotechnical Commission committee responsible for the International Standards IEC 62489-1 and IEC 62489-2. He is also a member of the IEC committee responsible for IEC 60118-4, and several other British and International standards committees. He is a vice-chair of the Audio Engineering Society Standards Committee.

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