

The magazine of the
Institute of Sound and
Communications Engineers

September 2011

ISCE

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Introduction from our President

Terry Baldwin *ComplnstSCE*



As I write this, I am surrounded by newspaper articles giving us more information about the riots. Oh, woe. I do hope that none of our members have been affected.

I really wonder what can be done. I believe the

police are doing all they can within their powers. As a member of The Worshipful Company of Firefighters, I am appalled at the way firefighters are attacked and cannot 'go in' without police protection. What we as an Institute can do escapes me, perhaps simply to support those we can. If you know of any member who has suffered, do please let us know.

Last month I visited Wales on my journey around the country visiting supporting members and thanking them for their encouragement.

I was delighted to visit our latest recruit Vaughan Sound Installations in Llanelli. I met up with Richard Vaughan and Paul Adams, presenting the plaque to Richard... but more of that on page 15.

We still continue with VAT problems. John Woodgate is master minding that side of things so I'll happily leave that issue with him. If you can help by paying outstanding accounts sooner than later that would help Ros.

Back in June, we held a pilot 'regional meeting' in Sussex. The venue was The Red Barn at Blindley Heath. You might ask "why there?" Well it was half-way from those indicating they would attend. Not only that I live near there and I organised it. So there!

I think it worked well. Around 14 said they would attend, but what with work commitments and other matters we only finished up with seven. We do hope others will volunteer to organise a similar function up and down the country. Nothing outstanding was arranged. Just a beer or two and a friendly get together. For me it was good to see faces I'd not seen for a hundred years and to hear of problems they were facing. A couple of issues came to light where we were able to help our local members.

Well that will do for now. Do you realise that the next time I write this missive I will be wishing you a merry Christmas! ♦

We welcome your contribution to the magazine with editorial and advertising. Please send news or articles to Ros

Events diary

8–13 September 2011

IBC, Amsterdam

11–14 September 2011

PLASA 2011, London, UK

19–20 October 2011

xSolutions 2011, London, UK

3 November 2011

Institute Day, Watford, UK

16–18 November 2011

IOA Reproduced Sound, Brighton, UK

28 February 2012

ISCEX2012, UK

21–24 March 2012

Prolight & Sound, Frankfurt

Comments and/or opinions expressed by contributors and in letters are personal, and may not necessarily reflect the opinions and policy of the Council of the Institute of Sound and Communications Engineers.

Comments on articles and letters are invited and, to make them available in a timely manner, they will be published on the website and the mailing list, as well as in the magazine.

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A guide to the wonders of the wiggly line

Joules Newell *MInstSCE MIOA MAES*

Part 2 What you hear is what you get

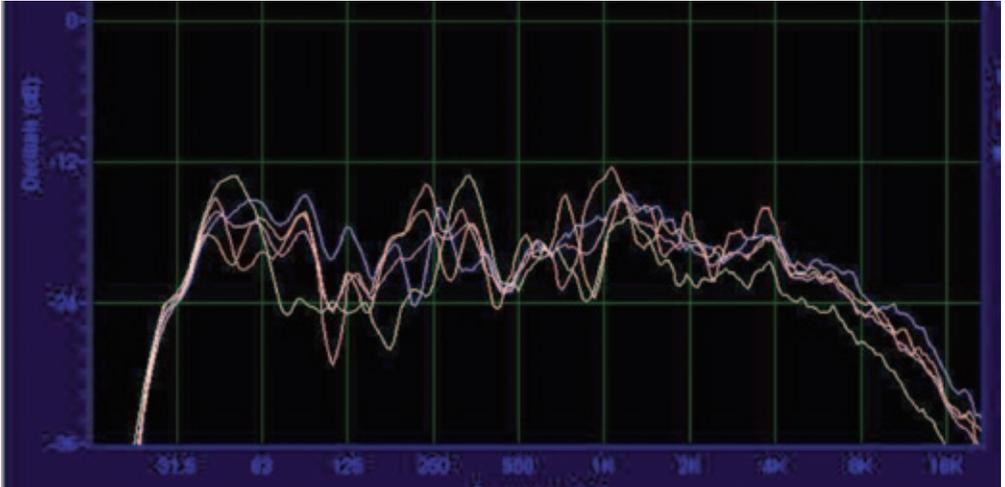


Figure 3 Frequency response at different places in the space

The above figure is a selection of plots from a single source in an excellent and even sounding room taken at various points within a 1 m x 3 m area. The huge variations seen specifically at the low frequencies are purely a function of microphone position. The only common response on any of the plots below 1 kHz is a dip at 450 Hz.

One super-important factor when performing the most basic of measurements is to be able to look at the results and ask oneself “Is this in any way related to what I hear?” It is also important to refer to more than one point in space when measuring; you can do this simply by walking the analyser around the area you wish to measure, so as to make sure the position you use is not in an acoustic hole where its measurement is being adversely affected by some anomaly. Again try asking yourself “Is what I hear here representative of the space as a whole?” This is where a live trace measuring device is essential; you can gain so much more immediate data as you move than you can with “offline” systems that run a

process then display the data. As you do this you will realise that, in many circumstances, by simply moving the measurement point about you can ‘manipulate’ the plot by quite a few decibels here and there. It is essential that you begin to understand these limitations of measurement systems in order to be able to properly use them.

This is in many ways the great point of enlightenment, where we begin to understand how little we can see. Once we understand this limitation we can look at dealing with the problems where we can control things, rather than what is the common easy fix method of trying to tune out something that just plain can’t be tuned out.

The settings

Just as the space in which we are measuring is so variable, so is the way in which we measure the signal once within the analyser. There are still to this day various legacy systems and standards that require us to use 1/3 octave analysis and correction, yet ▶

with the simplest of modern systems we can refine this down all the way to 1/48 octave. We can also run FFT traces of various FFT size and window settings, we can do single ended RTA or comparative (transfer function) measurements. There are many high resolution options available to us that show us more accurately what is entering the microphone.

Where we start, and what analysis method we choose, can impact massively upon what we achieve. Third octave analysis should be avoided unless it's for really rough and quick measurement looking for a trend rather than pinpointing something

The same signal measured with different frequency resolutions

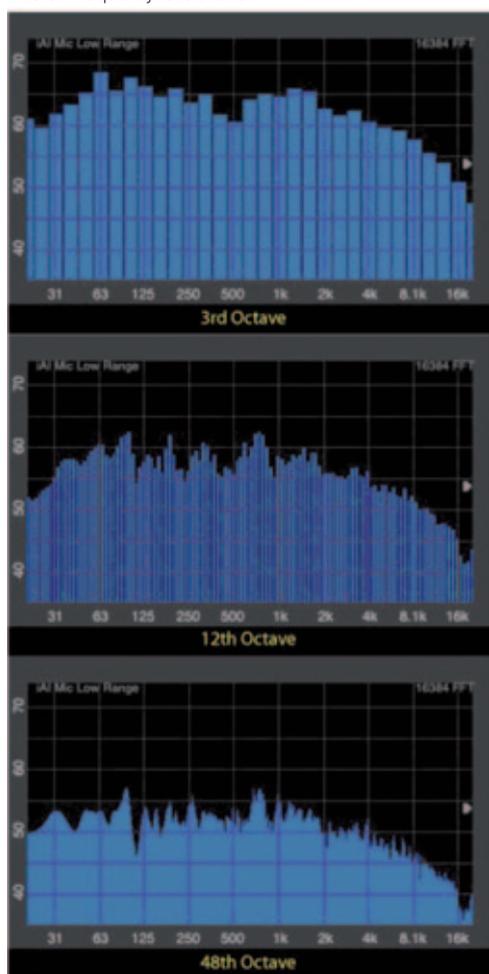


Figure 4 Effects of different analysis bandwidths

for treatment. The 1/3 octave frequency resolution is far too low for reliable measurements, even though it is related to human ear characteristics, and is prone to serious averaging errors. It is exceptionally difficult in third octave resolution to see where we have narrow band anomalies. It is also easy to get readings where a peak and dip sum to zero within an averaged band, just as it is easy to get a peak or dip crossing two bands and showing up at a different frequency to where it really is. If we must work within software based RTAs then work in the higher resolution domains, and only refer back to lower resolutions when required to do so.

Where we use 1/3 octave RTA it is essential to understand its limitations and realise how limited its view of the world really is.

In Figure 4, in the 1/3rd octave plot we can see what looks like a wide hump in the 20 Hz – 600 Hz response, yet when viewed in 1/48th octave we see it is actually very flat, but with a kink at 100 Hz caused by a floor reflection at the microphone position. The peak at 800 Hz seen in the 1/12th and 1/48th octave response do not show in the 1/3rd octave response due to the slight dips either side of it averaging out within the 1/3rd octave bands.

In the early 1980s at a major London recording studio it was found that with a 1/3 octave analyser and a 1/3 octave equaliser many different settings on the equaliser could achieve an identical flat reading on the analyser, the main variable seeming to be at which frequency the equalization process began. From this it was decided that it was not possible to verify which one of the results was correct, and the equalisers were thus removed from the loudspeakers following the theory that no EQ is better than the wrong EQ.

Lessons learned

So where does all this leave our measurement and analysis tools?

Well, it leaves them in the 'ballpark' category. It also leaves them in the 'needs cross referencing to ears' category too. This is why there is no advantage in laboratory acoustic measurement systems accurate to fractions of a decibel for general field testing purposes. The environment itself will not afford us such luxury. It's pointless arguing over a half dB or even a whole dB within the measurement systems when the measurement chain itself has a huge unpredictable variable in it. The ultimate ▶

goal is to achieve the best result to be listened to; the end user has a pair of ears and a brain which they use to receive the information transmitted. The psychoacoustic processing ability of the ear-brain combination is still very poorly understood, but is capable of interpreting hugely complex, constantly changing, spatial information that analysis tools miss. However, system tuners also have ear-brain systems which they can use to get a much closer idea of what the end user will experience. It is just unfortunate that most system tuners have a disinclination to use their brains in preference to believing some wiggly lines on a laptop.

So, if the system doesn't work then what are we doing using it? Well it does work, it's just important to fully understand what we are seeing, doing, and understand the limitations and fundamentally basic nature of our tools. What current systems show us is a hopelessly small part of the picture. A system will only measure what goes in to it, so we must first understand what we are putting into it. With any live running FFT or transfer function analyser we can first verify that what we see is, or is not, an anomaly by simply walking the microphone about a bit and listening as we do. If we see any dip or peak that we thought was a problem starting to move up and down the trace, or even reduce in amplitude as we walk about, then we need to think again about that problem and listen carefully. The truth is probably that what we are seeing is only affecting that point in space, and that we really need to think hard about whether to do anything. It is at this point that this message should always appear: [refer to ears].

Mid to far field acoustic analysis in non-anechoic spaces is mostly educated guesswork, and should always be a case of 'refer to ears before attempting any electronic correction of the system'. Any attempt to measure to within a single dB is futile, both in spectrum analysis and sound level analysis.

It is surprising how often we see an authoritative document proclaiming that the expert measured a sound pressure level of 82.35 dB averaged across 10 points in the venue, yet if in some cases we moved each of these points selectively to one side slightly we could probably get something like 78.48 dB. The truth of the matter is that we have an SPL best described as 'somewhere around 80 dB', but many people feel that such a statement just isn't professional, and it's no good for the legal profession. It is striking that when we have a particular venue that needs to achieve below or above a threshold of measurement in order to comply with something or other, it can all hinge upon how the measurements were taken. If we are close to the required result it is very easy to re-measure (and do so totally correctly) in order to change a fail into a pass, especially if coverage is poor. Various examples of slightly questionable practices from some acousticians have been seen, (keep measuring till you get one that passes) especially where pressure is there to make something meet a specification. In many ways it is not the fault of the acoustician, as clearly they did get a measurement that passed, but the fault lies with the attempt to define a specification based on an uninformed implementation of a rather arbitrary specification in the first place.

This situation can of course be more or less pronounced depending upon the general acoustics, but it is always very important to understand the true circumstances from which our results are obtained.

System / room analysis is not a scientific procedure; it does not produce absolute results It can best be used as an indication as to where issues may lie, but as scientific as the wiggly lines may look, the data within is very limited and fundamentally flawed. No spectrum analyser output or sound pressure level measurement at an arbitrary point should be regarded as absolute proof of performance. They are at best a guide, and, to some degree, always wrong. ♦

Reproduced Sound 2011

16-18 November, Brighton



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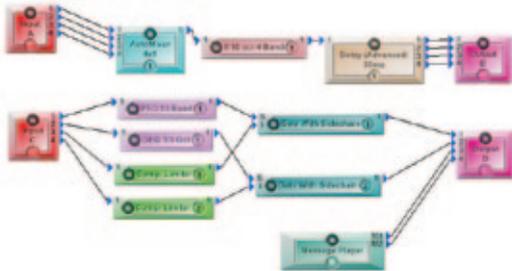
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A more flexible universal audio processor from Ateis

Neil Voce *MInstSCE, Ateis UK*

Over recent years, the ability to use a programmable DSP device to take over from the traditional mixer amplifier has been radically increased due to lower cost, more features and improved programmability.

A typical system for a church may have consisted of a microphone mixer, some equalisation and compression in a small rack of discrete components. However, a DSP device, such as the Ateis UAPG2 can offer considerably more flexibility and control. James Hunt of Cunnings Recording Associates explains their choice of the UAPG2 for a particular project:

“Our client at St John Ambulance approached us to provide a sound system for installation into the Priory Church of St John of Jerusalem for use during their official ceremonies and special services. Given the importance of the building it was necessary for the sound system to be as unobtrusive as possible which extended to colour matched loudspeakers to blend in with the walls and wireless lectern microphones to avoid any cables. The control of the system also needed to be as unobtrusive as possible with minimal control for use by inexperienced operators. We looked at a number of DSP units but decided on the ATEIS UAPG2 primarily because of its features and price. The ability to provide a completely automatic solution without the need for an operator made the UAP a very good choice for both us and our client. The automatic microphone mixer, set as a gated response, which appears to be unique to the UAP, rather than gain sharing allows the church to leave all microphones connected and ‘live’ with no risk of feedback. The built-in anti-feedback device, though not used on this project as there is

ample EQ built-in, is a nice added extra, which again appears to be unique to the UAP. Using the UAPG2 we are confident that the system will always work well, regardless of which microphones are used, giving us and our client assurance of a good sound from the system every time it is used.”

However, the UAPG2 has won fans within the ISCE for many different roles. Andy Huffer of HD Pro Audio explained: “Projects have ranged from airport lounges to private members clubs to restaurants to motor racing team VIP suites and beyond. We have recommended it to our clients with excellent results”

The reason that a DSP unit like the UAP is so successful across a variety of markets is interoperability with other systems. Another company using the UAP, BL Acoustics, told us “We have chosen the UAPG2 for a number of projects due to the flexibility and ease of programming. This, together with the ability to control the unit via third-party control systems over IP, provides us with a cost effective, highly controllable DSP solution.”

For ISCE members, the UAPG2 gives an opportunity to reach into additional markets. Certainly the addition of audio to town centre CCTV systems is interesting and the UAP allows you to link to the CCTV system selecting and routing audio between control rooms and town hotspots.

But the UAPG2 has a swan-like approach in church systems with a serene outlook coupled to considerable power beneath the surface, and it is this that allows the installer to offer a more comprehensive system. Terry Billau, says about the unit : “UAPG2 has all the features you would ▶



New Members September 2011

Member

Gary Ashton

Fuzion plc

Sahand Athari

Ian Davis

Black Country Audio

Andy Stiles

B&H Sound Services Ltd

Upgrade to Member

Kevin Cartwright

Cooper Notification

Richard Dungan

Contacta Ltd

Technician

Ben Sultana

Pure Install Ltd

Max Middleton

Romers Electronics

Temporary

Ric Burdge

Pro AV Ltd

Ian Wallington

Pro AV Ltd

Steven Schofield-Linnell

B&H Sound Services Ltd

Gary Newbury

Electrosonic Ltd

Paul Harnett

Electrosonic Ltd

expect to find in a versatile DSP unit including automatic mixing, many types of EQ and all the usual signal processing functions. It has “open architecture” so you can create any combination of functions you need. Where it especially scores over similar units is in the number of control functions it has as standard – there are 16 control inputs and 8 control outputs. The control inputs can be analogue or logic controls. Also there are 8 configurable front panel controls that you can program to perform practically any function. It will operate on mains or 24V DC. When I have had suggestions for improvement, Ateis have been quick to incorporate them into the software.”

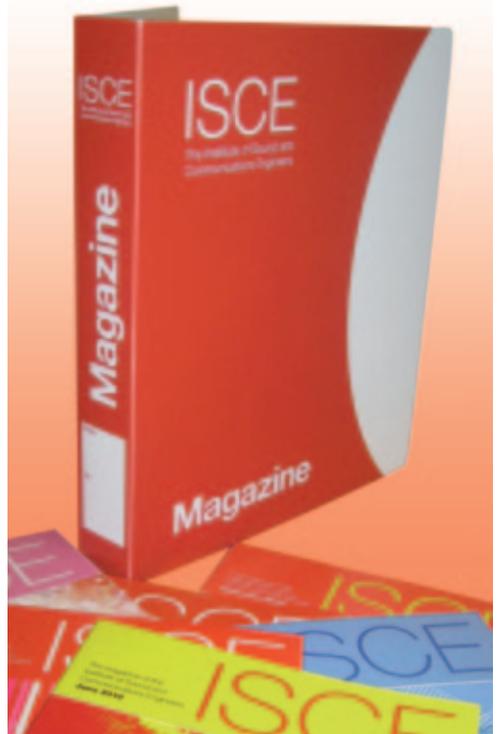
For those hesitant about changing to a more software based control system, Matt Collman from Ateis adds “It is worth noting that the UAPG2 allows an engineer to reverse the configuration out of the device onto a laptop – a useful safety feature where different engineers may have made on site ‘tweaks’.”

So, take the opportunity of offering more control for less and enriching your next system with Ateis UAPG2 – the final word comes again from Andy Huffer: “UAPG2 combines flexible, powerful DSP with easy external control and superb sound quality, all at a keen price point.” ♦

ISCE magazine binders

If you want to pick up your smart A5 ISCE branded magazine binder while at PLASA, Ros will have some available on the ISCE stand. This is a perfect way to store your ISCE magazines and make it easy to refer back to previous articles.

These will be available to buy at ISCE events throughout the year, at a discounted price of £5 including VAT. If you can't wait to get your hands on one, and want the binder posted to you, the price will be £6.50 including VAT.





ISCE

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Thursday 3 November 2011

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INSTITUTE DAY 2011

The ISCE invites you to Institute Day 2011

Warren-Barnett memorial lecture

A visit to the cinema

Presented by Philip Newell FIOA, MAES

Almost certainly, everybody likely to be attending an ISCE event will have been to the cinema on many occasions. Either consciously or subconsciously they will be aware that the experience of watching a film in a large theatre is very different from watching it at home, even on a relatively large screen. There is obviously the sense of going to a performance, and that it will be an experience shared with others.

However there is much more to it, which even the majority of people in the professional sound industry are largely unaware of.

Cinema acoustics, psychoacoustics and production techniques all play their part in creating the changes of mood and the appropriate sounds for the images. But what happens when the film arrives at a wide range of public cinemas of all different

shapes and sizes? And how do the directors ensure that there is a worthwhile experience for those in the audience with less than perfect hearing and vision? These people could make up more than 30% of the cinema-going public. They may well be a minority, but they are too great a minority to ignore.

All-in-all, there is a great deal of science, art and technology that goes into creating an appropriate sense of excitement or emotion in a cinema soundtrack, much of which the world outside of film industry is totally unaware.

About Philip Newell

Philip Newell has been responsible for many pioneering designs. The Manor Mobile in 1973, was the world's first, purpose-designed, 24-track mobile recording studio. His collaboration with universities has been an essential part of his design developments and his results have been widely published as papers, articles and books.

Commissioning a sound system for G Live

Jon Raper *MInstSCE*, R K Sound Engineering



For most of us the concept of commissioning a sound system brings thoughts of a slightly stressful experience where we try to convince a consultant that we have done a wonderful job.

In July, I was part of a commissioning process that was a very different experience.

G Live is a multi-purpose hall for Guildford and R K Sound Engineering installed an acoustic control system (ACS) to the specification of Peter Mapp Associates. After all the initial commissioning and setting of presets, the day had come to try the hall with a 60-piece orchestra and an audience.

First job was to see how the hall acoustics changed with an orchestra on stage. An impulse response was taken with the natural acoustics and then at the acoustic pre-set most suitable for a symphony orchestra. Later these could be compared with the measurements taken in an empty hall.

The orchestra then played some of their repertoire while various ears belonging to musicians, acousticians and management sampled the fare throughout the auditorium. So far so good.

While the orchestra disappeared for a short break the audience of about 400 filed into the lower section of the auditorium seating; the entire hall seats just over 1000. This enabled us to take some measurements to see the effect of the audience on the room acoustics. When the orchestra returned we could take some further measurements with both the audience and the orchestra in situ.

And then the music. We had a chance to hear the orchestra playing some Beethoven, Elgar's Cello Concerto, Stravinsky's Firebird, John William's Star Wars and the ever popular, Pomp and Circumstance. We finished with a vocalist leading Land of Hope and Glory accompanied by the audience; very 'Last Night of the Proms'.

The local authority are keen to use the hall for classical music as well as other popular entertainment and they already have a variety of major orchestras, brass bands and choirs booked for the coming season. Therefore it is important that the hall acoustics can deal with a wide variety of acoustic expectations. The ACS system with its pre-settable configuration augments the natural acoustics for a variety of performance requirements thus maximising the potential of the venue.

The comments from the conductor and orchestra were very complimentary about the assisted acoustics. Their verdict was reinforced by a show of hands from the audience.

What was intended to be an open rehearsal by the orchestra had become an orchestral performance with additional witty introductions from the conductor. The audience's enjoyment of the experience was made abundantly clear at the end.

System commissioning does not come any more rewarding than this. ♦

Report on second International Hearing Loop Convention held in Washington DC, 18–21 June 2011

Doug Edworthy *HonFInstSCE*, Edworthy Audio Consulting

The USA gets 'in the loop'

John Woodgate *FInstSCE* and I attended the second International Hearing Loop Convention held in Washington DC to present papers about AFILS technology to an awakening market for this technology.

With many hundreds of speakers and participants from all over the world, this convention was organised by the Hearing Loss Association of America in conjunction with the American Academy of Audiology to promote the installation and use of AFILS.

The HLAA have long been aware of the wide use of AFILS in the UK, Europe and Scandinavia, and of the very limited adoption of this technology in North America. Audiologists and dispensers of hearing aids in the USA have been reluctant to enable the telecoil facility in hearing aids and cochlear implants through the mistaken belief that AFILS was old technology now surpassed by newer technologies such as bluetooth, 900MHz/2.4GHz RF and near field magnetic induction (NFMI). This convention was programmed as part of the HLAA's 'Get in the hearing loop' campaign to address these misunderstandings and promote AFILS use.

John and I made presentations to very receptive audiences on the subjects of; magnetic interference, AFILS standards (including our own BS 7594), AFILS on London Underground, campaigns by 'Action on

Hearing Loss' (formerly RNID), and of course the success of the ISCE's AFILS training programme.

Audiences were extremely appreciative, being only just short of ecstatic, and many useful contacts were made with professionals and users from all over the world but in particular within the USA. People representing audiologists, AFILS suppliers/installers and architects spoke of the need for better training and asked how the ISCE could help.

Can we help? Watch this space

The education went in both directions, we learned a lot about AFILS from the user's point of view and about the new technologies that are now being used in conjunction with neck loops to give hearing aid users full participative access. For example: did you know there are 'gateway' devices that connect streaming data services (iPod, streamed audio, etc.) to neck loops and also provide remote control of some hearing aid functions, or that in the eyes of disability access professionals those with 'normal' hearing are 'TABs (Temporarily able-bodied) as nearly all of us will be needing hearing-assistive technology at some time in our lives?

Following the success of this convention, the HLAA Convention will be held in Providence, RI, from 21–24 June, and the International Federation for the Hard of Hearing will be holding their Convention next year in Bergen, Norway, from 25–28 June. ♦



Construction products directive

Roland Hemming *MInstSCE* and Lauren Rogers, RH Consulting



As almost all members of the ISCE know, there has been a lot of fuss about the impact of the new product approval standards for voice alarm equipment: EN 54-4, EN 54-16 and EN 54-24. It's still too soon to really know what their impact will be, but like many others within ISCE, we have had clients coming to us for guidance.

Rather than look at the standards and give an opinion, we decided to take a different approach. We assumed we knew nothing (no problem there!) and started from scratch. We looked into the origins of the standards, why they were created and what the law says our obligations are.

We have published our complete findings, with all references to the appropriate European legislation on our website.

In 1998 the EU published a mandate that required standards to be written for items concerning fire and voice alarm systems to comply with the Construction Products Directive (CPD). This means that systems in our industry have to comply with the CPD. This work took several years and they were only enforced under the CPD from April this year.

It is important to note that no standard is law. Standards are recommendations. However the CPD is law. The actual requirement is for us to comply with the CPD. The CPD sets out six essential safety requirements for constructions. The CPD does not concern itself with individual components but the construction as a whole.

In most cases, compliance with the CPD would be by using equipment that conforms to a harmonised European standard. In our case EN 54.

However there are other methods of complying with the CPD.

In 1997 an EU guidance paper was published on the treatment of 'Kits' within the Construction Products Directive. Note that this was written before the mandate concerning our field of work. It was updated in 2002.

It sets out an acceptable route to compliance with the CPD using a kit system. Given the age of this guidance note on kit systems, it is clear that other disciplines take this approach sometimes. The example the note gives is of a fire alarm system, which is very similar to what we do.

In addition to that guidance note, there is another note about CE marking and explains what to do about that. You can use products CE marked under other directives in voice alarm systems, when they are part of a kit.

Some people have said that it is important for all VA items to be tested under EN 54 because it is a mark of quality. Yet very specifically the European Commission says that product standards are not quality standards. It is a mark of conformity to ensure free circulation of a product across EEA borders. The testing of a product under EN 54 may infer a degree of quality, but there are plenty of other ways of demonstrating that. Indeed some EN 54 tested products are very low cost utility loudspeakers. They are not 'quality items', but they do conform.

EN 54-16 also specifically excludes kits from its purpose, as stated in its response to the mandate. Some parts of EN 54 include kits, so this is not an omission error.

Our own interest in kits arises from the very large, complex or high power projects we get involved in with many of our clients. Loudspeakers for 'special' applications don't have to be tested but what if someone does? We can't find an EN 54-4 UPS, let alone one with an inverter big enough to drive stadium amplifiers. One test house recently ►

proposed cutting a large loudspeaker in half, so it could fit inside its test chamber. Another proposed breaking a system into several parts to accommodate testing – turning it into a kit. The irony was lost on them.

Many of the type-tested VACIEs do not offer the number of outputs or the flexibility required in these projects. In this case a kit system actually reduces risk as you are using equipment appropriate to the task in hand, rather than trying to hack together something with multiples of type-tested product.

Whilst EN 54–16 does mention multiple rack and distributed systems, this still does not preclude the use of kits. Indeed the clause about configurable functions and multiple cabinets is pretty woolly,

stating that such a test would need to be agreed between the test house and manufacturer, perhaps a kit by another name. The important difference set out by the EC is that a kit is bespoke for the works.

Our research is not to discredit EN 54. In many cases type-tested equipment will be a better approach. We are simply explaining what the law says you can do and we can see that in some cases this gives you a reasonable alternative approach. We hope that future VA specifications will simply state that they require conformity with the Construction Products Directive, which is actually what we are required to do. ♦

www.rhconsulting.eu

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For a sound job, always choose an ISCE member



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Keeping industry standards high

Kent, East and West Sussex regional ISCE meeting

Bryan Robinson *FlntSCE, MIOA, MAES*

ISCE members in the Kent, East and West Sussex area, were invited to the first regional meeting on 15 June, which was held at the Red Barn pub in Lingfield.

Fifteen members said they would come along, but only seven managed to make it on the day, which was a shame, but it still proved to be a great success.

Our President, Terry Baldwin, opened the meeting by asking members to introduce themselves and give a brief description of how they started in the industry. Although I had met all of them before over the years, I was surprised how little I knew of their backgrounds.

This meeting was held in the evening, which was preferable to the members present, but they could be day time or evening events.

I know the ISCE intend to hold more of these regional meetings, so if you would like to host one in the future, please get in touch with Ros, who will happily help you organise it.

Guidelines for holding future regional meetings, such as choosing a venue and topic of discussion, having a willing note-taker present etc, are on the members only pages of the ISCE website www.isce.org.uk.

I thought it was successful AND at no expense to ISCE and the most frequently asked question was "when is the next one?".

Those attending were Terry Baldwin, Roger Dey, Steve Jones, Bernard Bibby, Nick Baldwin, Bob Howard and of course, myself. ♦



Sound Stores

BARNS

The Octo Sound Store shown here continues to assist engineers and installers to fit Voice Messaging and Music playback features into their Public Address and Voice Alarm systems. It now has sixty-four playback triggers, eight of which are contact driven and the remainder tied to the internal Clock for scheduling automatic playbacks.

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- High fidelity, balanced audio output to ensure easy installation into your system.
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AK Barns Ltd., Cambridge CB6 3SQ Tel: 01353 740225 www.soundplayback.com

Visit to Vaughan Sound Installations



Having bought my visa to enter Wales (£8 at the bridge) I made my way via various cities arriving at the home of The Scarlets rugby club, Llanelli. Richard Vaughan had already sent me a map of how to get to their premises. It was indeed a fine map as it showed all the speed cameras. Not that that would concern your president.

I had been to PAI group before, so I knew what I was looking for. With the amalgamation of PAI with Vaughan Sound, their premises had doubled in size with a very impressive reception. Infact the entire building was state of the art with so many gadgets (loved by Paul Adams) I could have stayed forever.

Our ISCE meeting over, into Richard's office walked Paul looking as immaculate as only Paul can. And then ... in walked Dai. Yes Dai Vaughan himself. A legend in our industry. You can't say Dai Vaughan without stuttering a few words.

PAI and Vaughan Sound Installations had jointly completed a most interesting installation at an old listed pump house in the dock area. It was used to remove the water from the docks once a ship had arrived and then to pump the water out of the dock (once they'd closed the gates, of course) and turned into a dry dock. Easy. Now the difficult part. Four local gentlemen came together and turned it into a very fine restaurant. Wow, the food and wines were to rush over to Llanelli for. Robert, one of the owners, joined us for lunch and from his lifestyle you could tell this restaurant, called Sos Panne (I believe, and English is, yes you've guessed, saucepan!) was going to be successful.

Thank you again to Vaughan Sound Installations for becoming a supporting member. I wonder who the next is going to be. ♦

The background of the advertisement features a close-up of a blue audio mixing console with various knobs and sliders. Overlaid on this are several vertical bar charts in shades of blue and grey, suggesting data or statistics. The overall aesthetic is professional and tech-oriented.

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The problems of tiny induction-loop systems

John Woodgate *FInstSCE*

We have had 'portable AFILS', with loops less than about 250 mm square, on the market for some years. A few products work about as well as the laws of physics allow, but some have 'curious' performance characteristics, in spite of enjoying a volume of sales, both in UK and other countries. However, even those products that 'work' have performance seriously constrained by their small dimensions and those laws of physics. The following concerns those that 'work', not the 'curious' products, which are by no means an improvement.

It is a characteristic of induction-loops that they 'scale', ie the field patterns are the same shape, irrespective of the size of the loop. From Figure 1 we can see that for a field strength range of 10 dB, the usable region extends above (or below) the central null (where the horizontal field can be very strong) from about 0.2 height units to 2.2 height units. For a 150 mm square loop, this is only 300 mm, which is not likely to be sufficient. To cover a height-above-floor range of 1.2 m to 1.7 m, a minimum of a 250 mm square loop is required, at a height of 1 m above the floor. But this comes only at the penalty of a loop current 54 times that required to get 400 mA/m at the centre of the loop! Of course, this can be mitigated by using a loop of several turns, but the huge field strength of 21.5 A/m close to the loop remains.

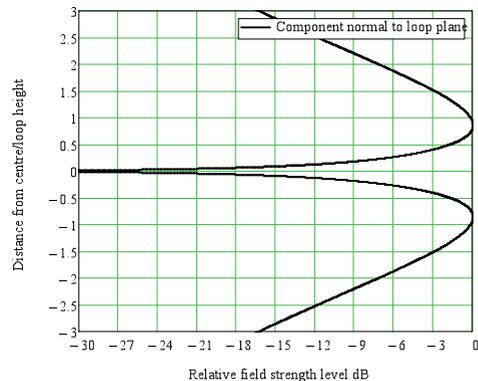


Figure 1 Vertical field pattern of a square vertical loop at a distance of 1.5 times the loop height

Unfortunately, this isn't the only problem. Figure 2 is rotated a quarter-turn from Figure 1, because Mathcad won't let me plot more than one curve with the dependent variable on the horizontal axis. The middle curve is the same as in Figure 1, while the top curve is at 1 height unit away from the loop and the lowest curve is at 2 units away.

We can see that for a 150 mm square loop, a change of distance of only 75 mm from 150 mm away to 225 mm away causes a change of maximum field strength level of 9 dB (and it does not occur at the same height), while a change from 150 mm to 300 mm causes a change of level of 16 dB. It is most unlikely that this would be regarded as acceptable by most users. If the field strength at 225 mm peaks at 400 mA/m, at 150 mm it peaks at over 1 A/m, which is likely to overload many hearing aids, and I can assure you that the effect is not pleasant. It's even worse if you nod your head and get a sniff of that huge horizontal field.

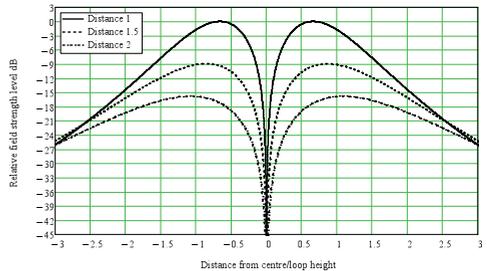


Figure 2 Curves showing the field strength gradients

Some tiny systems use a solenoid rather than a loop to produce the magnetic field. I won't show the results for a 100 mm tall solenoid, as it's a (bad) joke, but Figure 3 shows the results for a 236 mm tall solenoid 11 mm in diameter (as it's one I made earlier). Once again, you have to imagine the graph rotated a quarter-turn so that the height axis is vertical. 'On axis' refers to the field strength on the axis of the solenoid, and is just there to show how much weaker the external field is. Of course, this is mitigated by the number of turns on the solenoid, but you need quite a large number of turns in order to reduce the current required to something ▶

reasonable. We see that the height coverage is only 354 mm at 0.2 m away. The field strength level drops 12 dB between 0.2 m away and 0.35 m away, and a further 9 dB to 0.5 m away. Not nice.

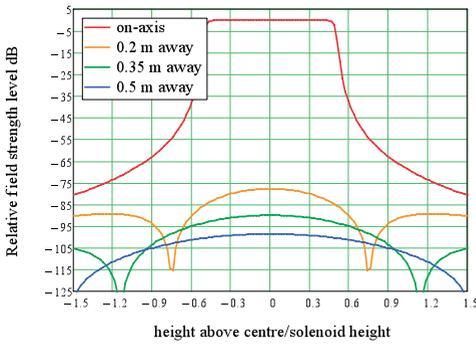


Figure 3 Field patterns of a solenoid

Of course, manufacturers can market any sort of product that they think will sell, but marketing the equivalent of a car with square wheels and a 1 HP engine to buyers who don't know what a car should be like doesn't seem to me to be a laudable policy. ♦

Communication Technology to offer international online buying opportunity

Communication Technology, part of the Scarecrow Group, is offering the professional and commercial audio markets the chance to buy direct, online. With improved prices for online buyers, there are over 50 products available – full details of each product are on their website www.communication-technology.co.uk. The website offers product manuals and technical specifications for each product group.

So whether it's paging microphones, portable public address systems, or their extensive range of microphones, international installers can now buy direct and benefit from the most competitive pricing opportunities.

Once selected from their 'buy now' pages the order is sent to sales@communication-technology.co.uk and a member of the sales staff will then be in contact to discuss delivery times, carriage charge, any sales tax due and payment. It's as simple as that – friendly too.



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Analogue or digital?

John Woodgate *FInstSCE*

Actually, the title should be 'Analogue or digital or both?'. Human beings only have analogue audio input and output, so if the equipment has to interface with them, it has to have analogue interfaces even if the core is digital.

Digital devices are so low in cost these days that almost every design requires the 'analogue or digital' decision. It really doesn't pay to make the wrong guess. So how do we arrive at an 'informed decision' rather than a guess?

SWOT analysis (Strengths, Weaknesses, Opportunities and Threats, see, for example, http://en.wikipedia.org/wiki/SWOT_analysis) is a useful tool for this purpose, even though it is discredited as a corporate planning tool (maybe because in many cases it was incorrectly implemented). SWOT includes factors within and external to the company, and for the latter the analysis tool PEST (Swat - pest - geddit?): (en.wikipedia.org/wiki/PEST) or one of its developments, from PESTLE to STEEPLED, can be used. PESTLE is 'Political, Economic, Sociological, Technological, Legal, Environmental'. There is a lot more information about SWOT at: www.rapidbi.com/created/SWOTanalysis.html

This is the sort of thing that could be a three-volume novel or a simple table. Guess which one I'll chose, without a SWOT analysis!

SWOT usually classifies strengths and opportunities as 'internal' and 'weaknesses' and opportunities as 'external', but for the present purpose, that isn't really useful. For example, a weakness may be 'shortage of analogue designers', while a strength may be 'competitors have limited experience in selling digital products'.

You make one of these tables for the analogue solution, and another for the digital solution, and compare them. While the blank table shows just four rows, you will probably need more, BUT if you need more than ten, you are probably analysing too minutely and the exercise won't work - too confusing.

You probably won't need to have a PESTLE table, because most of its topics can be included in your SWOT tables:

Political

Governments change infrastructures; an example is the Digital Dividend's effects on radio microphones.

Economic

What price will people pay under the current conditions? Do we need a loan to buy a pick-and-place machine?

Sociological

What is the public perception of this product ('likely' perception if it's totally new)? Is 'digital' a selling-point?

Technological

Continued availability of devices?
New display technologies?

Legal

European Directives, national regulations at home and abroad.

Environmental

RoHS, WEEE, REACH, energy consumption ... a growing list. ▶

SWOT analysis table

Strengths	Opportunities	Weaknesses	Threats

General comparison table

Analogue		Digital		Mixed (in signal chain)		Digitally-controlled analogue	
Strength	Weakness	Strength	Weakness	Strength	Weakness	Strength	Weakness
Simplicity; short development time	Accuracy	Accuracy	Software as well as hardware; long development time	Versatility	Long development time	Precise control	Software development time, but may be short (eg PIC)
Few EMC issues; maybe no testing needed	Inflexibility	Flexibility by changing software	EMC issues		EMC issues, including internal EMC of digital and analogue parts		EMC issues, but fewer because of low data rates
	Remote control difficult	Remote control possible	Complexity: field servicing often requires modular construction	Remote control possible	Complexity: field servicing often requires modular construction	Remote control possible	

It isn't as simple as that!

Very often, there are four (or is it three and a half?) options - pure analogue, pure digital, mixed digital and analogue and digitally-controlled analogue. This fourth option can be very attractive, because it has most of the advantages of analogue with fewer of the disadvantages of digital, or has them to a much lower degree. The above general table should not be used as a starting point for your own analyses; it's only to show a general comparison of 'features', whether positive or negative.

Why isn't cost mentioned?

Because in the general case, it's not possible to say which of the four possibilities has the most attractive overall cost. There is no point in having a low-cost design if it needs £50,000 of production test equipment or third-party testing. ♦

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Sound industry charities

We, as an industry, have two independent registered charities, both founded in the days of APAE (Association of Public Address Engineers). They are managed by independent trustees, all of whom are also members of the ISCE. The older one is the Public Address Engineers Benevolent Fund, set up to help members of our industry in times of need. The trustees have created a new introductory leaflet to encourage donations to be made to the fund, either by individuals (which can be 'gift aided' by UK tax payers) or by companies as straight charitable donations.

Donations in the form of cheques made payable to 'Public Address Engineers Benevolent Fund' should be sent to the charities administrator:

Ron Walker
132 High Street North
Stewkley LU7 0EP

Gift aid forms are available.

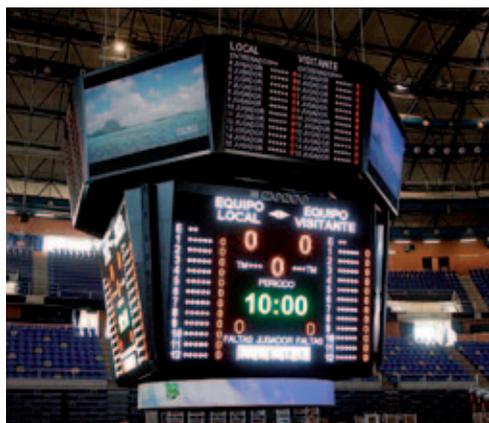
Claims for assistance from the Benevolent Fund should be made to the administrator supplying full details to substantiate the individual's claim. ♦

Audio transformation at top Spanish basket ball stadium

Nick Screen, Duran Audio

The Palacio de los Deportes Jose Maria Martin Carpena stadium has undergone an audio transformation thanks to the installation of four AXYS® INTELLIVOX DS1608 digitally steerable, self-powered, loudspeaker arrays.

The Palacio de los Deportes Jose Maria Martin Carpena in Málaga is one of the reference fields of Spanish basketball. It is the home of Unicaja Málaga Team (League Champion in 2006, Cup Champion in 2005 and 3rd in Euroliga in 2007).



The stadium owners decided that whilst expanding the stadium to more than 11,000 seats, which is an audience area of over 5,500m², they would resolve the historic issue of poor intelligibility (0.44 STI) with the PA system.

Genuix Audio's technical team supported by Duran Audio Iberia, opted for a centralised sound system, one focussed around the score board. Using 4 x AXYS® DS1608 which not only have the ability to offer over 98dB (continuous) evenly across a range of over 50mtrs, but also allow for preset programming that allows the stadiums sound system to be reconfigured quickly for a variety of uses, such as live performances, tennis matches, motocross, etc which are also staged at the venue.

The digital directivity control of the Intellivox loudspeakers is a real advantage since the sound emission patterns can be adapted for each of the shows based on the audience areas and the position of the video scoreboard.



Despite having a reverberation time (T60) at the Palacio of around 3 seconds. The new system has achieved a remarkable intelligibility level of over 0.56 STI at a level around 94dB.

Even the press has echoed the quality of this new sound system "the sound is much more crisp and clean, reducing the feeling of disco that recently wrapped the basketball game," Málaga Hoy 10/10/2010. ♦

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