

The magazine of the  
Institute of Sound and  
Communications Engineers

**February 2012**

# ISCE

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# Introduction from our President

Terry Baldwin *ComplnstSCE*



What a few days!

First the visit to ISE Amsterdam where we witnessed Ros working hard, pulling in new members, including a few more supporting members. Well done Ros. Ros tells me there was much interest shown

on the ISCE stand and in fact it proved to be a useful meeting point for members.

Then came the snow for a few of us in the East and South. I live in a little Sussex village, where the words 'snow plough' are synonymous with crop failure. Fortunately we live between two very fine pubs and it is in one of them that I've taken to writing this.

Members don't talk technically to me... can't think why. However, many speak about the future of our institute. The topic of 'where are we going?' is paramount on the Council's agenda.

Of course we always need more members. Each existing member ought to be able to find just one interested party to join us and that would make all the difference to finances, when we would then be able

to pay for a professional website, help for Ros, fund more technical seminars and so on. We are so nearly there. Is your beer glass half full or half empty!

ISCEx2012 is soon to be upon us. 28 February at Jury's Hotel, Milton Keynes. A great location for most people, especially Keith and Dave of DNH Worldwide, who we know will be there.

May I take this opportunity to thank those who attended the Institute's Annual General Meeting. To say it was lively could be taken as an understatement. Many interesting items were discussed both at and after the meeting and across lunch. If you haven't been to an AGM, pop it into your diary now for early October 2012 – exact date and venue to be confirmed.

It was very unfortunate that we were unable to hear from Michael Jakins who was to speak on the new Health & Safety guide HSG195, but time beat us. Michael has promised to talk to us on the next appropriate occasion. Thank you Michael.

Well I hope you all enjoyed your Christmas and you all received the gifts you wanted, such as an amplifier, indoor speakers, an induction loop system and microphones galore. ♦

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

## Events diary

**28 February 2012**  
ISCEx2012, Milton Keynes, UK

**15 March 2012**  
Using Social Media for Business training – Watford, UK

**21–24 March 2012**  
Prolight & Sound, Frankfurt

**16–19 April 2012**  
NAB Show, Las Vegas, USA

**17–18 April 2012**  
PLASA Focus, Leeds

**1–3 May 2012**  
PALME, Middle East, Dubai

**9–12 September 2012**  
PLASA Show, London, UK

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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## Procurement strategies

By David Futers *MInstSCE*

If you are installing systems in churches and village halls you might wish to stop reading this article now, but if you are looking to play with the big boys then perhaps you might get some useful information from this.

Procurement strategies are, or have been, written by many of the major organisations and definitely by public bodies such as Health Authorities, Education Authorities, Police, Fire and Councils. They are written to ensure that these organisations get good value for money from the public funds they allocate and it is no longer the cost of the project that will ensure you will get the job. Indeed it is possible that a higher quotation may get the business because of the added benefits the organisation brings to the table.

Organisations now look at a number of other factors when procuring work and they now require a close look at your internal policies to see if you are an organisation they wish to partner with. Councils now look to engage local companies but if they need to go national they look to see if you can in any way bring along a local workforce which helps employment in the area they are located. On large contracts they may look at what you can do to help with local regeneration and working with local voluntary and school groups. I am involved in building a £9 million office block and have got the main contractor to do some groundworks for a neighbouring housing estate. Residents on the estate have raised grant funding to develop a community forest and they need ground works and a block of concrete to mount a pit wheel at the entrance.

So lesson one is to read carefully the Pre-qualification questionnaire (PQQ) together with the supporting information you have to submit if you want to work on larger contracts.

A lot of organisations are working with framework contracts now and is worth considering if you wish to become a framework contractor for organisations. In general they only renew frameworks every five years so you need to register an interest at an early stage to ensure you have a chance to get onto the framework list. If you do get onto the framework list this does not mean you get all of the work. You will still have to price for individual contracts and the organisation will



give the work out to one of the framework contractors based on a set of predetermined criteria.

In some cases you may have to enter into a partnership with a framework contractor and be part of his framework bid. He will want to ensure your methods of working and your social responsibility fits in with his and you are able to keep up with your end of the bargain.

Another consideration which comes into the equation is the EU regulations and how they affect the route taken to procure works and services. The current thresholds are: £3,927,260 for the procurement of works; £101,323 for the procurement of supplies and so called Part A services by Central Government bodies, and £156,442 for the procurement of supplies and Part A services by other public sector bodies. Organisations have to adhere to these rules and regulations but a way round having to go and advertise in the European Journal each time they want to procure goods or services is that they can set up a buying group representing a number of organisations and then appoint framework contractors. As this takes time and effort the contracts for such agreements could last up to five years and you will not get a chance to be on the list till after this period has expired.

If you are new to these methods of procurement, a look on your local council website might just have information and help to ensure you can compete with similar organisations and they should also list contracts they have coming up in the future. Northumberland CC has a department to help companies around the procurement minefield and have run courses to help local business. ♦

# ISCE

The Institute of Sound and  
Communications Engineers

**15 March 2012**

Park Inn Hotel, Watford

**Non-member £170**

**Member £145**

**Three or more persons  
from the same company:  
10% off each individual fee**

**All fees exclude VAT**

## Using social media for business

**Presenter:  
Ivor Kellock**

**Ivor Kellock is a visionary. He believes that the way we do business is changing rapidly and he wants to show us how to use social media and the web to our business advantage. He wants us to embrace e-marketing, Twitter, Facebook, ad-words, LinkedIn and all those other buzz words we may have heard about, even use, but do not understand sufficiently well to use to full advantage. Listen to him and you will find how you can use new techniques to build your business. You will leave this one day course with a new outlook.**

Ivor Kellock brings you this full day of interactive training showing you how to combine the power of your website with LinkedIn, Twitter, Facebook and Youtube.



Training Courses

## NSR install new speaker system for 2012 New Year's Day Parade

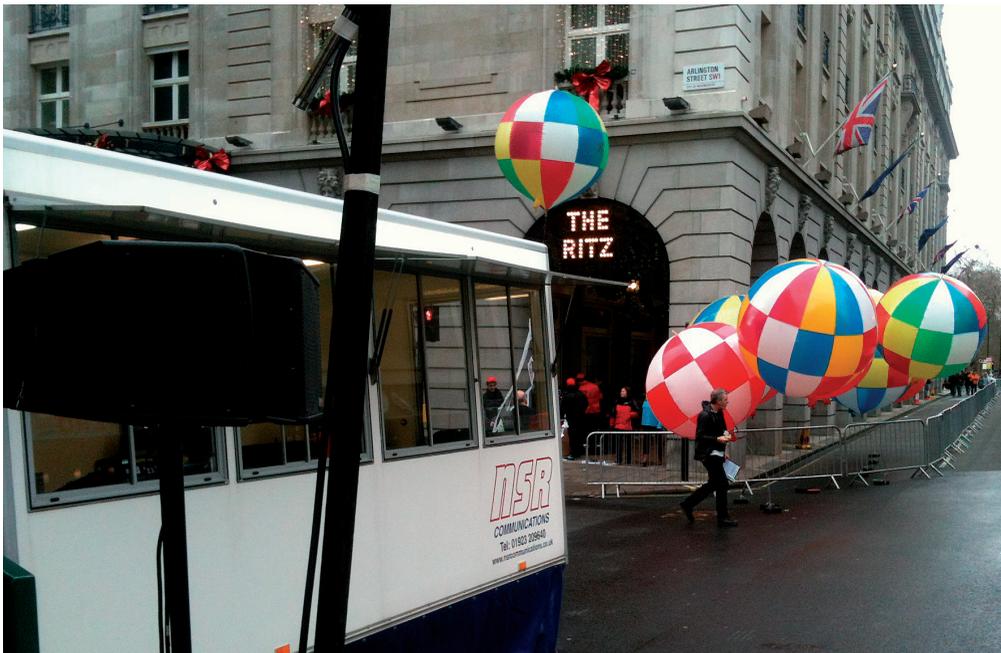
NSR Communications is delighted to announce the arrival of their new loudspeaker system; the EAW JFL210 loudspeakers, which had its first successful installation at the start area of the 2012 New Year's Day Parade. The JFL210 loudspeaker is an ideal solution for many applications, including live sound reinforcement for concerts and events, making them ideal for the New Year's Day Parade. The enclosure size, shape, weight and rigging of the JFL210 loudspeaker are optimised for easy transportation and installation and can be individually pole-mounted or alternatively arrays can be easily flown, ground stacked or permanently installed.

NSR has provided the sound and communications for the London New Year's Day Parade every year since its inception on North Carriage Way Drive of Hyde Park 26 years ago when the team for the event consisted of one man who installed six speakers, one lead mic and one radio mic. Today the New Year's Day Parade requires a team of 15 NSR technicians responsible for six PA sites all with single tier commentary units and a seventh PA site at the finish arena in Whitehall,

which had a two tier commentary box housing the live commentary team and the media crew that broadcast the parade on world-wide television. The sound system installed in this area was the NEXO PS15 sound rig, which NSR introduced into their stock in 2011. In total these PA sites required over 650m of cabling as well as 10 generators up to 20kVA.

In addition to the PA sites, NSR also provided a two-tier unit situated in Whitehall opposite Downing Street, which acted as the overall control unit and housed the Police, Security, St John Ambulance control, Westminster City Council and the Event Control. This control unit provided the central point for contact with all services throughout the parade route.

NSR has been supplying the event industry with audio and visual equipment for purchase or hire for over 50 years and the team is looking forward to a busy 2012 culminating in providing the sound and communications once again for the 2013 New Year's Day Parade. ♦



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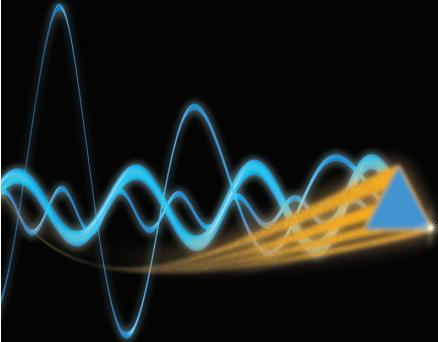
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**LEADING THE WAY TO SAFETY**



# CAN YOU BELIEVE IT?



This plastic mounted loudspeaker was installed in a sauna.

**If you have any strange or funny snippets to add to this column, we would love to include them in future issues of the magazine.**

# **NSR**

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Website: [www.nsrcommunications.co.uk](http://www.nsrcommunications.co.uk)  
E-mail: [sales@nsrcommunications.co.uk](mailto:sales@nsrcommunications.co.uk)

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## Report on meeting with Action on Hearing Loss

Doug Edworthy and John Woodgate attended an excellent meeting with Action on Hearing Loss (formerly RNID) in January to discuss the promotion of ISCE AFILS assessment scheme, ISCE training courses, and referrals of enquirers to ISCE members.

### ISCE training courses

Kevin Taylor of Action on Hearing Loss attended the ISCE's AFILS measurement and certification training course in December and the charity considers the ISCE AFILS training and certification courses the best it has experienced, and are the only courses that Action on Hearing Loss feels able to endorse. It now wishes to send a number of its technical staff on ISCE AFILS training courses.

Action on Hearing Loss is considering how it could promote the training and point to it as the qualification that potential customers should be looking-out for in its installers.

### ISCE AFILS assessment scheme

We described the scheme and the entry qualifications for ISCE members wishing to participate, and we showed the relevant pages on the ISCE website. We were asked about the selection/screening process used, and Action on Hearing Loss expressed general satisfaction with it.

It is interested in the CPD aspect to the scheme and we explained how CPD certificates are issued to those attending ISCE events and training.

Action on Hearing Loss will link to AFILS assessment scheme via its website and materials.

### Referring enquirers to AFILS installers

After discussion, the current ISCE policy was considered appropriate – ie referring enquirers to the membership pages of the website so that the enquirer takes responsibility for the choice.

Action on Hearing Loss confirmed that it would be comfortable in referring enquirers to the ISCE Register of Members, but wanted clearer information to identify those members with proven expertise in AFILS. We are considering how this can best be done.

Action on Hearing Loss is proposing to provide a link to the ISCE Register of Members from its website, with appropriate text encouraging those selecting a loop installer not to accept loop installation services from any engineer who does not appear on the register.

The ISCE members at the meeting agreed that the relationship we have established with Action on Hearing Loss will bring great benefit to the Institute and its members as well as raising the standard of AFILS design, installation and maintenance for the benefit of Action on Hearing Loss's members – the hearing aid user community. ♦



## Octo Sound Store at ISCEx

Tony Barns will be happy to demonstrate the new Octo Sound Store to you at ISCEx exhibition.

Avoiding the need for a USB connection to a PC for programming, the Octo now has a colour TFT screen and a navigation wheel for swift and easy self-configuration.

The user prepares audio wave files on any device that can save to SD memory card. Then he/she moves the card to the Sound Store and sets all the criteria for triggered to timed playbacks. It's easy to set and test all the settings, whether the Sound Store is installed in the PA/VA system or on the designer's desk. Barns also provide a comprehensive PC configuration utility so that a library of SD cards can be prepared off-site. ♦

## Plans for new website

Since Institute Day 2011, Council has been looking to replace the existing ISCE website with a more fashionable design. It's not a small task; there are 40 pages there at present and we will be adding more, as a result of closer ties with Action on Hearing Loss (formerly RNID).

Since the appearance is crucial, we will be enlisting a professional designer, either to produce a complete site or to work with members. Of course the site will need to be maintained in-house as it is at present. Some of the present pages reflect a somewhat older style and the new site will have a much more uniform presentation.



A basic proposal has been received from a member and development work on the new site will begin shortly. ♦

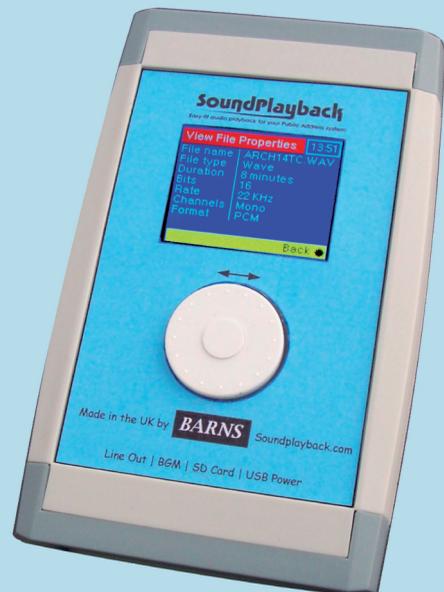
## 2012 AGM minutes available

The AGM minutes and questions raised at Institute Day in November, are now available on the ISCE website, members' only pages, for you to view. Unfortunately, we are unable to supply CD recordings of the day to those who requested a copy, because of a technical problem after the event, for which we apologise. ♦

## New Sound Store from **BARNs**

The quickest way to add audio playback to your PA/VA System — fit this Sound Store with in-built programming screen!

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- 0dB balanced audio output



Prepare your audio recordings on SD-Card using a PC, MAC, Mobile, etc. Put the card into the Sound Store and use its screen to configure playback triggers and times.

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01353 740225 [www.soundplayback.com](http://www.soundplayback.com)

# Exhibition and Seminar Day

Tuesday 28 February 2012 · 9.30am–5pm

Jurys Inn Milton Keynes, Midsummer Boulevard, Milton Keynes, MK9 2HP

t: +44 (0)1908 843708 f: +44 (0)1908 843777 w: www.jurysinns.com

## Mix with the best in the business – Join us at ISCEx2012

At the most relevant event in the sound industry calendar, you will meet the people that matter most to your business, with informative seminars led by industry experts, running alongside the exhibition.

10.00am

### Are modern technologies always appropriate?

**Tony Barns** *MInstSCE*

**Managing Director, AK Barns Ltd**

In an era of convergence of technologies, often a technology is applied to a solution that is not always appropriate. This seminar will address whether the application of certain technologies compromises the integrity and reliability of voice alarm systems.

11.00am

### The science and art behind audio localisation

**Robin Whittaker**

**Director, Out Board Electronics Ltd**

Audiences find it distracting to see an actor on the right side of the stage, but hear their voice from a loudspeaker on the left. Spread this out across multiple actors and you have an audience stressed by the effort of trying to discern who is saying what. This seminar covers source-oriented reinforcement, effectively giving each performer their own PA system, voice localisation techniques and automation.

2.30pm

### Audio over IP – a new solution for old problems?

**Eric Bevilard**

**Global Product Manager, Ateis Europe**

The Audio over IP solution can be used in every-day applications, and its ease of use and integration enables a flexible system for a variety of different applications. This seminar will cover how you can fit this powerful solution into your daily projects for PA, intercom, retail and transport, in an efficient and effective way.

3.50pm

### The future of live sound – controlling the mix the new way

**Martin Daley** *AMInstSCE*

**UK Sales Manager, Allen & Heath**

Digital is here to stay, and in the case of live festival events to church and theatre sound installations, digital mixing can offer invaluable tools for creativity and control. This seminar will look at how these digital desks can be accessed using laptops, iPads and iPhones and the best ways to get them all talking to one another.

# ISCE

The Institute of Sound and  
Communications Engineers

All seminars will be commercially neutral, although demonstrations may use the speakers' own products



### How to get there

#### By road

Jurys Inn MK9 2HP  
M1 Jn 14, A509

#### Nearest train station

Milton Keynes

#### Nearest airports

Heathrow, Stansted, Luton

#### Parking

Parking is available  
opposite the hotel at  
£3.50 per day



### Exhibitors so far

ADS Worldwide Ltd  
A K Barns Ltd  
Ampetronic Ltd  
Ateis UK Ltd  
Baldwin Boxall Communications Ltd  
Canford Audio Ltd  
Cloud Electronics Ltd  
DNH Worldwide Ltd  
Fuzion Ltd  
Gordon Morris Ltd  
Ikon AVS Ltd  
Institute of Acoustics  
Out Board Ltd  
Penton UK Ltd  
RCF Spa  
Sennheiser UK Ltd  
Sound Directions Ltd  
TOA Corporation (UK) Ltd  
Voice Perfect Ltd

ISCEX is the perfect event to launch a new product. ADSworldwide will be launching their new T-series multi-zone/multi source matrix range and A K Barns will be launching the new Octo Sound Store.

Come and see for yourselves what else our exhibitors have to show you.

For the latest list of exhibitors, please visit  
our website [www.iscexshow.com](http://www.iscexshow.com)

## ADSworldwide launches new T-series at ISCEEx 2012



ADSworldwide are using ISCEEx 2012 as a platform to launch their new T-series multi-zone / multi-source matrix range.

At the heart of the range is the ADS T 8x8 Matrix, this clever 3u unit allows 8 signal sources as well as 2 dedicated paging microphones into 8 separate zones which, with additional T8x8s it is expandable up to 32 zones. Each zone can be controlled remotely a wall plate controls which means it offers complete flexibility whilst total control is maintained centrally via the master front panel.

In addition to offering control of level and source the wall plates allow a further balanced line input for each zone allowing connection of a local source, as well as microphone input and/or auxiliary input depending on the plate used. Installation of the plates is simple as the plates are connected using CAT5S cable and RJ45 plugs.

The ADSworldwide T-series is amplified by the ADS-T4Z range of power amplifiers, these reliable amplifiers deliver 4 channels 70V/100V line or low impedance 4~16Ω as 2 options, 4 x 120 watt (ADS-T4Z120) and 4 x 240 watt (ADS-T4Z240).

Flexibility, control and power makes the T-series ideal for installation into schools, leisure centres, hotels and restaurants. ♦

# plasa**focus**

LEEDS 2012, 17-18 APRIL



Remember to book your place on ISCE's seminar on 18 April 11.30am-12.30pm presented by Peter Mapp FInstSCE and Jon Raper MInstSCE

[www.plasafocus.com/leeds/seminars/](http://www.plasafocus.com/leeds/seminars/)

### 'Listen up' – diagnosing sound system problems with our ears

The most powerful sound analyser yet invented does not match the power of our ears and brain to identify and quantify sound. Many sound system problems can be identified and often resolved without the need for instrumentation – just a set of ears and a knowledge of how to use them. The aim of the seminar, which will be packed with live demonstrations and audio examples, is to let the audience listen to and see how a sound system should sound and respond and then demonstrate using both standard test equipment and live audio output what happens when a system is not performing optimally and has underlying faults or incorrect settings.

If you are interested in knowing how to optimise and fault find an audio system – be it in a theatre, church or a railway station, then this seminar is a must see (and hear!). Presented by two of the UK's most experienced sound system practitioners, you will come away with a wealth of information, practical tips and invaluable listening experience.



## Training report

Recent training activities have included the *AFILS design & installation and AFILS measurement & certification* course, held in Watford and presented by Doug Edworthy. Both courses contained new material and an up-to-date workbook can be obtained from Ros, by past delegates only, at a rate of £25 plus VAT each.

Last month, we held the *Basic training for sound system installers and technicians* course in Reading, presented by Terry Billau. This is the first time this course has been held in its 'certified' format, ie it includes an exam with a pass mark.

The results were good on the whole, but most delegates found the mathematics difficult. This is a real problem, because sound system design gets

very mathematical as one progresses to more taxing design issues. Nevertheless, the delegates clearly worked as hard as Terry to put on a good show. However, we have established that this course is a bit more than 'basic' and it covered a wide range of material. We are likely to have a revised specification for this course in future and aim to support this and other courses with some form of foundation courses in basic mathematics and basic electronic theory and practice.

ISCE training courses are excellent value for money, and the possession of a pass certificate is a very credible indication of a member's value to his company. ♦



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## The evolution of the 13 ampere plug and socket

Now retired and at the age of 95, Bill Shorey, tells us about his early designs

**T**owards the end of 1944, when a successful outcome of the war was anticipated, the Government gave serious thought to the problem of replacing the hundreds of thousands of dwellings destroyed by enemy bombing.

For electrical installations, the ring circuit method of wiring had already been determined as the most economical. A suitable standard plug and socket was now needed.

As a design engineer, I was taken off 'other work' to revert to my pre-war involvement in the development of electrical installation products and to cooperate with other manufacturers, the Institution of Electrical Engineers, British Standards and the Ministry of Works, in deciding on a suitable design.

The specification at first, was for a socket outlet rated at 10 amperes with local fusing at each socket with an appropriate 3 pin plug. Pre-war, there was a conglomeration of standard plugs and sockets in 3, 5 and 15 ampere ratings with 2 and 3 pin versions of each and also many non-standard types. The 5A 3 pin, size to BS 546 was chosen as the one to up-rate, subject to satisfactory tests results.

Stringent tests were carried out at 10A and the products passed easily. However, the Ministry then decided that an allowance had to be made for 3kW appliances and further tests were successfully made at ISA.

A spanner was then thrown in the works, because it was belatedly realised that the socket outlet was the wrong place to locate the fuse. Several ratings of cartridge fuse were being standardised to suit various ratings of appliances and obviously users were not going to keep changing the fuse in the socket to suit the difference appliances being plugged in.

This meant that the fuse had to be in the plug and of a current rating appropriate to the connected appliance. However, this ruled out using the 5A plug and socket because of the thousands of unfused plugs already in circulation and could then be inserted to an unfused socket on a ring circuit backed up by a 30A fuse or circuit breaker at the distribution board.

The requirement then was for a standard 13A fused plug and a mating socket which were non-interchangeable with any known existing types. After much deliberation regarding the shape and type of pins and configuration, agreement was reached and a British Standard was prepared and issued as BS 1363.

The original standard was for unswitched sockets, but with the miniaturisation of AC switches, most sockets are now switched. To avoid the possibility of human contact with live pins during insertion and withdrawal of a plug, the pins were later sleeved.

I am probably the only person about today, who knows this history, so I thought I would put it down on paper in response to several requests and before it is too late! ♦



# Integrated Systems Europe



## Biggest-ever ISE, Amsterdam provides the perfect start to Europe's integration year

Integrated Systems Europe broke all records with registered attendance of 40,869 over the three show days of Tuesday 31 January to Thursday 2 February at the Amsterdam RAI.

Beyond the statistics, the sheer excitement generated by so many professional people converging on a show full of dynamic new technologies created an atmosphere unsurpassed by any previous ISE.

The space-rebooking process for ISE 2013 began on the second morning of the 2012 show with many companies choosing to size-up for next year.

The ISCE stand was busy, particularly on day two, with European visitors showing an interest in ISCE's training opportunities and throughout the show, our own members converging on the stand to meet Ros and find out the latest news on our activities. ♦



## Anthony Walker retires

**A**t 75yrs, Anthony Walker FInstSCE, Founder and Chief Executive of Scarecrow Bio Acoustics Systems, is saying a fond farewell to his colleagues and friends in the industry, so he can finally take a well-earned rest.

Anthony says "I have to say thank you for your support over the years of trading together, some of you who go back to when I owned The Millbank Electronics Group, sold in 1990 – when I had the original intention to retire."

"I have enjoyed developing my audio experience into efficient bio-acoustic bird dispersal systems and in creating novel products for our subsidiary Communication Technology."

Terry Baldwin, President of ISCE, congratulated Anthony on his knowledge of our industry, which he described as legend. Terry says "his inspiration has been of benefit to so many throughout the sound industry, including Baldwin Boxall, and he will always be looked upon as an ambassador".

John Woodgate, Vice President of ISCE, remembers Ken Walker (ex Secretariat of ISCE), asking him, in confidence, about Anthony's plans to develop his product. John quoted an RSPB article that said



acoustic bird-scarers don't work because the birds get to learn they are no threat. But Tony persisted and proved that twitchers don't know everything.

Anthony will continue to enjoy receiving his ISCE magazine every quarter, to catch up on the news. ♦

### New Members

February 2012

#### Member

**Steve Badham**

#### Senior Technician

**Simon Hurditch**  
Simcol Communications Ltd

#### Technician

**Mark Birch**  
Gordon Morris Ltd

**Dan Roberts**  
Gordon Morris Ltd

**Jon Tilver**  
Royal Society of Medicine

**Chris Hewitt**  
Royal Society of Medicine

**Ayhan Behic**  
Royal Society of Medicine

#### Temporary

**Keith Barker**  
The Works Technical

**Paul Smith**  
The Works Technical

**Kevin Beazley**  
Bosch Security Systems

**Stephen Binks**  
Current Thinking Assistive Listening Ltd

**Joseph Ayre**  
Current Thinking Assistive Listening Ltd

**Rob Brooks**  
Vaughan Sound Installations Ltd

**James Jackson**  
Vaughan Sound Installations Ltd

#### Ben Cottingham

Ashdown AV Ltd

**Liam Pickett**  
Ashdown AV Ltd

**Craig Greensill**  
Simcol Communications Ltd

**David Taylor**  
Simcol Communications Ltd

**Thomas Krippner**  
Tyco Integrated Systems

**Matt Slade**  
Gordon Morris Ltd

**Anna-Marie Shearer**  
Steve Jones Associates

## Your charities need you!

**Ron Walker** *ComplnstSCE, Charities Administrator*

**T**he last two issues of the ISCE Magazine carried articles by me on behalf of the Trustees of the two industry registered charities. Despite the present hard times, these charities both need and deserve your support. We never know just when even the most careful of us might need that little extra for a life-threatening operation, a help with tuition fees for a talented youngster, or a short-term loan to deal with an unpredictable domestic crisis.

**The Public Address Engineers Benevolent Fund** (216648), was set up in 1962. Any bone fide person engaged in the sound industry can apply for assistance, which will be vetted by a board of independent trustees.

**The Alex J. Walker Memorial Fund** (262085), with a separate list of trustees and named after the founder of our predecessor organisation, the Association of Public Address Engineers (APAE) was established in 1969 to provide help with education and training in the industry.

In the past, money from this fund had been used to subsidise some of the training courses, which otherwise would be too expensive for members to attend.

Please earnestly consider making a donation, however modest. Where possible, please Gift Aid your donation, turning £100 into £125 courtesy of the Chancellor of the Exchequer. Please send your contribution by post to myself as Charities Administrator, Ron Walker, 132 High Street North, Stewkley, LU7 0EP. (Please nominate preferred charity, and if transferring funds by BACS ask Ron at ron@stewk.co.uk or phone 01525 240444.

For further information, quote either of the above charity registered numbers on the Charity Commissioners website, or pick up further information at ISCEX 2012, where the trustees will also be glad to answer any questions. ♦

ISCEX2012 28th Febuary, Jury's Inn Milton Keynes

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# Where did the wind blow my sound?

or 'Anomalous propagation of acoustic waves due to meteorological influences'

John Woodgate *FlntSCE*

**T**hese relatively uncommon effects due to the weather often come as a nasty surprise, especially if you don't operate outdoor systems very often. They range from problems of people not hearing on the site to problems of people 10 miles away hearing much more than they want. In the worst case, both at once!

## Sound radiation over distance

An omnidirectional source outdoors would obviously radiate into part of a sphere, depending on its height above ground level. But most sources (loudspeakers) used outdoors are directional, so we may consider radiation along the principal axis, where the radiation is strongest, without too much risk of error.

At a distance above ground, in good weather the radiation is predictable. Near the ground, the radiation tends to be effectively delayed by interaction with the ground covering, especially long, sparse grass.

Dense grass tends to appear like a smooth surface, however. This delay causes the direction of maximum radiation to bend down towards the ground, which may be an advantage in reducing sound spill outside the venue. The same effect occurs if the temperature of the air just above ground is much lower than the air temperature at a height; the speed of sound is lower at low temperatures. The effect can actually be 'encouraged', if necessary, by deliberately aiming the loudspeakers at points on the ground near the site boundary.

## Effects of wind

Headwind (blowing towards the source), being stronger at height, tends to refract the sound upwards, away from the ground, while a tail wind refracts it downwards. These effects are quite noticeable; the 'wavefront' only needs a small push at the top to deflect it significantly. On the other hand, a cross wind tends to deflect the sound sideways, but not much. A 60 mph cross wind deflects by about 4.5°, or 8 m at 100 m distance.

## Humidity

For humidity values over 50%, the effects of humidity are fairly well-behaved. But at low humidities and especially at low temperatures, the attenuation of high frequencies can be large. For example, at 10 °C and 20% RH, the attenuation at 4 kHz is over 9 dB/100 m, and far more at 10 kHz.

Conversely, the attenuation at high humidities may be unexpectedly low.

## Temperature inversion

This is often the most traumatic situation. If a layer of warm air is trapped below a layer of cold air, often resulting in fog or mist, sound can 'tunnel' through the warm layer with very low attenuation with distance.

Effectively the atmosphere is making the loudspeakers have the same fan-shaped directional response as a line source, and quite a tall one. The result can be that disturbing sound levels occur at considerable distances, leading to complaints and possible official retribution. This is probably what happened at Glastonbury in 2007, if you can remember that far back. ♦

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