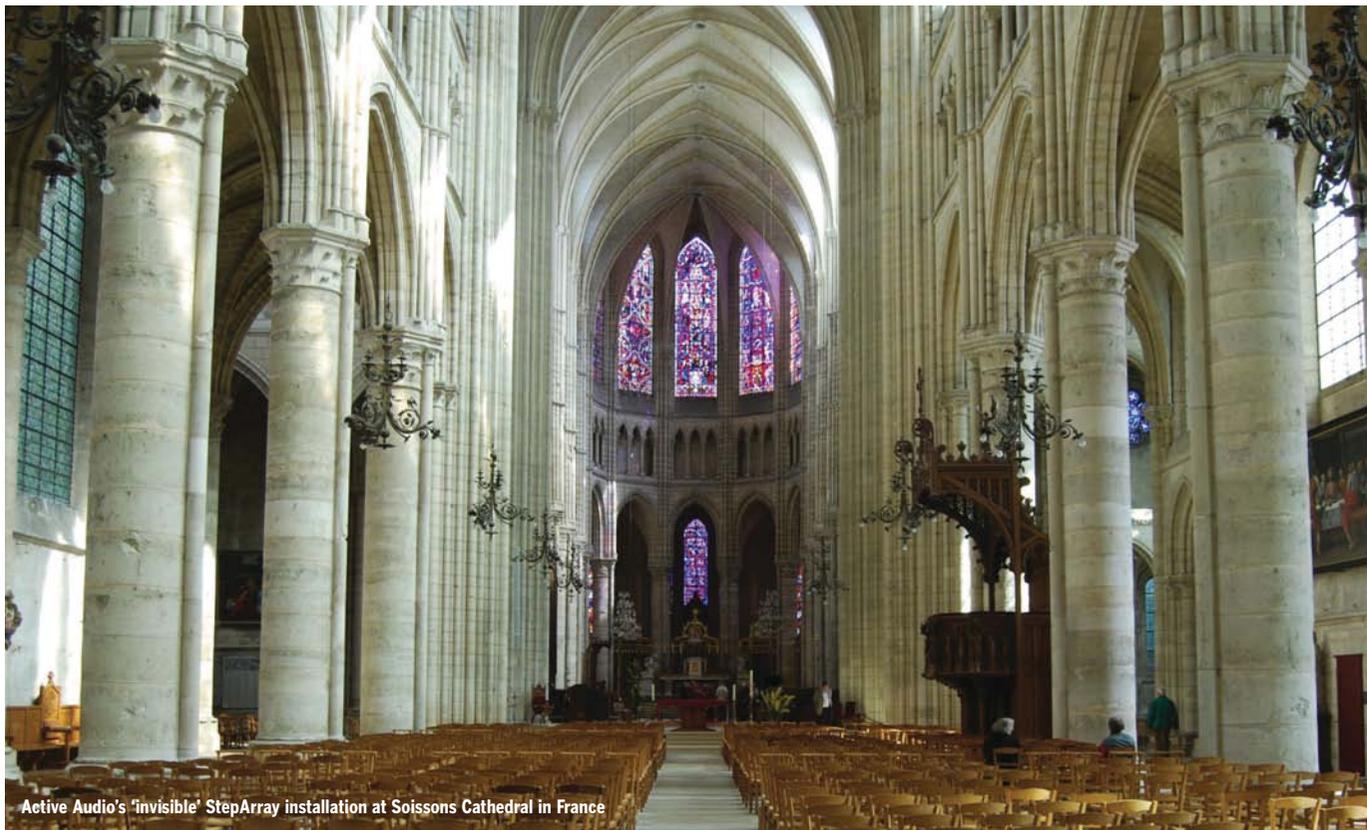


Service upgrades

Audio has a big part to play as cash-strapped houses of worship seek to expand their revenue-generating opportunities into new areas such as concerts and tourism. **Gez Kahan** looks at how modern technology can help them



Active Audio's 'invisible' StepArray installation at Soissons Cathedral in France

Key points

- Multipurpose systems can help HoWs raise extra revenue through events such as concerts, but intelligibility of the spoken word remains the prime consideration in every installation
- Beam steering and DSP technology are the main tools for dealing with excessive reverberation in difficult acoustic environments
- Sound systems, especially in architecturally noteworthy buildings, should be heard and not seen
- Modern installations favour multiple-use, DSP-driven systems with layman-friendly control surfaces
- Upgrading an existing system may be possible but might be a false economy once time, labour and lack of future-proofing are taken into account

By every measure, the traditional church in Western Europe is in decline. The reference source *Religious Trends* reckons that UK membership – across Christian denominations as a whole – has fallen by 30% in the past 30 years, and regular weekly attendance by 40% in the same period. Some figures are rising however – such as the average age of those attending, up from 37 in 1980 to over 50 in 2010. And it's the same story in almost every other EU country – Poland and Ireland being notable exceptions.

The statistics are undeniable, and the economic consequences are inescapable. For a traditional church struggling to attract its traditional congregation (and the income that accrues from it), the choice is stark: shut up shop (the Church of England, to name but one denomination in one country, currently lists 14 churches for sale, and puts the annual closure figure at around 20) – or find other ways to make up the shortfall.

The opportunity for installers, therefore, is increasingly to provide not just sound reinforcement for use

during services, but multipurpose systems that can help houses of worship mine additional revenue streams



‘Churches are going for more flexible control, and chiefly digital management systems’

Léon Phillips, Allen & Heath

such as tourism, concerts and special events. Technology can help, but only as long as it's simple enough for a non-techie to operate.

“A sound system for a church from 15 years ago would mostly rely on a mixer amp with set gain values and a bass and treble control,” says Neil Voce, MD of Ateis UK. “Now with programmable DSP units, churches can have a lot of intelligent processing for EQ, compression, auto mixing and so on while leaving only the most basic controls visible on the unit for the lay person to adjust.”

“It depends on the type of venue,” says Fohhn sales and marketing director Uli Haug. “The larger, historical houses of worship that have a number of broadcast services and concerts place great emphasis on audio quality and require excellent reproduction of speech and music. This often results in complex systems that can be adapted for multipurpose use. The system needs to be flexible, with sufficient dynamic range and directionality to cope with the acoustics of the venue.”

Churches, agrees Léon Phillips, product manager at Allen & Heath, “are going for more flexible control, and chiefly digital management systems which allow for the quick recall of different states

often by ‘unskilled’ operators”. Distributed digital audio and interfacing options, he adds, allow control surfaces to be located from a variety of positions. “They also allow inputs and outputs to be patched in from different (and often temporary) locations, in different formats, such as analogue XLR, MADI, Dante and EtherSound.”

Seeking clarity

These ‘add-on’ benefits can't, of course, come at the expense of the building's primary function, or its aesthetic appeal. “The requirements for a house of worship are twofold,” says Mark Flanagan, communications manager for Tannoy. “First of all, it is the sermon that is important – so the key requirement is

intelligibility. That's a challenge on its own. Particularly in Europe, churches can be medieval buildings, where acoustics are very bad – cavernous, old stone places with really high reverberation times.

“The other main part is the actual worship itself, which generally means singing. Again, this is a challenge that has changed in recent years, as more modern congregations and churches incorporate live music and instruments into the service. And that's where the brief that an effective PA has to fill gets a little bit more complicated: it needs to be full range, you need to have some low-frequency extension, some bass control, and it needs to offer higher performance, higher outputs. The standard

ONLINE EXTRAS: CASE STUDIES

➤ **Saint Geneveva church, the Netherlands: A Vari-directional solution from Bosch has improved intelligibility of the spoken word**

➤ **Mainz Cathedral, Germany: Fohhn Linea Focus, Linea LX and AL series speakers have been installed as part of an upgrade to this impressive cathedral**

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A Fohhn Linea Focus system is employed to overcome the high reverberation of Mainzer Dom

A modern solution to a post-modern problem

The striking post-modern design of Vicques Church in Switzerland and its stunning stained glass montages in particular, attract a steady stream of visitors, but pose severe acoustic challenges. A plethora of hard surfaces reflect sound off the back and side walls, and – prior to the installation of a Tannoy QFlex system – rendered vocals barely intelligible and often

inaudible. Recorded music, played during services and as a background while tourists were looking around, lacked clarity and had to be kept to relatively low levels to avoid excessive echoes.

After making do for nearly 50 years because of fears that a full acoustic redesign would be necessary but prohibitively expensive, the church bit the bullet, and was surprised to learn that a full-range beam-steering

system could solve the problem.

The QFlex system, supplied by Tannoy's Swiss distributor Decibel, and installed by Charles Widmer SA, directs controlled beams of acoustic energy to user-defined target areas, thereby minimising the level of sound reflected off the walls, floors and other hard surfaces. And because QFlex's beam control goes beyond 12kHz, the resultant clarity applies not just to



CASE STUDY

speech but to musical content too – all without breaking the bank.

voice paging systems that are installed in many old churches just don't cut it – you get a lot of distortion and things like that.”

Beam steering – by focusing sound away from reflective surfaces and directly onto the congregation – helps intelligibility, of course, and not only in old buildings. Flanagan points to its use in the post-modern surroundings of Vicques Church in Switzerland (see case study, above). And, he says, as long as you've specified a product with full-range beam control rather than just across the frequencies appropriate to speech, a beam steering system can do the same for musical content too.

The sound of music

The type of music has to be taken into account, however, as Xavier Meynial, Active Audio's founder and technical director, notes. “In traditional European churches, in the vast majority of cases, it is classical music, ranging from recital to chamber music, symphonic music, or choral music,” he says. “Their long reverberation times may be suitable for choral music, but not for recitals or chamber music which require much shorter RT.

“These concerts are not often amplified – but if the audio system is capable of generating a strong and even direct sound over the audience, such as you can achieve with DSP column speakers, it may be beneficial since it will increase the presence and clarity of the performance. But high SPLs for pop music or even symphonic music generally require big loudspeakers, which are aesthetically unacceptable in historic European churches such as Soissons Cathedral where our StepArray installation had to be, to all intents and purposes, invisible.”



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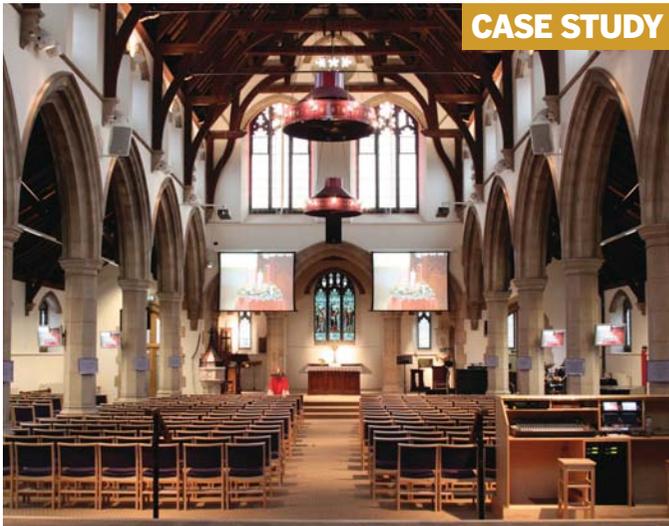
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CASE STUDY

There are plenty of recent high-profile installations to illustrate that last point: the Ateis system installed in the Gaudi-designed Sagrada Familia in Barcelona in time for the papal blessing last November; the Fohhn Linea Focus system (plus QSC Q-Sys networking) for the impressive (and impressively reverberant) Mainzer Dom; Bosch's systems for the Franciscan Sisters in Denekamp and for the Church of Saint Genoveva in the Netherlands; the huge Martin Audio/RCF installation at Westminster Abbey; the multipurpose Dynacord/Electro-Voice system in the Jakobskirche (Church of Saint Jacob) in Nuremberg; and RG Jones's elegant JBL-equipped solution – with discreetly mounted delay speakers – for the chapel of Trinity College, Cambridge (and you can read about all these in more depth on the *IE* website).

One size fits all?

Aesthetics aside, it obviously makes financial sense if a house of worship's many and varied audio requirements can all be handled by a single system.

"That," says Meynial, "depends on the type of music or events the church plans. When high SPLs are required, another system might need to be used or it might be necessary to extend the frequency range, for example with subwoofers. In addition, when sound technicians are handling the event, they often prefer to use equipment they know rather than the audio

system of the church which they have no experience with."

"If the system has flexible busses then different scenarios can easily be accommodated by the core DSP," says Phillips. "Being able to expand a system in terms of additional inputs and outputs is a key feature as everyone has to be budget conscious with the



'The visual impact of large audio systems might pose problems in churches'

Xavier Meynial, Active Audio

initial investment."

One area in which such technologically advanced solutions are already commonplace is the more evangelical end of the market. Richard Ferriday is product manager for Midas Consoles. "As the architecture of houses

of worship moves away from the traditional, towards a more 'theatre' style of building, then the audio requirements change to become appropriate for this type of venue. Both speech intelligibility and the ability to fill a large room with quality, full-bandwidth sound for presentations and modern live worship bands are now high-priority requirements," he says.

"Typically, any correctly configured audio system capable of projecting live music to every seat in a venue, will be able to function as a PA system for spoken word too. This is one area in which digital mixing consoles offer significant advantages over analogue, as they can be pre-programmed for multiple applications, making otherwise complex reconfigurations quick and easy for the unskilled volunteer operator."

Sum of the parts

There is, of course, a further economic equation to consider. Houses of worship might be perfectly alive to the revenue-generating opportunities of multipurpose audio systems but reluctant – particularly if they already have some sound reinforcement in place – to splash out on a complete refit. Such customers will often want to look at the viability of an upgrade instead.

The other side of that coin, Phillips believes, is where too much labour and time is needed to be able to change the system to meet different demands – such that an upgrade rather than a refit might be a false

Multiple EV units for UK HoW

The brief to Creative Digital Solutions from the 1,000-capacity St Paul's Church in St Albans, UK, was to design and fit a new multi-speaker live system, integrating it with the extensive multimedia system it had installed in 2008. As an Electro-Voice supplier, CDS specified a system drawing on the different characteristics of several EV products, including vertical beam shaping and DSP.

Through EASE modelling, CDS determined that an Xi2123A/106F should be flown as the main central speaker. The speaker's vertical beam shaping, processed via a NetMax 8000, reduced LF arriving at the platform directly below and optimised the

tri-amplified configuration, driven via an EV CPS 4.10 amplifier with remote monitoring.

EV's compact ZX speakers, in white, cover the main body and side aisles of the church, and, along with a separate 100V line auxiliary room relay system, are driven by a remote-monitored CPS 8.5 amplifier. With 16 outputs, the NetMax processor effectively EQs, delays and optimises all eight speakers within their specific areas.

For the signal from the traditional pipe organ, mic'd up at the rear of the Church, the NetMax is used to bypass the normal delayed audio settings for each speaker to minimise echo when mixed with the live worship band.

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Dynacord and EV components, including speakers, mixers and amps, have been installed in Germany's Jakobskirche



Some 80 RCF CS 6940 two-way cardioid column loudspeakers, as well as Martin Audio OmniLine micro-line array loudspeakers, have been installed as part of an upgrade at Westminster Abbey in London

economy. And anyway, he says: "Being able to save and recall new and complex setups is a huge advantage over older analogue systems. Fixed basic I/O count can sometimes mean the original equipment becomes obsolete or incompatible with a flexible distributed and expandable system."

"Of course, extending/upgrading the audio system makes sense if there's a real need for amplified music, and if the technicians are open to using the resident system," says Meynial. "If these conditions are met, then one has to check if the system is actually upgradeable: is it capable of providing the required SPL, is there sufficient bandwidth, will it offer even coverage of the whole audience area, and so on? If so, it can be useful to upgrade the system by adding speakers for SPL coverage and/or increasing the max SPL, adding subwoofers for LF restitution, adding microphones, adding or

modifying the EQ, and so on – always bearing in mind that the visual impact of such large audio systems might pose problems in churches."

"If a house of worship has one of the older 100V systems primarily intended for speech, with a frequency range of between 500Hz and 5kHz, it probably makes sense to refit as this may not sufficiently fulfil requirements for multipurpose use," says Haug. "Other systems can probably be more easily extended if the existing loudspeakers are able to handle the required frequency ranges and dynamics required for the different applications, as well as having an appropriate degree of directionality to fit the room acoustic."

However, cautions Ferriday: "It can be difficult to add to an already-installed speaker system. It is usually better to start from scratch with a complete new design. A more straightforward upgrade is to replace an old analogue

console with a configurable and networkable digital mixer, which can provide mixing and audio distribution for an entire building, and be pre-programmed for different events and applications."

Entering the mainstream

Ferriday is also conscious of the economic benefits of multipurpose systems. "A house of worship with a theatre-type auditorium can attract events from outside the particular faith, and these events can help in raising revenue for the cause. Many HoWs have gained a reputation as a sought-after venue for mainstream events, due to their investment in production infrastructure."

That, indeed, sounds like the perfect sales strategy for any installer looking for business in the houses of worship sector. ■

➤ Turn to page 50 to read about a beam-steering installation in a Baroque church in Germany.

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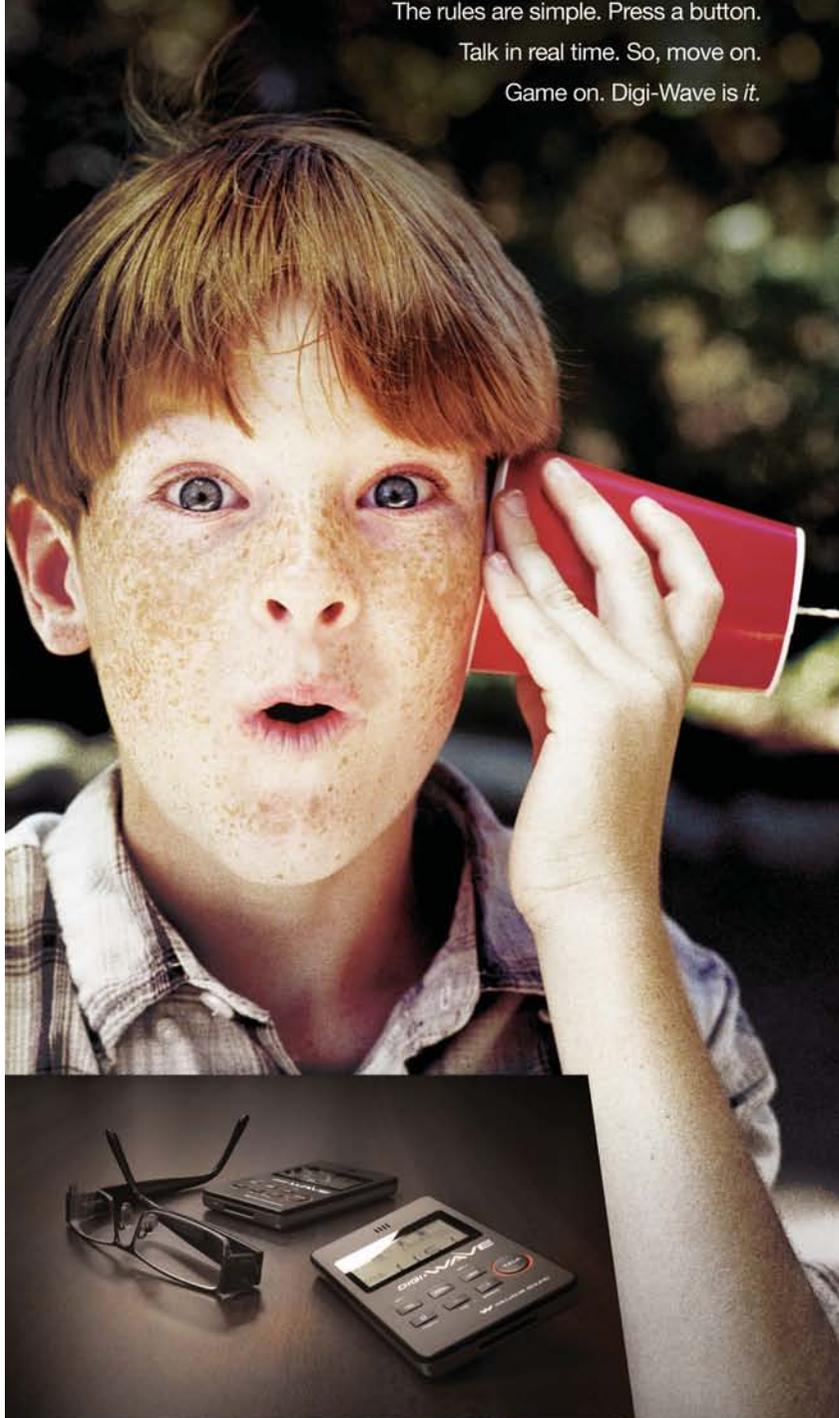
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