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The Bucharest International Light Festival - *Spotlight* which transforms the city's capital into an open air light art exhibition

Are you seeing the bigger picture?

Andrew Williams sifts through the dazzling array of projector options and assesses their best use cases.

» When it comes to choosing a new projector, businesses are faced with a bewildering array of options. So, which types of projectors suit which types of business application? How best should business customers go about evaluating projectors? Which functions are most important for busi-

nesses? And what are likely to be the key market changes, trends, technological developments and innovations in the projector market over the next few years?

Projector types

Generally speaking, there are two main types of projector on the market:

lamp based and Solid State Light Source (SSL) - including LED, phosphor laser and RGB laser. In basic terms, the difference between each type centres on the technology used to create the light.

According to Wolfgang Haunschild, product marketing manager, NEC Display Solutions Europe, the advantage »

of laser based technology is its “very long life and maintenance free design.” In his view, this makes it an “install and forget” solution requiring no lamp exchange, no filter replacement and no danger of dust ingress thanks to the sealed light engine.

“This makes SSL based projection solutions ideal for applications demanding long-term operation in permanent installations. Laser projection offers compelling benefits since these installations are often located high up at ceiling height where access is problematic,” he says. “Where usage is low, such as in classrooms and less-frequented meeting rooms, where access for maintenance is not an issue, then lamp technology still offers a good value option and the price of laser is not justified.”

Elsewhere, Chris Goff, BenQ UK’s product management head agrees that, in today’s market, laser projectors will suit most business applications because they are “ideal for bright meeting rooms and the laser’s high-lumen output ensures high picture quality and crisp text for readability.” In a corporate environment, he observes it is also important to ensure that projectors easily integrate with optional interactivity solutions for wireless presentation, convenient collaboration and meeting productivity.



Ocubo Criativo’s Confluence video mapping show exploring colour and form in Holland



Downtown Chicago’s Art on theMART public art installation which illuminates a 2.5m stretch of waterfront

“It is important for the end-user to make sure that the projector will suit their business installation, so manufacturers or resellers need to work closely with them to find the right solution for their needs,” he says.

Meanwhile, Nick Highton, associate director at Blend Technology Consultants (BTC) reports that he and his team have received “good feedback” from specifying solid projectors with laser light sources, which he believes is mainly due to their impressive start-up and cool-down times.

“It is frustrating that 4K/UHD projectors are still prohibitively expensive when designing an otherwise end-to-end 4K/UHD AV distribution system,” he says. »

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Nick Highton

Associate director, Blend Technology Consultants (BTC)

Evaluating the right option

When it comes to evaluating the right option, Goff thinks that the “first port of call” will be for business customers to discuss their requirements with solution experts and run through the projector solutions that are available to them - with the next step being a trial of the selected projector in the specific installation environment.

“This is really important as the business customer can test the projector features, adjust brightness levels and make sure it meets their installation requirements,” he says.

Meanwhile, Emma Bigg, director of AV design and strategy at Octavius RE, argues that the main initial factor for businesses to consider is to establish what the projector is being used for and by whom, what room it’s being used in and what your budget is.

“The room or rooms in which the projector is being used will determine what you need in terms of brightness and projection distance as these are determined by the environmental factors of ambient light, size of room and projector location,” she says.

In Haunschild’s view, the decision criteria relating to which projector to choose is mainly determined by the application and the requirements of the installation – and he highlights the crucial need to define the major requirements of the application at the outset.

“The major decision criteria is based on the requirement for brightness, image size and resolution. If the projector is mainly used to share information in meeting rooms, class rooms, museums or in digital signage, the brightness is the main decision criteria. Effortless readability is a must in order to ensure effective sharing of the information,” he says.

As Haunschild explains, the brightness requirement of a visual display is mainly determined by the environmental situation, with brightly lit spaces requiring very bright displays. He also argues it is vital for all users to pre-define the environmental conditions. In doing so, he observes that the desired brightness output has to be clarified, which is most commonly the screen area in m^2 multiplied by the light situation on the screen surface in lx , multiplied by the desired contrast. For example, this means that a meeting room screen of $6m^2$ with a light situation of $100 lx$ typically requires a contrast of 10:1 resulting in a required brightness level of 6,000 ANSI lumens - or $6 \times 100 \times 10$.

“The ideal image size depends on the type of viewing. We categorise this into



3D mapping delivering delight on the buildings of Moscow State University during the capital’s International Festival Circle of Light

ALEXANDER TOLSTIKH / SHUTTERSTOCK

three different viewing scenarios. For *analytic viewing* - a detailed view for active participation - image size should be one to two times the screen width. For *basic viewing* - providing a good overview of content but no detail - image size should be two to four times the screen width. For *passive viewing* - providing a big picture with only huge text readable - image size should be five to six times the screen width,” he says.

“Keeping the purpose of the meeting room in mind and mapping it with the room size and the distance to the farthest away seat, you will calculate the recommended screen size for appropriate visibility,” he adds.

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Wolfgang Haunschild
Product marketing manager,
NEC Display Solutions Europe

Levels of contrast

Depending on the screen size and application, Haunschild points out that different resolutions also have to be considered - with XGA and WXGA resolution still appropriate for cost-sensitive projects with small screen sizes, such as those required for classrooms.

Moreover, although projectors providing WUXGA resolution are also capable of achieving Full-HD content, he reveals that WUXGA and Full-HD resolution is currently seen as the most universal approach to meet the needs of most applications.

“In professional environments, 4K UHD projectors are becoming increasingly demanded in the installation projector market - for short viewing distances and where there is a requirement to see smallest details ‘pixel-free’ on a large projection screen. From a cost point of view, the 4K UHD resolution projectors address premium high-end setups, for example in a corporate board room,” he says.

Meanwhile, Highton observes that decisions relating to the most appropriate device depend on how central the projection is to a room or system, and how many instances of projection feature in a given project.

“Often the number of projectors in workplace projects is quite low, and room types mainly comprise training rooms and flexible spaces,” he says.

Highton also reveals that BTC generally uses an American National Standards Institute (ANSI) standard known as *Projected Image System Contrast Ratio (PISCR)* to arrive at the correct technical specification of projectors. This InfoComm-created standard defines four levels of contrast based on typical content viewing requirements.

These include *passive viewing* (7:1 contrast ratio), where viewers can readily distinguish text and recognise images on a screen but not achieve in-depth understanding of content; *basic decision making* (15:1 contrast ratio), where viewers are capable of making simple decisions based on screen-displayed content (often used in public information displays, as well as classrooms and, occasionally, in multi-purpose boardrooms); and *analytical decision making* (50:1 contrast ratio) where viewers are capable of making critical decisions based on the detailed analysis of content displayed on screen and full-motion video (80:1 contrast ratio).

According to Highton, PISCR calculations using this standard have proved to be very useful in applying some science in specifying projectors and projection screens.

“The type of projector we would consider depends very much on the application. For example colour reproduction, resolution and sometimes

For Concorde, icon of the sky, Projection Artworks created a stunning projection show and interactive experience inside Concorde's retirement home, Aerospace Bristol



acoustic noise are often critical for commercial and home cinematic applications," he says.

"Workplace projects generally have a higher level of, and less control over, ambient light in rooms and areas with projection, so brightness becomes a central theme. Likewise legibility is important for reviewing text for critical decision making applications, so text character height - and so image size - become important factors to review," he adds.

Functions for business

When it comes to sticker price, Brad Martin, product manager at Christie, believes that 3LCD remains the most affordable projection technology. However, if users need a projector that will be on for lengthy periods of time, or used in a high-demand 24/7 environment where image quality is key, he argues that 1DLP projection will cost less to operate over time.

"1DLP projectors have sealed optics, reducing the possibility of dust on the focal plane and minimising maintenance costs for the life of the projector. There are two additional advantages with 1DLP, with the first being that there are no convergence errors because there is only one chip. The image will be crystal clear over the long haul with no colour separation. The second advantage of 1DLP is you won't experience ghosting or burn-in," he says.



In Goff's view there are three projector functions that are 'most important to business installations.' The first is *ensuring the projector has the right brightness for the installation environment*, because there is no one best level for brightness and it will depend on the amount of ambient light and the size of the image. In his view, this is why testing the projector in the environment in which it is to be used and speaking to a knowledgeable source is so important.

"The second function is *matching the projector resolution with the desired source resolution*. Each projector has a native resolution, and this is the maximum number of pixels it can project, which can affect the compatibility of the projector with the user's device. In

short, users need to select a projector resolution to match the resolution or shape of the source material," he says.

The last function Goff believes business customers need to consider is *size of image* - largely due to the fact that meeting rooms too often have a projected image that is too small for the

"1DLP projectors have sealed optics, reducing the possibility of dust on the focal plane and minimising maintenance costs for the life of the projector."

Brad Martin
Product manager, Christie

audience, resulting in the people at the back not being able to read the content.

"This is OK for video, but when showing detail, like a spreadsheet in a finance meeting, image size really does matter. This can be overcome, by following the 4,6,8 rule where you should be no further away from the image than 4x image height for detailed content, 6x for PowerPoint type presentations and 8x for video. If businesses use this rule as a guide everyone will clearly see the content and achieve optimum image size," he adds.

Future trends

Looking ahead, Goff highlights the fact that Futuresource Consulting has recorded that the laser projector market »

has grown around 40 per cent year on year. As a result, he believes that all projectors “will eventually have a laser light source, with business projectors probably being the first to transition.”

Moving forward, Highton points out that the inverse proportional relationship between resolution and cost is a big challenge for projector manufacturers to solve, particularly because increasingly higher percentages of meeting rooms and spaces in workplace projects are fitted with conferencing equipment.

“Given that projectors and screens are often not fixed there are some challenges around incorporating projection into conferencing systems. These challenges result in large format LED LCD displays being specified over projection, so this might be an interesting topic for projector manufacturers to consider,” he says.

Meanwhile, Haunschild observes that developments in Solid State Light sources have revolutionised the AV landscape, with SSL, or laser, set to become the standard for projector technology. He also points to Futuresource research, which predicts that the market for projectors in 2020 will be 74 per cent laser light source based - primarily because it “offers reliability and high brightness and is set to offer significant advantages to a wider range of indus-

For 10 days, the Festival of Lights transforms Berlin’s most famous landmarks and historical monuments



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Eindhoven's International Light Art Festival - GLOW

tries or applications including cinema, large venues, education and control rooms.”

Haunschild also singles out the introduction of RB (red-blue) laser light sources, which combine the advantages of brilliant colour reproduction with cost efficiency, as the newest development in laser technology. In RB laser projection a blue laser is used to create the blue colour and a red laser is used to create the red colour in the final image. The green colour is generated by a green phosphor wheel emitting green light.

“This technique allows very efficient light reproduction by avoiding optical »

“The room or rooms in which the projector is being used will determine what you need in terms of brightness and projection distance as these are determined by the environmental factors of ambient light, size of room and projector location.”

Emma Bigg

Director of AV design and strategy,
Octavius RE



Projection mapping on the former Hokkaido government office building

filters resulting in more intense and more natural colours, especially in the red colour segment. Another new development is the combination of the long life advantages of laser with the high brightness of LCD technology," adds Haunschild.

Finally, Bigg predicts that collaboration will be very important – as will the ability to seamlessly switch between multiple users and multiple sources. "We'll see more manufacturers offering their own multi source functions to provide cost effective solutions for simple applications. Also, as 4K content becomes more prevalent we w'll see a democratisation of 4K technology to make the technology more affordable and that will filter down to the business projector market," she says. ■

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