

May/June 2009

advancing information transport systems

BICSI news

PRESIDENT MESSAGE	3
EXECUTIVE DIRECTOR MESSAGE	4
EDITOR'S NOTE	35
BICSI UPDATE	36-38
COURSE SCHEDULE	39-41
STANDARDS REPORT	42

Volume 30, Number 3

Access on the High Seas >> 10

Efficient Infrastructure Management for a New Year, New Challenges >> 16

Digital Signage Systems >> 20

Modern Advances in Firestop Technology >> 24 The Changing Face of ITS Jobs >> 28 Getting Technical >> 30

OSP Cabling Downrange

Deploying telecommunications infrastructure in war-torn Afghanistan. >> 6

The logo for BICSI, featuring the word "BicSI" in a stylized, italicized font with a registered trademark symbol. A white arc is positioned above the letters "i" and "S".

BicSI[®]

Digital Signage Systems

AV design considerations beyond cabling.

BY M. PAXSON LAIRD, CTS-D & GONZALO RODRIGUEZ, CTS-D

As convergence between the AV and information transport systems (ITS) industry increases, the lines between the responsibilities of the AV designer and those of the Registered Communications Distribution Designer (RCDD) or installer have become increasingly blurred. With current industry trends, this will likely continue, making it even more important for each group to have a better understanding of what the other is doing.

Along with other enterprise systems such as video conferencing and IPTV, digital signage is emerging as one of the most prominent examples of convergence. A digital signage system is a series of video displays distributed throughout a space or campus to provide information or entertainment. This system typically uses a distribution method that is familiar to the communications specialist but connects to devices that are familiar to the AV specialist. So, who should design and install these systems?

There are many of us that want to cross-pollinate and work with both parts of the system. In reality, the two groups should work together and divide the responsibilities depending on the expertise required.

If you regularly receive this publication, it is probably safe to assume that you are comfortable working with the required cable but you may be less familiar with video displays. There are many issues that are considered by an AV designer



when selecting a display; two of the most fundamental issues are size and brightness.

How big does it really need to be?

Sometimes bigger is better, but in the instance of video displays, this is not always the case. Anyone that has sat in the front row of a movie theater has suffered from a display that is too large. I recently had the misfortune of watching a movie from the center of the front row and had to constantly turn my head to keep track of what was happening on the screen. About half way through the movie, I developed a very uncomfortable crick in my neck, caused by leaning my head back to see the top portion of the screen.

Just as a viewer will be dissatisfied if the display is too large, the viewer will be equally dissatisfied if it is too

small. To determine the size of the video display, there are a few matters that need to be considered:

How close will the nearest viewer be to the display?

The person closest to the video display is typically considered the most favorable viewer (MFV). In digital signage applications, the viewers are often not in fixed seats. However, even when the intended audience is in motion, a viewing area can be defined. To avoid the issue of the viewer having to turn his head to the left and right, the MFV should not be closer than the width of the video image as shown in Figure 1. However, this will not necessarily limit the need to tilt the head back to view the top portion of the image. To ensure that viewers are not going to develop sore necks, the angles from the viewers' eyes to the center and top of the image need to be

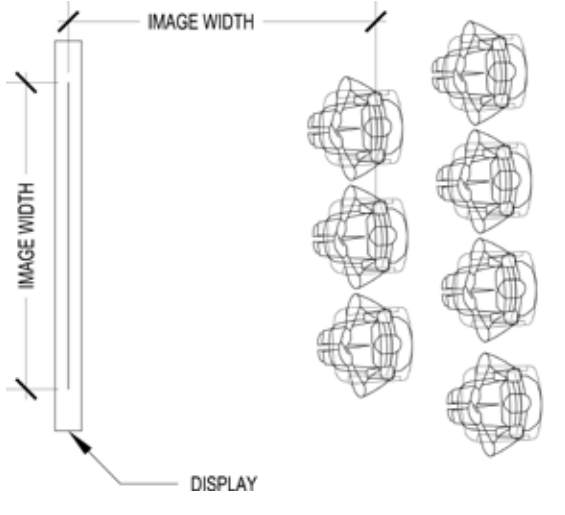


Figure 1: The most favorable viewer (MFV) should not be closer than the width of the video image.

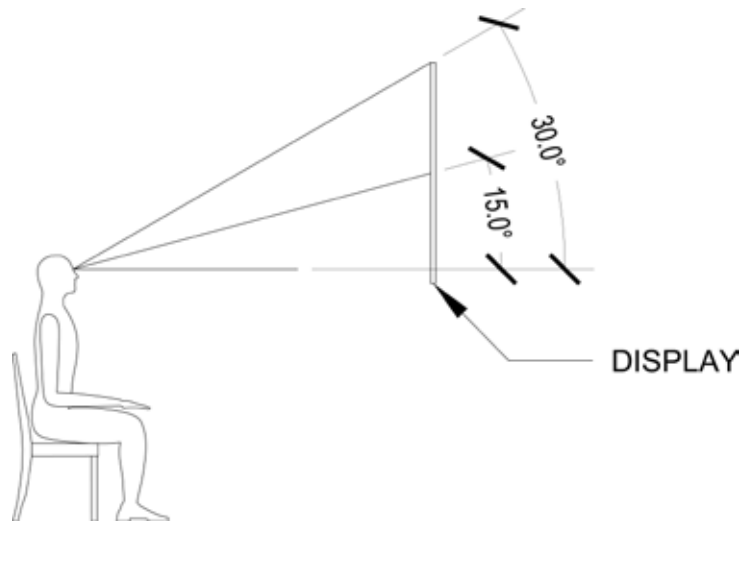


Figure 2: Viewers should have no more than 15 degrees of eye rotation to the center and 30 degrees to the top of the image.

considered. To view a video image for an extended period of time, a viewer should have no more than 15 degrees of eye rotation to the center of the image and 30 degrees to the top of the image as shown in Figure 2.

This 15-30 degree rule can be modified or broken if the display will be used for short messages. For example, a digital signage display placed at a store entrance to alert customers of a big sale could be placed at a higher elevation, as customers will only glance at it as they enter the store. However, for a display in a hospital waiting room to entertain people as they wait, possibly for an extended amount of time, one should consider the angle of eye rotation. Regardless, in any scenario, if the display can be placed at an elevation that requires minimal eye rotation, it will attract more attention and achieve a better overall effect.

How far will the furthest viewer be from the display and what content will be displayed?

These questions need to be asked together because one answer could determine the other. To establish

how large the video image needs to be, the type of content and the level of clarity that the viewer will require need to be considered. When planned correctly, the content to be displayed will determine how large the video image needs to be. Conversely, the content displayed may limit how far the viewer can be and still interpret what is displayed.

While the viewer closest to the video display is the MFV, the viewer furthest from the display is considered the least favorable viewer (LFV). In the past, this calculation was based on the diagonal dimension of the image; however, due to the different aspect ratios commonly used today, this calculation is now based on the height of the video image. To determine how large the image needs to be to be effective, take the ratio of the distance of the LFV to the image height.

Now that a calculation has been made, it can be applied by dividing the types of content into three basic categories—inspection viewing, detailed viewing and general viewing as described below and shown in Figure 3 on the following page.

- *Inspection viewing* should be considered when very intricate or precise content is to be displayed. Examples include maps, spreadsheets or text with about a 14-point font. When the content fits into this category, the ratio of the distance of the LFV to the image height should be no greater than 4:1. In other words, the furthest viewer can not be any further from the display than 4 times the height of the image.
- *Detailed viewing* should be considered when the content needs to be read but can be set to a larger size, typically between a 14 and 22-point font. A typical PowerPoint® presentation would be considered detailed viewing. For detailed viewing, a LFV-to-image height ratio of 6:1 should be considered.
- *General viewing* should be considered for motion video, some PowerPoint presentations and advertisements with large text. General viewing is loosely

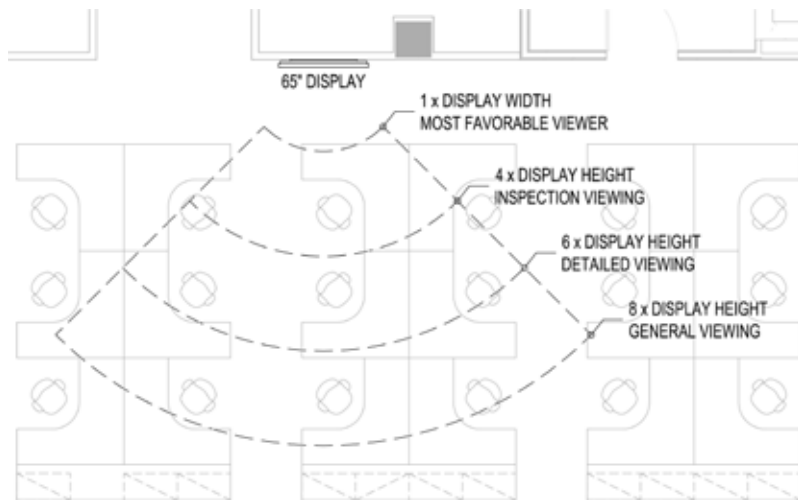


Figure 3: Inspection viewing, detailed viewing and general viewing content types determine how large an image needs to be.

calculated with an 8:1 ratio. The rules for general viewing can be stretched depending on the content and detail required. If the video display is placed in an executive boardroom where the CEO is intending to watch CNN, the 8:1 ratio should be observed. However, if the display is placed in a doctor's waiting room for general television viewing for patients while they wait, a ratio of 12:1 or even 14:1 could be used and still accomplish the desired effect.

How bright does it really need to be?

Just as bigger is not always better, brighter is not always better. The brightness of the video image will be dependent on how much light is in the room and on the display. Considering the movie theater example, the ambient light in the room is well controlled and low. Therefore, the image on the screen does not have to be exceptionally bright to appear bright to the viewer.

For a fair contrast there should be at least a 10:1 ratio between the amount of light that the display produces and the quantity of

ambient light that hits the display. There is an important distinction—it is not the ambient light in the room that we are considering but the ambient light that is actually on the display surface. Obviously, if the amount of light in the room is low (as in the movie theater example), it is easier to control the amount of ambient light on the screen. A good lighting design will allow the appropriate amount of general and ambient light for the occupants in the room while keeping the level of light on the display as low as possible.

It is true that brighter can be better, but only to a point. It is possible to create eye fatigue with an image that is too bright or too dim. The amount of light that is provided for the viewer to accomplish other tasks in the room needs to be considered. If the viewer is looking from materials on a desk to a video image on a display, the amount of light should not exceed a 3:1 ratio, meaning the display should not produce more than three times the light on the desk and the amount of light on the desk should not be greater than 3 times the amount of light produced by the

display. In either scenario, as the viewer looks from one to the other, if the amount that the viewer's eyes are required to adjust is too great, this will cause eye fatigue.

Again, who should design and install these systems?

There are many factors that need to be considered when choosing the correct display in digital signage systems, but ultimately the AV designer will need to determine what is appropriate for each unique space and application.

Although AV systems, along with other low-voltage trades, such as fire alarm and building automation, are now using the same infrastructure, the truth is there will not likely be a full convergence. Each has its own user needs and solutions that require expertise, which separates the AV and ITS industries. However, efforts should be made by both AV and ITS professionals to educate themselves about the other—vast opportunities are available for firms in these two industries who forge strategic partnerships with one another. ■



M. Paxson Laird, CTS-D
As part of RTKL's Special Systems Design Group, Paxson specializes in the design, development and installation of AV systems. He can be reached at plaird@rtkl.com.



Gonzalo Rodriguez, CTS-D
As an AV designer for RTKL's Special Systems Design Group, Gonzalo has designed systems for a wide spectrum of facilities. He can be reached at grodriguez@rtkl.com.