

Planar[®] Mosaic[®] Architectural Video Walls: Content Guide eBook

An artist's guide to content development for
architectural displays

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Introduction

Content in the Foreground

In this ebook, we describe the options with regards to content selection, development, and deployment on Planar® Mosaic® Architectural Video Walls. The overall investment and impact of a display hardware installation depends heavily on the content showing on its screens: one enabling the other to its full potential.

“Like other forms of fine art, the screens of an architectural display system can not be considered independent from the content. Incredible display technology enables incredible art.”

–Jennifer Davis, Chief Marketing Officer

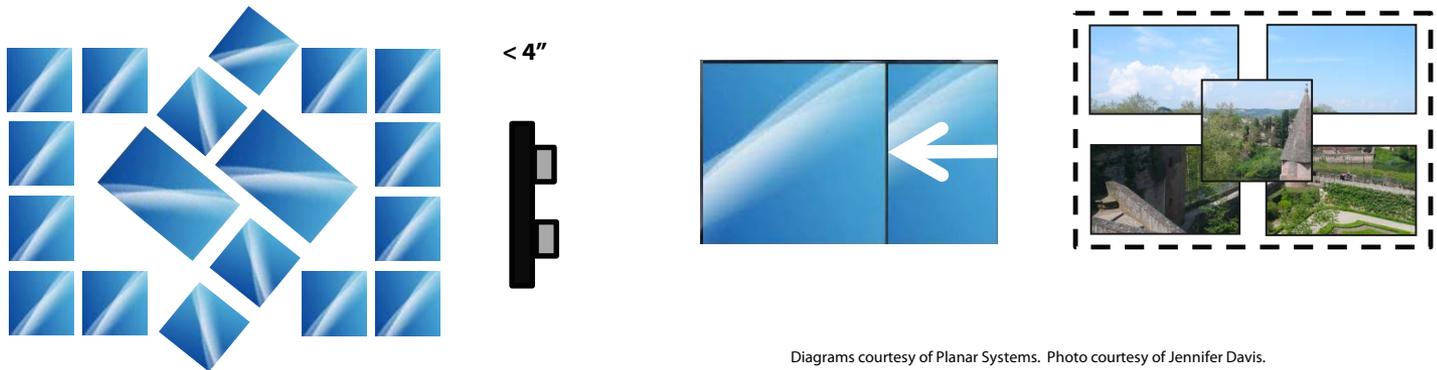


Photo of Yorgo Alexopoulos' "Transmigrations" courtesy of Dez Moleski.

Introduction to Planar Mosaic

Unleashing Architectural Expression

The Planar Mosaic architectural display system allows one to create a video array where the displays are spaced out and angled artistically, even overlapped into a more sculptural design. Using a mix of tile sizes, all at a slim 4" mounted depth, unlimited options are possible. The new Planar® Salvador™ square tile, measuring just 15.6" on each of its equal sides creates opportunities for video to be deployed like a building material or wall covering. But, once the wall is arranged and built, attention immediately turns to putting a video or imagery up across the face of the entire display wall. And that is where this guide begins. We'll now dive into what options are available and how to get started thinking about your own Planar Mosaic array.

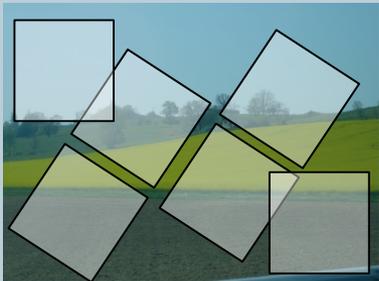


Diagrams courtesy of Planar Systems. Photo courtesy of Jennifer Davis.

Simple and Standard: Video

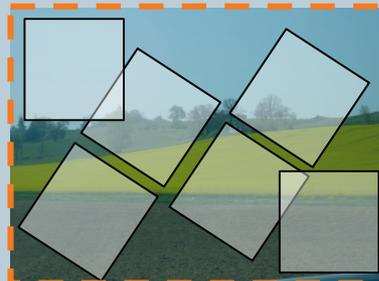
What You Get

- A single video displayed across the entire layout



How It Works

- The Planar Mosaic layout acts as a single monitor, allowing you to connect any source and play it on the video wall.



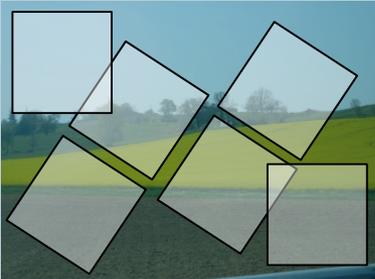
What You Need

- Planar Mosaic array, including Mosaic Project Designer™ Software
- Your choice of video playback device: media player, PC, handheld, smart phone, DVD, or BluRay® player
- Video content (typically in mpg4, mov, or wav format) from any source including a stock image library, video camera, internet sources, DVD or BluRay disc, etc.

Simple and Standard: Still Images

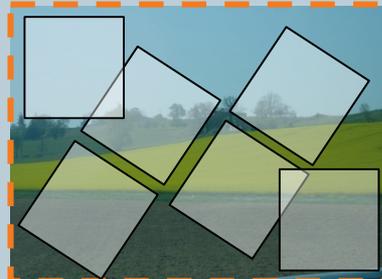
What You Get

- A visually interesting slide show of still images with transitions displayed across the entire layout.



How It Works

- The Planar Mosaic layout acts as a single monitor, allowing you to connect any source and play it on the video wall.



What You Need

- Planar Mosaic array, including Mosaic Project Designer Software
- Your choice of playback device: media player, PC, handheld, smart phone, or anything that will output full-screen images in a slide show. Look for a player that has "Ken Burns" effect for more artistic transitions.
- Photography or illustrations (typically in jpg or png format) from any source including a stock image library, cameras, internet sources, or marketing assets.

Simple and Standard: Content Sources

Finding imagery and video

There are a variety of stock photography and video houses that provide high-resolution imagery, illustrations, animations, art, and video that can be easily browsed, licensed and deployed on your Planar Mosaic array. Most have online collections numbering in the millions that you can search and preview. And let's not forget that your own collection of event or product photos or vacation videos can become beautiful digital wallpaper.

Some of our favorite commercial stock services are listed below:



Their collection features photography, video, and illustrations. They offer free downloads weekly so that you can test content. www.pond5.com



Offers photography, video, illustrations, and Flash animations. They represent several video artists/agencies and can even broker custom commissions. www.istockphoto.com



They specialize in video footage, up to 4k resolution, and offer a free research service to find the perfect piece for you. www.artbeats.com



One of the leading sources for journalists, their collection includes entertainment and sports imagery featuring celebrities and professional athletes. www.gettyimages.com



Their collection includes world events and a great selection of fine art. www.corbisimages.com



They are an aggregator of professional images and footage and are a favorite of corporate brands. www.fotosearch.com

Purpose-Built Content: Graphics

Designing Graphics for Planar Mosaic

A variation on the slide show images approach is to develop custom content that takes advantage of the shape of the display array. These graphics are typically created by artists or graphic designers, either commissioned individually, contracted by an agency, or using in-house talent. They can consist of photo-realistic elements or more fanciful illustrations or sketches, as the overall design demands.

You can start with a Planar Mosaic layout in the software, giving the artist the final design and a “mask” they can use to select or create content. Alternatively, you can give the artist freedom to create the shape of the array as it aligns to content they have created. In either case, the Planar Mosaic Project Designer software is a visualization, design, and wall configuration tool.



Purpose-Built Content: Video

Designing Video for Planar Mosaic

Video artists and designers rarely get to choose the shape of their canvases: typical designs are for 16:9 aspect ratio TVs only. The creativity they can bring to a design-driven arrangement of displays is truly amazing.

Custom content can be developed by any digital design professional, but even “prosumer” packages like iMovie or Adobe Premiere Elements can create compelling videos for a Planar Mosaic array.

The Planar Mosaic Project Designer software exports masks that give the exact position of each display tile relative to the canvas, so sequences can be designed uniquely suited for that arrangement of displays – where the content interacts with the shapes created by the tile layout itself.

There is a whole other group of artists that create visual performance art, using a different set of real-time video (and audio) mixing tools. This creates even more opportunities to use Planar Mosaic in truly artistic ways!



Opening night at the Yorgo Alexopoulos “Transmigrations” exhibit at the Cristin Tierney Gallery.

“This project was about inspiring the imagination. Our limits were not creative ones. We were limited by the shape of the art wall, that’s about it.”

-Seth Cameron Short, ADi Creative Lead speaking about designing for an artistic Planar Mosaic array.

Purpose-Built Content: Tips and Tricks



Photos courtesy of Nancy Hoffman, Seth Cameron Short, and the team at ADi

Things to keep in mind:

1. Start with high quality source material. Minor flaws and rendering artifacts that are invisible on a desktop monitor can become very intrusive annoyances on large, professional-quality Planar Mosaic arrays.
2. Generally, more saturated colors look best. Pale colors and white tend to “glow” on backlit displays like the Planar Mosaic tiles, so we have found that saturated colors in bold tones look richer and integrate better with architectural materials.
3. Add texture for additional interest. Solid blocks of color often don’t look as good as textures or gradients on digital displays. Think of what brush strokes on a fine oil painting add to the art. The same is true of digital canvases like the Planar Mosaic.
4. Get creative! Experiment with having the content play off the shape of the layout. Bounce balls as if the edges were walls and floors. Have the area within the display “fill up” with coffee beans or simulate liquids swirling around corners.
5. Always build some “safe area” into the design around the planned position of each tile. This ensures that when the wall is built the content can accommodate the inevitable slight variation in the physical positions of the display tiles.
6. Use storyboards, sketch concepts, renderings, and Planar Mosaic Project Designer’s live mask tool and preview modes to determine placement and to guide design decisions in early stages, before changes become more difficult.

Strategies for Scaling: Quality IN = Quality OUT

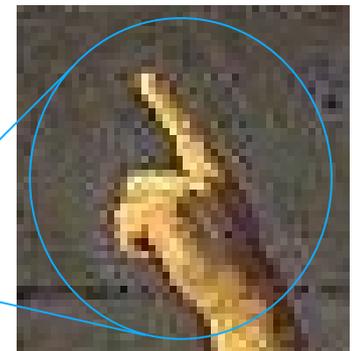
Content pixels matter more than display pixels

For Planar Mosaic display systems, a fundamental principle to remember is that content pixels matter more than display pixels. This is mainly a result of the fact that at some distance every display achieves the famed “retinal display” quality – where you can’t see the individual pixels of the display. For Planar Mosaic display tiles, this distance is about six feet. Beyond that distance, most people cannot see the individual display pixels of a Planar Mosaic tile.

However, content images and video are often heavily manipulated for purposes of encoding visual information into limited storage or bandwidth capacity. This processing of images can introduce features or artifacts, not present in the original scene, which detract from the perceived quality of the image. Very often, these artifacts are not visible when the content is viewed at a small scale on a desktop monitor, but when scaled up to a large professional quality display system like Planar Mosaic, these unwanted features in the content can become visible.

This gives us the first and most important rule for managing the visual effects of scaling content onto Planar Mosaic displays:

*Start from the highest quality source images and video available
(and avoid source images and video that show compression artifacts)*

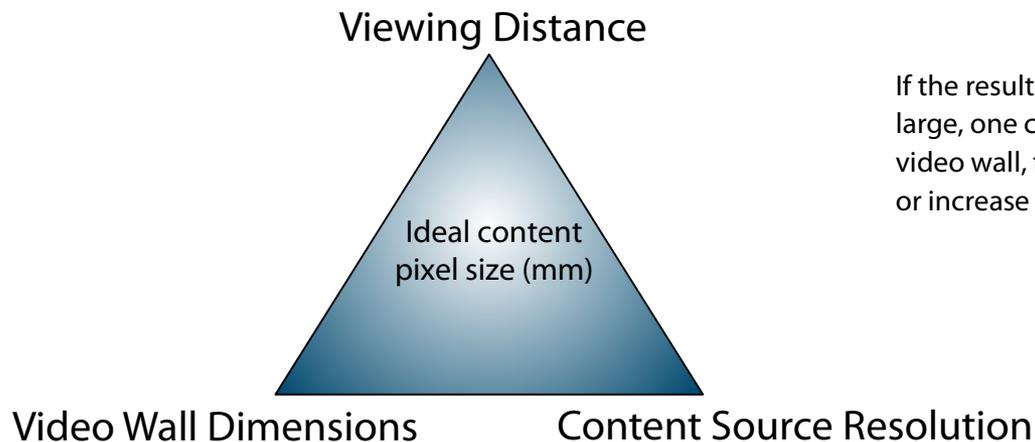


Strategies for Scaling

Content pixel size vs. viewing distance

Because there are generally a large number of physical display pixels for each content pixel (i.e. the content is always “upscaled”) on a Planar Mosaic video wall, the scaling function can blend content pixels very smoothly between adjacent content features. This almost always gives a very good result for high definition, high quality content, even when scaled up to a large physical area.

But there are cases where the combination of content resolution, wall size, and intended viewing distance result in not enough visual source information per unit area to give a good perceived result. In the end, the best way to determine this is with a live test of example content on a Planar Mosaic display at the proposed viewing distance.



If the resulting content pixel size is deemed too large, one could reduce the physical size of the video wall, further the target viewing distance, or increase the content source resolution.

Strategies for Scaling

Viewing distance effect illustrated

As an image is scaled up from its original resolution to a large high resolution display like Planar Mosaic, content features become physically bigger and so undesirable artifacts might be visible to viewers at close distances. At some viewing distances and with some content, this effect is negligible and does not detract from the art. In other cases, the visible pixels or magnified artifacts can detract and alternate strategies must be employed. See illustration below.



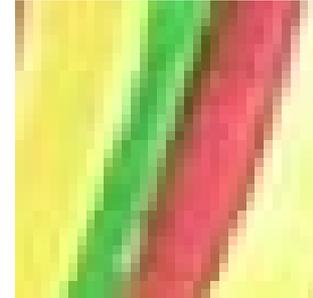
View from 4 meters



View from 1 meter



View from 40 cm



View from 10 cm

Examples of Scaling

There is a direct relationship between viewing distance and content pixel size required to deliver a compelling and crisp image. For instance, despite the move to Full HD televisions, if you are sitting just 10' from the screen, many viewers cannot see the difference between 1080p resolution (1920x1080 pixels) and previous generation 720p (1280x720 pixels) displays – because the pixel size of the 720p display is already smaller than the average viewer can distinguish at that distance.

Below are a few examples of real-life video walls that give you a sense for what scaling might be acceptable for your application which may affect your wall size, your content selection, or how you set up the system to achieve maximum effective resolution.

Example	Resolution of Source (pixels)	Physical Size of Wall (edge to edge)	Description of Content	Content Pixel Size	Minimum Viewing Distance
Nike Portland retail store 	1920 x 1080	10.1' x 5.7' (3 x 1.74 meters)	Interactive wall highlighting Nike products and history	1.56 mm	2-3' (~1 meter)
Planar Mosaic Tradeshow 	1920 x 1080	25' x 12' (7.6 x 3.7 meters)	Scenic and art slideshow	4 mm	5-6' (~2 meters)
Hollister retail store 5 th Avenue in NYC 	1920 x 1080	53.3' by 20.2' (16.2 x 6.15 meters)	Live video feed from the Huntington Beach Pier in California filmed in HD	8.4 mm	10' (~3 meters)
Cowboys Stadium in Dallas, TX 	1920 x 1080	160' by 72' (49 by 22 meters)	Game footage and other content	25.5 mm	100' (~30 meters)

Strategies for Scaling

The scale vs. content complexity (cost) tradeoff

For most common installation and design configurations, we have found that scaling up a single high-quality 1080p content source provides a cost-effective and visually-effective end result.

One simple strategy for decreasing the scaling on a portrait or vertically-oriented Planar Mosaic array is to rotate the content. A full high definition video is 1920 pixels wide by 1080 high, so if you rotate the content, there is nearly 2x the vertical resolution to spread across your array.

But there are cases where the net result of the simplest and most cost-effective solution cannot attain the desired visual result. In these cases, the flexibility of the Planar Mosaic display system allows you complete control over sub-dividing a large design, and / or managing the relative orientation of the content stream to the displays, to achieve the required visual performance.

The bottom line here is that the further a design moves away from the simple, single 1080p input source, the more complexity (and so potential cost) is inherent in the content production process and content playback system.

Strategies for Scaling

Some examples of when to make the scale vs. content complexity (cost) tradeoff

1. For very large walls, where the minimum viewing distance puts the viewer close enough that the scaled-up content is not acceptable.
2. For designs that have extreme aspect ratios (very tall and narrow, or very wide and short), or with a long axis which is rotated at some arbitrary angle which is not horizontal or vertical.
3. When there are widely separated groups or clusters of display tiles in the design.
4. When the use model for the display system requires high-density or fine detail information to be displayed, such as text. Planar offers other display solutions that may fit your use case more directly.

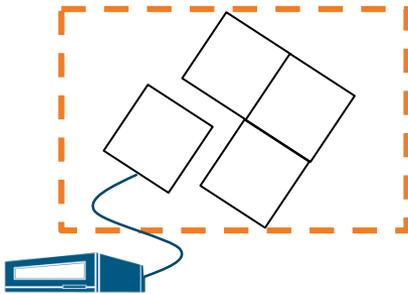
Strategies for Scaling

Options for Achieving a Smaller Content Pixel Size

There are essentially two strategies for achieving a lower overall content pixel size (aside from changing the size of the design):

1. Increase the input resolution beyond 1080p, or:
2. Sub-divide the design into groups of display tiles, each driven by a separate, synchronized input. Within each group, the source signal is passed through daisy-chain style via loop-through cables attached tile-to-tile.

Example 1: Increase input resolution



Video Wall Size: 1.8 meters wide

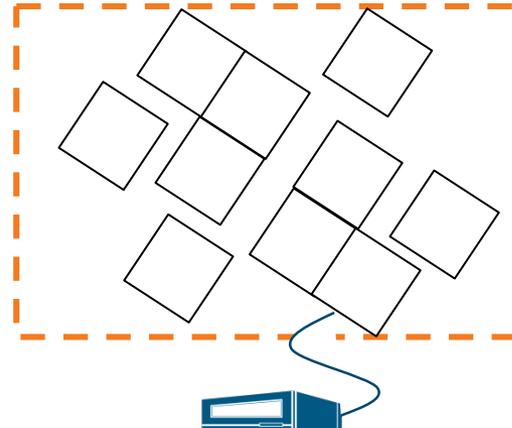
Source: Single 1920x1080 video

Pixel size: 0.94mm

Source: Single 2560x1440 video

Pixel size: 0.70mm

Example 2: Increase input resolution



Video Wall Size: 2.3 meters wide

Source: Single 1920x1080 video

Pixel size: 1.12mm

Source: Single 3840x2160 video

Pixel size: 0.6mm

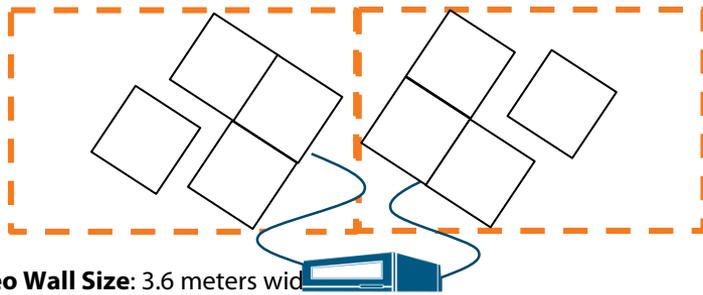
Planar Mosaic now supports content sources up to 3840x2160 @ 30FPS.

Strategies for Scaling

Options for Achieving a Smaller Content Pixel Size

If the pixel size on a large video wall is unacceptable and increasing the single input resolution is not enough, you can also divide that single wall into several sub-groups. Each group has its own input, allowing you to lower your final pixel size across a large area. This approach requires either a multi-output video card on a computer, or synchronized media players that work in tandem to deliver a single image across an array. These kinds of players and related software are available from a number of third-party sources, and also may require specialized content development to pre-render video streams for synchronized playback.

Example 3: Dual output player; 2 display groups



Video Wall Size: 3.6 meters wide

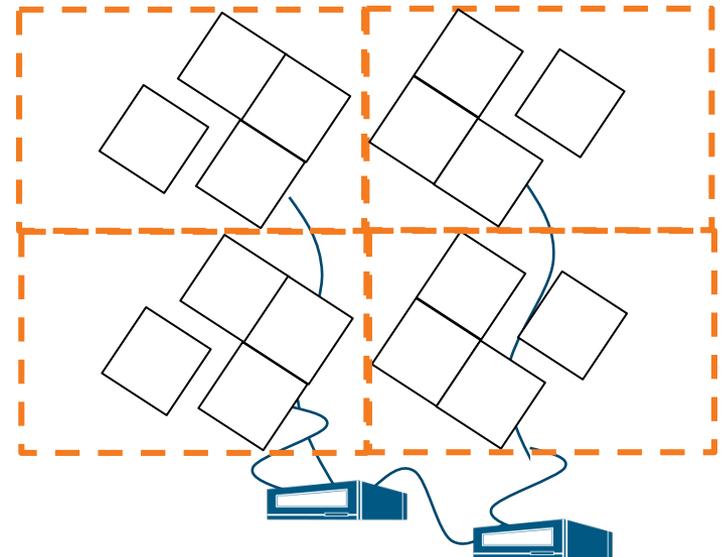
Source: Single 1080p

Pixel size: 1.88mm

Source: Dual 1080p

Pixel size: 0.94mm

Example 4: Sync'd dual output players; 4 display groups



Video Wall Size: 3.6 meters wide

Source: Single 1080p

Pixel size: 1.88mm

Source: Quad 1080p

Pixel size: 0.94mm

Third-Party Digital Signage Software



real digital media



iQmetrix



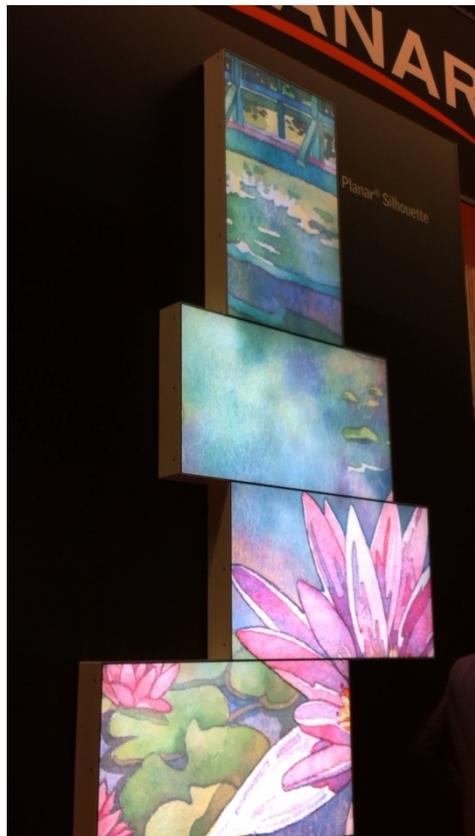
The software and hardware that comes with the Planar Mosaic is quite powerful and allows you to drive a whole array of displays with a single image or source. But sometimes you may want to use the wall a little differently and that is where third-party digital signage software comes into play.

Today's best-in-class signage software programs include the following additional features which you might like for your Planar Mosaic video wall:

- **Playlist Management:** create a list of content, either video or still images, and have them play in the order you choose or have them triggered by other events
- **Daypart Scheduling:** have different playlists on the display at different times of day. Show different content in the morning than you do during the lunch hour.
- **Zones of Content:** have different content playing on different regions of the wall. You could have a video playing in one corner, while other tiles in the array are showing an RSS feed of news.
- **Content Creation:** most software packages allow you to create your own simple messaging content (i.e., welcome greetings for a corporate lobby)

For any of these capabilities, we recommend you check out some of the software packages to the left that our customers have deployed successfully.

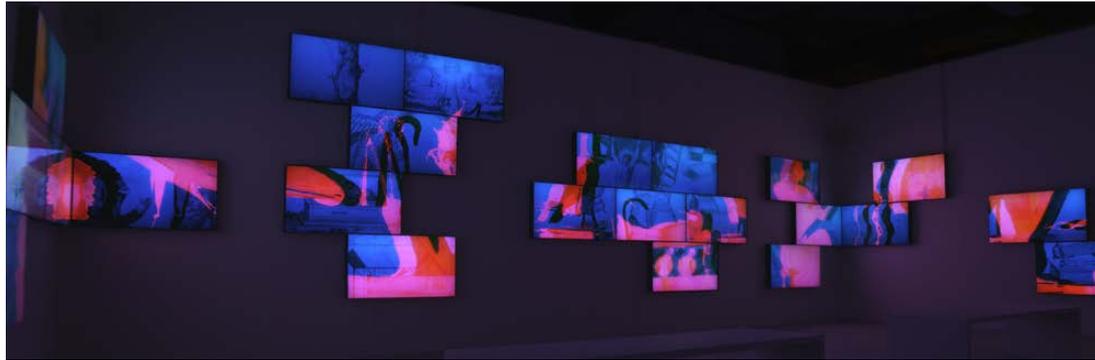
Case Study: Trade Show Exhibition by Animation Dynamics, Inc



ADi created purpose built content for a pre-configured Planar Mosaic concept. For the free-standing 10' video sculpture, their content combined elements of digital signage, architectural imagery and fine art with a whimsical animated approach that is visually interesting. It was developed for a variety of trade events and was designed to appeal to both architects and designers, as well the audio/video industry.

They began their design with a content mask exported from the Mosaic Project Designer software which showed the active and safe areas for their animation development. They created a single 1080x1920 (1080p portrait) video content loop that was loaded on a Western Digital media player and then attached to the display array for simple playback. The final video evolved over several weeks of ideation, concepting and production.

Case Study: Video Fine Art by Yorgo Alexopoulos

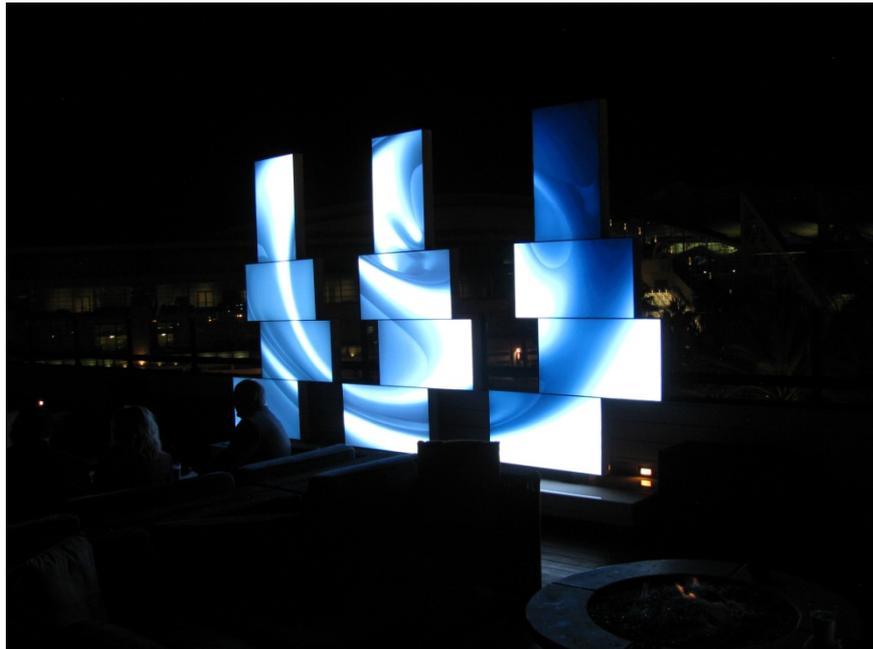


An accomplished video artist in an emerging field, Yorgo Alexopoulos had already made a name for himself among collectors and commercial clients before he envisioned his newest work entitled *“Transmigrations.”* The installation at the Cristin Tierney Gallery in New York City, features 24 displays in a non-linear array around three walls of the space. A directional audio track, combined with compelling graphic imagery transform the room and create an immersive environment in which to experience the moving artwork.

The planning and development of the Planar Mosaic array was entirely driven by Yorgo’s vision for the exhibition and the content was purpose-built for those arrays (which are available for sale in smaller groupings and in the full 24-display layout). Using a full canvas mask from the Mosaic Project Designer software, he composed a full scene and then rendered it out into multiple video streams for playback.

He created several high-definition video streams that play from synchronized digital signage media players.

Case Study: Hospitality



This array was built for a private corporate event held at a hotel. This wall array is over 17' in width and 10' in height and ran a single 1920x1080 video signal across the entire display.

The array of this Planar Mosaic video wall was divided physically into three sections, but the video signal was provided by a single computer output. Using a computer-driven slide show of high-resolution still imagery selected for the event allowed the event's graphic design team to search for and deliver the most effective images under a very tight delivery deadline. The light from the displays also served as ambient lighting in the otherwise darkened environment.

Case Study: Trade Show Exhibition

This 24-foot wide wall was created for Planar’s booth at the Digital Signage Expo as the centerpiece of a booth design.

The content ran as a single video source off a single player across the entire video wall . A slide show of stock photography played from a single MacMini attached to the first tile on the wall and then daisy-chained on the wall. The MacMini was selected due to its professional “Ken Burns” effect as a transition between images.

This array, with four 46” Planar Pablo tiles and twelve 21.6” Planar Salvador tiles in a non-rectangular array, utilizes two 1U sized Mosaic Power Supply Modules (included in the purchase of a display) driving the entire video wall – without a single outlet having to be installed behind the display tiles, reducing the cost and complexity of installation.

Hospitality Tech Decisions called this the “most eye-catching booth” at the tradeshow.



Case Study: Corporate Office Lobby

This free-standing Planar Mosaic art sculpture was deployed in a corporate lobby as a point of interest and excitement to visitors.

This array, with single 55" Planar Vincent tile and four 21.6" Planar Salvador tiles in a non-rectangular array, is displaying a single slide show of still images (simple stock photography in JPG format) across the face of the display.

Each display is mounted at an angle and the tiles overlap to create a 3D effect. The piece stands over 7' tall and is very eye-catching.

The Planar Mosaic Project Designer software (included with purchase) allows for overlapping tiles and the included processing in the displays and software avoids any pre-processing, cutting content, or programming to be done.



Summary

In conclusion, harnessing the power of the Planar Mosaic can take a number of forms: from the very simple and straightforward to the more complex, depending on your needs, capabilities and budget. Whether you decide on a simple slide show of images, re-purpose existing video, build an interactive visual application, or commission an original work of digital art, the possibilities are endless.

To achieve the highest degree of success, it is important to begin with an understanding of the physical wall size, target viewing distance, and quality of available source content, before making decisions regarding content resolution and playback device configuration.

If Planar can be of additional assistance to you in the design and installation of your Planar Mosaic array, do not hesitate to contact us. We look forward to seeing all the amazing things the creative community will do with this new platform.

Additional Information

Planar, a Leyard company, is a global leader in display and digital signage technology, providing premier solutions for the world's most demanding environments. Retailers, educational institutions, government agencies, businesses, utilities and energy firms, and home theater enthusiasts all depend on Planar to provide superior performance when image experience is of the highest importance.

Planar video walls, direct view LED offerings, large format LCD displays, interactive touch screen monitors and many other solutions are used by the world's leading organizations in applications ranging from digital signage to simulation and from interactive kiosks to large-scale data visualization.

Planar is headquartered in Oregon, USA and is a wholly-owned subsidiary of Leyard Optoelectronic Co., Ltd (China: Shenzhen 300296), a global leader in display and visualization technologies with over 300 patents and marquee installations globally.

Please visit us at www.planar.com where you can learn more about Planar's innovative display solutions.

