Applications

Cinematic Meeting Facilities Using Large Displays _____

George
Fitzmaurice,
Azam Khan,
Gordon
Kurtenbach, and
Graham Binks

Alias

Most people think of using large-display installations for highly technical visualization work such as scientific visualization of a large data set, process control, or technical design. In the past several years at Alias, we have investigated these types of applications,[1] for example, using large displays that let automotive stylists view and design on full-size displays of automobile exteriors.[2] Recently, however, we have begun extending our work with large-display technology into the domain of corporate meeting facilities. At our corporate headquarters in Toronto, we have designed and built the Alias Visualization Studio (the VizStudio), a unique meeting facility that makes use of large display technology to support digital visual communication and collaboration with corporate clients, future customers, employees, and corporate partners (see Figure 1). We have discovered that using large displays in this type of corporate meeting facility produces its own unique set of challenges and solutions.

Early in the conceptual design phase for the VizStudio we realized that we were not just designing a flexible meeting space but, more broadly, a user experience. Aligned with the premise from Pine and Gilmore's book, *The Experience Economy,*[3] our design approach was to consider a visitors' total experience, including arrival and initial impression, work requirements, all day meeting needs, overall comfort, social needs, departure feelings, and so on. Moreover in *Computers as Theatre*, Laurel proposes a theater metaphor for designing interactions with digital information.[4] Combining this metaphor with the experience approach and large-display technology has yielded a facility with many cinematic and theatrical characteristics. In this article, we highlight the subtle but important interplay between large-display technologies, interior design, and social and corporate dynamics.

Corporate briefing center

A fundamental challenge for any company is to communicate, listen, and converse with its customers, employees, and partners. The aim of these communications is to build awareness, understanding, and shared goals and values between the various entities. For example, the company wants customers to understand its vision so that people can critique and provide input to the company, ultimately leading to the company building the right products for their markets. While advertising, sales campaigns, and Web sites help make customers aware of new products or features, there still remains a need to discuss with customers more general issues such as, where do you see your business going? and, how do you think our products should evolve to support the direction of your business? These types of questions typically require face-to-face discussions and contemplation to reach mutual understandings. To support these types of discussions, we constructed the VizStudio.

Typically a key reason that businesses host large corporate clients in specially designed formal meeting facilities is to create a positive portrayal of the company. More specifically, the goal is to try to create an impression that accurately portrays the company's visions, values, and directions. At Alias, we saw the need for this

1 Alias Visualization Studio.

Table 1. VizStudio use activities.

Use Scenario	Purpose
Customer executive briefing	Hosting to communicate, listen, and converse with a customer and to formally present material.
Design activity	Working meeting with a single group collaborating around one large-display landscape.
Seminar workshop	Multiple groups working around multiple tables with a facilitator.
Strategic planning	Internal private planning session.
Public event	Maximum seating to view a presentation.

2 Visitors get a sense of arrival and departure from the VizStudio through the use of funneling toward the semitransparent red door.

type of corporate boardroom and the potential benefit that large-display systems could have in this type of environment. The intention was that large displays would allow the company and customers to visualize and discuss their meta issues or demonstrate concepts visually, within the context of group discussions.

Specifically we designed the corporate meeting room around large-screen display technology with three main goals:

- *Create a signature space for Alias*. VizStudio acts as a customer briefing center for Alias. It promotes digital visualization use for storytelling and collaborative problem solving. Users should also have an experience that enlivens the senses and supports long periods of creative work.
- *Showcase workflow-driven, technology-enabled solutions*. VizStudio features the best of our own and our partners' new and emerging technology. We need to showcase current and up-and-coming technologies that support a variety of customer workflows and needs.

- *Offer a flexible space*. The ability for groups to come together and break out into subgroups is an important aspect of the design, accounting for the inclusion of four distinct meeting spaces. Moreover, the VizStudio supports five major use scenarios, as Table 1 shows.

Cinematic design

While we did not explicitly set out to draw exclusively from the cinematic or theatrical domains when designing the studio, in retrospect, these domains had a strong influence and presence in the design decisions related to the final user experience. We wanted to consider the relationship—and even a metaphor—between the space, people, and digital information.

To enter or leave the VizStudio, the user is presented with a sense of drama to transition and signal the beginning and, when leaving, the end of the experience. We achieved this through the use of curved walls that funnel arriving and departing visitors toward a red semitransparent door (see Figure 2).

As in a movie complex or theater, we have provided an explicit space adjacent to the main stage area to offer intermission support—food and beverages on the reception table. This reception space also offers a water wall for both improved air quality and a soothing background ambient sound. A number of projectors are visible from this space to show digital content. When hosting a customer, we showcase the visiting company's logo, their products, or other eye candy. In some sense, these displays serve as dynamic posters of what is currently happening or being shown in the VizStudio (see Figure 3).

Consider the studio layout in the context of a theater space. The studio's working space is approximately 40×80 feet. The core design centers around a flexible inner immersive visual studio consisting of an eight-sided enclosure with large digital displays projected on each wall. Each wall panel measures 12×9 feet with the front and back walls being almost twice as wide (20×9 feet). We commonly refer to the immersive studio as the *octagon*. While three of the walls remain permanently fixed,

we can rotate and slide the remaining five walls along a ceiling track to open or close the space, allowing for a variety of configurations (see Figure 4). The octagon portion of the space serves as the studio's main stage and viewing portion. Dynamic content displayed on the walls acts almost like a set or visual backdrop to the action in the room.

The most common stage configuration we use is a half-octagon arrangement (five walls and six projectors) in the front with a semicircle of tables and chairs facing the displays (see Figure 5a). The main front wall uses two projectors (Barco SIM6) with a total maximum resolution of $3,200 \times 1,200$. This setup and viewing is akin to a large, high-resolution movie theater. On both sides of the main front wall are single projectors on angled walls, and these are both further flanked by an additional wall and projector. This makes for a total of 64×9 feet of display space with $7,680 \times 1,024$ pixels having six projectors set at $1,280 \times 1,024$ resolution (see Figure 5b). The reconfigurable tables have hookups for power, monitor, audio, and network connections for laptop computers and tablet PCs, which are plugged into floor receptacle panels within the studio's raised floors. All of the supplied laptops and tablets have wireless IEEE 802.11g networking and we can transmit video across LAN/WLAN using a Hewlett-Packard Remote Workstation. Similar to a cinema, the visual studio has high-quality stereo sound and flexible lighting to accommodate a variety of experiences and uses of the space.

Presenters and content can be seamlessly showcased and switched on the main screens while material is queued up behind the scenes. We achieve this in two ways. First, we can instantly switch six high-end workstations and a number of laptop feeds to any of the large displays. A customized, Web-based GUI facilitates this process. Seamless visual coherence in the display content is important to preserve the visual experience's quality and thus a default graphic (such as the company logo) appears on a large display in the absence of a monitor signal. This prevents visually jarring experiences like seeing the blue screen of a projector flashing "no signal." Secondly, because the octagon is essentially a room within a room, presenters, participants, and technicians can silently enter and leave the inner room without distracting the audience. Together these two aspects of the design help maintain the flow of the experience.

Observations

The VizStudio has been open for about a year and we have learned some valuable lessons. First, the studio supports multiple groups working and meeting at the same time but so far, in practice, groups opt to reserve the entire space instead of subareas. Due to privacy and sensitivity issues, people want to know who is hearing and seeing the information being presented and discussed.

Second, the room design focuses the more formal activity close to the main front display while less formal activity occurs in the back of the room. While this might seem obvious, we note that this attribute is important. Having a unified formality would make the meetings feel stiff. Allowing people to chat in the back and come and go from the space is important for many types of

3 Reception area consisting of table, large displays, and a water wall.

(a)


(b)   **(c)**   **(d)**   **(e)**
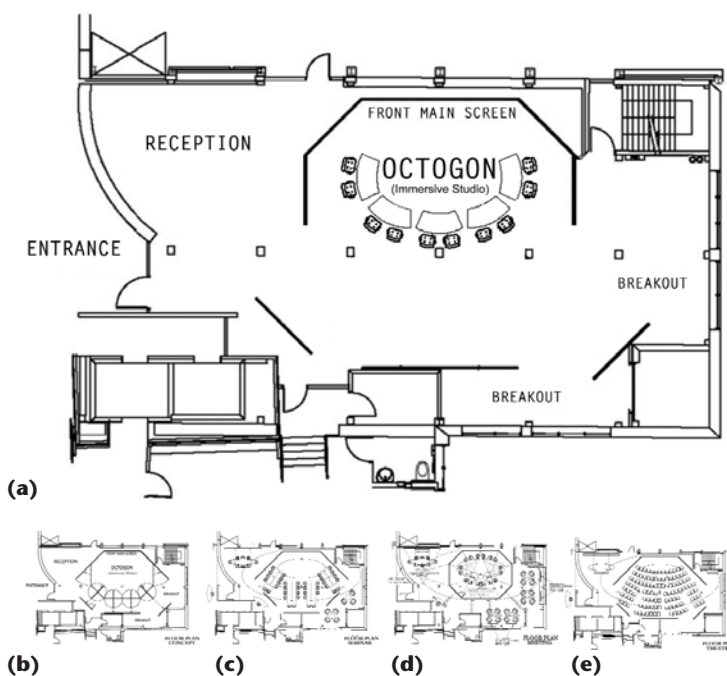
4 VizStudio configurations: (a) customer executive briefing or design activity (half octagon), (b) six moveable display walls for center octagon space, (c) seminar workshop, (d) private executive meeting or strategic planning, and (e) public event.

meetings. Thus, again, the half-octagon configuration works best. We have rarely had meetings with the closed octagon where the inner room is completely blocked off from the remainder of the space.

While we need to factor in the physical architecture (for example, structural posts and beams), we must also consider what we call *digital beams*. At this stage in the VizStudio, we use front instead of back projection for our large walls. This introduces digital beams where the projector light paths cut through the room. Consequently, when people walk around the space, they can unexpectedly be blinded by crossing into or glancing at a projector beam (akin to hitting your head on a physical beam). While this is less likely to occur in the main

(a)

9 feet (1024 pixels)

64 feet (7680 pixels)

(b)
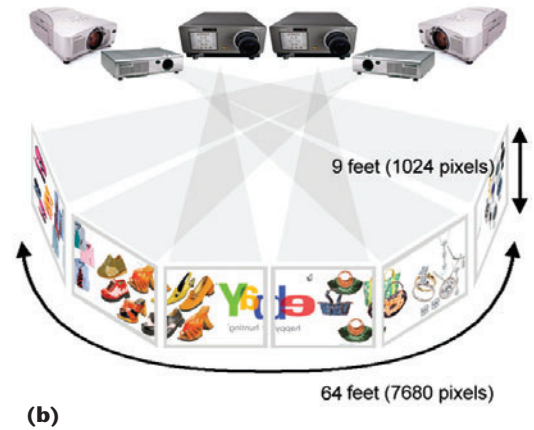
octagon space, it's more common in the reception space. In the future, this will be much less of a concern when we eliminate the front projection.

Our presentations often include material from a visiting customer to illustrate how Alias can help a company visualize their products and process. These visitors have remarked about how pleasing it is to see their own material in a visual landscape as part of a collaborative meeting. Because the VizStudio has nine large projection surfaces, we can show lots of data in a persistent way across the entire duration of a meeting and even from previous meetings—essentially presenting virtual conversation pieces. In this way, customers get a sense of the value of having a VizStudio in their own environment.

In terms of content generation for the main front display, presenters must take extra care to produce a widescreen format version. For example, Microsoft PowerPoint slides should be reformatted to use all of the visual space and resolution instead of showing the standard 4:3 aspect ratio presentation in the center surrounded by lots of empty space. This is necessary because the front wall is often driven by one computer having dual monitor support (one for each projector) and PowerPoint centers the content across both monitors. Moreover, depending on the content, there can be interesting scale effects that occur when the material, originally designed on a desktop monitor, is now magnified by an order of magnitude on the large displays.

Lastly, we have found it useful to run multiple applications during a single presentation. In the presentations that do not use all six projectors for a single unified content landscape, we often present auxiliary material. For example, we will show the main presentation on the two front projectors, the agenda on a third projector, and an interactive whiteboard application and visual context (for example, previous meeting content, or product concepts, and so on) on the side walls. Care must be taken not to make this side material too dynamic, as it will distract from the main presentation flow. We have also found it useful to duplicate screens on both sides of the main front display (what we sometimes refer to as the *wings*). This allows everyone to see the content and also provides visual symmetry, which makes the presentation more pleasing. In addition, we often will simultaneously show a PowerPoint presentation trans-

lated in another language (for example, Japanese) to support communication.

During a presentation we have observed that the wide visual landscape of large displays dominates the audience's attention flow. In fact, we have noticed that the presenter must often compete with the displayed visual content and can have a difficult time directing the audience to portions of the visual landscapes. We have developed some techniques for dealing with this such as our software spotlight (see Figure 6).[1]

The spotlight technique, once invoked, begins by darkening the display content (by about 75 percent) except for a large circular region around the current cursor position. This serves to draw the viewer's attention to the current region of interest. The spotlight follows the cursor as the presenter moves it. Unlike a real physical spotlight, while the spotlight is moving, the dark region outside of the spotlight is brightened up (to about 50 percent), letting participants more easily see the intended destination. After the spotlight stops moving, there is a short dwell time, then the exterior region of the spotlight again slowly darkens to the maximum darkness setting.

To manage the room properties (physical as well as digital layout), we have found that we need a dedicated staff member to manage the facilities for the smoothest possible experience during, for example, customer briefings. Presenters and hosts often don't have time to reconfigure the room or problem solve technical configurations (such as how to get a projector out of standby mode or how to switch which computer is being displayed on a given screen). Nevertheless, many internal meetings and seminars will occur without the dedicated staff member present—relying on the Web-based GUI to manage many of the common display configurations.

One major issue that remains unsolved is the ability to have a room-level application that would let users drive one or more applications across one or more display surfaces. Properly directing input to these displays also remains a challenge. Research systems such as PointRight[5] and IBM's Deep View Computing are trying to address these issues.

Lastly, employees and visitors must be able to determine what's happening in the VizStudio at any given moment (for example, what "show" is in progress). The

6 Spotlight technique for directing audience attention (enhanced image).

studio has a variety of different states: unoccupied, setting up, presentation dry run, postmeeting debriefing, available, hosting a customer but on a break, customer present or not present, working meeting in progress, and so on). Each of these status states must be easily revealed to people outside of the VizStudio. Currently, the reception area display screens only vaguely indicate whether the studio is busy or not by posting the name of the visiting company. However, this does not represent the full level of detail of the status states and further development is needed to make this information explicit.

Conclusions

In the end, the VizStudio experience enlivens the senses and supports long periods of creative work. We achieve this through the design of both the physical space and user experience. The physical space employs the use of natural materials such as slate, wood, and water and carefully considered factors such as daylight, lighting variety, great air quality, acoustical clarity and insulation, reconfigurable space, and comfortable seating, which all work together to make visitors comfortable and productive.

We have found it critical to consider the holistic user experience. For those designing large-display user experiences, think about the large display as not just a larger desktop monitor. Instead focus on the properties of the entire space. The metaphor of a cinematic or theatrical experience works well to guide design decisions to create effective and enjoyable experiences.

In general, users have responded positively to the experience of using the VizStudio. Visitors from large corporations have expressed that their business would derive significant benefit from having a similar facility that encourages collaboration and discussion earlier in their design efforts and throughout their production process. Even though these customers already have visualization centers for displaying high-resolution data,

these spaces are not designed to accommodate prolonged working meetings.

The VizStudio is still evolving as we experiment with different ways to use this space and adapt our practices to take advantage of a new digital design environment. ∎

Acknowledgments

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Readers may contact George FItzmaurice at gfitzmaurice@alias.com.

Readers may contact Mike Potel at potel@ wildcrest.com.