EXPLORING 21ST CENTURY HEALTH

Kaiser Permanente Capitol Hill Center for Total Health educates with immersive AV.

BY DAN DALEY

Increasingly, healthcare and technology are becoming an inextricable pairing. From the imaging systems in doctors' offices to the secure back-office networks that transfer and store patient data, medicine has become a digital proposition in the 21st century. As a result, medical services providers are measured as much by the perception of their technology complement as by what it can actually accomplish. That's the case at the recently completed Kaiser Permanente Capitol Hill Center for Total Health (http://centerfortotalhealth.org) in Washington DC, a 13,500-square-foot open-plan space adjacent to the company's Capitol Hill Medical Center that uses sophisticated AV systems—updatable via a LAN—to project media mastery as much as technical competence.

Interactive Videowall

The highlight of the Center is an extended 80'Wx10'H interactive videowall that uses GestureTek's multi-touch technology so multiple visitors can interact with the message simultaneously. One of the world's largest interactive landscape-aligned videowalls, the "Every Body Walk" video mural aims to convey an attainable sense of personal responsibility for one's health by encouraging visitors to incorporate walking into their lives and to build sustainable, walkable communities.

AV systems integrator Electrosonic (www.electrosonic.com) provided the wall's eight Stewart StarGlas rear-projection screens and eight Christie DS+10K-M projectors (with 1.2:1 lenses). The projectors were mounted on custom RPV mirror-bounce projector frames built by rp Visual Solutions to accommodate the shallow space housing the projection equipment, and are programmed to allow the screens to act independently or as a single long mural. There are 16 Dakota 602 focused-array speakers mounted two over each screen to deliver audio to visitors as they walk alongside the videowall.

On the opposite side of the free-standing mural wall are six areas with large interactive touchscreens with content that explores visitors' relationships with health, the challenges facing healthcare today and the best practices to improve healthcare. These are formed using a dozen 55-inch Samsung 550EX LED monitors, with pairs of joined monitors comprising six interactive stations. Twelve additional Dakota 602 focused-array speakers supply the audio, with two speakers dedicated to each screen.

Two Conference Rooms

The media displays are just the front end of a larger facility with its own extensive AV. Two conference rooms that support videoconferencing have a removable partition that can make the area into one large space as needed. However, each space is supplied

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The overall effect of the videowall is panoramic. And, focused-array speakers mounted two over each screen deliver highly focused audio to visitors as they walk alongside the videowall.

with its own Da-Lite 9428 motorized screen, Panasonic PTW-300 projector on Draper ceiling lifts, EAW JF60z speakers mounted flush with the wall flanking the screens, EAW CIS400 ceiling-mounted speakers and AKG DHT700 wireless microphone system.

The temperature and humidity-controlled AV equipment room located back-of-house is the AV system's nerve center, housing Middle Atlantic racks containing a combination of Dell T3500 Precision computers and Dell Alienware Aurora ALX computers, APC Smart UPS units, BSS Soundweb, Christie 1608 Vista Spyder image processors, Extron IN1508 scaling switcher, and QSC CX108V, CX254 and CX404 power amplifiers for the audio. All AV in the Center is scheduled through an AMX NI-4100 central controller with 12-inch touchscreens, as well as two Dell Poweredge R310 data servers with redundant power supplies and RAID storage.

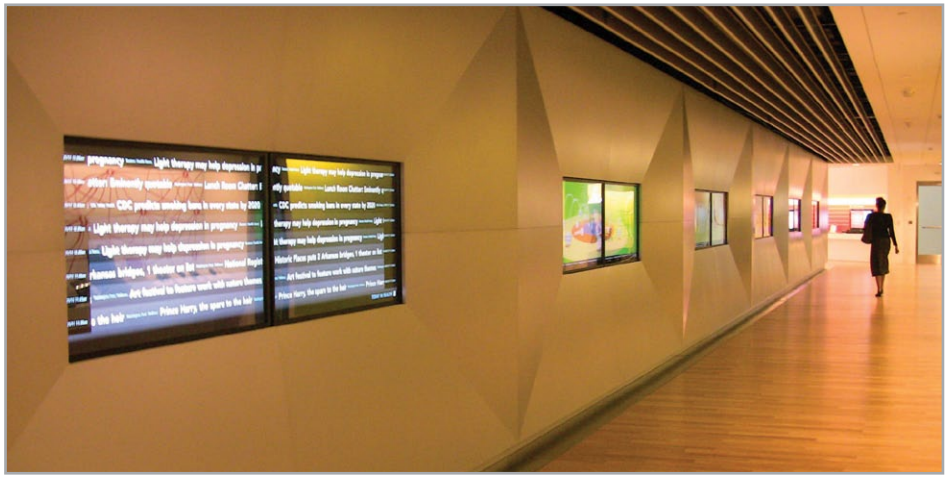
An AV LAN interconnects all relevant equipment; a connection to the Kaiser Permanente building network enables a credentialed operator on the K-P system to see the AV system and forward media data to the AV system from other locations. (Electrosonic also supplied and installed equipment to the New York City Brand New School facility, a commercial art studio in Manhattan where the media producer and interactive programmers work on new content to keep the Center's exhibits fresh.)

Spearheaded The Way

"Kaiser Permanente has spearheaded the way into computerized health records: Once you're plugged into their system, all your records are there and the system is very efficient, and that's what the public and corporate access areas of the Capitol Hill Center for Total Health were designed to get across to visitors," explained Christopher Miceli, the associate at Ralph Applebaum Associates (www.raany.com), the New York City firm that did the Center's interior and exterior designs.

Miceli offered that the philosophy

The Kaiser-Permanente 80'Wx10'H interactive videowall consists of eight rear-projection screens and eight projectors, which are programmed to allow the screens to act independently or as a single long mural.



The interactive screen arrays are on the opposite wall from the wall photo. The large interactive touchscreens' content explores visitors' relationships with health, the challenges facing healthcare today and the best practices to improve healthcare.

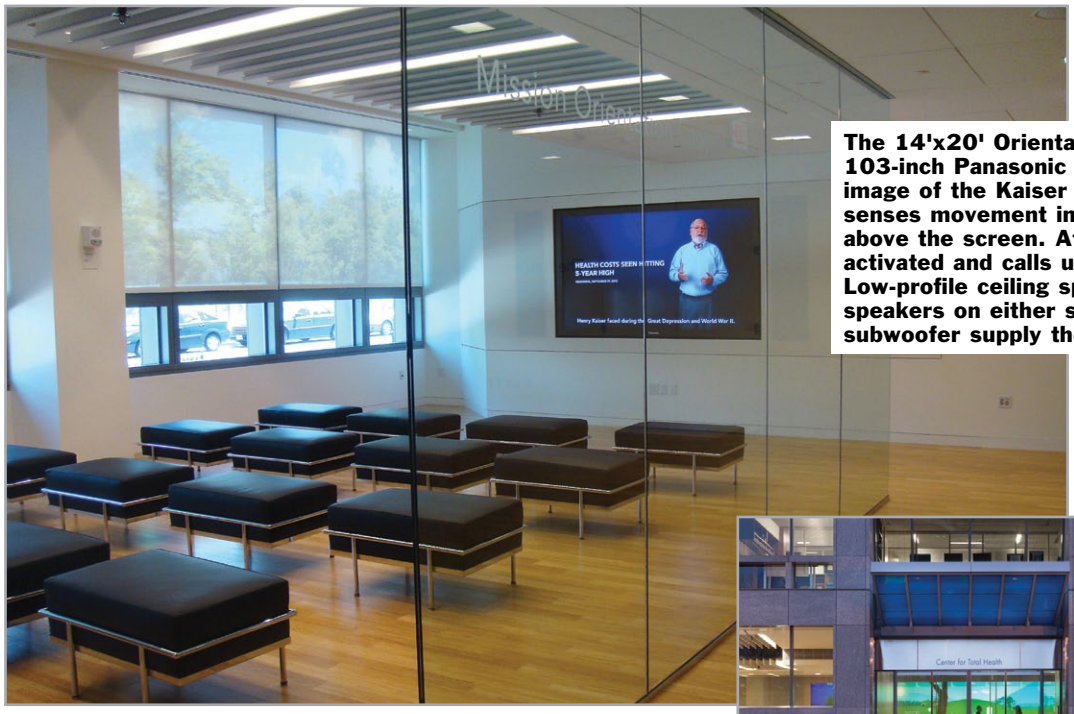
behind the AV technology choices was a combination of very high tech, such as the GestureTek touchscreen interactive overlays, but programmed in such a way as to make interfacing with them as user friendly as possible. And the displays also have a secondary mission: to act as backdrops for announcements and presentations, as well as to impress VIPs as part of the lobbying efforts that have become increasingly intensive as healthcare remains a hot-button item in Washington DC.

"It has to function on a few levels," Miceli concluded.

LAN-Based Data

It was a lot of technology to integrate into a sensitive space, said Gary Barnes, Electrosonic's project manager. The content that fills the screens and future content developed at the Brand New School facility rides on a LAN that's an extension of the Center's main network, provided by Kaiser's IT division there. The day Barnes spoke to *Sound & Communications, The New York Times* carried a front-page story about how confidential medical data for nearly 20,000 emergency room patients at California's Stanford Hospital was exposed to public view for nearly a year because of a third-party contractor's mistake.

"The internal AV LAN is proprietary for this system. It is completely coordinated by Kaiser's IT team and completely secure from other data on their networks," said Barnes. "We have the ability to access it remotely for diagnostics and updating, and the Brand New School can update content on a regular basis. But this is done on a level that you find at command-and-control center installations. This is one of the most security-conscious projects I've ever seen. IT networking is one of the things you have to be aware of working on a medical facility."



The 14'x20' Orientation Theater is focused on a 103-inch Panasonic LCD display that runs a static image of the Kaiser logo until the control system senses movement in the theater via an IR sensor above the screen. At that point, a video player is activated and calls up the brief introductory film. Low-profile ceiling speakers two-way bookshelf speakers on either side of the screen and a subwoofer supply the audio.

The Kaiser Permanente Capitol Hill Center for Total Health videowall can be seen from the street.

Equipment

1 3M SCP717 DLP short throw projector
1 AKG DHT 700 w/D5 element handheld mic w/encryption
1 AKG DPT 700 belt pack transmitter w/encryption
1 AKG DSR 700 2-channel encrypted wireless receiver
1 AMX FG2020 NXC-REL10 relay card
1 AMX FG2105-06 NI-4100 integrated controller
2 AMX FG2022 NXC-COM2 serial control cards
1 AMX FG2105-06 AMX AVS-MD-2404-840 Modula Matrix Switcher Netlinx controller
1 AMX FG2250-60K NXT-1200V 12" Modero video tabletop
1 AMX FG2251-60K NXT-1200V 12" Modero video tabletop
4 AMX FG2261-02 NXD-5i Modero 5" wall/flushmount touchpanels
2 AMX FG423-41 PSN6.5 power supplies
1 AMX FGP34-0416-840 AVS-MD-2404-840 Modula matrix switcher RGBH
1 AMX FGP34-2404-840 AVS-MD-2404-840 Modula matrix switcher RGBH
1 Analog Way PLS200 Pulse LE dual scaler
17 APC SUA1500RM2U APC Smart UPS RM 2RU 1500VA, 120
1 Bag End Infra-MXB integrator electronics 12VDC
2 Bag End S10E-I INFRA subwoofer systems
5 BSS Soundweb BLU-120 network I/O expanders
1 BSS Soundweb BLU-160 network signal processor
9 BSS Soundweb BLUCARD-IN 4 analog input mic/line cards
14 BSS Soundweb BLUCARD-OUT 4 analog output cards
8 Christie M Series edge blending kits
9 Christie DS+10K-M 3DLP 9300 lumen projectors
8 Christie ILS 1.25+/1.1 HD lenses
3 Cisco WS-C2960-48TCL Catalyst 2960 48-port layer 2 switches
29 Dakota FA-602 focused array speaker systems
2 Da-Lite 94281R Advantage Deluxe motorized screens w/SCB-100
8 Dell ALIENWARE AURORA ALX+TactX headset systems
2 Dell Poweredge R310 PE-R310 servers
10 Dell PRCSN T3500 Precision T3500 CMT system
1 Dell 320-0940 19" flat screen monitor, E1910
2 Draper 300031 LCD Projector Lift As w/bomb bay doors
4 EAW 12618 JF60z compact 2-way speakers
2 ExtenHD X-CON YUV HDMI to component converters
1 Extron MTP UTAD video input panel/extender
2 Extron MS9500GL HD FrEND Plus digital signage media players
20 Extron P/2 DA2xi distribution amps
14 Extron IN1508 scaling presentation switchers w/PIP
23 Gefen EXT-DVI-FMP Extender Plus video extenders
10 Gefen EXT-FW-1394BP Firewire 800 extenders
6 GestureTek SG41-J1 Shuttle computers, Core2Quad
7 Icron ICR2224 USB 2.0 FiberRanger MMode 120V
1 Marantz PMD-371 5-disc CD player
8 Middle Atlantic 4436 racks w/fan tops
1 Minicom 0SU52015A Universal Phantom Manager
1 Minicom 0SU52016A Universal Phantom Manager
1 Moxa NPORT-5610-16 16-port serial to Ethernet interface, 10/100
3 Panasonic PT-FW300U 3500 lumen WXGA 1280x800 LAN projectors
1 Panasonic TH-103PF12U 103" 1080P hi-def plasma display
3 QSC CX108V 8-channel 70V amps
1 QSC CX254 4-channel amp 170W/channel @8 ohms
2 QSC CX404 4 channel amps 250W/channel @8 ohms
1 Raloy RA19 19" rackmount LCD monitor, PS2 keyboard
2 Renkus- Heinz TRX81/9 2-way, full-range speakers
2 Samsung XL2370-1 SyncMaster 23" wide screen monitors
2 Samsung 460TSN-2 46" touchscreens
16 Samsung DW 550EX monitors w/touch
8 Stewart Filmscreen StarGlas rear-projection screens
6 Tannoy CMS601DCBM low-profile ceiling speakers
1 Vista Spyder Model 1608 video processor, 16 input/8 output
1 Wohler AMP-1A PLUS 2-channel audio monitor
Belden Wire & Cable wire
General Cable fiber

List is edited from information supplied by Electrosonic.

The Galleries

Visitors get a quick introduction to Kaiser Permanente at the Orientation Theater, just off the main building lobby. The 14'x20' theater is dominated by a Panasonic 103-inch TH-103PF12U 1080p HD LCD display that runs a static image of the Kaiser logo until the AMX NI-4100 control system detects, via an infrared sensor above the screen, movement in the theater. At that point, an Extron MS9500 MPEG video player is activated and calls up the brief introductory film.

If the system senses that the theater has emptied, the audio (the room is fitted with Tannoy CMS601DC/PM low-profile ceiling speakers, Renkus-Heinz TRX81/9 two-way bookshelf speakers on wall-mounted enclosures on either side of the screen, and a Bag End InfraMXB subwoofer) is dimmed, and the film eventually stops and is restarted the next time the sensor detects motion.

Mounting the screen was the room's biggest challenge, said Barnes. First, the general contractor, DPR Construction, was asked to anchor a mounting base to the concrete block wall on the building's shell. To that, a customized mount from rp Visual Solutions was attached to the display and then hoisted to meet the mount base on the wall. "It was definitely an engineered solution on site," said Barnes.

Electrosonic's techs describe the Center's two media walls as flanking what they call "the boxcar," a 100-foot-long rectangular space whose 13-foot width holds the projectors, sensors and cabling that power the 80-foot-long videowall facing outward from one side, and the 12 55-inch Samsung 550EX displays set up as paired displays facing the other way on the boxcar's opposite outside wall.

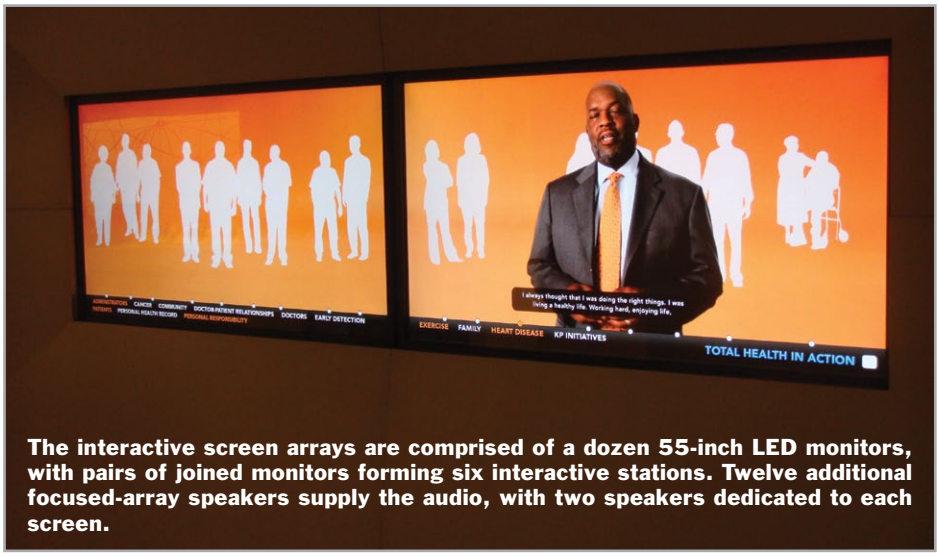
Critical Projector Positioning

The 80-foot-long videowall is illuminated by eight Christie DS+10K-M 9300 lumen projectors, with the projected image bouncing off mirrors to be able to fill the 10-foot height of the screens. According to Barnes, the exact positioning of the projectors and mirrors was worked out mathematically by the company's California- and Florida-based engineering groups: A mockup of both the display, using a 4'x4' section of StarGlas videowall with a super short-throw Panasonic XGA projector, a media server, custom GestureTek interactive sensing system, Ethernet switch and a single-channel powered speaker with passive stereo combiner was created to demo the concepts to Kaiser executives and rehearse the positioning of components.

But, said Barnes, creating a truly seamless experience also required using the Christie M Series edge-blending software and Christie 1608 Vista Spyder image processors to get the pixel overlaps exact. Applebaum Associates' Chris Miceli also pointed out that because the display is high definition, the images had to be exceptionally sharp in order to show the captions necessary to comply with Federal ADA regulations, a particularly impor-

tant point in a Washington DC corporate medical facility. Seams between the display panels were kept as tight as possible and then filled with clear silicon caulking, which helps transmit light and adds to the seamless effect even at close-in viewing distances.

Atop this was laid the GestureTek touchscreen system. Two sets of eight infrared sensors, one mounted at the top of the length of the projections and one on the bottom, interact with infrared cameras mounted behind the screens and facing outward to sense touches on the screen, which in turn triggers the appropriate content from the dedicated GestureTek server, located in one of eight racks in the control room that houses all of the space's show control systems and media sources, such as the Marantz PMD371 five-disc CD player.



The interactive screen arrays are comprised of a dozen 55-inch LED monitors, with pairs of joined monitors forming six interactive stations. Twelve additional focused-array speakers supply the audio, with two speakers dedicated to each screen.

On the other side of the videowall, the 12 55-inch Samsung 550EX displays are mounted using custom unistrut mounts with custom-sized stainless steel bezels that also required exact positioning. Due to a late change order, the displays were larger than had originally been specified; as a result, to install the Cat6 and fiber cabling and the Gefen EXT-DVI-FMP DVI extenders and Extron DVI-to-RGB interfaces for these displays, the projectors for the videowall had to be moved, their positions carefully marked for precise repositioning, due to the tight space between the two display areas.

The Center is rounded out with the split conference room area. The Sennheiser wireless microphone system that both rooms share can also be ported into the PA/paging system whose EAW CIS400 ceiling speakers are sprinkled throughout the facility.

Acoustics

The publicly accessible exhibit spaces are large and high-ceilinged, and were designed originally to be surrounded with mostly glass and other hard wall surfaces. That, combined with the vertically mounted display surfaces, would have created an acoustically challenging environment, particularly in light of the fact that they are adjacent to the conference areas, where acoustical privacy was very important.

Steve Haas, owner of SH Acoustics (www.shacoustics.com), in Milford CT, was brought to the project by Ralph Applebaum Associates. He said the need for isolation bumped up against the philosophical expression of transparency manifested by the extensive use of glass. But, as visually and metaphorically transparent as they might be, they are also highly reflective of sound.

What Haas was able to do was convince Kaiser executives and Applebaum to forego some of the glass panels for more conventional opaque wall sections, which would be better suited to the application of absorptive materials to reduce the sonic reflections in the spaces. For instance, a percentage of the conference room and briefing room area walls was exchanged for wallboard, while the remaining glass wall sections and doors were upgraded to double-glazed insulating construction, with extra seals to help minimize sound transference.

In addition, the new drywall was installed using neoprene isolation pucks to reduce mechanical sound transfer and also included Quietrock sheets applied and sound-deadening fabric and acoustic materials stretched over them. "It was essential to preserve space in the conference rooms, so we had to achieve the best acoustic performance without resorting to double-wall or staggered-stud construction," Haas determined.

Sound Absorption

Applied to the high ceilings is BASWAphon, a sound-absorptive plaster-like compound, used to reduce reverberation time and increase intelligibility across the frequency spectrum: High-frequency sound energy passes through the plaster's pores and into a mineral wool backing and is converted into heat energy; low-frequencies energize the porous surface diaphragmatically, transforming the sound energy into heat energy. "Using that kind of seamless, highly-aesthetic solution also allowed us to integrate the ceiling speakers and other devices, and still maintain very good and even coverage of the acoustical treatment," he explained.

Intelligibility was also behind the decision to use a semi-distributed system approach to sound in the conference rooms, instead of solely a point-source solution. The Renkus-Heinz TRX81/9 two-way speakers on the front wall flanking the Da-Lite projection screens were bolstered by EAW CIS400 ceiling-mounted speakers, with delays processed by a BSS Soundweb London BLU processor.

Audio delivery in the galleries for the interactive exhibits uses the Dakota FA-602 high-focus speakers, with their dispersion patterns adjusted to cover the equivalent of two to three people standing in front of any single display

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