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GUIDE TO AV APPLICATIONS

AV TECHNOLOGY

Content contributions provided by:



Understanding the applications and trends within each vertical market will help build AV/IT systems that meet the needs of the end user today and well into the future.

Introduction

As end users become more dependent on and infused with communication technologies, the demand for applications integrating AV and IT is growing. Likewise, the number of ways one can define these end user groups and distinguish their specific needs is also growing. In marketing terms, offering the same product in the same way to all groups would be considered "horizontal" marketing. Savvy marketers have learned that success is more likely with an approach that recognizes the differences between their various customer groups, an approach known as "vertical marketing". In AV, there are many ways to segment the different groups of AV users into "verticals".

VERTICAL MARKETS

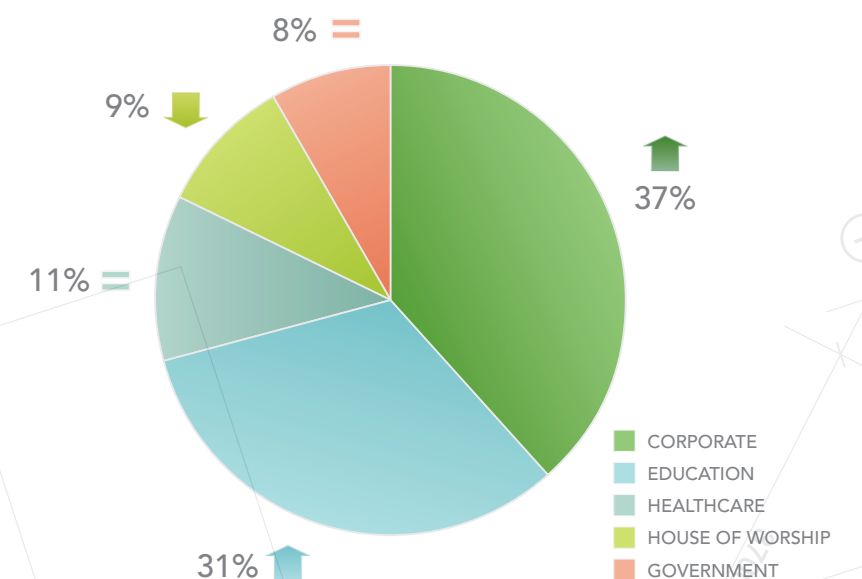
AV systems, like many business/communication tools, have applications in virtually every type of organization. To make the process of analyzing and developing marketing strategies across such a wide range of potential applications, it's helpful to look at the end-use of these systems. When we think about where AV systems are actually used, we can envision different types of "applications" within specific "installations".

Many vertical markets, however, apply technology in very different ways. For example, schools, businesses, and cinemas all have auditoriums, yet they are clearly different markets with different dynamics, purchasing practices, and most importantly, different needs or ways the equipment is used. These characteristics or uses must be considered when doing business or dealing with customers in different markets, even though their technical requirements might be very similar. Thus a hybrid definition that combines both the vertical market and the application within the installation can be a useful way to segment the broader AV marketplace.

EXPLORING VERTICAL MARKETS TRENDS

The five most common vertical markets are discussed in depth within this section of the **AMX Guide to AV Applications**. Understanding the applications and trends within each vertical market will help build AV/IT systems that meet the needs of the end user today and well into the future.

Primary Vertical Markets By Integrator*

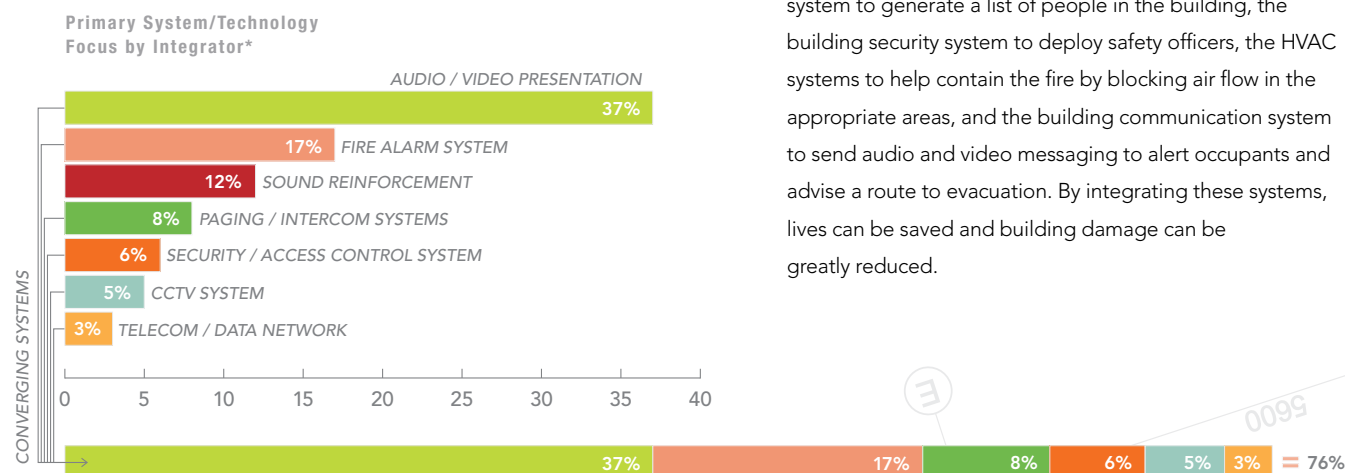


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EMBRACING, SUPPORTING AND PROMOTING TECHNOLOGY CONVERGENCE

Now that AV and IT technologies are steadily growing towards each other or “converging,” more vertical markets are realizing the efficiencies that melding these technologies naturally creates. While they both share a very broad technology umbrella, IT and AV couldn’t be more different in the solutions they offer and the way they communicate to the end user. But as convergence spreads to just about every vertical we support, integrators are embracing, integrating, supporting and promoting convergence whenever possible to increase efficiencies, reduce costs and create greater value for their clients.

A good example of AV/IT convergence is the utilization of IT networks, servers and compression technologies to share and distribute audiovisual messaging throughout a building or across the globe. As the demand for video content to be stored, transferred and shared continues to grow, the convergence of these technologies grows. And, as the cost of employees traveling to meetings continues to climb while the cost of video conferencing continues to fall, this marriage of technologies is becoming essential. In fact, video is now commonplace in presentations, education and communication vehicles in a wide variety of vertical markets.



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SYSTEM STANDARDIZATION

Companies around the world are realizing the efficiencies of copying systems rather than duplicating efforts. The reduction in set up costs plus the time saved in reduced learning curves to operate and maintain these systems is gaining widespread approval. More and more integrators are adopting standardization techniques to support their clients and to maximize efficiencies within their organizations.

SUB-SYSTEM INTEGRATION

Building sub-system integration is another example of convergence that has created an entirely new market for integrators and can be utilized in just about any vertical's operation facility. Access control, building security, fire protection, lighting and shades, HVAC, meeting scheduling, equipment monitoring and building communications are all examples of building sub-systems that could have a much greater overall benefit for the building when integrated and working together. The following bar chart illustrates the primary technology applications being installed by Integrators today. With simple arithmetic we can see how the convergence of these individual sub-systems could soon exceed all expectations and increase the demand for AV/IT integration to support such needs.

For example, in the event of building fire, an integrated system can direct the alarms to sound, the access control system to generate a list of people in the building, the building security system to deploy safety officers, the HVAC systems to help contain the fire by blocking air flow in the appropriate areas, and the building communication system to send audio and video messaging to alert occupants and advise a route to evacuation. By integrating these systems, lives can be saved and building damage can be greatly reduced.

ENERGY MANAGEMENT: A WIN-WIN FOR ALL

The need to find ways to cut costs and maximize profit potential, especially in the corporate environment has never been greater. This presents a significant opportunity for integrators no matter what vertical they are supporting. With increasingly smarter energy management technologies, integrators can offer their clients more ways than ever to maximize natural resources and minimize the unnecessary use of utilities.

Not only is the client able to significantly reduce their costs, they also have an opportunity to reap an enormous return on investment both in company profits and company goodwill. They will be able to promote themselves within their industry and their community as global stewards for environmental responsibility, which in turn can have a very positive effect on share price, company image and other areas.

READ MORE ABOUT IT
 The first AMX Guide to System Integrations Practices provides detailed information about Green Building technologies and highlights the efforts of the United States Green Building Council and the LEED Rating System. In addition, the section discusses ways AV technology can help manage and save resources contributing to the LEED point system.

LEED Compliance Checklist – AMX Solutions
 With proper planning, design architects are integrating AMX hardware and software into building automation systems that are playing an important role in contributing to LEED (Leadership in Environmental Design) points as published by the USGBC.

For recommendations on how AMX control technology can help you achieve LEED points, go to <http://www.amx.com/assets/whitepapers/Leed-Compliance.Checklist.pdf>

INCREASING CORPORATE IDENTITY

Businesses from just about every vertical are becoming more and more interested in the ever growing list of items the public uses to shape their opinion of and their decision about a company. From the company logo and corporate tagline, to the lobby and how employees communicate - all of these experiences help sell that company. Integrators can introduce a variety of solutions to their clients to assist in increasing

corporate identity. Digital Signage is an excellent example of IT/AV convergence that utilizes video displays, IT servers and networks to extend the company's brand and message to any audience they desire.

Meeting rooms and training facilities are also ideal locations for promoting the company image. Most companies probably utilize an AV and/or IT control system including a user interface, which is commonly a touch panel. These panels are starting to play a larger role in providing an opportunity for the company to advertise their identity, show how the technology works and show how this communication device interacts with other departments. The control system is also a great way to demonstrate how automation is helping the company manage natural resources as described above.

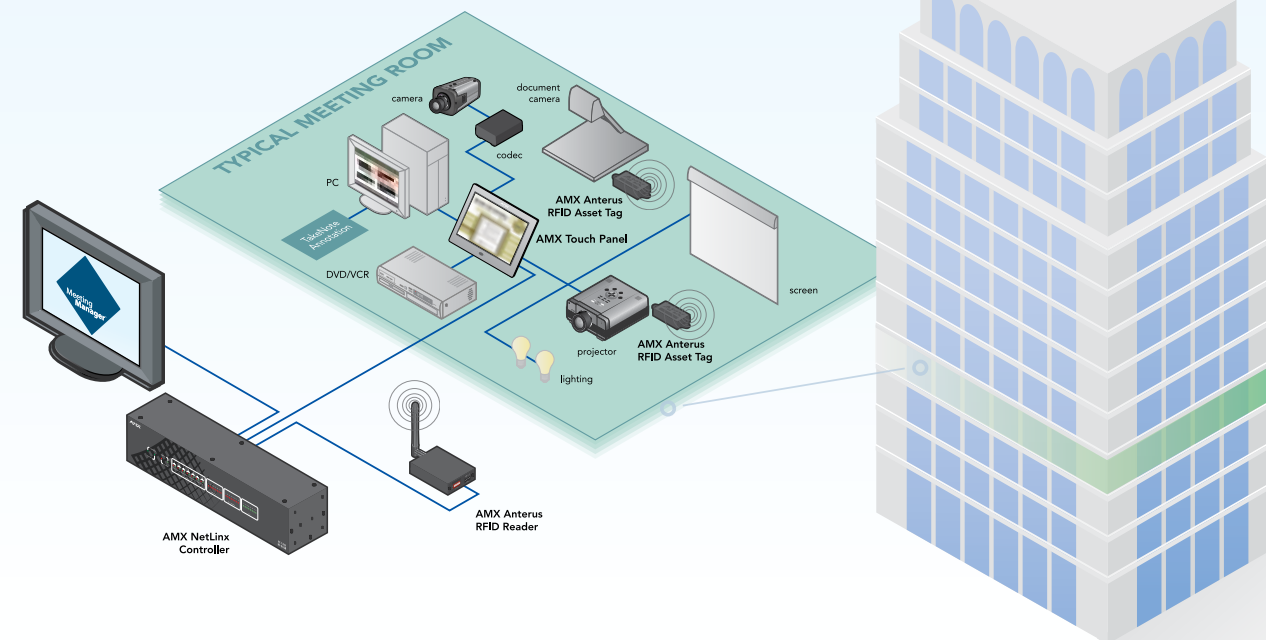
INCREASED DEPENDENCY FOR AUTOMATION

As our world becomes more and more addicted to immediate communications, more obsessed with energy consumption, more reliant on private security and less dependent on public safety; automation is becoming less a luxury item and more of a requirement. In government and other security-ensuring verticals, automation is not only a requirement but a mission critical component. This global paradigm shift has forced a convergence of AV and IT technologies and created an entirely new market, almost overnight for integrators seeking growth and new opportunities.

This Guide Is Intended to:

1. Explore the vertical markets that most benefit from AV/IT integration
2. Identify the various needs of company's for AV/IT integration and support within each market
3. Provide insight to integrators that are trying to expand into a new market or are in an existing market and trying to find ways to extend their reach within that market

Scheduling and Asset Management Software: Essential Equipment for All IT Organizations



Managing, monitoring and tracking assets and conference room schedules is an essential process for any IT organization seeking to optimize its presentation, conferencing and educational operations. Scheduling and asset management software such as MeetingManager from AMX (used as an example below to describe typical capabilities of this software) is an enterprise-level, server-based software solution for corporate IT professionals, facility managers and conference room users.

Equipment Monitoring and Proactive Maintenance

The asset management feature can constantly monitor equipment in your system and, in real time, reports any disturbances in functionality by paging or generating an email to the appropriate member(s) of your staff. System status may also be viewed in real time from any location using a browser-based console.

Facility Scheduling and Configuration

The facility management function combines scheduling, equipment configuration and customized touch panel signage to make room preparation a snap. With AMX MeetingManager for example, appointments can be set three ways: directly from the AMX Touch Panel outside the room; via Microsoft Outlook/Exchange, GroupWise, Lotus Notes and more. Either way, the reservation is communicated back to the scheduling server. You can also check a room's daily, weekly or monthly availability; reserve your room; and schedule your projector to be up and running as your guests arrive.

Asset Security

Your investments are always secure with the asset security component of this software. By sending instant alerts when assets, such as a projector or mobile A/V cart is unplugged or relocated. Additionally, you and your team can feel secure knowing that the administrative functions are password protected.

Notification Groups

Administrators can monitor devices by assigning them to 14 different notification parameters (security, maintenance, network, etc.) and sort within these notification groups based on device type, room or group.

Simple Network Management Protocol (SNMP) Support

MeetingManager features SNMP Support. This industry standard protocol allows IT administrators to execute remote diagnostics, manage performance and plan for network growth – all in a clear, definitive and intuitive format.

Redundant Server with Failover Support

To minimize server downtime, MeetingManager will enable the deployment of several backup methods to protect your data.

Maintaining Data

MeetingManager works seamlessly with your database server to log data, create a variety of instant reports and export log data for customized reporting. Only AMX supports SQL Express, which eliminates the need for a dedicated SQL Server.

Highly Scalable

Scheduling and asset management software can typically support many rooms and devices – MeetingManager for example, can support up to 1,000 meeting rooms and approximately 10,000 assets.

Device and Asset Tracking

Create and register any asset – such as tables/chairs, flip charts, podiums/lecterns and mobile A/V carts – for inventory management.

Automation Based on System Conditions

Perform a specific function as a result of a pre-defined event. For example, the system can be configured to automatically turn on a fan based on the temperature threshold in an equipment rack or turn lights and non-essential equipment, such as a projector or display, on or off based on the occupancy status of a room.

A Variety of Reporting Options

IT professionals have a variety of reporting options for tracking assets, rooms and people. For example, MeetingManager report options include: Device Activity, Device Inventory, Room Activity, Control System Inventory, Device Location, System Users, Tag Battery Level and more.

Flexible, Intuitive Interface

A point-and-click interface makes it easy to find what you are looking for with simple-to-understand text descriptions. A Web-based interface allows access for multiple users from any location, even operating simultaneously.

Multilingual Support

MeetingManager for example, supports eight languages - Chinese, Dutch, English, French, German, Italian, Japanese and Spanish - and localizes based on the user's installed operating system.

Instant, Web-Based Reports

Remain organized and efficient by tracking equipment usage and performing preventative maintenance.



A CLOSER LOOK

Taking Asset Management to the Next Level With RFID Technology

Radio Frequency Identification (RFID) technology can provide IT organizations with capabilities for device tracking and people locating that have never before been available. An RFID system such as the AMX Anterus system includes an RFID Reader, which connects to the AMX NetLinx Controller, and a choice of RFID tags – either an Asset Tag or ID Badge – which are attached to devices or worn by people to identify and track location, keep assets secure and trigger events. Anterus was designed to enhance RMS for the ultimate in device management, monitoring and scheduling.



Drivers of the upside include increased focus on conferencing to and from multiple points, more affordable costs of systems, and increasing convergence of IT with AV.

Corporate

DESCRIPTION

The use of AV technologies in corporate/enterprise environments has always been a key part of the AV industry. For business and sales presentations, training, collaboration, corporate communications, and many other needs, AV plays an increasingly important role in commerce in the U.S. and around the world.

According to a survey conducted by the National Systems Contractors Association (NSCA) whose members include AV systems integrators, a solid majority (72%) of systems integrators said they were involved in the corporate facilities market. Despite some predictions of new office construction slowdown, the corporate market is likely to continue to be one of the largest users of AV systems with a larger proportion of projects in remodeling, retrofit, and systems upgrades. It is estimated that there is over 11 billion square feet of office space in the U.S. and Canada. The corporate new construction market is also large and projected to be over \$68 billion in 2008 (FMI Corp. data), and it is a growth sector for the building industry at large.



APPLICATIONS IN CORPORATE FACILITIES BY LOCATION WITHIN THE BUILDINGS

There is growing awareness and demand for AV systems in corporate facilities. Drivers of the upside include increased focus on conferencing to and from multiple points, more affordable costs of systems, and increasing convergence of IT with AV.



A CLOSER LOOK

Jones Day
www.amx.com/markets/customerProfiles/JonesDay/



Jones Day is one of the largest international law firms in the world employing more than 2,200 attorneys in 30 offices around the globe and boasts 250 of the Fortune 500 among its list of clients. Jones Day believes technology adoption is critical to the firm's continued success, and as an organization, it standardized on AMX® control systems for increased efficiencies across its offices.

Unilever Nederland Holdings BV
www.amx.com/markets/customerProfiles/Unilever/



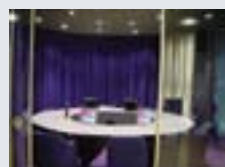
Unilever ranks among the globally prominent producers of consumer products with a mission to help people feel good, look good and get more out of life. An AMX system was selected to automate all of the AV equipment in Unilever's head office boardroom, including 26 TFT screens sunk in the conference table that rise by means of a lifting system. The system also controls a voice enhancement device, next to each TFT screen which allows meeting participants to make themselves heard when talking.

JD Edwards
www.amx.com/markets/customerProfiles/JDEdwards/



Nearly 6,000 customers. Approximately 5,000 employees. J.D. Edwards is the leading supplier of e-business solutions, delivering resources built on speed and agility for customers worldwide. No wonder this highly respected company relies on AMX control and lighting systems as an integral part of its success and professional image.

Interpolis
www.amx.com/markets/customerProfiles/Interpolis/



At Interpolis, one of the largest insurance companies in the Netherlands, employees rarely call in sick. No made-up excuses. No mental health days. That's because the staff of 5,000 strong enjoy not only where they work, but the unique environment in which the job gets done.



The Decision Theater at Arizona State University. Integrator: Technology Providers Inc. (TPI)- Chandler, Arizona

Lobbies

Architectural and interior design aesthetics are playing larger roles in the influence of the design of corporate facilities. Prime areas where this is seen more are boardrooms and corporate lobbies. Since lobbies are the reception spaces for visitors, they are the areas of the building where much design effort is focused. Digital signage in corporate lobbies is growing. In addition to art-framed photos featuring the companies' successes (whether products or events), more flat panel displays are showing corporate "stories." Dedicated media players are often used to drive the repeating content in these applications. In the past eight years, there has been increasing focus on the aesthetics of lighting in lobbies, with some high-concept lighting designs using theatrical lighting products and techniques.

In many buildings, the telephone and paging switchboard is located at the reception desk; some reception areas also house the CCTV monitors. Access control systems have a focus in the lobby, too. In addition to electronic access control to the main entryways, the receptionist often has control over guest check-in and entry.

Building-wide systems

Control and monitoring of life safety systems is centrally located and usually near the entryway for easy access by police and fire officials. Since 9/11 more office building managers have given increased focus to evacuation planning and upgrading of their life mass notification alarm systems.

Increasing focus on "green" environments is driving some systems upgrades that promise energy management and savings. Watch for more automated window shade control tied to the HVAC and lighting systems as part of these upgrades.

Access control systems within office buildings are focused on individual offices, conference and training rooms that house valuable equipment, and any other areas where special clearance is needed, such as R&D labs. Entry can be controlled with various technologies, including keypads, key cards, RFID devices, or even biometrics.

Main controls for the HVAC and lighting systems in buildings typically allow local control at various zones. In some buildings, the HVAC and lighting systems are controlled via individual zone or room sensors. Increasing focus on "green" environments is driving some systems upgrades that promise energy management and savings. Watch for more automated window shade control tied to the HVAC and lighting systems as part of these upgrades.

Offices and cubicle areas

Paging systems are ubiquitous in office areas. The systems typically consist of flush mounted speakers, usually commodity quality. In large office spaces with multiple zones, there may be a separate audio mixer and a series of power amplifiers. The distributed audio systems may also do double duty for background music. In the business music vernacular, "background music" (BGM) is by definition narrower band audio with instrumental music content (no vocals), and is meant to be noticed only in its absence. Some distributed audio systems in offices may also be used for speech privacy

Though meeting rooms can range from very utilitarian to posh, high-concept design, the blend of function and aesthetics is usually well planned.

systems in which narrow bands of noise (similar to HVAC noise) are emitted to mask nearby conversation. These systems are sometimes known as sound masking systems. In offices where there is the need for heightened security, there may also be anti-eavesdropping systems. A specialized subset of speech privacy, audio security systems are designed to prevent accidental or deliberate eavesdropping attempts often made with microphones and other “bugging” devices. In the audio security systems, noise is generated with active electronics, preventing the listener from hearing and understanding conversations.



Unilever Nederland Holdings BV Boardroom. Integrator: BIS- Netherlands

Meeting Rooms and Boardrooms

It is in the corporate meeting rooms where the traditional AV systems take center stage. Like lobbies, the meeting rooms in office buildings frequently play host to guests. As such, these spaces are where there is likely a relatively higher degree of interior design focus. Though meeting rooms can range from very utilitarian to posh, high-concept design, the blend of function and aesthetics is usually well planned. There is typically a tech closet in the room with racks for the gear. At the highest end of the spectrum, custom, very expensive boardroom tables are a crown jewel. In these rooms the tables are “wired” to accommodate the electronics gear, and they can present unique aesthetic challenges. In these rooms, systems integration is a high priority for optimal system functionality as well as for aesthetic reasons.

AV presentation systems

In many corporate facilities, meetings often include remotely located participants, and this format is likely to become even more common. The systems in these rooms are likely to call for integration of teleconferencing equipment with AV presentation systems. Increasingly, the teleconferencing is video over IP. In these systems, there are cameras strategically placed in the room, and in some systems the camera movements are sync’d to individual microphone activation. Mics, sometimes boundary layer type, are located strategically to pick up voice from each participant at the table.

The presentation material is served up either via a networked computer or a media player. With increasing interest in HD video and larger files of presentation content, the demands on the computer or media player will include more robust video and audio processing and output capabilities. Screens are either motorized “pull-down” screens displaying video projected material, or flat panel LCD or plasma displays. Projectors in the high-end rooms are ceiling mounted on motorized mounts.

The software of the conferencing systems allows for multiple view options from all cameras to and from the remote locations. Meeting rooms with these AV presentation and conferencing systems are prime locations for integrated touch-panel systems controllers that also ideally incorporate the lighting control system, and often include other advanced functions.



HELPFUL HINT

At AMX, we are developing more specialized solutions to integrate control and automation technology with AMX products into the vertical markets that we believe people and businesses can most benefit from using our products.

We invite you to visit the Markets section of amx.com (amx.com/markets) where you will be able to discover how we support the unique needs of each of these verticals as well as view and download customer profiles (print and video) of these solutions at work:



- Business
- Whole Home
- Home Theater
- Education
- Government
- Houses of Worship
- MDU
- Hotels
- Entertainment
- Healthcare
- Broadcasting
- Network Operations Center
- Retail
- Private Transportation



Conferencing voting systems that include individual mics (and headphone jacks for language translation) are sometimes integrated into the AV systems of boardrooms. These systems allow for egalitarian turn-taking, queuing, and anonymous voting.

Electronic or digital whiteboards are used widely in corporate meeting rooms, and their software allows remote participants to receive files of the content.

The proliferation and increasing robustness of wireless networking technology is enabling more flexibility of AV systems design and less wire concealment challenges in meeting rooms.

With increasing interest in HD video and larger files of presentation content, the demands on the computer or media player will include more robust video and audio processing and output capabilities.



Rehearsals.com. Integrator: Newmagic Entertainment

AV Production Facilities

The larger corporate venues are more likely to have in-house AV production departments that record, produce, and distribute content, from training programs to annual reports. With more affordable, ubiquitous audio and video recording and playback systems, content that was once assumed to be in “book” form is now becoming multimedia.

Office space trends

A progressive approach to office space planning called “fluid architecture” is gaining popularity. In offices using this design approach, there are less rigidly cordoned off cubicles, more unassigned spaces for telecommuters to “park” on days when they are physically at the headquarters, and more open

spaces for groups to convene for planned or spontaneous collaboration. Fluid architecture provides the setting for the “task team” trend in business. Companies that use this model tend to be less hierarchical and “flatter” organizational structures where more teamwork is encouraged. This approach is enabled by wireless networking. Software that

enables group collaboration from remote locations is also coming into the corporate world. With these programs, participants see a shared desktop on their screens, or they can also use the AV system in meeting rooms. As this trend grows, there will be demand for more networked displays throughout the enterprise.

CASE STUDY: Aetna Computer Network Command Center



The facility is divided into three distinct areas – Network Operations, which oversees the company’s Ethernet connectivity; Data Operations, which is responsible for maintaining applications, servers and mainframes; and Mission Control, which coordinates and troubleshoots any significant quality of service issues that may arise with the company’s network and data operations.

As Bob Reynolds, Aetna’s lead computer specialist explains, “It’s extremely important for the CNCC to integrate the most advanced technologies to ensure we receive immediate notification of any IT problem. Our sophisticated systems also provide the tools and resources needed to rapidly respond to and solve these problems.”

STREAMLINED CONTROL

A critical component of the CNCC is its AMX® control and automation system. “A control system was essential for this facility because of the sheer number of sources and components it requires,” said Ben Watkins, technology integration engineer for Constant Technologies, an AMX system integrator based in Wickford, RI.

The AMX system in the CNCC provides centralized control of the facility’s video cubes, LCD displays, display wall processors, audio and video switchers, overhead lighting, video and audio conferencing equipment, cable television receivers, DVD players and VCRs.



INCREASED EFFICIENCY

For example, using AMX 15” Modero® Touch Panels, CNCC staff can quickly preview, select, route and display any source device in the room – including desktop PCs, cable television receivers and videoconferencing equipment – to any or multiple video cubes and/or flat panel displays. Without an AMX interface to the display wall processor, this would be a tedious, time consuming task for Reynolds and his staff, explained Watkins.

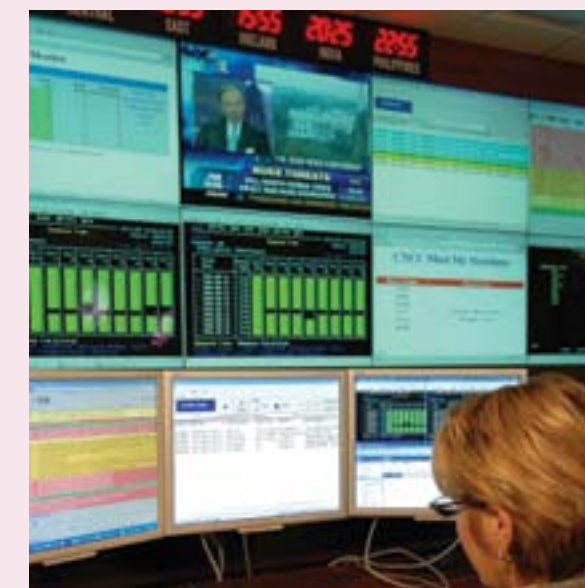
“Since installing an AMX control system in the CNCC, we’ve significantly increased efficiency, enabling us to do more in less time,” added Reynolds. “With AMX at the core of our network command center, we’ve been able to improve our customer service, resulting in an overall satisfaction level that’s as high or higher than it’s ever been.”

The AMX system in the CNCC is especially valuable during times of crisis because it maximizes staff efficiency,

enabling quicker resolutions. By selecting pre-programmed macros via the Modero Touch Panel, staff can execute a series of commands, such as dimming the lights, switching audio and video, and initiating a videoconference with just one touch.

SAFETY AND SECURITY

“Today, the CNCC is really a showcase for Aetna,” said Reynolds. “When a current or prospective client visits, they see several large video walls displaying a multitude of information and staff members who can walk up to one of the touch panels in the wall and make just about anything happen. I believe this provides a level of comfort to them, knowing the steps Aetna has taken to ensure our network and data are safe and secure.”



“It used to take Bob and his staff about an hour to set up a video conference call and route it to the video wall. Thanks to AMX, this process now takes about two minutes,” said Watkins.

“Since installing an AMX control system in the CNCC, we’ve significantly increased efficiency, enabling us to do more in less time”

Aetna is a worldwide leader in health care, dental, pharmacy, group life, disability, and long-term care insurance, as well as employee benefits. Recognized by *Fortune* magazine as one of the country’s Most Admired Companies, Aetna is headquartered in Hartford, Conn. with satellite offices in Blue Bell, Penn. and Middletown, Conn.

Aetna’s Middletown campus houses the company’s impressive Computer Network Command Center (CNCC), which manages and monitors Aetna’s Information Technology (IT) operations around the clock – 24 hours a day, seven days a week, 365 days a year.

Within the past ten years there has been increasing attention paid to amplification in the classroom, primarily in public K—12 schools.

Education

DESCRIPTION

Representing one of the AV industry's oldest and greatest long term opportunities, the education market encompasses both public and private schools from pre-school level, through K—12 grades, through higher education. According to the U.S. Department of Education's most current data, there are about 90,800 elementary schools of which about 23,500 are private and 67,300 are public. There are approximately 30,100 secondary schools, approximately 23,800 of which are public and 6,300 are private. In addition, there are over 14,000 schools (5,707 public and 8,500 private) that are combined K—12 facilities. In higher education, there are approximately 4,300 universities and colleges, with private schools representing over half the total (60%).

APPLICATIONS BY LOCATION WITHIN EDUCATION VERTICALS

Education verticals, as a category, typically include multiple and diverse applications and systems. Among the diverse range of vertical markets, educational facilities are home to all low voltage electronic systems applications that exist.

Building Front Office

Typically, in K—12 facilities, each building has a central office. It is within this central office complex that the controls and interface for the security and life safety systems, the clock-timed signaling system, the telephony system, and the paging/intercom system are housed. On small college campuses and multi-building K—12 campuses, the central building office may network several buildings for these functions.

Paging was one of the earliest low voltage applications and has been prevalent in K—12 schools for decades. Flush-mount speakers, usually of low-fidelity, commodity quality are installed in each classroom (usually one per classroom). They are used for the automated electronic bell signals and voice announcements. These systems are tied to a central intercom control station located in the main office where the mixer, amp, controller, and microphone are located. Paging/intercom systems are sometimes tied to the telephone

system, and at least historically, were installed by the telephony systems installer. Many are two-way, allowing call-in from each speaker location. Use of paging systems is less common in college or university classroom buildings.

K—12 Classrooms

Classroom amplification for general instruction is also called "voice lift", or "soundfield systems". Within the past ten years there has been increasing attention paid to amplification in the classroom, primarily in public K—12 schools. One driver is the recognition that students, especially those with mild learning disabilities or fluctuating hearing acuity, need the most advantageous signal to noise ratio possible. Furthermore, the typical classroom has the acoustic constraints of high reverberation and high ambient noise. Increasing awareness of the need to protect classroom teachers from excessive vocal stress and abuse further supports prioritization of these systems. Voice lift systems can be either permanently installed (usually with surface mount speakers) or portable, typically with two to four stand-mounted speakers, and a small mixer/amplifier. The instructor usually wears a lavalier-type microphone.



A CLOSER LOOK

AMX Novara ControlPads:
Maximizing Cost-Effective Control

The need to cut costs and discover cost effective technologies has never been greater for schools and universities of all levels; public and private. With increasingly tighter budgets, control technology must be extremely affordable for learning institutions to justify this expense. This is why relatively inexpensive and affordable ControlPads are becoming popular interface options for controlling lights, sourcing inputs and adjusting volume for many classroom devices.

- Available in US, UK and Europe configurations
- 8-button and 16-button panel layouts
- Programmable blue, backlit buttons
- Includes acetate sheet with 50 pre-cut button label inserts for easy, cost effective labeling
- 1315 events per panel
- 2 relay ports for relay control
- 1 RS-232 port
- 1 IR port
- 1 I/O port for input detection or logic level control
- 1 USB device configuration port
- Compatible with baud rates from 1200 to 115200
- Available in choice of Black, White or Brushed Aluminum mounting plates



A CLOSER LOOK

Cornell University
www.amx.com/markets/customerProfiles/CornellUniversity/



Simply put: It was time. More than 90 years since opening its doors on the campus of Cornell University in Ithaca, N.Y., the School of Industrial and Labor Relations (ILR) Conference Center underwent an extensive interior renovation and significant technology upheaval.

Arizona State University
www.amx.com/markets/customerProfiles/ArizonaStateUniversity/



When the new Lattie F. Coor Building, located on the main campus of Arizona State University (ASU) in Tempe, opened its doors in January, it ushered faculty, students and IT technical support staff into the future of enhanced teaching methods, technology-aided learning, proactive maintenance and rapid response times — a future that is being experienced here and now.

Buena Vista University
www.amx.com/markets/customerProfiles/BuenaVistaUniversity/



In terms of enrollment, Buena Vista University (BVU), located in Storm Lake, Iowa, may be considered a small college. When it comes to incorporating the latest technology, however, it's exceeding the greatest of expectations. Take, for example, the university's innovative policy of providing a wireless laptop PC to each of its 1,300 students. A tech-savvy perk for a tech-savvy population, simply rolled into the cost of tuition.

Education Service Center, Region XV
www.amx.com/markets/customerProfiles/RegionXVESC/



In the state of Texas, twenty Regional Education Service Centers (ESCs) serve districts with professional development and technical assistance in a variety of needs. The ESC for Region XV, which is located in San Angelo, Texas, serves 43 school districts. The facility provides teachers and other staff members in the region with professional development for state-mandated curriculum.

AV presentations, once conducted mainly in common areas such as a resource center or library, have found their way into individual classrooms. With so much software-based courseware, curriculum content input and student work output is increasingly focused on individual computers. An increasing proportion of instruction at the classroom level is occurring via AV presentation media. At earlier and earlier ages, students are acquiring "stand-up" presentation skills. The same installed audio system used for voice lift does double duty as student presentation gear. Projectors, now more affordable, are increasingly prevalent in classrooms. Screens are commonly installed with remote-controlled operation.

Computer networks (likely to be wireless in both new and retrofit systems) are common within school buildings. Teachers are able to access instructional materials from a central server. In addition, administrative tasks such as submitting student scores/grades is happening via central IT systems. Watch for increased demand for AV media players that accept portable media files to show at central locations (resource rooms) via the network or on SD memory cards. These players will address issues such as the memory limitations of legacy computers and the codecs needed for more robust multimedia content.

Electronic whiteboards are cropping up in more classrooms. On a network, the material written or diagrammed on the whiteboard goes directly to individual computers.

Lighting control is becoming a more prominent focus in all school buildings. This is driven by increased consciousness of energy cost management and increased value placed on optimal instructional environments that so often includes projected visual material. In a sense, low voltage lighting control is in delicate balance between the domains of electricians and low voltage systems contractors. Electricians are often untrained in low voltage lighting control and are finished with their part of the construction project long before the low voltage systems are being configured and commissioned. Nevertheless, there is likely to be increased awareness of the educational benefits of good lighting in educational environments, analogous to the growth in awareness of the educational benefits of intelligible audio.

An increasing proportion of instruction at the classroom level is occurring via AV presentation media. At earlier and earlier ages, students are acquiring "stand-up" presentation skills.

In some colleges and universities, the students can tap into the wireless network that the presentation itself is on and view the presentation on their own laptops.

College and University Lecture Halls (100-500 seats)

The form factor for a "lecture pit" is similar to an auditorium; in fact, auditoriums frequently double as classrooms. The seating is typically fixed, and the presenter area is "stage-like." The sound reinforcement system is installed and includes either flush mount or surface mount speakers. There is typically an AV control room where the mixer/amp and any audio signal processing or recording gear is located. Video projection is also installed, and the screen is large and motorized on the "stage." Microphone types include both lectern and lavalier. Lighting control of the room may include several pre-set "scenes" is commonplace. Electronic whiteboards are being used more and more in these situations. In some colleges and universities, the students can tap into the wireless network that the presentation itself is on and view the presentation on their own laptops. Specialized software programs allow for note taking right on each slide during the presentation. These notes are data-logged and are searchable.



Education Service Center. Integrator: Flexite Multimedia Systems- San Antonio, Texas

Specialized Classrooms

In both K—12 and higher education there are dedicated classrooms fitted out for specialized functions. Included in this group are science labs, computer labs, and language labs. Language learning systems are controlled from a central console computer where the teacher controls what the students see and hear. Alternatively, students can also listen to a recording from an optical disk or via streaming media from the Internet. Because the teacher's computer is attached to the school network, there is access to DVDs or the Internet to listen to foreign language (or English) television and radio to work on listening comprehension.

In classrooms where actual objects are the materials of instruction (e.g. biology labs, mechanical engineering), there is continuing demand for overhead projectors, document cameras (also known as "visualizers"), and image magnifiers. Because of cost restrictions, these tend to be shared and housed in a central location to be used on a sign-up/registration basis.

Auditoriums in High Schools and Colleges and Universities

Auditoriums are a prime location for installed AV systems, including audio and video presentation, reinforcement, and playback. Size and quality vary depending on factors such as size of the space, uses of the space, and budget priorities of the school. In the private school sector, there is competitive motive to have state of the art facilities and systems to attract enrollment. In colleges, universities, and secondary schools, most auditoriums are outfitted for fine arts performance of all types—concerts, plays, lectures, and dance recitals. These spaces double as large lecture halls, and the AV system is used for both visual presentation and speech. There is a trend, particularly in upper education at the college and university level, for lectures to include playback of HD audio and video content. In these locations there is also increased attention paid to sound quality of the audio system.

In colleges and universities and in affluent high school districts, the quality of the audio and video systems is highly important. This is not only to deliver a high quality performance experience for the audience (frequently populated with people who have a financial stake in the institution) but also to serve as a hands-on lab for students training for technical careers in the entertainment and communications industry. In high schools (especially drama and music magnet schools) and colleges and universities that have special curriculum emphasis on the performing arts, these systems are a prime focus and high priority.

Theatrical lighting systems are usually part of these performance spaces, not only for the performance applications, but also to serve as training for students studying the technical aspects of the performing arts. It is in these spaces where there is likely to be integration via an integrated show controller.

Assistive listening systems are also included in these systems, and their audio mix is usually controlled via a separate audio output from the mixer.

It is common for installed AV systems to include high quality surface mount loudspeakers, stage monitors (usually wedges), amplifiers, live entertainment mixing console, signal processing equipment, a suite of microphones, an installed high lumen projector, installed motorized screen, a central media source (either computer and possibly a media player), and lighting, including moving lights and a theatrical lighting control system. The system may also include an optical disk player as a media playback option. Some systems may also include large LCD or plasma display screens.

Broadcast and AV Recording and Production

Many college and universities have recording, production, and local area broadcast systems located in or near the campus performing arts center. In addition to serving the purpose of lab training for students, they offer the ability to record, produce, and transmit events via local radio and/or television stations. In these facilities, there is a studio outfitted with recording, editing, and storage equipment as well as broadcast transmitter feeds.

It is also common for colleges and universities to have their own radio and/or television station. These stations are more elaborate and active in schools that have radio/TV broadcast major degree programs.

Multi-Use Gyms and Auditoriums

In many smaller or less affluent K—12 schools that do not have separate performance auditoriums, the gymnasium may be used for a wide range of purposes including ceremonies, guest lecturers, indoor sports, and drama and music performances. The installed sound reinforcement system often consists of surface mount speakers, a mixer/amp, and microphones. Video presentations are often done via a portable or installed projector and screen. The multi-purpose use of these spaces often presents significant audio challenges, since acoustics are rarely considered in athletic facility design.

Athletic Stadiums and Fields

The size and scope of school athletic facilities range from modest outdoor baseball fields and tracks to mega, professional-level stadiums at "marquee" colleges and universities. Installed sound reinforcement systems are prevalent in most of these venues. In outdoor venues, the ruggedness and weatherproofing of the speakers is vitally important. Funding of these systems is often supplemented by booster fund-drive money. Some schools view their athletic facilities and amenities, including the AV systems, as being competitively important among in-conference rivalries. This facilities "competitiveness" helps drive prioritization of AV systems in some regions.

Campus Boardrooms

In both K—12 schools and colleges and universities, there are administrative offices that are housed either in their own freestanding building or as part of another classroom building. The same range of applications seen in corporate facilities is found in these administrative headquarters. Boardroom systems for AV presentation have network connections to the offices. Systems include installed projectors, motorized screens, and microphones, including boundary layer mics on the conference table. Some include teleconferencing capabilities for remote attendees, integrated into the system via a central controller.

Digital Signage on College and University Campuses

Digital signage as an application is a burgeoning application on college and university campuses. Digital signage systems are being used for wayfinding, announcements, and general news. The additional functions these systems can serve are driving new sales opportunities. For example, a trend on campuses is to transition from traditional food service to branded fast-food vendors. Students (or their parents) fill pre-paid credit/debit cards with funds that are accepted at these on-campus commercial restaurants. These same restaurants can then provide revenue to the school by buying advertising time on the digital signage systems. With this model, the ROI becomes more tangible and compelling to the school.

Auditoriums are a prime location for installed AV systems, including audio and video presentation, reinforcement, and playback. Size and quality vary depending on factors such as size of the space, uses of the space, and budget priorities of the school.

Another example of an application (driven by the specialized software) for the digital signage systems is one that allows for educational project collaboration. Study groups can convene without needing to be physically in the same location. Students reserve time on specific screens of the system and tap into the network via their own laptops from each of their individual locations. Each digital signage display then

becomes a shared computer screen with the software allowing group input.

On large campuses, the digital signage systems tend to be networked via Ethernet or wirelessly with content served up by a central computer to receiver/processor cards located in the displays. It is expected that new generations of AV media

players and specialized IT solutions will drive the growth of campus digital signage systems.

Distance Learning

Public education facilities such as K—12 public schools, public university extensions and community colleges serve the extended educational needs of the community at large.

Distance learning systems are prevalent in these venues. The distance learning rooms are used for curriculum-based classes, for special seminars and conferences, and for public meetings of specialized groups or committees. Systems in these spaces include videoconferencing and streaming media.

CASE STUDY: Temple University



Temple University is a world-class center for teaching, research and health care. As such, it continues to aggressively integrate the latest technologies into its classrooms and labs. In just four years, the university has expanded its number of smart classrooms from 30 percent to more than 55 percent, with plans to further expand this number to 80 percent over the course of the next few years.

“One of the benefits that AMX brought to us was its system design and programming expertise.”

STANDARDIZING ON AMX

Early on, Temple recognized the significant benefits it could achieve by standardizing on one control platform across its campuses – including ease of use for faculty and increased efficiencies for its IT staff. After weighing its options and real-

world experiences with a variety of control manufacturers, the school adopted AMX.

As Tim O’Rourke, Temple’s vice president of computer and information services, explains, “One of the benefits that AMX brought to us was its system design and programming expertise. We knew which technologies we wanted in each room, but we didn’t know how to integrate these technologies in a way that would be user friendly. AMX helped us design and integrate our AV systems in such a way that every faculty member, including those who are not as tech-savvy, can use computers, DVD players, document cameras and flat panel displays to enhance the learning process, which is of course our ultimate goal.”

Over the years, Temple has significantly enhanced the capabilities of its smart classrooms by adopting AMX’s MeetingManager software. Today, the university uses the software to manage and monitor the equipment in more than 100 smart classrooms in 14 buildings on three campuses. When equipment malfunctions or a faculty member requests help via the AMX Touch Panel, members of Temple’s Classroom Technology Support (CTS) team receive instant e-mail alerts and text pages, which allows them to significantly increase their response time. The team also uses the software to track device usage, enabling them to perform preventative maintenance, such as replacing projector lamps before they burn out, thereby reducing the number of help desk requests they receive.

THE TECH CENTER

At 75,000 square feet, Temple’s TECH (Teaching, Education, Collaboration and Help) Center is the largest computer facility in the country, and the school believes it ranks among the most sophisticated as well. The Center includes 600 fixed work stations; 100 laptops; 13 breakout rooms, which students use for collaboration and group study; specialty labs for video editing, graphic design, music composition and software development; and social space for students with lounge areas and flat screen TVs. It also houses the school’s Welcome Center, 24-hour help desk and a full-service Starbucks Café.

“The TECH Center is a very large facility that integrates many complex technologies, and we clearly needed something to control it. Based on the positive experiences we’ve had with our smart classrooms, we chose AMX,” said O’Rourke.

The school installed an AMX Control System in each of its high-end breakout rooms so that students can prepare and/or practice multimedia presentations that utilize a variety of technologies, such as computers, flat panel displays and audio. “The AMX Touch Panels in the breakout rooms are so easy to use, most students can operate the equipment without any help from our staff, which frees them up to more quickly respond to student requests in other parts of the facility,” commented O’Rourke.



“The TECH Center is a very large facility that integrates many complex technologies, and we clearly needed something to control it. Based on the positive experiences we’ve had with our smart classrooms, we chose AMX.”

An AMX Control System is also used to distribute video, such as cable broadcast, recorded DVDs and multimedia PowerPoint presentations, to the 30 flat-panel displays installed throughout the building. At any given time, a variety of programming – from 24-hour news networks to university communications – is displayed. Temple even developed an application that shows the number of workstations available in each area of the facility, which allows students to find available computers more easily.

WHY AMX

“With AMX, the significant technology investments we’ve made are really paying off. Not only are our control systems extremely reliable, but they’re also very easy to use. When our faculty members walk into any classroom on campus and see the touch panel, they immediately know what to do because the AMX user interface is easy and constant,” said O’Rourke. “To sum it up, AMX makes a fantastic product that we’ve been very pleased with. Based on our many positive experiences, we plan to continue using AMX well into the future.”

Like IT systems, control and AV systems have now evolved from a "luxury" item to an integral component of agency operations. Whether at work in the War Room, the Courtroom, or NASA Mission Control, reliably controlling AV, data, and communication systems is critical.

Government/Legal

DESCRIPTION

As a vertical market from the perspective of the AV industry, government cuts a wide swath as it encompasses facilities of many types, sizes, and functions. According to the U.S. Department of Labor, the Federal Government alone (not including state, county, city governments) is the single largest employer in the country. Although accurate quantification is nearly impossible, many AV industry observers also believe it to be the largest user of AV systems and technologies. Primary segmentation occurs by level of government and includes federal, state, county, and municipal facilities.

Facility types within government buildings include offices, courthouses, meeting chambers, public transaction rooms (bureaus where the public can access records, pay taxes, file and make changes to legal documents, and obtain licenses of various types). Some government buildings tend to be sub-verticals serving a specific function, such as departments of motor vehicles, police and fire stations, post offices, some social security offices, and correctional/penal facilities.

The number, range, and reach of government facilities is vast and wide. In fact, the Government Services Administration Office's Public Buildings Service (PBS) is the largest public real estate organization in the country. PBS has an inventory of over 342 million square feet of workspace for 1.1 million federal employees in 2,100 American communities. There are roughly 500,000 federal buildings in the United States.

CONTROL AND AUTOMATION: MISSION CRITICAL FOR GOVERNMENT

Like IT systems, control and AV systems have now evolved from a "luxury" item to an integral component of agency operations. Whether at work in the War Room, the Courtroom, or NASA Mission Control, reliably controlling AV, data, and communication systems is critical. Agencies on the local, state and federal levels all rely on control and AV systems to distribute vital information to decision makers, communicate messages to partner agencies and the public, and increase the efficiency of the overall operation. If government AV,

data or communication systems fail, the safety and security of citizens is at risk, which is why government agencies are increasingly turning to control and automation systems to provide this extra level of redundant support.

APPLICATIONS BY TYPE OF FACILITY WITHIN GOVERNMENT/LEGAL VENUES

Government facilities are home to many and varied types of low voltage systems. General building types are described below in terms of the areas within them where AV applications are most prominent.

Office buildings

Building-wide systems

Office buildings house a variety of types of spaces and serve a number of key functions. The security of government buildings is a prime focus that became sharpened after 9/11 and has continued to intensify. There is quick uptake of new security technology in this market, and in fact, the government market is a prime driver of research and development of new security technology. Building wide systems include tight access control and CCTV monitoring. In buildings housing courthouses, law enforcement, and high level state and federal government functions, the security systems are even more robust and include entry screening magnetometers. Access control to highly sensitive interior spaces can include biometric devices.

CCTV coverage in government buildings is thorough and includes the exterior perimeter of the building, and the video encoders/decoders tend to have the largest available hard disk space for storage of the video data over longer periods of time. The CCTV monitoring is active in real time in many cases.

Life safety systems, which in many cases include voice evacuation, are paired with stringent and detailed procedures for quick and organized evacuation. In the highest security facilities, lighting systems typically include back-up emergency lighting tied to separate generators.

Building-wide paging systems usually tie the intercom to the telephone system, the head-end gear of which is housed near the central switchboard.

IT systems in many government venues incorporate the most advanced data security encryption. In fact, IT technologies, including data search engines used for intelligence gathering and mining, are often developed in government applications, only later in their life cycle to be decommissioned for civilian use.

Digital signage systems used for wayfinding are increasingly being used in government office buildings. Typically, visitors aren't "regulars," many coming to the buildings only rarely and for very specific transactions and purposes. The wayfinding function is key to efficient operating of the buildings, cutting down on staff time as room assignments and configurations change and keeping the security force less distracted by having to help visitors navigate the buildings.

Offices and cubicles

Within office areas of government buildings, loudspeakers for paging systems are flush mount and are typically commodity quality. Speech privacy, sometimes called "sound masking," an application found in office buildings of all types, is common in government offices, particularly in open office and cubicle settings. Narrow bands of noise are emitted to mask nearby conversations and provide speech privacy. Masking systems are sometimes integrated to include paging or background music applications. Audio security is a specialized subset of speech privacy that designed to prevent accidental or deliberate eavesdropping attempts. Such attempts are often made with microphones and other "bugging" devices, and the noise generated with active electronics intervention prevents the listener from hearing and understanding conversation.

Meeting rooms

Government buildings from small town city halls to the U.S. Capitol Building have chambers for decision-making meetings, many of which are accessible to the public. The roles of the general public in government meetings range from observer to participant. The burgeoning technology, spawning new generations of AV systems, paired with the drive for increased citizen participation in government



A CLOSER LOOK

Stuttgart Parliament
www.amx.com/markets/customerProfiles/StuttgartParliament/



In recognition of the 50th anniversary of Baden-Wuerttemberg, a state in southwest Germany bordering France, the Stuttgart Parliament upgraded the existing Assembly Hall's camera system by adding additional units to improve the visual and audio documentation of each session. The AMX NetLinX Control System provides one-touch control and automation, dramatically enhancing every public broadcast over local television feeds and Internet streaming.

U.S. Army 82nd Airborne Division
www.amx.com/markets/customerProfiles/USArmy/



The war with Iraq began with the US Army's most versatile soldiers trained to deploy and execute the initial stages of an offensive strategy. Their primary mission, as with all directives that call on their abilities, require action within only 18 hours of notification. These combat-ready men and women comprise the 82nd Airborne, a first-strike division that floods the skies with paratroopers and equipment to overwhelm the enemy and secure the surrounding terrain for additional military might to arrive. As this elite force follows each order in a series of well-planned attacks, the division's first-ever portable command center employs the power and speed of AMX control technology.

Endeleo Government Case Study
www.amx.com/markets/customerProfiles/EndeleoCourthouse/



A local municipality in Florida hired a system integrator to design and deliver a system that would distribute a variety of AV sources to a number of displays installed throughout a courthouse.

Consistency proved harder than expected, as the proposed solution needed to be installed in both new and existing facilities, and in both cases, the solution needed to work within the limited cabling pathways in place.

The burgeoning technology, spawning new generations of AV systems, paired with the drive for increased citizen participation in government processes, converge to create the perfect storm for increasingly robust AV systems in government meeting facilities.

As these systems evolve, they are becoming more robust and configurable, and incorporate digital and wireless technologies. In these systems, at each participant's table location, there is a microphone, an individual speaker, a headphone jack, and controls for signaling a response whether a vote or a request to make a comment.



DID YOU KNOW?

AMX Systems Meet the Most Mission Critical Demands

Unique Capabilities

- Ultra-flat frequency response, high bandwidth switching
- Long-distance Cat5 distribution systems for integrated audio, video, control and power
- The industry's first large scale, fully digital switch - the Epica DG
- Real-time customizable Touch Panels with unmatched features, including exclusive VoIP
- Digital Signage solutions with unsurpassed detail, resolution, and flexibility

Built From the Ground Up To Support 24/7 Operations

- Utilization of Linux Operating Systems which are both robust and virus resistant
- Separate OS and Application Layers provide real-time system updates, without downtime
- Device Discovery: rapid replacement of system components without reprogramming
- Self Diagnostics for power systems, cooling and signal verification
- Hot-swappable power supplies and I/O cards which limit downtime
- Industry renown customer and technical support

Open, Standard Architecture and Interfaces for Maximum Flexibility

- Open, extensible architecture allows use of best in class components
- Standards based to allow open connectivity
- Support of SIP, ZigBee, WiFi, Cat5, TCP/IP, IPsec, SSL, MPEG2/4, SSH, PoE
- Device Discovery for flexible system design and upgrades
- Digital Generation (DG) technology and "anything" over Cat5

Highly Modular, Scalable Systems to Support A Variety of Applications

- NetLinx Architecture with cascaded controllers for virtually unlimited scalability
- Common software for all Touch Panels from 5" to 17", wired or wireless
- Module Based Extensible Switching
- Resource Management Suite support for up to 1000 rooms and 10,000 devices
- RMS WAN architecture for support of global deployments

Deployed in Some of the Most Secure Environments Around the Globe

- Cryptographic algorithms to maintain and secure sensitive RMS data
- IPsec, SSL, and SSH authentication and encryption for secure system communications
- Fiber-based DG Architectures

processes, converge to create the perfect storm for increasingly robust AV systems in government meeting facilities.

The use of conferencing and voting systems is becoming more commonplace in all levels government meeting venues. As these systems evolve, they are becoming more robust and configurable, and incorporate digital and wireless technologies. In these systems, at each participant's table location, there is a microphone, an individual speaker, a headphone jack, and controls for signaling a response whether a vote or a request to make a comment. Comment queuing for equanimous participant turn-taking is a feature that can take the burden off of the person running the meeting and place it squarely and fairly on the system itself. Language translation functions are be channeled through the conferencing systems to specific channels that participants listen to via headphones. Assistive listening can be accomplished through these systems as well.

In large-scale systems, AV networking over Ethernet is common; AV networking is also growing in midsized systems, as well.

Increasingly, government meetings include remote location of participants driving increased proliferation of audio and video teleconferencing systems, with video teleconferencing becoming more ubiquitous. The majority of these systems are IP based, and include a suite of cameras and microphones strategically placed to include all participants. There is also a dedicated channel for direct digital feed from the computer running any presentation comment. Image on the displays can be configured via multiple split screen view options. Questions of security are raised by these applications, and new, more robust audio and video transmission encryption schemes are being developed and used. The use of fiber optic cabling for signal transmission is gaining popularity in these applications since optical signals are nearly impervious to "bugging" or eavesdropping, compared to copper cabling.

AV presentation systems can be either "stand alone" basic systems with audio amplification using hand held, lectern, or lavalier mic, a simple mic/mixer/amp feeding PA speakers.

However, increasingly commonly in government meeting rooms, the AV presentation systems are integrated with the audio and video teleconferencing systems.

Governments at all levels are working harder to communicate with and involve citizen participation, and the technical capabilities of audio video streaming over IP is making this more possible and more prevalent than ever. As such, government meeting facilities are including more digital TV recording and broadcast systems. Larger and more major government facilities may even have their own broadcast production studio.

Courthouses

Courthouses also house offices, judges' chambers, legal consultation and meeting areas, and public waiting rooms. As such, the AV systems applications are the same as those described in the "Office Building" section above.

Hallways, common areas

As with general office buildings, digital signage systems used for wayfinding are becoming more commonplace. At the courtroom doors, the displays list the docket and the proceedings particulars (e.g. what stage they are in).

Courtrooms

There are several types of AV systems that are becoming more commonplace courtrooms. On the audio side, sound reinforcement systems used for voice lift of witnesses, council, and the judge are becoming more commonplace in courtrooms. The audio signal is output is to loudspeakers, usually retrofit (in older buildings) surface mount speakers connected to a small mic/amp/mixer. The assistive listening and language translation functions work through this system via separate channels. A unique requirement of the audio systems is a master control to kill the audio quickly, reliably, and system wide for the private sidebars.

AV presentation plays a prominent role in court. Video output can be from a PC feeding into a projector onto a screen, and more recently, a flat panel display. Document cameras (visualizers) and overhead projectors are also prevalent in courtrooms for displaying evidence.

The use of digital audio recorders for court reporting is changing the role of live court stenographers. This very specialized field is evolving to include more operation and monitoring of the recording devices and their output rather than longhand court proceedings transcriptions.

Law enforcement

Common and private areas of police and federal law enforcement headquarters require tight security, and as such, have varying degrees of the most stringent access control, CCTV monitoring, and life safety systems as are found in high level courthouses and other government office buildings.

Switchboard hubs of these facilities are robust, and include wireless communications with field based officers. Digital technology has made these emergency response centers more reliable, more efficient, and more robust. GPS technology is incorporated in these systems for quick, accurate location identification. Communications are recorded on hard disk recorders, and some of the same companies that make flight data recorders make emergency center recorders.

Typically, there are paging systems in the law enforcement facilities, and these are generally controlled from a central office, often times tied to the switchboard area. In facilities where highly sensitive security information is discussed, audio security systems may be in place to detect and counteract any possible eavesdropping.

Meeting and training rooms in law enforcement facilities, while historically fairly low tech, are now incorporating more AV presentation systems.

Many "interview" or interrogation rooms are configured as observation rooms with two-way mirrors and audio mic-ing with playback to small loudspeakers or headphones to observation rooms.

Lock-up areas of law enforcement facilities are used for temporary holding of suspects under arrest, and these areas have high-grade access/egress control systems.

AV presentation plays a prominent role in court. Video output can be from a PC feeding into a projector onto a screen, and more recently, a flat panel display. Document cameras (visualizers) and overhead projectors are also prevalent in courtrooms for displaying evidence.

Correctional facilities

Of the many low voltage systems in correctional facilities, obviously the most important are the security systems. Access/egress control systems are robust. CCTV monitoring is also essential and even redundant for full coverage and back-up. The life safety systems include alarm and alerting

functions tied to monitoring of specific areas of the facility. The prison population is increasing in the U.S., and as such, this is a "growth market" for AV technologies.

Government entities, functions, and operations are widespread and diverse, and are touching every citizen's

life. Low voltage systems, particularly those based on the convergence of AV and IT, are inspired by and in use in this market. The government isn't just the largest employer, it is the largest market for AV technology.

CASE STUDY: Pasadena City Hall



As Steve Wright, assistant city engineer, explains, "We needed a technology solution that would preserve the historical integrity of the Chamber while simultaneously bringing it into the 21st Century."

Pasadena City Hall is one of the most distinctive public buildings in the United States and one of the finest examples of California Mediterranean design. Built in 1927 and listed on the National Register of Historic Places, it stands as the dominant building in the Civic Center Historic District – a complex of government, institutional and cultural buildings that epitomizes the Beaux-Arts, City Beautiful planning movement of the early 20th century.

In 2007, the city completed an extensive building rehabilitation project, which included significant technology infrastructure and equipment upgrades to its City Council Chamber,

including new wiring and AV equipment. The city hired AMX dealer Hoffman Video Systems of Glendale, Calif. for the project.

As Steve Wright, assistant city engineer, explains, "We needed a technology solution that would preserve the historical integrity of the Chamber while simultaneously bringing it into the 21st Century. That's what we hired Hoffman to do, and that's exactly what they achieved."

CUSTOMER NEEDS

"The city knew that they needed a control system to coordinate audio, video and lighting during meetings, and since the Chamber is used by a variety of outside groups, including zoning boards and community organizations, they also knew that they needed the touch panel icons to be intuitive and easy-to-use, so that the system could be used with little if any instruction," said Rob Shepherd, president of Hoffman.

The system implemented in the Chamber features an AMX® NI-4100 NetLinx® Integrated Controller and 12-7" Modero® Touch Panels, which are installed at each councilmember's seat and allow them to mute and un-mute their microphone and to request permission to speak. They can also select and view video sources and feeds, such as a video, PowerPoint presentation, meeting agenda or document camera, directly on the touch panel.



The Chamber's AMX Control System also includes AMX's iVote software, which simplifies and streamlines the voting process for the council and its administrative support. When a councilmember casts a vote using his/her assigned Modero Touch Panel, the vote is automatically logged and tabulated, providing real-time results.

To provide technical support during meetings, the City Clerk and Assistant City Clerk each have a 12" Modero Touch Panel, which enables them to select which video source is displayed on each of the Chamber's four 63" Plasma displays. Additionally, they are able to prepare the 7" Modero Touch Panels for a vote and adjust the room's lighting.

WHY AMX

"We selected AMX for the Chamber because AMX is the only company offering a complete hardware and software solution for city government with on-site technical support," said Shepherd. "Without AMX, it would have been much more difficult, if not impossible, to meet the needs of this customer."

"We selected AMX for the Chamber because AMX is the only company offering a complete hardware and software solution for city government with on-site technical support."

Hospitality And Hotels

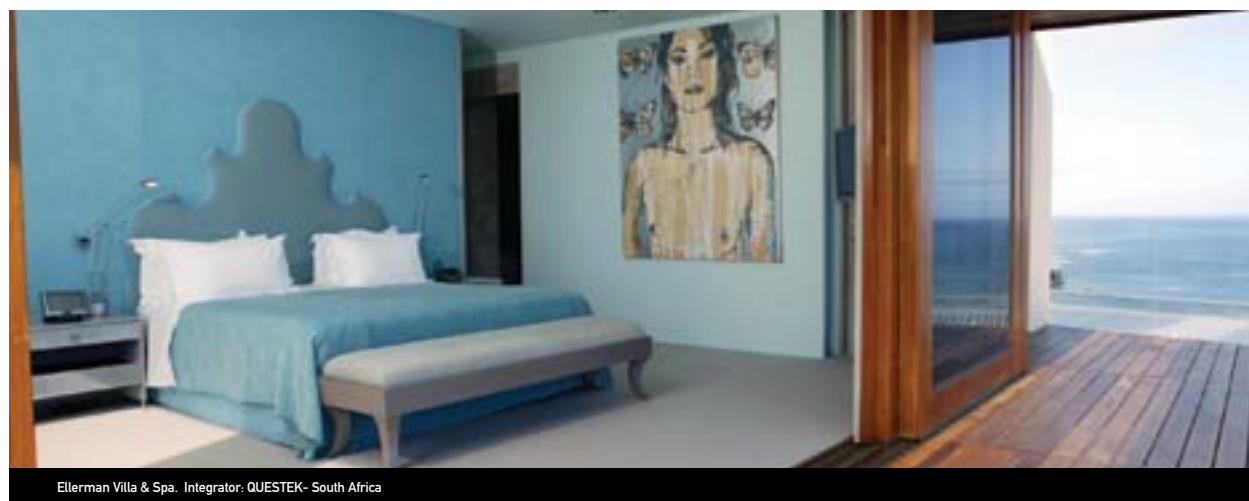
Hospitality venues, as a category, typically include multiple and diverse applications and systems. Among the wide range of venue markets, hospitality facilities are home to virtually all low-voltage electronic systems applications that exist.

DESCRIPTION

The hospitality and lodging industry is a prime user of AV systems and technologies. Why? Because so many meetings and conventions that are AV-intensive take place in hotels, convention centers, and casinos. There are over 48,000 hotel and motel properties with over 4.3 million rooms in the United States, ranging from large urban complexes to small bed-and-breakfasts.

The hospitality market represents 13% of all US commercial construction expenditures in 2008. That translates to \$22 billion, more than double when compared to the year 2003. Growth peaked in 2007, and is forecasted to be flat to down over the next three years, and then up in 2011 and beyond. The sharp growth of the past five years was in direct response to the dramatic downturn in 2002 following the events of 9/11/01.

APPLICATIONS BY LOCATION WITHIN HOSPITALITY VENUES



Ellerman Villa & Spa. Integrator: QUESTEK- South Africa

Hospitality venues, as a category, typically include multiple and diverse applications and systems. Among the wide range of venue markets, hospitality facilities are home to virtually all low-voltage electronic systems applications that exist. The examples below are those that are especially relevant to AV integrators.

Hotels and Motels

Starting with audio, hotels are prime markets for distributed paging and business music systems that are found in lobbies, common areas, offices, restrooms, retail shops, and restaurants.

Poolside loudspeakers at resort hotels are weatherproof and systems are securely installed in outdoor venues.

Many hotels have on-premise nightclubs and bars, some featuring live entertainment. These systems are scaled to the size of the club and to the type of entertainment. This ranges from karaoke or piano bars to full-scale concert clubs. Systems accordingly range from simple portable mixer and powered speakers to installed rigs that include monitors as well as main speakers.

Video systems are used for entertainment, news feeds in common areas, and merchandising. Big screens are often found in sports bars, gradually replacing CRT-based video

walls or projection systems. Digital signage is increasingly popular in hotels, used for wayfinding, advertising, and merchandising. Both audio and video conferencing systems are used in hotel meeting environments.



A CLOSER LOOK

Conrad Hotel
www.amx.com/markets/customerProfiles/ConradHotelMiami/



Conrad Hotels was founded with the goal of operating a network of luxury hotels and resorts in the world's major business and tourism capitals. The Conrad Miami Hotel, owned by Grupo Espirito Santo and managed by Hilton Hotels Corporation, was the first Conrad Hotel in the United States. An established brand in Europe, Conrad represents the luxury tier of the Hilton Family of Brands.

Ellerman Villa & Spa
www.amx.com/markets/customerProfiles/EllermanVilla/



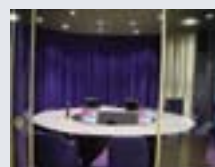
When the rich and famous travel to Cape Town, South Africa, they are likely to stay at The Ellerman Villa and Spa, an exclusive home-away-from-home immediately adjacent to the world-renowned, five-star Ellerman House Luxury Hotel. Constructed in 2004, the Frank Lloyd Wright-inspired building was designed from top to bottom with unparalleled luxury in mind.

Four Seasons Resort and Club
www.amx.com/markets/customerProfiles/FourSeasonsLasColinas/



The Four Seasons Resort and Club Dallas at Las Colinas has made an intelligent investment that continues to pay significant dividends today. Within this finely appointed luxury hotel, the numerous and lavish amenities offered reflect a commitment to quality through cutting edge AMX technology.

Hotel Skt. Petri
www.amx.com/markets/customerProfiles/HotelSktPetri/



Converted from a famous department store building in Copenhagen, Denmark, the Hotel Skt. Petri is a beautifully modern, five-star hotel featuring the interior designs of renowned Danish artist, Per Arnoldi. The hotel's 300 capacity grand ballroom, which doubles as a conference facility, is equipped with a flexible AV solution that is controlled and automated by an AMX® NetLinx® Integrated Controller and two AMX Modero® Touch Panels.

Luxury suites are another growing application for AV in hotels and lodging facilities. While low-cost digital televisions and clock radios are found in standard sleeping rooms, suites are increasingly being outfitted with large screen televisions, 5.1 surround, wireless Internet access, and zoned AV control. Watch for a trickle-down effect as digital television (mandated for all broadcasts as of February 19, 2009) proliferates in the United States.



Ellerman Villa & Spa. Integrator: QUESTEK- South Africa

Big screens are often found in sports bars, gradually replacing CRT-based video walls or projection systems. Digital signage is increasingly popular in hotels, used for wayfinding, advertising, and merchandising.

Convention and Conference Centers

According to the Convention Industry Council, over \$123 billion was spent on meetings in 2004. Business services (including AV system rentals and purchases) accounted for an estimated \$15 billion of this total. Convention centers include exhibit spaces, breakout meeting rooms, lobbies, and auditoriums.

Like hotels, convention centers include distributed paging and business music systems throughout the space. As in performing arts centers, full-bandwidth, music quality speaker systems are found in auditoriums. Some auditoriums are adding 5.1 surround capabilities, but this is less prominent to date.

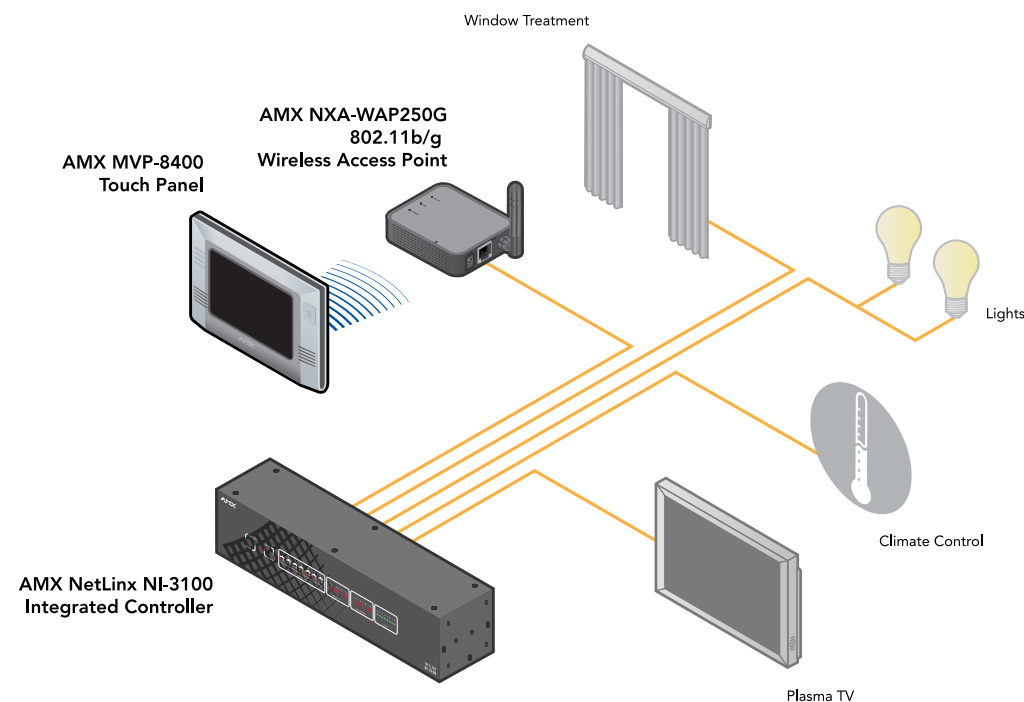
Convention facilities make money from rentals, so installed systems are often rudimentary, leaving more advanced systems for case-by-case configurations. Portable AV systems range from simple speech reinforcement and video presentation gear for meetings and seminars to full-blown concert systems for major corporate events. These are largely the domain of rental and staging companies.

| HOTEL |

Business Centers, Guest Rooms, Guest/Equipment

Luxury suites are another growing application for AV in hotels and lodging facilities.

While low-cost digital televisions and clock radios are found in standard sleeping rooms, suites are increasingly being outfitted with large screen televisions, 5.1 surround, wireless Internet access, and zoned AV control.



From an audio standpoint, a typical rental system for meetings includes wired and wireless microphones, mixers, powered speakers, and stands and accessories. These can be scaled to the size of the room or audience.

Video systems for AV presentations are predominantly front projection-based, but watch for them to transition to flat panel displays driven by PC's or digital media players. The choice of projector and screen are dependent on the size of the room and the needs of the audience.

Lighting control and video effects/playback are often integrated in both exhibit and performance spaces. Digital signage and kiosk systems are increasingly used in convention centers for wayfinding, merchandising, visual branding, and entertainment applications. These systems are increasing networked and operated by AV/IT/security personnel who require simplicity and reliability on a 24/7 basis.

Casinos

Casinos are highly AV-intensive and often the proving ground for cutting edge AV technology. For example, many of the early (mid-1990's) networked AV systems were installed in Las Vegas casinos. AV systems in casinos need to be flexible, configurable, and ultra-reliable since they are in constant operation. Consider that a typical casino complex is a small city that includes the following:

- Lodging facilities
- Restaurants
- Nightclubs and bars
- Gaming floors ("casinos")
- Live entertainment showrooms
- Themed attractions
- Video game arcades
- Meeting and conference facilities
- Retail shops
- Offices and "back of house" prep and staging areas
- Indoor and outdoor pools and spas
- Health clubs and/or sports facilities

Entertainment showrooms (over 1,000 capacity) include state-of-the-art installed audio, video, lighting, and special effects. Wireless microphones, digital mixers, show control systems, laser effects—the list goes on, depending on the requirements of the performers and producers. Long run shows (Cirque de Soleil, Celine Dion, Penn & Teller) include AV systems that are designed by specialized entertainment systems consultants.

Live music and dance-oriented clubs in casinos feature state-of-the-art sound, lighting, and video systems to attract and retain audiences. Club sound systems range from sophisticated multi-zone installations to simple stand-mounted powered speakers that are locked up for security after each performance. While wireless microphones were once the exclusive domain of the major showrooms, they are now used in even the smallest clubs.

Lighting and special effects (mirror balls, smoke machines, etc.) are important elements in showroom and club systems. The idea is give the audience the kind of entertainment experience that they can't find at home, which promotes return customers.

Digital signage is everywhere in casinos, but no more prominent than in the "sports book" where multiple events are posted and monitored continually.

Like hotels, restaurant, and retail markets, casinos feature paging, business music, and automatic messaging systems throughout the common areas.

Pools, spas, and outdoor attractions need weatherproof speakers and video playback systems. In addition to durability and performance, these systems need to be securely installed to protect against theft and vandalism.



READ MORE ABOUT IT

AMX System Design Library (SDL) Each SDL is a start-to-finish resource for designing a control and automation system in increasingly complex applications. The System Design Library includes all the materials needed to properly demonstrate/illustrate different solutions – all dedicated to help educate the user and manage their expectations. AMX offers SDL's for every market including: Business, Whole Home, Home Theater, Education, Government, Houses of Worship, MDU, Hotels, Entertainment, Healthcare, Broadcasting, Network Operations Centers, Retail, and Private Transportation.



For more information, go to www.amx.com/markets/sdl.asp

Cruise Ships

The cruise ship market is a cross between the casino and luxury resort markets, with a twist. Everything needs to be compact (due to onboard space limitations) and weatherproof (due to environmental factors). Like casinos, cruise ships are floating mini-cities that include:

- Lodging facilities
- Restaurants
- Nightclubs and bars
- Gaming floors ("casinos")
- Live entertainment showrooms
- Themed attractions

- Video game arcades
- Meeting and conference facilities
- Retail shops
- Offices and "back of house" prep and staging areas
- Indoor and outdoor pools and spas
- Health clubs and/or sports facilities



READ MORE ABOUT IT

This AV TECHNOLOGY excerpt was edited from the AMX Guide to AV Applications. This is the second section in a three part series edited by AV TECHNOLOGY and System Contractors News – both NewBay Media publications, with contributions from BICSI, CEDIA Custom Electronic Design & Installation Association, InfoComm International, NSCA National Systems Contractors Association, Stierberg Consulting, and produced by AMX. For the complete series, go to www.amx.com.

CASE STUDY: Conrad Hotel



"The AMX system gives our customers an extraordinary experience through the AMX Modero Touch Panel. It's a new level of sophistication and distinction for our property."

Conrad Hotels was founded with the goal of operating a network of luxury hotels and resorts in the world's major business and tourism capitals. The Conrad Miami Hotel, owned by Grupo Espirito Santo and managed by Hilton Hotels Corporation, was the first Conrad hotel in the United States. An established brand in Europe, Conrad represents the luxury tier of the Hilton Family of Brands.

The Conrad Miami opened in October 2004 to an elite guest and meeting clientele. From the outset, the hotel installed an AMX® control system in its eight meeting rooms and grand ballroom. The system, based on award-winning Modero® Touch Panels and NI-3000 NetLinx® Integrated Controllers,

puts control of multimedia presentations, lighting and sophisticated audio visual equipment in the hands of meeting leaders and executive guests.

"It is a highly intelligent system," said Andre Cope, Business Center and guest events services manager. "It operates off a Wi-Fi system, and controls PowerPoint, DVD and CD media through one controller. The AMX system definitely enables a more professional meeting."

The Conrad is a leader in technology. The entire property is a wireless hotspot, and the AMX systems integrate seamlessly with the Cisco 1100 series Wireless Access Points (WAPs) throughout the hotel.

AMX also controls the lighting and temperature in the meeting rooms and grand ballroom. Cope said the overall effect impresses Conrad Miami guests because, "it's something new, and it provides a convenience factor that many of our guests appreciate while trying to coordinate important meetings and events."

The reaction of nearly every hotel guest, meeting client or meeting attendee has been, "Wow," Cope added.

MOVING ON UP

Conrad Hilton management decided to take that "wow-factor" and move it upstairs to a select number of guest suites. In the suites, the AMX systems provide not only control for various electronic devices, but also a dynamic guest directory on the panel. According to Robert Thraikill, Conrad

Miami general manager, the AMX systems in the suites set the Conrad Miami apart from other top hotels in the highly competitive city.

"We chose AMX because we were looking for a way to provide a unique room experience for our guests," Thraikill said. "The AMX system gives our customers an extraordinary experience through the AMX Modero Touch Panel. It's a new level of sophistication and distinction for our property."

BANKING ON A WINNER

Thraikill said hotel guests have embraced the AMX technology like little he has seen in the hospitality industry. And the goal of creating a different type of experience from what a traveler could realize at other hotels has been achieved.

"The ability to have a single point of control through a panel that allows our guests to operate so many elements of their rooms practically says, 'Please, touch me. I have some information to share with you.' The guests love that."

PERSONAL TOUCHES

Thraikill pointed to the simplicity of the AMX control panels as one of the primary reasons hotel guests use and enjoy the amenities it provides. The displays shown on the touch panel are intuitive, and the wireless options allow guests to carry the units around the large and well-appointed guest rooms. The Moderos also provide consistency, so guests and staff know what to expect in a familiar format, he said.



"I've seen similar systems, but nothing as simple to use, as innovative or as intuitive. By adding that 'wow-factor' to the guest rooms, our opportunities are endless. AMX truly is the platform for the future. It's a marketer's dream come true."

Of course, every hotel possesses a large amount of internal data. Guests can now access information concerning reservations, checkout times, restaurant and room service information, baggage check, entertainment, in-house video-on-demand systems, transportation schedules, meeting and event bookings – all via the AMX panel. Thraikill said the customization and integration of the hotel's data into the AMX system proved to be a smooth transition toward taking the control panels online.

"From the first time I saw the AMX system and got to play with it, I knew it probably was the best application of its kind out there," he said. "I've seen similar systems, but nothing as simple to use, as innovative or as intuitive. By adding that 'wow-factor' to the guest rooms, our opportunities are endless. AMX truly is the platform for the future. It's a marketer's dream come true."

Healthcare

DESCRIPTION

There are 5,747 hospitals in the U.S. according to the American Hospital Association with healthcare treatment revenues representing a third of the \$2 trillion annual U.S. health care bill. Other types of healthcare facilities are also commonplace throughout the U.S. and include approximately 17,000 urgent care facilities, 30,000 outpatient clinics, and over 10,000 diagnostic labs. Doctors offices are also ubiquitous, and there are approximately 200,000 in the U.S. In addition, there are an additional 120,000 dentist offices. Skilled nursing facilities cost American taxpayers about \$73 billion a year in subsidies across the 16,400 nursing homes in the U.S.

Outpatient healthcare services are emerging as part of retail locations, for instance in drug stores. However, even with more than 900 of these facilities in place, forecasts are for slowed growth of this treatment location option due to uncertain revenue models for this new venue approach.

APPLICATIONS BY TYPE OF HEALTHCARE VENUE AND LOCATION WITHIN THE FACILITY

Of all the relevant markets with applications for AV, the healthcare facilities market probably houses the highest concentration of cutting edge electronic technology.

Hospitals

Reception and waiting areas

In the past fifteen years, these common areas began including TV monitors usually playing network programming from a satellite feed. CCTV cameras are trained on the entryways and usually cover the whole reception area. Though a large proportion of the visitors to hospitals are elderly, very few reception desks are equipped with hearing assistance systems, but could (and probably should be).

Interior spaces: Corridors, visiting lounges, common areas, patient rooms, and nurses stations

Security systems are robust and include CCTV monitoring, access and egress control, more stringent in specialized floors such as psychiatric wards, and children's areas, and maternity

wards. For hospitals, one of the top security concerns, among many, is infant abduction. The centralized CCTV encoder/decoders are likely to have maximum hard disk capacity for much video data stored over long periods of time.

Paging systems are crucial in hospitals, and in many facilities are higher than commodity quality in terms of speaker quality. Nurse call systems are also of prime focus in hospitals. In the past ten years, robust wireless systems have become more prevalent and tie together the paging systems, nurse call, and hospital telephony. This has freed up the medical staff who now carry wireless phones for their pages and has led to new opportunities to de-centralize the physical nurses station. Though some systems integration firms specialize in these healthcare facilities wireless systems, telephone and data companies are also prominent players in this market.

The hospital wireless systems also can include the PDA component. Charge nurses and physicians, in making their rounds, make notes on their PDAs that are uploaded wirelessly to patients' charts. Patient privacy and data security are key areas of focus for hospital IT managers.

In hospitals, life safety is more than an alarm system—it's something to learn. Staff are trained in evacuation, triage, and other aspects of emergency/disaster management. As such, the life safety system takes up more "mind share" of the staff than in other types of facilities.

Patients' rooms typically have TV's mounted near the ceiling. In cutting edge hospitals, there are choices of specific programs (e.g. movies) feed from a central media server.

Operating rooms

It is in the "OR" where "high-tech AV" comes to life most vividly. In addition to the very specialized medical treatment and monitoring equipment, video cameras are often trained on the procedures at hand. Live feeds of video over IP are sent to displays either in observation galleries of the operating room or to remote locations for the purposes of training and also collaborative consult with specialists located elsewhere. At times the video is recorded through surgical microscopes. Special considerations for this equipment that don't arise in

other types of venues center around the need for a sterile and static controlled environment. Video of the procedures is also recorded for retrospective viewing and training. It's not hard to imagine the high value of high definition video in these applications. This also drives the need for high definition video into the presentation and training spaces of hospitals.

Meeting rooms

In hospitals, meeting rooms are generally configured as large boardrooms. Video display systems are basic to many of these rooms so that presentation content of surgeries, patient conditions, and resource material can be viewed. These meeting rooms may also include teleconferencing systems for participants in remote locations. It is likely that the content is driven by either a dedicated or networked computer, but with high definition video being more prevalent, the demand for dedicated AV servers and players will increase.

Classrooms and auditoriums

In hospitals, training is an important and ongoing activity at all levels. Classroom and training spaces include traditional classroom formats as well as some auditoriums in the larger facilities. The larger rooms are likely have installed sound reinforcement systems, video projection systems, either portable or installed and in general the classrooms house the same types of AV systems seen in universities and colleges with the additional emphasis on overhead object projectors and possibly whiteboards.

AV production facilities

It is fairly common for large hospitals to have their own in-house AV production department. This department also serves the marketing communications functions of the facility. Often this department designs and produces the facility's own collateral, promotional media, and publications. With the increased emphasis on video recording of procedures and AV presentation for training, these departments are robust and active users of the AV systems.

Children's wards

Children's wards deserve special mention. In addition to the overall need for a more active and colorful AV environment, in long-term facilities, such as specialized children's cancer

hospitals, this aspect of care is of prime importance. There is an organization called "The Elf Foundation" that was launched about eight years ago and grew up in the custom home installers (CEDIA) integrator culture. Elf's mission is to install theater quality systems in children's long-term wards so that these isolated patients can see first-run movies their friends see. Manufacturers donate gear, and integrators donate systems design and installation. It is mentioned here for two reasons: 1) to brief commercial AV integrators that they may encounter this foundation or its systems on the job in hospitals, and 2) there may be ways AV integrators could participate and offer expertise on these systems as they continue to crop up around the country.



Multi-building campuses

Some hospitals have campuses with multiple buildings. In these facilities, just like on university campuses, the IT, telephone, HVAC control, life safety, and security systems are networked.

Skilled Nursing Facilities (SNF's)

Skilled nursing facilities provide temporary and long-term stays and treatment for patients who are unable to be cared for at home. Some SNF's are vibrant rehabilitation centers. Some house a larger proportion of long-term care and elderly patients. Many of the same systems that are in hospital general areas, patient rooms, and nurses stations exist in skilled nursing facilities. With patients often times more mobile (even though frequently wheel-chair bound), egress control and monitoring is a focus. There are generally large rooms with exercise equipment dedicated to physical therapy (PT) and small office treatment rooms for speech therapy (ST)

and occupational therapy (OT); however, OT treatment tends to take place in common areas, as well.

SNF's tend to be less in the spotlight, in general, compared with marquee level acute care hospitals. As such, (again, in general) they tend to have less demand and less motivation for state of the technology AV systems. Nevertheless, they

still have much of the same paging, telephony, security, and life safety systems found in the acute care hospitals.

Outpatient surgery centers and specialty treatment and diagnostic centers

These facilities tend to be smaller than primary care or specialized hospitals. The operating rooms can also include video recording capabilities. Intake and discharge of patients

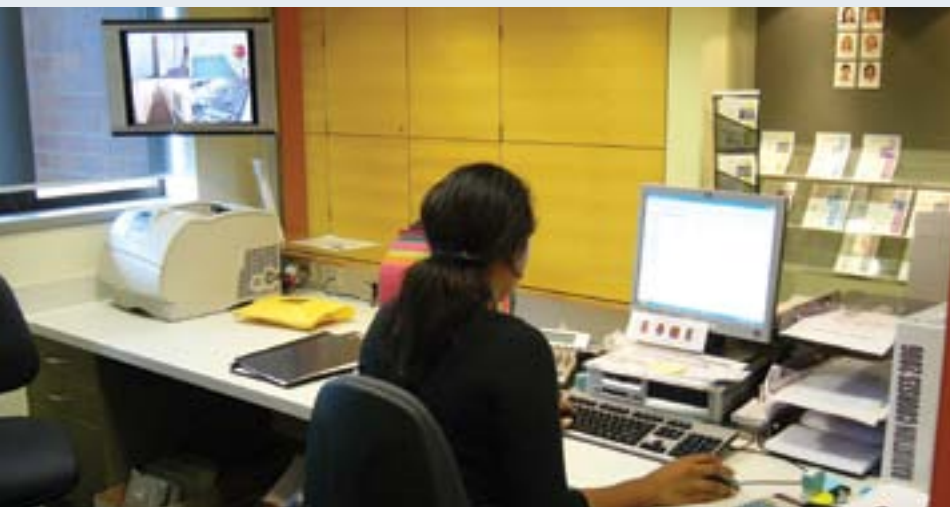
is in constant flux requiring robust reception systems and full-featured waiting areas.

Medical office buildings

Medical office buildings house some of the same medial technology equipment found in hospitals and outpatient surgery and diagnostic centers. Networking within offices and between partnering practices are IT applications. The office

buildings themselves are adopting more digital signage for wayfinding. Access control, CCTV monitoring, and life safety systems are prominent in these multi-office facilities. These facilities generally lag hospitals in the stringency of these systems. Business music could play a larger role in these complexes if an ROI case could be made (and it could with the right finesse) if for not other reason than staff morale.

CASE STUDY: Queensland Health's Skills Development Centre



Due to the complexity of the project and the technology at hand, ease of operation for all users with simple navigation through touch panels and user interfaces was a key requirement of the system.

Queensland Health's Skills Development Centre (SDC) is one of most technologically advanced and comprehensive skills development centers in the world. The center is only one of seven in Oceania to have a complete suite of virtual reality and simulation training equipment – including high-fidelity mannequins programmed to respond physiologically to all treatments or interventions.

Based at the Herston Campus in Brisbane, Australia, the SDC provides healthcare professionals – doctors, nurses and allied health professionals – in Australia and the Asia Pacific, with tools and training to improve their practical skills and enhance the quality of patient care.

Operating through nine inter-related domains, the SDC offers courses for a broad cross-section of healthcare providers by constantly researching and identifying areas of need and investing time and money into the development of world-class courses. The center continuously updates its courses and ensures the technology and information it uses is the latest.

Queensland Health's vision was to develop a world-renowned medical simulation center. This required multiple rooms with extensive AV facilities, each with the ability to send and receive video and audio signals to and from multiple locations around the center. Today, the facility features two fully-functional operating theaters for simulation, two seminar rooms with videoconferencing capabilities and 14 AV rooms.

COMPLEX REQUIREMENTS

Using multiple cameras, SDC staff needed to digitally record simulations held in the theater with the ability to place time-code markers at specific times to aid future identification of particular events or activities. The ability to review these events via special camera angles was also a significant requirement.

The SDC's technology solution also needed to include a robust control system that would stand up to the demands placed on a working medical facility. Due to the complexity of the project and the technology at hand, ease of operation for all users with simple navigation through touch panels and user interfaces was a key requirement of the system.



WHY AMX

They chose AMX products on the recommendation of its installer, SpaceAge Communications, knowing its staff was completely conversant and confident with the capabilities needed to make the centre's practical applications a reality. In total SpaceAge, a design consultant and systems integrator with offices in Melbourne, Sydney and Brisbane, installed 11 AMX NI-4000 NetLinx® Integrated Controllers and 11 AMX

NXP-TPI/4 NetLinx Touch Panel Interfaces in the SDC. The control system allows users to quickly and easily control a wide variety of AV equipment, including the 50 pan, tilt, zoom cameras installed in facility's training rooms.

ROOM TO GROW

Thanks to SpaceAge Communications and AMX, Queensland Health now has a world-class training center. The virtual reality and simulation equipment at the SDC is among the best in the world, and because the AMX Control System is upgradeable and adaptable, it will undoubtedly continue to be in the future.

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