THORBURN ASSOCIATES
ACOUSTIC AND AUDIOVISUAL CONSULTANTS

eNEWSLETTER April 2004

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1. Greetings

Welcome to the April 2004 issue of our eNEWSLETTER. It is a little late but we wanted to add in a quick summary of the Large Format Cinema Association (LFCA) Conference that ended Friday, April 30th.

The LFCA is an organization that is just over 8 years old. It was founded in September of 1996 in Barcelona Spain. The LFCA formed from the remnants of the Cinema 360 group, which developed large format films for the planetarium industry. Large Format Films refer to images shown on really large screens using large "negatives". The most well known version of this format is IMAX. A number of new films were screened for the attendees and the film buyers for many of the large format theatres. Much of the break time talk was about how digital processing of films, the scanning and manipulation of the picture elements in a computer, has improved the story telling process. At the closing gala, Steve Thorburn, Chris Reyna, and Kasho Furuya were honored as the Last Founding Board Members to serve out their terms. From our point of view, we are looking forward to things picking up and more theaters built or refurbished. Since our founding in 1992, Thorburn Associates has worked on more than 60 Large Format or Specialty Theatres.

As always if you have an idea, question, suggestion please drop us a note at TA@TA-Inc.com for general information or eNews@TA-Inc.com for specific comments about our eNEWSLETTER.

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2. InfoComm 2004 - Continuing Education and Product Giveaways

One of the largest AV Industry conferences and tradeshows is just around the corner. InfoComm '04 will be held June 5 to 11 in Atlanta, Georgia.

For the first time ever, InfoComm is implementing a New Product Treasure Hunt and the Ultimate Boardroom/Classroom Giveaway. Thorburn Associates is part of the team that provided engineering services to design the Boardroom systems around the showcased equipment; in addition we will be presenting a short course on selecting the correct image size for your room. Be sure to participate – you could win a new boardroom or classroom system!

The Ultimate Boardroom/Classroom Giveaway
Envision what's possible with a working application showcase of new products. The Ultimate Boardroom/Classroom Giveaway – combined with the New Product Treasure Hunt gives you the chance to win tens of thousands of dollars in new equipment!

The New Product Treasure Hunt
InfoComm makes it fun to find the latest new technologies! Sponsored by exhibiting companies, the New Product Treasure Hunt game guarantees you'll learn the most in the shortest time – and have a chance to win. Registered attendees will receive a map of the new products to guide them around the Show floor. Get your map stamped by participating exhibitors to become eligible to win products. Drawings will take place in the afternoon of all three Show days, June 9-11.

In our continuing support of the industry, Thorburn Associates, Inc. is presenting the following technical sessions. If you are interested in additional information on any of these presentations please contact us.

Facilities Design for Universities, June 5-7, 2004. Speaker: Steve Thorburn, PE, CTS-D, CTS-I. Level: Basic. Registration Code: IPD4

Do you work with design consultants and systems integrators to update old lecture halls, conference rooms or classrooms in current facilities to design new ones? If so, don't miss this course designed specifically for people from institutes of higher learning charged with making these decisions and seeing them through. An effective project takes a lot of communication between you, your customers, the designers, and the people who implement the final product. If you have difficulty understanding AV terminology, this course is for you. You'll learn how to provide a preliminary analysis of an existing room's audiovisual/presentation needs based on client usage and demands; provide an AV "wish list" for a new space; explain the role of each player in the process; explain your audiovisual/presentation needs using terms both you and an AV professional can understand; and explain your decisions to top management in a way that helps them understand the whats and whys so you can get project approval. Also find out how to use tips to help you plan a budget and meet it, how to evaluate a proposal, how to explain what you have to look for during the implementation phase and how to provide a training strategy for users of the new, improved facility.

Project Management, June 8, 2004. Facilitator: Steve Thorburn, PE, CTS-D, CTS-I.
Level: Intermediate. Registration Code: ST3

Everyone talks about it and how the industry needs it. What is project management for audiovisual professionals, and how do you develop and implement it in your company? Chaired by Steve Thorburn, PE, CTS-I, CTS-D of Thorburn Associates, this six-hour program on the Tuesday preceding the show is divided into four key topics:

- An Overview of Project Management provided by Management Concepts, Inc.
- The Human Side of Audiovisual Project Management, Joe Bocchiaro, CTS-D of Electro-Media Design
- Increasing Quality and Efficiency in AV Project Flow, Jim Maltese, CVE, CTS-I, CTS-D of Audio Visual Resources, Inc.
- Project Management from a General Contractor's Point of View.

This is not your generic project management course. It is designed to deal with issues specific to AV professionals. Don't miss it.

Defining the Perfect Teaching Station for Colleges and Universities, June 9, 2004. Speaker: James A. Horn, CTS-D. Level: Intermediate. Registration Code: S11

How do we define and build the perfect teaching station for college and university classrooms, seminar rooms and auditoriums? Join this session and review the elements of the evolving station, share ideas with your colleagues and participate in designing your perfect teaching station. Course Objectives:

1. Define elements of good teaching stations.
2. Review the types and evolution of teaching stations.
3. Participate in a small group to design and present your teaching station solution.

Advanced Acoustics, June 10, 2004. Speaker: Steve Thorburn, PE, CTS-D, CTS-I.
Level: Advanced. Registration Code: S60

This advanced class is aimed at individuals that have been working in the industry for a number of years and have been forced to give acoustical advice that you were not quite sure of, it is not a basic class -- the fundamentals of acoustics will not be covered. The participants should have a strong working knowledge of the basics.

During the session we will develop the acoustical design for a large boardroom, and a 300 seat auditorium / lecture room. Upon completing the session, the participants will be exposed to:

- How to design rooms for even distribution of low frequency room modes.
- Selection of wall constructions to control noise transfer from adjacent rooms.
- Calculation methods of air system duct noise control.
- Why some room finish materials are more efficient at reverberation and echo

control than others.
- How to determine if absorption or diffusion is required.
- How to specify the type of diffusion required.

A detailed workbook / reference will be provided to all participants in a CD format. We suggest that each student bring a scientific calculator that they have used for past work.

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3. HDTV Update!

If you have been to your local electronics retailer lately, you likely noticed the explosion of HDTVs (High Definition Televisions). You might already own your own HDTV. With the FCC mandated conversion well under way, we felt it might be useful to re-visit this issue and discuss how it will affect AV presentation needs.

In our Summer 2000 newsletter we discussed:

- The history of broadcast standards. The NTSC standard used throughout North America, Japan, and other various nations has 525 horizontal lines of information updated 60 times per second. The PAL standard used in Europe, most of Asia, Africa, and South America has 625 lines of information updated 50 times per second.

- Why the FCC was mandating a change to Digital Television. Digital broadcasts take up a fraction of the airspace as analog broadcasts – not to mention improved quality of both video and audio with digital.

- The change in aspect ratio. Standard television broadcasts are in a ratio of 4 wide to 3 high. HDTV is broadcast in a ratio of 16 wide to 9 high. This change in aspect ratio more closely matches motion pictures, commonly shot in a 1.85 to 1 format.

The FCC mandated conversion from analog to digital broadcasts (but not necessarily high definition) is scheduled for completion by January 2007. At that time all 1500+ pubic and non-profit TV stations should be broadcasting digital signals. Four years ago, the feeling in the Industry was that the conversion "could not be physically completed by 2007." There would not be enough bodies and equipment to do the actual work. Well, the Industry was wrong. According to the National Association of Broadcasters, 1175 stations are already broadcasting digital information.

So how will all of this impact audiovisual presentation needs and system designs?

First, lets look at the equipment components. Eventually you will need to replace the television with one that supports digital signals. In the meantime, you can get a conversion box (such as a Sony's SATHD200 HDTV & DirecTV Receivers / Decoders) that will convert a digital TV signal to the analog NTSC standard, then display that signal on your existing TV. Most audiovisual manufacturers have already begun manufacturing equipment (projectors, switchers, and other video routing products) that support HDTV signals as well as traditional NTSC and computer signals. The conversion process will take time, with most analog components being replaced through obsolescence as old equipment is replaced and new equipment (that supports both formats) is installed.

Next, lets look at the issue of aspect ratios. As mentioned above, until now, video signals (NTSC) and most computer signals typically used the same aspect ratio of 4 to 3. So a video or computer image on a projection screen or TV monitor in a 4 to 3 ratio will "fill" the screen without any distortion or stretching. Of course when motion picture films (which use a wide screen format – typically 1.85 to 1) are converted to NTSC, they are compressed horizontally or each side is cut off in a "pan and scan" conversion process.

With the advent of HDTV screens, in the 16 to 9 format, there is a closer correlation between HDTV images and motion picture images. The issue is that there is less of a correlation between HDTV/Motion picture and Computer images. One solution is to size the screen or display device for the largest dimension in both directions then leave blank "bars" on the top and bottom of the display or blank "pillars" on each side of the image, thus maintaining the correct aspect ratio of the original image.

Alternatively, the image can be electronically expanded or compressed to fill the screen. Unfortunately this distorts the image. While not a significant problem for video images, this is noticeable when text or computer images with text are displayed. The best solution may be found in solving another problem with mixing various aspect ratios through the video input/display process. A drawback with current video projectors is that very few, to date, use an HDTV native resolution or wide screen aspect ratio LCD chip inside the projector. They still use a 4 to 3 aspect ratio display chip.

Pixel based displays (e.g. LCD chips) provide the best image when they use the same resolution from signal input to signal display. On the consumer side where most projectors only display video data (but this is quickly changing!) there are already a number of projectors that have LCD chips in wide screen resolutions. These projectors display the image at its native resolution and do not distort or manipulate the image to fit a particular aspect ratio. Unfortunately they don't display computer resolutions very well nor are these chips found in higher brightness projectors needed for larger AV presentation spaces. It is only a matter of time before this consumer trend is pushed into professional AV projectors with native wide screen aspect ratio chips. These projectors will fill an HDTV format projection screen when displaying HDTV signals and show pillars on each side when displaying lower resolution 4 by 3 aspect ratio images.

A simple way to think about it is that it all comes down to geometry. Traditional televisions and computers use a smaller, almost square, rectangle compared to an HDTV display. Like an IQ test where you must fit the correct block in the proper hole, we have dissimilar shapes that must fit together. Until we all agree to use the same shape rectangle to watch video and computer images, it's going to be a challenge to put it all together and make it look good. No matter how you address these issues, what is certain is that the quality of video and computer images is on the way up.

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4. Changes in Resilient Channels

Acoustical Consultants often specify resilient channels to improve the sound isolation of a construction assembly. Sound isolation is the amount of noise the wall or floor/ceiling reduces. Resilient channels are installed perpendicular to the stud or joist. This reduces the number of points were the gypsum board system is actually in direct contact with the framing system (called a lattice connection system) and provides the gypsum board some ability to "deflect" when sound waves come in contact with it. This deflection "absorbs" some the acoutical energy and therefore reduces the sound levels heard on the other side of the partition.

There are several manufacturers of resilient channels. The original manufacturer US Gypsum (USG), created and tested the first resilient channel USG RC-1, but as is often the case the copies are not a good as the original. When competitor resilient channels are tested side by side against the USG RC-1 channel, the RC-1 always outperforms the others. For example, when we were called in as an expert for a multifamily housing project and had a wall or ceiling opened up for inspection, in every problem case a non–USG RC-1 channel was used. When the USG RC-1 was installed and the ceiling was refinished, the problems almost always went away. The installation of the correct channel and even the proper installation of channels seem to be a challenge in the field at a job site. There was one project that had three different channels installed on one wall and none of them were the specified USG RC-1.

The basic design of a resilient channel is a metal channel bent into three sections: a flange about 40 mm wide (where the gypsum board is attached); a section about 12 mm tall (with long slots routed into it to provide some spring); and the third flange about 15 mm wide where the channel is attached to the joist or stud. (Go to http://www.ta-inc.com/newshtml/rc.htm for more information.) USG has sold their product to Unimast, which then sold it to Worthington Industries. Worthington Industries' Dietrich Division now manufacturers two versions of resilient channels, the RC Deluxe and the URC, yes it is confusing. The RC Deluxe is very similar to the original USG RC-1 but the URC version has smaller slots and if tested would not perform as well.

So, while we still specify resilient channels we have been looking for a better solution that will be a little more contractor friendly. One new product is a metal clip with a rubber busing that will support a traditional hat channel. In looking at it, it seems to be a system that field crews will have an easier time installing. The extra thickness will help minimize some of the common problems we see where the installers use a screw that is too long and screw

through the channel and into the framing system. This "short circuits" the resilient channel, eliminating the deflection component of the system. The new product tests well in the laboratory. We have specified it in some of our more recent multifamily projects and a couple of commercial projects. The projects are not finished, so we do not have actual field test results, but from what we have heard, everything is looking and sounding good. For more information on this new product please look the at RSIC system in section 6 below.

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5. Restoration of the Cathedral of the Immaculate Conception

In response to the needs of the expanding Catholic Diocese of Memphis, Tennessee, Williamson Pounders Architects (WPA) also of Memphis, selected Thorburn Associates to assist with the acoustical and audio system design for the restoration of the Cathedral of the Immaculate Conception.

The restoration brought the cathedral into full conformance with contemporary Catholic liturgical standards. The altar table was moved forward into the center of the nave on a raised platform and surrounded by new pews and moveable chairs. A new marble baptismal font, incorporating the old altar railing and font, was added near the main entrance. Old acoustical tiles were removed and the central dome was rebuilt to improve the acoustics. The balcony was reconfigured to provide additional seating. The east transept was reconfigured for an expanded choir. The west transept features a new sky lite Eucharistic Reservation Chapel.

The main challenge for TA was all of the curved surfaces in the altar area. For example, parishioners complained that they could not hear the priest but could hear a whispered conversation from the other side of the transept (this was due to the focusing of sound by the curved ceiling and walls). The original design architect used segments of spheres, columns, and circles that created a significant problem with focusing of sound in many different locations within the nave. Sound absorptive material and coffers were introduced into these surfaces to help minimize the focusing of sound.

The reverberation time was adjusted to support a new electronic pipe organ. The longer reverberation time required for the pipe organ and the relocated choir area created a challenge for the design team in selecting acoustical finishes. Both paper and computer modeling of the acoustical environment confirmed this.

The original sound system was loudspeakers located on the columns. Parishioners complained that the old loudspeakers did not work and there were spots that they could not understand what was being said. Our solution was to design a pew back sound system. The philosophy of a pew back loudspeaker system is a hybrid of what is called a distributed audio system. Distributed audio systems use many low powered loudspeakers located close to the listeners versus a central cluster loudspeaker system which has one large loudspeaker system located in a central area, in this case over the altar, to distribute audio throughout the sanctuary. A lighting analogy would be to consider the difference between numerous down lights providing uniform illumination of the floor/seating area versus a single high light output floodlight providing the same illumination from a pole.

The electronic portion of the audio system is automated. The system uses several mixing components, which provides two primary formats. The first format is speech reinforcement, or in this case, the spoken word. The second format is for choir and music; the choir may be accompanied by organ music. Both formats are routed through a main mixer and can be heard throughout the sanctuary.

The spoken word is heard through the pew back distributed loudspeaker system. This provides even coverage throughout the sanctuary. The loudspeaker system is divided into six zones. This allows the church to control each zone as required per worship event. The music audio system is also heard through the pew back loudspeaker system. The loudspeaker system is capable of supporting choir vocals and other music sources but is supplemented with two larger format column mounted loudspeakers. These loudspeakers are "time aligned" with electronic delay to improve the speech intelligibility of the sound heard naturally from the choir and electronically from the column and pew back loudspeaker systems. The choir and music sources are routed through a local choir mixer, then into the speech audio system.

More information on the project can be found at: http://www.wparchitects.com/projects/ic.htm

6. Sound Control by PAC International Inc.

A product that competes with Resilient Channels is the Resilient Sound Isolation Clip (RSIC) available from PAC International. Inc. The RSIC-1 clip combined with a 7/8-inch furring channel can achieve sound transmission class (STC) ratings of 62 in wall assemblies and impact isolation class (IIC) ratings of 82 in floor-ceiling assemblies.

The RSIC-1 clips can be attached to wood, steel, concrete, or CMU; have been tested in acoustical laboratories; and are "Classified by Underwriters Laboratory (UL)" for use in over 150 UL Fire Resistive Design Assemblies. It can be used to support other lightweight items such as Bathroom Fans and Light fixtures as well as garage door openers from the floor on the unit above.

www.pac-intl.com for more information.

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