This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

GEN113
CTS Prep Virtual Classroom

Course Materials

infoComm Academy
AV Education That Works

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

infoComm INTERNATIONAL
11242 Waples Mill Road, Suite 200
Fairfax, VA 22030
www.infocomm.org
703.273.7200
800.659.7469
703.278.8082 FAX

InfoComm International®
GEN113 CTS Prep Virtual Classroom

Course Materials

These course materials are a companion to GEN113 CTS Prep Virtual Classroom course. InfoComm International® is pleased to offer distance education as a certification prep pathway.

Students

This document includes content from: *Audiovisual Best Practices: The Design and Integration Process for the AV and Construction Industries* and *AV Setup Guide for Events, Meetings, Conferences, and Classrooms.* Your course assignments include readings from this document, followed by participation in group discussions and completion of workbook activities.

Completion of the CTS Prep course in no way guarantees that you will pass the CTS exam, nor will this program cover all the topics listed in the exam outline. Also, InfoComm reserves the right to modify the contents of these course materials as appropriate to meet course objectives.

Potential Students

What is a Virtual Classroom?
A virtual classroom is an interactive, online course combining real time and self-paced study. A virtual classroom uses the Internet to create a class you can visit anytime, and from any location. It brings the benefits of face-to-face learning to students spread out across the globe. This setup allows you to learn on your own schedule while still enabling you to interact with your instructor and fellow students.

Is Virtual Classroom Right for You?
Ask yourself if the following statements apply to you:

- I want high-quality industry education, but I don't want to travel to get it.
- I like being able to ask questions and get answers in real time.
- I learn from sharing ideas with my peers.
- I feel comfortable with online tools like webinars and discussion boards.
- I'm good at time management and keeping track of deadlines.

If this sounds like you, then you are the perfect virtual classroom student.

For more information about the CTS Prep Virtual Classroom course or other certification preparation pathways, visit www.infocomm.org.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

AUDIOVISUAL BEST PRACTICES

THE DESIGN AND INTEGRATION PROCESS FOR THE AV AND CONSTRUCTION INDUSTRIES

infoComm
International Communications Industries Association, Inc.®

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

AUDIOVISUAL BEST PRACTICES

The Design and Integration Process for the AV and Construction Industries

This highly anticipated volume published by the leading AV industry association covers a broad range of territory in succinct, targeted prose with appropriate illustrations throughout.

The book's primary mission is to explain the complete AV process from start to finish, while simultaneously providing professional insight into the best and recommended practices to use for a successful audiovisual design and integration project.

A companion to the popular industry reference manual, the *Basics of Audio and Visual Systems Design: Revised Edition*, this new book builds upon the technical aspects of the *Basics* book to reveal the intricacies of the process and also to provide information about the industry, its historical roots, its growth and where it is headed. A must read for all AV professionals, and those who work alongside them to make audiovisual best practices a reality.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

AUDIOVISUAL BEST PRACTICES

THE DESIGN AND INTEGRATION PROCESS FOR THE AV AND CONSTRUCTION INDUSTRIES

infoComm
International Communications Industries Association, Inc.®

Addressing AV process questions of architects, building and construction trade personnel, consultants, contractors, developers, engineers, facility owners, project managers and AV professionals.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

First edition.

Published by the International
Communications Industries
Association, Inc.® (ICIA®)

11242 Waples Mill Road
Fairfax, VA 22030, U.S.A.

www.infocomm.org

Copyright 2005 by the International
Communications Industries Association, Inc.®

Authors:
Timothy W. Cape, CTS-D, Principal
Consultant, Technitect, LLC
Jim Smith, CTS, Director of Strategic
Initiatives, HB Communications, Inc.

Editors:
Susan J. Higginbotham
Taly Walsh, Senior Vice President,
Marketing & Membership, InfoComm
International

Book Design:
Holli Rathman

Printed in the United States of America
Library of Congress Control Number
2005927586

ISBN: 0-939718-20-0

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means, including photocopying and information storage and retrieval systems, without written permission from the publisher.

While every precaution has been taken in the preparation of this book, the publisher assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

DEDICATION

To organizations that want successful audiovisual systems and to the professionals who know how to make it happen.

The best way possible.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

WHAT THIS BOOK MEANS TO INFOCOMM INTERNATIONAL EXECUTIVE DIRECTOR, RANDAL A. LEMKE, PH.D.

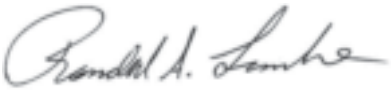
As I was reading through the first draft of *Audiovisual Best Practices*, I paused at a paragraph that reads, *"The greatest differentiation between pro-AV and other trades is that pro-AV involves the full-blown creation of communications environments. Consequently, AV professionals are concerned with more than just the cable pathway and the electronics at the end of the cable; they are concerned with making it possible for the customer to communicate."*

This statement accurately describes our industry. AV professionals, who have found their life's work in this field, are increasingly more concerned with the bigger picture in systems integration. They and their collaborators from other disciplines need to know, from the outset, how the entire building construction or renovation will affect the AV system, and vice versa. This new perspective means that the AV professional, architect, engineer, facility owner, project manager and others in the process interface routinely with one another. Successful AV installation and integration is no longer dependent upon a small group of technically savvy individuals (although they are vital to the process), but rather it requires a strong relationship among the members of a more disparate team. To be effective, this team must know as much as possible about AV projects and how they are accomplished.

This book, then, is our opportunity to disseminate information about the business of pro-AV. It is a unique publication that reveals the best of AV — from the standpoint of the industry, its roots, its professionals, its processes and practices and, importantly, its customers.

To see this book published during my tenure as Executive Director is right up there with being a part of an industry that is emerging as a powerhouse and helping the association make valuable contributions to its membership and the industry as a whole.

To all those who worked tirelessly on this book, as well as those who conceived of it and made it happen, I offer simply this statement: "You set a high goal when you conceived of this book, and clearly you have reached it."



Randal A. Lemke, Ph.D.
Executive Director
International Communications Industries Association, Inc.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

The InfoComm Best Practices Committee

Committee Chair
Mark Valenti
The Sextant Group

Co-Authors
Tim Cape, CTS-D
Technitect
Jim Smith, CTS
HB Communications
SAVVI Council Chair

SAVVI
George Bing
HB Communications
Spencer Bullins, CTS
AMX
Tom Peters, CTS
Integrated Media Systems
2005 InfoComm President
Jim Smith, CTS (co-author)
HB Communications
SAVVI Council Chair
Byron Tarry, CTS
AVW-TELAV Audio Visual Solutions

ICAT
Tim Cape, CTS-D (co-author)
Technitect
Kris Kuipers
Newcomb & Boyd
Jeff Loether
Electro-Media Design
Mark Valenti
The Sextant Group
AVBP Committee Chair
Brad Weber
muse, inc.

Technology Managers/ End Users Council
John Pfleiderer, CTS-D
Cornell University
Technology Manager/End-Users Council Chair

Reviewers
Peter Gross, AIA
Kohn Pederson Fox Associates PC
Architects and Planning Consultants
Stephen Newbold, AIA, RIBA
Gensler
Dave Labuskes, RCDD/NTS/OSP, CSI
RTKL Associates, Inc.
John Pfleiderer, CTS-D
Cornell University
Scott Walker
Waveguide Consulting, Inc.
2005 InfoComm Chairman
Brad Weber
muse, inc.

Editors
Susan Higginbotham
Higginbotham Associates
Taly Walsh
InfoComm

ACKNOWLEDGMENTS

Audiovisual Best Practices: The Design and Integration Process for the AV and Construction Industries is the result of an extraordinary combined effort of three primary groups among the membership of the International Communications Industries Association, Inc.® (ICIA®). They are the AV systems integrators, the independent consultants and the technology managers/end-users.

Through their councils — the Sound, AudioVisual and Video Integrators (SAVVI), the Independent Consultants in Audiovisual Technology (ICAT) and the Technology Managers/End-Users — members volunteered their time and commitment in forming the AV Best Practices Subcommittee, chaired by Mark Valenti of The Sextant Group.

The result was a committee of eleven that gathered and determined the scope and goals of the project, the intended audiences, and the elements that were necessary for the completion of a useful and valuable guide to the AV process.

The collaboration of integrators and consultants was a significant accomplishment that merits a word of recognition. While often serving as team members on projects, independent consultants and systems integrators sometimes find themselves at odds philosophically. They also often compete for business. Yet, when the two groups decided to work together on this project for the good of the AV industry, they rolled up their sleeves, put aside differences, agreed that sometimes it was OK to disagree, and got to work.

The significant body of work was developed by the co-authors, Tim Cape, CTS-D, of Technitect, and Jim Smith, CTS, of HB Communications.

Our heartfelt thanks go also to Bradley P. Weber, P.E., of muse, inc., who was a major contributor and peer reviewer, as well as to architects, design consultants, integrators and technology managers who provided insight and in-depth reviews: Peter Gross, AIA, of Kohn Pederson Fox Associates PC; David Labuskes, RCDD/NTS/OSP, CSI, of RTKL Associates, Inc.; Jeff Loether of Electro-Media Design; Stephen Newbold, AIA, RIBA, of Gensler; John Pfleiderer, MA, CTS-D, of Cornell University; Byron Tarry, CTS, of AVW-TELAV Audio Visual Solutions; and Scott Walker, CTS-D, of Waveguide Consulting, Inc.

Susan J. Higginbotham of Higginbotham Associates and Taly Walsh of InfoComm edited the publication; creative design and layout of the publication were produced by Holli Rathman.

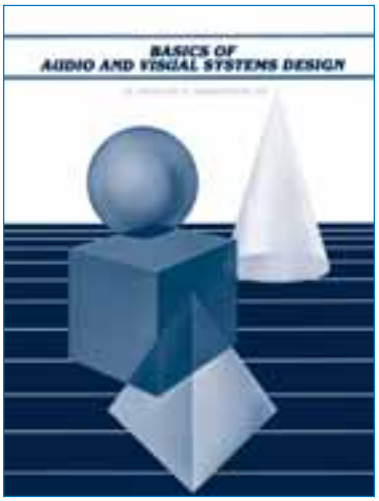
The publisher, InfoComm, is the association for the professional audiovisual industry. InfoComm represents the entire distribution chain worldwide, including AV technology manufacturers, distributors, dealers, systems integrators, independent representatives, rental and staging companies, independent consultants, independent programmers, production companies, presentations professionals and technology managers/end-users.

Through its Board of Governors, its councils and committees, and members at large, InfoComm International has advanced numerous industry initiatives, including an AV industry awareness campaign, online and classroom education, individual and company certification at general and specialized levels for design and installation, workforce development, awards programs, online information resources, and InfoComm and Integrated Systems tradeshows for Europe, China and Asia.

The 2005 *Audiovisual Best Practices* guide, and its companion, *The Basics of Audio and Video Systems Design*, are two key initiatives to emerge from the association. InfoComm gratefully acknowledges the important contributions of its membership toward making these valuable industry references a reality.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

PREFACE



The realization that AV was becoming a significant industry was reinforced by the issuance in the late eighties of InfoComm International's milestone publication, "*The Basics of Audio and Visual Systems Design*."[1] This landmark book, updated and re-published in 2004, delineated the complex technical aspects of professional AV design.

The AV industry, however, has become far more than simply technical design and application. Because of its pivotal role in delivery of modern information communications, it is an integral part of virtually all major construction and redevelopment projects, as well as the production of live events. As such, the industry has experienced record growth. According to a 2004 study, the AV industry represents a total market size of close to $19 billion in North America alone.[2] In actuality, the worldwide statistics may exceed triple that figure.

Because of the industry's increasing significance, three leading member councils at ICIA[3] recognized that the time had come to produce another industry publication that would go beyond the basics. This new book would help industry professionals, as well as those with whom they work, better understand the process of managing complex information communications projects in buildings and facilities.

To accomplish this goal, the content of *Audiovisual Best Practices* needed to cover significant territory. It needed to present an overview of the industry, explore the inner workings of AV projects with start-to-finish process descriptions, and conclude with an assessment of what the

Members of the AV Best Practices Committee during its meeting in October 2004. Pictured, l. to r., Jim Smith, CTS, Kris Kuipers, Tim Cape, CTS-D, Byron Tarry, CTS, Brad Weber, Mark Valenti, Jeff Loether, John Pfleiderer, CTS-D. Not pictured: George Bing, Spencer Bullins, CTS, and Tom Peters, CTS.

[1] Raymond Wadsworth, *The Basics of Audio and Visual Systems Design* (Fairfax, Virginia: InfoComm. 1983). The book was the first to contain the diverse set of physics, electronics, ergonomics and design that makes up the audiovisual system. Many AV professionals credit this book for advancement in their careers.
[2] Survey conducted May 2004 for InfoComm/ICIF by Acclaro: Market Intelligence Special Report: 2004 AV Market Definition and Strategy Study.
[3] The Sound, AudioVisual and Video Integrators (SAVVI), the Independent Consultants in Audiovisual Technology (ICAT) and the Technology Managers/End-Users Councils

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

The AVBP Committee spent a day in October 2004 wrestling with the goal, scope, audiences and outline of the guide.

future holds for the industry.

While the development of this book has been professionally rewarding for all those involved, it was a complicated venture from the outset. The job of producing a single volume that encompassed all aspects of the delivery of AV installations — from project design to development and from installation to systems operation and training — was no easy task.

In addition, the book had to appeal to a multi-faceted audience that existed within and beyond the AV professional's arena. These diverse groups include architects, mechanical engineers, electrical engineers, structural engineers, general contractors, electrical contractors, facility managers and owners, and many others who perform vital roles in the process. Finally, the publication needed to have relevance to the end-users — critical players on the team because they need to "own the project" and will reap the rewards of its success.

Creating a book of this nature required a first-of-its-kind industry collaborative effort. Professionals from every aspect of the industry (in many cases, those who would be competitors outside of the conference room) sat together over a two-day period and planned this remarkable volume. Integrators, designers, and end-users — typically coming to the project from differing perspectives — made a commitment that transcended their usual business interests. They joined forces, putting the best interest of the AV industry first. This book is the result of that effort.

It should be noted that the processes and practices described in the guide are primarily derived from North American experience; however, with InfoComm International's international focus, attempts are made to allow for variation in other parts of the world, while still offering a foundation and starting point to serve as a guideline for future adaptations.

Some aspects of AV solutions, including live events, video production and presentations, are mentioned in passing in *Audiovisual Best Practices: the Design and Integration Process for the AV and Construction Industries.* While these are important aspects of the AV industry, this publication's scope is focused on fixed installations.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

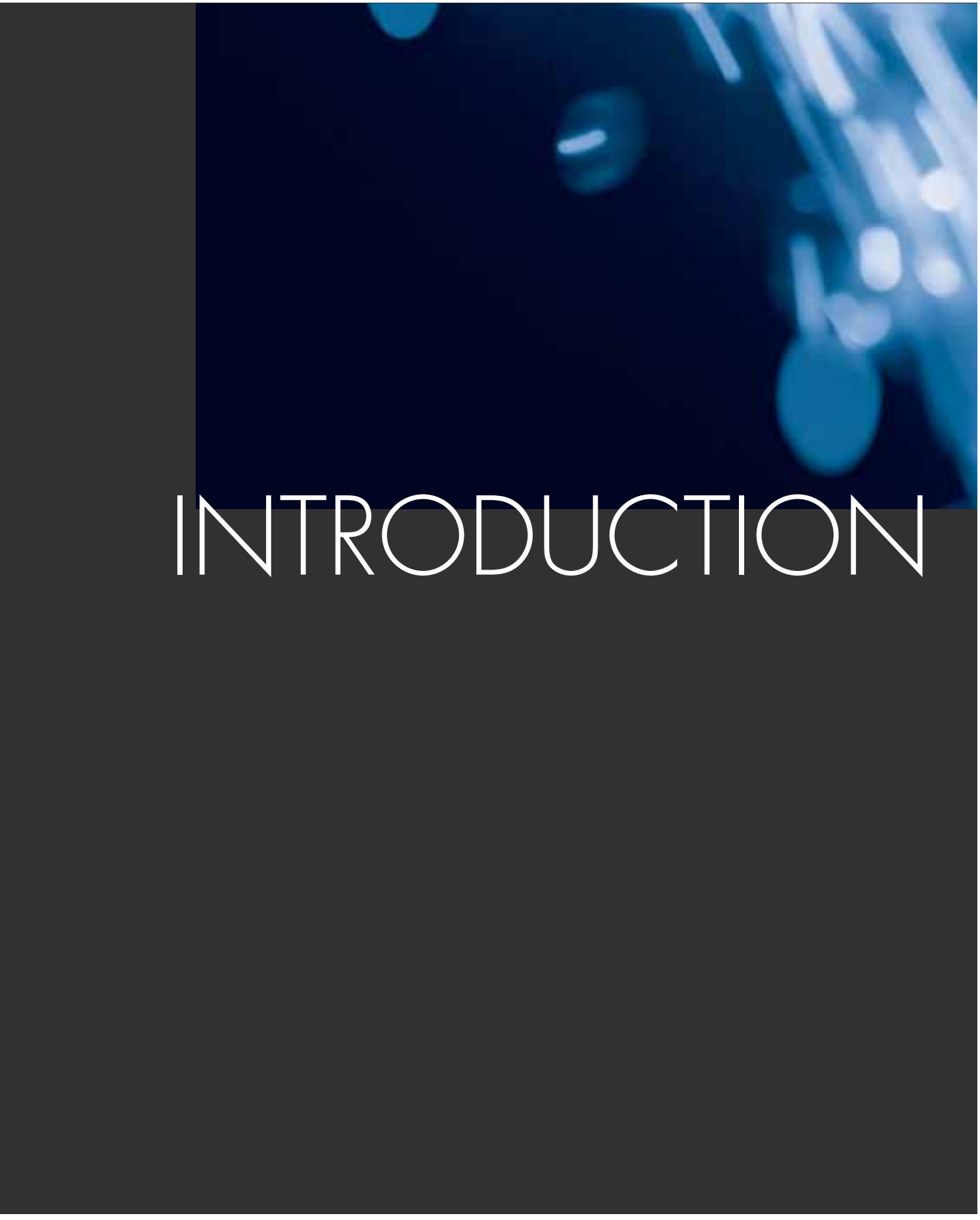
TABLE OF CONTENTS

CHECKLISTS

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

Photos and graphics for *Audiovisual Best Practices* were provided courtesy of:
AMX Corporation; Audio Visual Innovations, Inc.; Brett Sneed/Swiderski Electronics Inc.; Cinema Park Network, Ltd.; Crestron Electronics, Inc.; Ewing Consulting; Gray Bow Communications; the International Communications Industries Association, Inc.® (ICIA®); HB Communications; Konover Construction Corporation; Marigan O'Malley-Posada / RTKL Associates Inc.; MediaMethods; Media Systems Design Group; NOR-COM, Inc.; Smith Audio Visual, Inc.; Swanson Rink, Inc.; Technical Innovation, LLC; Technitect, LLC; United Visual, a Chicago based audiovisual system integrator and AV dealer; and Waveguide Consulting, Inc.

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.



INTRODUCTION

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

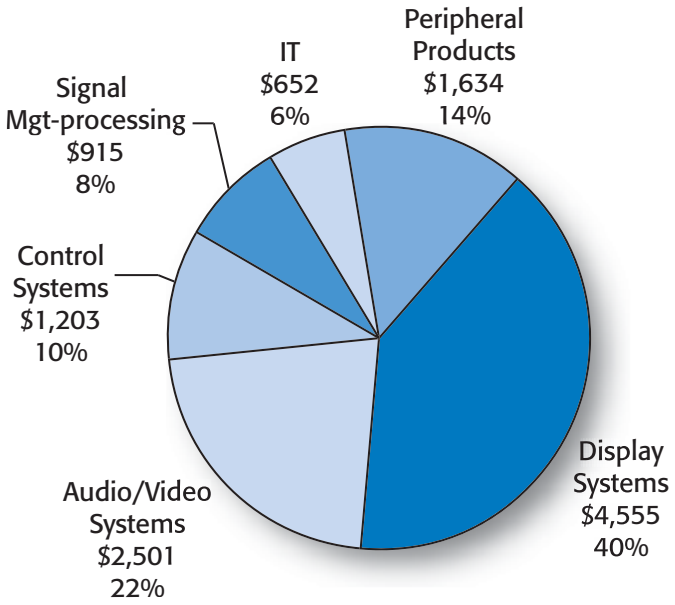
INTRODUCTION

The professional audiovisual (pro-AV) industry has come into its own.

Never before in its history has professional audiovisual system design and integration been such a vital part of the construction industry. In 2004 alone, the industry reported revenues of nearly $19 billion in North America, with a projected growth rate of 9.6% over the next five years; the worldwide statistic is potentially more than triple that figure. The AV industry has undoubtedly

Figure 1. AV Market Breakdown
$18.9 billion total market size for the year 2003 in the US and Canada

Products = $11.5 Billion
(Figures shown in millions)



IT	Peripheral	Display	Audio/Video
Wireless Connectivity & Software $380	Furniture $402	Displays $1,115	Acquistion & Delivery $1,025
	Cables/Connect $425	Projectors $2,400	Conferencing $534
Streaming Media & Webcasting $272	Mounting $422	Screens/Shades $650	Sound Reinforcement $942
	Lighting $385	White Boards $390	

According to the 2004 Market Definition and Strategy Study conducted by Acclaro Partners for InfoComm, the total North American AV market size of $18.9 billion was largely above what had been anticipated. The convergence of AV and IT as well as new applications for AV products are key factors driving the market. Growth in the product component of the total market is driven primarily by display systems. That product category has witnessed acceleration in innovation and new technologies, particularly in plasma and flat screens, as well as in projectors.

Source: InfoComm 2004 AV Market Definition and Strategy Study

This is a preview of "ICedu-GEN113v1". Click here to purchase the full version from the ANSI store.

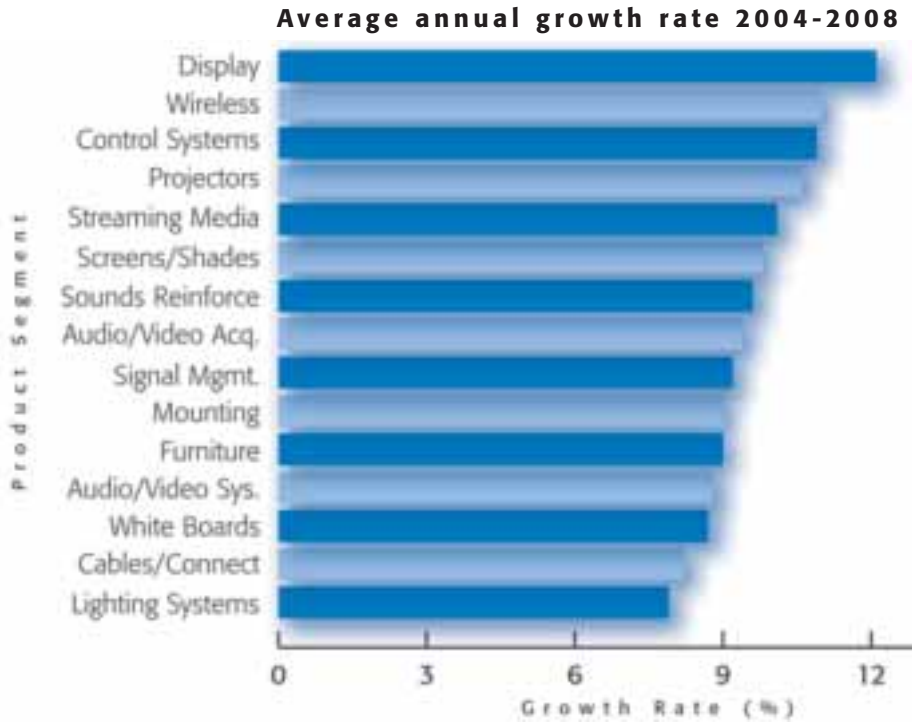
become a major player in the global economy.
The AV industry has evolved dramatically. AV technology enhances communication everywhere today — whether in the boardroom, the classroom or in public spaces, such as airports, museums and retail centers. The convergence of AV and IT, emerging applications for AV products, as well as the demand driven by home markets are key factors driving the professional AV market. These trends promise a continuing significant impact within and outside of the AV industry.

AREAS OF GROWTH

The increased usage of select audiovisual technologies in key market segments is behind the growth of the industry. Beyond its top markets (business/corporate, colleges/universities, and government/military), AV technology is making significant gains in other arenas. These growth areas include retail establishments, sports facilities, museum exhibits, meeting rooms, convention sites, healthcare facilities, and, interestingly, places of worship. So much growth is expected that, as of 2004, 75% of the audiovisual companies responding to an InfoComm International survey were confident enough to forecast a revenue and profitability increase over the next few years.

From videoconferencing and streaming media to digital signage[4] and plasma displays, AV technology is virtually everywhere. Innovative AV solutions are appearing in all market segments, reflecting the increase in mainstream awareness of AV technologies. The general population is seeing technology as a necessary component in homes[5], businesses, and educational facilities. In fact, AV technologies are being incorporated anywhere there is a need or desire for state-of-the-art communication or visualization. The AV industry has

Figure 2. AV Industry Growth Rate



Displays, wireless, control systems, projectors and streaming media will outpace the overall industry growth rate of 9.6%, spurred on by technological innovations and the addition of customer-driven features such as wireless and interoperability. Streaming media, webcasting, wireless and software are all relative newcomers to the AV space. Technologies are being introduced rapidly as a result of AV and IT convergence. Currently, these segments have low penetration rates; however, they are expected to grow significantly as products continue to migrate to web-enable technologies. Cables, connectors, furniture and lighting systems are viewed as "must haves" but only represent a fringe contribution to overall revenue.

Source: InfoComm 2004 AV Market Definition and Strategy Study

[4] A positive trend is the increased use of digital signage, particularly in the retail sector, for delivering messages, selling products or simply providing information. The increased demand (primarily from business and universities) has led to increased competition, which, in turn, has lowered costs. The cycle continues, and the industry grows.
[5] Both here and abroad, the increasingly sophisticated residential market is growing. Nearly 25% of dealers in North America and nearly 30% in Europe are currently in residential sales. Evidence of the increasing crossover between commercial and residential applications is the launch of a Residential Pavilion at InfoComm's InfoComm 2005, the largest tradeshow for the professional audiovisual industry worldwide. The pavilion features home theater systems, high-definition displays, residential audio, lighting, electronics and security systems, satellite equipment, and home automation systems.