

The Image Revolution

Zooming in on cinematography

By Carlos V. Girod, Jr., P.E.

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Cinematography

A Global Industry by Nature

There can barely be an industry more global than the cinematographic industry by its very nature: the same films are viewed the world over, requiring similar technical specifications for the equipment, and similar technical requirements for those same films to be most rationally and easily handled in all countries of the world.

Cinematography (that can be simply defined as “the making of motion-pictures”) is a mature industry, and much of the work done in ISO/TC 36, *Cinematography*, is concerned with the review and maintenance of existing documents. The current work programme includes updating screen luminance standards, electro-acoustic response of theatres and reverberation times for theatres. New projects include spectral response of photographic audio reproducers for analogue dye sound tracks on 35mm film, methods of measurement of perceived loudness of motion-picture audio material, relative and absolute sound pressure levels for motion-picture multichannel sound systems—measurement methods and levels, and image area produced on 35mm motion-picture film by transfer of electronic images for post-production and release prints—position and dimensions.

An exciting new area concerns Digital Cinema—the presentation of feature films in cinemas using electronic projection techniques.

All of these technical activities are done primarily for one industry—the motion-picture film entertainment industry.

The Motion Picture Industry

A few business data to start with from the Motion Picture Association Worldwide market research, that show the sheer size and breadth of the motion picture industry.

Worldwide box office revenues were 20.3 billion USD in 2003, an increase of 3% from 2002. The US and

International box office make up 47% and 50% respectively of the worldwide box office.

In 2003, worldwide admissions were 8.6 billion, a drop from the 2002 record level of 9.1 billion; attendance remains higher than in 2000 and 2001, however.

Global screen count grew at an average annual rate of 4% from 1996 to 2001.

In 2002, the China and India exhibition market lost 3 609 screens, which pulled the overall market down from 106,975 screens to 104,122 screens. Screen growth in other markets negated the losses in these two markets, making the total worldwide screen count loss 2,853. Investments in the construction of multiplexes and mega-plexes have contributed to the 4% annual growth rate in screens between 1996 and 2001. USA, Europe and Asia Pacific control most the worldwide screens, comprising 87% of the market.

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Concerning digital cinema, digital screens jumped from 45 to 178 between 2001 and 2003. Much of the growth in 2003 came from additional screens in the United Kingdom and USA. China was home to nearly 25% of the total global digital screens in 2003, while 50% of the global screens are deployed in the USA.

Two major announcements pointing to future growth in digital screens came from the United Kingdom, with the announcement of 250 new screens through the UK Film Council Initiative, and from the US Landmark theater chain in conjunction with Microsoft, that will equip all 177 of its screens for digital screenings.

ISO in “Action”

ISO has been involved in standards for the industry for over 50 years, indeed soon after the organization came into being. ISO/TC 36, *Cinematography* held its first meeting on 9-11 June 1952 at Columbia University in New York, NY, USA, with its initial members being

This article first appeared in the November 2004 issue of ISO Focus—*The Magazine of the International Organization for Standardization* and is reproduced here with the permission of ISO Central Secretariat (www.iso.org). Editorial enquiries: allen@iso.org. A one-year subscription costs 158 Swiss francs. Subscription enquiries: sales@iso.org.



At 1952 New York meeting: (l-r) 1st row: J. Vivie, G. Graham; 2nd row: L. Knopp, L. Busch, W. Waegelein; 3rd row: F. Carlson, P. Arnold, D. White, M. Townsley, R. Davis.

Belgium, Canada, France, Germany, United Kingdom, USA and the (then) USSR. The Secretariat was the American Standards Association (now the American National Standards Institute, ANSI), assisted by the Society of Motion Picture and Television Engineers (SMPTE). These members have been joined over the years by China, Japan, the Republic of Korea and the Russian Federation, replacing the USSR.

The scope of ISO/TC 36 is defined as:

Standardization of definitions, dimensions, methods of measurement and test, and performance characteristics relating to materials and apparatus used in silent and sound motion picture photography; in sound recording and reproduction related thereto; in the installation and characteristics of projection and sound reproduction equipment; in laboratory work; and in standards relating to sound and picture films used in television.

The initial projects in 1952 concerned the international standardization of :

- *Emulsion and Sound Record Positions in Cameras and in Projectors.*
- *Dimensions and Locations for Sound Records and Scanning Area.*
- *Location and Size of Picture Apertures in Cameras, Projectors and Printers.*
- *Dimensions of Raw Stock.*
- *Definition of Safety Film.*
- *Standards Relative to Projection Halls.*

Companies and organizations represented through their national member bodies included: Ansco, Bell & Howell Company, Bureau de Normalisation du Cinéma, Cinematograph Exhibitors Association, DuArt Film Laboratories, Eastman Kodak Company, E.I. duPont de Nemours & Co., Inc., General Electric Company,

General Precision Laboratory, Inc., Motion Picture Research Council, National Carbon Company, National Film Board of Canada, RCA Victor Division, Society of Motion Picture and Television Engineers (SMPTE), Technische Universität Berlin, US Army Signal Corps, US National Bureau of Standards and US Naval Photographic Center.

The SMPTE Engineering Vice-President, Mr. F.T. Bowditch, stated that the initial meeting in 1952 showed that “When men of good purpose sit down together and talk things over, much can be accomplished.” And, by 2004, some 52 years later, much has been accomplished: TC 36 has 109 International Standards covering all aspects of cinematography.

Making Standards for Making Motion Pictures

ISO today has at disposition 109 International Standards used to support these industries. Among the most important cinematography International Standards are the three documents that specify **image areas** for cameras and projectors to facilitate international exchange:

- *ISO 2906:2002, Image area produced by camera aperture on 35mm motion-picture film—Position and dimensions;*
- *ISO 2907:2002, Maximum projectable image area on 35mm motion-picture film—Position and dimensions;*
- *ISO 2467:2004, Image area produced by 65mm/5 perforation motion-picture camera aperture and maximum projectable image area on 70mm/5 perforation motion-picture prints—Positions and dimensions.*

Basic **film dimensions** and perforations are specified in:

- *ISO 491:2002, 35mm motion-picture film and magnetic film—Cutting and perforating dimensions;*



At 1952 meeting: (l-r) W. Rambal (ISO CS), F. T. Bowditch (SMPTE), H. Kogel (SMPTE).

- *ISO 3023:1995, 65mm and 70mm unexposed motion-picture film—Cutting and perforating dimensions.*

Sound records are specified in:

- *ISO 17266:2002, Multichannel analogue and digital photographic sound and control records on 35mm motion-picture prints and negatives, and digital sound-control records on 70mm motion-picture prints and negatives—Position and width dimensions.*

How ISO/TC 36 Functions

Today, work is conducted through five Working Groups :

- WG 1 Film technology*
- WG 2 Laboratory services technology*
- WG 3 Audio technology*
- WG 4 Presentation technology*
- WG 5 Film/electronic interface technology*

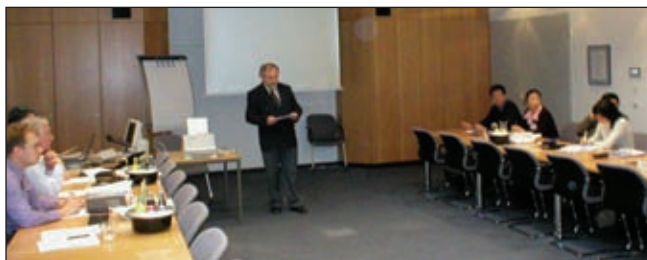
Much of the work is conducted by correspondence, with formal plenary and working group meetings taking place every three years, most recently in October 2003 at Deutsches Institut für Normung e.V. (DIN) in Berlin, Germany.

The American National Standards Institute (ANSI) serves as Secretariat for ISO/TC 36 with work delegated to the Society of Motion Picture and Television Engineers (SMPTE). The author serves as chair and secretary. There are at present 10 Participating members (P-members), while Observer (O-) members include Austria (ON), Bulgaria (BDS), Cuba (NC), Czech Republic (CSNI), Greece (ELOT), India (BIS), Iran, Islamic Republic of (ISIRI), Korea, Democratic People's Republic (CSK), Norway (SN), Pakistan (PSQCA), Poland (PKN), Romania (ASRO), Serbia and Montenegro (ISSM), Spain (AENOR), Tunisia (INORPI).

Other ISO and IEC committees in liaison include ISO/TC 42, *Photography*, ISO/IEC JTC 1/SC 29, *Information Technology—Coding of audio, picture, multimedia and hypermedia information*, as well as IEC/TC 100, *Audio, video and multimedia systems and equipment*. ISO/TC 36 enjoys good liaison relationships through the exchange of documents. Two of the liaisons



In 2003, Dr.-Ing. Peter Kiehl, Member of the Management Board and Director of Standards at DIN welcomes the ISO/TC 36 delegates.



In 2003, the ISO/TC 36 delegates at work. Computers have considerably reduced the amount of paper required.

are facilitated by the fact that ANSI also serves as the secretariat for ISO/TC 42, *Photography*, with the work delegated to the International Imaging Industry Association (I3A), which is located less than 15 kilometres from Society of Motion Picture and Television Engineers (SMPTE) headquarters, and that the Chair of IEC/TC 100, Mr. Mark S. Hyman, is a co-worker at SMPTE.

International organizations in liaison include CIE (International Commission on Illumination), EBU (European Broadcasting Union), ITU (International Telecommunication Union), SMPTE (Society of Motion

Picture and Television Engineers), UNESCO, and WCO. SMPTE has an ongoing relationship with EBU and SMPTE is a sector member of ITU-R.

ISO standards represent a useful portfolio of reliable and trusted standards that the cinematographic industry would be hard pressed to be without.

THE AUTHOR

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He has been the Director of Engineering at the Society of Motion Picture and Television Engineers (SMPTE) in White Plains, New York since 1995. He was the Vice-President for Satellite Technology at the Public Broadcasting Service (PBS) in Alexandria, Virginia, from 1988 to 1995. He held several Director of Engineering positions at the CBS Television Network in New York from 1974 to 1988. He is a Fellow of SMPTE, member of IEEE and its Broadcast Technology and Computer Societies. He has been a member of BKSTS, a rapporteur for ITU-R, and Chairman of the North American Broadcasters Association Technical Committee.

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