

a universal European approach but to the authors' knowledge has never been used for normal broadcasting. The E system, mentioned in connection with early SECAM tests in France, is limited to monochrome broadcasts and is slowly becoming extinct even in this application.

Figure 22 (Systems Comparison Summary — Part I) provides a "summary-at-a-glance" of the major color television system general characteristics as presently practiced, whether it be monochrome only or including the addition of chrominance information. Figure 23 (Part II) characterizes the fundamental features relating to the differences between NTSC, PAL, and SECAM in the critical areas of color encoding techniques. Similarly, Fig. 24 (Part III) indicates the color encoding line-by-line color sequence operation for the three systems.

The information conveyed in these last seven charts (Figs. 18–24) highlights the technical equalities and differences among the systems and attempts to show some kind of order as an aid to understanding the existing worldwide situation. It serves as well to point out the difficulties of entertaining the notion of a "universal" system.⁷

Comments on International Exchange of Images

The international exchange of images in broadcast television in the face of the variety of standards is difficult. It should be remembered that all TV systems, both monochrome and color, can be operated

from movie film. Special television camera chains have been developed and manufactured that are capable of operating at 625-lines and 48-field rate — the field rate purposely being made to be compatible with the 24-frame rate motion picture standards.

It is comparatively straightforward to exchange television program material by tape, microwave, or satellite between areas employing the same scanning rates: the video bandwidths are, of course, not equivalent but the differences do not result in major image degradation. Electronic standards converters have been developed and used for converting between 50-fields/s and 60 fields/s systems.

The direct exchange of color television programs between the three major systems is obviously more complex. Special transcoding systems have been developed to translate color subcarrier frequencies between similar color systems having different scanning rates. More complex transcoders are possible which translate from one color technique to another, although always at the cost of some degradation of resolution or reduction of performance. Even simultaneous translation between different scanning rates and different color systems, such as between 525-line NTSC and 625-line PAL, has been accomplished.

As previously stated, the advent of satellite worldwide television relay, coupled with recent advances in digital processing of television signals, has given new importance to standards conversion relative to the exchange of program material on an international basis. Thus, the intent of this

worldwide color systems standards review is to highlight the similarities as well as the major differences for those who desire an overview of the related television concepts and standards. A thorough understanding of those concepts and standards by many people is essential if effective international exchange of programming is to grow.

Acknowledgments

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International Standardization

Antwerp, Belgium, 24 September–1 October 1979

During September and early October 1979, ISO Technical Committee 36 on Cinematography was privileged to be a part of the millennium festivities being celebrated by Belgium in honor of its 1000th birthday. Hosted by the Belgium Institute for Standardization (Institut Belge de Normalisation), with the cooperation of the Agfa-Gevaert Corporation, the meeting was held at the Antwerpen EuroCrest Hotel from 24 September through 1 October 1979. The meeting brought together 55 motion-picture engineers from 13 countries, as well as representatives from the IEC (International Electrotechnical Commission) and observers from the People's Republic of China, to consider and resolve the many problems emanating from the ever-expanding international exchange of motion-picture products. Those in attendance were from Belgium, France, Denmark, the Federal Republic of Germany, Italy, Japan, the Netherlands, Poland, Sweden, the United Kingdom, the U.S.A., and the U.S.S.R.; there were also the observers from the People's Republic of China and IEC/TC 60.

The importance placed on the development of International Standards through the ISO attests to the rapid advance the world of science and technology has made since the inception of ISO in 1926 (54 years ago). Known then as the International Federation of National Standardizing Associations (ISA), it had only 20 nations comprising its membership. Today, its 84 member countries represent virtually all of the world's industrial community. This record and the 3500 International Standards it has published underline the fact that the ISO plays an essential role in the extension of international ties to economics, scientific, and technological activities.

By ALEX E. ALDEN,
Manager of Engineering Services

A nongovernmental organization, the ISO and its standards have no legal force; however, more than half of its members — the official standards bodies of the 84 nations — are governmental agencies incorporated by public and national laws, and the remainder, such as ANSI here in the U.S.A., have close links with the government administration in their respective countries.

Technical Committee 36 on Cinematography

TC 36 activities began in 1939, with its first meeting in 1952. Since that date, the Committee has met regularly at approximately three-year intervals:

- 1952 — New York City (Oct. 1952 *Journal*, pp. 351-355)
- 1955 — Stockholm (Feb. 1956 *Journal*, pp. 102-107)
- 1958 — Harrogate (Jan. 1959 *Journal*, pp. 32-37)
- 1961 — Garmisch-Partenkirchen (Jan. 1962 *Journal*, pp. 32-37)
- 1965 — Milan (Dec. 1965 *Journal*, pp. 1112-1116)
- 1967 — Moscow (Nov. 1967 *Journal*, pp. 1113-1115)
- 1971 — London (Oct. 1971 *Journal*, pp. 832-833)
- 1973 — Williamsburg (Feb. 1974 *Journal*, pp. 134-136)
- 1976 — Paris (June 1976 *Journal*, pp. 409-412)

Actions by this Committee have resulted in the acceptance of 65 International Standards in the field of motion pictures, with four new standards now under ISO Council approval review.

TC 36 consists of 16 Participating Member Bodies, 14 Observer Member Bodies, and 9 Liaison Organizations.



Yu Zhengzhong (People's Republic of China), Robert M. Smith (U.S.A.), Zhao Chaoqun (People's Republic of China), and Eric V. Knutsen (U.S.A.) (left to right) enjoying a break during the ISO TC 36 meeting in Antwerp.



P. Croon, Director of Institut Belge de Normalisation (IBN), Alex E. Alden, Secretariat, and Fred J. Scobey, Chairman, (left to right) at the plenary meeting.



Roland J. Zavada (U.S.A.), R. Marie-Saint Germain (France), and Eric V. Knutsen (U.S.A.) (left to right) participating in one of the Working Group sessions.



Members of the French Delegation: P. Offenstien, R. Marie-Saint Germain, and P. Baby (left to right).

Participating Member Bodies:

Australia	France	United Kingdom
Belgium	Italy	U.S.A.
Canada	Japan	U.S.S.R.
Czechoslovakia	Netherlands	
Denmark	Poland	
Federal Republic of Germany	Sweden	
	Switzerland	

Observer Member Bodies:

Austria	Mexico	Romania
Bulgaria	Pakistan	Republic of
Chile	People's	South Africa
Greece	Republic of	Spain
India	China	Yugoslavia
Iran	Portugal	

Liaison Organizations:

- ISO Technical Committee 42, Photography
- ISO Technical Committee 73, Consumer Questions
- IEC Technical Committee 60, Recording
- Council for Mutual Economic Assistance (CMEA)
- European Broadcasting Union (EBU)
- International Commission on Illumination (CIE)
- International Radio and Television Organization (OIRT)
- International Telecommunication Union (ITU)
- International Radio Consultative Committee of ITU (CCIR)

Prior to the formal start of the meeting, Mr. Zavada, speaking for the Technical Committee, took the opportunity of having the President of the SMPTE, Robert M. Smith, attending as a member of the U.S.A. Delegation, extend to the SMPTE the Technical Committee's gratitude and appreciation for the assistance and guidance the Society has offered the committee for the past 30 years. Mr. Zavada noted that the Committee was especially mindful of the degree of importance placed on the TC 36 activities by the SMPTE, as is reflected through its administration of the ANSI Secretariat, for which the Society has borne the entire cost for nine years.

Tenth Plenary Meeting

The opening session began with a warm greeting by Mr. P. Croon, Director of the IBN (Institut Belge de Normalisation), who welcomed the Delegates to Belgium and its millennium. He assured the Committee of complete cooperation, stressing the importance of standardization to the economic well-being of all countries. Mr. Alden, speaking on behalf of the Secretariat, suggested a departure from the customary practice of naming a single chairman for the meeting. As a means of recognizing the essential part the host country plays in the success of a meeting, he proposed and received unanimous endorsement for the appointment of two chairmen — one for technical matters and one to handle arrangements. Mr. Croon accepted the appointment of Co-Chairman—Arrangements, and Fred Scobey, President of DeLuxe Laboratories, was named Co-Chairman—Technical. Mr. Scobey has participated in the TC 36 program as a U.S.A. Delegate in two previous plenary meetings — Williamsburg, U.S.A., in 1973 and Paris, France, in 1976. He



Robert M. Smith (U.S.A.) (left) and Alex E. Alden (Secretariat) (right) in conversation with members of the Russian Delegation: L. V. Sheetov, V. L. Trusko, and V. V. Holodov.



Members of the U.S.A. Delegation: N. P. Goldberg, D. W. McConnell, F. J. Kolb, Jr., M. E. Clasby, and R. J. Zavada (front row, left to right); R. C. Lovick, S. F. Burns, J. G. Baer, and L. L. Endelman (rear row, left to right).



Members of the United Kingdom Delegation: M. P. Lonnon, L. Knopp, A. W. Lumkin, B. Happé, and J. D. Croft (left to right).



Members of the Russian Delegation: V. V. Holodov, V. V. Rakovsky, L. V. Sheetov, and V. L. Trusko (left to right).

was also the U.S.A. Specialist on Preparatory Working Group-2, International Film Exchange, Printing and Processing.

The U.S.A. Delegation was once again under the able leadership of Roland J. Zavada of the Eastman Kodak Company and currently the SMPTE's Engineering Vice-President. Mr. Zavada also led the U.S.A. Delegation for three previous meetings. The Delegation at Antwerp was comprised of the following Specialists:

Jack G. Baer, Century Projector Corporation
 Glenn M. Berggren, Schneider Corporation of America
 Selom F. Burns, S. F. Burns & Company
 Martin E. Clasby, Eastman Kodak Company
 Lincoln L. Endelman, Perkin-Elmer Corporation
 Norman P. C. Idberg, Goldberg Brothers, Inc.
 Eric V. Knutsen, Eastman Kodak Company
 Fred J. Kolb, Jr., Eastman Kodak Company
 Robert C. Lovick, Eastman Kodak Company
 David W. McConnell, Eastman Kodak Company
 Robert M. Smith, Du Art Film Laboratories, Inc.
 Roland J. Zavada, Eastman Kodak Company

The 12-man delegation was able to cover effectively the activities of the six Working Groups which held meetings throughout the week, assuring that the U.S.A. position was well represented on all questions.

Currently, the Technical Committee works through six Preparatory Working Groups which do hold additional meetings during the interim periods between plenary meetings. The designated U.S.A. Specialists to the groups are:

Working Group 1, Raw Stock, Dimensioning and Labelling

Convenor: France

U.S.A. Specialist: E. V. Knutsen

Working Group 2, International Film Exchange, Printing and Processing

Convenor: U.S.S.R.

U.S.A. Specialists: M. G. Michelson and F. J. Scobey

Working Group 3, Sound Recording and Reproduction

Convenor: United Kingdom

U.S.A. Specialists: F. J. Kolb, Jr., R. C. Lovick, and I. R. Allen

Working Group 4, Projection

Convenor: (to be appointed)

U.S.A. Specialists: J. G. Baer and G. M. Berggren

Working Group 5, Spools, Shafts and Magazines

Convenor: U.S.A.

U.S.A. Specialist: D. W. McConnell

Working Group 6, Motion-Picture Films and Slides for Television

Convenor: U.S.A.

U.S.A. Specialist: R. J. Zavada

It should be noted that the U.S.A. is represented on each Working Group and carries the chairmanship of two, PWG-5 and PWG-6. Although one or two U.S.A. Specialists are listed for each group, they quite often are assisted by other specialists or the appropriate SMPTE Engineering Committee and do welcome assistance from anyone who can contribute to this international work.

With the rapidly expanding international exchange of motion-picture release prints and television programs, it is becoming increasingly important for United States industries to recognize the



Members of the Japanese Delegation: M. Masaki, N. Takahashi, Y. Yasuda, H. Teshi, and K. Ohkubo (front row, left to right); M. Hara and T. Itoh (second row, right).

need to participate in the development of international standards. In European countries, where national standards have the effect of law, much more significance is attached to this work than in the U.S.A. where standardization is of a voluntary nature. However, if we are to compete with the foreign markets, we must take advantage of voicing our views during the formulation of the standards to which we will be forced to comply.

The SMPTE joins the American National Standards Institute in thanking those organizations which realize the importance of International Standards and make it possible for a strong U.S.A. Delegation to participate and uphold our views.

Each of the 80 items on the agenda was efficiently handled and disposed of during the 15 meetings held by the six Working Groups. The success of the meeting is illustrated by the completion of eight items, which will be forwarded to the ISO Council for approval as International Standards, and the eleven items which were approved



A. Tholle and E. Rasmussen, members of the Danish Delegation, and M. Vrancken, J. J. R. Smith, A. Vekemans, and H. Janssens, members of the Belgian Delegation (left to right).

by the Technical Committee and will be circulated as Draft International Standards. The committee further agreed to undertake the development of four new items covering subjects such as:

- (a) standards for precision reels for television use;
- (b) test films for magnetic sound on release films;
- (c) measurement of signal-to-noise on photographic sound records; and
- (d) safe areas on super-8 prints.

A detailed report of the meeting, prepared by the Secretariat, is available from SMPTE Headquarters. More complete information on the activities of Technical Committee 36 may be obtained from A. E. Alden at SMPTE Headquarters.

The next meeting of Technical Committee 36 will be held in the spring of 1982 in West Berlin, Germany. It will be hosted by the Deutsches Institut für Normung (DIN), the German Standards Institute.

Standards & Recommended Practices

Approved American National Standards

On 9 August 1979 the American National Standards Institute approved three new standards: ANSI C98.18M-1979, Basic System and Transport Geometry Parameters for 1-in Type C Helical-Scan Video Tape Recording; ANSI C98.19M-1979, Dimensions and Location of Records for 1-in Type C Helical-Scan Video Tape Recording; and ANSI C98.20M-1979, Frequency Response and Reference Level of Recorders and Reproducers for Audio Records for 1-in Type C Helical-Scan Video Tape Recording. The National Academy of Television Arts and Sciences awarded the Society a plaque for outstanding achievement in engineering development "for the standards work associated with the compatible one-inch Type C videotape format."

Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Approved SMPTE Recommended Practices

Two SMPTE Recommended Practices on the 1-in Type C Format were approved by the Society's Board of Governors on 1

February 1979: RP 85-1979, Tracking-Control Record for 1-in Type C Helical-Scan Video Tape Recording; and RP 86-1979, Video Record Parameters for 1-in Type C Helical-Scan Video Tape Recording.

SMPTE Recommended Practices are available from Society Headquarters for \$1.50 each.

Proposed SMPTE Recommended Practice

A Proposed SMPTE Recommended Practice is published here for a trial period and public review: RP 98, Measurement of Screen Luminance in Theaters. The practice specifies a procedure for measuring screen luminance in theaters in order to produce good pictorial quality for the maximum number of patrons.

Comments should be addressed to Alex E. Alden, Manager of Engineering Services, at Society Headquarters prior to 1 April 1980. If no adverse criticism is received, the proposal will be submitted to the Society's Board of Governors for approval. — *Alex E. Alden, Manager of Engineering Services*