An Engineering Perspective

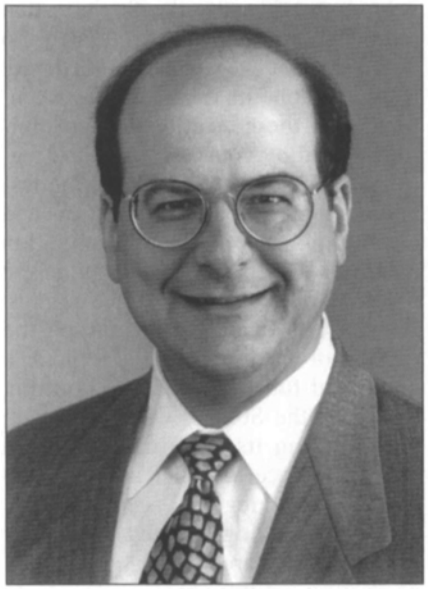
Convergence or collision? Everywhere you looked in 1996, the worlds of computing, data communications, and entertainment were coming ever closer, but it remains unclear whether we will see some celestial-scale harmonic convergence or a titanic collision as these three disparate worlds, each with its own standards and operating practices, attempt to engulf each other.

The Society has taken a leadership role in reaching out to standards organizations in these other industries. We now have formal liaison with subgroups of X3, the computer standards branch of ANSI, and T1, its telecommunications branch. (We, of course, are the ANSI member body responsible for television and motion pictures.) We have also established joint Task Forces with the Radio and Television News Directors Association (yes, they too have technical committees), and we are deeply involved with the European Broadcasting Union and the Association of Radio Industries and Businesses of Japan. All of these efforts are focused on one objective: to make all three technologies work together smoothly so that the artistic community we serve can concentrate on their art.

The Society is fortunate to have the talents of the Engineering team put in place by my predecessor, Mark Richer. Led by our Engineering Directors, S. Merrill Weiss and Ioan Allen, this team encompasses nine Technology Committees and 41 subgroups. Their work is carried out by hundreds of dedicated volunteers, enabled by the companies and organizations that support them.

During 1996, 10 new ANSI/SMPTE standards were approved and 30 were revised. The new ANSI/SMPTE standards are:

- ANSI/SMPTE 224M-1996, Television Digital Component Recording — 19-mm Type D-1 — Tape Record
- ANSI/SMPTE 225M-1996, Television Digital Component Recording — 19-mm Type D-1 — Magnetic Tape
- ANSI/SMPTE 226M-1996, Television Digital Recording — 19-mm Tape Cassettes



William C. Miller

- ANSI/SMPTE 227M-1996, Television Digital Component Recording — 19-mm Type D-1 — Helical Data and Control Records
- ANSI/SMPTE 228M-1996, Television Digital Component Recording — 19-mm Type D-1 — Time and Control Code and Cue Records
- ANSI/SMPTE 277M-1996, Television Digital Recording — 19-mm Type D-6 — Helical Data, Longitudinal Index, Cue and Control Records
- ANSI/SMPTE 278M-1996, Television Digital Recording — 19-mm Type D-6 — Content of Helical Data and Time and Control Code Records
- ANSI/SMPTE 279M-1996, Television Digital Recording — 1/2-in Type D-5 Component Format — 525/60 and 625/50
- ANSI/SMPTE 291M-1996, Television — Ancillary Data Packet and Space Formatting
- ANSI/SMPTE 292M-1996, Television — Bit-Serial Digital Interface for High-Definition Television Systems

In addition, SMPTE approved four new Recommended Practices and revised three more. The new Recommended Practices are:

- RP 188-1996, Transmission of Time Code and Control Code in the Ancillary Data Space of a Digital Television Data Stream
- RP 189-1996, Organization of DPX Files on TAR Tapes
- RP 190-1996, Care and Preservation of Audio Magnetic Recordings
- RP 191-1996, Routing Switcher Type-Specific Messages for Remote Control of Broadcast Equipment

In addition to this, work was completed on virtually all of the production formats for the ATSC advanced television (ATV) standards. Another significant milestone was the completion of work on Universal Labels, a standard for easily identifying data types in packetized streams.

SMPTE's engineering activities are open to all who express a significant interest in their work. To open up the documentation process to a wider audience, the Engineering Department has substantially enlarged its presence on SMPTE's Web site (http://www.smpte.org), where you will find a listing of our entire Engineering Committee structure, meeting calendars, meeting locations (including hotel arrangements), Technology Committee meeting agendas, and current status reports. There is also a list of ballots currently open. I encourage you to browse through these and to participate in those activities that you find of interest.

Engineering documents, once completed, serve no purpose if they are not used. To make our documents more available, we have begun publishing collections of them, with additional tutorial material where appropriate. In April, we released a collection of HDTV standards, which has become a bestseller by SMPTE standards. In October we published a set of film standards for which we have equally high hopes. Still to come are compendiums of digital control documents and monitoring and diagnostics standards.

A commitment has been made to releasing our engineering documents on CD-ROM. This should reduce our costs of publishing and mailing and will also allow us to cross-reference related standards. We are exploring methods to reduce the frequency of reissue of these discs by making new and updated documents available to subscribers on the Internet. A switch to digital distribution is expected by January 1998.

The Society is about to embark on a significant new activity, that of registrar for the program identifiers called for in the ATSC television standards. SMPTE President Stan Baron described these in his message in the August 1996 *Journal*. A committee headed by our Engineering Director for Television, S. Merrill Weiss, has been busy setting up the administrative structure under which this registration authority will operate. This is an extremely ambitious undertaking, as the ATSC standard that defines the program identifiers provides for more than one trillion unique identifiers, which are expected to last for more than 150 years.

As I write this, I am completing six months in this office. I am deeply grateful to the Board of Governors of the Society for their confidence in me, and to my predecessor, Mark Richer, for assembling an exceptional engineering team. I am also indebted to the Headquarters Engineering staff, led by Director of Engineering Carl Girod and Staff Engineer Mark Hyman, for their support. We have an ambitious agenda for 1997 as we try to make convergence of collision, and with their efforts, and those of the hundreds of volunteers who give unstintingly of their time, I am confident that we can accomplish what we have set out to do.

William C. Miller
SMPTE Engineering Vice-President

Motion Pictures

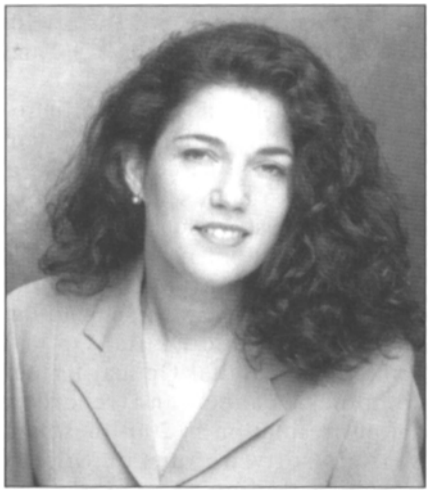
With an estimated 70% of all film color negative going directly to telecine, 1996 was the year that recognized the importance of video dailies and the cinematographer's need to better communicate with his or her video post-production and computer graphics counterparts.

New York's venerable Guffanti Film Labs, opened by Paul Guffanti, Sr., in 1929, closed its doors in September 1996. But other labs were acquired by video post-production facilities. Commonwealth Film Labs in Richmond, Va., was bought by Henninger Video of Arlington in January 1995, and Detroit's Filmcraft Lab was bought by Grace & Wild, Inc., a Michigan video post-production house, in October 1995.

Video Post and Transfer in Dallas, Tex., opened its own film lab in May 1996, offering 16mm and 35mm color negative processing. In June, Miami's Continental Film Laboratories opened a new branch in Orlando, Fla., for 16mm and 35mm color negative processing and video dailies to service the growing local needs of studio and independent production.

With negative cleanliness a prime concern, Lipsner-Smith introduced the Excel 1100 and the compact Excel 900 nonimmersion motion picture film cleaning machines, both featuring dry particle transfer rollers and rotary buffers wetted with isopropanol instead of the now-banned film cleaning solvent trichloroethane.

Several companies proposed systems to enable the telecine colorist to



Linda Young

convey color and density information to the cinematographer. The Gamma and Density Co. introduced the Thorough Control System (TCS), featuring a unique cinematographer's chip chart that, upon transfer, produces a seven-step gray scale to match against defined IRE levels on a waveform monitor. The result is a transfer gamma of 1. Other color and tonal scales on the chart provide additional analysis of film latitude and contrast. TCS requires the use of its own Tele-Cine Chart set-up film loops, available for every negative, intermediate, and positive stock.

Because of TCS's controlled gamma of 1, a ratio of 1:2 is established between standard Bell & Howell printer points and IRE units. By matching the filmed cinematographer's chart at the head of every take to the Tele-Cine control loop, overall negative density in "printer points" of under- or over-exposure can be estimated and listed like a lab timing report.

Eastman Kodak, Rank Cintel, and Aaton introduced evaluation systems based on Kodak's enhanced 18% Gray Card Plus for the cinematographer. Kodak's system comprises the Kodak Cinematographer's Tool Kit and the Kodak Telecine Tool Kit. The Cinematographer's Tool Kit includes a Gray Card Plus, Telecine Exposure Calibration (TEC) films, Cinematographer's EV Software, and a Cinematographer's EV Scale. The Telecine Tool Kit includes both the TEC films and an improved Telecine Analysis Film (TAF).

Having calibrated the telecine with TEC and a waveform monitor, the colorist reads the red, green, and blue levels of the Gray Card Plus at the head of each scene and matches them against a Kodak look-up table. The results are red, green, and blue "transfer points," defined by Kodak as equivalents of lab printer points. The Cinematographer's EV Software and EV Scale, a slide-rule version of the EV Software, provide an on-location method of spot-metering and measuring available film latitude, given the characteristics of the telecine involved.

Rank Cintel's TKG system is a hardware solution based on Kodak's TEC and TAF set-up films. For the gray area at the head of each take, TKG automatically samples output