

An Engineering Perspective

The digital evolution continued in 1995. Certainly some would refer to it as a *revolution*, but for SMPTE it is an *evolution* that has been in progress for over a decade. This past year, however, was one of remarkable change for our industry: digital direct broadcast satellite (DBS) services grew at record rates for a consumer product introduction; the U.S. FCC Advisory Committee on Advanced Television Service completed its eight-year effort with the recommendation of the Grand Alliance Advanced Television (ATV) system; and the detailed ATV standard was documented by the Advanced Television Systems Committee (ATSC). As the Chairman of the ATSC T3 Committee, SMPTE President Stanley Baron has played a lead role in this historic activity.

The cable television industry is now poised for a massive rollout of digital technology, and the phenomenal growth of the Internet is changing the way information and entertainment is delivered to the public.

1995 was a successful year for SMPTE Engineering activities. The Society was fortunate to have Ken Davies, David Fibush, and Rami Mina lead its efforts for the past four years. These efforts are comprised of ten Technology Committees, which are made up of approximately 60 Working Groups and Study Groups. The engines behind each of these Committees, Working Groups, and Study Groups are the dedicated individuals, companies, and organizations that support them.

During 1995 6 new ANSI/SMPTE Standards were approved and 23 ANSI/SMPTE Standards were revised. The new ANSI/SMPTE standards are:

- ANSI/SMPTE 240M-1995, Television — Signal Parameters — 1125-Line High-Definition Production Systems
- ANSI/SMPTE 262M-1995, Television, Audio and Film — Binary Groups of Time and Control Codes — Storage and Transmission of Data
- ANSI/SMPTE 273M-1995, Television — Status Monitoring and



Mark S. Richer

Diagnostics Protocol

- ANSI/SMPTE 274M-1995, Television — 1920 x 1080 Scanning and Interface
 - ANSI/SMPTE 275M, Television and Audio Equipment — ESlan-1 Remote Control System
 - ANSI/SMPTE 276M-1995, Television — Transmission of AES/EBU Digital Audio Signals Over Coaxial Cable
- In addition, SMPTE approved ten new Recommended Practices:
- RP 157-1995, Key Signals
 - RP 166-1995, Critical Viewing Conditions for Evaluation of Color Television Pictures
 - RP 167-1995, Alignment of NTSC Color Picture Monitors
 - RP 169-1995, Television Audio and Film Time and Control Code — Auxiliary Time Address Data in Binary Groups — Dialect Specification of Directory Index Locations
 - RP 182-1995, List of Virtual Machine Numbers for ESbus and ESlan Systems
 - RP 183-1995, Monitoring and Diagnostics Processors
 - RP 184-1995, Measurement of Jitter in Bit-Serial Digital Interfaces
 - RP 185-1995, Classification of Projection Depth of Focus
 - RP 186-1995, Video Index Information Coding for 525- and 625-Line Television Systems

- RP 187-1995, Center, Aspect Ratio and Blanking of Video Images

This work includes such landmark accomplishments as completion of work on the D-5 (SMPTE 279M) and D-6 (SMPTE 277M and 278M) recording formats and the bit-serial digital interface for high-definition television systems (SMPTE 292M). Substantial work was also completed on video index and the 720 x 1280 HDTV video format.

For SMPTE to remain effective in its role as a standards organization, the Engineering structure must be as dynamic as the technology that we address. As we begin 1996, several changes in structure have positioned us to aggressively achieve our goals:

- In recognition of the importance of packet and compressed video, a new technology committee was formed. The new Packetized Television Technology Committee includes the existing Working Groups on Headers and Descriptors, Switching and Synchronization, TV Compression Systems, Packetized TV Interconnections and Video Index. The Committee is chaired by David Fibush, Tektronix.

- The Interactive Multimedia Association (IMA) and SMPTE formed a joint working group on multimedia disciplines. This working group has already developed a list of potential work areas, and at its last meeting, the SMPTE Board of Governors approved a proposal to rename the existing Hybrid Technology Committee, which is now known as the Committee on Multimedia. In addition to the existing working groups of the Hybrid Technology Committee, this new committee will form a Working Group on Content Formatting and Authoring and a Working Group on Captioning and Subtitles. The Committee on Multimedia will be chaired by Gavin Schutz, Four Media Co.

- Another SMPTE response to the convergence of technologies is the consolidation of work in the area of audio. The existing Committee on Audio Recording and Reproduction Technology, which has traditionally limited itself to audio issues related to

film, will expand its scope to include audio aspects of television. Ron Uhlig, Eastman Kodak Co., will continue to chair this committee.

Cooperative efforts with other standards organizations such as ANSI, ATSC, EBU, and the ITU continue to be critical to the success of SMPTE engineering efforts.

As I start my term as Engineering

Vice-President, I am extremely optimistic about the future engineering efforts of the Society. I am always impressed by the energy, talent, and commitment of those individuals who support the engineering efforts of SMPTE. With the leadership of Ioan Allen as Engineering Director-Motion Pictures and S. Merrill Weiss as Engineering Director-Television, as

well as the continuing support of SMPTE Director of Engineering Carl Girod and SMPTE Staff Engineer Mark Hyman, I am confident that the 80th anniversary year of SMPTE will be one of great success.

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Motion Pictures

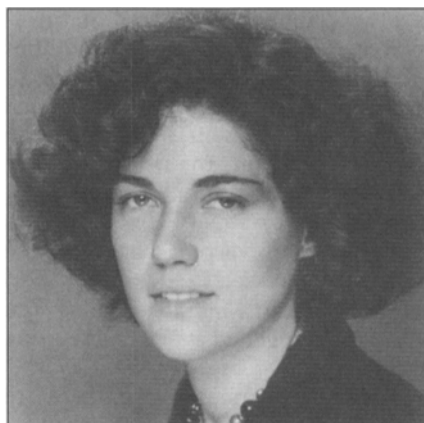
There was a wide range of advancements in film-related technologies in 1995, some reflecting the impact of computers directly, such as visual effects, remote camera control, non-linear editing and others indirectly, such as computer-aided lens design.

1995 saw the release of *Wings of Courage*, directed by Academy Award-winner Jean-Jacques Annaud, the first dramatic film shot in Imax 3D and featuring Imax's new "3-D sound" system, the Personal Sound Environment (PSE).

To create 3-D, paired Imax 3D cameras were synchronized to expose dual horizontal frames of 15-perf 65mm negative at 24 frames/sec, with lenses spaced apart to simulate in 3-D what the viewer's eyes would see from the same vantage point. Some scenes in *Wings of Courage* were filmed with a newly developed Imax 3D camera containing two camera movements in a single housing.

Wings of Courage premiered in April at the Sony Imax Theater in New York, itself a groundbreaker when opened in November 1994. Its screen measures 80 feet high and 100 feet wide and is the world's largest showcase of Imax's dual-projector 3-D technology.

Wings of Courage is also the first in the world to feature Imax's PSE system, incorporated into Imax's lightweight, cordless 3-D headsets. The headsets — with left-eye and right-eye LCD lenses synchronized to projection by infrared signals to act as alternating shutters to enable the stereoscopic effect — also contain miniature personal speakers which move sound from front to side to



Linda Young

back. The 6-channel PSE soundtrack originates from a CD player slaved to projection.

Super 16, a popular format in Europe, has gained more currency in the U.S. with the prospect of widescreen TV. For the first time, prime lenses designed specifically for Super 16mm were introduced in 1995 by four different manufacturers. Optex introduced focal lengths of 4mm, 5.5mm and 8mm. Century Precision Optics debuted a 6mm T1.9; Kinoptik offered a new 9mm, T1.7. Optica of St. Petersburg, Russia, introduced the Optar Illumina Super 16mm Series: 8mm, 9.5mm, 12mm, 16mm, 25mm, and 50mm primes — all T1.3. Panavision modified two Canon zooms for Super 16mm.

Three companies — Century Precision Optics, Optex, and Innovision — introduced new periscopes for 35mm. Although this is not a new technology, it is notable that there is new demand by cinematographers to shoot small objects ultra-close for a

different perspective. Panavision introduced the periscope-like Panavision/Frazier Lens System, which stands out for having a depth of field from a magnification of 1:1 to infinity and a "swivel tip" to enable shooting from awkward angles. An internal element linked to an external gear knob permits rotation of the image around its optical axis a full 360° without rotating either camera or lens, enabling instant dynamic Dutch tilts. Special lenses required by the system include a range of seven interchangeable primes, from 12mm through 35mm, including two for perspective control/slant focus and a third for perspective control only.

A new negative film stock, Eastman EXR Primetime 640T teleproduction film, is the first designed specifically for film-to-tape transfer. Its lower contrast is optimized for the transfer characteristics of telecines. Its recommended E.I. of 640 can require less equipment for lighting or permit greater flexibility in available light situations.

Kodak also introduced a new sound recording film, 5378/7378, with a newly added green sensitivity to complement its blue sensitivity, making it faster and endowing it with more exposure latitude to better accommodate digital sound. Its D-min is less sensitive to process variations and its D-max has been raised for higher contrast. It also incorporates the lubricant and scratch resistant coating that Kodak introduced for black-and-white camera negative films in 1994, which is now incorporated into all black-and-white laboratory films.

Fuji added Color Intermediate Film