

Report on the Tenth Annual SMPTE Winter Television Conference *Detroit, 23-24 January 1976*

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On January 23 and 24, more than 700 broadcasters from all over the country braved a snowstorm and subfreezing temperatures to hear a full schedule of papers on Television Newsgathering and Digital Television — subjects that are beginning to radically change television systems. In addition to these four daytime sessions, there were panel discussions held on Friday evening on Electronic Newsgathering and Fundamentals of Digital Television.

Considerable credit for the success of this meeting is due the Conference Committees listed below and many local companies who contributed their facilities and the time of their personnel.

Conference Chairman: Leonard W. Eden

Program Chairman: Frederick M. Remley, Jr.

Vice-President for Television Affairs: Joseph A. Flaherty

Exhibit Chairman: John F. X. Browne, Jr.

Publicity and Public Relations: John Zeman and Mike Dyer

Projection: Ted Horn

TELEVISION NEWSGATHERING

On Friday morning, Joseph A. Flaherty, SMPTE Vice-President for Television Affairs, welcomed those attending the Conference. The morning session chaired by Warren Happel of Browne Associates concentrated on television newsgathering.

Raymond J. Smith, of WKYC-TV, Cleveland, Ohio, described his station's experience with electronic newsgathering (ENG) and gave some helpful advice to those entering the field. He felt that ENG equipment could not replace news film systems entirely until the field equipment had been made more compact to the point where one man could carry both camera and recorder in comfort. He emphasized, however, that many news stories have been covered in Cleveland which could not have been accomplished on film.

We are indebted to three of the Winter TV Conference participants who agreed to collaborate on this report:

Rupert L. Stow, CBS Television Network, 51 W. 52 St., New York, NY 10019.

Henry R. Owen, WJBK-TV, 2 Storer Place, Southfield, MI 48075.

Abraham A. Goldberg, CBS Technology Center, 227 High Ridge Road, Stamford, CT 06905.

Hugo Bondy of WAGA-TV in Atlanta, Georgia, presented some interesting statistics on the achievements at his station with his first ENG camera and editing equipment. He reported remarkable success with his microwave equipment noting that he was able to achieve 100% effective reception from the downtown area at his studio tower located 5½ miles away.

Productivity has been increased at WAGA-TV to 5 stories a day gathered by one camera crew. The single ENG camera replaced 37,000 ft of film used in the previous year, while at the same time, increasing the overall productivity of stories by 18%. No change in total personnel has been made. In review, Mr. Bondy felt that ENG would never replace film completely until the compactness and weight of ENG equipment can match that of a CP-16 film camera.

A number of papers were presented describing new cameras, all of which were designed to meet the requirements of size and weight evidenced in the opening papers. Renville H. McMann, Jr., of Thomson-CSF Laboratories, described the Microcam. The camera-head, with viewfinder and lens, weighs a total of 8 lb while the electronics pack, which may be worn on a belt or attached to the camerahead, weighs 3 lb. A significant advance is the reduction of total power consumption requirements to approximately 23 W, making it possible to provide a 1-h battery pack weighing only 2½ lb. Many of the features of the Microcam match in sophistication and performance a full broadcast quality camera.

Nick H. Nishi, of Ikegami electronics (U.S.A.), Inc., presented a paper describing the performance and design features of the Ikegami cameras, HL-33 and HL-35, which have provided the backbone of so many ENG operations in the United States.

The special features of an updated portable 2-in quadruplex videotape recorder, designed by Ampex to work with their new BCC-2 handheld camera, was presented by William Carpenter. In the design of the BCC-2 camera, the relay lenses used for the blue and red channels illuminate only half the area of the 1-in Plumbicon® tube face, thus reducing dark current. The camerahead weighs 16½ lb while the backpack weighs 19 lb without batteries.

L. J. Bazin, J. J. Clarke and A. H. Lind of RCA, next presented a paper describing the new TK-76 portable camera for ENG. The camera is designed to accept three ⅔-in Plumbicons, has an f/1.4 prism optical system and a 1½-in viewfinder. A 12-V battery power supply is worn on a belt. The design includes the use of an LSI synchronizing signal generator and a 2-line vertical optical corrector. The total weight of the camera is expected to be under 20 lb.

The morning session concluded with a paper presented by T. Imai *et al.* on a micro-powered handheld color camera for ENG built by the Nippon Electric Company of Tokyo, Japan. The new camera is completely self-contained and weighs 14 lb, exclusive of lens and battery pack.

In the afternoon session, chaired by Mr. Rudolph Kryger of CBET-TV, Edmund DiGiulio of Cinema Products Corporation, presented a paper on the role of film and tape in a balanced television newsgathering operation. This speaker asserted that a mixed assembly of film and electronic newsgathering equipment at a station represented a sensible compromise between the high capital cost of electronic equipment and the need, on occasion, for the immediacy which only electronic newsgathering crews could provide.

Mr. DiGiulio described a new Cinema Products CP-16 reflex camera incorporating a new electronic viewfinding system which attaches to the camera. He also described a new camera stabilizing technique which is of equal value for film or electronic cameras. This device should be helpful for handheld camera operation where shooting must be effected on the move.

Peter Burgess of the Canadian Broadcasting Corporation, described some



Program Chairman Frederick Remley, Jr., Conference Chairman Len Eden, and Exhibit Chairman John F. X. Browne, Jr.



Participants in the ENG Rap Session: Charles Meyer, Ray Smith, Charles Kotcher, John Tallerico, Harry Owen, Ray Schneider, Tom Battista, Jim Kitchell, and Hugo Bondy.



Panelists at the Friday evening Digital Video Tutorial Seminar: Frank Davidoff, Leonard Golding, Charles Ginsberg, A. A. Goldberg, and Denis Connor.

experimental production use of the Canadian Domestic Satellite, ANIK. The new communications technology satellite (CTS) is expected to be valuable in electronic newsgathering. One example of its planned use is the relay of Olympic Equestrian events covered live at Bromont and sent back to the news center in Montreal for live network distribution.

David K. MacDonald, of Sony Corporation of America, presented a paper describing the new line of broadcast equipment which Sony is about to place on the market. He stated that the new portable VTR, which will replace the VO-3800, will have a better signal-to-noise ratio and better resolution. In addition to an improved servo and vertical lock system, an SMPTE address track will be provided in addition to the two audio tracks. The unit will be battery operated and provide full-color playback.

The new editing recorder will employ an SMPTE address track combined with memory logic in the mode switch, making it readily adaptable to computer-type editing systems. This recorder will also be able to use control-track editing and will operate in both forward and reverse search modes. The new editor, based upon the original RM-400, will use control track addresses and independent remote control systems allowing machines to move in either direction, faster or slower than real time.

The Spectra-Tac, a total area-coverage communication system was described in a paper by Robert Fleissner of Motorola. The limited range of a portable two-way radio may be extended by supplementing the base station receiver with satellite receivers placed within the range of a portable unit. With a number of such satellite receivers spread around the area of operation, the signals may be received from the portable transmitter over a wide area.

Thomas Vaughan of Micro Com-

munications Inc. provided a detailed review of the various antenna systems with multiple polarization used in electronic newsgathering. A new approach in multiple polarization, controlled from the transmitter rather than the receiver, was described. A detailed comparison of the gains achieved by the various systems available and the costs of each was presented.

A very useful tutorial paper describing the microwave concepts used in electronic newsgathering was presented by John Fielek of Microwave Associates.

Two papers on editing were presented: the first dealt with electronic editing at NBC and was presented by Robert Mausler who described the special equipment developed by NBC. Of special interest was the improvement achieved in the color picture quality from a Sony portable VTR by a tricolor VTR system which provides full-fidelity NTSC color pictures.

In the last paper of the session. Dennis Christensen of Convergence Corporation described his company's editing equipment. It is believed to be the first editing machine with a simple joystick control of both tape direction and speed, at up to three times real-time speed. — *Rupert L. Stow*

ELECTRONIC NEWSGATHERING

On Friday evening, a Panel Discussion on Electronic Newsgathering was held. The following people comprised the panel:

Henry R. Owen, Chief Engineer, WJBK-TV, *Chairman*; Hugo Bondy, Chief Engineer, WAGA-TV; Raymond J. Smith, Manager, Technical Operations, WKYC-TV; James Kitchell, General Manager, NBC News Services; Thomas Battista, Executive Vice-President, CBS-TV, Stations Division; Raymond D. Schneider, Director of Special Projects, Engineering and Development, CBS Television Network; John Tallerico, Director of News, WILX-TV; Charles Kotcher, Chief Engineer,

WXYZ-TV; Charles Meyer, Supervisor of Engineering, WBBM-TV.

The audience of approximately 250 was divided roughly 70/30 between engineering and news people. Much of the questioning involved cost of operation of electronic newsgathering as compared to the cost of shooting 16mm reversal film. Understandably, many of the questions asked involved the "direction" that electronic news is taking and what the "ultimate system" will consist of and what it will do. There appeared to be unanimity among both the panel members and the audience on the need for further miniaturization and portability of equipment.

A number of questions concerned the need for an improvement in overall communications between the newsgatherers and those people making the editorial decisions. One important point brought out during the session was that there is still a situation existing where the technology of electronic newsgathering has improved at a greater rate than anticipated by news people, resulting in a situation where it is not being used to its fullest capability. While there were occasionally differing opinions among the various members of the panel, there was complete agreement on the idea that reliability is the most important single factor in the new equipment.

Additional topics discussed were archival problems, microwave frequency allocations, cost of equipment, new developments (both in equipment and applications), maintenance, product support, all news television stations, reliability of equipment, design of electronic newsgathering vans, labor relations considerations, retraining of personnel and composition of the ENG crews. — *Henry R. Owen*

DIGITAL TELEVISION

A tutorial presentation and panel discussion on Digital Television was held Friday evening; Frank Davidoff of CBS-TV Network and Leonard Gold-

ing of Digital Communications Corp. were Co-Chairmen. Both gave tutorial talks on the fundamentals of digital television to prepare the audience for the next day's papers sessions. A panel consisting of Davidoff, Golding, Charles Ginsburg of Ampex Corp., Abraham Goldberg of CBS Technology Center, and Denis Connor of Bell Northern Research answered questions from the floor.

Saturday morning was taken up with five tutorial papers sponsored by the SMPTE Digital Television Study Group. Its Chairman, Charles Ginsburg, described the Study Group and its accomplishments. The primary purpose of the Study Group is to examine how best to apply digital technology to television systems, identify those areas ripe for standardizing, and to communicate this to the profession; however, the Study Group does not set standards per se. Richard Painter of H. M. Dyer Electronics was the session's Vice-Chairman.

Abraham Goldberg's tutorial paper "PCM NTSC TV Characteristics" covered the fundamentals of PCM NTSC TV signals, examined the merits of the encoding frequency being three or four times the color subcarrier frequency, and discussed the needs for precisely specifying the sampling phases.

"Quality Assessment of Digital TV Signals," by Leonard Golding examined procedures for assessment of the quality of digital television signals. The present methods for measuring analog TV circuit performance for differential gain, phase, and random noise will not suffice for digital-television circuits. These have unique aspects such as quantizing errors and differing coding schemes that make the picture quality source-dependent. A number of possible testing techniques were offered.

There has been a great deal of conjecture about the effect on picture quality after the digital-television signal passed through a number of codecs in tandem. Charles Ginsburg, in his paper "Effects of Multiple Codecs on Television Signals," dispelled these concerns by showing that the pictures were still reasonably good after passing through seven codecs in series.

Denis Connor, in his tutorial paper "Bit-Rate-Reduced Digital Video," reviewed the prior work on this subject and concluded that practical systems can be built to carry NTSC color TV signals on 42.8 Mbits/s. This is half the bit rate of 86Mbit/s required for PCM encoded at 8 bits and 10.7 MHz.

The Saturday afternoon Digital Video session had as its Chairman John Browne, Jr., of Browne Associates and

its Vice-Chairman was Ted Horn of Chrysler Corp. A total of seven papers on applied digital-television technology were presented.

Toshinori Miura of NHK offered "A Study on 'Total Digitalization' of NHK Broadcasting Center Facilities." Existing analog VTRs generate a vast amount of tape, and it is hoped that a digital VTR will lead to a higher density recording, but this appears to be years in the future. TV cameras could profit from digital-television circuits, but this is also years away. Digitizing the studio complex is technically feasible now, although not cost effective until digital VTRs and cameras are introduced. Meanwhile, digital television "boxes" such as standards converters, synchronizers, time-base correctors, and character generators are already in use. Miura suggests that the TV plant and the transmission networks will use different digital signals because of differing requirements.

William Connolly of CBS TV Network and Joachim Diermann of Ampex co-authored the paper "Digital Techniques for an Electronic Still Store." It describes a means to store 1600 NTSC color TV still pictures on two rotating magnetic disc packs similar to those used in the computer industry. Each picture is stored as one frame of DTV, PCM-encoded 8 bits at 10.7 MHz PALE. Any picture can be accessed within 100 ms. Keyboards permit searching, retrieving, and assembling a desired sequence of still pictures.

Problems of digital-television were covered in the paper "Differential Phase and Gain Measurements in Digitized Video Signals" by Michael Felix of Ampex Corp. He reviewed the difficulty of measuring DG and DP through one or more codecs due to the novel quantizing errors in PCM signals. Felix proposed that doubling the subcarrier amplitude of the test waveform to 40 IRE units and using a random phase subcarrier would improve the situation.

Synchronizers to lock remote TV signals to local sync are among the more unique devices employing digital-television techniques. J. Brian Matley of Micro-Consultants, Inc. presented the paper "A Digital Frame-store Synchronizer" describing the Quantel DFS 300 synchronizer. It stores a full TV frame in a compact package only 8.75 by 19 in and consumes under 250 VA. The DFS 3000 can also be used as a time-base corrector for VTRs and for obtaining a 4:1 area reduction.

Another paper on synchronizers was "Television Frame Synchronizers and Their Application" by M. Inaba, A. Sugimoto and M. Shimizu of Nippon

Electric Co., and Y. Itoh and Y. Inoue of Tokyo Broadcasting System. The NEC FS-12 digital synchronizer was described. It consists of a digital memory holding one TV field plus a second vertical blanking interval to reconstruct a full NTSC signal. The FS-12 has a 4:1 area reduction capability. Extra circuits are available for a time base correcting function.

T. Imai, S. Motohashi, M. Inaba, K. Yuasa, and M. Sonoda of Nippon Electric Co., in their paper "Color Freeze Picture Transmissions System," described a means to send a color TV still picture through narrowband telephone lines. Differential PCM is employed to compress each sample to 4 bits and 750 kbits per field are stored in a digital memory. This is sent via modems at 4.8 kbit/s or 9.6 kbit/s, depending on the telephone line. Successful transmissions were made through terrestrial lines 6000 miles long and via a satellite as well.

The final paper "Digital Time-Base Corrector for Video Signal Processing" by David Acker of Microtime, Inc., described the Microtime 640 Time-Base Corrector. It has the ability to correct displacement errors of $\pm 1/2$ h. The PCM signal format is 8 bit encoding at 10.7 MHz. Capability is provided to correct either direct or heterodyned color TV signals. — *A. A. Goldberg*

EQUIPMENT EXHIBIT

The Winter Television Conference boasted a 23-booth Equipment Exhibit. This exhibit was unique because the only equipment allowed was either Electronic Newsgathering or Digital Video Equipment, in order that the exhibit be coordinated with the technical sessions. This idea proved to be very successful with exhibitors and with Conference attendees alike. The list of exhibitors follows:

Akai America, Ltd.
Ampex Corp.
Asaca Corp. of America
Cinema Products Corp.
Cine 60
CMX Systems
Consolidated Video Systems
Convergence Corp.
Datatron, Inc.
H.M. Dyer Electronics
Eastman Kodak
Eigen Video
General Television Network
Hitachi Shibaden Corp. of America
Ikegami Electronics, Inc.
JVC Industries, Inc.
Micro Consultants, Inc.
Microwave Associates, Inc.
Motorola, Inc.
Nurad, Inc.
RCA
Sony Corp. of America
Television Research International