

SMPTE Participates in HDTV Live Satellite Transmission

During the 131st SMPTE Technical Conference and Equipment Exhibit held in Los Angeles last October, history was made via the first transmission of a live all-digital HDTV signal sent by satellite from Japan to the U.S.

SMPTE conference attendees were able to view a live presentation given by Tsuguyoshi Itoh, executive director of the R&D department for NTV Corp., EIZO Center. Airing from the parking lot of the KDD (International Telecommunications Co. of Japan) building in Tokyo, Itoh spoke about the value of HDTV in movie making and demonstrated the technology's potential through film clips of colorful productions performed by the Chinese Peking Opera Company as well as some theatrical releases. The entire broadcast ran about 15 minutes.

During the transmission, 131st Conference Program Chairman John Baptista, Consolidated Film Industries, and Itoh communicated via a telephone connection and exchanged greetings and well wishes. Baptista thanked Itoh and the MPTESJ for helping the Society to commemorate the 100th anniversary of film and the 50th anniversary of television.

According to Larry Thorpe, Sony, who helped to coordinate the event, the digital HDTV link was based on a system developed by KDD. "The system was comprised of a digital codec system, employing a sophisticated compression algorithm to reduce the almost 1.2 Gbit/sec data rate of the 1125/60 video studio origination signal down to approximately 120 Mbits/sec. The codec system selected for the transmission was the Canon DITS-120. The code and decode are structured as one integral unit which allows bidirectional communication. However, for this event only one-way communication, from Tokyo to Los Angeles, was implemented."

The digitally encoded HDTV video and audio were fed to the KDD-built modem, housed in a mobile earth station in Tokyo. An upconverter followed the digital modulation system, and this signal was fed to a 2.4-m E-1 antenna mounted on the mobile van. The signal was directed at the Intel-



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Sat Satellite at 174° East longitude. "The transponder used had an effective RF bandwidth of 72 MHz which was necessary to handle the still relatively high data rate," Thorpe said.

Keystone Wold International Communications was responsible for creating the receive station. "We established an earth station at the conference by providing a 7-m antenna and LNA on a Ku-band frequency on a 72-MHz bandwidth international transponder on Intelsat, which is an international satellite," said Gene Deck, Keystone Wold.

The downconverted signal was fed to the KDD demodulator system housed in the auditorium where the transmission was displayed. The demodulated digital HDTV/audio was fed to an adjacent Canon codec, identical to the unit in Tokyo. The DITS-120 decoded the HDTV video and audio and restructured the 1125/60 video components' Y , P_b , and P_r signals and two channels of audio. The video signals were then fed via wideband Grass Valley distribution/equalizing amplifiers to ten HDTV monitors (four 38-in. and six 28-in.) which were distributed throughout the auditorium.

According to eyewitness reports in

Los Angeles, the broadcast was flawless. "There were no reports of artifacts within the transmission," Deck said. "There was no distortion and the results were great."

He added that difficulties had to be overcome to provide the HDTV broadcast. "The international satellite was positioned in inclined orbit. This means it is unstable and that the elevation is low. To correct this we had to track the satellite to get the quality up to where we wanted it. We had to get the SNR to a level where it was acceptable to receive 120 Mbits/sec at a bit error rate that had no distortion. It took us about a day to iron out these problems, but the result of the broadcast proved that it was time well spent."

Masami Hirayama of Videocom International (in Japan), the late Dan Brewer, Paramount, who served as the conference's Topic Chairman/Television, Ken Kishimoto, Fuji Photo Film U.S.A., Inc., and Nobatuda Yagi, president of the MPTESJ and a professor of cinematography and sound technology, Nihon University, also played key roles in coordinating this futuristic event.

—Carol King