

EBU Village at Montreux '97

The 20th edition of the *International Television Symposium* took place in Montreux, Switzerland, between 12 and 17 June. There were more than 40 sessions under nine different categories, and eight workshops. Running in parallel with the Symposium was the usual exhibition of technical equipment, this year featuring more than 250 exhibitors who are leading the way towards "the all-digital world of television".

Within the Exhibition area, there were several display stands run by EBU Members, under the collective title of *EBU Village*. This, in fact, was the third EBU Village at Montreux, following on from its successes at the 1993 and 1995 editions of the ITVS. This year, there were seven display stands in the EBU Village, offering a good overview of the type of technical research that is currently being carried out by prominent EBU Members, including those studies that are taking place in the framework of various European collaborative projects.

The **ACTS INTERACT** consortium was established to develop "interaction channel signalling" for the digital television era. Several broadcasters are already operating commercial services which allow their viewers to participate in, or interact with the content of, their programmes. Currently, the two-way "interaction channel" between the broadcaster and the viewer is a normal telephone line, but this is expensive and inconvenient. It would be far more attractive if the interaction could take place through the same medium that is used to deliver the broadcast.

Working closely with the DVB consortium, INTERACT initially developed a list of 26 commercial requirements for interactive services, covering such complex issues as transport signal protocols, flexibility to handle different types of services, and compatibility between different delivery media. It then went on to design interaction systems for several broadcast media (including cable and terrestrial), in order to meet these requirements.

The development of an interaction channel for terrestrial broadcasting is extremely challenging because of the vagaries of UHF propagation. To achieve this end, the INTERACT system employs a rugged transmission format for the return path, based on the Synchronous Frequency Division Multiplex Access (SFDMA) principle. This is a multi-carrier signal which is similar to that used in digital terrestrial broadcasting. A prototype of the SFDMA system was shown publicly for the first time at the EBU Village in Montreux.

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Looking to the future, INTERACT plans to explore the performance of its systems in extensive trials in France and the UK. The consortium is also currently assessing the potential of the European cordless telephony system (DECT) as a medium for interaction channels.

The primary objective of the **ACTS SAMBA** (System for Advanced Mobile Broadband Applications) project is to develop a broadband cellular radio network called Mobile Broadband System (MBS). This will allow the mobile user to gain access to broadband fully-interactive multimedia services. Among other things, the consortium plans to:

- demonstrate mobile applications at bit-rates of up to 34 Mbit/s;
- design and realize transparent ATM connections to mobile users via radio transmissions;
- develop a portable millimetre-wave transceiver, including the antennas, for use in the 40 GHz band.

The current work of SAMBA focuses on a trial platform which comprises a digital cellular radio network of two base stations and two mobiles. One of the mobiles is mounted in a vehicle which may travel at speeds of up to 50 km/h while the other mobile is a personal portable unit. The trial configuration allows the basic system aspects to be verified, including (i) reliable transmission of ATM signals in a mobile radio environment which is suffering from noise and multipath interference, and (ii) seamless handover from one cell to the next. For these trials, two applications have been chosen: a medical application (transmission of medical images in remote emergency situations), and a wireless TV camera for news-gathering, sport and other OB purposes.

The first public demonstration of the SAMBA trial platform will be given at Expo'98 in Lisbon, Portugal.

The **ACTS VALIDATE** project aims to verify in detail the DVB-T specification for digital terrestrial broadcasting. It will provide experimental results from which the parameters needed for service planning can be derived, and will help the broadcasters to launch services and the equipment manufacturers to develop receivers.

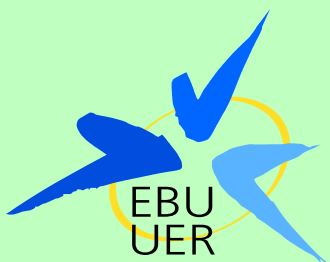
At Montreux, VALIDATE demonstrated a complete DVB-T transmission chain. The multiplex was assembled and the COFDM modulated at the TDF stand in the exhibition centre. From there, the COFDM signal was transmitted across Lake Geneva to Thollon (France) via an SHF link and broadcast from there in UHF channel 49 (698 MHz). The received signal was also rebroadcast from Clarens, near Montreux, on the same frequency. Both the broadcast signals (Thollon and Clarens) were received at the exhibition centre using a rotatable directional antenna: the signal from Clarens arrived about 1.5 μ s later than the signal from Thollon. Turning the antenna varies the ratio between the main and delayed signals that are received, and visitors to the stand were shown that DVB-T can be received even with a 0 dB echo.

The Digital Terrestrial Television Action Group (**DigiTAG**) aims to create a framework for the harmonious and market-driven introduction in Europe of digital terrestrial television services using the DVB-T standard. It complements the technical and commercial elements of the DVB consortium, bringing together the international elements of the various existing DVB projects. DigiTAG activities are co-ordinated in order to share resources and knowledge, to emphasize common aims, to gain strength and influence in negotiations, to bring economies of scale into play and to maximize the speed of introduction of DVB-T services.

DigiTAG not only maintains close synergies with cable and satellite interest groups, but also co-operates with DVB, the EU, CEPT/ERO, EACEM, the European Platform Union and various national platforms. It has four Task Forces covering Services, Equipment, Regulatory matters, and Promotion & Marketing. The consortium consists of more than 50 Broadcasters and Service Operators, Manufacturers, Network Operators and Regulatory Authorities/Administrations from 18 countries.

Issues that are considered critical by DigiTAG include the Application Programming Interface (API), the Common Interface, the Event Service Guide (ESG), interactivity, enhanced services such as 16:9 widescreen, high-quality sound, broadcast multimedia and Internet access.

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Design: Serge Boulanger (EBU)

The **IRT** has developed a few software and hardware tools to support the demonstration and evaluation of experimental services in DVB-based digital data broadcasting. A complete DVB chain – from the original data sources to a PC-based receiver – has been realized and is used to demonstrate possible data services.

On their stand in the EBU Village, the IRT demonstrated a preliminary version of an Electronic Programme Guide (EPG), fed by data which complies with the DVB-SI standard plus specific extensions. The data was transmitted in its usual DVB environment together with a variety of different video and audio streams.

Parts of this development have been funded by the European Community within the ACTS project, CINENET.

The **ITC** stand in the EBU Village featured two of their current projects:

- a digital Microwave Television Distribution System (MVDS);
- virtual television production.

MVDS has applications in remote communities where cable operators are reluctant to provide their services by traditional means, on economic grounds. The system is based on a cellular network structure where small transmitters with omni-directional or sector antennas radiate the television signals via a line-of-sight path to homes which lie within network cells having a diameter of several kilometres. In Europe, 96 overlapping, cross-polarized, transmission channels for MVDS have been allocated in the 40 GHz band. Even allowing for the restrictions imposed by frequency re-usage, the allocated spectrum can support the broadcasting of hundreds of digital services. For several years, the ITC has been conducting propagation trials in conjunction with Rutherford Appleton Labs, to understand the spectrum-planning criteria associated with MVDS. Two 50 MHz channels within the available spectrum have also been allocated to “return” signalling, making it possible to provide interactive services such as home shopping, banking and games, in the remoter corners of Europe.

The ACTS project, MIRAGE, is addressing all the issues of television virtual production for use in broadcast multimedia, interactivity and telepresence. It has the following objectives:

- to develop virtual production tools and techniques at affordable costs;
- to demonstrate hardware and software systems for use by traditional programme makers;
- to integrate production techniques, define working practices and address standardization matters.

The MIRAGE consortium, which includes the ITC, has recently developed a virtual studio which is affordable to all, not just a few select broadcasters. Using little more than a PC, the MIRAGE studio is able to achieve full broadcast quality. The system is modular, and easily tailored to a broadcaster's needs.

On the **RAI** stand, visitors could gain an insight into three current projects:

- the assessment of digital video quality at different bit-rates within a thematic “bouquet” of channels (which is being carried out in the framework of the ACTS project, TAPESTRIES);
- the accessing via satellite of video, audio and multimedia archives using the DVB-S system;
- the satellite transmission of multimedia DAB services at 2 Mbit/s.

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Of these three projects, most space was given over to the multimedia archive project. The introduction of computer technology, based on powerful multimedia database software, will significantly improve the time-consuming browsing process when searching for suitable archive material. The RAI system architecture is based on an audio-video archive to store the programme material, and a multimedia catalogue that can readily be consulted by means of Internet browsers. A powerful database search engine helps to access the wanted material by means of (i) key words, (ii) programme content identifiers, (iii) key dates (when production was completed, first transmission, etc.), (iv) author and/or programme name, (v) director's name, (vi) programme characters or (vii) places.

In the RAI archive pilot scheme, consultation of the multimedia catalogue makes use of the Fast-Internet browser system developed by Global Communication & Services GmbH. Requests to the audio-video archive are made via a terrestrial return link and the selected datagrams are sent back to the enquirer via satellite at a maximum bit-rate of 2 Mbit/s. Once the desired audio-video material has been identified and selected, it is encoded at 4 Mbit/s in the MPEG-2 MP@ML format and multiplexed with the 2 Mbit/s Fast-Internet datastream for delivery to the enquirer via satellite on a DVB-S carrier. Very high quality programme material – intended for contribution and/or post-production purposes – is encoded in the 422P@ML format and requires the use of high-capacity satellite channels. The pilot system can also provide a variety of data broadcasting services such as: distribution of large multimedia objects; distribution of electronic newspapers: HTML-based teletext magazines, and support for distance learning projects.

DVB shows digital terrestrial HDTV at Montreux '97

High Definition Television (HDTV) was the talk of the town at ITVS Montreux this year. The DVB Project Office, with the co-operation of various DVB Project members, demonstrated fully-digital terrestrial HDTV. The transmissions were shown throughout the week, both on the DVB stand in the Palais des Expositions, and in the nearby Hollywood Cinema.

A "world-first" was achieved when DVB and the US Advanced Television Systems Committee (ATSC) showed their two different digital HDTV systems "side-by-side" in the cinema, during one of the Management Forum sessions. Many people attending the Symposium saw this world-first (mistakenly) as a contest between the European and US systems for digital video broadcasting. The DVB system can hardly be thought of as European any more; the consortium now consists of 227 member organizations from more than 30 different countries world-wide.

In spite of the good-natured rivalry between them, the ATSC and DVB teams collaborated closely on setting up the demonstrations, sharing the transmitting site just outside Montreux and the fantastic HDTV projector in the cinema.

Audiences were thrilled by the cinema-quality images that were projected onto the big screen during the Management Forum session, and throughout the week in scheduled screenings that were open to members of the public. The excitement generated by HDTV is not only because of the beautiful pictures (of near film quality) that it provides, but also because of the sensational sound; it makes use of the full potential of cinema sound systems.

The transmission site for both teams was the Surval Mont-Fleuri Finishing School for Girls, situated in the hills above Montreux. Thankfully the school was deserted at the time, because its normally peaceful ambience was shattered by hordes of talented young (male) technicians, working under considerable pressure. Who knows what might have happened to this important demonstration of HDTV if there had been crowds of curious young women present, distracting the technicians!

Although HDTV also captured the hearts of visitors to the DVB stand in the exhibition centre, the minds of the more serious professionals were also very taken with the demonstrations of DVB solutions to two problems:

- Conditional Access interworking;
- interoperability between cable, satellite, terrestrial and other delivery media.

DVB showed two solutions which allow different proprietary Conditional Access (CA) systems to work together. The guiding principle here is that no viewer should need a "stack of set-top boxes" in order to receive all the Pay-TV channels of interest. The DVB *MultiCrypt* solution allows multiple Pay-TV services to be received and decoded on a single set-top box, whereas the *SimulCrypt* solution allows users with different proprietary CA systems to have access to the same broadcast.

The cornerstone of DVB's success – interoperability – was also a focal point for visitors. Although you probably won't find "interoperability" in the Oxford English dictionary (yet!), it is a word which has two meanings for DVB. Firstly, it means having the maximum number of elements in common between the different delivery media, e.g. satellite, cable and terrestrial. Secondly, it means ensuring that equipment from multiple manufacturers can work together in the same broadcast chain.

To demonstrate interoperability, a single DVB-S source was routed to a group of satellite decoders. Simultaneously, the DVB-S source signal (QPSK) was effortlessly transmodulated to DVB-C (QAM) and routed to a group of cable decoders. Both groups of decoders were from a wide variety of different manufacturers and the successful decoding of the DVB signals proved once again the fundamental advantage of the DVB family of standards.

While all this was going on, the DVB Project Office staff – Lou Dutoit, Peter McAvoock and Martin Jacklin – along with Roger Miles (EBU) had to shuttle back and forth between the DVB stand in the exhibition centre, the HDTV demonstration theatre in the Hollywood Cinema and the transmission site at the school (all the way up the mountain). Consequently, they found no time to visit the other stands in the exhibition centre. Oh well, maybe next time!

Martin Jacklin (DVB Project Office, Geneva)

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HDTV pulls in the crowds at the DVB stand.