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The new Eurovision Control Centre in Geneva

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1 Background

At the beginning of 1988, the European Broadcasting Union decided to move its Technical Centre, including the Eurovision Control Centre (EVC), from Brussels to Geneva. Shortly thereafter, I began to prepare the specification for the new Eurovision Control Centre in Geneva (EVC-G).

At this stage it was envisaged to install the new centre in the existing EBU Headquarters building in Geneva, adding another floor to provide additional office space. This solution was found to be unacceptable, and it was subsequently decided to erect a completely new building opposite the existing one. The Eurovision Control Centre is installed on the ground floor of this new building, with the layout shown in *figure 1.* Difficulties in the procurement of the ground and the granting of bulding permission caused a two-year delay, so the target date for completion slipped from mid-1991 to mid-1993.

At this point it is perhaps useful to define the basic responsibilities of the Eurovision Control Centre as follows:

- To ensure that the required network is established on time for each transmission by coordinating network switching with the National Technical Coordination Centres (CNCTs).
- To monitor the quality of the network and take corrective action when necessary.
- To record the real-time circuit utilization for cost-clearing.
- To prerecord intercontinental news items for subsequent distribution in the regular news exchanges.
- To plan transmissions at less than one hour's notice.

2 Choosing the right technology

In 1990, whilst design work on the new centre had been proceeding on the basis of conventional transmission technologies, the EBU Technical Committee decided to adopt component-digital video transmission at 34 Mbit/s on the Eurovision network, starting with the EBU-leased capacity foreseen in a Eutelsat II satellite, which replaced the EBU-leased capacity in a Eutelsat I satellite from January 1993 *(fig. 2).*

For specification, this decision was not so much a case of moving the goal-posts as changing the game from soccer to rugby, necessitating different goal-posts. The new requirement was for serial component-digital signals to be switched and monitored in addition to composite-analogue signals in PAL, SECAM and NTSC. I opted for a 270 Mbit/s serial component system to meet this new requirement.

In fact, a mixed network will exist for several years, utilizing 34 Mbit/s component-digital transmission via leased satellite circuits and composite-analogue transmission via terrestrial circuits and other satellite circuits. It is obviously unacceptable in a new installation to decode the 34 Mbit/s signal to composite-analogue video for switching purposes, because in the long term future the terrestrial circuits should also utilize 34 Mbit/s signals. Decoding/recoding component-digital/composite-analogue/component-digital for switching purposes would introduce unacceptable degradation.

An alternative approach would be to code all composite-analogue signals to 270 Mbit/s digital-component signals for switching purposes and to decode back to analogue-composite signals where necessary at the output of the switcher. This is a rather expensive solution, however. The solution adopted is to utilize a 270 Mbit/s component-digital switcher, plus a composite-analogue switcher, to feed component and composite destinations, respectively. Corresponding inputs of the two switchers carrry the same signal in digital and analogue form, respectively *(fig. 3).*

We should note that this solution would not be appropriate for the International Television Centres (ITC) operated by broadcasters connected into the Eurovision network because future international switching of

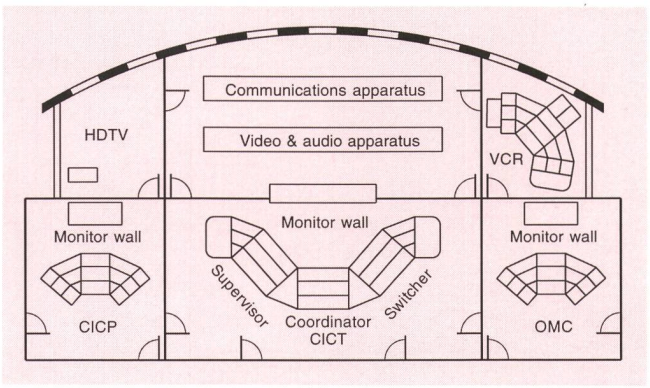
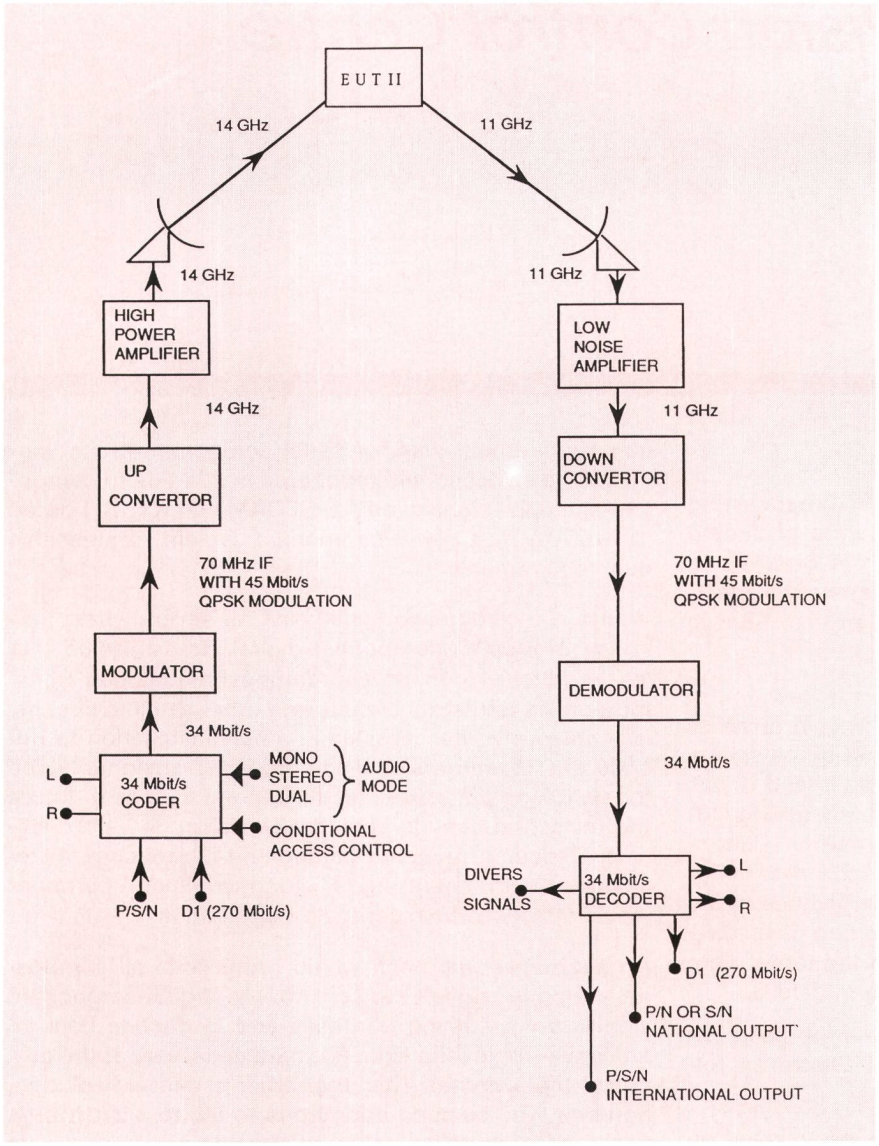


Fig. 1 Arrangement of operational areas

Fig. 2 34 Mbit/s transmission chain



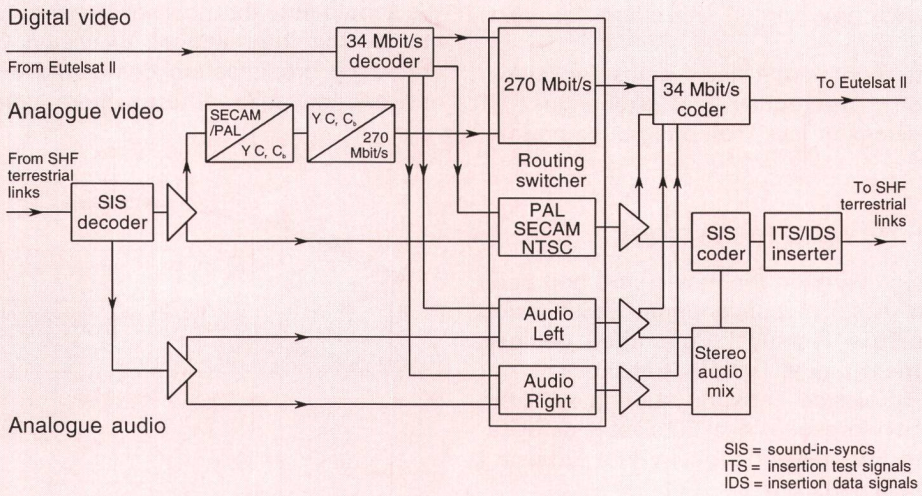


Fig. 3 Simplified schematic of video and audio configuration

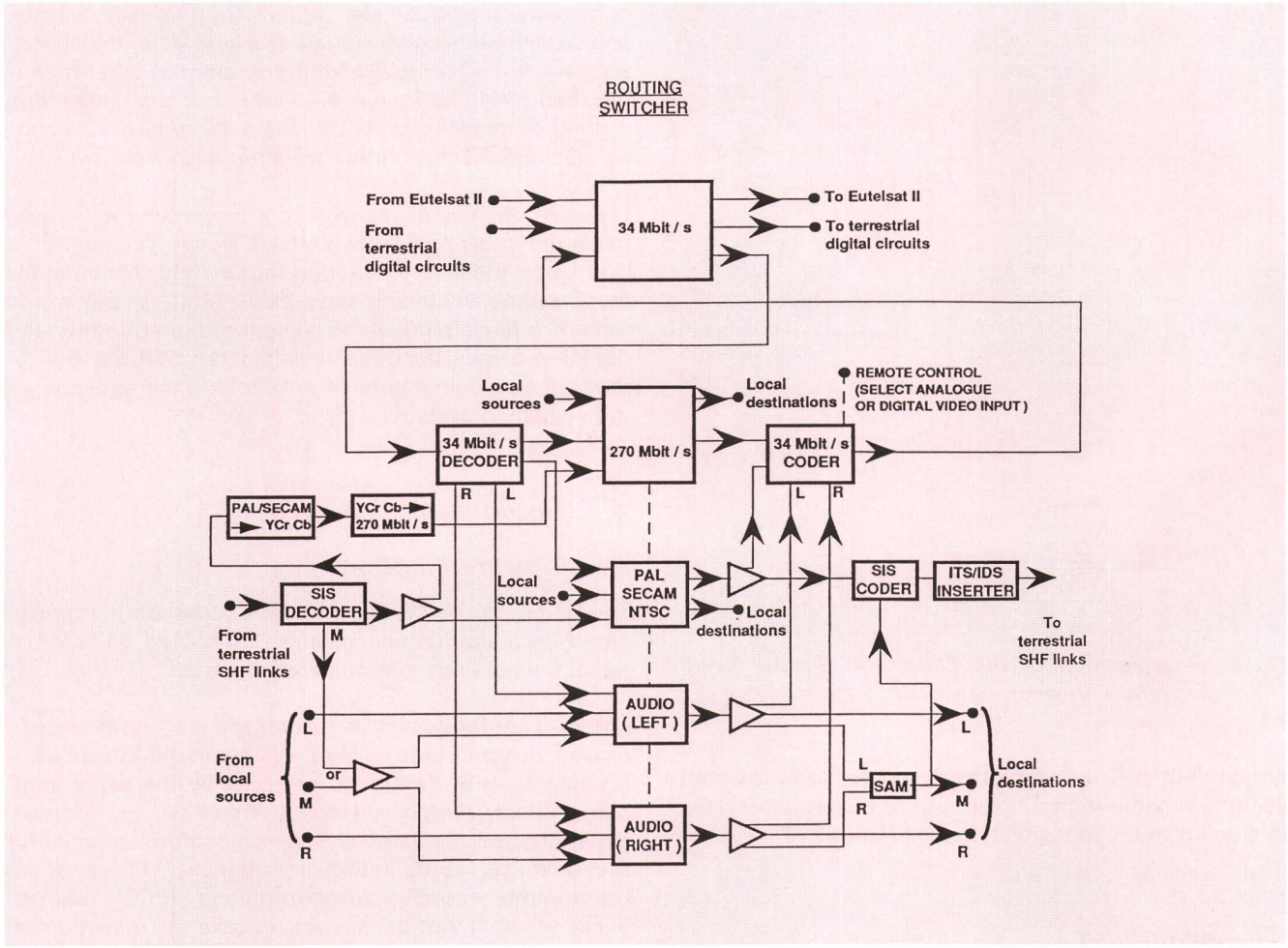


Fig. 4 Future switching arrangement for the National Technical Coordination Centre (CNCT)

34 Mbit/s signals should be carried out at 34 Mbit/s *(fig. 4)*. This is because the 270 Mbit/s signal will not carry all the ancillary data contained in the 34 Mbit/s signal. Conditional access information would be lost, for example. Moreover, even though it functions entirely in the digital domain, the 34/270/34 Mibt/s decompression/compression process introduces some degradation. However, the Geneva Eurovision Control Centre is not really an international switching centre but rather a monitoring and coordination centre, with only two outputs to the international network.

These outputs will be used primarily to inject pre-recorded news items into the daily news exchanges, fed from videotape recorders.

3 Network and switching aspects

31 Network

International switching in Switzerland was formerly carried out by the Swiss Telecom PTT at its switching centre in Albis near Zurich. From June 1993, the Swiss broadcaster SRG in Zurich has taken over responsibility for this switching, using a computerized remote-control system.

The new Geneva Eurovision Control Centre will have three terrestrial microwave circuits from Albis to EBU Geneva to provide monitoring of the Frankfurt-Albis, Vienna-Albis, and Milan-Albis permanent vision network (PNV) circuits. An EBU Geneva-Albis-Zurich circuit will carry the centre's output to the international network. In addition, two circuits from the Swiss PTT's network relay station at La Dôle to EBU Geneva will provide monitoring of the Lyon-La Dôle-Albis and Albis-La Dôle-Lyon PNV circuits, respectively *(fig. 5)*.

All these circuits will utilize a new PTT dish antenna, installed on the roof of the existing EBU Geneva building, providing circuits to and from La Dôle.

In addition, the signals received from the EBU-leased Eutelsat channels via the Swiss PTT's earth station at Vernier, located a few kilometres from EBU Geneva, will be sent to the new centre via fibre-optic circuits. Initially, there will be six composite analogue signals (EUTA-F), sent via two OVID-4 fibre-optic units. Each unit can carry four composite analogue signals with two audio channels. One composite analogue circuit from the centre to Vernier will be added in March 1994 plus a go-and-return 34 Mbit/s circuit for test purposes. In a subsequent development, eight 34 Mbit/s component-digital signals will be received from the EBU-leased transponders of Eutelsat II (EUTA-H) via the earth sta-

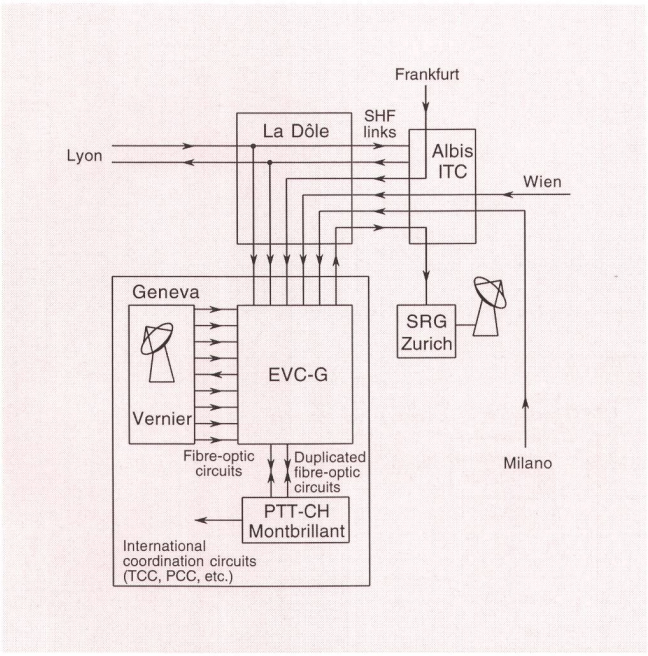


Fig. 5 Incorporation of the Eurovision Control Centre into the Eurovison network

tion at Vernier. These signals will be sent to EBU Geneva using a suitable digital fibre-optic transmission system, this being the responsibility of the Swiss PTT.

32 Switching

To cope with this diversity of standards, the centre's switching system must be flexible enough to accept composite-analogue video signals from Vernier, initially, and component-digital signals at a later date. It will consist of a 48-in/24-out 270-Mbit/s routing switcher manufactured by *Alpha Image,* a 48-in/24-out analogue video routing switcher from *AAVS,* and a 48-in/48-out 2-channel analogue audio routing switcher, also from AAVS.

I have often been asked why I do not switch the 2-channel audio as an AES/EBU 3 Mbit/s signal. The answer is that since most of the audio sources and destinations are analogue, switching audio as a 3 Mbit/s signal would require a large number of analogue-digital coders and digital-analogue decoders. I calculated that the cost of these units would approximately double the total cost of the switching system.

4 Equipment

41 Communications

The communications facilities are based on a sophisticated *(n-l)* conference system connected to international 4-wire voice communication circuits.

The *(n-l)* conference system foreseen is a larger and improved version of the existing system in the Brussels Eurovision Control Centre. It was built by the same company, namely *Sander* of Norway, who have considerable experience in this domain. Back-up conference units for the technical coordination conference (TCC) and the programme coordination conference (PCC), respectively, are built into the system, in case the main conference unit should break down *(fig. 6).* This 'belt-and-braces' approach is adopted for all essential facilities in the project.

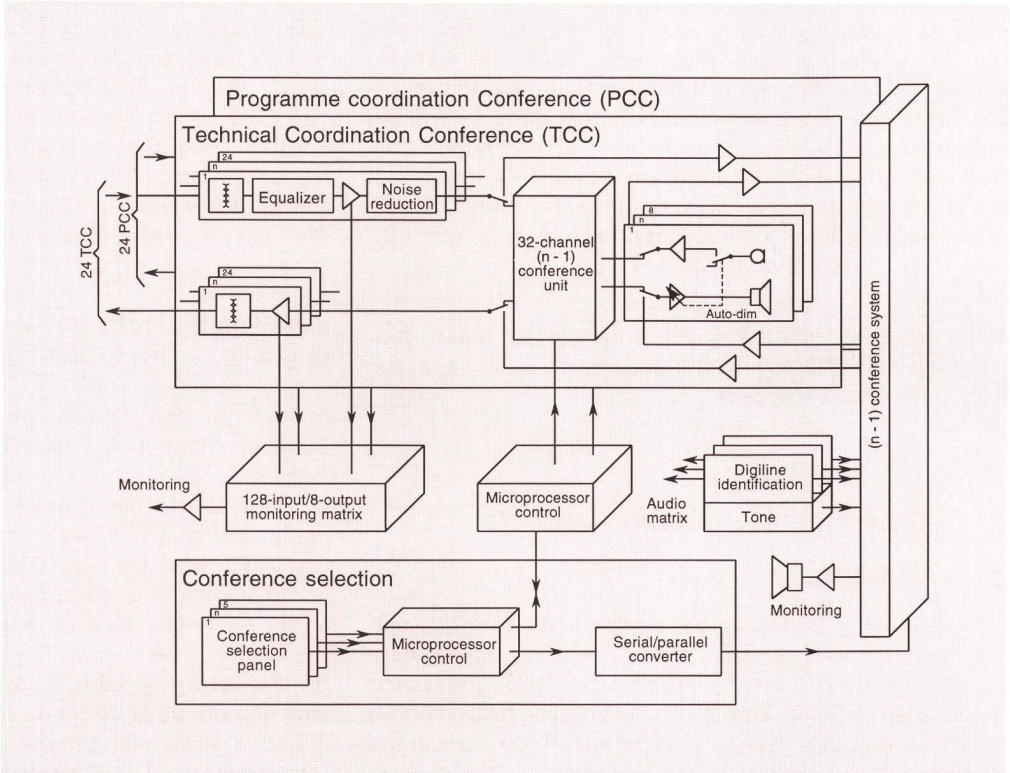


Fig. 6 (n-1) conference system

42 *Video/audio monitoring and switching*

The video and audio monitoring and switching facilities, measurement equipment, intercom equipment and video recording facilities form the basis of the main contract.

Several turnkey project companies from the United Kingdom, France, Germany and Switzerland tendered for the main contract, which was finally awarded to AAVS of Paris. Not only did their proposal contain the most innovative engineering solutions, but it was also the cheapest offer. Within this main contract, *Drake* of the United Kingdom will supply a specialized intercom/planning communications system, and *Barco* of Belgium will supply multistandard SIS-compatible colour monitors which can be switched between 4:3 and 16:9 aspect ratios. In addition, companies from almost every European country, Japan and the USA will supply units of equipment as specified in the main contract.

This includes automatic ITS measurement and a 270 Mbit/s test unit. It is interesting to note that one of the most critical test signals for 270 Mbit/s is a plain green raster, because it produces long series of O's and 1's, respectively.

43 *Quality control*

A wide range of hardware is being installed for automatic video measurement and audio measurement for quality control purposes.

44 *Computerized information system*

The computerized information system (TPP, Transmission Planning Procedure) is being supplied by *British Telecom,* this being a separate project, managed by my colleague, Bill Lloyd.

45 *Video recording*

The videotape recording facilities in the Brussels Eurovision Control Centre consist of two *Ampex* VPR-2B 1-inch format C machines. They were adapted to be compatible with PAL and SECAM, switching automatically between the two standards.

For the Geneva centre it was considered more appropriate to utilize Betacam machines for two reasons. Firstly, using a component recording system enables us to record and replay the future 34 Mbit/s component-digital video in analogue-component form, thereby avoiding the degradation caused by coding into a composite-analogue standard. Secondly, if the EBU programme news coordinators are required to take advantage of our future colocation to edit the prerecorded news material, they would prefer to work with Betacam machines.

We could ensure even better quality by utilizing one of the new component-digital machines, such as digital Betacam or the *Panasonic* D5 machine. Apart from the fact that these machines cost about twice as much as the standard Betacam machines, it was considered too early to go digital in the videotape recorder room. Any editing required is very limited, so we can hardly justify the extra cost of digital immunity to multigeneration degradation.

46 *Additional facilities*

Two additional operational areas are foreseen in the new centre compared with the Brussels facilities, namely the One Man Coordination (OMC) desk and the High-Definition TV (HDTV) room.

The OMC desk will permit one person to carry out all EVC functions from one position. This will be used during night shifts for example, when the network traffic is relatively light. At very busy times it will provide an additional coordination facility. (In case anybody accuses us of adopting sexist terminology, I would like to explain that 'One Person Coordination' could not be used because 'OPC' is already used as the abbreviation for 'Occasional Programme Circuit'.)

The HDTV room is foreseen for monitoring HDTV test transmission, which will be organized in the future to evaluate HDTV transmission systems. This room will be equipped in due course, as and when the requirement is confirmed.

5 *Creativity*

Engineering design work is very enjoyable because it is creative. One unit in the EVC-G project is based on a wider meaning of creativity. A solid-state stereo audio jingle-generator is foreseen to play a 32-second jingle in continuous-loop mode, which will be transmitted in conjunction with the video test-pattern between programme transmissions. The chosen music is a flute duet, with which I won the 'BBC Children's Hour Young Composers' Competition' in 1952. This choice of music avoids complications with copyright, etc.

6 *Looking ahead . . .*

In 1994 operational tests of the 34 Mbit/s transmission system will commence, with full implementation via Eutelsat II-F4 in 1995.

Another future project is the transfer of voice and data communications from leased terrestrial circuits to a dedicated VSAT system. This will enable us to provide a better quality news conference plus 19.2 kbit/s go-and-return data connections from EBU Geneva to each National Technical Coordination Centre, all at a lower cost than the present terrestrial news conference.

Meanwhile, the national broadcasters of Eastern Europe and four CIS countries have been integrated into the Eurovision network, which now extends from Iceland and Morocco to Russia and the Middle East (nearly 50 countries).

Zusammenfassung

Das neue Kontrollzentrum der Eurovision in Genf

Der Autor, langjähriger Chef des Eurovisions-Kontrollzentrums in Brüssel, gibt eine Übersicht über seine Tätigkeit als Projektleiter und Entwerfer des neuen Kontrollzentrums der Eurovision in Genf. Die alten PAL-, SECAM- und NSTC-Systeme werden durch digitale und analoge Technologien, gemischt oder mit Komponenten, ersetzt. Den neuen Bildverhältnissen 16:9 sowie dem künftigen HDTV wird Rechnung getragen.

Résumé

Le nouveau centre de contrôle de l'Eurovision à Genève

L'auteur, chef de longue date du Centre de contrôle de l'Eurovision à Bruxelles, fait le compte-rendu de ses activités de conception du nouvel EVC de Genève, projet dont il est le responsable. Les bons vieux PAL, SECAM et autre NTSC, y céderont la place aux technologies numérique et analogique, composite et à composantes ainsi qu'aux formats 4:3/16:9, tout en prévoyant déjà la future TVHD.

Riassunto

Il nuovo centro di controllo dell'Eurovisione a Ginevra

L'autore, che ha svolto molti anni la funzione di capo del Centro di controllo dell'Eurovisione a Bruxelles, fa una panoramica della sua attività quale progettista responsabile del nuovo centro di controllo dell'Eurovisione a Ginevra. I vecchi sistemi PAL, SECAM e NSTC vengono sostituiti con tecnologie numeriche e analogiche, composite o a componenti come pure con i formati 4:3/16:9 e in previsione della HDTV.

Summary

The new Eurovision Control Centre in Geneva

Here the author, long-time Head of the Eurovision Control Centre in Brussels, gives an account of his work to design the new EVC in Geneva, for which he is Project Manager. If the old system was PAL/SECAM/NTSC, the new one will be analogue/digital, composite/component and 4:3/16:9, with provision for future HDTV.