The European widescreen market

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1. Introduction

During 1996, the market for 16:9 (widescreen) television receivers in Europe took an important step forward, strongly positioning itself in the overall consumer market for television sets. Today, there are a significant number of 16:9 television sets in Europe – more than 1 million – and it is widely considered that 16:9 will be the next television format for many digital projects.

In order to understand the infrastructures set up by the European broadcasters to promote 16:9, a brief examination of the 16:9 consumer market must first be made.

2. 16:9 consumer market

2.1. The statistics

As shown in Fig. 1 and Fig. 2, development of the 16:9 consumer market is now significant in Belgium, France, Germany and the Netherlands. (In addition to these sales figures, 100,000 widescreen sets were sold in Switzerland during 1996.) In these countries, the sales of 16:9 television sets represent more than 50% of the market for large-screen televisions and around 8% of the total market for television sets.

By the end of 1995, 490,000 television sets with 16:9 screens were owned in Europe and this figure rose to 1 million by the end of 1996. It is estimated that around 1.9 million 16:9 receivers will be owned by the end of 1997, and 7 million by the year 2000.

There is a direct relationship between the sales of 16:9 television sets and the number of hours broadcast in the 16:9 format. Fig. 3 shows that, between 1992 and 1996, approximately 60,000 hours of 16:9 programmes were broadcast in Europe (by more than 40 television channels); that figure is rising consistently. Furthermore, Euro-
European receiver manufacturers are advertising 16:9 television sets on an increasingly regular basis.

1997 will be a turning point for 16:9 broadcasts. It should in fact witness important promotional efforts in countries where 16:9 sales are not yet significant (notably Ireland, Italy, Spain and the UK).

2.2. Building the confidence of consumers

The steps taken by those broadcasters and manufacturers involved in 16:9 are aimed mainly at increasing the confidence of the consumer, who is not yet convinced about the relevance of a new screen format.

2.2.1. The “Home Video Cinema”

Above all, 16:9 is being presented by the manufacturers as one of those technological innovations which improve the comfort of the television viewer. The following viewpoint was taken from a commercial brochure:

Like a cinema screen, 16:9 enables more comfortable and natural viewing. It has long been used by film producers, and is increasingly being used in broadcast programmes. With a programme produced in 16:9 you will benefit from 33% more of the picture than with one produced in 4:3. The visual impact is exceptional, the emotional impact guaranteed: you are right in the heart of the action!

Abbreviations

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CCD</td>
<td>Charge-coupled device</td>
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<td>DVB</td>
<td>Digital Video Broadcasting</td>
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<td>DVD</td>
<td>Digital video (versatile) disc</td>
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<td>EACEM</td>
<td>European Association of Consumer Electronics Manufacturers</td>
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<td>HD</td>
<td>High definition</td>
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<td>HDTV</td>
<td>High-definition television</td>
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<td>IRD</td>
<td>Integrated receiver/decoder</td>
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<td>ISO</td>
<td>International Standards Organisation</td>
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<td>MPEG</td>
<td>(ISO) Moving Picture Experts Group</td>
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<tr>
<td>NICAM</td>
<td>Near-instantaneous companding and multiplexing</td>
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<td>PAL</td>
<td>Phase alternation line</td>
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<td>SDTV</td>
<td>Standard-definition television</td>
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<td>SECAM</td>
<td>Séquentiel couleur à mémoire</td>
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Other arguments in favour of the 16:9 receiver are (i) its frequent use of 100Hz scanning technology (improved picture stabilization and the elimination of flicker) and (ii) its better sound quality (NICAM stereo and Dolby Surround Pro Logic).

The commercial effort to sell 16:9 receivers could not succeed without programmes. Therefore, in countries where 16:9 has penetrated the market, the television networks have laid emphasis on 16:9 broadcasts of cinema films. The channels with a high level of cinematographic broadcasts (Première, Channel Four, Ciné Cinémas and Canal+ in France and Belgium) have adopted 16:9 and Dolby Surround Sound to reinforce their commercial activity. The big generalist terrestrial channels (ARD, BRT, NOS, ORF, RTBF, SSR, ZDF, etc.) have improved the quality of movie and television film broadcasts by using the PALplus widescreen system.

In France, in spite of the absence of a system similar to PALplus, the generalist channels (France
Television and, to a lesser extent, TF1) have increased the use of the letterbox format, accompanied by NICAM stereo sound, for the broadcasting of fiction programmes. In this way, owners of a 16:9 television set – thanks to its zoom function (which can be automatic) – can enlarge the 4:3 letterbox picture to fill the screen. However, if the film has subtitles which impinge on the black edges of the letterbox, the use of the zoom function means that the viewer loses part of the translation. Although they make use of pictures with inferior quality to PALplus or DVB, these processes round off the 16:9 “package” in a useful way, particularly if the original pictures are of high quality before the SECAM coding and also if the television set uses a digital interpolation technology to improve the resolution of the enlarged picture.

The importance of the “Home Video Cinema” concept is illustrated by the dominant sales of large-screen television sets (Fig. 4).

The Home Video Cinema market will be reinforced in 1997 by the launch of the Digital Video Disk (DVD), which is currently being manufactured by the American “majors” [1]. On the same disk, DVD will offer both a 16:9 and a 4:3 pan & scan version (where the picture extracted from the original 16:9 production completely fills a 4:3 screen). The owner of a 4:3 television will therefore be able to choose between (i) a letterbox picture (converted by the DVD reader) or (ii) a pan & scan picture.

### 2.2.2 The launch of 16:9 in Europe

The marketing policy of Home Video Cinema, carried out jointly by the manufacturers and the television channels, has led to an increase in momentum along the road towards acceptance of 16:9. The confidence of the consumer has been gained through an increasing number of indicators which favour the 16:9 format:

- significant availability of 16:9 television sets and a wide choice of models;
- a purchase price not exceeding 30% more than the price of a 4:3 set of the same size;
- security brought about by the big national television networks backing the format and the benevolent neutrality of the others;
- attractive programmes (movies, television films, sports) that are clearly identified as being in 16:9;
- the use of 16:9 (or letterbox in France) for other programme types (magazines, programmes for young people, sitcoms, games shows etc.) in order to familiarize people with this format.

The absence of one of these factors has weakened the 16:9 market in countries other than Belgium, France, Germany, the Netherlands and Switzerland.

### 2.3 Making 16:9 a common format

It is believed that, in the long run, 16:9 will replace 4:3 because it offers (i) significant cost savings and (ii) standardization. This point of view has been particularly strong in Japan where, today, more than 6 million 16:9 television sets have been sold. Of all the television sets sold there, the percentage of 16:9 receivers is as follows:

- 90% of all sets with screens larger than 26”;
- 70% of those sets with screen sizes between 22” and 25”;
- 30% of sets with screen sizes between 16” and 21”.

The sales of small 16” television sets (16:9) is currently being stimulated in Japan and Europe by the marketing of video games in the 16:9 format as well as digital video cameras that are equipped with a 16:9 CCD device. These rising sales will also be aided by general increases in the broadcasting of 16:9 programmes other than fiction.
3. The implementation of 16:9 in Europe

At the heart of the European television networks, the coexistence of 4:3 broadcasts and an increasing number of 16:9 broadcasts is leading to complex implementation strategies.

3.1. 16:9 broadcast strategies

The constraints and difficulties encountered in establishing the 16:9 format in Europe vary according to the strategy chosen by the different television channels. These various strategies should eventually lead to 16:9-only broadcasts.

Four cases can be distinguished:

a) Analogue channels which broadcast certain parts of their principal programme in PALplus (e.g. ARD, BRT, NOS, RTBF, SSR, ZDF [2]). In this case, 16:9 is presented as adding value to the programme schedule. Such a choice does not preclude the later possibility of 16:9 digital programmes being simulcast (i.e. simultaneously broadcast in a different channel) along with the terrestrial version.

The viewers to this type of channel are mostly equipped with a 4:3 receiver and therefore they receive the PALplus programmes in letterbox format. This compromise is completely acceptable in continental Europe for films, documentaries, certain non-prime-time cultural events and for magazine programmes. However, the programme directors are proving to be more reticent with regard to other programme types – such as sport or peak-time broadcasts – as they are worried that letterbox will cause a reduction in the audience. 16:9 broadcasts are therefore limited to a certain percentage of the overall programme schedule. The progress of PALplus is slow and depends on the confidence of the programme director regarding the relevance of 16:9 for the broadcast. Thus, certain weekly talk shows which were initially produced and broadcast in 16:9 have been rescheduled after a few months in 4:3 format.

Television News programmes will be the most difficult to convert to 16:9.

b) Analogue terrestrial networks which simulcast their 4:3 programmes on a digital channel in 16:9 (e.g. the BBC, Canal + and RAI). In this case, the new digital channel is presented to the viewer as being the channel of the future; it extracts maximum benefit from the new broadcasting technologies, notably 16:9.

Some programmes produced in 16:9 are broadcast on the main analogue channel in letterbox format (or in PALplus if the broadcaster has adopted it). However, 16:9 programmes which would irritate the television viewer if broadcast in letterbox format are transmitted in 4:3 full-screen format on the main terrestrial channel, and in 16:9 on the new digital channel. As a result, there is much more freedom than previously to provide a wide programme schedule in 16:9 without causing annoyance to the 4:3 audience. Nevertheless, the impact of this 16:9 initiative is dependent on the size of the digital audience (slow to establish) and on the number of programmes broadcast in letterbox format on the main terrestrial channel.

When creating its new 16:9 channel called “France Supervision”, France Television decided that the new channel would not strictly simulcast its normal programmes. Instead, France Supervision would develop its own identity, based on in-house programmes produced in 16:9.

c) Digital 4:3 pay channels which broadcast certain parts of their programme in 16:9 (e.g. Telepiú). In this case, the 16:9/4:3 compatibility must be set up perfectly in the digital decoder used by each subscriber. Every 16:9 broadcast must be identified with precise information whilst, at the same time, the subscribers with 4:3 television sets must be reassured that they will have no difficulties in receiving the programme.

d) Digital pay channels which simulcast 16:9 productions on another digital channel (e.g. Ciné Cinémas). These networks have chosen to identify their 16:9 broadcasts by placing them on a channel that is independent of their normal 4:3 digital broadcasts. This solution increases the number of channels in the digital “bouquet” and necessitates separate treatment of the 16:9 and 4:3 versions of the programme.

3.2. Significant investment

For two years the European television networks have been anticipating the introduction of 16:9. This effort has involved some specific technical changes:

- the purchase of 4:3/16:9 switchable cameras, even when the 16:9 service does not yet exist or has not been considered;
– the conversion of telecine machines to the 16:9 format (e.g. the purchase of a high-resolution telecine);
– the conversion of studios, contribution links and network centres to digital component format;
– the installation of the necessary automatic switching and 4:3/16:9 conversion facilities.

Such an investment policy is long and laborious, particularly when the television network is organized into numerous regional sites. Most of the experts encountered by the Author estimate that the modernization work (in terms of the central infrastructure and the production studios of the largest networks) will take at least another four years. Many networks will not convert their technical facilities for newsgathering into 16:9 until later. The networks which have only centralized production facilities have been able to carry out their modernization work more quickly. Nevertheless, some of them have had to request that their programme suppliers and regular video facilities houses make a similar effort. Towards this end, the European producers of television films and documentaries have given up filming in 16mm in favour of the Super-16mm format.

3.3. Constraints necessitating a joint effort by broadcasters and manufacturers

Over and above the technical difficulties which each individual television network will encounter in the implementation of a 16:9 service, certain problems need tackling with a common approach. These problems will occur in three essential areas:
– digital broadcasts;
– sports coverage;
– purchase of programmes by the broadcasters.

3.3.1. Simultaneous management of 4:3 and 16:9 digital television broadcasts

Digital 16:9 channels are often presented as a simulcast of the 4:3 channel within the same transmission “bouquet”. Eventually, in order to avoid the use of two digital channels, the networks will have to consider accommodating both the 16:9 and the 4:3 programmes within a single 16:9 channel. Implementing such a solution will require that the transmitted 16:9 signal is converted to 4:3 format in the digital decoder of those subscribers who own a 4:3 television set.

Two types of 16:9-to-4:3 conversion are possible:

a) The 4:3 picture is obtained by removing the sides of the original 16:9 picture. This solution is feasible as long as the sub-titles in 16:9 are not destroyed as a result of the conversion to 4:3. The resulting 4:3 image may be ill-suited for certain scenes (e.g. faces at either side of the 16:9 image) but in due course it will be possible to make a pan & scan conversion, using additional transmitted digital information.

b) The 16:9 picture is converted to 4:3 letterbox. This solution is preferable for the broadcasting of cinema films, since they are already transmitted in letterbox format in numerous countries. In particular, the implementation of such a solution would enable the operator of a digital transmission “bouquet” to provide its subscribers with 4:3 and 16:9 versions of the programme within a single pay-per-view channel.

These two solutions have not been systematically introduced into the digital services currently available. In some cases, this is because the digital 4:3 decoder does not have the necessary parameters to convert the transmitted 16:9 picture (either because the parameters of the broadcast service are unsatisfactory or because the decoder itself is badly configured). The result is that the 4:3 viewer sees an anamorphic picture (with elongated people), unless he/she has a recent 4:3 television set. This effect could be eliminated if the broadcasting centre was able to update remotely the software architecture in the consumer IRD.

The conversion from 16:9 to 4:3 will most often be type a as described above. In order to obtain a type b conversion to letterbox format, the 4:3 decoder should include a sufficiently large memory which undoubtedly represents an additional cost. Nevertheless, this cost factor is probably offset by the enhanced picture quality that is obtained, thus providing a valuable promotion of the 16:9 format.

These problems must be taken into account now – before the number of installed consumer decoders becomes too great to adopt the most satisfactory solution. The implementation of these solutions will require good co-ordination between the manufacturers and the television networks; the setting up of the format’s parameters must be simple and practical for the consumer, and its compatibility should be tested with all makes of receivers.

The systematic introduction of both types of conversion in new digital decoders would simplify the approach to this problem, and it would encourage the development of a greater number of 16:9 services.
3.3.2. Compatible 16:9/4:3 production of sports events

If sport is to be offered to the public in 16:9, it must be done under the same or better conditions than those of 4:3 [3] (see the article commencing on page 14 [4]). Indeed, a viewer who has bought a 16:9 television set would wish to benefit from the most prestigious programmes available in this format – without any compromises in the scheduling and programming options that are now available to the 4:3 viewer. The owner of a new 16:9 receiver would be greatly disappointed if, for example, it was not possible to watch a favourite team, or if the coverage was less interesting in 16:9 than in 4:3 on the main channel.

As it would obviously be too expensive to use two production vans, one for 4:3 broadcasts and the other for 16:9 broadcasts, a good compromise would be to produce for 4:3 as well as for 16:9 with the same production van configured for 16:9. The “digital component” production vans used today in Europe are equipped with switchable 16:9/4:3 cameras and, in fact, this compromise is very often implemented when a 16:9 broadcaster is involved.

Moreover, this compromise provides a marketing advantage in favour of 16:9:

- the 16:9 pictures are broadcast with the same commentary as the 4:3 pictures, given by the star reporters of the channel;
- the 16:9 pictures give a wider field of vision than the 4:3 pictures, allowing the spectator a better view of the action and an improved anticipation of its progress.

Compatible 16:9/4:3 production does not restrict the production in 4:3; the 16:9 pictures can simply be considered as giving added value to the 4:3 production. However, the compatible production of sport events must take account of certain organizational factors which may be summarized as follows:

a) The 16:9 cameras must provide a “usable” picture which is framed inside the 4:3 format.

b) A 16:9/4:3 converter installed at the output of the final mix should deliver a 4:3 signal with full resolution.

c) Specific cameras (small hand-held “lipstick” models) also exist in 16:9. Although video recorders and slow-motion devices do not need to be adapted to function in 16:9, the case of the “Super SloMo” device in 16:9 format needs to be examined; exceptionally, it could be solved by conversion of the output 4:3 images to 16:9.

d) Graphics and sub-titling must be examined in order to be compatible in the two formats. Otherwise, they should be inserted separately but simultaneously by two distinct “keyers” placed after the 16:9/4:3 converter.

Figure 5
Off-air pictures from some of the main 16:9 television networks in Europe.
e) Certain cameras in the common 16:9 pool will be used in “diverged” mode – in response to the specific unilateral demands of some 4:3 broadcasters. In this case, it will be necessary to provide for a 16:9/4:3 converter at the output of these cameras.

f) It is not absolutely necessary to have a supplementary and specific 16:9 control room, in order to broadcast in 16:9.

Numerous experiments with this type of production have already been carried out for the broadcasting of football, volleyball, rugby and tennis (e.g. by the BBC, NOS in the Netherlands, and France Television).

Compatible 16:9/4:3 coverage conforms with (i) the inevitable and logical evolution towards the coexistence of 625-line 4:3 and 16:9 broadcasts in the same transmission channel and (ii) the economic reality that the double coverage of sport will not automatically be financed in the future.

3.3.3. Purchase of programmes

The broadcasting of 16:9 programmes is hampered by the fact that the television and movie programme distributors do not recognize the importance of the 16:9 market and do not make the necessary efforts for the exchange of 16:9 masters.

It appears more and more clearly that the commitment of the distributors will only materialize in answer to a strong demand from their clients – the broadcasters.

A few television channels have convinced programmes buyers to ask their suppliers to provide feature films and television movies on 16:9 anamorphic component digital tapes for transmission, and that the shooting and editing methods should preserve the original 16:9 quality. If this initiative from the committed European 16:9 television channels could become generalized, the distributors would probably come to realize the importance of this format.

4. How to approach the transition towards High Definition

In order to open the way for high-definition (HD) television services, there are two principal reasons why Europe has decided to launch the 16:9 format in the consumer marketplace:

a) The original HDTV receivers, based on CRT technology, were too big and too expensive. A significant audience for HDTV services could not be expected without the sale of large flat screens at affordable prices.

b) The programme-makers and the broadcasting industry were not ready to make a radical conversion to HD video equipment. A specific mechanism had to be found in order to permit, firstly, a smooth transition to 16:9 broadcasts and, at a later date, to HD broadcasts.

During the last two years the situation in Europe has evolved as follows.

In the field of production:

a) HD production facilities have become available for rental at competitive prices. HD video is recognized as the only tool that is capable of associating the possibility of multicamera live coverage with the guarantee of keeping the archives on high-quality supports. HD video is also used for its realism and faithful reproduction of detail, as well as for the speed of the picture control and of the electronic post production. A recent increase has been observed in the use of HD video as an electronic tool which is complementary to 35mm film.

b) HD technology has been successfully introduced into the telecine marketplace.

c) Cheaper and more compact HD production equipment will appear over the next few years, which should encourage user investment.

In the consumer market:

a) Very large flat HD screens (more than 36” across the diagonal) will provide a significant added value for the viewers. The first prototypes have been shown over the last year and their launch could occur within the next two years.

b) HD 1250/50 transmission encoders and decoders which comply with the European DVB and MPEG-2 standards are being developed (e.g. by the ADTT and Cinenet channels) and were demonstrated last year during IBC ’96 in Amsterdam.

c) A network of HD video theatres exists in France (VTHR). This network, which is growing, is a forerunner in the distribution of programmes for specific audiences gathered together in halls and public places. This type of project should experience a European expansion in the coming years.

However, the HD market can only be developed in Europe under certain conditions:
a) The overall implementation and success of the 16:9 consumer market. This will need a minimum of three years.

b) The market introduction of large flat screens. These will require higher quality source pictures and therefore could lead the way to the introduction of high-definition broadcasts.

c) The co-existence of HDTV with 16:9 and 4:3 SDTV services. High definition should not imply a complete change of the broadcast chain, but an added tool which is inserted into an existing environment. HD digital transmissions would have to be compatible with 16:9 and 4:3 standard transmissions, commencing with the HD programming of feature films and music programmes.

d) The expected increase in HD production activity over the next few years. The aim here will be to provide the European producers with access to HD facilities in every European country.

e) The convergence of electronic and computer technologies. As is currently the case in the United States and Japan, a discussion should be carried out in Europe, involving the broadcasters and the manufacturers, on the prospects and strategies for the introduction of HDTV in respect of these new technologies.

5. Conclusions

Today, the 16:9 project is still very fragile in Europe. It has seen a significant development in Germany, France, the Benelux countries and Switzerland which, together, make up half the volume of 16:9 receiver sales in the European market. However, 16:9 television sets are almost non-existent in most of the other European countries (less than 30,000 units in each of these countries). The Action Plan launched in 1993 by the European Commission triggered off the emergence of 16:9 in these markets. Nevertheless the critical mass of sales which would ensure its long-term survival in these countries has not yet been attained.

In the complex context of technological change, the professionals and the politicians are not yet sufficiently aware of the structural long-term challenges and implications of 16:9. Consequently, the constant effort needed to ensure its development is not made a matter of priority and can be called into question at any moment.

Most of the professionals in the field of programme distribution are not in touch with the state of the 16:9 market and, therefore, are not developing an active strategy aimed at the distribution of programmes produced in this format.

It is unfortunate that, in parallel with the 16:9 Action Plan launched in 1993, there has not been a co-ordinated European initiative. Promotional teamwork – helped along by the broadcasting department of the television channels and the marketing department of the manufacturers – could allow the constraints which are hampering the development of 16:9 to disappear. Moreover, a focused debate conducted by professional organizations should help to put 16:9 (and eventually HDTV) into perspective with the introduction of digital and multimedia services. These actions would ensure the credibility and durability of the efforts to favour the 16:9 format.

As a result, the European development of the 16:9 market can only be guaranteed by national collaborative efforts between television networks, manufacturers and equipment distributors as well as by strong promotional actions by the main audio-visual players, addressed at the general public and the politicians. It is to be hoped that the involvement of a greater number of European countries will stimulate promotional activity in favour of this format. The debate concerning the re-launch of the 16:9 market which is currently in progress should contribute towards

Mr Jean-Pierre Lartigue graduated in 1989 from the Ecole Nationale Supérieure de Télécommunications in Paris. While working at the Centre National du Cinéma, at the Société Française de Production and then at Vision 1250, he gained an interest in the broadcasting services market and the various applications of high-definition television systems. He was involved in organizing and engineering the high-definition coverage of the Olympic Games at Albertville and Barcelona, both in 1992, and at Lillehammer in 1994 where he was the technical director.

Mr Lartigue has attended many international conferences to give presentations on the 16:9 market and has organized the three European Widerview conferences on this topic. He is the co-editor of the Widerview 1996/7 report, published in May 1997, which includes detailed analyses of the main players in the 16:9 market.

Until its demise at the end of 1996, Jean-Pierre Lartigue was Deputy Director General of the European Economic Interest Group, Vision 1250. He is currently a consultant on 16:9 broadcasting to the European Commission.
giving the various television networks that are involved the means of acting as catalysts in these efforts.

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EBU, March 1997.


Further reading:
a) Widerview Report ’94
Vision 1250, April 1995.
b) Widerview Report ’95
Vision 1250, April 1996.
c) Widerview Report 1996/7

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