

## RECOMMENDATION ITU-R BT.1379

**FRAMING OF WIDE-SCREEN 16:9 AND STANDARD 4:3 ASPECT RATIO PRODUCTIONS  
TO ACHIEVE A COMMON PRODUCTION FORMAT DURING A TRANSITION  
PERIOD TO WIDE-SCREEN 16:9 PRODUCTION AND BROADCASTING**

(Question ITU-R 42/11)

(1998)

The ITU Radiocommunication Assembly,

*considering*

- a) that standard definition television production and transmission will in time undergo a transition from the conventional 4:3 aspect ratio to the newer wide-screen 16:9 aspect ratio;
- b) that there are incompatibilities in existing production techniques for 16:9 images as against 4:3 images;
- c) that during a transition period wide-screen 16:9 aspect ratio images will need to be broadcast in a conventional 4:3 aspect ratio service;
- d) that similarly, conventional 4:3 aspect ratio images will need to be broadcast in a new wide-screen 16:9 aspect ratio service;
- e) that although pan-scan techniques can be used to obtain a 4:3 image from one of 16:9, the technique is expensive and is difficult with live programmes;
- f) that although a 16:9 image can be displayed as a compatible letter-box on 4:3 displays, this technique is not universally accepted by all broadcasters and viewers;
- g) that although a 4:3 image can be displayed centrally within a 16:9 display, this technique is unlikely to be universally accepted by all broadcasters and viewers;
- h) that by framing for a 14:9 (shoot and protect) image, a 16:9 image can be extracted from the 4:3 source without loss of important action, and similarly a 4:3 image can be extracted from a 16:9 source without loss of important action;
- j) that there would be economic and practical benefits arising from the use of a single production chain capable of producing a programme suitable for transmission in either conventional 4:3 aspect ratio or enhanced 16:9 aspect ratio services;
- k) that the use of component 16:9 production chains will provide viewers watching 16:9 services with the optimum picture quality;
- l) that the ability to use a 16:9 production chain for the transmission of a programme in 4:3 will encourage the introduction of new 16:9 equipment,

*recommends*

- 1** that during a transition period where an electronic video production chain may be required to be used for programmes intended to be suitable for transmission in an aspect ratio of either 4:3 or 16:9, the scene should preferably be framed (shoot and protect) for a 14:9 image, as described in Annex 1,

*further recommends*

- 2 that in these circumstances it is desirable that 14:9 graticules are available for viewfinders in 4:3 and 16:9 electronic cameras, including HDTV cameras;
- 3 that in these circumstances captions are kept within the safe area of the 14:9 graticule;
- 4 that, where available, the use of a fully component electronic production chain in the 16:9 aspect ratio is to be preferred.

#### ANNEX 1

### **A framing technique to allow a common production format for 16:9 and 4:3 television programmes during a transition period to wide-screen 16:9 production and broadcasting**

Until such time as the 16:9 format is fully established as the norm for broadcasting, programme producers will have to choose the shooting aspect ratio to use for productions which have overseas potential and long shelf life, particularly drama, bearing in mind the usage of 16:9 and 4:3 television receivers and the penetration of wide-screen enhanced analogue and digital services. For television production, the choice is either 4:3 (i.e. 12:9) or 16:9. The programme might be shot on video, or on Super 16 mm or 35 mm film.

Video production aspect ratio is determined by the physical dimensions of camera sensors, and in practice is either 4:3 or 16:9. For film, the Super 16 mm format has an aspect ratio of 15:9, whereas the full image area of 35 mm film is standardized for the Academy format at approximately 4:3. Film, however, can subsequently be transferred to video at almost any aspect ratio in the telecine.

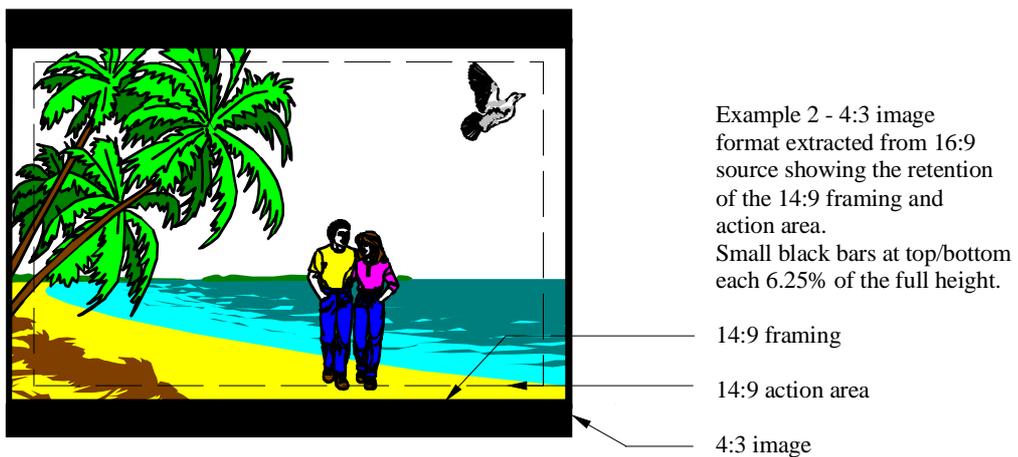
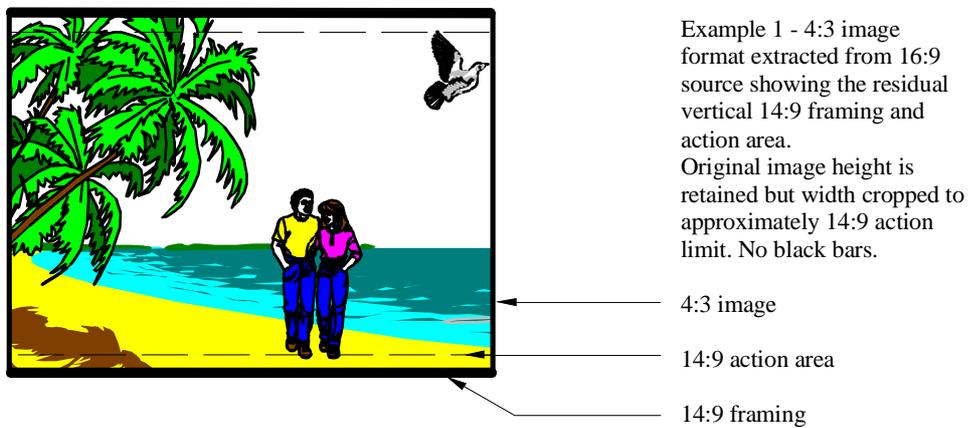
A method of framing is proposed which enables producers of electronic video productions to enjoy similar flexibility to that of film producers. In the short term, this increases the amount of programme material potentially available for transmission in the 16:9 format; it also provides encouragement for programme makers to commission productions in the 16:9 format, and for existing 4:3 aspect ratio equipment to be replaced by new production chains operating in the 16:9 format.

It should be recognized that the optimum picture quality for transmission by 16:9 aspect ratio enhanced analogue or digital services is obtained when the complete production chain is itself in the 16:9 format. Nevertheless, to achieve flexibility and to obtain consistency, until such time as the dominant aspect ratio for both production and transmission is 16:9, it is suggested that for electronic television production and post-production, *the major action is framed for a mean aspect ratio of 14:9*; that is, wholly contained within the source format, i.e. within 16:9 or 4:3. By this means, the production format within the television studio will be in a chosen aspect ratio of either 16:9 or 4:3. For subsequent transmission, it is a relatively simple matter to extract either 16:9 or 4:3 with minimal loss or extension to the action area.

Appendices 1 and 2 illustrate how the framing can be achieved in the cases of 16:9 camera sources and 4:3 camera sources, respectively. The transfer to 14:9, if required, is part of the transmission pre-processing and the production formats within the studio will always be 16:9 or 4:3. In the case of a transfer from 16:9 to 14:9, the exact number of active lines may be chosen at the discretion of the producer. In some cases, it may be preferred to retain a full letter-box format for transmission of 16:9 programmes; producers can have the freedom to decide whether to transmit the material in 4:3 or in any compromise aspect ratio up to 16:9.

APPENDIX 1 TO ANNEX 1

14:9 framing with 16:9 camera source (figures drawn to scale)



*Note 1* - Two examples are given to illustrate some of the possible options for conversion to 4:3 - Example 1 has no black bars, Example 2 has small black bars at the top/bottom.

*Note 2* - Depending on the production format, the horizontal resolution capability of the 4:3 display might not be fully exploited.

*Note 3* - If a 625-line system is used for 16:9 production and for extraction/display in 4:3, then the 16:9 display and the 4:3 display of Example 1 have 576 active lines, while the 4:3 display in Example 2 has 504 active lines.

APPENDIX 2 TO ANNEX 1

14:9 framing with 4:3 camera source (figures drawn to scale)



4:3 image as seen in camera and on standard display showing proposed camera viewfinder graticules for 14:9 framing and 14:9 action area (90% of the width/height of the 14:9 framing area).

14:9 framing

14:9 action area

4:3 image



Example 3 - 16:9 image format extracted from 4:3 source showing the residual horizontal 14:9 framing and action area. Original image width retained, height cropped to approx. 14:9 action limit. No black bars.

16:9 image

14:9 framing

14:9 action area



Example 4 - 16:9 image format extracted from 4:3 source showing the residual horizontal 14:9 framing and action area. Small black bars at the sides.

16:9 image

14:9 action area

14:9 framing

Note 1 - The vertical resolution capability of the 16:9 display is not fully exploited in Example 3.

Note 2 - If a 625-line system is used for 4:3 production and for extraction/display in 16:9, then the 4:3 and 16:9 displays have 576 active lines.