



Independent Television Commission

Evolution of Wide Screen Broadcasting in the United Kingdom

*ITU Inter-Regional Seminar
Kyiv, 13 November 2000*

Paul Gardiner
Head of Engineering Policy

Widescreen Broadcasting in the UK

- Factors Affecting Subjective Picture Quality
- The Domestic Viewing Environment
- Digital TV in the UK
- Widescreen Production & Transmission
- Conclusions

ITC

- Regulates commercial TV in the UK
- Manages UHF frequency planning
- Manages research into new technologies
 - (IBA: MAC/enhanced PAL/digital - 1980s)
 - contributed to PALplus, digital terrestrial
 - collaborative European projects
for example, picture quality evaluation

How to Improve Picture Quality

- Lessons from 'early' work:
 - eliminate PAL artefacts (e.g. MAC, PALplus)

PALplus

- Advantages:
 - widescreen: 16:9 letterbox (430 active lines)
 - MACP - luminance/chrominance separation
 - vertical helper for luminance
 - line 23 signalling
 - close to Rec. 601 studio quality at 4H
- Disadvantages
 - letterbox!

How to Improve Picture Quality

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 - widescreen picture

The Shape of the Picture

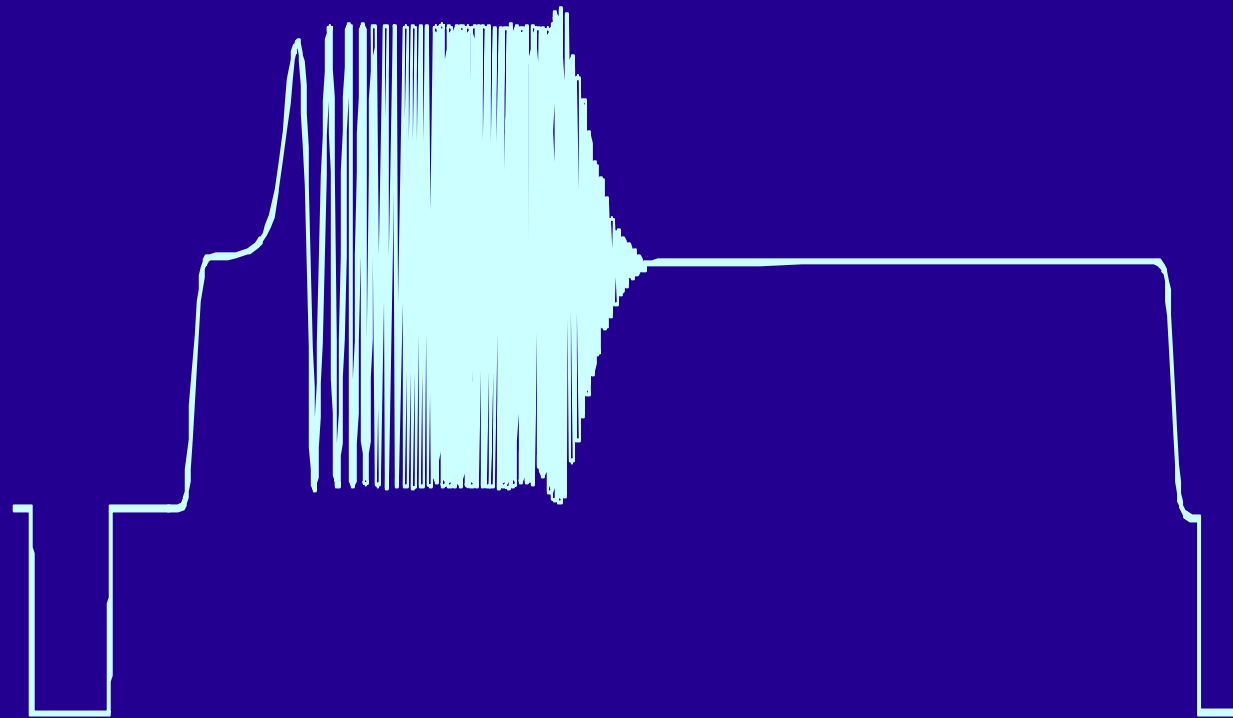


How to Improve Picture Quality

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 - widescreen picture
 - ghost cancellation

GCR - Line 318

- Rec. ITU-R BT. 1124



How to Improve Picture Quality

- Lessons from 'early' work:
 - eliminate PAL artefacts (e.g. MAC, PALplus)
 - widescreen picture
 - ghost cancellation
 - reduce picture noise
 - improve sound quality!
 - HDTV?
- Digital Production & DVB Transmission
 - can achieve all the above
 - AND improved spectrum efficiency

How Do We Classify TV Systems?

- Proposal in ITU-R BT. 1127:
According to 'Design Viewing Distance' at which Picture Quality graded 'excellent':
 - SDTV : 6H
 - EDTV: 4H
 - HDTV: 3H

HDTV

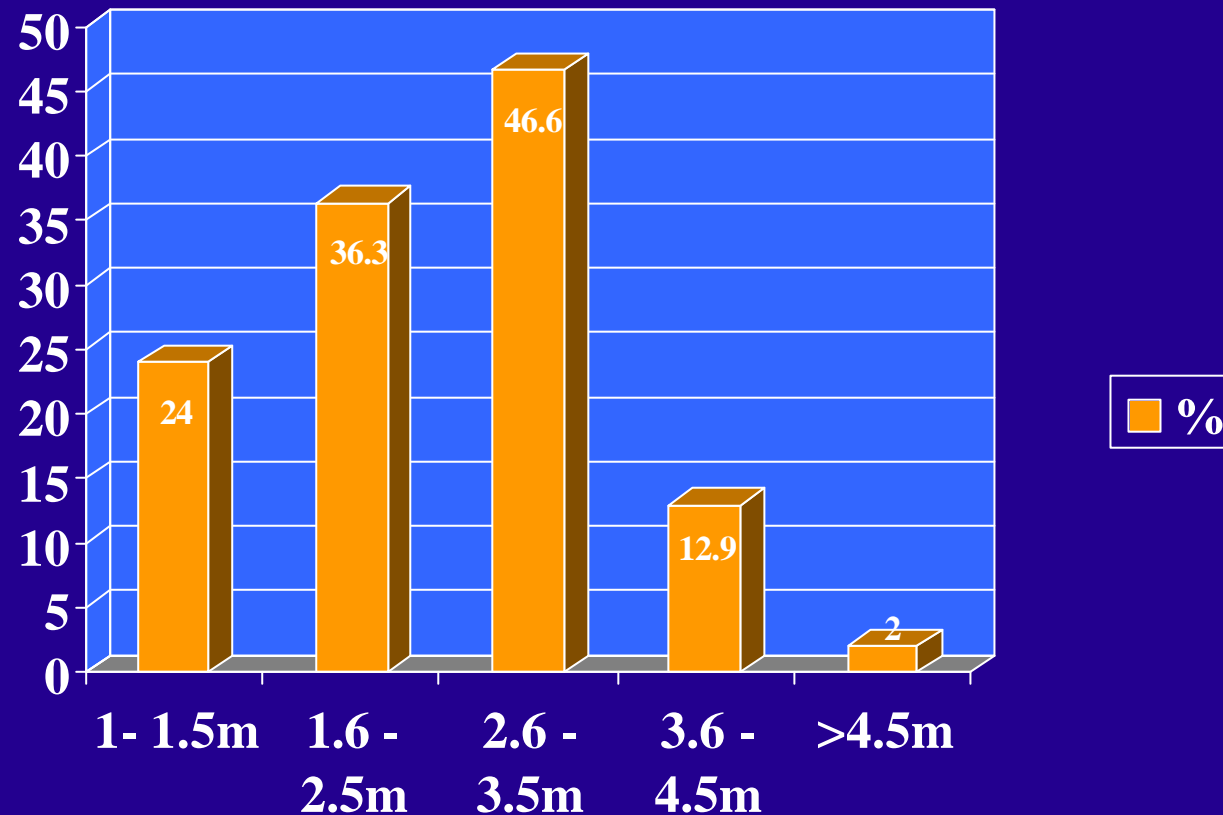
- Aspect Ratio 16:9
- “Twice the horizontal & vertical resolution of standard definition television”
- “Essentially transparent to a bi-dimensional representation of the real world when the picture is seen at three times the height of the screen (3H)”
- Production: Rec. ITU-R BT. 709
 - 1920 x 1080 pixels, 24/25/30/50/60 Hz



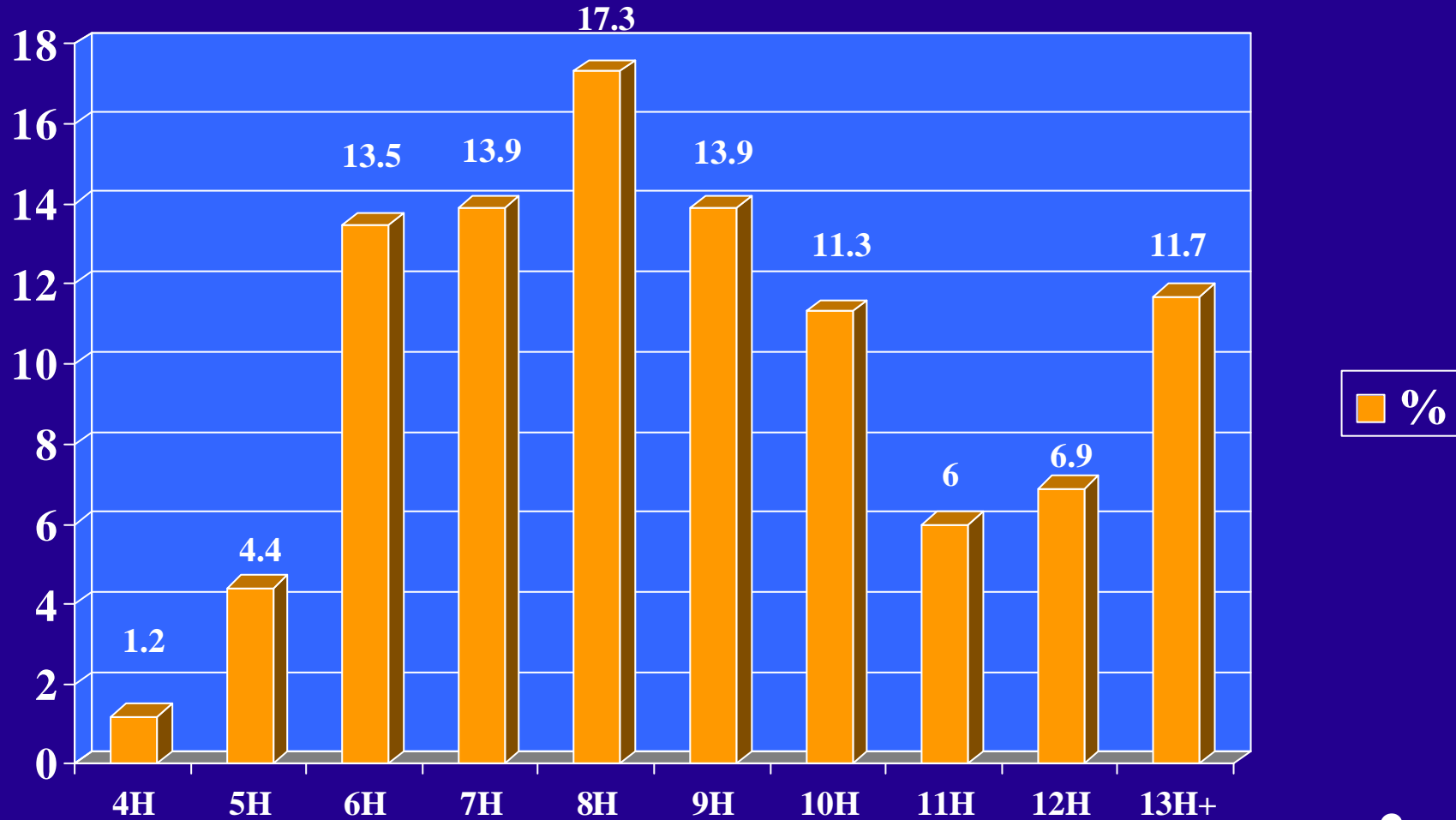
'MOSAIC': 1994-5

- Tools to evaluate subjective picture quality
 - single-stimulus continuous quality evaluation technique (SSCQE)
- Study the effects of viewing conditions
 - the domestic environment
 - survey of 500 homes

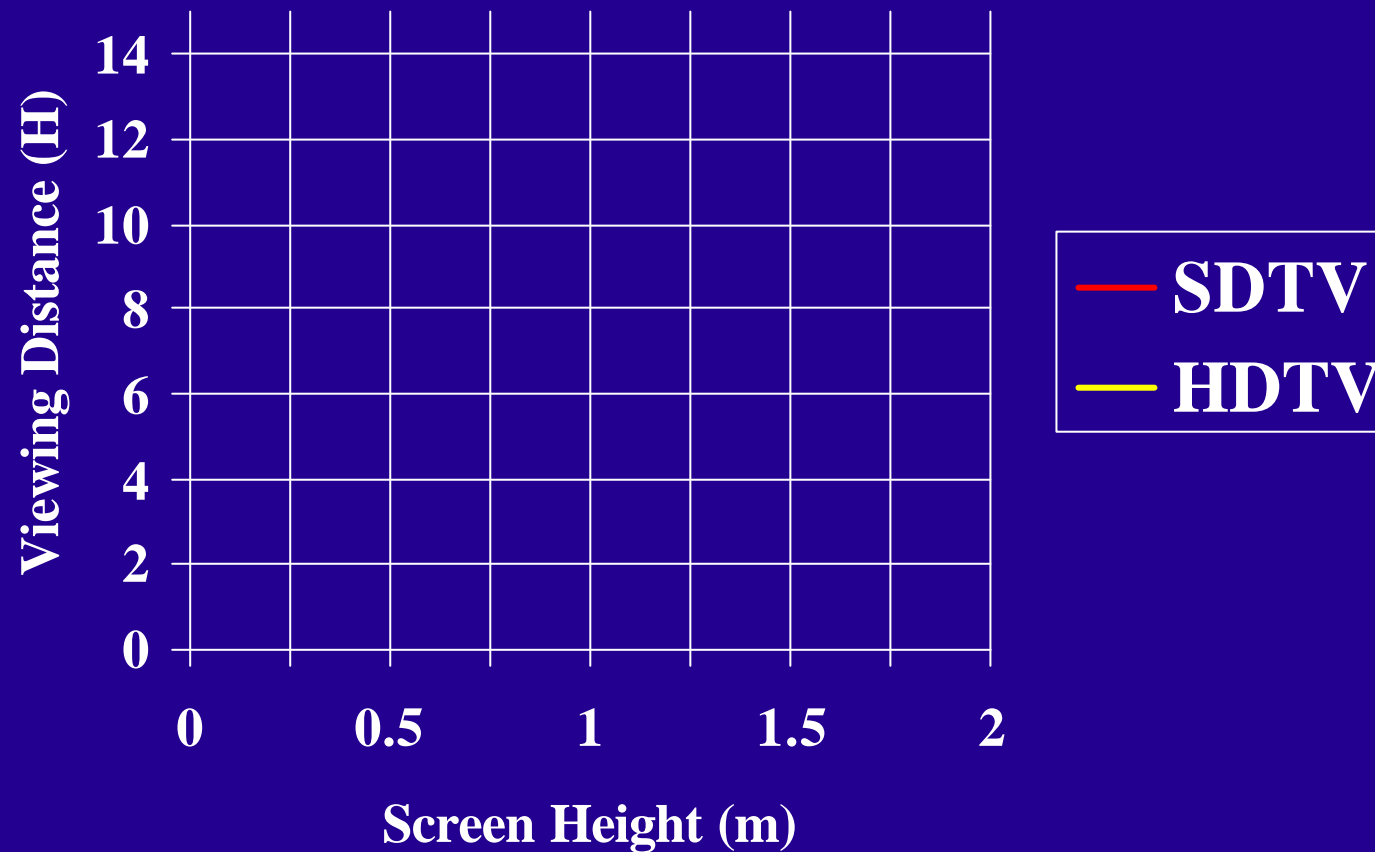
Actual Viewing Distances



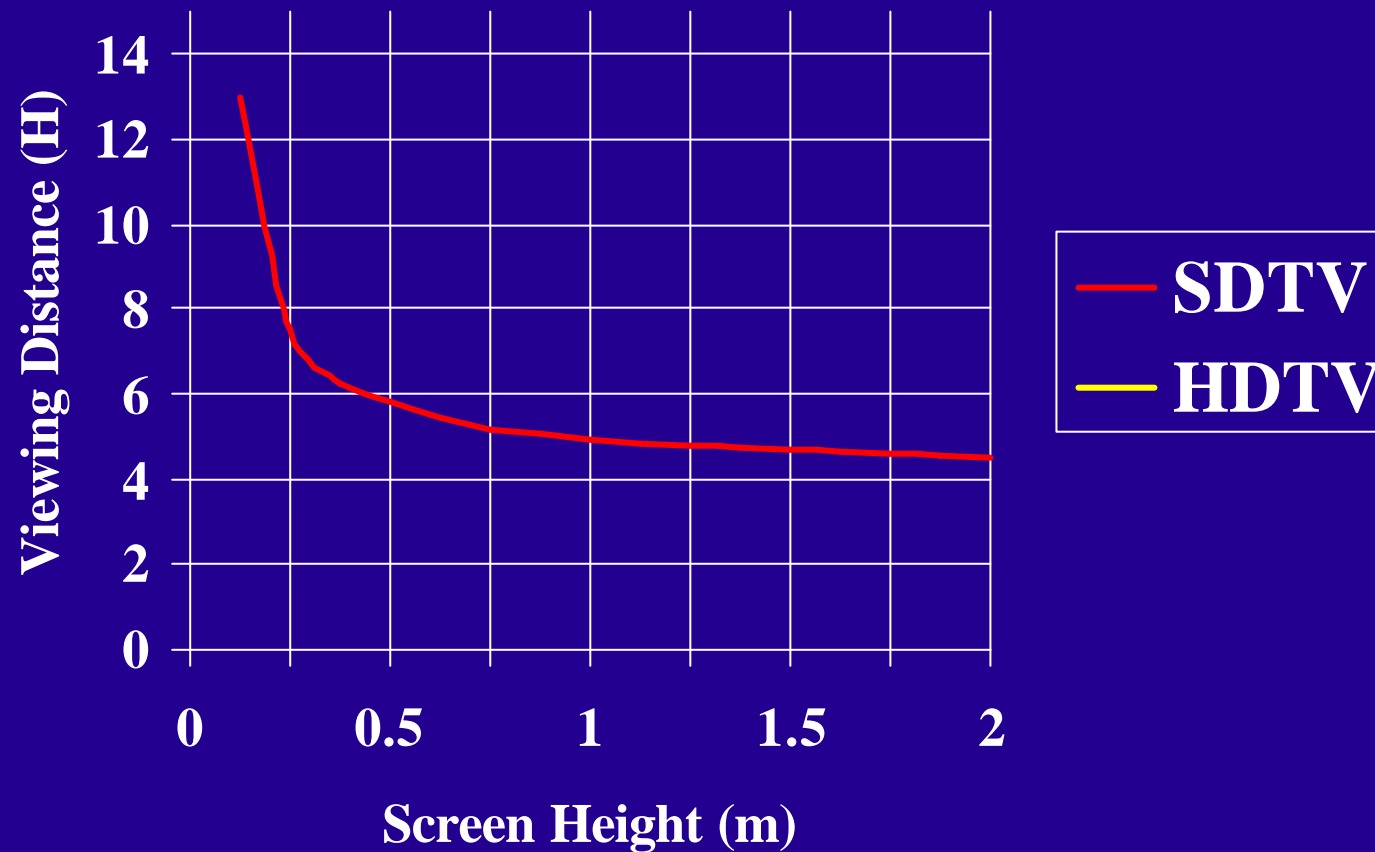
Actual Viewing Distances



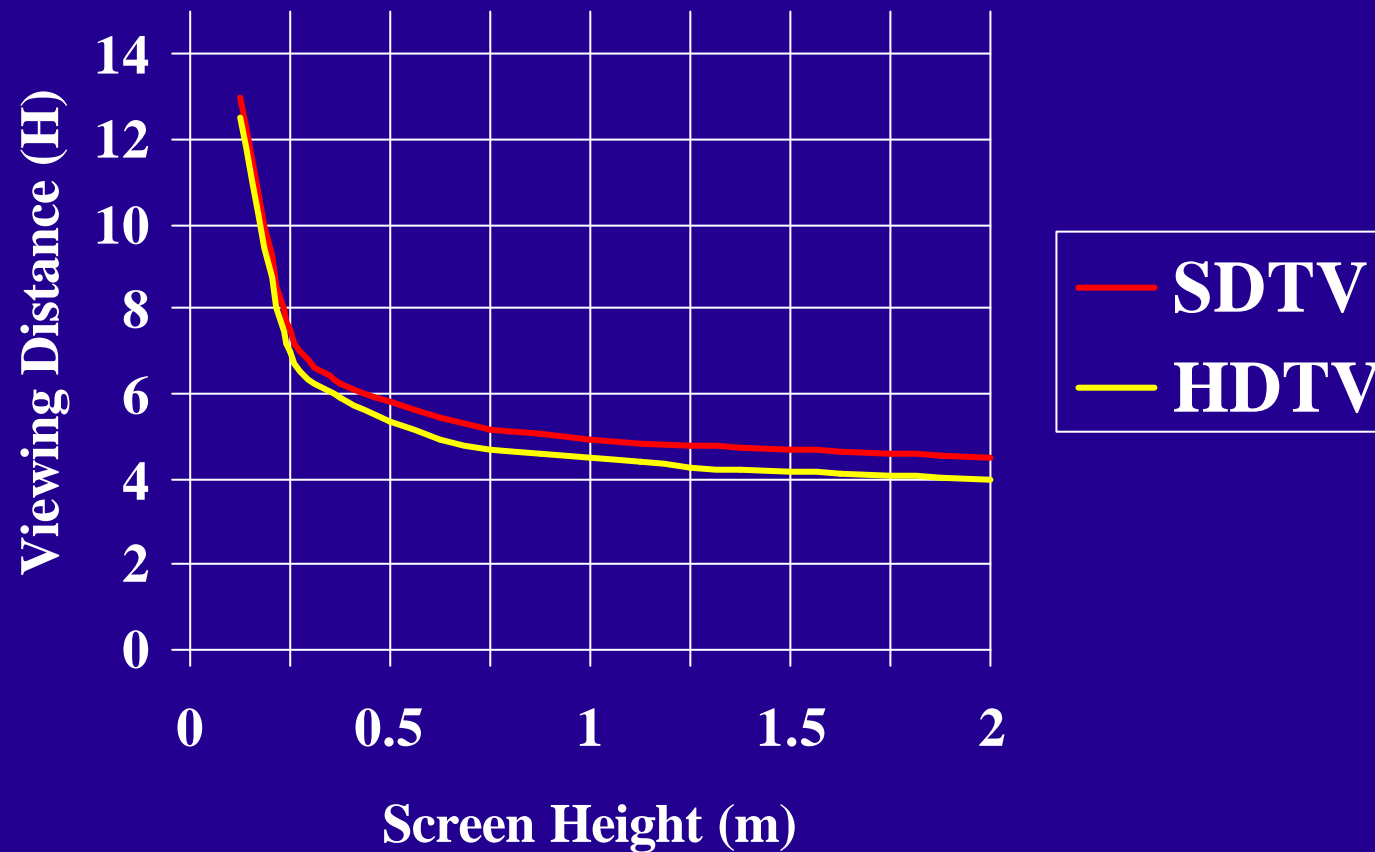
Preferred Viewing Distance



Preferred Viewing Distance



Preferred Viewing Distance



Home Environment: ITU-R BT. 500

| Screen diagonal (in) | | Screen height (H) | PVD |
|-------------------------|------------|----------------------|-----|
| 4/3 ratio | 16/9 ratio | (m) | (H) |
| 12 | 15 | 0.18 | 9 |
| 15 | 18 | 0.23 | 8 |
| 20 | 24 | 0.30 | 7 |
| 29 | 36 | 0.45 | 6 |
| 60 | 73 | 0.91 | 5 |
| > 100 | > 120 | > 1.53 | 3-4 |

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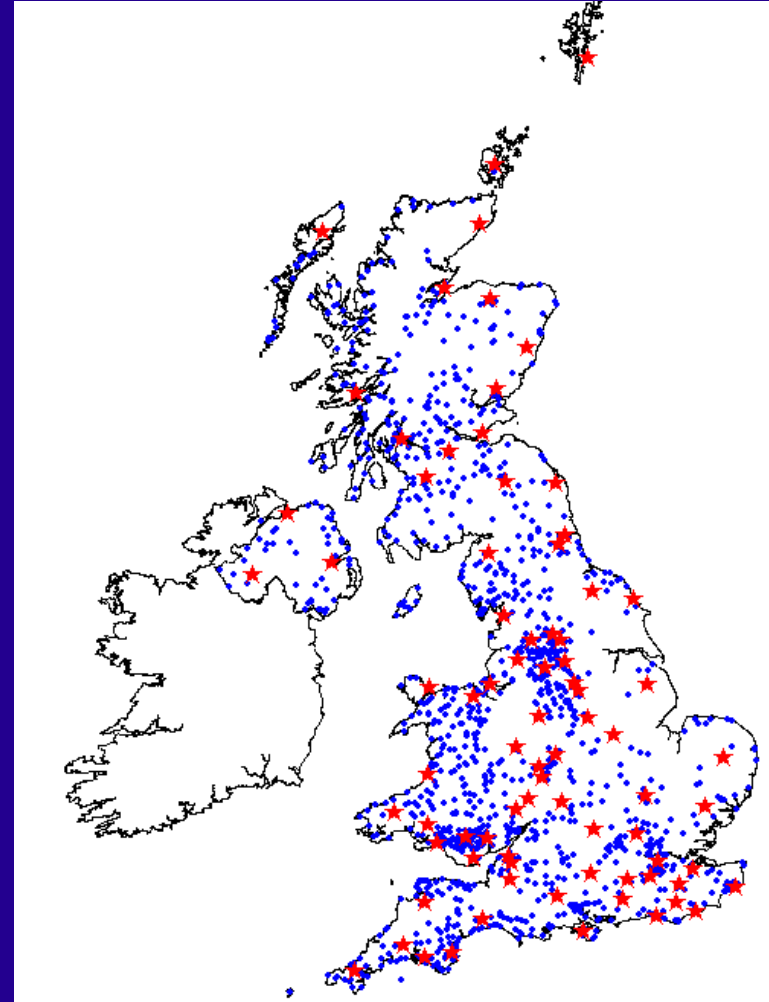
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UK Digital TV

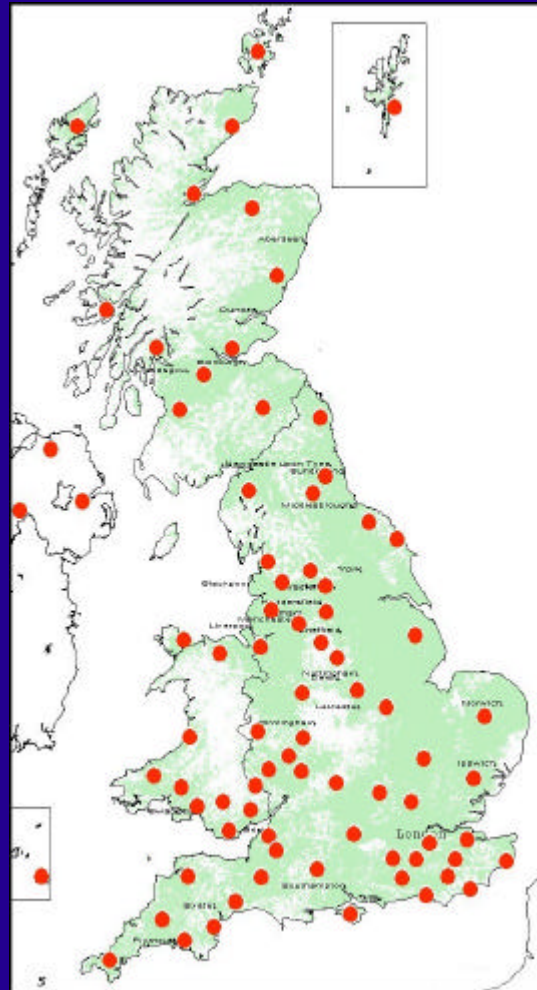
- Transmission: 625-line interlace
 - no demand for HDTV
- Introduced from autumn 1998
- Simulcast existing channels
 - many programmes in 16:9
 - simulcast in 14:9 analogue PAL
- Also, many new programme services

UHF Television

- 4 analogue networks
 - over 1100 sites
 - 99.4% coverage
- Channel 5
 - 44 sites
 - 80% coverage
- 6 DVB-T multiplexes



80 DTT Sites



DTT Coverage & Services

BBC 1&2, News 24, Choice, Text

81% coverage

ITV & ITV2

C4 & FilmFour

Teletext

78% coverage

SDN (S4C, C5 + other services)

78% coverage

ONdigital

74% coverage

ONdigital

66% coverage

ONdigital

64% coverage



Production in 16:9

- Content producers' budgets are under enormous pressure...this influences choice of equipment
- *Single* production chain for widescreen digital & analogue simulcast is *highly* desirable
- Rec. 601 production/post-production:
 - well established
 - cost effective
 - can be used to produce in 16:9
- The solution: 14:9 'Safe Areas'

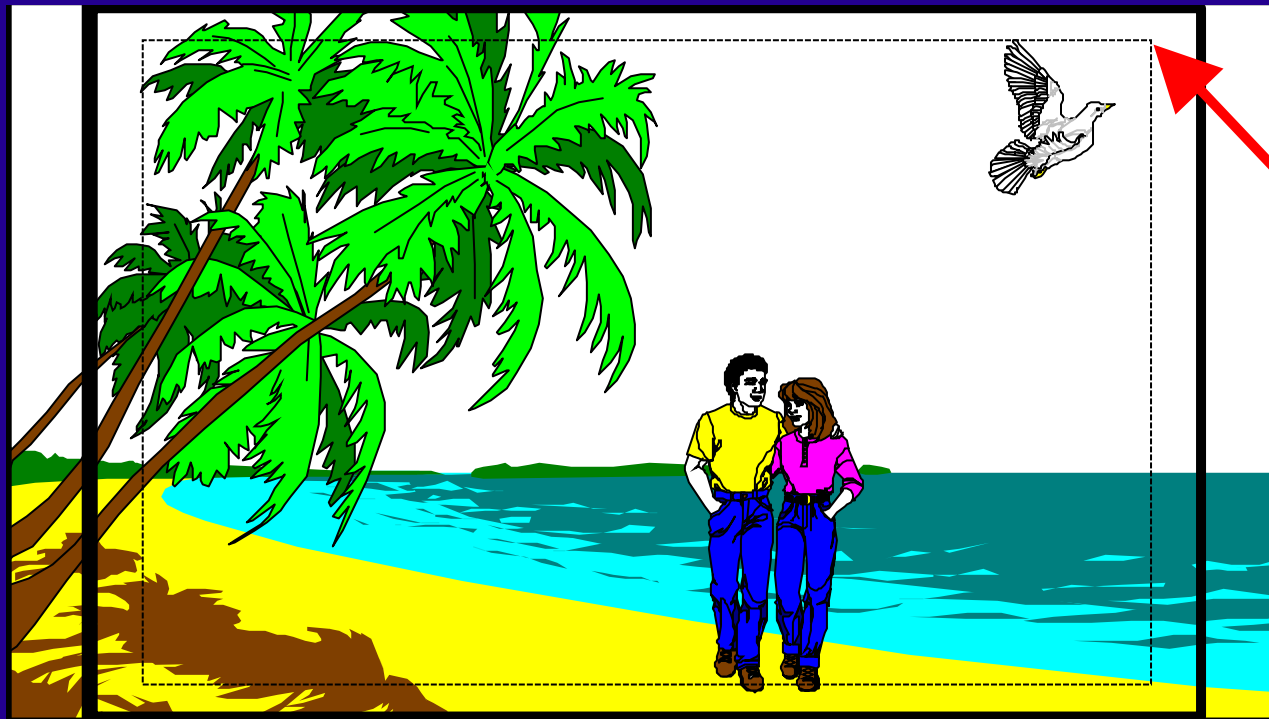
Production in 16:9



Shoot to Protect 14:9

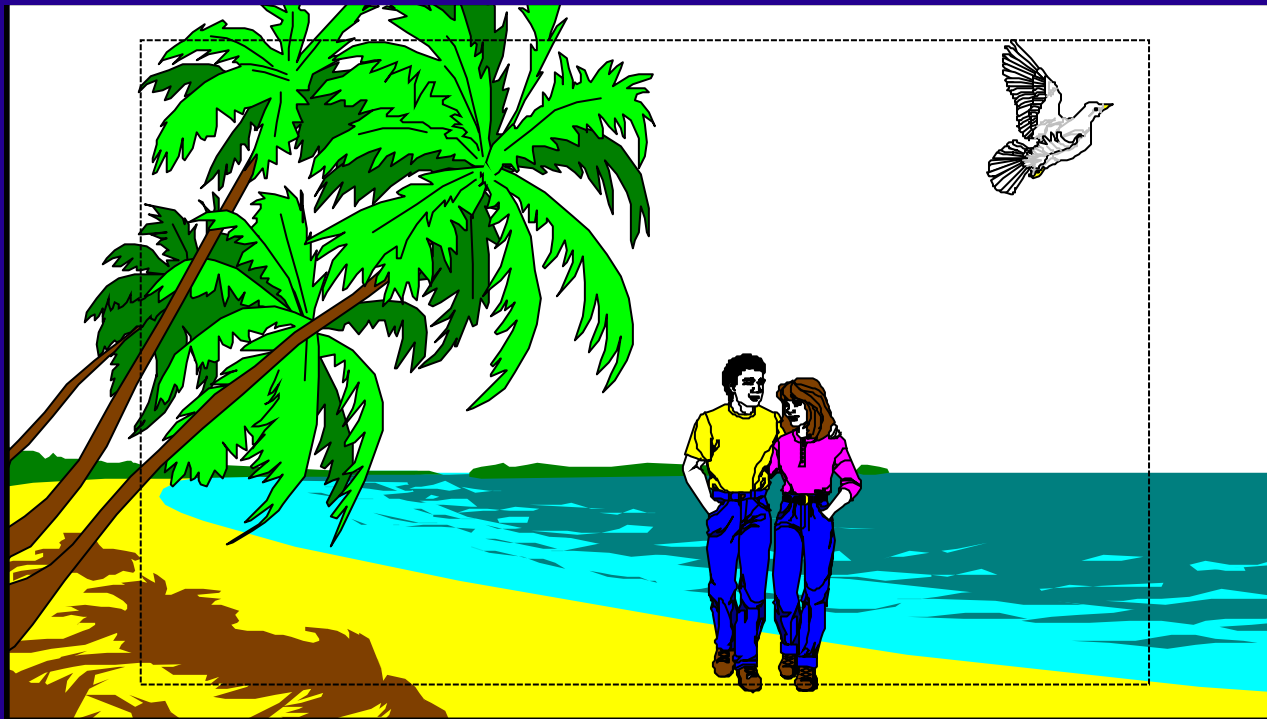


Shoot to Protect 14:9

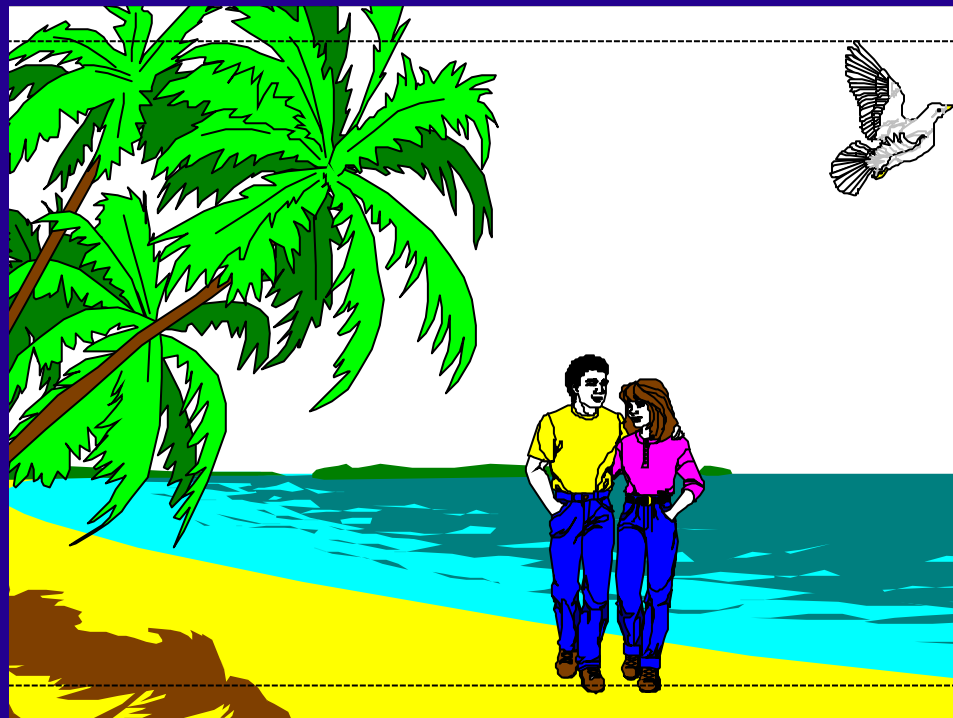


'Safe Area'

Digital Viewer with 16:9 TV



Digital Viewer with 4:3 TV



Digital Viewer with 4:3 TV



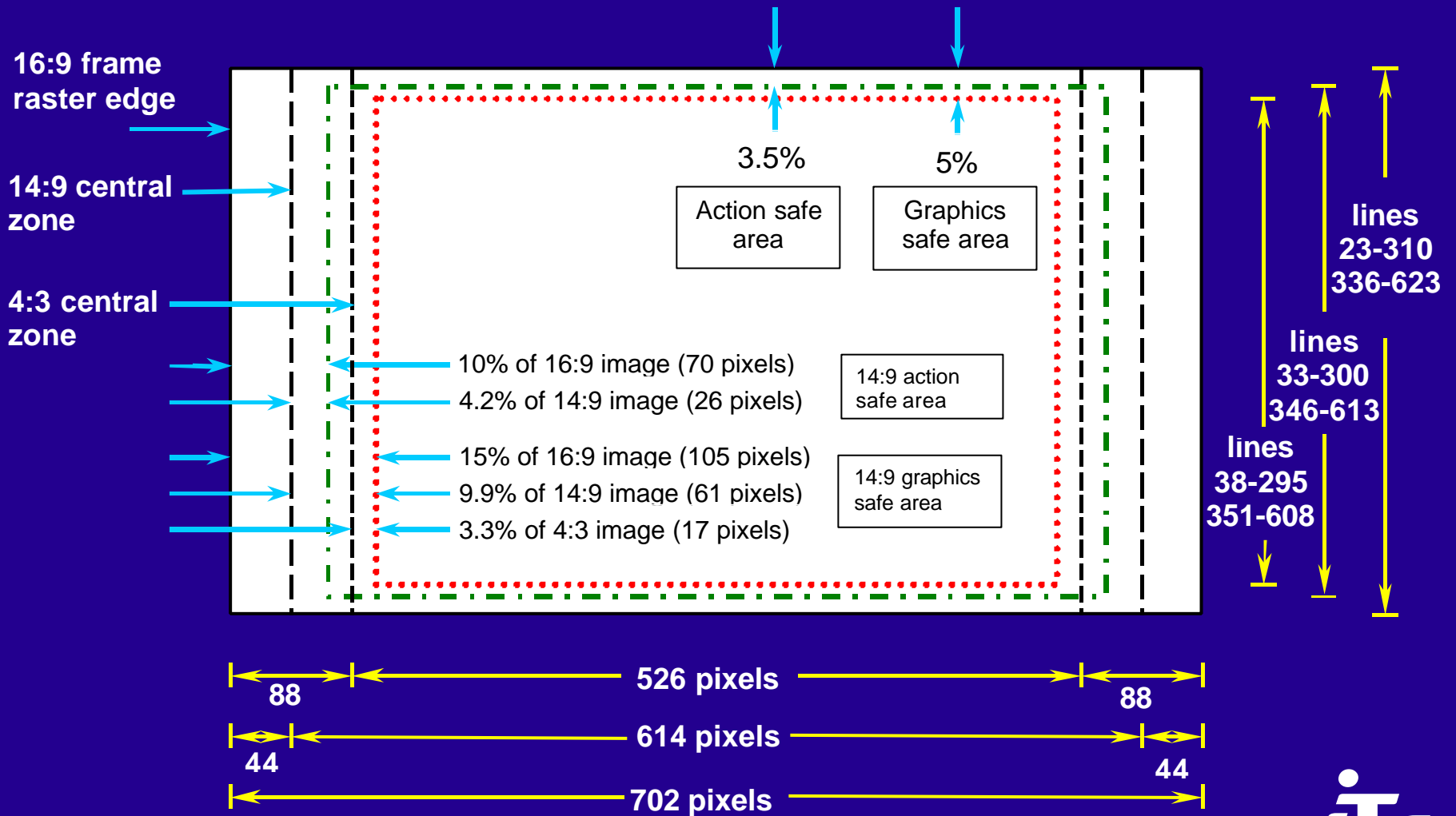
Viewer chooses full screen or 16:9 letterbox



Analogue PAL Simulcast: 14:9



16:9 Shoot to Protect 14:9



UK Widescreen Broadcasts

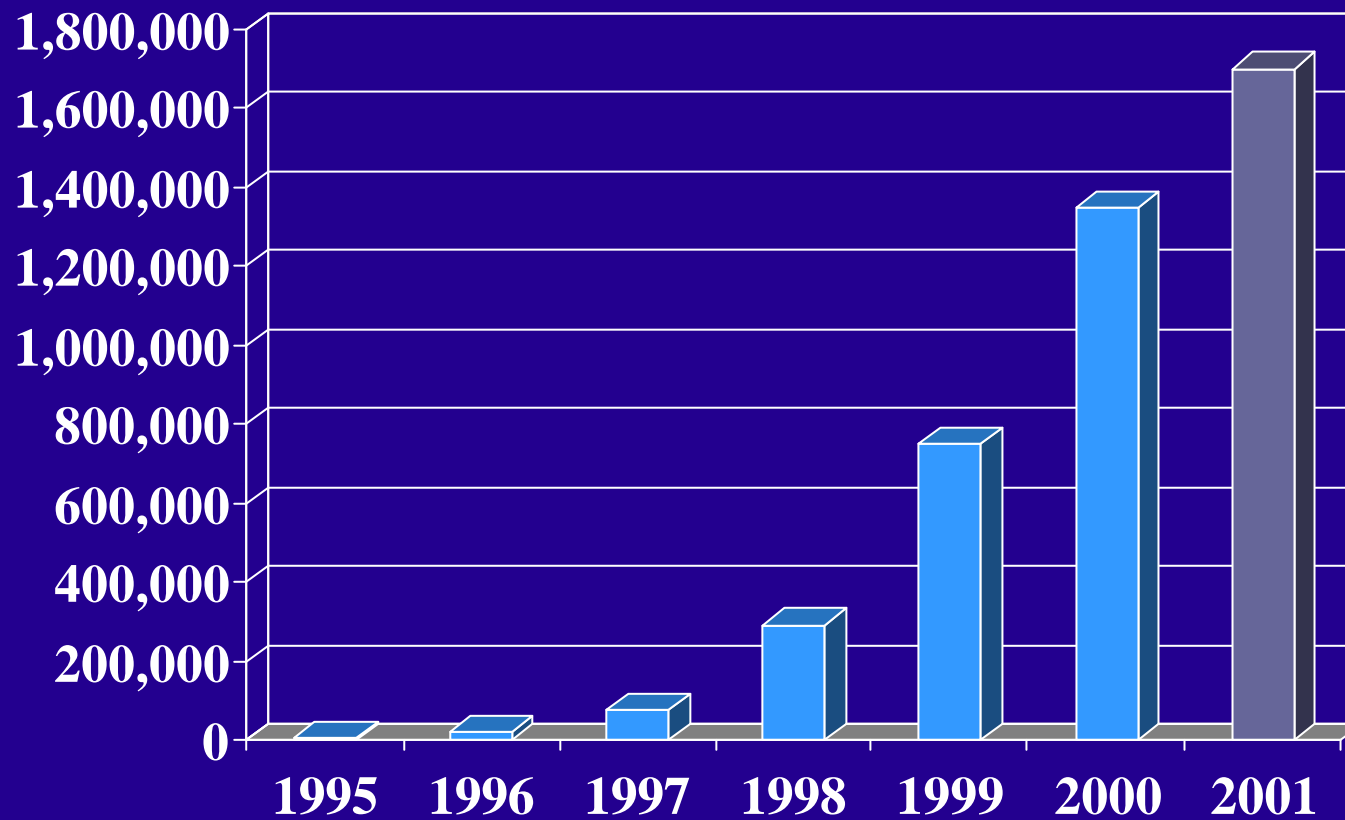
- Over 50% of simulcast BBC/ITV in peak time
- Several (digital only) movie channels
- ALL advertisements since 1 July 2000
- ALL programme genres
 - including news
 - but some sport remains in 4:3
- Programme sources:
 - mainly Rec. 601 in 16:9
 - film (including drama shot in Super 16)
 - (downconverted HTDV - Rec. 709)



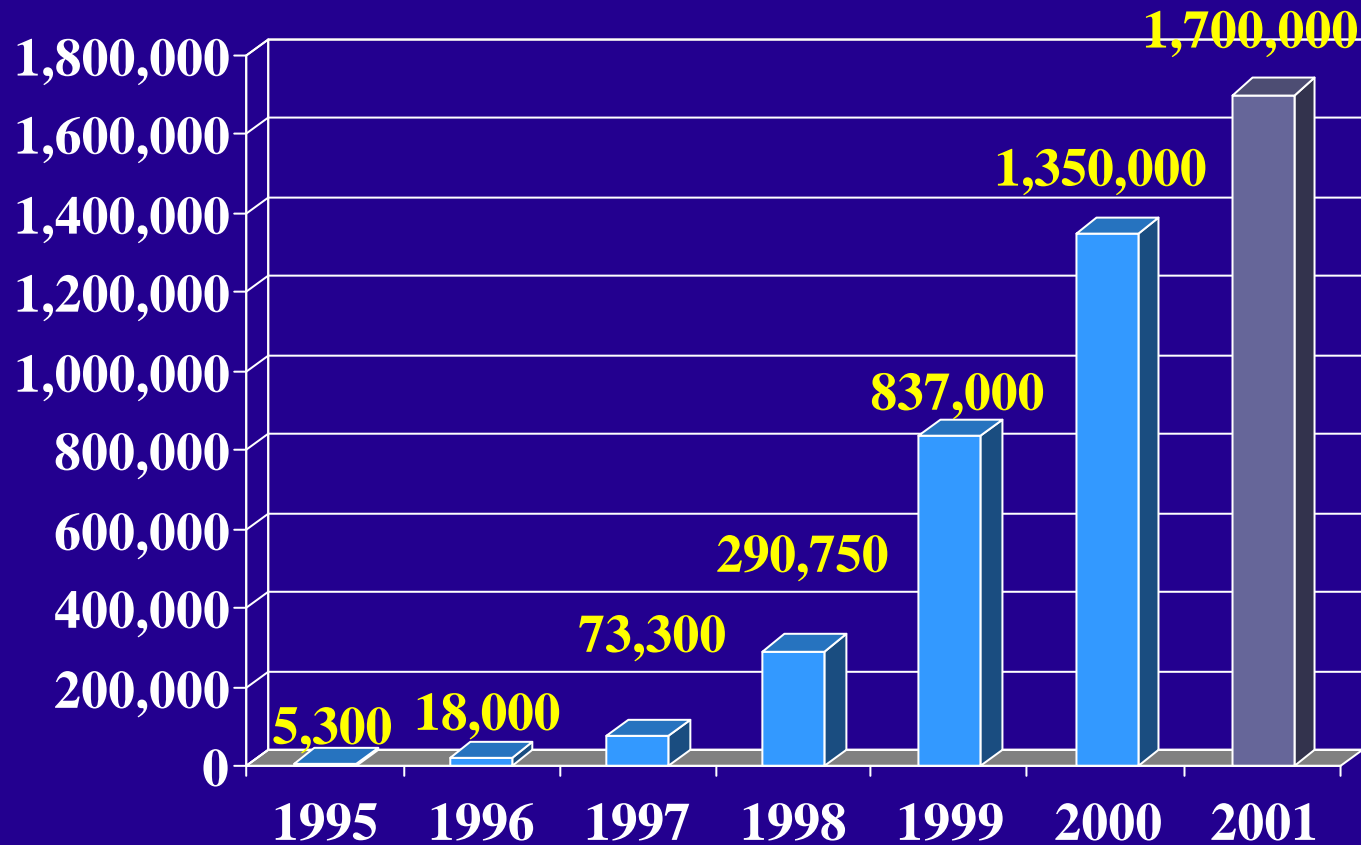
16:9 TV: UK Sales

- September 2000: 127,000
- Year 2000 so far: 1,187,000
- 90% growth in sales over same period 1999
- 50% of large-screen TVs (>43 cm)
- 61% of value of TV market: £750 million

16:9 TV: UK Sales



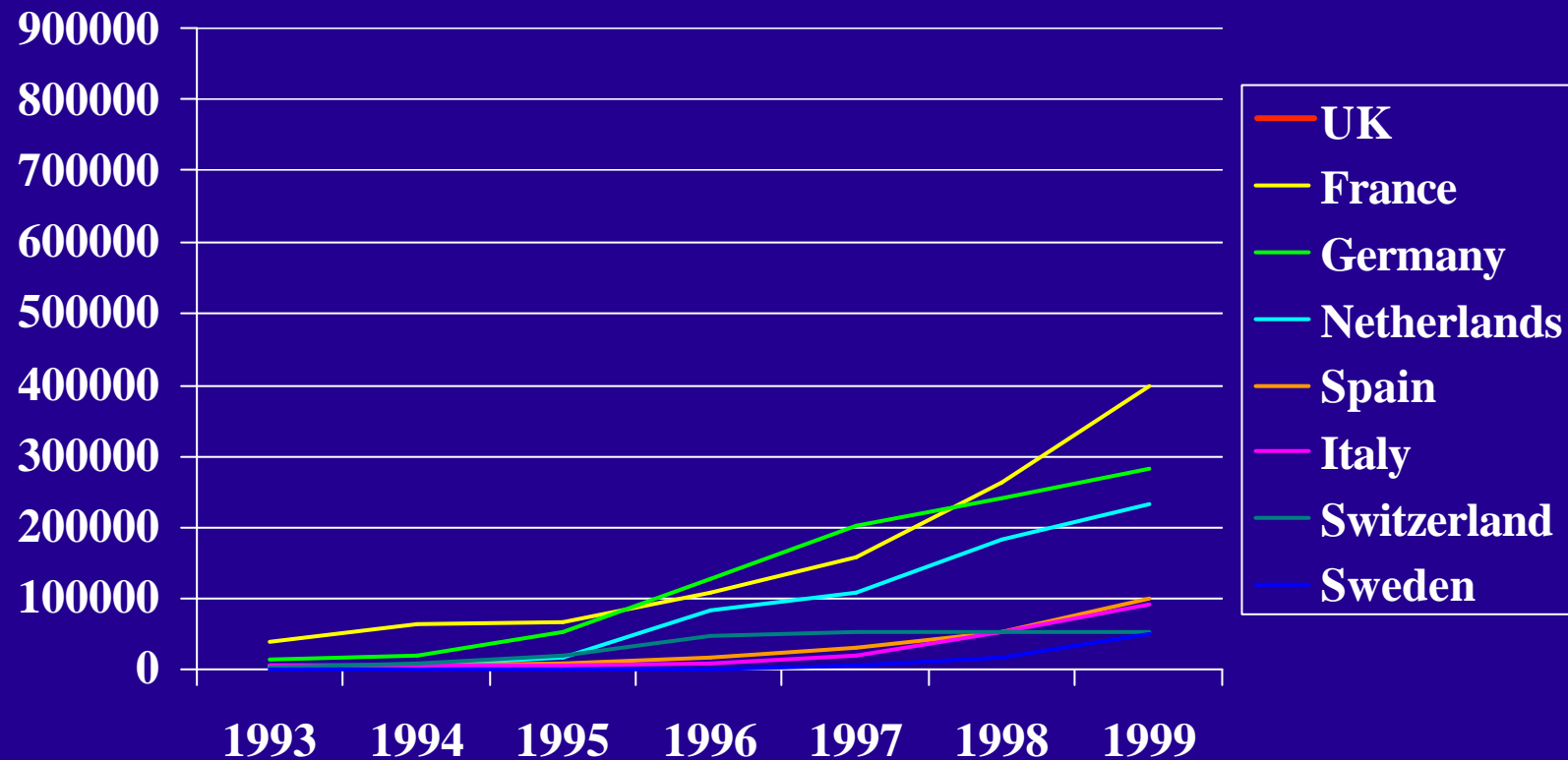
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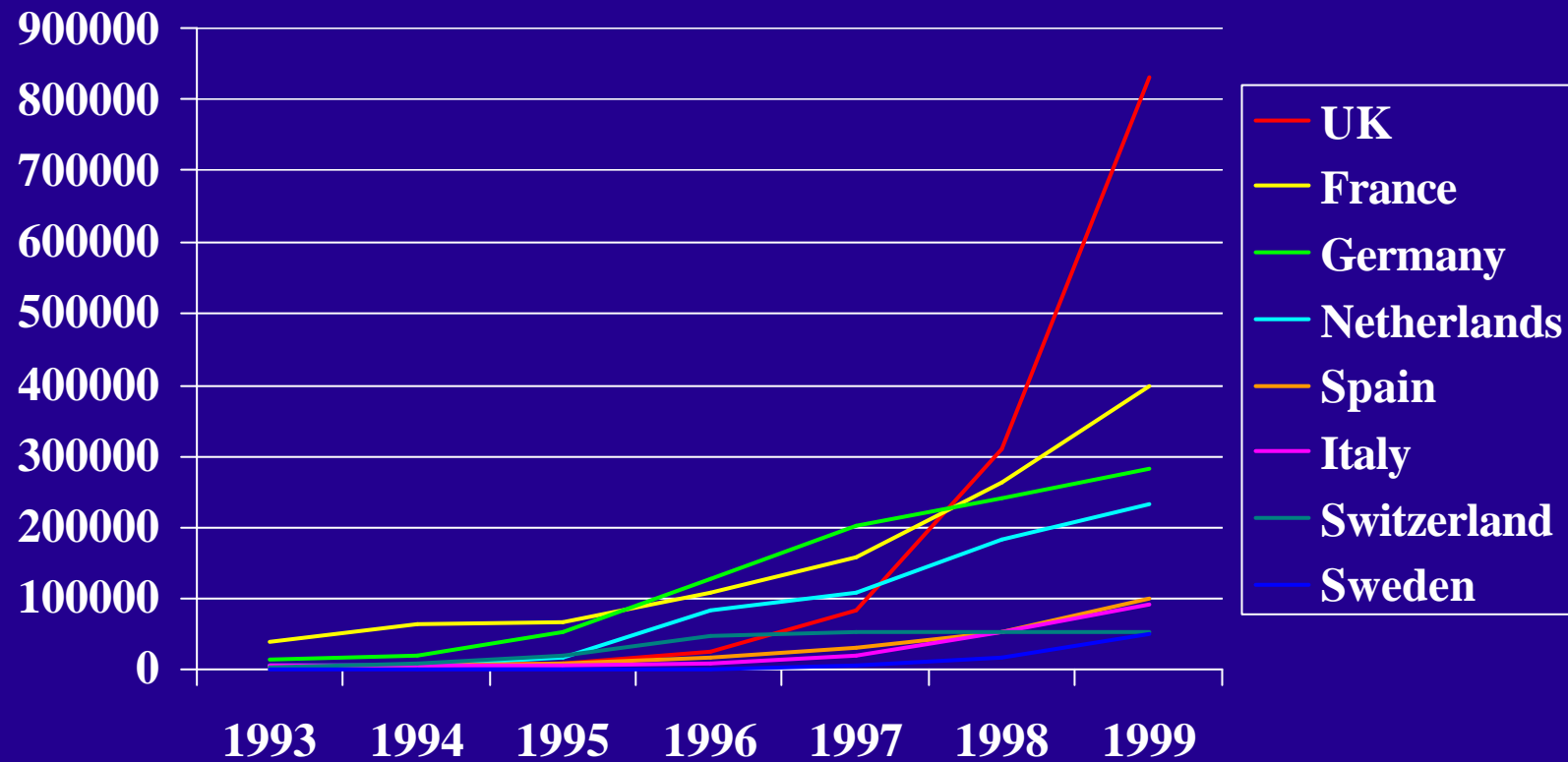
Forecast penetration end 2000: 10.4%



16:9 Sales in Europe



16:9 Sales in Europe



Conclusions: Digital Transmission

- Digital TV in the UK is a success story
 - market take-up: 1 in 5 households
 - strong commercial players
 - consumer choice (terrestrial, satellite, cable)
 - widescreen is important
- 625-line interlace is adequate for the foreseeable future
- There is no commercial requirement to *transmit* HDTV
...for the time being

Conclusions: UK Widescreen

- Digital Widescreen transmission is a success
 - many programmes are in widescreen
 - 1 in 10 homes and growing rapidly
- Made possible and *affordable* by:
 - Rec. 601 in the studio
 - analogue PAL transmission in 14:9
 - single production chain using appropriate Safe Areas: Rec. ITU-R BT.1379



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