



Four Components for UHD TV

CHANGES TO PRODUCTION

1. Resolution
2. Frame Rate
3. Dynamic Range
4. Audio



Resolution



Resolution

CHANGES TO PRODUCTION

1. Producer's seeing the benefit
2. UHD Cameras in demand
3. ITU-R BT.2050
4. Storage expensive but dropping



Storage

- **Today** SD 270MB/s or 33.75MB/s = 121 500MB/h = 122GB or about \$25 for a disk
- **1990** 1GB cost around \$36 000 making 122GB cost \$4.2M!

- **Today** HD 1.5Gbps or 187.5MB/s = 675 000MB/h = 675GB or about \$40 for a disk
- **2000** 1GB cost \$7 making 675GB cost around \$4.7k

- **Today** UHD Level 2 72Gbps or 8GB/s = 28 800GB/h = 28.8TB
1GB now \$0.07 making an hour of Ultra HD Level 2 storage about \$1.5k

- **By 2020** 1TB should be around \$0.70
or \$15 to store a 1 hour Ultra HD Level 2 programme



Cameras

Range

- Consume
- Pro-sume
- Daily use
- High-end



Frame Rate



Frame Rate

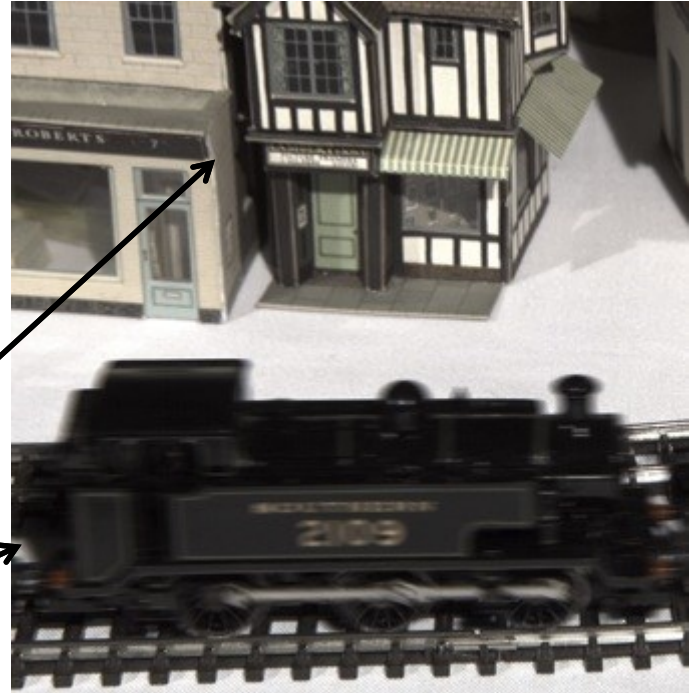
Loss of Resolution

Portrayal of motion is a trade

- Motion Blur (long shutter)
- Temporal Alias (short shutter)
 - Jerky motion
 - Wheels revolving backwards
 - Less light – more noise

Static Object

Moving Object



Dynamic Range

Image Dynamic Range

Not dependant on viewing distance!

- Screen Size independent
- Consumers like picture with “punch”

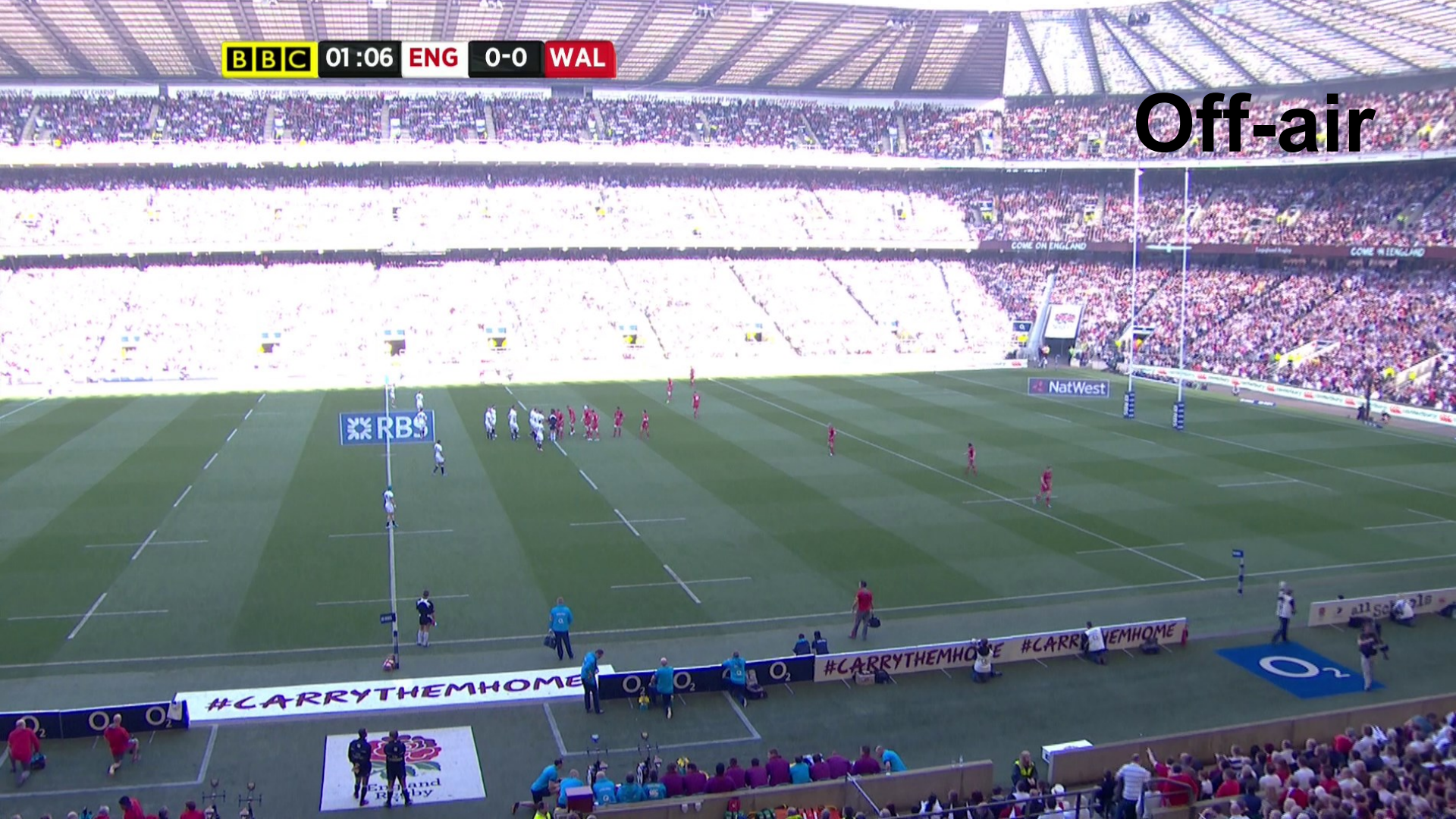






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Debate in the UK

CONSUMERS

Can we get TVs to market as soon as possible?

PROGRAMME MAKERS

What does it let me do and how much will it cost?

BROADCASTERS

Does it give us a premium product?

