

# HOW ARE EBU PSM MEMBERS USING 360/VR?



Graham Thomas (BBC)

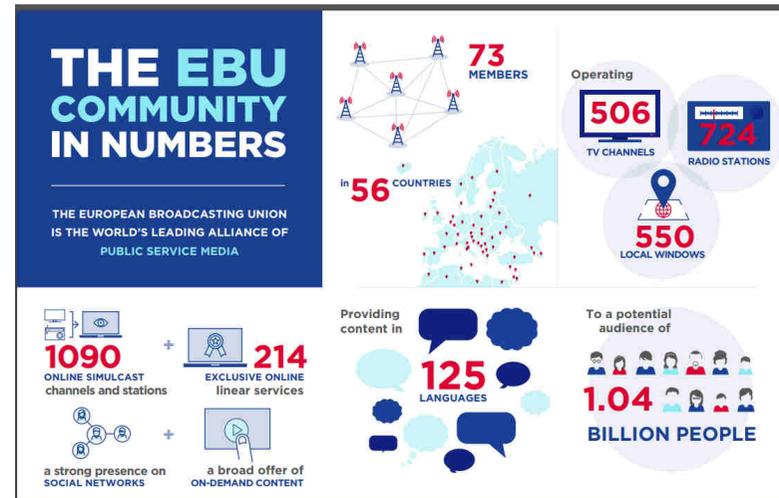
Paola Sunna - EBU Technical & Innovation (T&I)



## ABOUT THE EBU

The European Broadcasting Union (EBU) is the world's leading alliance of public service media (PSM). We have 73 Members in 56 countries in Europe, and an additional 33 Associates in Asia, Africa and the Americas. Our Members operate almost 2,000 television, radio and online channels and services, and offer a wealth of content across other platforms. Together they reach an audience of more than one billion people around the world, broadcasting in more than 120 languages. The EBU operates Eurovision and Euroradio services.

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The EBU is devoted to making public service media indispensable. We support and strengthen public service media, provide first-class media services and offer our Members a centre for learning and sharing.

# APPLICATIONS OF (VR) TECHNOLOGIES IN PUBLIC SERVICE BROADCASTING

- ❑ An overall mission that is (in general terms) to inform, educate and entertain
- ❑ The provision of services that are free at the point of delivery
- ❑ A need to cater for the needs of a diverse audience
- ❑ Be more relevant to younger audiences: it's part of our remit and they are our future
- ❑ A well-established broad portfolio of services
- ❑ A largely fixed income model, making it difficult to charge for or otherwise obtain funding for things that fall outside the usual model for programme commissioning
- ❑ Need to justifying the benefits by meeting public purposes rather than increased revenue
- ❑ Reach large audience in cost-effective way; ideally low entry barriers for exploiting new experiences



## JOINT INTERDEP MIS/MEDIA and T&I INITIATIVE

[www.ebu.ch/vr](http://www.ebu.ch/vr)

### STRATEGY AND TRENDS: HOW ARE EBU MEMBERS EXPERIMENTING WITH VR?



#### "WE ARE STILL EXPERIMENTING"

Many EBU Members started experimenting with VR in 2016 because they saw the potential of the medium to connect with their audiences.

In early 2017, 26% of EBU Members declared that they would explore the topic within the present year, while nearly as many said they had plans to develop their existing offer.

#### 360° VIDEO / VR / AR: DOES YOUR ORGANIZATION OFFER...



Source: EBU Media Intelligence Service / MIS Survey, based on answers from 43 organizations, Q1 2017

VIRTUAL REALITY

### VR CONTENT: SOME LESSONS LEARNED SO FAR BY EBU MEMBERS



EBU Members are still in an experimentation phase with regard to 360° and VR content production. As a consequence, lessons are still being learned and final conclusions about how to produce VR storytelling at its best are not yet ready and might still evolve as the experimentation moves forward. However, some learnings are clear, and are worth sharing, particularly for those who are newcomers to VR.

#### REDEFINING STORYTELLING

When we produce 360°/VR, we have to rethink the way we tell our stories in order to draw the user in. The user needs to be able to play an active part in the reality that we have created. We no longer produce linear content: we are now producing full experiences, in which users can participate, act and react, instead of simply passively watching and listening. The art for the storytelling is to create a high level of immersion.

The grammar of production is also being reinvented for VR narratives. Close-ups, camera



WE HAVE TO FIGURE OUT THE STORY FIRST, AND THEN SELECT THE TECHNOLOGY THAT WILL BE MOST SUITABLE FOR IT. IF YOU DON'T HAVE A SUPER-POWERFUL STORY (NOT FOR THE TECHNOLOGY USED BUT FOR THE EMOTIONAL ASPECT), THEN DON'T GO ON VR.

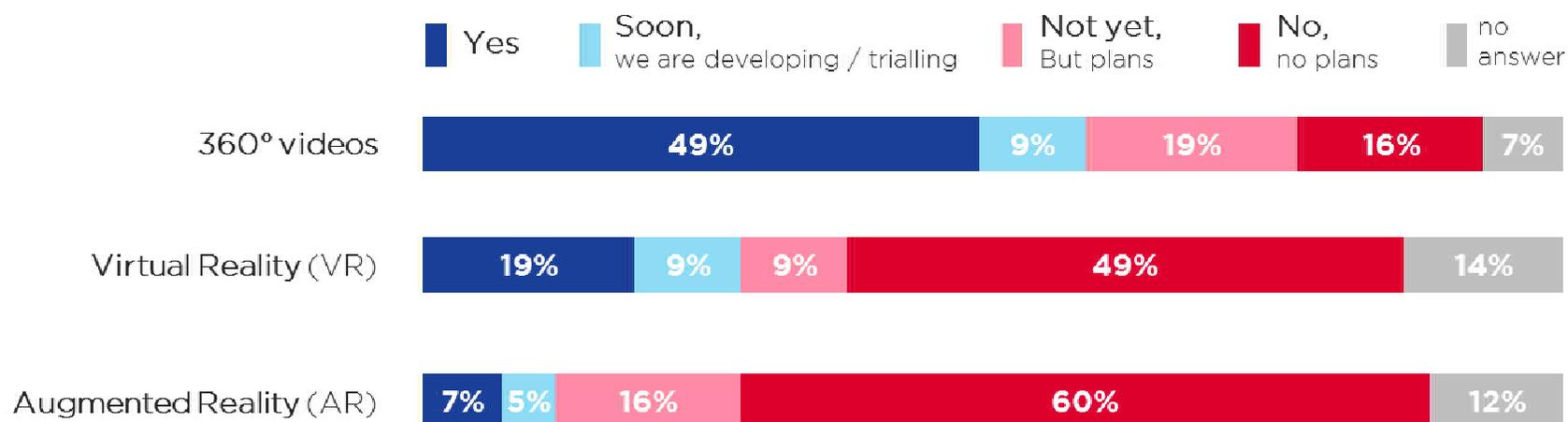
Miriam Fernanz, RTVE

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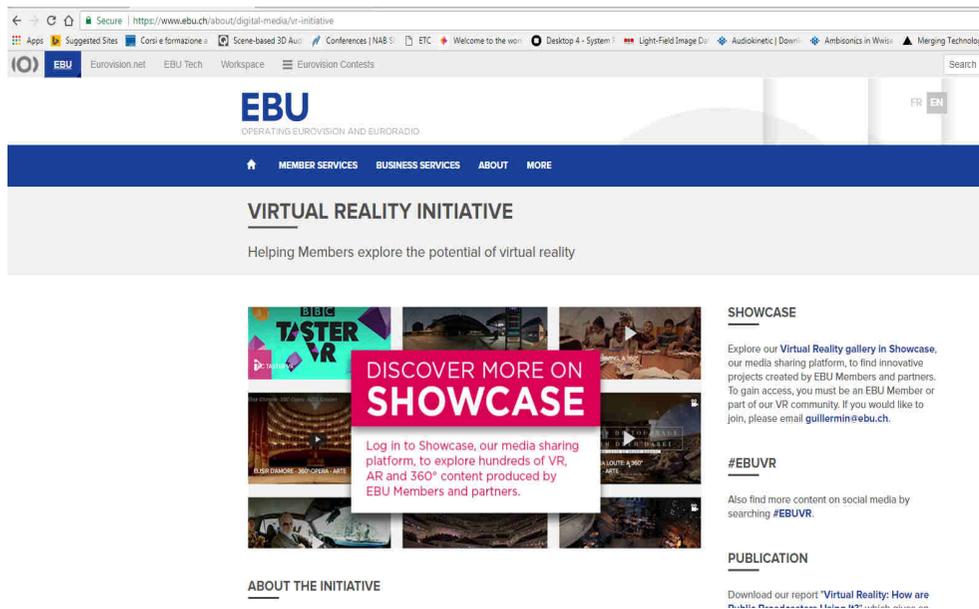
# SURVEY: WHAT EBU MEMBERS ARE DOING ON 360/VR/AR

## 360° VIDEO / VR / AR :

DOES YOUR ORGANIZATION OFFER...



# EBU VR SHOWCASE: SOME DATA (FROM MEDIA DEP)



- 245 projects listed
- Members are free:
  - to add their own projects
  - to think about potential collaboration
- 45 projects (18,37%) are VR projects
- 200 projects (81,63%) are 360° projects
- 101 projects (41,22%) are available on app
- 144 projects are web-only projects
- Main genres are:
  - natural history film/wildlife film; history documentaries; live events (sport, music, exhibition...), fiction
  - most of them are part of Member's transmedia strategies

**TR 039**

**OPPORTUNITIES AND CHALLENGES  
FOR PUBLIC SERVICE MEDIA IN VR,  
AR AND MR**

**EBU TECHNICAL REPORT**

**SOURCE: BTF-VR WORKING GROUP**

**Geneva  
April 2017**

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PSBs contributing to this work

- BBC (UK)



- KBS (Korea)



- NHK (Japan)



- RAI (Italy)



- VRT (Belgium)



- ZDF, BR (Germany)



BBG | Research & Development

## A/V PRODUCTION

### Video

- cameras: clusters of GoPros, e.g. in a Freedom rig or Panoera 360 rig, Ricoh Theta, Samsung Galaxy Gear360, Kodak SP360 4K
- stitching software Kolor Autopano video and VideoStitch Vahana for live use
- distribution has primarily been via YouTube and Facebook

### Audio

- Ambisonics and/or object-based audio
- Headphone audio rendered using straightforward stereo (or even mono), or using binaural processing

## VR TECHNOLOGIES IMPACT ON STORYTELLING

- **Viewer at the centre:** 360/VR is likely to need a new approach to storytelling. Deliberately placing the viewer at the centre of the action appears to be important in delivering the emotional engagement and empathy that VR is capable of, but this requires re-thinking the storytelling and filming/production process.
- **Interaction, presence and agency:** Interaction of the viewer with the scene needs to be considered carefully: believable VR includes the user seeing himself in the scene; ideally being able to interact with it or influence it. Achieving this within the technical constraints of the medium and the editorial constraints of the 'story' is not easy.
- **Directing attention:** VR lacks one of the basic tools for film storytelling - the "shot", i.e. the possibility to explicitly show (or hide) some element of the scene. This can make storytelling very problematic, requiring careful directing and editing. This does not mean that it would be impossible to make a full-length length 360° drama production, but a proper language still needs to be developed.
- **Navigation:** When we enjoy VR, we really want to move forward, not just look around. But 360 video itself does not allow the viewer to control their movement, leaving it up to the director to determine how the viewer moves and what can be seen.
- **Exploiting interesting locations:** 360 video particularly adds value when the location itself is interesting, and the viewer can enjoy exploring it through head movements. Removing the need for a controlled camera also allows cameras to be placed in locations where it would be difficult to use a manned or remotely-operated camera. This will impact on storytelling because we can tell a story in places that are currently impractical. On the other hand, many locations currently used for storytelling (e.g. a studio) may not work for 360 video if there are places that the viewer is not intended to see

## KEY TAKEAWAYS

- ❑ Short-term uptake to a useful proportion of the audience will be for 360 video, mostly on phone-based headsets or via a scrolling window on a mobile, tablet or PC browser
- ❑ Is 'live' important?
  - For most genres considered, live is not important, but...
  - Some journalism and sport applications would need live delivery
- ❑ VR has the potential to give us exciting and impactful new ways of delivering public service content particularly given its apparent ability to convey emotion, empathy and drive memorability
- ❑ However,
  - it is still hard to tell how much current activity is 'hype' and how much will become part of the ongoing mainstream activities of viewers
  - the audience is small at the moment which **makes cost a critical factor**
- ❑ and ...



# **SOME MEMBERS EXPERIENCES**

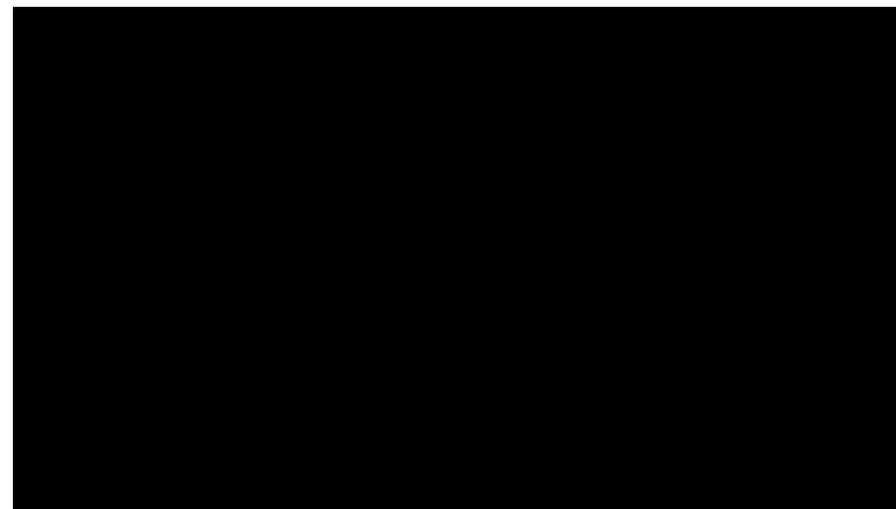
## 360° LIVE BROADCAST – FRANCETV

Roland Garros: 360° live broadcasts in 4K

RG360 virtual reality app available for free on iOS, Android and Samsung Gear VR: for fans to view live or replayed matches in full immersion 360° 4K.

To make the content available to everyone: YouTube Live 360 player on the French channel francetvsport. The 360° replays through francetvsport's YouTube and Facebook offer.

New experience through a 3D full body scan booth: visitors will be able to create their own digital avatars, which will then be transported to a virtual tennis court.



# DESIGNING SUBTITLES FOR 360° CONTENT – BBC

## Subtitles placement

- into the scene in **three fixed positions**, equally spaced by 120° around the video and slightly below the eye line
- 'head-up display'** style always in **front of you**, and slightly below straight ahead. As you **turn your head, the subtitle moves with you**, always at the same location in the headset display.
- following** your **gaze** around, but only for **larger head** movements
- in the scene **in the direction** you are looking **at the time when it appears** and remains **fixed in that location** in the scene until it **disappears**

## USER TESTING SUBTITLES FOR 360° CONTENT – BBC

- ❑ Unreal games engine + Oculus Rift headset: detection of where the viewer was looking to display the subtitles according to one of the test conditions
- ❑ Test footage consisted of a set of short 360° video clips to cover a range of scenarios; from a Planet Earth video of the Arizona desert with a narrator out of shot, to scenes with one or two speakers in view along with other items of interest
- ❑ 24 subjects who habitually use subtitles to watch television to come into the lab and give their opinions
- ❑ Each person viewed the set of four videos, each with a different subtitle behaviour. The subtitle behaviours were rotated around the videos to balance the tests. We asked them about their experience of each video, how easy they found it to find and read the subtitle and to follow the clip

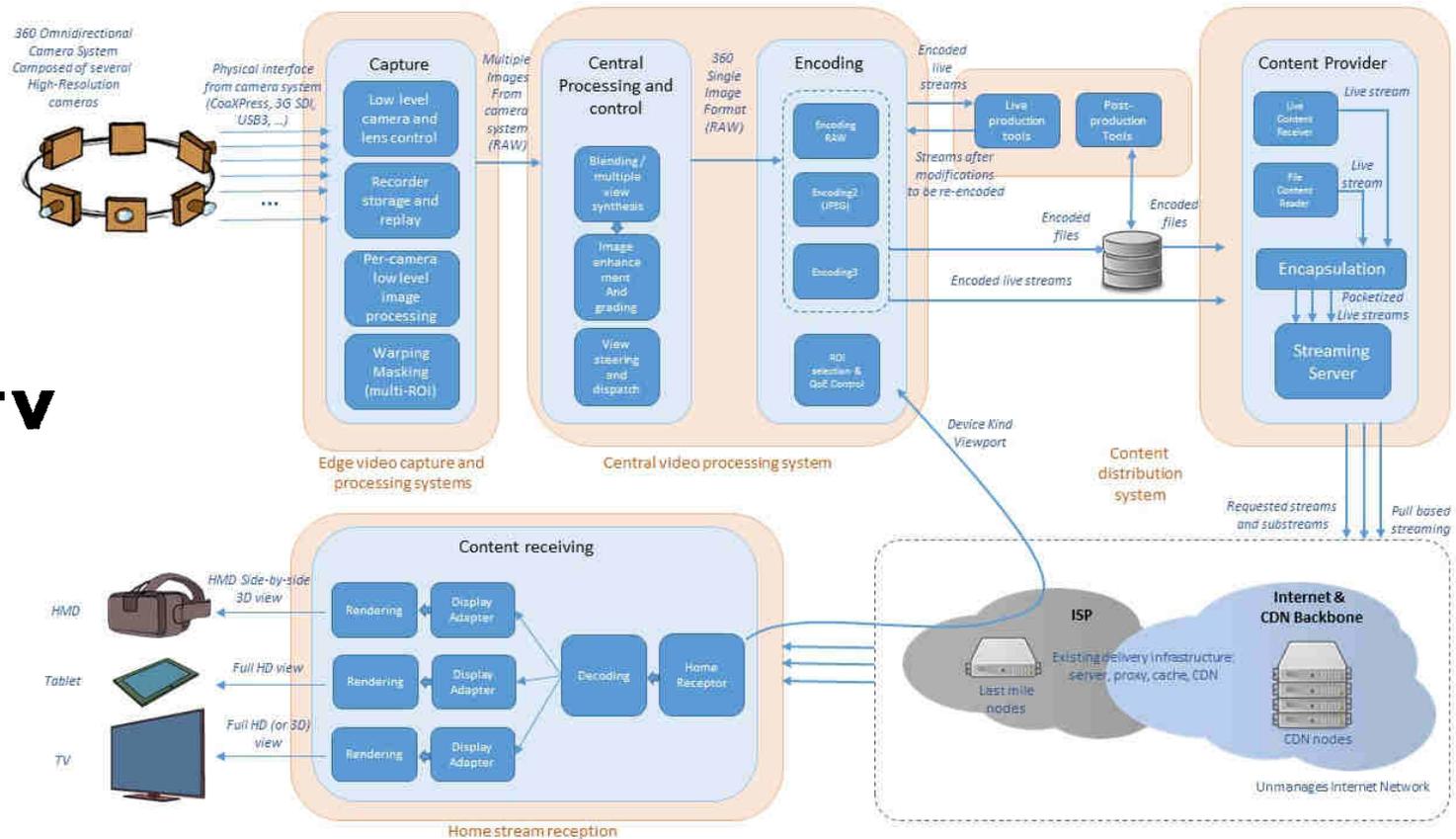
**Follow Head Immediately - Head up display** the most popular behaviour.

- Biggest drawback of this behaviour: the subtitles obstructing the video content were justified
- Feedback from the participants suggests that subtitles need to be lowered within the field of view.
- Inducing 'VR sickness'; this was barely a problem (only one or two of our participants commented on it feeling slightly odd)

**How do these behaviours stand up to prolonged viewing?**

# 360° CONTENT FOR MULTIDEVICE DISTRIBUTION - VRT

**IMMERSIATV**



## **360° VERSUS 180° - YOUTUBE (2017)**

"According to YouTube, viewers spend **75 percent** of the **time looking in the front 90 degrees** of a 360 video, suggesting that, **despite the immersive format, the direction you orient the camera in matters**

The numbers are a bit different when considering **just the most popular 360 videos**, the video-streaming platform suggests. For these videos, **20 percent of viewers** spend a significant time **exploring the space behind the camera, or directly opposite the original view** when that video first loads

**Desktop users tend to jump right into the experience, while users with Google Cardboard need a few seconds to “get situated” in the scene**, suggesting some videographers may not want to jump into the action from the very first frame"

[YouTube will now give content creators heat maps](#) that indicate which direction viewers spent the most time at, accessible on any videos with over 1,000 views. It places a color heatmap overlay on the video, showing areas of low attention in blue and high attention in red.

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YouTube's VR 180 and Daydream cameras bring immersive video to traditional creators

<https://www.digitaltrends.com/photography/youtube-360-heatmaps/>

## **360° VERSUS 180° - WE KNOW THE THEORY ...**

- ❑ VR180 is both compatible with VR devices and 2D screens
- ❑ VR180 video format keeps the user always looking at the right place: action in the front of him, or slightly on the sides
- ❑ The number of pixels dedicated to the relevant part of the video is bigger in VR180
- ❑ NextVR's rigs use a 180-degree field of view to record only the action in front of them

**... but we need to experience**

## EBU & VR-IF

EBU Members appreciate the work done so far by the VR-IF and some of them consider particularly relevant the future activities planned by the VR-IF

"VR is a new medium of creative expression providing a truly immersive experience but it is still in the early stages. It is therefore important for the **EBU to guide its Members and the industry in building a successful cross-platform ecosystem and truly compelling content**"

Simon Fell, EBU Director of Technology & Innovation

"If there is a **new medium out there**, then it is part of **PSM's remit to explore** what is in it **to serve the audience better**. At the **EBU** we are committed **to supporting our Members** in their primary role of connecting **with all audiences**, by facilitating the **exchange of lessons learned** within their exploration of new opportunities, as well as by **promoting their work at relevant industry events**"

Jean Philip De Tender, EBU Director of Media

## SOME OF THE MOST CRITICAL TECHNOLOGY ISSUES

- ❑ UHD/HDR/WCG/HFR plus OBA (object-based audio)/NGA: from trials to daily production
- ❑ Evolution into an IT- and IP-based infrastructure: the transition to IT- and IP-based infrastructure can help broadcasters to automate some of their processes and find new ways need to increase efficiency and effectiveness in production
- ❑ Unlock potential of data using Machine & Deep learning:
  - ✓ Understanding content
  - ✓ Curation and personalization
  - ✓ Understanding audiences/design **new** experiences
- ❑ 5G mobile broadband system: pros and cons; future relationship between broadcast needs and the use of 5G
- ❑ Smart radio: looking for a hybrid radio approach to make the best from digital and internet radio

## KEY QUESTIONS TO THE VR CONTENT PRODUCERS

### ❑ What makes VR specific to produce?

- Different approach to storytelling, need to think spherically in how camera is positioned, need to think about who the viewer is supposed to be in the experience: an invisible observer, present but passive or more actively present

### ❑ How mature are the production systems?

- Still immature but getting better. Low-end cameras are relatively easy to use but still lack resolution, low-light performance, etc; higher quality cameras are bulky/hard to stitch/proprietary technology

### ❑ Is there a commonly used production format? What is your preferred one?

- Equirectangular format seems ubiquitous in production and is fairly well supported in common video editing packing, with options for things like rotating/levelling the scene.
- More efficient packing approaches might be suitable for distribution but the simplicity of the equirectangular makes it good choice for production/mastering
- For the audio, ADM (Audio Definition Model) in production that can be rendered out to various flavours of ambisonic (e.g., Facebook/YouTube), or MPEG-H and AC4 for devices that support these

## KEY QUESTIONS TO THE VR CONTENT PRODUCERS

### ❑ Could a 360 production be reused for a conventional 2D consumption?

- Unlikely – resolution will generally be insufficient, camera placing likely to be different. Maybe some 360 clips could be reused, but unlikely that a whole programme shot to be "good" 360 experience could be repurposed to make a good conventional TV version

### ❑ Would 180 degrees be enough?

- In many case probably yes, but we have to experience. Probably it might be hard to explain to a viewer what this is: 360 is becoming known but 180 somehow doesn't have the same appeal

### ❑ How to guide the spectator within a 360 scene?

- Approaches pioneered in the theatre, e.g. lighting, movement and sound

## KEY QUESTIONS TO THE VR CONTENT PRODUCERS

❑ **Could you present a concrete case highlighting the specificities and problems you had to overcome?**

- A couple of days ago BBC has announced a department for virtual reality experiences called VR Hub, that is going to invest in commissioning high-quality VR experiences. **“Our research shows that for as long as the quantity of high-quality content remains low, and the experience remains cumbersome, mainstream audiences won’t use VR. That’s why we’re focusing on a small number of high impact pieces that have broad, mainstream appeal.”** – Zillah Watson (BBC)

[BBC R&D – 360 video and virtual reality](#)

[BBC R&D - 8 Tips for Producing VR Projects](#)

[BBC R&D - Factual Storytelling Tips for 360 Video](#)

[BBC R&D - Designing subtitles for 360 content](#)

[BBC R&D - Enhancing 360 Video with Graphics in the Large Hadron Collider](#)

[BBC R&D - Unearthed - Interactive 360 Sound and Video in a Web Browser](#)

[BBC R&D - Virtual Reality Sound in the Turning Forest](#)

[BBC R&D - A Virtual Reality Fairy Tale Premiered at Tribeca Film Festival](#)

[BBC – Immersive News](#)

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**THANK YOU!**

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