Subtitles for 360° Media

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Scenery 360° videos
What is the best way to present subtitles?
Basic approach
This is your subtitle in two lines.
Speaker identification
colors
Sie kriegen die neusten Meldungen aus Kultur, Wirtschaft und Sport.
He’s not speaking

Nicht in die Kamera gucken
← und bitte!

Speaker to the left
Video
Alternative presentation „modes“
Other activities

BBC 2017 – Test of different subtitle presentation modes
https://www.bbc.co.uk/rd/blog/2017-10-subtitles-360-video-virtual-reality-vr
NYT – often uses „evenly spaced“ mode

Source: https://www.nytimes.com
Dynamic subtitles: Fixed to the video, like burned-in

Positive:
Subtitles more comfortable (less motion sickness, better „presence“
Better speaker identification

Negative
Forced to look at speaker → In some cases, viewers didn’t look around that much.

Dynamic vs. Always centered → No clearly preferred method

Source https://www.researchgate.net/publication/326025677_Dynamic_Subtitles_in_Cinematic_Virtual_Reality
Subtitles in MPEG OMAF – fixed-positioned

Video
Implementation approach in ImAc
Formats

- Video and subtitles are streamed using Dash
  - Video encoded as h264, equirectangular
  - Subtitle format: IMSC, custom ImAc extensions for positional information

Example IMSC with extensions

```xml
<p xml:id="subtitle1" region="bottom" begin="00:00:01.000" end="00:00:04.000"
    style="paragraphStyle" imac:equirectangularLong="17" imac:equirectangularLat="-10">
    <span style="spanStyle">Subtitle one</span>
</p>
<p xml:id="subtitle2" region="bottom" begin="00:00:06.000" end="00:00:09.000"
    style="paragraphStyle" imac:equirectangularLong="-18" imac:equirectangularLat="20">
    <span style="spanStyle">Subtitle two</span>
</p>
```
Player implementation

Personalization options

• Font size
• Background: box or outline
• Position: top/bottom
• Margin
• Presentation mode (arrow, radar, auto-positioning)

Player renders subtitles according to settings and based on information from IMSC document.
MPEG OMAF

Two formats
IMSC1
WebVTT

Two modes
fixed-positioned
always-visible
Thank you for your attention!

Experts in audio-visual media

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