Subtitles for 360° Media

W3C M&E call 05.02.2019

Peter tho Pesch

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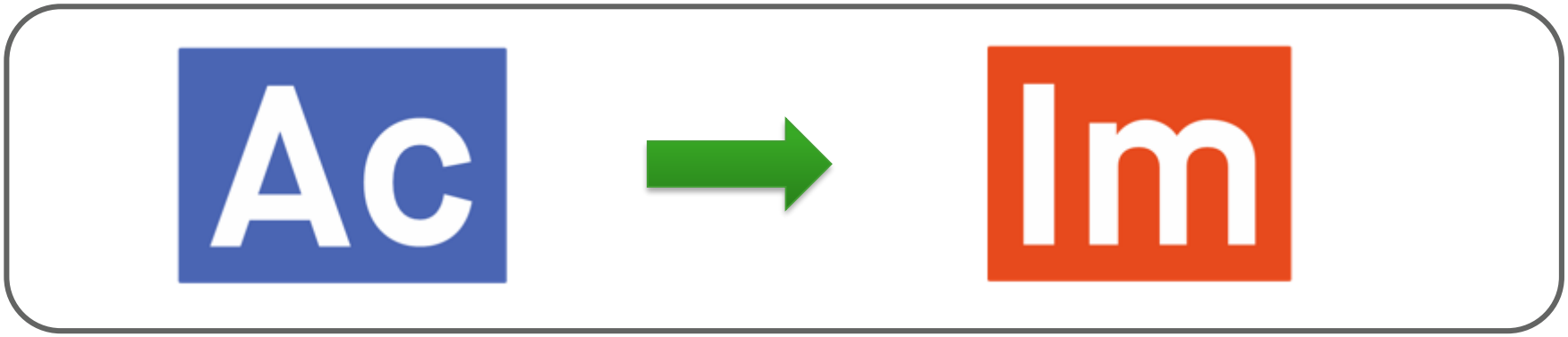
ImAc Immersive Accessibility



www.imac-project.eu

Funded by the Horizon 2020 Framework Programme of the European Union

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Scenery 360° videos

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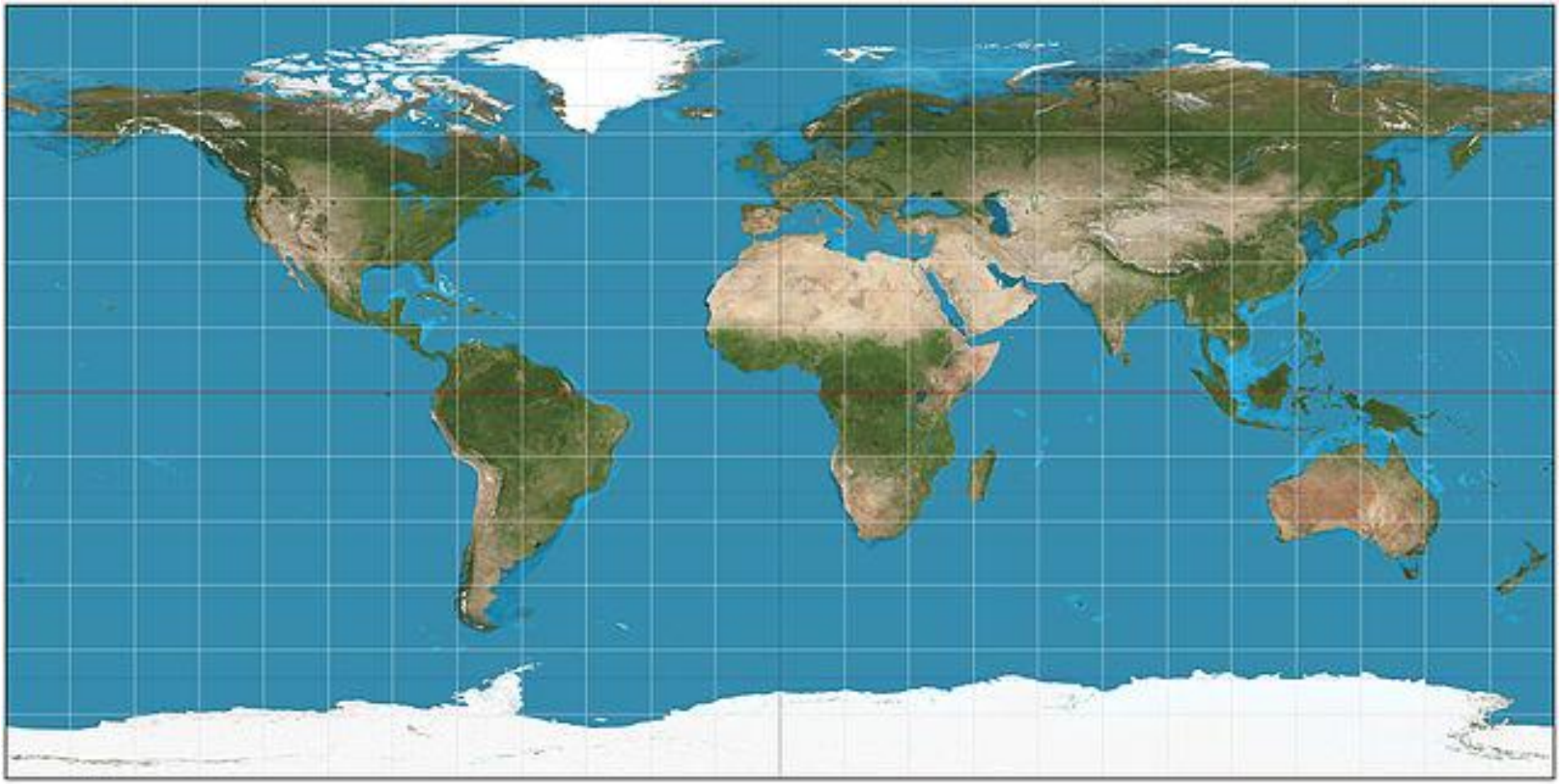


Source: Wikipedia, https://en.wikipedia.org/wiki/Equirectangular_projection

What is the best way to present subtitles?

Basic approach

This is your subtitle
in two lines.

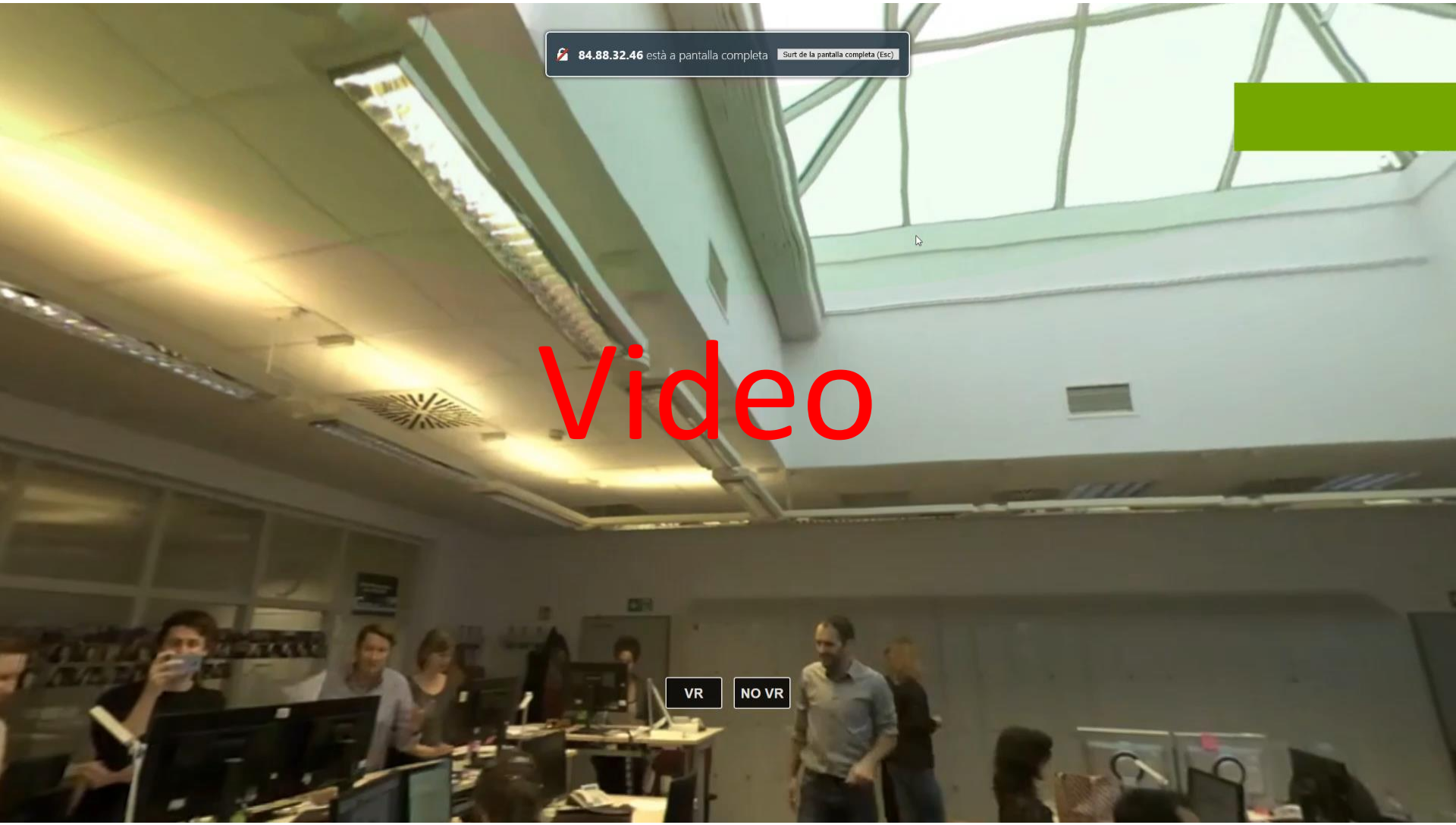
Video
always-visible
VR NOT FOUND

Speaker identification

colors

Viewing angle
Speaker
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

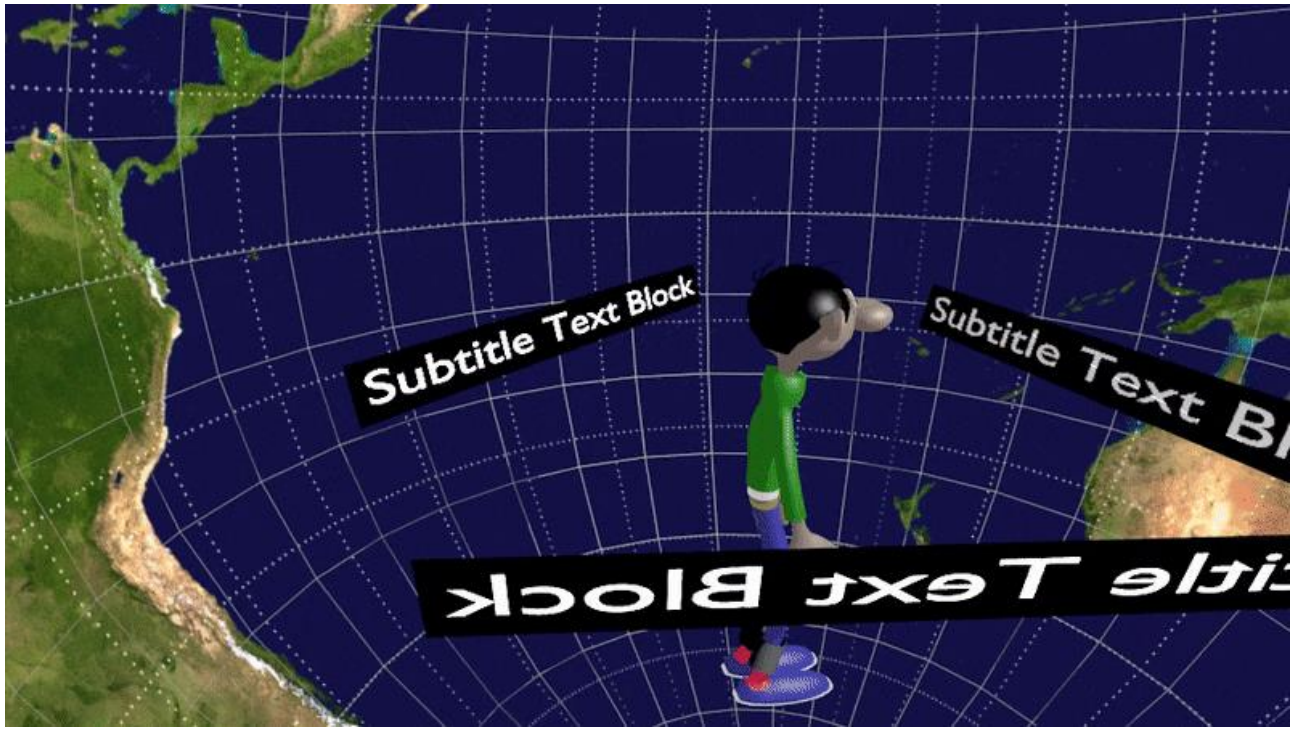

84.88.32.46 està a pantalla completa
Surt de la pantalla completa (Esc)
Video
VR
NO VR

Alternative presentation „modes“

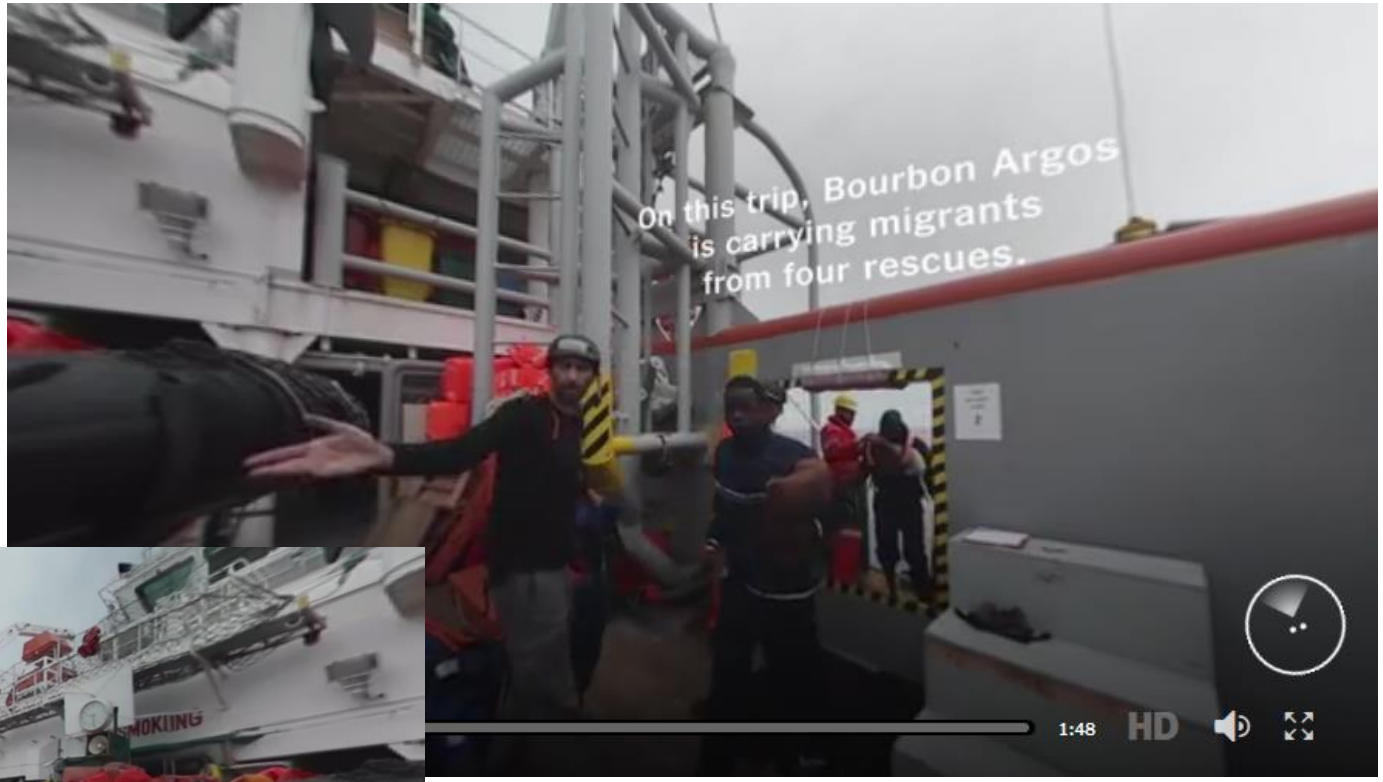
Other activities

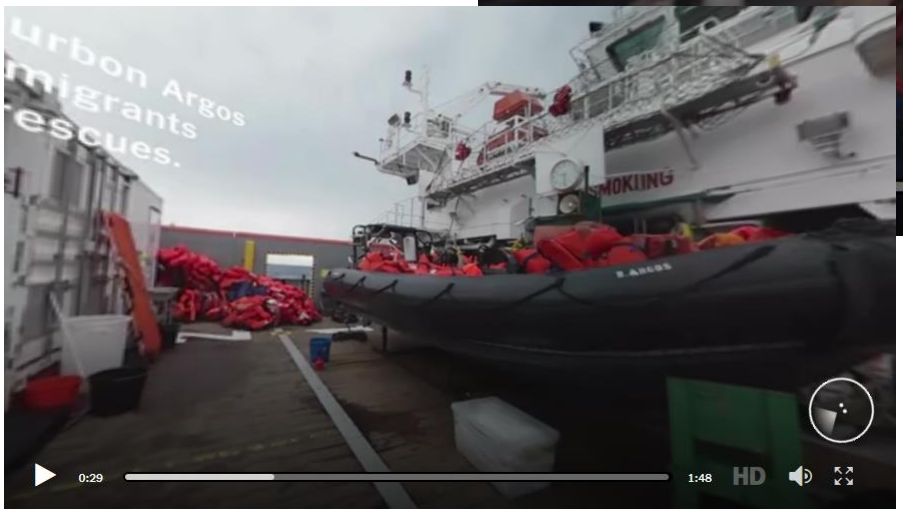
BBC 2017 – Test of different subtitle presentation modes

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

Ludwig Maximilian Universität (LMU)
„dynamic subtitles“

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

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Subtitles in MPEG OMAF – fixed-positioned

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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

```
<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>
```


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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.

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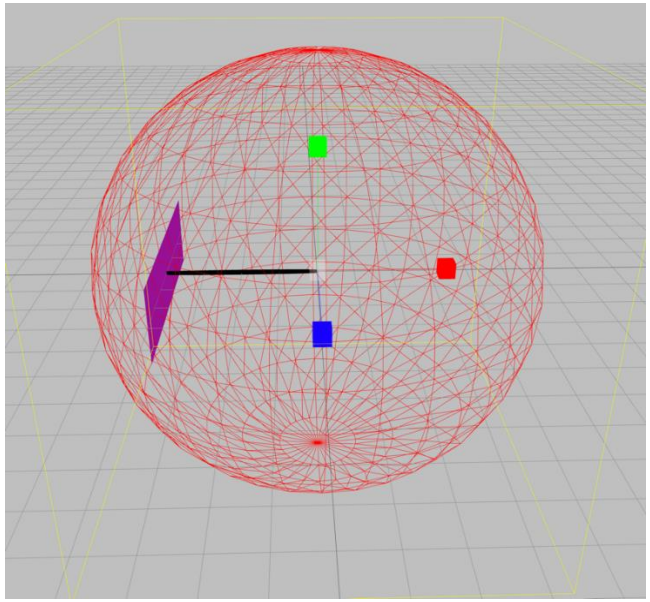
MPEG OMAF



Two formats

- IMSC1
- WebVTT

Two modes

- fixed-positioned
- always-visible

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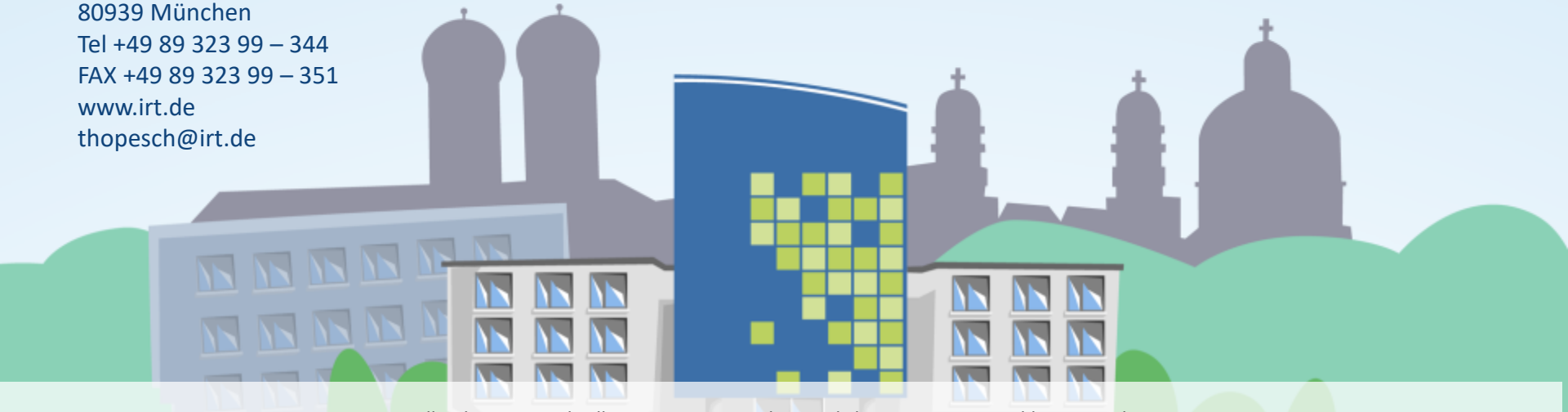
Thank you for your attention!

Experts in audio-visual media

Peter tho Pesch
Production Technologies

Floriansmuehlstrasse 60
80939 München
Tel +49 89 323 99 – 344
FAX +49 89 323 99 – 351
www.irt.de
thopesch@irt.de



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