

Overview of 3D TV drafts

Bert Greevenbosch

bert.greevenbosch@huawei.com

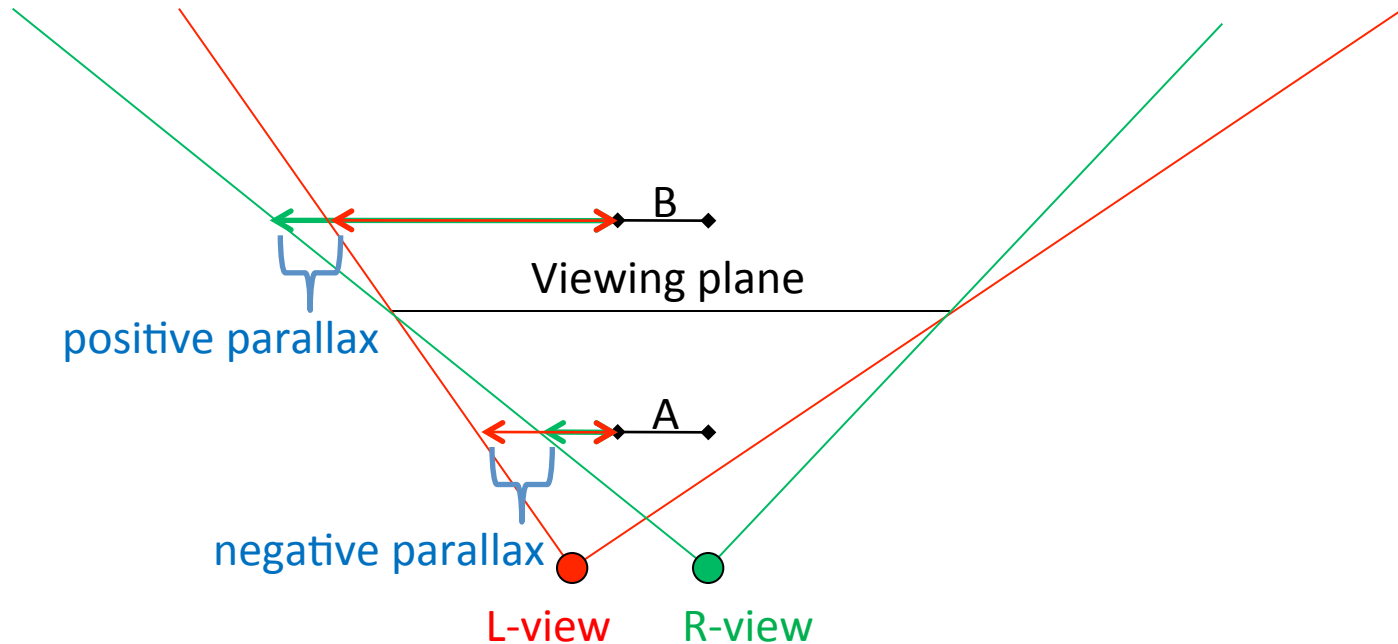
Overview

- Introduction of two drafts:
 - draft-greevenbosch-mmusic-parallax-attribute
 - draft-greevenbosch-mmusic-signal-3d-format
- Both drafts extend SDP to signal stereoscopic 3D streaming.
- The first one is for static positioning of 2D objects, such as text.
- The second is for signaling the format of the stereoscopic 3D video stream.

3D basics

- To see 3D, two separate 2D views are needed.
- One view is for the left eye, whereas the other is for the right eye.
- The brain combines the 2D images to form a 3D image.

Views & parallax



- The parallax is the difference in horizontal positioning between the L- and R-view.
- A appears left in the R-view as compared to the L-view => negative parallax
- B appears right in the R-view as compared to the L-view => positive parallax
- For objects that appear in the viewing plane (e.g. the TV screen), the parallax is zero.

draft-greevenbosch-mmusic-parallax-attribute

- Proposes an SDP attribute "ParallaxInfo".
- The attribute signals a parallax value for the display of 2D objects.
 - timed text (such as subtitles)
 - 2D graphics (such as channel logo)
 - on-screen display (such as volume bar)
- The attribute can be session level or media level.
- In general, the 2D object has a static 3D position throughout the session.

"ParallaxInfo" syntax

- The "ParallaxInfo" attribute has the following syntax:

a=ParallaxInfo:<transmitted position> <parallax>

- <transmitted position> indicates the position (Left/Right/Center) of the transmitted stream.
- <parallax> indicates the parallax (in pixels).

Example

```
v=0
o=Alice 2890844526 2890842807 IN IP4 131.163.72.4
s=The technology of 3D-TV
c=IN IP4 131.164.74.2
t=0 0
a=ParallaxInfo:L -20
m=video 49170 RTP/AVP 99
a=rtpmap:99 H264/90000
m=video 52888 RTP/AVP 97
a=rtpmap:97 3gpp-tt/1000
a=ParallaxInfo:L -16
m=audio 52890 RTP/AVP 10
a=rtpmap:10 L16/16000/2
```

Streaming of 3D video

- Simulcast:
 - Transfer the L- and R-views as separate video streams.
- Frame Packing:
 - Pack L- and R-views in a single video stream, by dividing each video frame over the L- and R-views.
- 2D + auxiliary:
 - Synthesize L- and R-views from 2D video and auxiliary data, such as depth or parallax maps.

3D video formats



2D + auxiliary*



Frame Packing



Simulcast

*) [picture source: Wikipedia](#)

draft-greevenbosch-mmusic-signal-3d-format

- Proposes a media-level SDP attribute "3dFormat".
- The attribute is used to signal frame packing, simulcast or 2D+auxiliary.
- Several configurations can be signalled:
 - Frame packing: Side by Side, Top and Bottom, Line Interleaved, Checkerboard, Frame Sequential.
 - 2D+aux: depth map and parallax map.
 - Simulcast: which stream is left and which is right.
- The SDP grouping mechanism is extended to associate two streams that form one 3D video.
- The attribute allows usage of industry standard codecs for 3D video.

"3dFormat" syntax

- The "3dFormat" attribute has the following syntax:
 a=3dFormat:<Format Type> <Component Type>
- <Format Type> indicates whether the stream is simulcast, frame packed or 2D+auxiliary.
- <Component Type> defines the type, i.e. left/right/center view, frame packing type, depth/parallax map.

"3DS" group semantics

- A new SDP group type "3DS" is introduced.
- It is used to associate two streams that constitute a single 3D video:
 - When L- and R- stream are transmitted as separate streams.
 - When one 2D stream and a depth/parallax map stream are transmitted separately.
- Grouping is not needed for frame packing or transmission of 2D + auxiliary in a single stream.

Example

```
v=0
o=Alice 2890844526 2890842807 IN IP4 131.163.72.4
s=The technology of 3D-TV
c=IN IP4 131.164.74.2
t=0 0
a=group:3DS 1 2
m=video 49170 RTP/AVP 99
a=rtpmap:99 H264/90000
a=3dFormat:2DA C
a=mid:1
m=video 49172 RTP/AVP 101
a=rtpmap:101 H264/90000
a=3dFormat:2DA D
a=mid:2
m=audio 52890 RTP/AVP 10
a=rtpmap:10 L16/16000/2
```

Links

- <https://datatracker.ietf.org/doc/draft-greevenbosch-mmusic-parallax-attribute/>
- <https://datatracker.ietf.org/doc/draft-greevenbosch-mmusic-signal-3d-format/>

Thank you.

Questions?

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