



ORPHEUS

Object-Based Audio Experience

**Piloting an End-to-end
Object-based
Audio Broadcasting Chain**

EURESCOM

Fraunhofer
IIS

BBC
R&D

TRINNOV
AUDIO



[°°] elephantcandy

b.com

ircam
Centre
Pompidou

BR

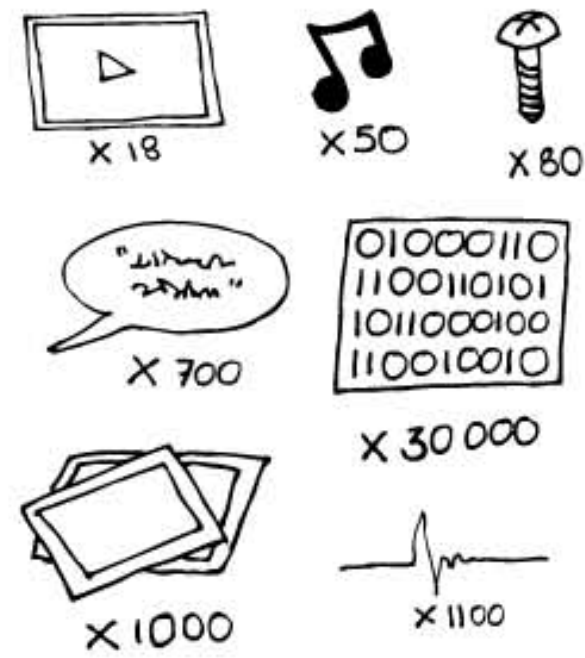
MAGIX

www.orpheus-audio.eu

[@ORPHEUS_AUDIO](https://twitter.com/ORPHEUS_AUDIO)

TRADITIONAL BROADCASTING

1



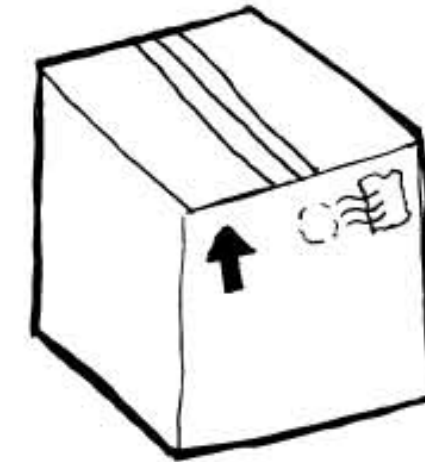
The programme is made in the traditional way.

2



The programme is turned into a piece of linear media.

3



This is broadcast to everyone.

4

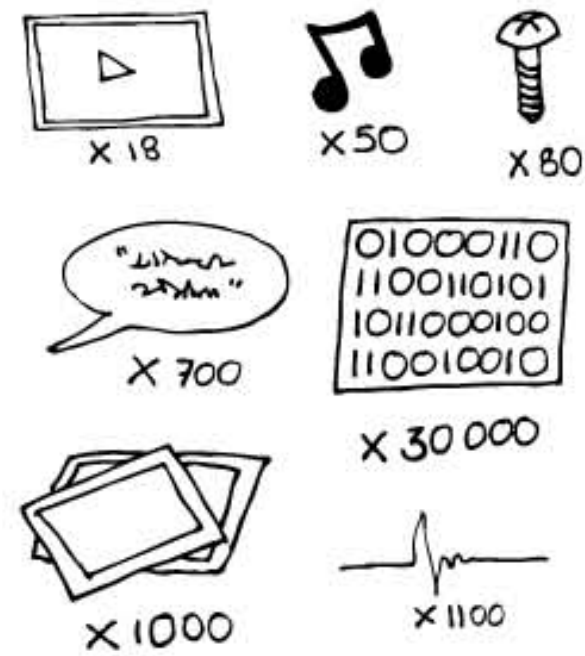


The same content is played back on all devices, resulting in compromises on some devices.

Design: BBC R&D

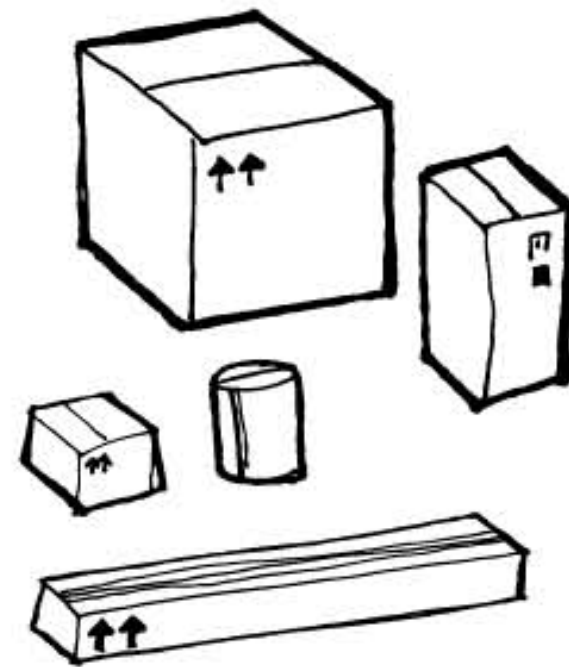
OBJECT BASED BROADCASTING

1



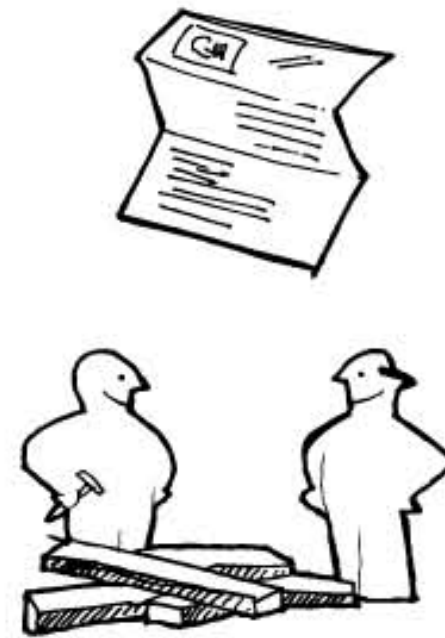
The programme is made in the traditional way.

2



The programme is turned into a collection of media objects along with some metadata to describe how it should be assembled. All of this data is broadcast to everyone.

3



The device inside the viewer's home re-assembles the media objects according to the metadata.

4



The objects can be assembled differently (based on the original metadata). optimising the experience depending on local factors relating to the device, environment and viewer.

Design: BBC R&D



research

ORPHEUS Partners

Object-Based Audio Experience



b com



BR



broadcaster



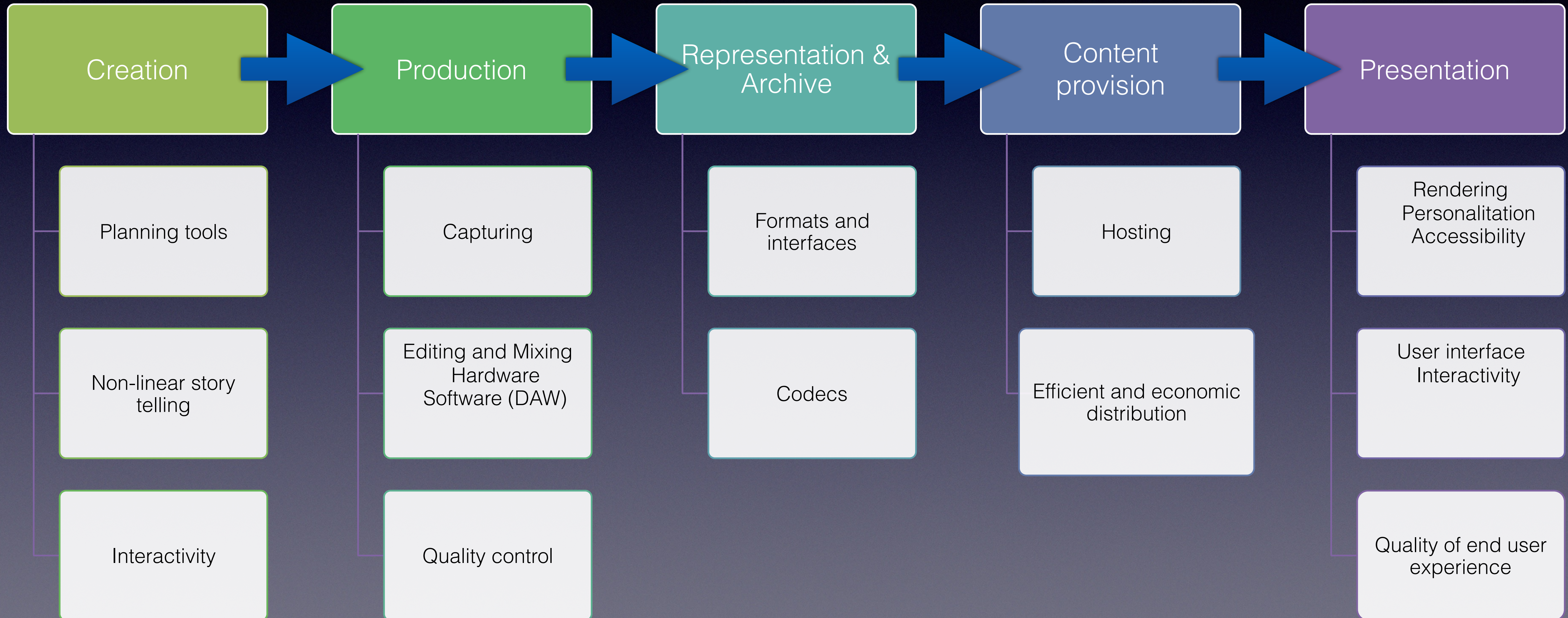
MAGIX

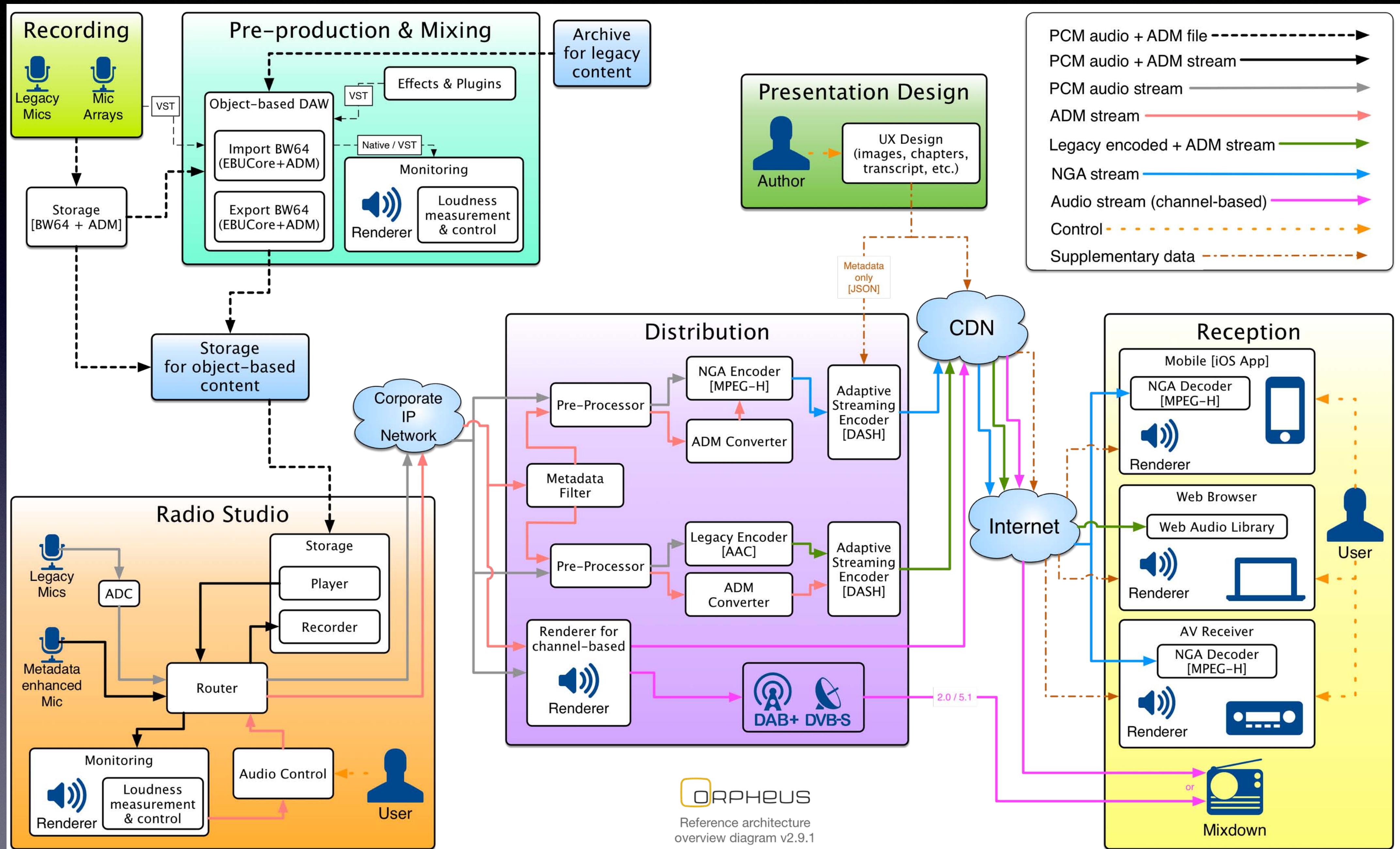
[°°] Elephantcandy

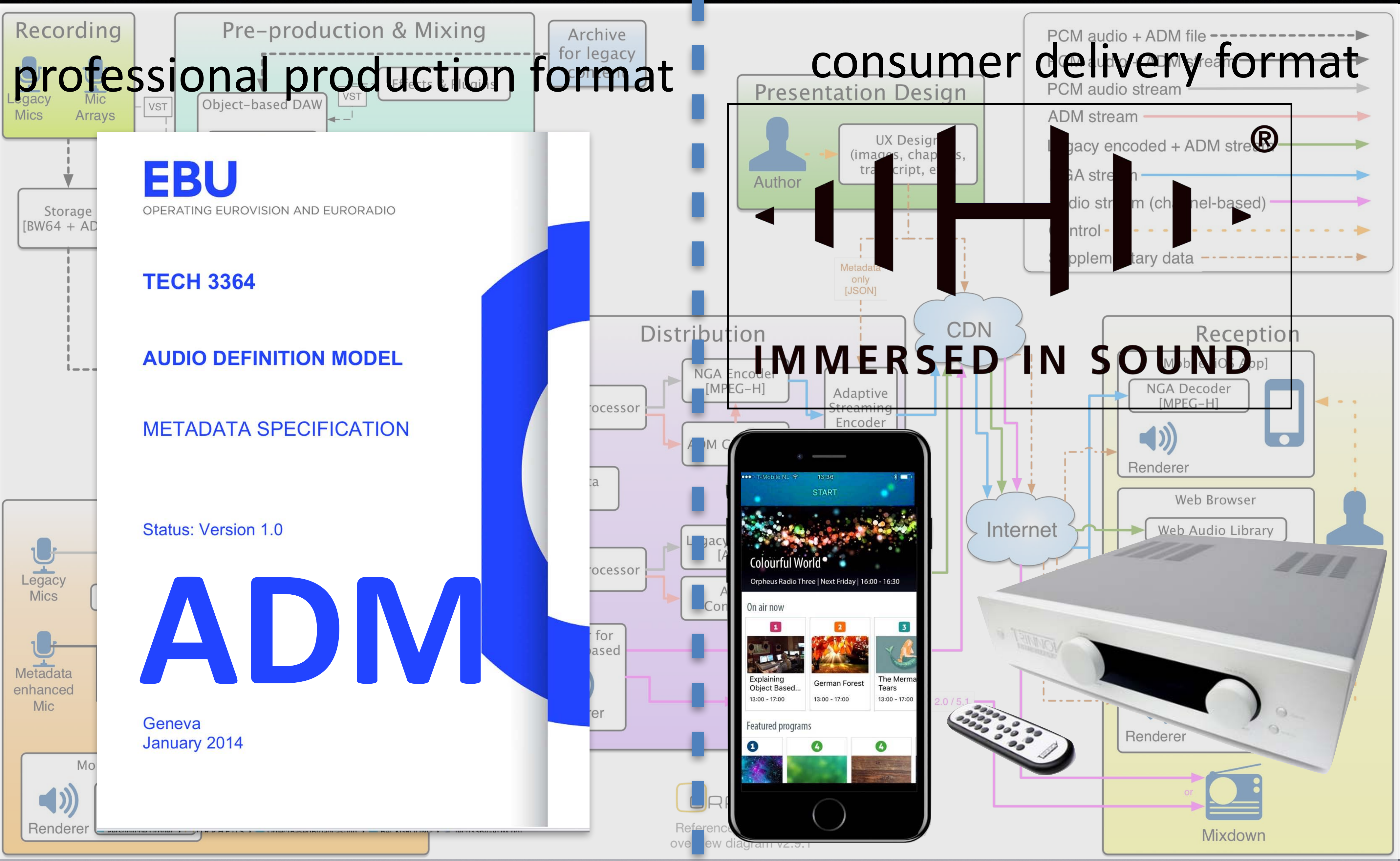
companies



End-to-end chain







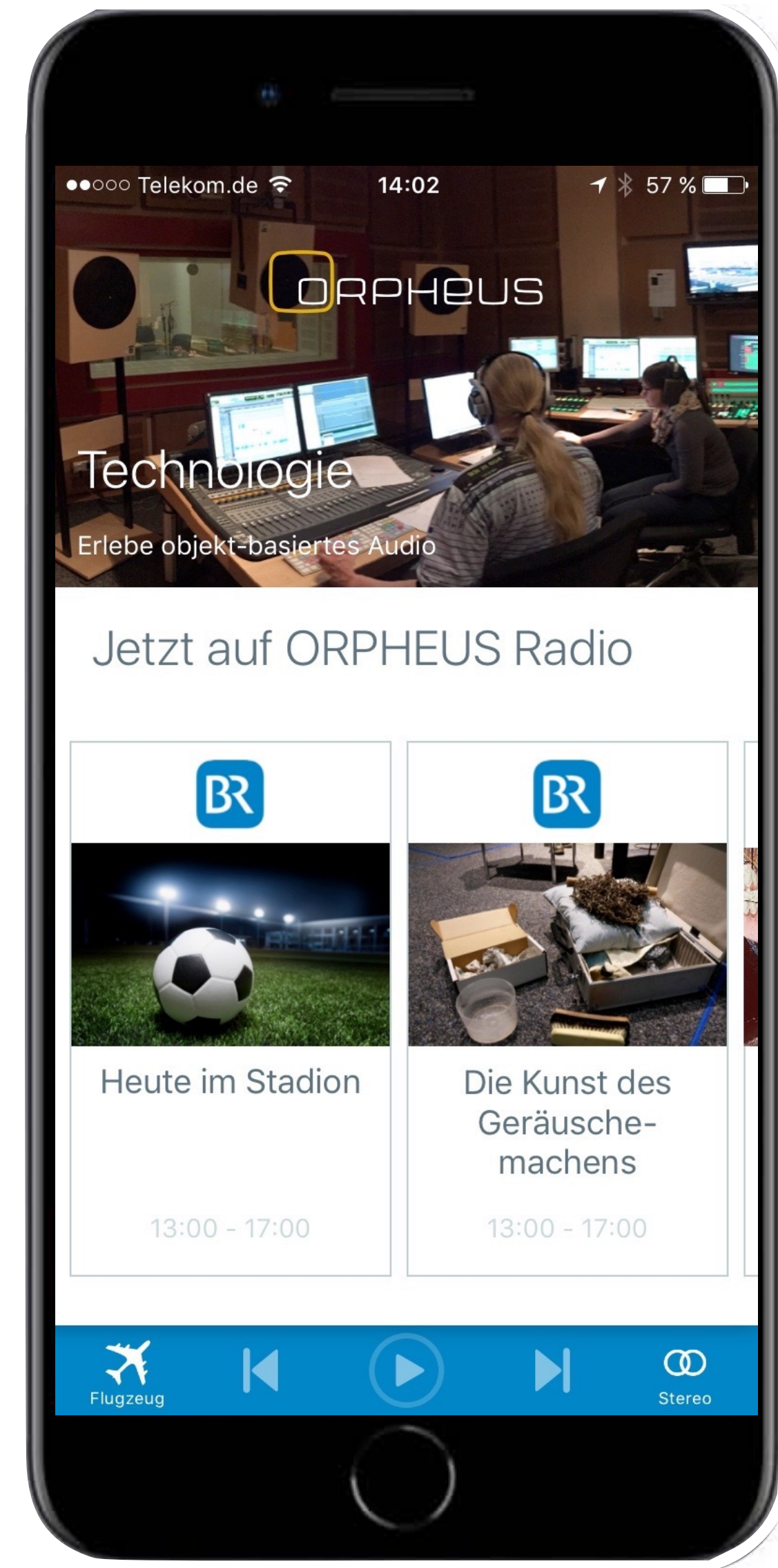
object-based media enables . . .

Accessibility

Immersion

Personalisation

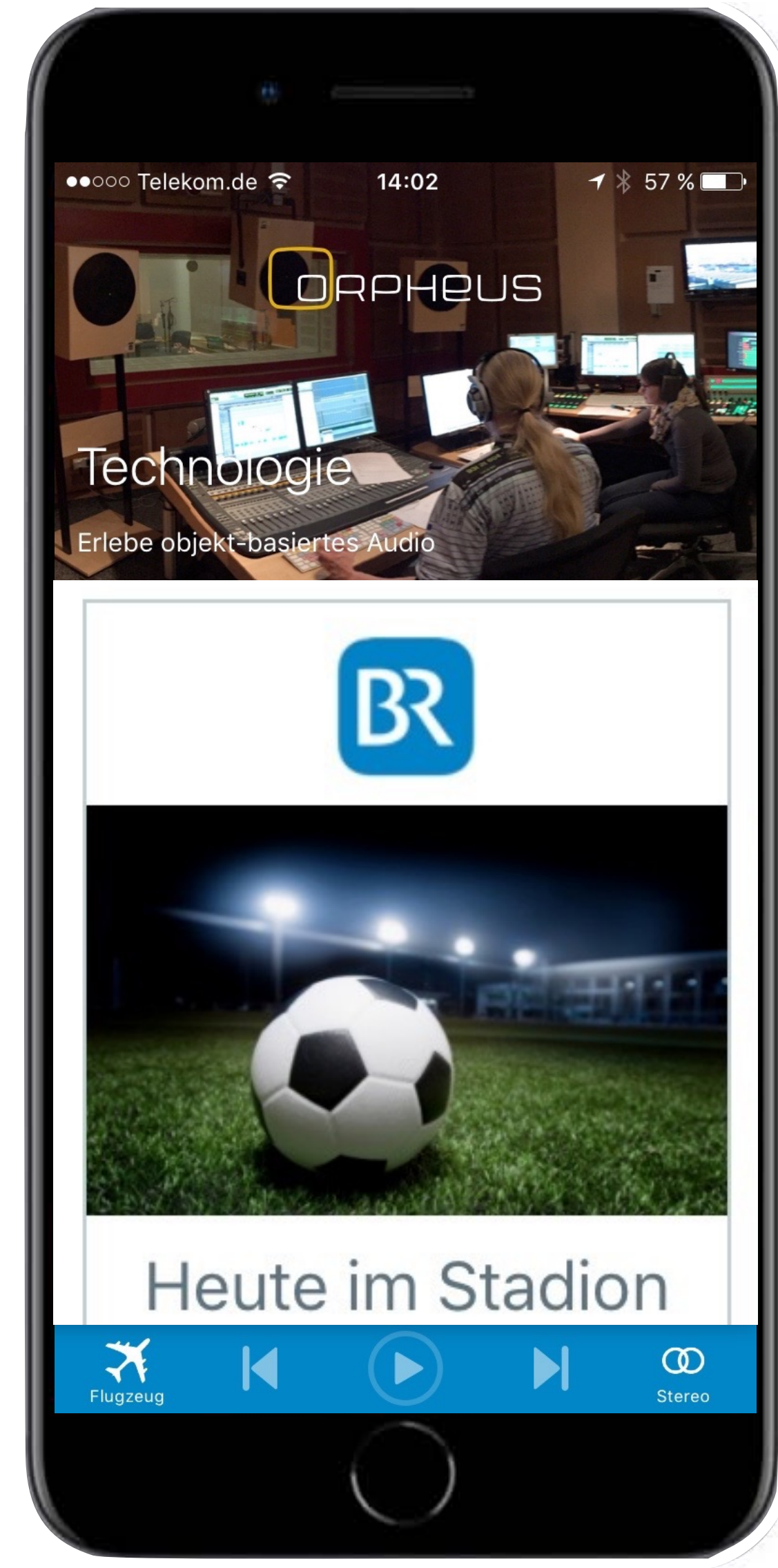
Interactivity





object-based media enables . . .

Accessibility



The commentary is not loud enough?

Or you just want to feel like being be on the spot?

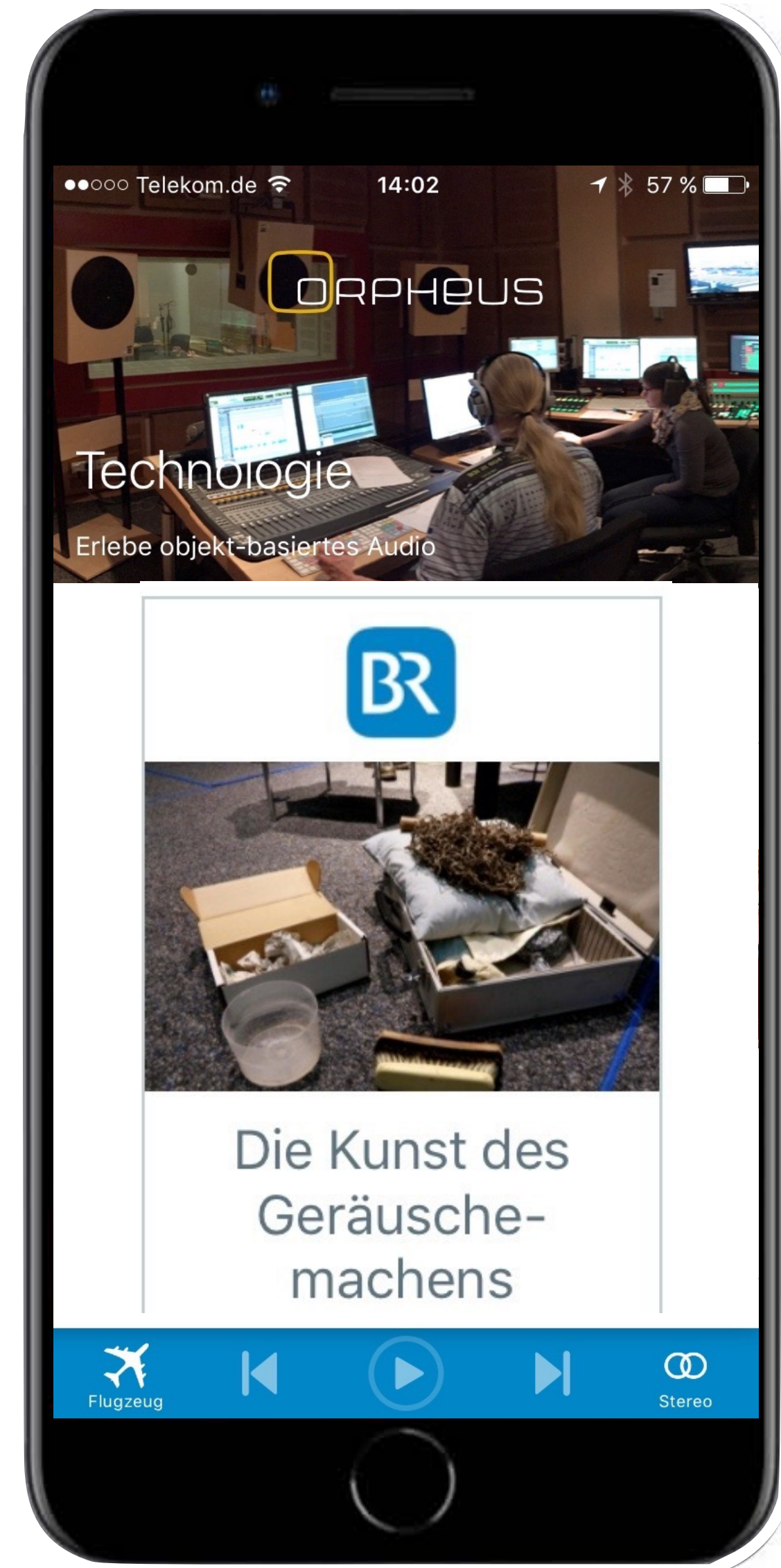
Object-based audio allows you to adjust foreground and background as you like it.

Football Match (BR)



object-based media enables . . .

Immersion



3D Sound is everywhere.
And everybody's wearing
headphones.

Object-based audio
delivers

binaural sound

direct to your ears.

Making Radio a

3D experience.

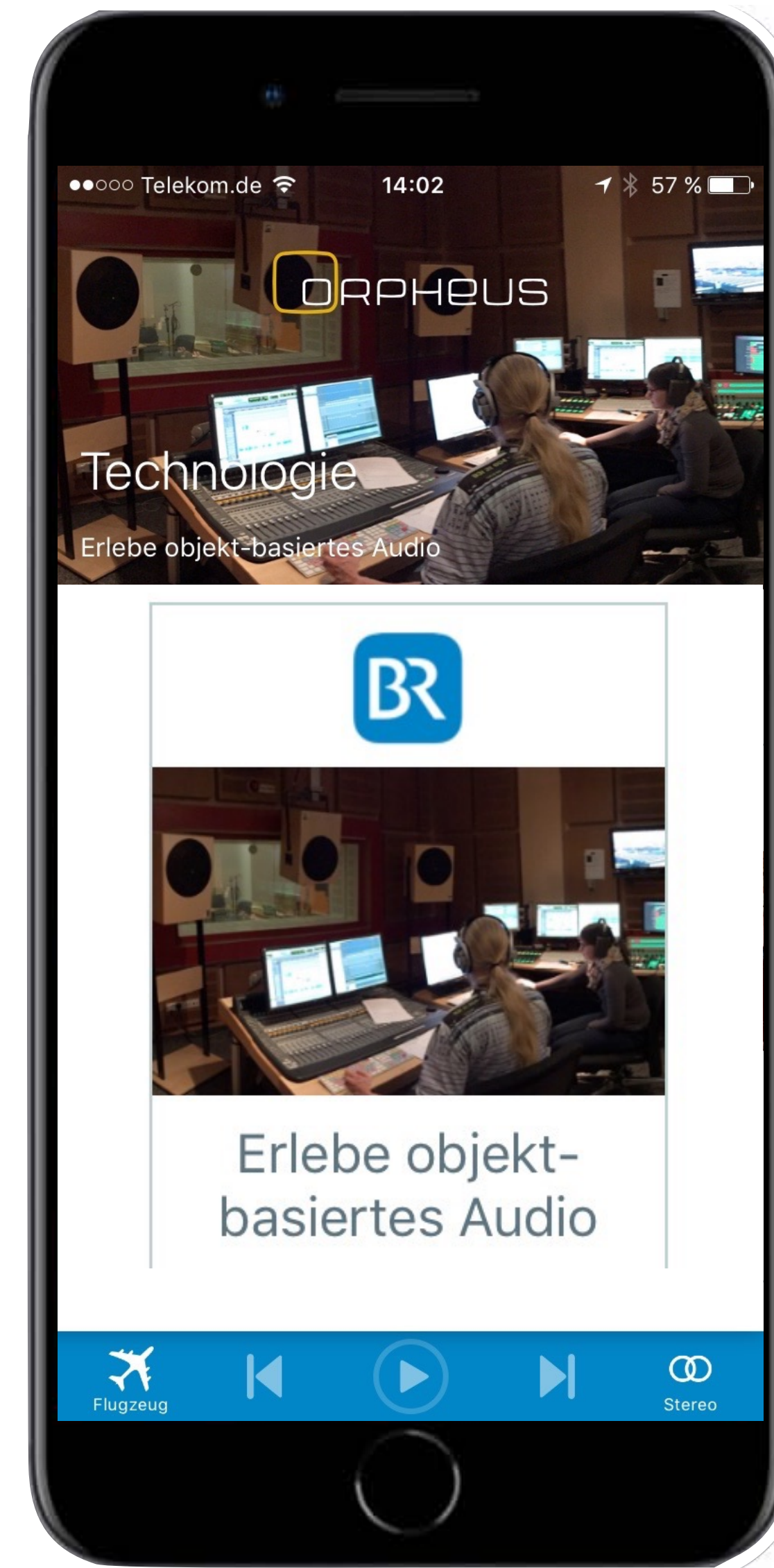
The Art of Foley (BR)



object-based media enables . . .



Personalisation



Don't have much time?
Want to be up-to-date?
Just want to focus on main
things?

Object-based audio
can deliver
**customized
information.**

**Experience object-
based audio (BR)**

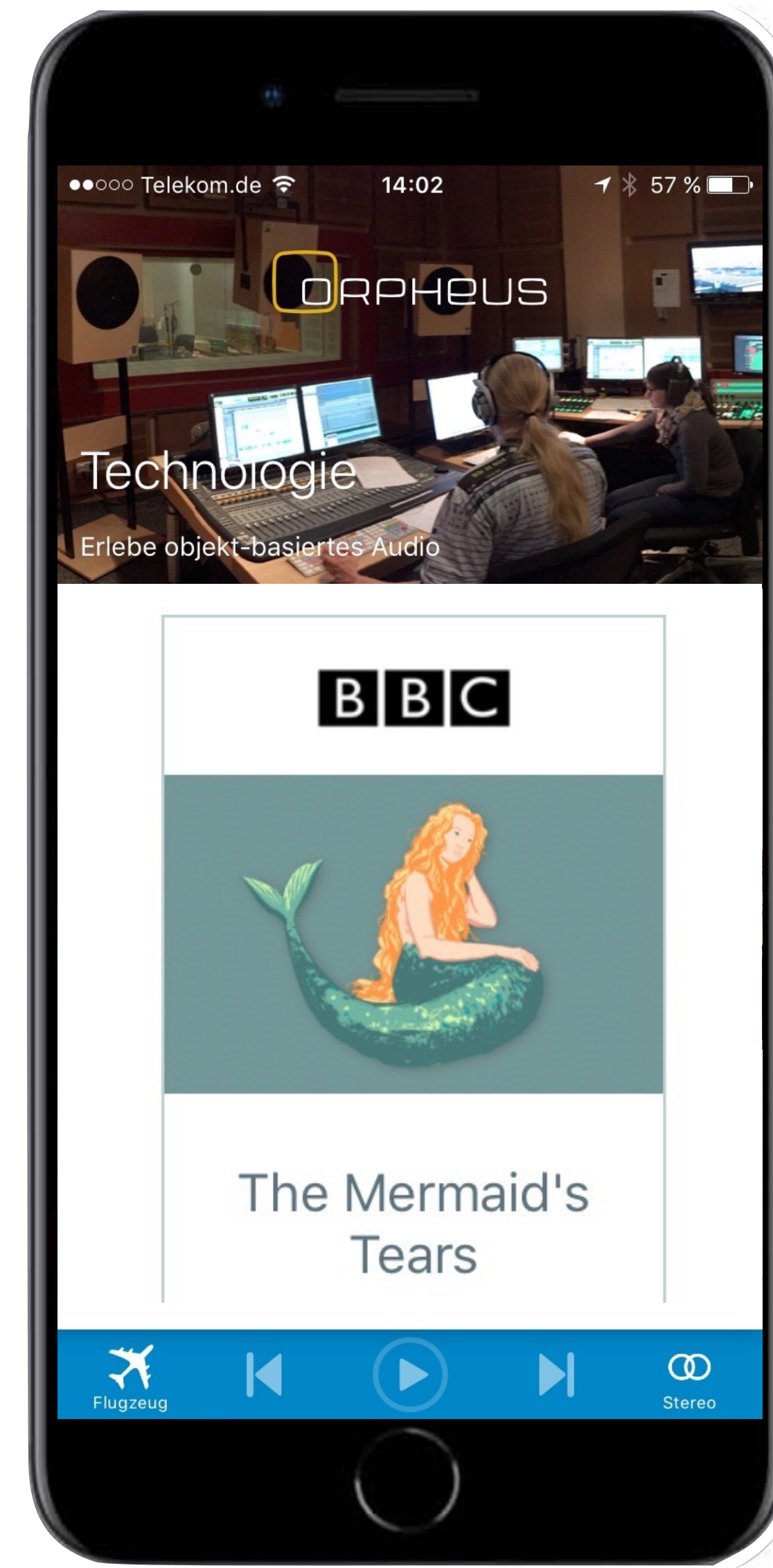


object-based media enables . . .

Look and listen around
and make a choice
yourself.

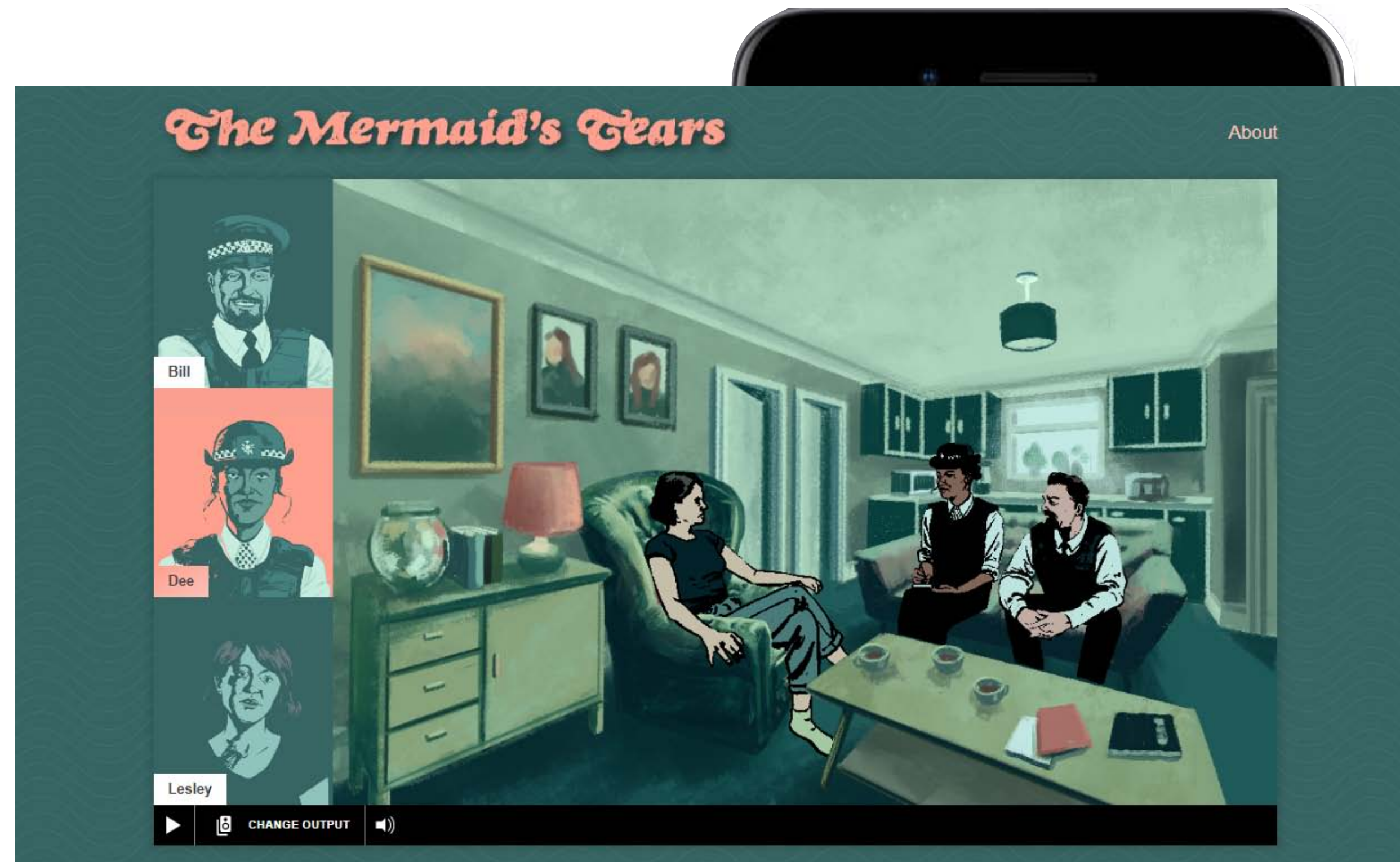
Object-based audio
enables
**multi-layer and
non-linear storytelling**
on the radio

**The Mermaid's Tears
(BBC)**



Interactivity

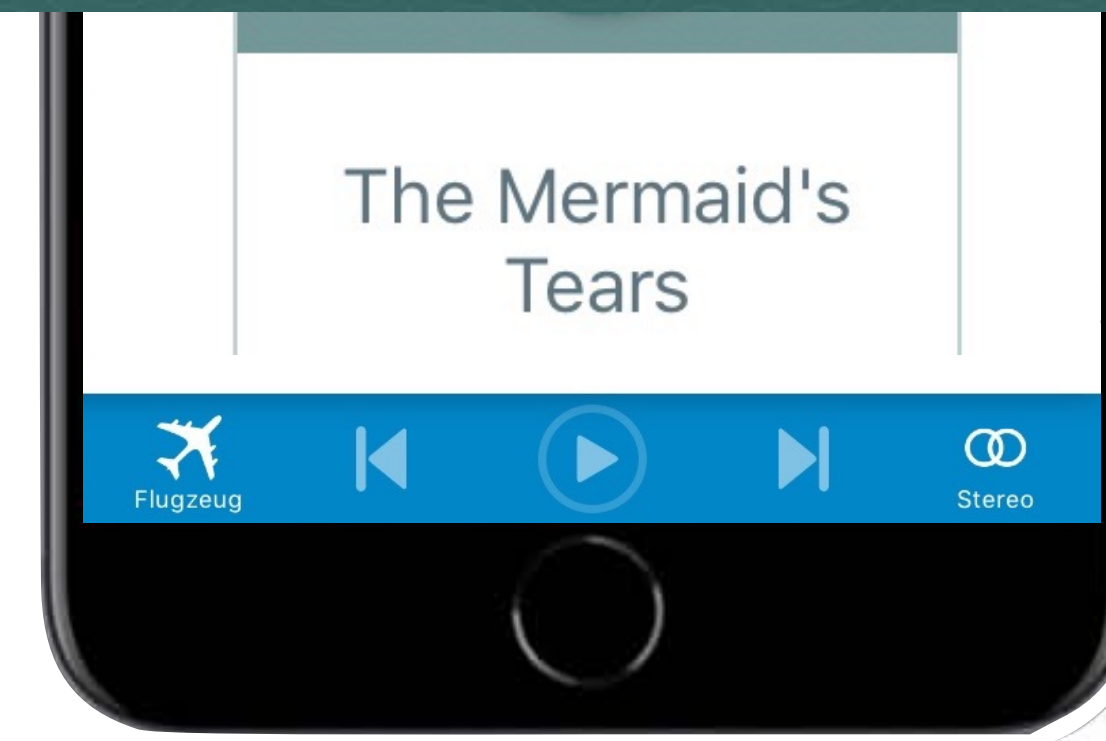
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Look and listen around
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Object-based audio
enables
**multi-layer and
non-linear storytelling**
on the radio

Interactivity



**The Mermaid's Tears
(BBC)**

object-based demo productions

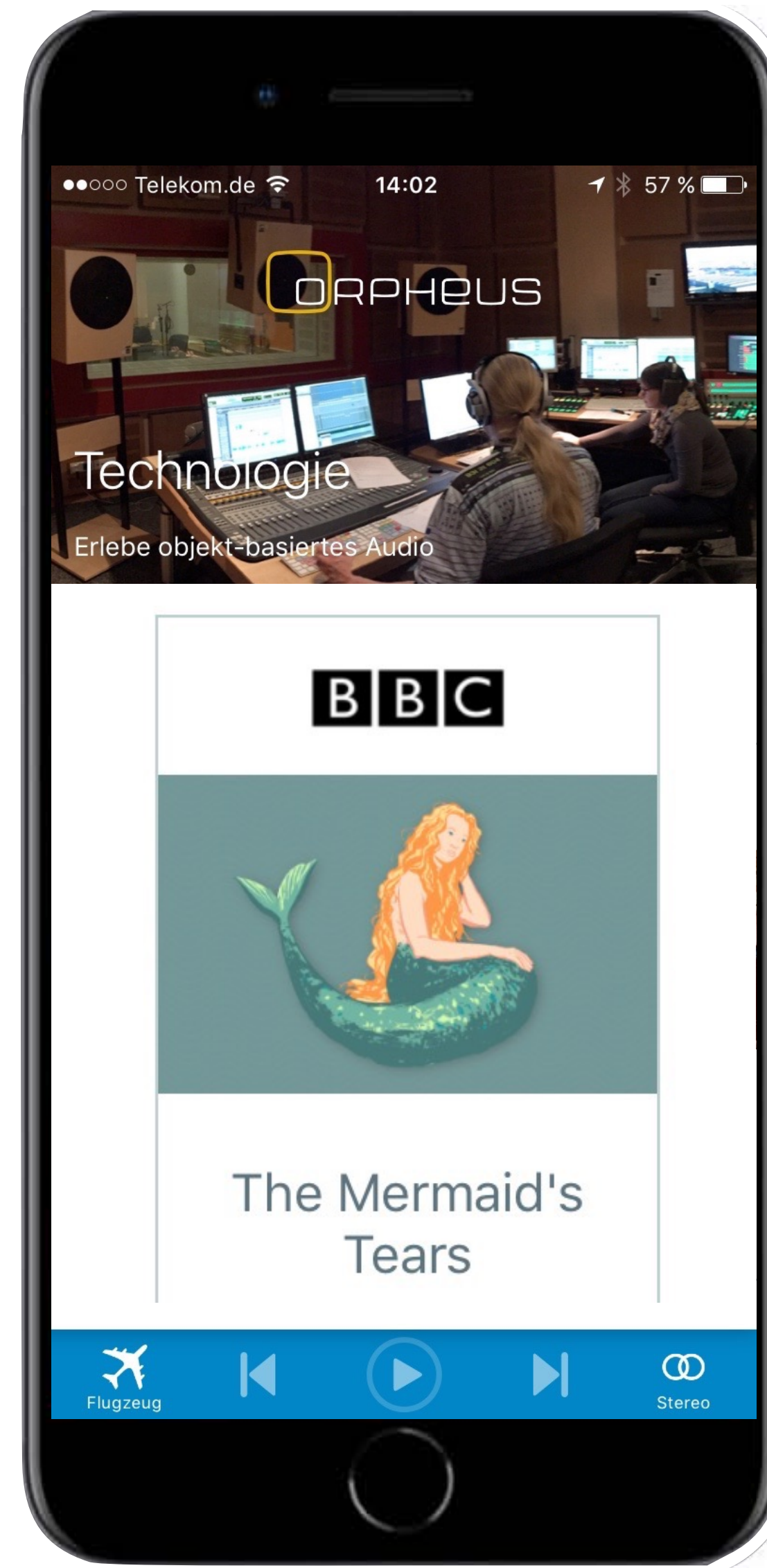
Foreground/background
or prominence balance

2 / 5.1 / 4 + 7+ 1
or binaural audio

Language selection

Interactive story-
telling

Positioning of audio-objects



Football Match (BR)

The Art of Foley
(BR)

Experience object-
based audio (BR)

The Mermaid's Tears
(BBC)

German Forest (FH IIS)



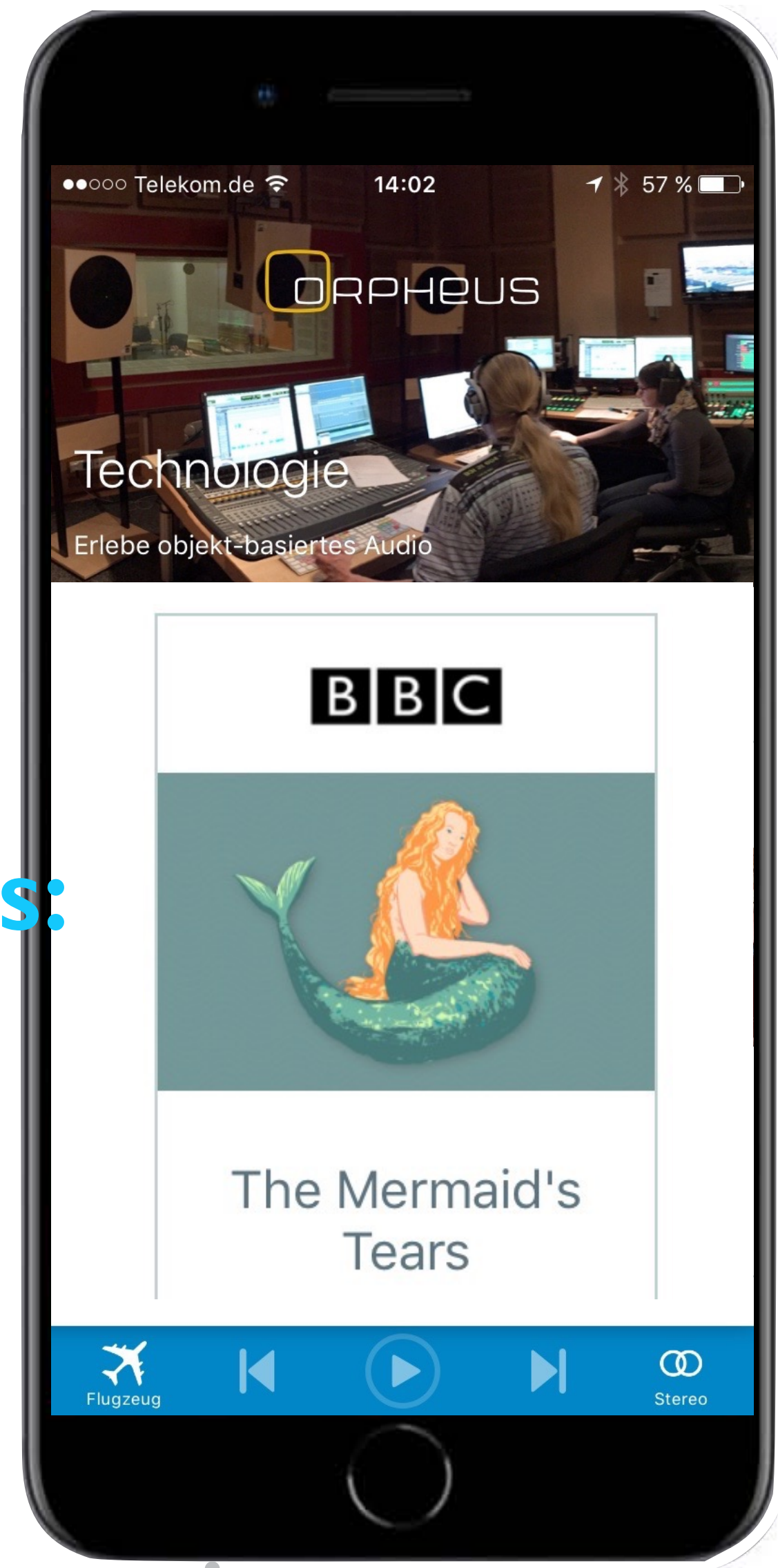
object-based demo productions

Channel bed: 5.1 or
7.1+4H

Transmitted
objects: 1 to 3x4

Reproduced objects:
1 to 1x4

Data rate: 516 kbit/s
for 7.1+4H



Chapter marks / POI / transcript . . .

User Experience



I want....

immersive experience

„immersive“

>audio

to know who is speaking /
...what is playing

context now

>>(meta)data

to know what they're playing/ talking about
when I join mid-way through

to interact with the programme
using my listening device

to go back to the start of the
conversation / music

interaction

>>usability

the BBC/BR to make more things that I enjoy

my friend to listen to what I just heard
and hear what he/she thinks about it

usability should be included

Alternative language option /
translation

to hear the speech/music
clearly in all environments

intelligibility

>>audio

to find out more about this topic now.

context „more“

>>(meta)data

to listen to everything on/
from a certain topic/person

User Experience



I want....

immersive experience

to interact with the programme
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to hear the speech/music clearly in all environments

usability experience

interaction

>>usability

to find out more about this topic now.

context „more“

>>(meta)data

to listen to everything on/
from a certain topic/person

usability should be included

information experience

User Experience



audio



BR

// MAGIX

usability

B B C

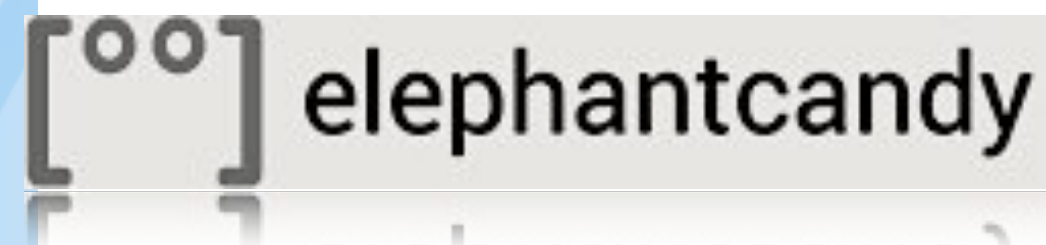
bc.com

R&D

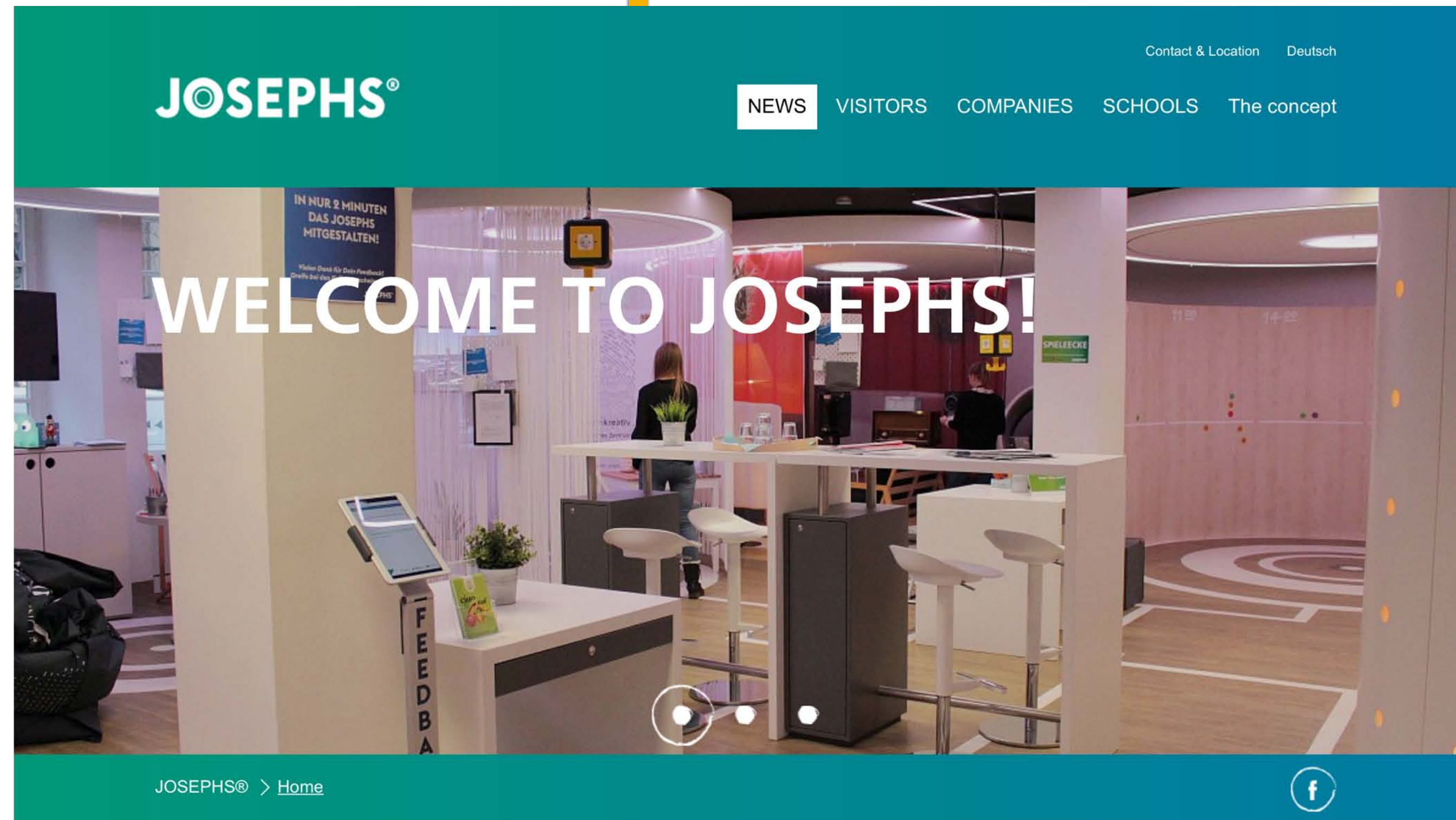
[°°] elephantcandy

information

User Experience



**We run public
end user tests in
this
open innovation
lab in
Nürnberg from
Dec. 1 2017 until
Feb. 28 2018**



Shaping future innovation

What is JOSEPHS®?

Do you have ideas for new products and services? Do you want to share your feedback for the improvement and development of better product and service features? If you are interested in shaping the future of innovation, directly interacting with interesting firms and brands, then you should come and visit JOSEPHS®!

At JOSEPHS®, you can contribute your ideas and experiences already during the development of new products and services, so future offerings will fit your needs just right. JOSEPHS® invites you to experience currently ongoing innovation journeys of established brands and brand new start-ups. In an open setting of a 400 m² shop floor, you can actively participate in the development, implementation and marketing of innovations.

JOSEPHS® is a project of the Fraunhofer Center for Applied Research for Supply Chain Services (SCS) in cooperation with the Chair of Information Systems I at Friedrich-Alexander-University Erlangen-Nuremberg. It is funded by the Bavarian Ministry for Economic Affairs and Media, Energy and Technology.



New Theme world at JOSEPHS®

MEGATRENDS

User Experience

The setting @ JOSEPHS

SITUATION

DEVICE

FORMAT

SIMULATION

AUDIO
EXPERIENCE

USABILITY
EXPERIENCE

INFORMATION
EXPERIENCE



binaural



environmental
noise playback



surround



V 1.0 1.12.2017 translated from GERMAN

Guidelines

FOR BOTH SCENARIOS (mandatory for all)

USABILITY

How did you cope with the app?

supporting questions:

- How do you like the pictures to the radio?
- Do you like to see the reporter / speaker /?
- How do you find the navigation in the piece ("dial wheel")
- Do the chapter marks help you with orientation?
- Is there something to improve?

IN SUMMARY

Would you use this app? Why?

Do you like the additional adjustment options?

Which of the new features did you like the most? V

Surround 3D headphone & Sound - transcript - intelligibility - loudn
(chapter markers)



V 1.0 1.12.2017 translated from GERMAN

Guidelines

- Where you can imagine the transcript application?

LIVING ROOM -SCENARIO

SURROUND 5.1 – loudspeaker playback (suitable pieces: all)

- How do you like it and why?

supporting questions:

- > Do you know SURROUND SOUND? Movies? TV? Radio?
e.g. BR-KLASSIK: broadcasts weekly in 5.1 SURROUND on digital satellite or digital cable

TRANSCRIPT (suitable pieces: HERBST and all but Mozart & Turning Forest)

Sure you know the subtitles on TV, you can turn on and off. Something like that, you can imagine that on the radio, for example to jump back within the stream.

- How useful do you think that is? And why?

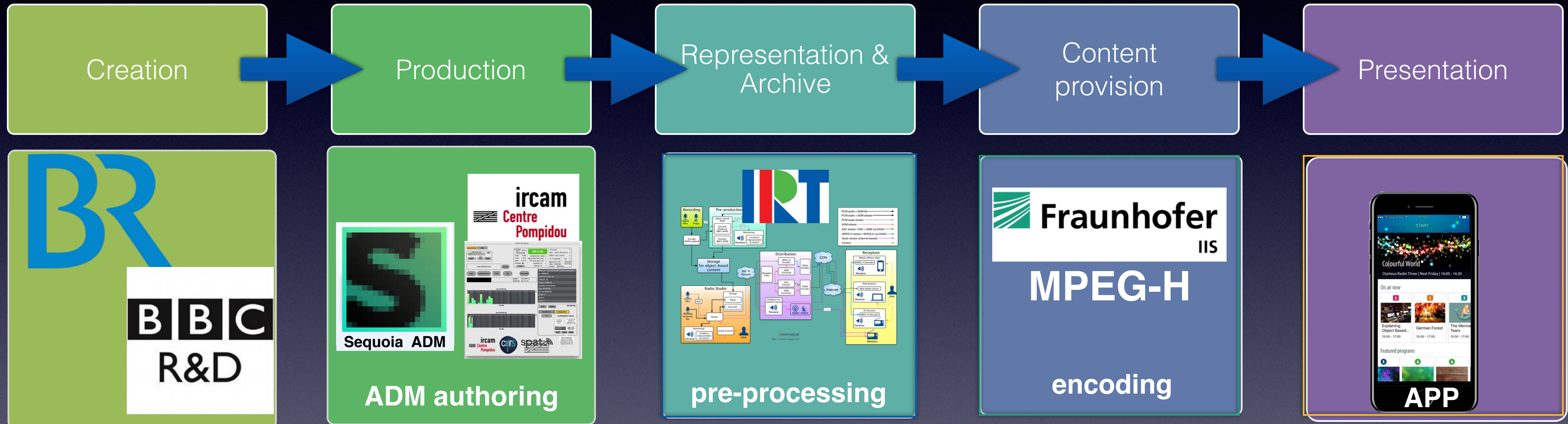
supporting questions:

- Does this helps you to understand the content
- Is there something to improve?
- Where you can imagine the transcript application?



Quality of end user experience..... The setting @ JOSEPHS







... can now become



Object-Based Broadcasting Development Platform

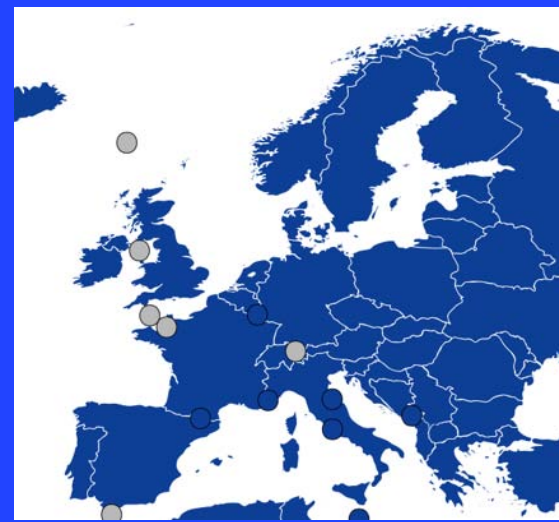
Creation

Production

Representation &
Archive

Content
provision

Presentation



BROADCASTER

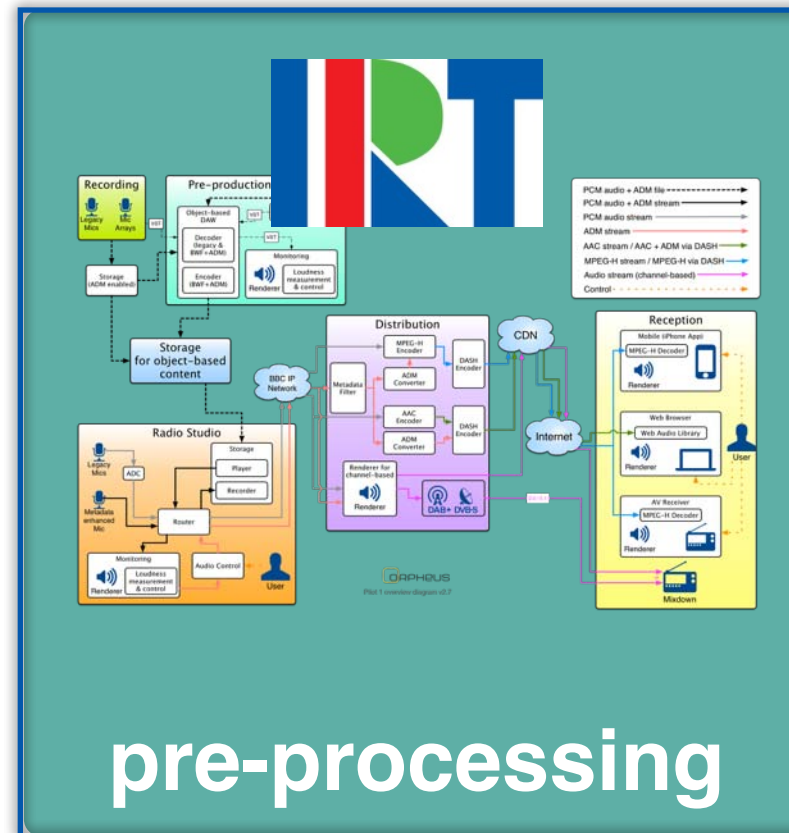
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Sequoia ADM



ADM authoring

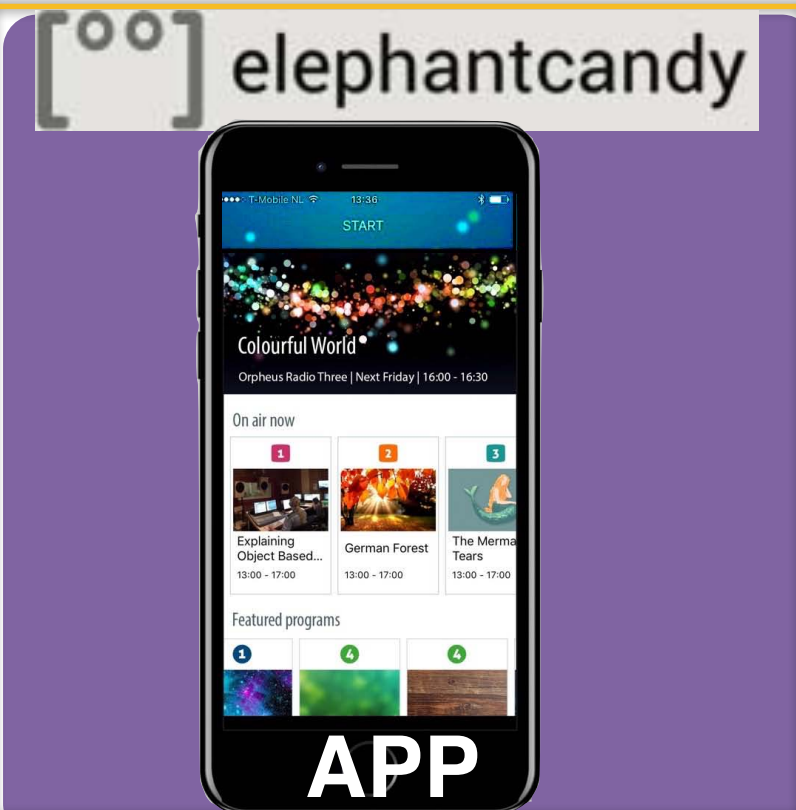


pre-processing

Fraunhofer
IIS

MPEG-H

encoding



APP



Experience yourself!
Come and try the

ORPHEUS
Object-Based Audio Experience

app here in the lobby



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ORPHEUS - OBJECT- BASED AUDIO EXPERIENCE

ORPHEUS is a European research project dedicated to improving the management of audio content. It will develop, implement and validate a new end-to-end object-based media chain for audio content.

Object-based media is a revolutionary approach for creating and deploying interactive, personalised, scalable and immersive content, by representing it as a set of individual assets together with meta-data describing their relationships and associations. This allows media objects to be assembled in ground-breaking ways to create new user experiences.

Orpheus started on 1st December 2015 and has a duration of 30 months. It receives funding from the European Commission under the Horizon 2020 programme.



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