

Claims

1. An apparatus for generating loudspeaker signals, comprising:

an object metadata processor, and

an object renderer,

wherein the object renderer is configured to receive an audio object,

wherein the object metadata processor is configured to receive metadata, comprising an indication on whether the audio object is screen-related, and further comprising a first position of the audio object,

wherein the object metadata processor is configured to calculate a second position of the audio object depending on the first position of the audio object and depending on a size of a screen, if the audio object is indicated in the metadata as being screen-related,

wherein the object renderer is configured to generate the loudspeaker signals depending on the audio object and depending on position information,

wherein the object metadata processor is configured to feed the first position of the audio object as the position information into the object renderer, if the audio object is indicated in the metadata as being not screen-related, and

wherein the object metadata processor is configured to feed the second position of the audio object as the position information into the object renderer, if the audio object is indicated in the metadata as being screen-related.

2. An apparatus according to claim 1, wherein the object metadata processor is configured to not calculate the second position of the audio object, if the audio object is indicated in the metadata as being not screen-related.

3. An apparatus according to claim 1 or 2, wherein the object renderer is configured to not determine whether the position information is the first position of the audio object or the second position of the audio object.

4. An apparatus according to one of the preceding claims, wherein the object renderer is configured to generate the loudspeaker signals further depending on the number of the loudspeakers of a playback environment.

5. An apparatus according to claim 4, wherein the object renderer is configured to generate the loudspeaker signals further depending on a loudspeaker position of each of the loudspeakers of the playback environment.

6. An apparatus according to one of the preceding claims, wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being screen-related, wherein the first position indicates the first position in a three-dimensional space, and wherein the second position indicates the second position in the three-dimensional space.

7. An apparatus according to claim 6, wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being screen-related, wherein the first position indicates a first azimuth, a first elevation and a first distance, and wherein the second position indicates a second azimuth, a second elevation and a second distance.

8. An apparatus according to one of the preceding claims,

wherein the object metadata processor is configured to receive the metadata, comprising the indication on whether the audio object is screen-related as a first indication, and further comprising a second indication, if the audio object is screen-related, said second indication indicating whether the audio object is an on-screen object, and

wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a first value on a screen area of the screen, if the second indication indicates that the audio object is an on-screen object.

9. An apparatus according to claim 8, wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a second value, which is either on the screen area or not on the screen area, if the second indication indicates that the audio object is not an on-screen object.

10. An apparatus according to one of claims 1 to 7,

wherein the object metadata processor is configured to receive the metadata, comprising the indication on whether the audio object is screen-related as a first indication, and further comprising a second indication, if the audio object is screen-related, said second indication indicating whether the audio object is an on-screen object,

wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a first mapping curve as the mapping curve, if the second indication indicates that the audio object is an on-screen object, wherein the first mapping curve defines a mapping of original object positions in a first value interval to remapped object positions in a second value interval, and

wherein the object metadata processor is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a second mapping curve as the mapping curve, if the second indication indicates that the audio object is not an on-screen object, wherein the second mapping curve defines a mapping of original object positions in the first value interval to remapped object positions in a third value interval, and wherein said second value interval is comprised by the third value interval, and wherein said second value interval is smaller than said third value interval.

11. An apparatus according to claim 10,

wherein each of the first value interval and the second value interval and the third value interval is a value interval of azimuth angles, or

wherein each of the first value interval and the second value interval and the third value interval is a value interval of elevation angles.

12. An apparatus according to one of the preceding claims,

wherein the object metadata processor is configured to calculate the second position of the audio object depending on at least one of a first linear mapping function and a second linear mapping function,

wherein the first linear mapping function is defined to map a first azimuth value to a second azimuth value,

wherein the second linear mapping function is defined to map a first elevation value to a second elevation value,

wherein $\phi_{left}^{nominal}$ indicates a left azimuth screen edge reference,

wherein $\phi_{right}^{nominal}$ indicates a right azimuth screen edge reference,

wherein $\theta_{top}^{nominal}$ indicates a top elevation screen edge reference,

wherein $\theta_{bottom}^{nominal}$ indicates a bottom elevation screen edge reference,

wherein ϕ_{left}^{repro} indicates a left azimuth screen edge of the screen,

wherein ϕ_{right}^{repro} indicates a right azimuth screen edge of the screen,

wherein θ_{top}^{repro} indicates a top elevation screen edge of the screen,

wherein θ_{bottom}^{repro} indicates a bottom elevation screen edge of the screen,

wherein ϕ indicates the first azimuth value,

wherein ϕ' indicates the second azimuth value,

wherein θ indicates the first elevation value,

wherein θ^i indicates the second elevation value,

wherein the second azimuth value φ^i results from a first mapping of the first azimuth value φ according to the first linear mapping function according to

$$\varphi^i = \begin{cases} \frac{\varphi_{right}^{repro} + 180^\circ}{\varphi_{right}^{nominal} + 180^\circ} \cdot (\varphi + 180^\circ) - 180^\circ & \text{for } -180^\circ \leq \varphi < \varphi_{right}^{nominal} \\ \frac{\varphi_{left}^{repro} - \varphi_{right}^{repro}}{\varphi_{left}^{nominal} - \varphi_{right}^{nominal}} \cdot (\varphi - \varphi_{right}^{nominal}) + \varphi_{right}^{repro} & \text{for } \varphi_{right}^{nominal} \leq \varphi < \varphi_{left}^{nominal} \\ \frac{180^\circ - \varphi_{left}^{repro}}{180^\circ - \varphi_{left}^{nominal}} \cdot (\varphi - \varphi_{left}^{nominal}) + \varphi_{left}^{repro} & \text{for } \varphi_{left}^{nominal} \leq \varphi < 180^\circ \end{cases}$$

and

wherein the second elevation value θ^i results from a second mapping of the first elevation value θ according to the second linear mapping function according to

$$\theta^i = \begin{cases} \frac{\theta_{bottom}^{repro} + 90^\circ}{\theta_{bottom}^{nominal} + 90^\circ} \cdot (\theta + 90^\circ) - 90^\circ & \text{for } -90^\circ \leq \theta < \theta_{bottom}^{nominal} \\ \frac{\theta_{top}^{repro} - \theta_{bottom}^{repro}}{\theta_{top}^{nominal} - \theta_{bottom}^{nominal}} \cdot (\theta - \theta_{bottom}^{nominal}) + \theta_{bottom}^{repro} & \text{for } \theta_{bottom}^{nominal} \leq \theta < \theta_{top}^{nominal} \\ \frac{90^\circ - \theta_{top}^{repro}}{90^\circ - \theta_{top}^{nominal}} \cdot (\theta - \theta_{top}^{nominal}) + \theta_{top}^{repro} & \text{for } \theta_{top}^{nominal} \leq \theta < 90^\circ \end{cases}$$

13. A decoder device comprising:

a USAC decoder for decoding a bitstream to obtain one or more audio input channels, to obtain one or more input audio objects, to obtain compressed object metadata and to obtain one or more SAOC transport channels,

an SAOC decoder for decoding the one or more SAOC transport channels to obtain a first group of one or more rendered audio objects,

an apparatus according to one of the preceding claims, wherein the apparatus comprises

an object metadata decoder, being the object metadata processor of the apparatus according to one of the preceding claims, and being implemented for decoding the compressed object metadata to obtain uncompressed metadata, and

the object renderer of the apparatus according to one of the preceding claims, for rendering the one or more input audio objects depending on the uncompressed metadata to obtain a second group of one or more rendered audio objects,

a format converter for converting the one or more audio input channels to obtain one or more converted channels, and

a mixer for mixing the one or more audio objects of the first group of one or more rendered audio objects, the one or more audio objects of the second group of one or more rendered audio objects and the one or more converted channels to obtain one or more decoded audio channels.

14. A method for generating loudspeaker signals, comprising:

receiving an audio object,

receiving metadata, comprising an indication on whether the audio object is screen-related, and further comprising a first position of the audio object,

calculating a second position of the audio object depending on the first position of the audio object and depending on a size of a screen, if the audio object is indicated in the metadata as being screen-related,

generating the loudspeaker signals depending on the audio object and depending on position information,

wherein the position information is the first position of the audio object, if the audio object is indicated in the metadata as being not screen-related, and

wherein the position information is the second position of the audio object, if the audio object is indicated in the metadata as being screen-related.

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15. A computer program for implementing the method of claim 14 when being executed on a computer or signal processor.

Claims

1. An apparatus for generating loudspeaker signals, comprising:
- 5 an object metadata processor (110), and
- an object renderer (120),
- wherein the object renderer (120) is configured to receive an audio object,
- 10 wherein the object metadata processor (110) is configured to receive metadata, comprising an indication on whether the audio object is dependent on a size of a screen, and further comprising a first position of the audio object,
- 15 wherein the object metadata processor (110) is configured to calculate a second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen,
- 20 wherein the object renderer (120) is configured to generate the loudspeaker signals depending on the audio object and depending on position information,
- wherein the object metadata processor (110) is configured to feed the first position of the audio object as the position information into the object renderer (120), if the
- 25 audio object is indicated in the metadata as being not dependent on the size of the screen, and
- wherein the object metadata processor (110) is configured to feed the second position of the audio object as the position information into the object renderer
- 30 (120), if the audio object is indicated in the metadata as being dependent on the size of the screen,
- 35 wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates at least a first azimuth and a first elevation, wherein the second position indicates at least a second azimuth and a second elevation,

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- 5 wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on at least one of a first linear mapping function and a second linear mapping function, wherein the first linear mapping function is defined to map a first azimuth value to a second azimuth value, wherein the second linear mapping function is defined to map a first elevation value to a second elevation value.
- 10 2. An apparatus according to claim 1, wherein the object metadata processor (110) is configured to not calculate the second position of the audio object, if the audio object is indicated in the metadata as being not dependent on the size of the screen.
- 15 3. An apparatus according to claim 1 or 2, wherein the object renderer (120) is configured to not determine whether the position information is the first position of the audio object or the second position of the audio object.
- 20 4. An apparatus according to one of the preceding claims, wherein the object renderer (120) is configured to generate the loudspeaker signals further depending on the number of the loudspeakers of a playback environment.
- 25 5. An apparatus according to claim 4, wherein the object renderer (120) is configured to generate the loudspeaker signals further depending on a loudspeaker position of each of the loudspeakers of the playback environment.
- 30 6. An apparatus according to one of the preceding claims, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates the first position in a three-dimensional space, and wherein the second position indicates the second position in the three-dimensional space.
- 35 7. An apparatus according to claim 6, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates a first azimuth, a first elevation and a

first distance, and wherein the second position indicates a second azimuth, a second elevation and a second distance.

8. An apparatus according to one of the preceding claims,

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wherein the object metadata processor (110) is configured to receive the metadata, comprising the indication on whether the audio object is dependent on the size of the screen as a first indication, and further comprising a second indication, if the audio object is dependent on the size of the screen, said second indication indicating whether the audio object is an on-screen object, and

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wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a first value on a screen area of the screen, if the second indication indicates that the audio object is an on-screen object.

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9. An apparatus according to claim 8, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a second value, which is either on the screen area or not on the screen area, if the second indication indicates that the audio object is not an on-screen object.

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- 25 10. An apparatus according to one of claims 1 to 7,

wherein the object metadata processor (110) is configured to receive the metadata, comprising the indication on whether the audio object is dependent on the size of the screen as a first indication, and further comprising a second indication, if the audio object is dependent on the size of the screen, said second indication indicating whether the audio object is an on-screen object,

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wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a first mapping curve as the mapping curve, if the second indication indicates that the audio object is an on-screen object, wherein the first mapping curve defines a mapping of original object

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positions in a first value interval to remapped object positions in a second value interval, and

5 wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a second mapping curve as the mapping curve, if the second indication indicates that the audio object is not an on-screen object, wherein the second mapping curve defines a mapping of original object positions in the first value interval to remapped object positions in a third value interval, and wherein said second value interval is comprised by the third value interval, and wherein said second value interval is smaller than said third value interval.

11. An apparatus according to claim 10,

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wherein each of the first value interval and the second value interval and the third value interval is a value interval of azimuth angles, or

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wherein each of the first value interval and the second value interval and the third value interval is a value interval of elevation angles.

12. An apparatus according to one of the preceding claims,

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wherein $\varphi_{left}^{nominal}$ indicates a left azimuth screen edge reference,

wherein $\varphi_{right}^{nominal}$ indicates a right azimuth screen edge reference,

wherein $\varphi_{top}^{nominal}$ indicates a top elevation screen edge reference,

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wherein $\varphi_{bottom}^{nominal}$ indicates a bottom elevation screen edge reference,

wherein φ_{left}^{repro} indicates a left azimuth screen edge of the screen,

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wherein φ_{right}^{repro} indicates a right azimuth screen edge of the screen,

wherein φ_{top}^{repro} indicates a top elevation screen edge of the screen,

wherein θ_{bottom}^{repro} indicates a bottom elevation screen edge of the screen,

wherein φ indicates the first azimuth value,

wherein φ' indicates the second azimuth value,

wherein θ indicates the first elevation value,

wherein θ' indicates the second elevation value,

wherein the second azimuth value φ' results from a first mapping of the first azimuth value φ according to the first linear mapping function according to

$$\varphi' = \begin{cases} \frac{\varphi_{right}^{repro} + 180^\circ}{\varphi_{right}^{nominal} + 180^\circ} \cdot (\varphi + 180^\circ) - 180^\circ & \text{for } -180^\circ \leq \varphi < \varphi_{right}^{nominal} \\ \frac{\varphi_{left}^{repro} - \varphi_{right}^{repro}}{\varphi_{left}^{nominal} - \varphi_{right}^{nominal}} \cdot (\varphi - \varphi_{right}^{nominal}) + \varphi_{right}^{repro} & \text{for } \varphi_{right}^{nominal} \leq \varphi < \varphi_{left}^{nominal} \\ \frac{180^\circ - \varphi_{left}^{repro}}{180^\circ - \varphi_{left}^{nominal}} \cdot (\varphi - \varphi_{left}^{nominal}) + \varphi_{left}^{repro} & \text{for } \varphi_{left}^{nominal} \leq \varphi < 180^\circ \end{cases}$$

and

wherein the second elevation value θ' results from a second mapping of the first elevation value θ according to the second linear mapping function according to

$$\theta' = \begin{cases} \frac{\theta_{bottom}^{repro} + 90^\circ}{\theta_{bottom}^{nominal} + 90^\circ} \cdot (\theta + 90^\circ) - 90^\circ & \text{for } -90^\circ \leq \theta < \theta_{bottom}^{nominal} \\ \frac{\theta_{top}^{repro} - \theta_{bottom}^{repro}}{\theta_{top}^{nominal} - \theta_{bottom}^{nominal}} \cdot (\theta - \theta_{bottom}^{nominal}) + \theta_{bottom}^{repro} & \text{for } \theta_{bottom}^{nominal} \leq \theta < \theta_{top}^{nominal} \\ \frac{90^\circ - \theta_{top}^{repro}}{90^\circ - \theta_{top}^{nominal}} \cdot (\theta - \theta_{top}^{nominal}) + \theta_{top}^{repro} & \text{for } \theta_{top}^{nominal} \leq \theta < 90^\circ \end{cases}$$

13. A decoder device comprising:

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5 a first decoder (910) for unified speech and audio decoding for decoding a
bitstream to obtain one or more audio input channels, to obtain one or more input
audio objects, to obtain compressed object metadata and to obtain one or more
transport channels,

10 an second decoder (915) for spatial audio object decoding for decoding the one or
more transport channels to obtain a first group of one or more rendered audio
objects,

an apparatus (917) according to one of the preceding claims, wherein the
apparatus comprises

15 a third decoder which is an object metadata decoder (918), being the object
metadata processor (110) of the apparatus according to one of the
preceding claims, and being implemented for decoding the compressed
object metadata to obtain uncompressed metadata, and

20 the object renderer (920; 120) of the apparatus according to one of the
preceding claims, for rendering the one or more input audio objects
depending on the uncompressed metadata to obtain a second group of one
or more rendered audio objects,

25 a format converter (922) for converting the one or more audio input channels to
obtain one or more converted channels, and

30 a mixer (930) for mixing the one or more audio objects of the first group of one or
more rendered audio objects; the one or more audio objects of the second group
of one or more rendered audio objects and the one or more converted channels to
obtain one or more decoded audio channels.

14. A method for generating loudspeaker signals, comprising:

35 receiving an audio object,

receiving metadata, comprising an indication on whether the audio object is
dependent on a size of a screen, and further comprising a first position of the audio
object,

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calculating a second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen,

generating the loudspeaker signals depending on the audio object and depending on position information,

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wherein the position information is the first position of the audio object, if the audio object is indicated in the metadata as being not dependent on the size of the screen, and

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wherein the position information is the second position of the audio object, if the audio object is indicated in the metadata as being dependent on the size of the screen,

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wherein calculating the second position of the audio object is conducted depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates at least a first azimuth and a first elevation, wherein the second position indicates at least a second azimuth and a second elevation,

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wherein calculating the second position of the audio object is conducted depending on at least one of a first linear mapping function and a second linear mapping function, wherein the first linear mapping function is defined to map a first azimuth value to a second azimuth value, wherein the second linear mapping function is defined to map a first elevation value to a second elevation value.

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15. A computer program for implementing the method of claim 14 when being executed on a computer or signal processor.

Claims

1. An apparatus for generating loudspeaker signals, comprising:

5 an object metadata processor (110), and

an object renderer (120),

10 wherein the object renderer (120) is configured to receive an audio object,

wherein the object metadata processor (110) is configured to receive metadata, comprising an indication on whether the audio object is dependent on a size of a screen, and further comprising a first position of the audio object,

15 wherein the object metadata processor (110) is configured to calculate a second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen,

20 wherein the object renderer (120) is configured to generate the loudspeaker signals depending on the audio object and depending on position information,

25 wherein the object metadata processor (110) is configured to feed the first position of the audio object as the position information into the object renderer (120), if the audio object is indicated in the metadata as being not dependent on the size of the screen, and

30 wherein the object metadata processor (110) is configured to feed the second position of the audio object as the position information into the object renderer (120), if the audio object is indicated in the metadata as being dependent on the size of the screen,

35 wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates at least a first azimuth and a first elevation, wherein the second position indicates at least a second azimuth and a second elevation,

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5 wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on at least one of a first linear mapping function and a second linear mapping function, wherein the first linear mapping function is defined to map a first azimuth value to a second azimuth value, wherein the second linear mapping function is defined to map a first elevation value to a second elevation value.

10 2. An apparatus according to claim 1, wherein the object metadata processor (110) is configured to not calculate the second position of the audio object, if the audio object is indicated in the metadata as being not dependent on the size of the screen.

15 3. An apparatus according to claim 1 or 2, wherein the object renderer (120) is configured to not determine whether the position information is the first position of the audio object or the second position of the audio object.

20 4. An apparatus according to one of the preceding claims, wherein the object renderer (120) is configured to generate the loudspeaker signals further depending on the number of the loudspeakers of a playback environment.

25 5. An apparatus according to claim 4, wherein the object renderer (120) is configured to generate the loudspeaker signals further depending on a loudspeaker position of each of the loudspeakers of the playback environment.

30 6. An apparatus according to one of the preceding claims, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates the first position in a three-dimensional space, and wherein the second position indicates the second position in the three-dimensional space.

35 7. An apparatus according to claim 6, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates a first azimuth, a first elevation and a

first distance, and wherein the second position indicates a second azimuth, a second elevation and a second distance.

8. An apparatus according to one of the preceding claims,

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wherein the object metadata processor (110) is configured to receive the metadata, comprising the indication on whether the audio object is dependent on the size of the screen as a first indication, and further comprising a second indication, if the audio object is dependent on the size of the screen, said second indication indicating whether the audio object is an on-screen object, and

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wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a first value on a screen area of the screen, if the second indication indicates that the audio object is an on-screen object.

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9. An apparatus according to claim 8, wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object and depending on the size of the screen, such that the second position takes a second value, which is either on the screen area or not on the screen area, if the second indication indicates that the audio object is not an on-screen object.

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- 25 10. An apparatus according to one of claims 1 to 7,

wherein the object metadata processor (110) is configured to receive the metadata, comprising the indication on whether the audio object is dependent on the size of the screen as a first indication, and further comprising a second indication, if the audio object is dependent on the size of the screen, said second indication indicating whether the audio object is an on-screen object,

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wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a first mapping curve as the mapping curve, if the second indication indicates that the audio object is an on-screen object, wherein the first mapping curve defines a mapping of original object

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positions in a first value interval to remapped object positions in a second value interval, and

wherein the object metadata processor (110) is configured to calculate the second position of the audio object depending on the first position of the audio object, depending on the size of the screen, and depending on a second mapping curve as the mapping curve, if the second indication indicates that the audio object is not an on-screen object, wherein the second mapping curve defines a mapping of original object positions in the first value interval to remapped object positions in a third value interval, and wherein said second value interval is comprised by the third value interval, and wherein said second value interval is smaller than said third value interval.

11. An apparatus according to claim 10,

wherein each of the first value interval and the second value interval and the third value interval is a value interval of azimuth angles, or

wherein each of the first value interval and the second value interval and the third value interval is a value interval of elevation angles.

12. An apparatus according to one of the preceding claims,

wherein $\phi_{left}^{nominal}$ indicates a left azimuth screen edge reference,

wherein $\phi_{right}^{nominal}$ indicates a right azimuth screen edge reference,

wherein $\phi_{top}^{nominal}$ indicates a top elevation screen edge reference,

wherein $\phi_{bottom}^{nominal}$ indicates a bottom elevation screen edge reference,

wherein ϕ_{left}^{repro} indicates a left azimuth screen edge of the screen,

wherein ϕ_{right}^{repro} indicates a right azimuth screen edge of the screen,

wherein ϕ_{top}^{repro} indicates a top elevation screen edge of the screen,

wherein θ_{bottom}^{repro} indicates a bottom elevation screen edge of the screen,

wherein φ indicates the first azimuth value,

wherein φ' indicates the second azimuth value,

wherein θ indicates the first elevation value,

wherein θ' indicates the second elevation value,

wherein the second azimuth value φ' results from a first mapping of the first azimuth value φ according to the first linear mapping function according to

$$\varphi' = \begin{cases} \frac{\varphi_{right}^{repro} + 180^\circ}{\varphi_{right}^{nominal} + 180^\circ} \cdot (\varphi + 180^\circ) - 180^\circ & \text{for } -180^\circ \leq \varphi < \varphi_{right}^{nominal} \\ \frac{\varphi_{left}^{repro} - \varphi_{right}^{repro}}{\varphi_{left}^{nominal} - \varphi_{right}^{nominal}} \cdot (\varphi - \varphi_{right}^{nominal}) + \varphi_{right}^{repro} & \text{for } \varphi_{right}^{nominal} \leq \varphi < \varphi_{left}^{nominal} \\ \frac{180^\circ - \varphi_{left}^{repro}}{180^\circ - \varphi_{left}^{nominal}} \cdot (\varphi - \varphi_{left}^{nominal}) + \varphi_{left}^{repro} & \text{for } \varphi_{left}^{nominal} \leq \varphi < 180^\circ \end{cases}$$

and

wherein the second elevation value θ' results from a second mapping of the first elevation value θ according to the second linear mapping function according to

$$\theta' = \begin{cases} \frac{\theta_{bottom}^{repro} + 90^\circ}{\theta_{bottom}^{nominal} + 90^\circ} \cdot (\theta + 90^\circ) - 90^\circ & \text{for } -90^\circ \leq \theta < \theta_{bottom}^{nominal} \\ \frac{\theta_{top}^{repro} - \theta_{bottom}^{repro}}{\theta_{top}^{nominal} - \theta_{bottom}^{nominal}} \cdot (\theta - \theta_{bottom}^{nominal}) + \theta_{bottom}^{repro} & \text{for } \theta_{bottom}^{nominal} \leq \theta < \theta_{top}^{nominal} \\ \frac{90^\circ - \theta_{top}^{repro}}{90^\circ - \theta_{top}^{nominal}} \cdot (\theta - \theta_{top}^{nominal}) + \theta_{top}^{repro} & \text{for } \theta_{top}^{nominal} \leq \theta < 90^\circ \end{cases}$$

13. A decoder device comprising:

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5 | a first decoder (910) for unified speech and audio decoding for decoding a bitstream to obtain one or more audio input channels, to obtain one or more input audio objects, to obtain compressed object metadata and to obtain one or more SAOC-transport channels,

10 | an second decoder (915) for spatial audio object decoding for decoding the one or more SAOC-transport channels to obtain a first group of one or more rendered audio objects,

an apparatus (917) according to one of the preceding claims, wherein the apparatus comprises

15 | a third decoder which is an object metadata decoder (918), being the object metadata processor (110) of the apparatus according to one of the preceding claims, and being implemented for decoding the compressed object metadata to obtain uncompressed metadata, and

20 | the object renderer (920; 120) of the apparatus according to one of the preceding claims, for rendering the one or more input audio objects depending on the uncompressed metadata to obtain a second group of one or more rendered audio objects,

25 | a format converter (922) for converting the one or more audio input channels to obtain one or more converted channels, and

30 | a mixer (930) for mixing the one or more audio objects of the first group of one or more rendered audio objects, the one or more audio objects of the second group of one or more rendered audio objects and the one or more converted channels to obtain one or more decoded audio channels.

14. A method for generating loudspeaker signals, comprising:

35 | receiving an audio object,

receiving metadata, comprising an indication on whether the audio object is dependent on a size of a screen, and further comprising a first position of the audio object,

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calculating a second position of the audio object depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen,

generating the loudspeaker signals depending on the audio object and depending on position information,

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wherein the position information is the first position of the audio object, if the audio object is indicated in the metadata as being not dependent on the size of the screen, and

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wherein the position information is the second position of the audio object, if the audio object is indicated in the metadata as being dependent on the size of the screen,

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wherein calculating the second position of the audio object is conducted depending on the first position of the audio object and depending on the size of the screen, if the audio object is indicated in the metadata as being dependent on the size of the screen, wherein the first position indicates at least a first azimuth and a first elevation, wherein the second position indicates at least a second azimuth and a second elevation,

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wherein calculating the second position of the audio object is conducted depending on at least one of a first linear mapping function and a second linear mapping function, wherein the first linear mapping function is defined to map a first azimuth value to a second azimuth value, wherein the second linear mapping function is defined to map a first elevation value to a second elevation value,

30 15.

A computer program for implementing the method of claim 14 when being executed on a computer or signal processor.

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