DOLBY ATMOS : SPATIALIZED SOUND

PREFACE

Dolby Atmos is a technology developed by the Dolby to enhance the capabilities of spatial sound.

In the theater, there are several speakers. The usual ones behind the screen, the other ones on the sides and at the back of the room, and sometimes on the ceiling as well (and on the floor too ?).

The Atmos technology follows the SMPTE **Immersive Audio Bitstream (IAB)** standard as a common basis and standardizes its data structure using the **Dolby Atmos Bitstream** standard [1] to create the Dolby Atmos technology within IAB-compliant DCP.

Concretely, in the way it works, it uses spatial metadata to "move" the sound between the different speakers in the room.

This metadata is refreshed several times per second on the sound timeline. A sound can be "moved" throughout the space without any constraints. All it needs is positional and sound level details. With that, we can create a sound effect that gives the impression the sound is moving to the space surrounding your head.

How works a (simple) spatialisation ?

To create a simple spatialisation - at a (very) small scale and only horizontally - all it needs is a pair of earphones and the use of the left-right balance in the audio settings. The sound then seems to move from left to right.

And, if the sound comes with the same itensity from both earphones at the same time, you get the impression that the sound is coming from ... the center of your head (not from the right or left). The brain creates a kind of phantom center spatialization at a central point inside your head.

It is the same principle but much more complex - in 3d, with more speakers, more channels and especially with the new concept of the **audio objects**.

Dolby Atmos supports 64 physical speakers, 128 sounds channels and 118 audio objects (data / metadata) [2]

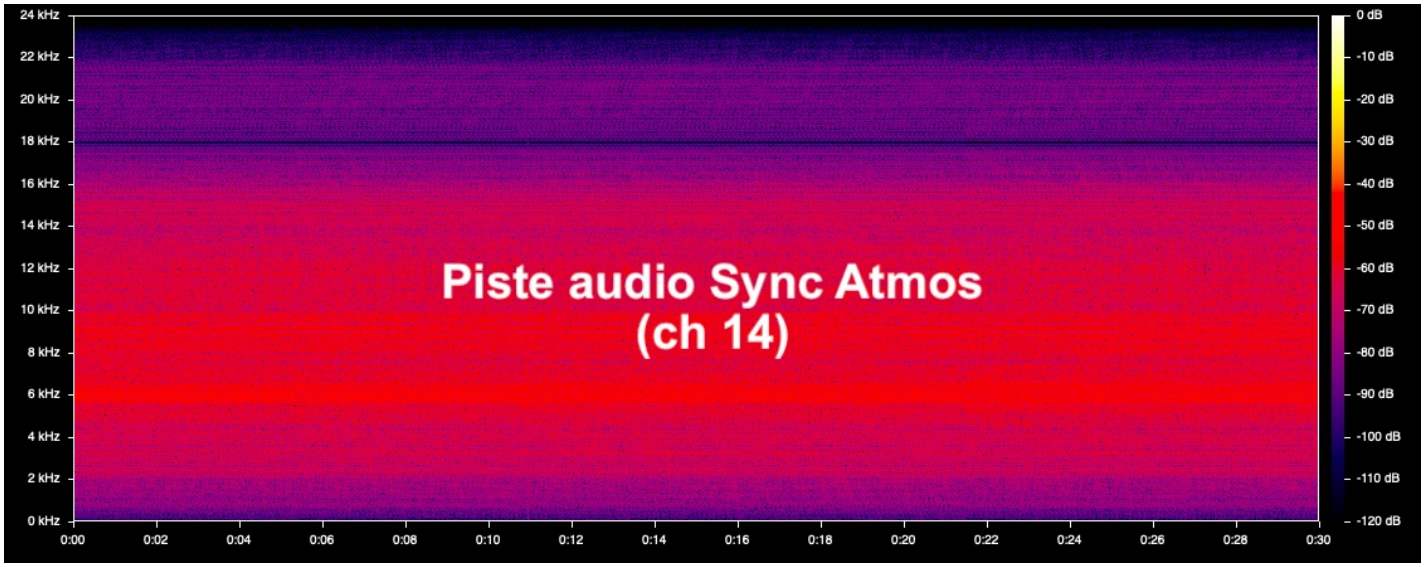
CPL

See the chapter Immersive Audio (IAB) and chapter CPL AuxData.

MXF

A complete chapter is dedicated to the analysis of MXF - Dolby Atmos.

To note that the MXF Dolby Atmos can be accompanied by a synchronization track for the audio processor on track #14 within the main sound MXF file (MainSound). The Dolby Atmos synchronization data are timecodes, here is a brief spectral analysis :



make a analysis of the raw data from the sync channel

REFERENCES

- Dolby Atmos Specifications
- Dolby Atmos Technologies
- Dolby Atmos - Cinema
- Dolby Atmos - Home Theater (Installation Guidelines)
- Excellent article about Immersive Audio Bitstream, its history and its technical aspect written by C.J. Flynn for CelluloidJunkie
- Brief technical documentation on the Dolby Cinema (in japanese)
- Differences between Atmos and DTS-X
- The 5 Things You Need to Know About the IAB Naming Convention

NOTES

1. To be very clear: **Dolby Atmos Bitstream** standard doesn't add any additional elements compared to the **Immersive Audio Bitstream** standard. It follows the latter. See the preface in the chapter MXF Dolby Atmos for a more precise description. ↩

2. *« **Object counts** : All IAFrames generated by Dolby and belonging to the same IAB track file have the same number of objects. The IAB track file can have a maximum of 118 objects. **Channel count** : The IAB track file can have a maximum of 128 channels. »* -- IMF IAB Interoperability Guidelines. Note that the number of 118 objects corresponds to 128 channels minus the 10 channels of 7.1.2 already occupied (called **Bed Channels**). ↩