SOLENT UNIVERSITY

Name: Guilherme Ferreira

Course: BSc (Hons) Music Technology (Top-Up)

Supervisor: Lee Davison

The Importance of Sound Localisation Cues on Immersive Audio

ABSTRACT

This study was conducted is an audio spatial lab, and explores the capabilities of four surround formats to deliver an immersive sound experience (a soundscape) through four different mixing methods. Each mix used an additional amount of channels and techniques, and each provided different types of sound localisation cue information to the sound system's sweet spot. mm

METHODOLOGY

The methodology to explore this reports' matter passed through: creating a soundscape in four different surround formats, which was then played back to a set of 25 subjects asked to locate static and moving audio objects on it; and a simpler subjective test where participants only had to spot a high-frequency tone burst in between the speakers on the horizontal dimension.

Results from the subjective tests were then backed by the values resulting from measuring the ITDs, ILDs and HRTFs on the sweet spot, which shows the quality of the primary sound localisation cues that reach there. Those objective values served as well to justify the misperceptions in the same hemisphere (left hemisphere or right hemisphere) happening in the participants' process of spotting a sound source.

RESULTS

Participant's localisation accuracy improved when:
- Localising audio objects panned to the right side of the room;
- Localising audio objects that were richer in high frequencies;
- Localising *Moving Audio Objects*;
- Localising any audio object on the *5.1* mix;
- Localising any audio object on the *Special* mix, regarding just the formats where all speakers in the room were reproducing sound.

Participants rated (immersive quality wise) the mixes by this descending order: *Special / Binaural / Ambisonic / 5.1.*

OBJECTIVES

- Create four different mixes for four different surround sound configurations. A *5.1*, an *Ambisonic*, a *Binaural* and a *Special* mix, exclusively designed to be played back through the sound system layout on room RM707;

- Explore the sound information provided by the speakers in the sweet spot;

- Show the influence that the quality of sound localisation cues have on immersive audio experiences.

SURROUND LAYOUTS USED

5.1

AMBISONIC & SPECIAL

BINAURAL

CONCLUSIONS

Based on data extracted from the correlations between objective and subjective tests, the influence of sound localisation cues is evident in the process of correctly localising an audio object in an immersive sound experience but providing those cues is not the only key to engage a listener in an immersive sound environment, which seems to be a balance between providing appropriate sound localisation cues and providing the right amount of them.