AALTO UNIVERSITY - DEPARTMENT OF MEDIA

TIME TURNED INTO SPACE - 2019

SOME DIRECTIONS TO SPATIAL SOUND

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TWO MAIN PERSPECTIVES TOWARDS SPATIAL SOUND

- The *mainstream* approach: the fidelity approach.
  - One loudspeaker is not enough information to reproduce sound in space realistically.
    - The system *reproduces* - qualities: neutral, uniform, ideal, illusory.

    –> the acoustic space is corrected or concealed by the reproduction system. Cinema surround, concert halls, video games etc.

- The *lo-fi* approach:
  - The system *determines (or generates)* - qualities: imperfect, “biased”, embodied.

    –> the acoustic space becomes a compositional parameter, a material. Electric guitars, vinyl records, acousmonium.

SOUND AS AN OBJECT

- The space is recreated according to ideal conditions:
- Simulation and reproduction
- Surround systems, binaural audio, 3d sound are all attempt to simulate the condition happening in real environments to deliver a credible illusion.
- The system has to be transparent, exact and control extends to all aspects of sound reproduction.
- Sound is thus an object to manipulate.
- “This unit of sound [sound-object] is the equivalent to a unit of breath or articulation, a unit of instrumental gesture. The sound object is therefore an acoustic action and intention of listening.” (P.Schaeffer, Traité Des Objets Musicaux, 1966)

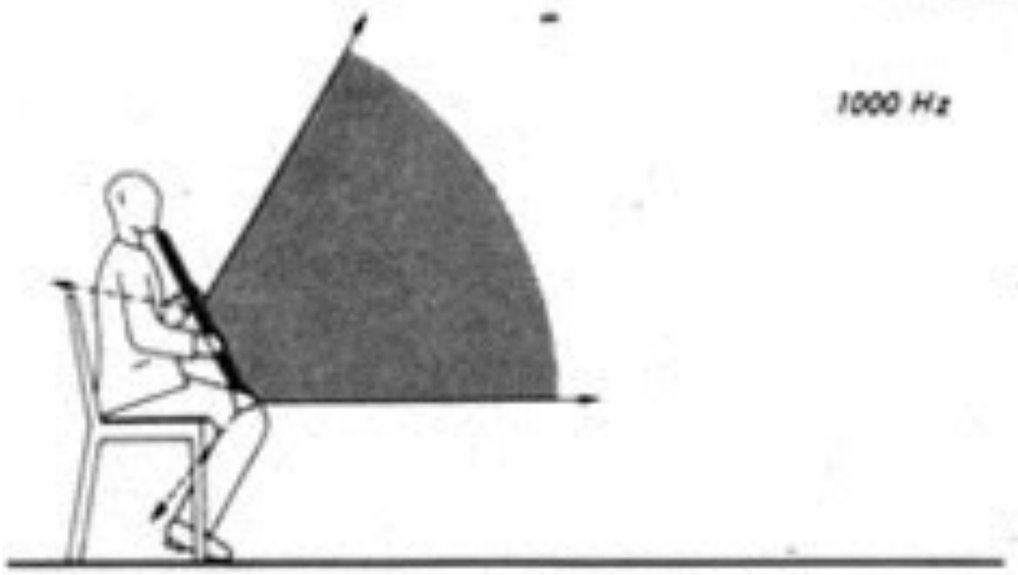
SOUND AS AN EVENT

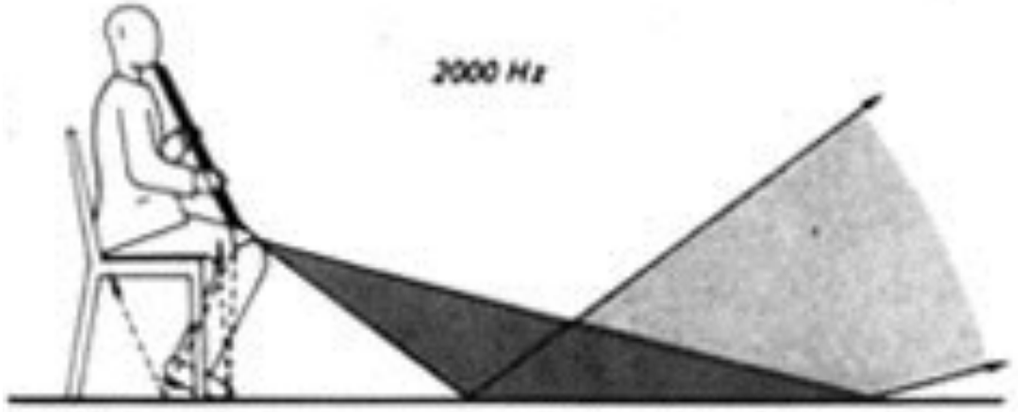
- I like to think sound rather like an event - Agostino Di Scipio
- "(...) the role of technology in the creative processes is not so much about designing and projecting the sound, as something to relocate, displace, move in space (...) rather it is about allowing the interactions through which the sound event happens, in a real time and a real place, as an emergence, indissociable (inseparable) from the specific space and those who dwell it." (A. Di Scipio, ascoltare l'evento del suono. *my translation*)
- Sound as an emergent phenomena
- Composition is thus site-specific, technology-specific, listener-specific…
- The non neutrality is not a limitation but it is the material to build upon, it resists and dictates the condition under which the piece is born.

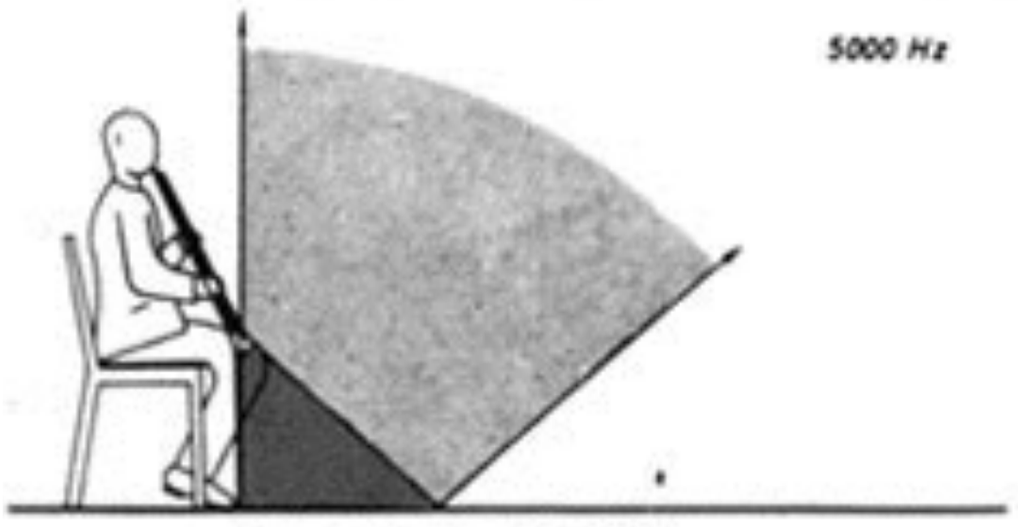
RADIATION PATTERNS…

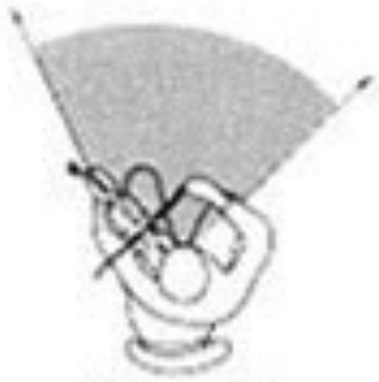
- The radiation pattern is a representation of directionality of sound, typically in different frequency ranges.
- The directionality of the radiated sound is very specific to each musical instrument.
- It may, for instance, depend on the structure of the vibrating body (e.g., string and percussion instruments) or on the spatial distribution of the opening holes (e.g., bells and open finger holes for wind instruments).
- Instruments have extremely wild radiating pattern, which also add to their sound richness.
- The loudspeaker, on the contrary, per se is rather boring…

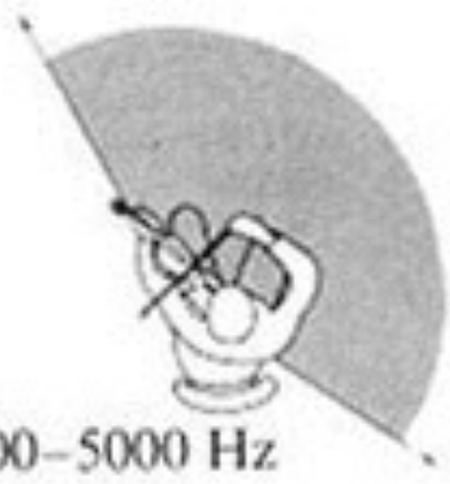
CLARINET AND VIOLIN



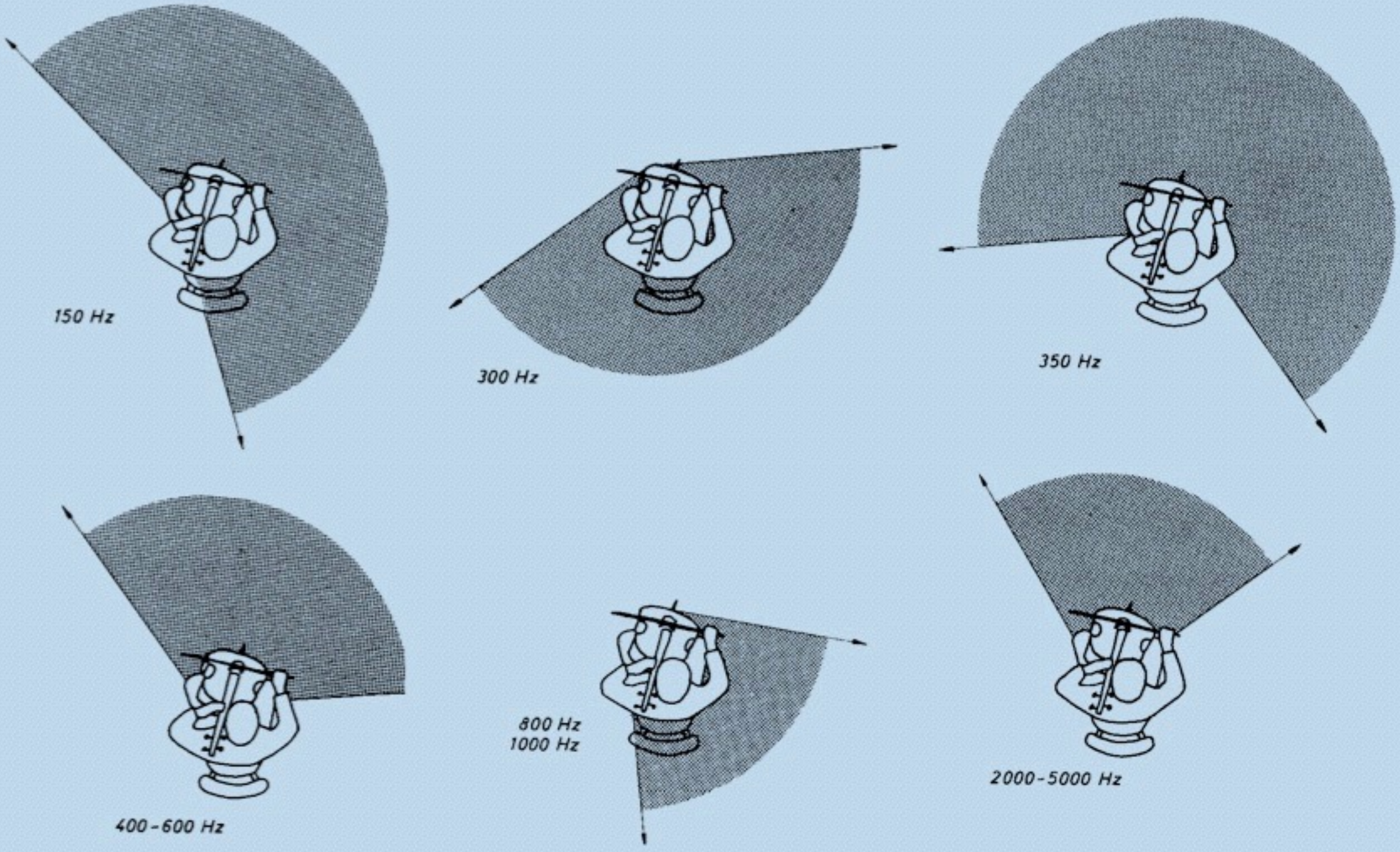




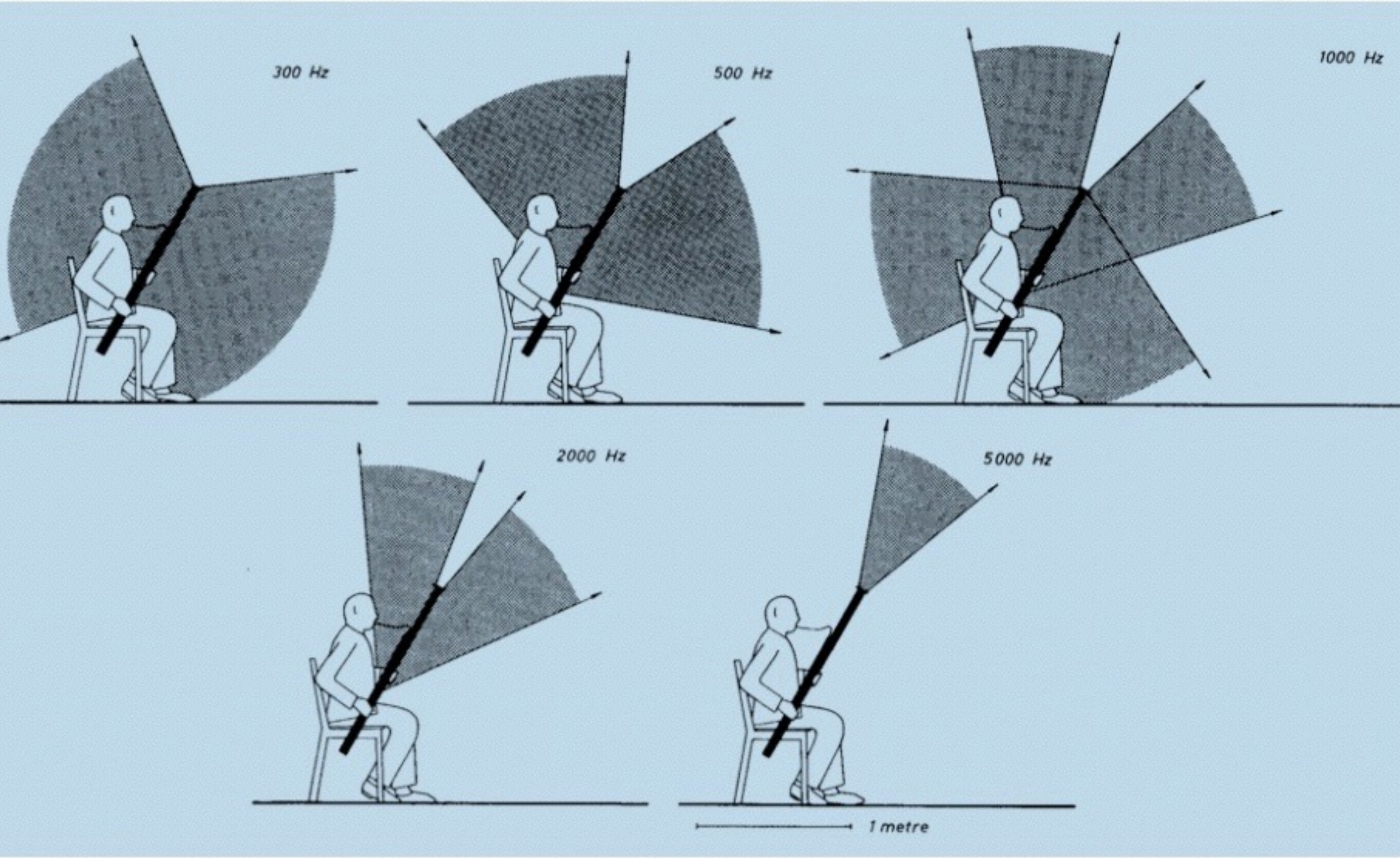




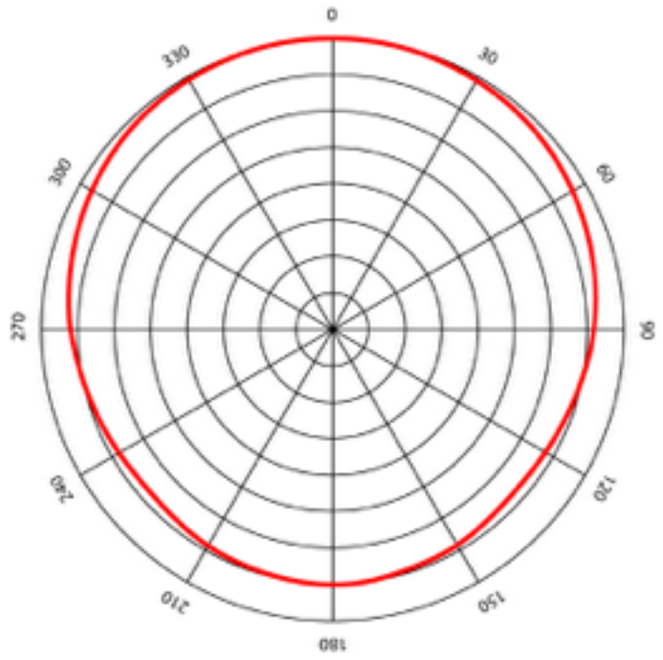
Cello



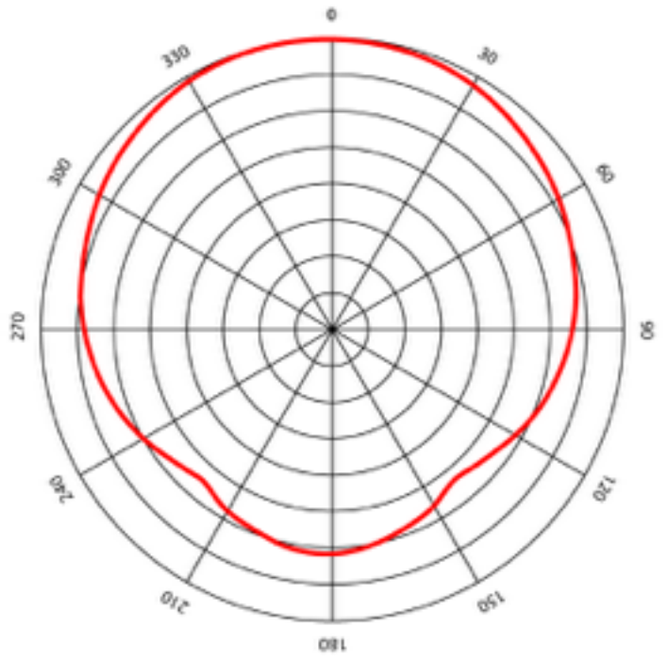
Bassoon



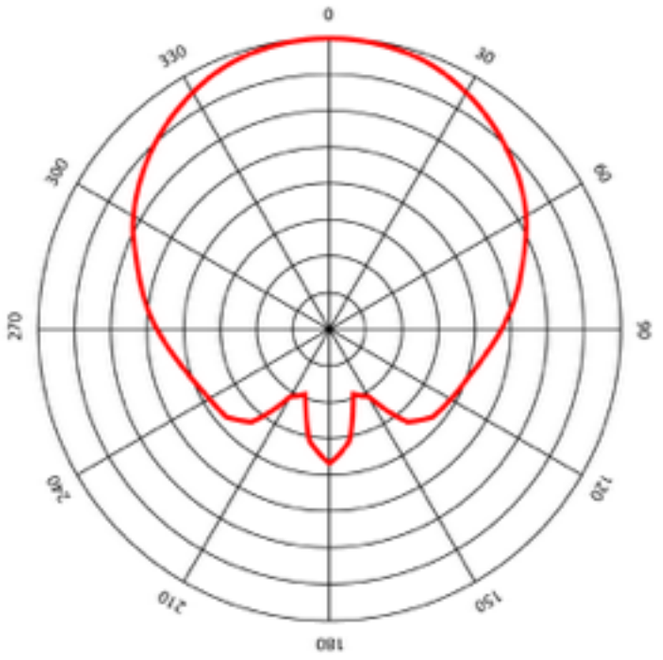
LOUDSPEAKER



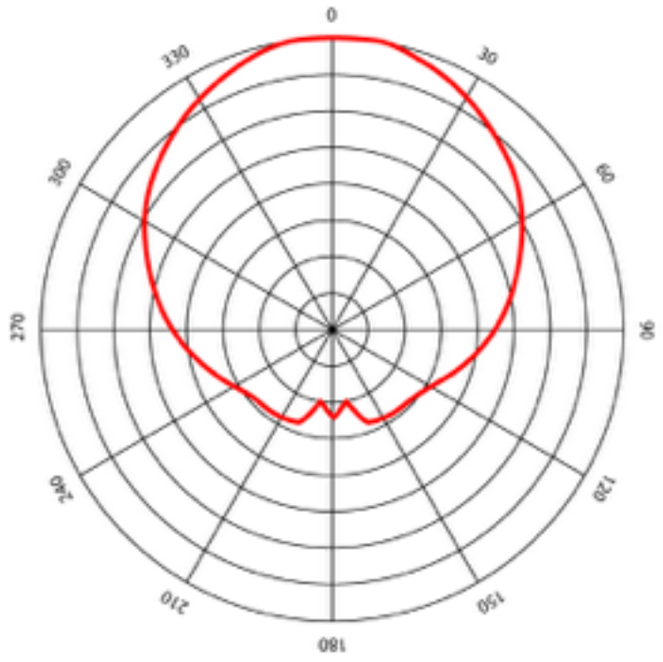
500 Hz



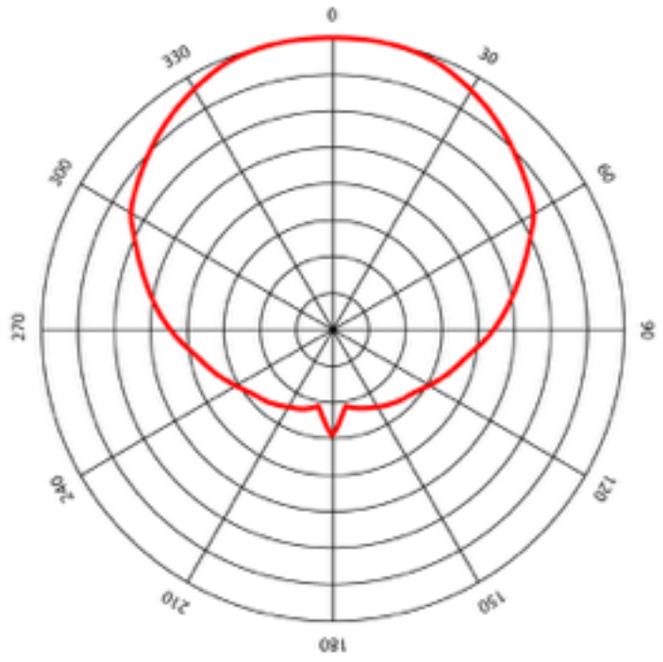
1000 Hz



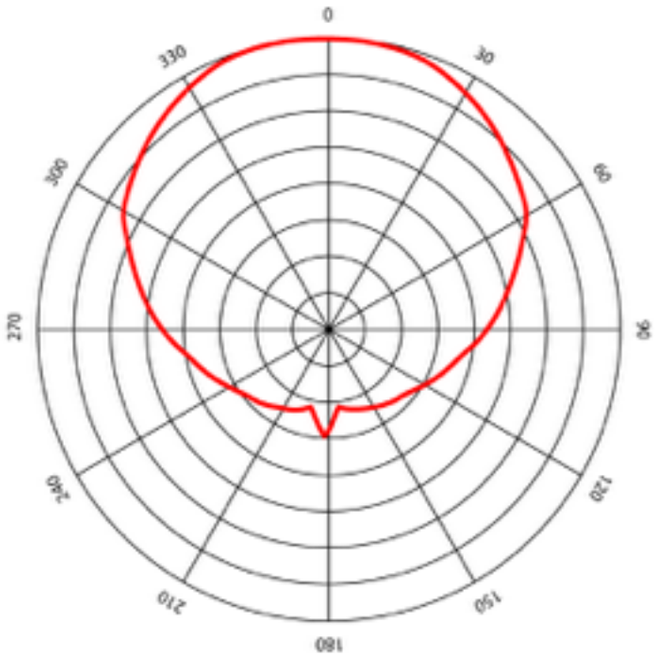
2000 Hz



4000 Hz



8000 Hz



10,000 Hz

AND MOVEMENTS

- Sound moving in space can involve a relatively complex amount of phenomena:
  - Air filtering, delays, doppler effects, reflection, diffusion and absorption from obstacles and room features.
- Spatialisers are always the result of a choice about which feature to model and which to exclude.
- Engineers and artists have very different goals: we don’t need our choices to be guided by plausibility (unless we wish so).
- We could think of sounds leaving a trace like snails or meteors, we could think of a sound exploding in slow motion across an improbable shape and use “unrealistic” strategies to reach our goal.