

Stadium Noise Project

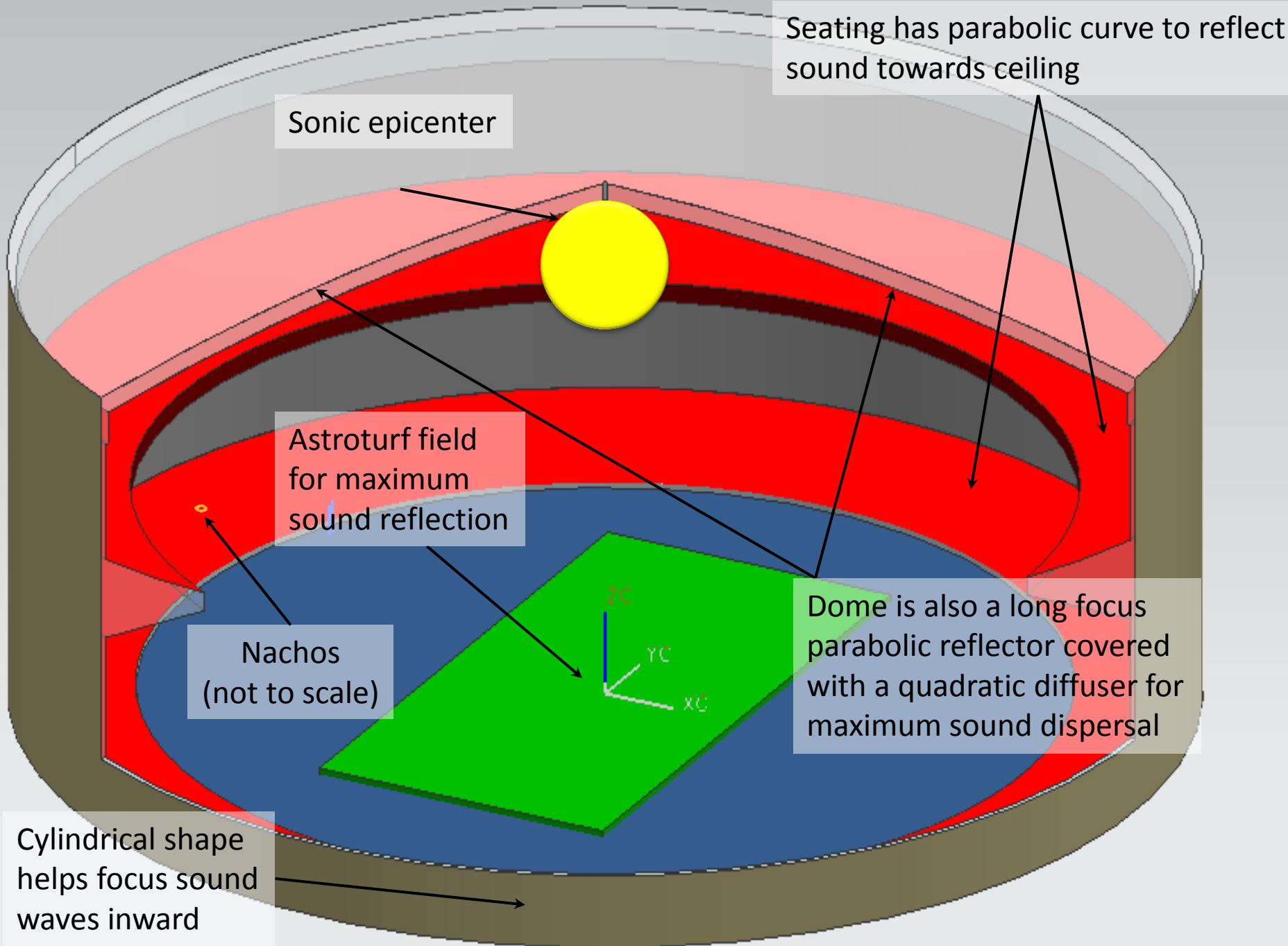
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Abstract

- Goal is to maximize noise and discomfort for all present
- All sound amplification and sourcing must be organic (no PA or active amplification systems)
- Stadium must still function as a stadium

Concept selection

- Parabolic reflectors were chosen to focus and direct sound waves
- Sound is directed towards the ceiling which then reflects and disperse the sound over the stands
- Human screams for both men and women have a frequency of roughly 3 kHz, so reflectors were optimized for this wavelength
- Human hearing is also naturally sensitive to this frequency
- Concrete, where applicable, is used for maximum reflectivity



Seating has parabolic curve to reflect sound towards ceiling

Sonic epicenter

Astroturf field for maximum sound reflection

Nachos (not to scale)

Dome is also a long focus parabolic reflector covered with a quadratic diffuser for maximum sound dispersal

Cylindrical shape helps focus sound waves inward

Validation of concept

- Louisiana Superdome (after which concept is modeled) has a maximum SPL of 120dB
- Assuming a conservative 50% seating reduction with proposed design, this would bring the unaided noise level to 117 dB
- Reflectors produce a maximum gain of 68 dB for a total SPL of 185 dB.
- Due to sensitivity of human hearing to the 3000Hz frequency range, the adjusted SPL would be closer to 195 dB
- As screams of pain increase, the noise level increases, creating a positive feedback loop of sound pressure level increase