

Vibrotactile Sensory Substitution Hearing Device

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Background and Problem

- 5% of population (360M people) has disabling hearing loss (72M of those are profoundly deaf)
- Severe hearing impairment creates an immense communication barrier
- Hearing aids are expensive and only help people with a moderate level of impairment
- Cochlear implants are invasive and costly
- Speech recognition based approaches are one-way (user cannot learn to speak)

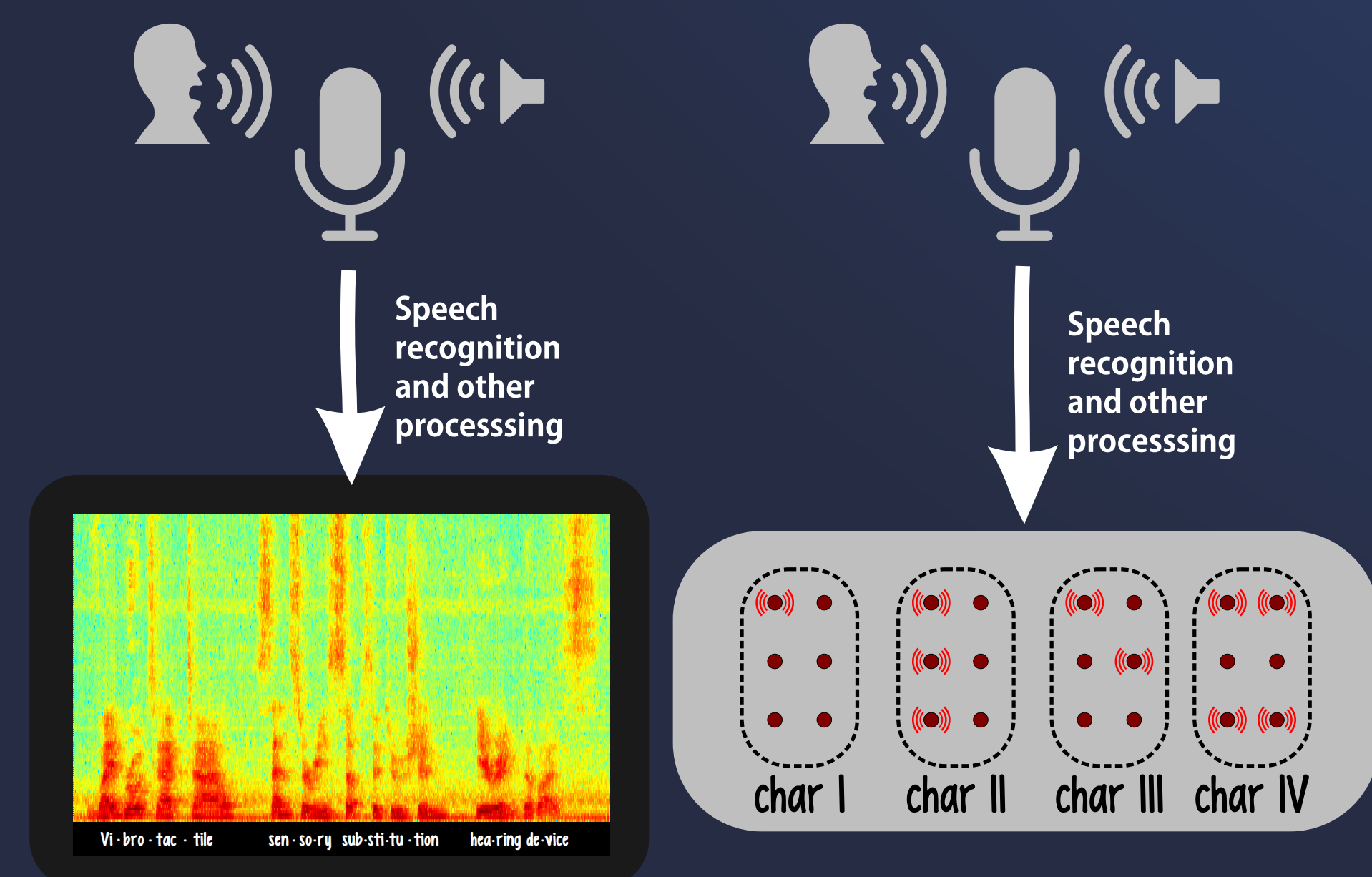
VTSSHD addresses these issues by providing sensorial substitution:

- Accommodates all levels of impairment
- Low cost, wearable, non-intrusive
- Two-way communication, user can learn to speak

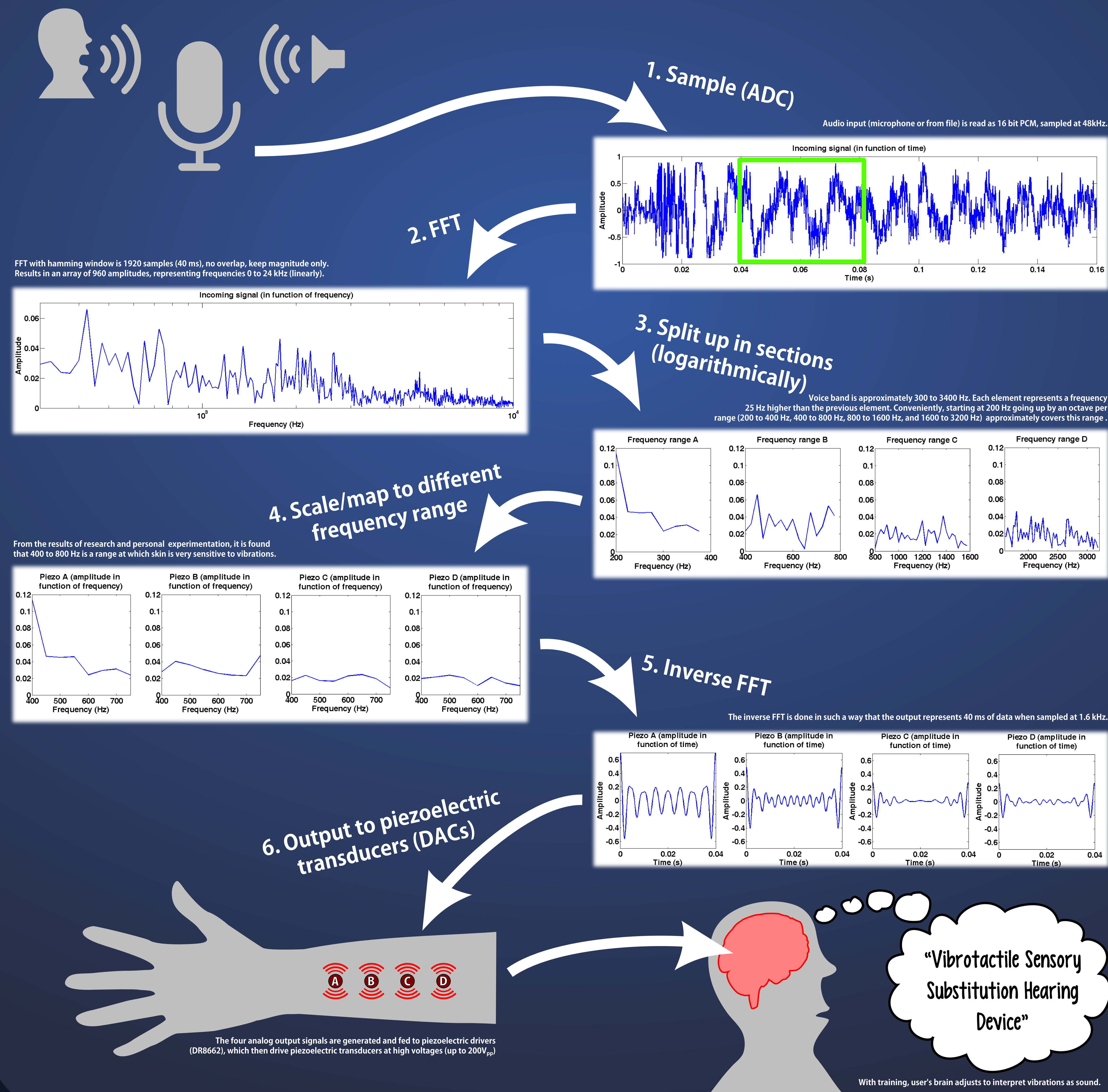
Designs Considered

Visual Stimulus Sensory Substitution Hearing Device

Wearable Braille-Like Actuation Device

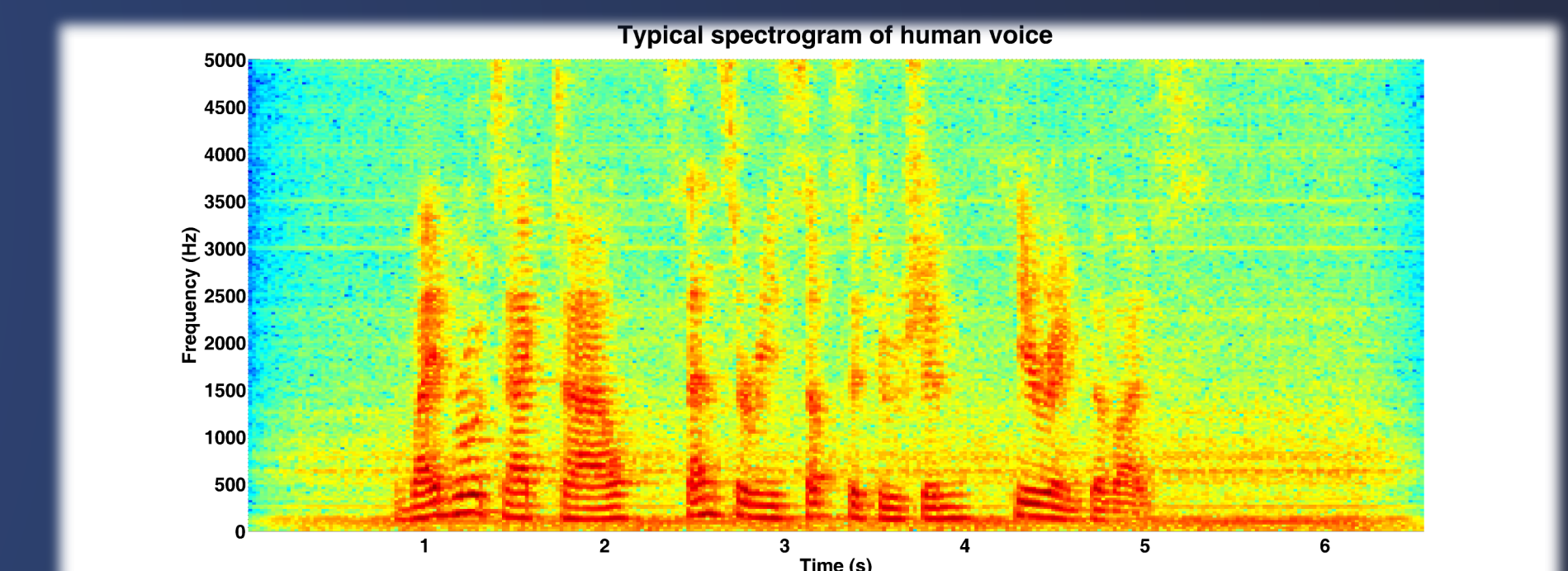


How does it work?

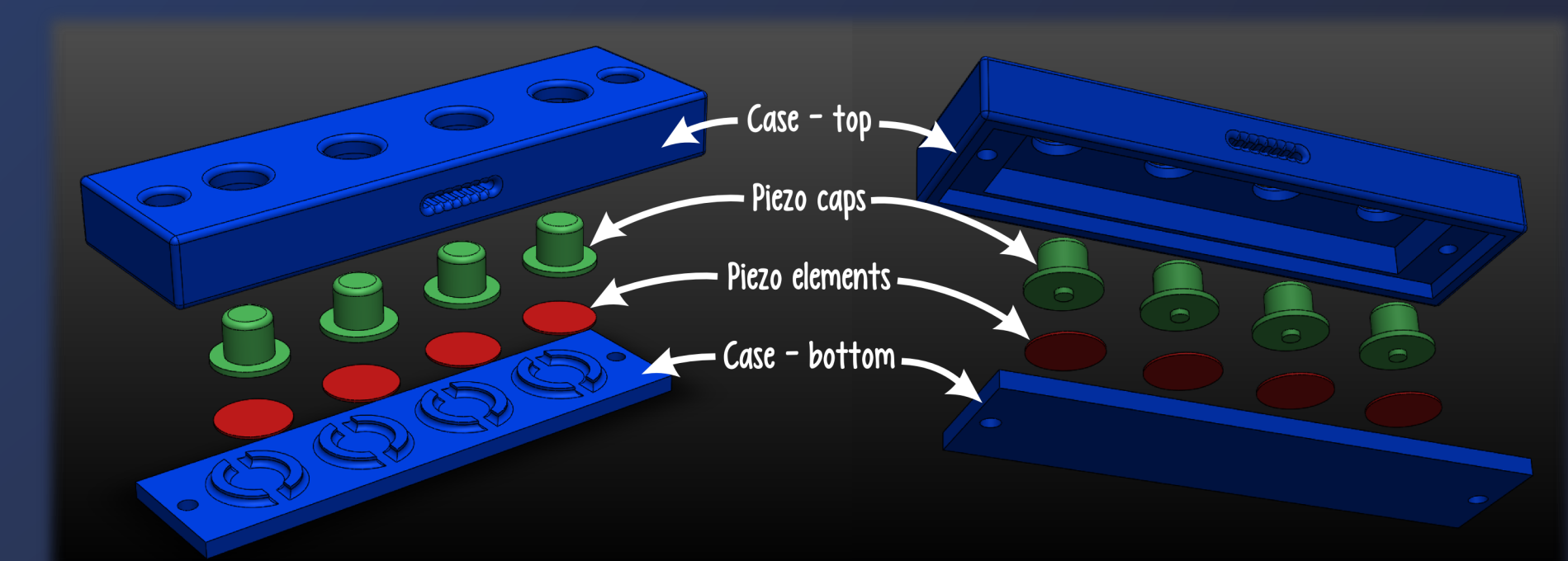


Properties of Human Voice

- In telephony, voiceband is ~300 to ~3400 Hz
- Voice fundamental frequency is 85 to 255 Hz, but the harmonic series create the illusion of hearing the fundamental
- Words are combinations of syllables, which are combinations of phonemes
- Phonemes can be identified by their formants (most importantly, f_1 and f_2)



Mechanical Design



Sponsors

