From Boom to Thump: Human Perception and the Waves of Sonic Booms and Thumps

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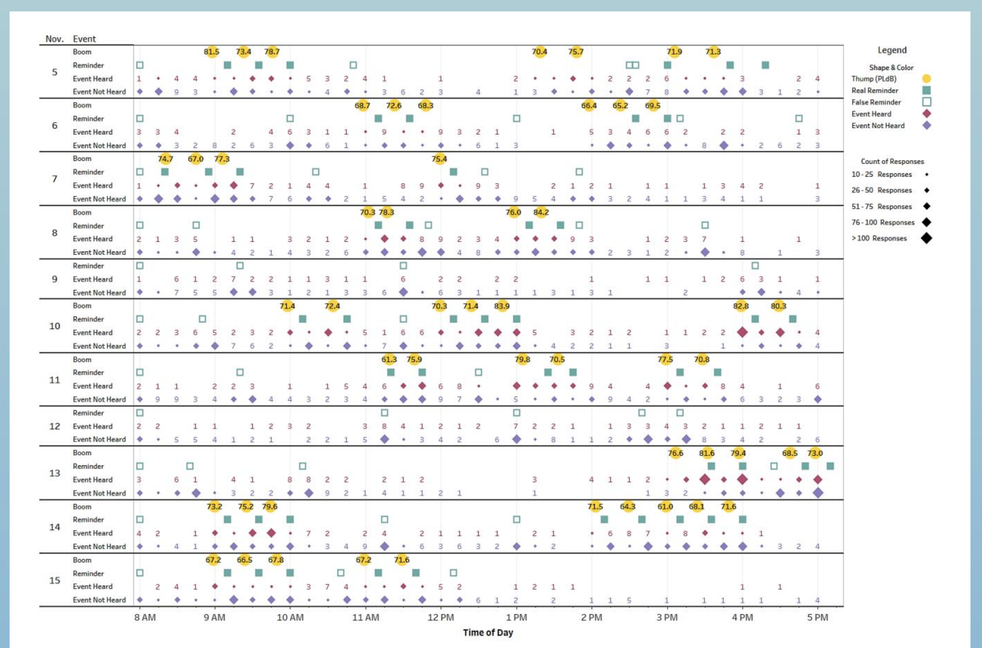
Motivation

The NASA X-59 represents a major step forward in supersonic flight with its quieter "sonic thumps." Our research aims to showcase the reduced noise impact.Our goal is to enhance public awareness and acceptance of this technology, making supersonic travel a viable and less disruptive option for future air travel.

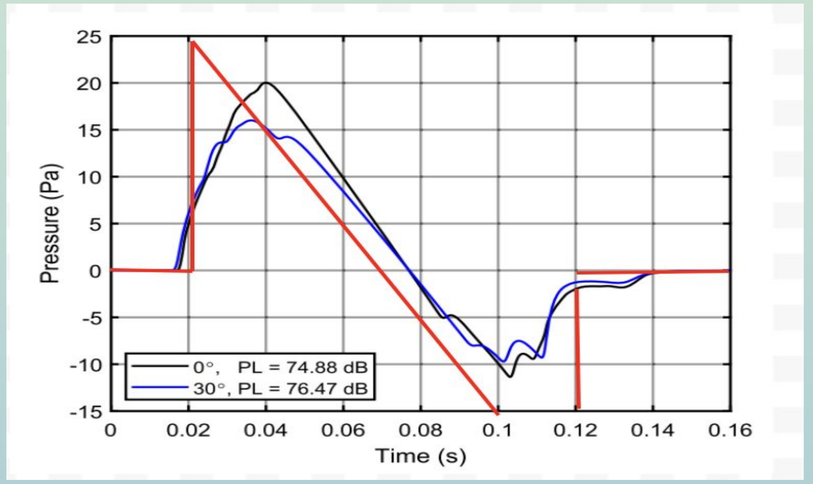
Nasa's X-59 Aircraft was designed to demonstrate technology that reduces the intensity of sonic booms, creating a quieter "sonic thump". Developed under NASA's QueSST program, it aims to pave the way for supersonic flight over land, reducing noise pollution and improving commercial air travel.

We have developed a low-cost, easy-to-assemble Sonic Thump Recorder using components like a Raspberry Pi, microphones, and a sound card. This DIY device allows anyone to record quieter sonic booms, known as "sonic thumps," produced by aircraft like the NASA X-59. By making this technology accessible, we aim to engage the public and gather valuable data on human perception of these events, encouraging civilians with helping to shape the future of supersonic travel.

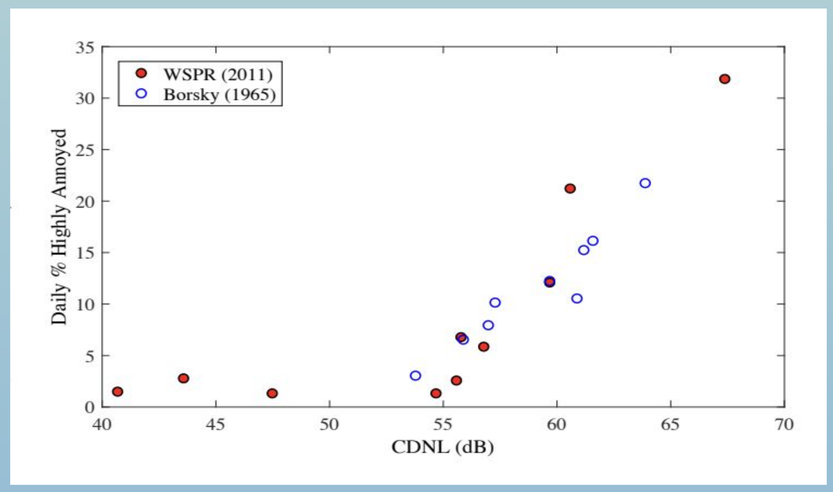
Quiet sonic booms are the future for commercial air travel if the public can be convinced.



Data: Booms vs. Thumps

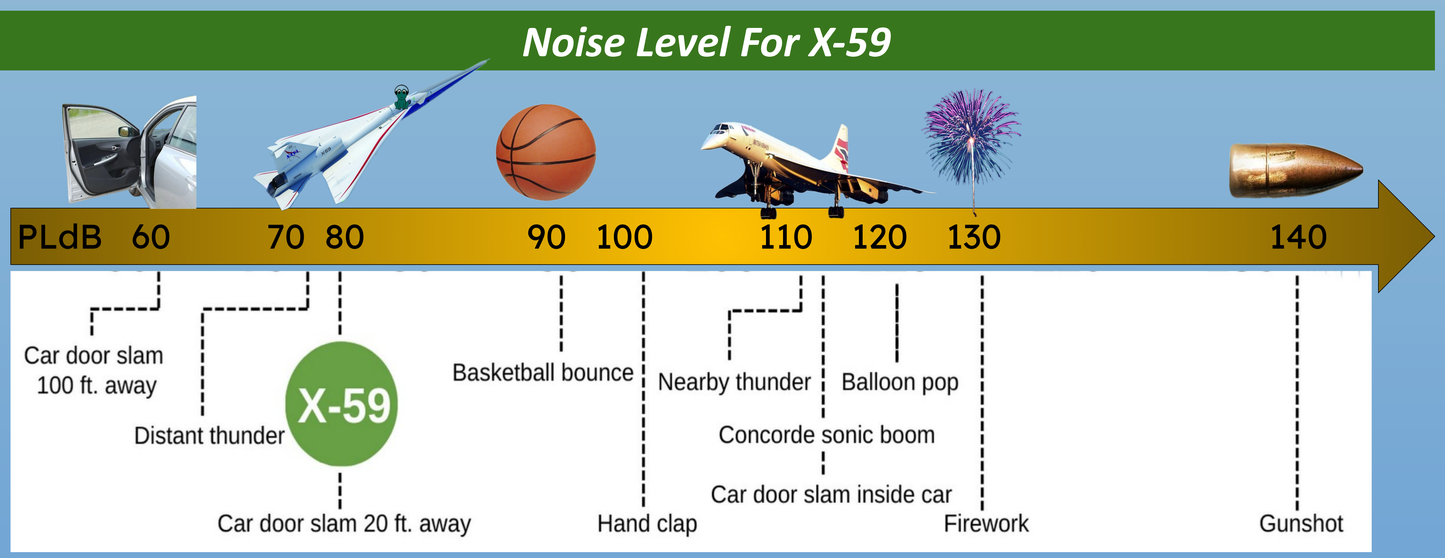


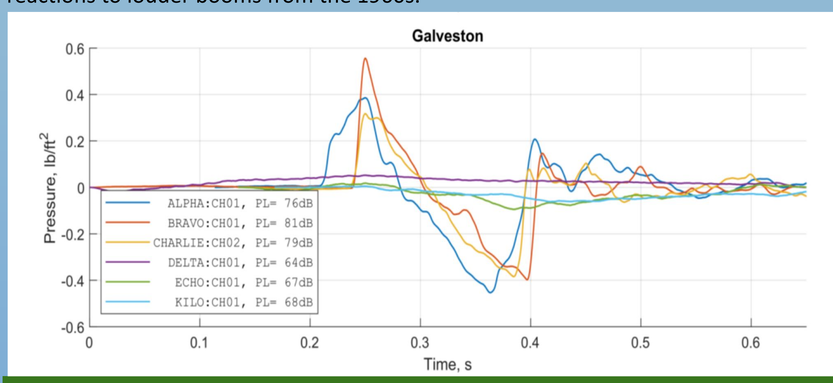
In this graph we see a simulation(black and blue line) of X-59's simulated pressure-time. The red line represents what a regular sonic boom would look like in comparison.



The graph compares two studies, WSPR (2011) and Borsky (1965), showing how noise levels from sonic booms affect annoyance. As noise levels (CDNL) increase, more people report being highly annoyed. The WSPR study used a low-boom dive maneuver to simulate future quieter sonic booms, while the Borsky study reflected reactions to louder booms from the 1960s.

Noise Level For X-59





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