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Case Study
Stereolithography

Novel Acoustics 3D-printed concept speaker designed by Boaz Dekel with Stratasys Stereolithography technology

With the ability to print large, single structures for rigidity and complex internal geometries for enhanced acoustics, will the Neo800 stereolithography printer be a game-changer for the future of audio innovation?

About Novel Acoustics

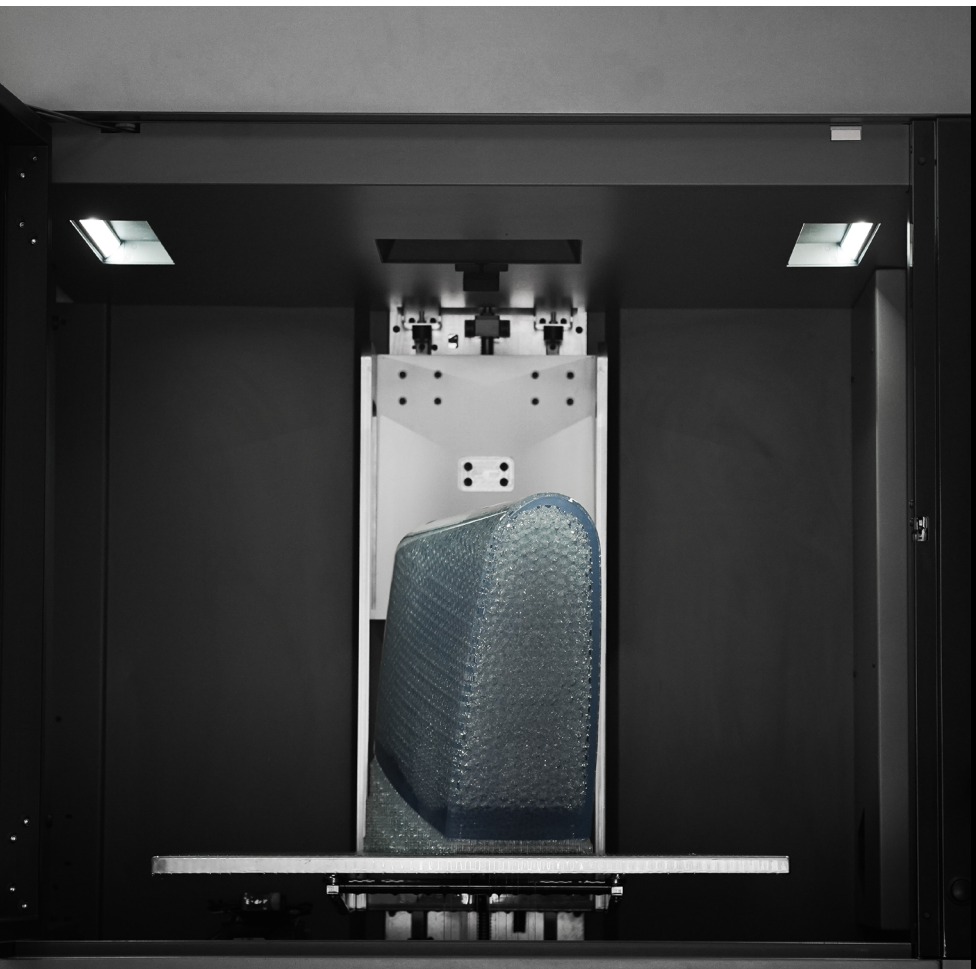
Boaz Dekel is co-founder of Novel Acoustics, an Israeli-based company at the forefront of acoustic and audio reproduction technology, that also provides expert consulting to a select clientele.

The Challenge

The Novel Acoustics 3D-printed concept speaker set was produced as a technology demonstrator, showcasing the capability of prototyping large functional parts with 3D printing, and using stereolithography as a facilitator for innovation to improve product performance.

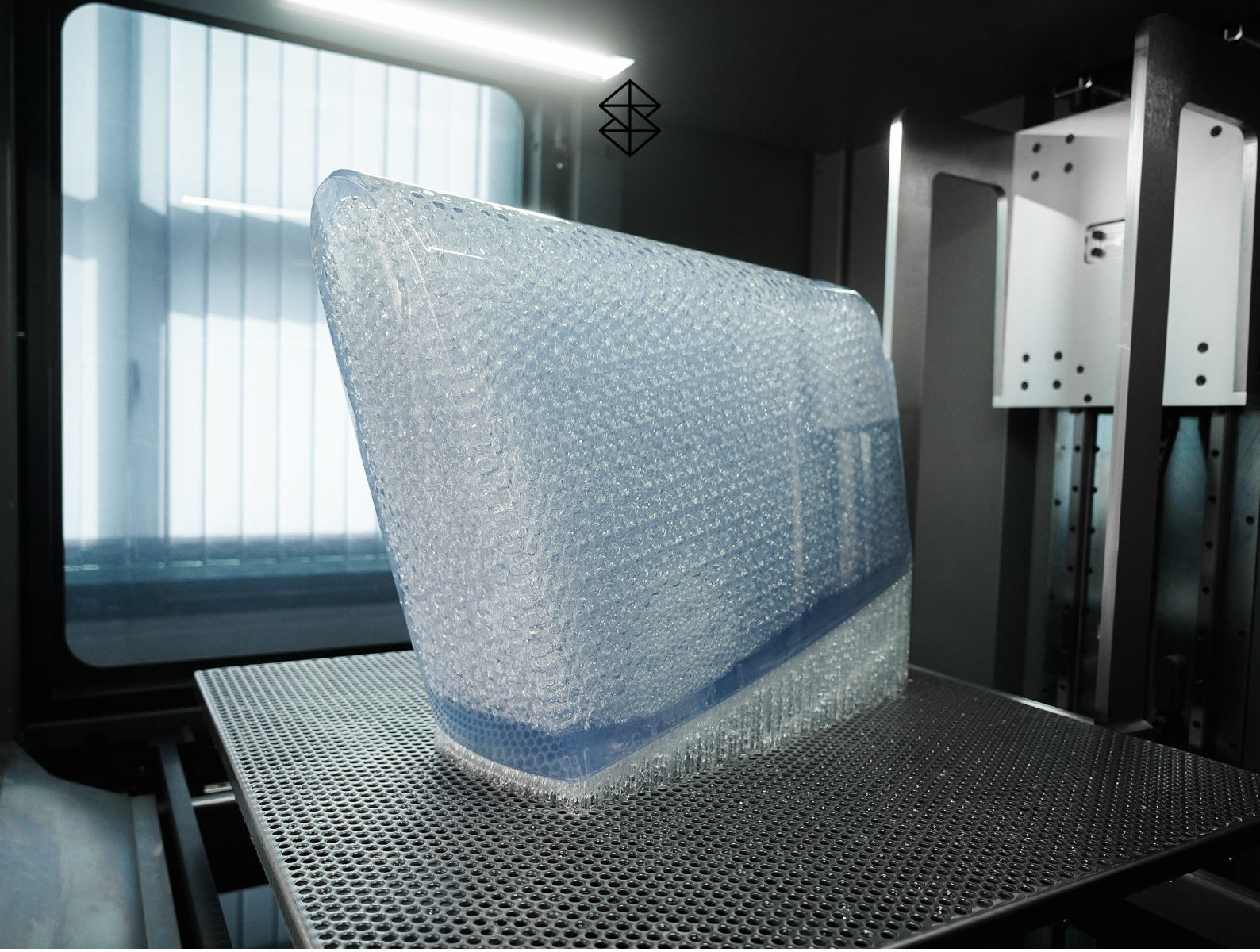
Designing a top-tier loudspeaker is a balancing act of mechanical and acoustical engineering, often with competing requirements. The complexity extends beyond design into production and assembly, where numerous potential points of failure exist.

High-fidelity speakers, which are prone to vibrations, require precisely manufactured parts that are assembled meticulously. Minor flaws can drastically affect system performance, causing air leaks or noise that leads to sound distortion.



“Sound waves like to behave in strange and unintuitive ways. You really want to control and engineer this behavior in order to achieve the performance that you’re after.”

Boaz Dekel
Novel Acoustics Ltd.



The Solution

The Stratasys Neo® Stereolithography 3D printer provided the cutting-edge technology to support Boaz's design, which incorporates components from industry-leading creators of speaker drivers, Morel.

The Stratasys Neo800's ability to produce highly accurate parts makes it ideal for such detailed applications. It offers unique benefits over traditional manufacturing methods, where the creation of complex geometries and internal structures necessary for optimal speaker acoustic behaviour proves a challenge.

Utilizing the Neo800's expansive print platform, the speaker enclosure was innovatively printed as one solid, monolithic piece. This seamless construction eliminates potential rattling and loosening, simplifies production, and ensures consistent acoustic performance over time.

Boaz was able to achieve excellent acoustic and structural results using the Stratasys Neo800:

The intricate internal lattice structure of the speaker cleverly meets the mechanical and acoustic needs of a loudspeaker enclosure. The unique benefit of 3D-printing is the ability to print the lattice as a single complex part at a very fine resolution, allowing for precise adjustments to structural firmness and sound absorption in specific areas.

Due to the large print platform of the Neo800, the team were able to produce the speaker's enclosure as a single entity. Hugely beneficial for acoustics, a single solid structure means there are no seams or partitions to rattle or cause distortion. It was printed using Somos® WaterShed resin, which is not only clear for visual quality checks but also mechanically suitable, with its rigidity and vibration-damping qualities. Somos® PerFORM material added extra stability to the front and base.

The Impact

Stereolithography technology offers the loudspeaker industry a faster and more flexible design-to-market process that allows for increased customization of acoustic components and the exploration of new ideas in the field.

> The outcome is actually beautiful and acoustically very correct. I see 3D printing as the best solution available today to reduce resonances and reflections in our speakers."

Oren Mordechai
CEO of Morel

What Novel Acoustics has demonstrated with this innovative project is that 3D printing allows for the production of speaker enclosures with enhanced acoustic properties using engineered and customized materials.

With the use of high-quality and carefully chosen materials, designers like Boaz Dekel can tailor the acoustic properties of the material to meet their speakers' performance requirements.

> This is the future of speakers."

Oren Mordechai
CEO of Morel

> The rigidity of the parts, the materials we're able to use, and the quality of surface finish that comes out from this printer is really impressive."

Boaz Dekel
Novel Acoustics Ltd.

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