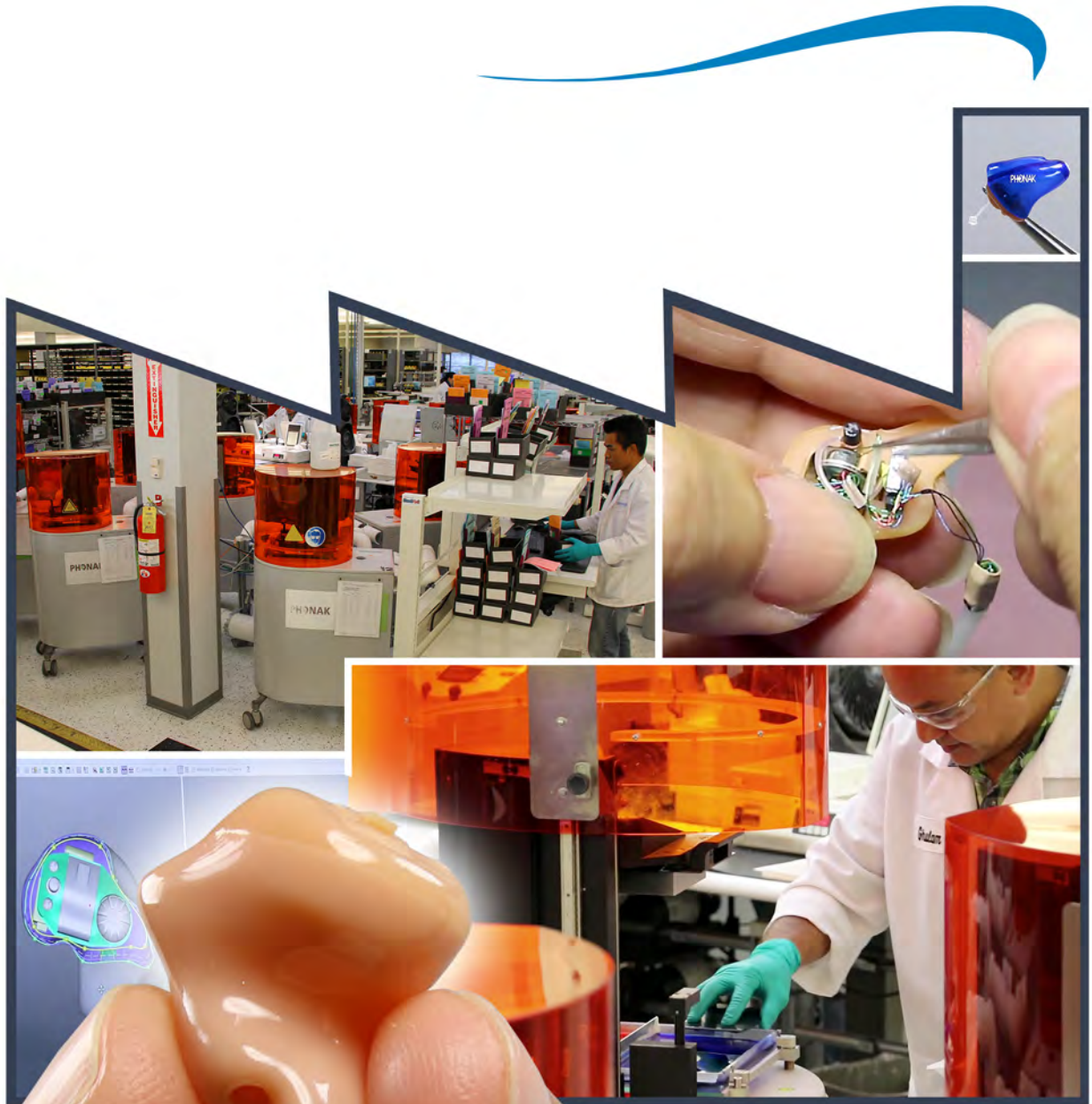


Inside a World-Leading 3D Printing Factory:

Sonova Leads the Future of Manufacturing



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AURORA, Ill. — The center, the heart, of Sonova’s Aurora Operations and Distribution Center (AODC) here is filled with 3D printers, rows of quiet gray machines on wheels with distinctive orange hoods.

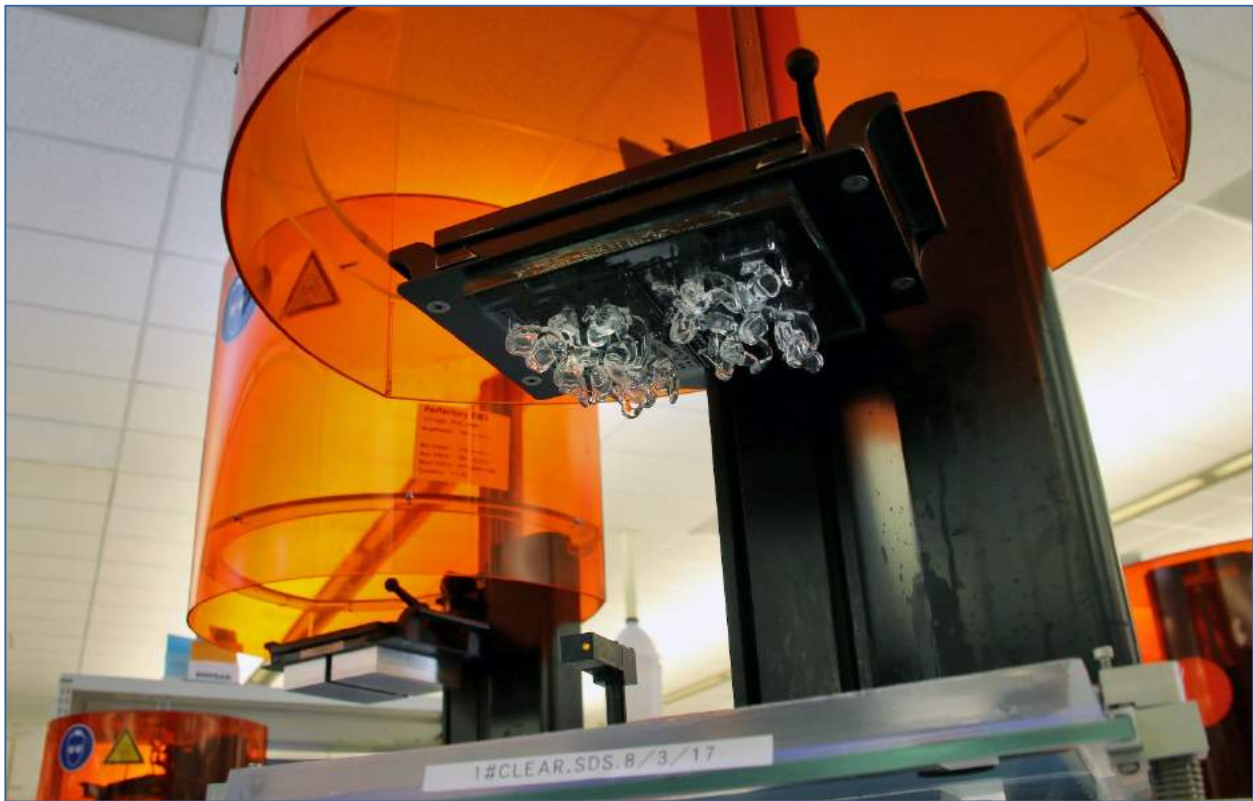
Nearby, shifts of skilled technicians in white lab coats sit at desks with large computer monitors. They scan silicone impressions of patient ears into digital files and then use special software to design custom hearing aid shells. The final digital files are sent to the 3D printers for production. Each EnvisionTEC Perfactory machine churns out batches of about two dozen shells per hour in flesh tones such as pink, tan and cocoa, as well as fun fashion colors.

After printing the shells, workers clean them and then assemble the tiny electronics inside. Each shell is customized for each individual patient’s ears, both the left and right, for a snug, comfortable fit.



“We operate two shifts with over 500 employees,” explained Mujo Bogaljevic, Vice President of Operations at Sonova US, which manufactures Phonak and Unitron brand devices. “I’m very proud that we were the first one to bring this new 3D technology into on-demand manufacturing. We have completely transformed the way custom hearing aids are made. Today, EnvisionTEC technology is the standard in our industry.”

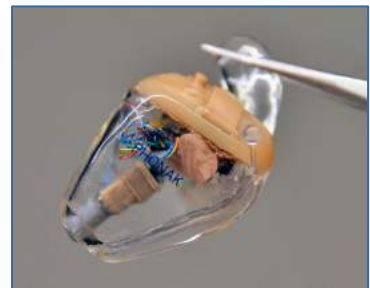
In all, Michael Walther, Director of Operations and Finance at Sonova’s AODC, said the company prints thousands of hearing aid shells each day. “It’s high volume.”



Since the inception of 3D printing in the early 1980s, mass production has been viewed as the technology's holy grail — the chalice that must be captured for 3D printing to prove it can produce quality parts quickly and affordably enough to compete against traditional manufacturing tools, like a mill.

But for more than a decade, while other companies have teased the possibility of full-production 3D printing of sneakers, eyeglasses, toys and other objects, Switzerland-based Sonova, the world's leading hearing care solutions provider, has quietly been doing it.

Today, the company runs several of the world's largest and most sophisticated 3D printing factories.



*Sonova's lean, finely-tuned digital
manufacturing process utilizes EnvisionTEC
Perfactory 3D printers worldwide.*

For Sonova, 3D printing has eliminated a traditional and handcrafting process for custom hearing aids that was once long, laborious and expensive. Today's 3D printed shells also fit better, have more room for microelectronics and result in higher satisfaction from patients and audiologists.



Bill Lesiecki, Director of Business Services, Sonova AODC.

Consequently, Sonova's early adoption of 3D printing helped the company gain market share over the years to secure the No. 1 position in its industry.

"Not too long ago, I read an article in the Wall Street Journal about a certain shoe company ... and how it was going to use 3D printing to print one kind of very special shoe. It made me smile," said Bill Lesiecki, Director of Business Services at Sonova's AODC. "Because for more than 10 years, we've been using this technology not to create some one-off or specialized item, we create all of our custom hearing instruments this way."

***"We create all of our custom
hearing instruments this way."***

Bill Lesiecki, Director of Business Services, Sonova AODC

Taking a Risk

The relationship between Sonova and EnvisionTEC started about 15 years ago. The 3D printing industry was still in its infancy then, and EnvisionTEC had just launched its first Perfactory, which is now in its fourth generation.

Sonova saw the potential that 3D printing had to transform its business making custom hearing aids. Despite all the time, labor and cost that it took back then to manufacture custom hearing aids, the final products didn't always fit well.

But 3D printing offered the promise of printing a part that could be an exact replica of a patient's ear canal, for a precise fit. It could also be digitally designed to hold various kinds of electronics for different patients. It was a promising possibility.



Mujo Bogaljevic, VP of Operations, Sonova US.

"We were the first one to believe in the technology," Bogaljevic recalled.

Together, Sonova and EnvisionTEC worked intensively together to adapt 3D printing technology to its particular needs, which included developing materials that would be biocompatible and safe for long-term use in the ear without causing irritation or discomfort.



"We needed a vendor that was going to be willing to work with us because we knew we were going to learn as we went along. Nobody was doing this yet," Bogaljevic said. "We needed a vendor that was going to want to be a true partner."

As Sonova began using the technology, Sonova also saw the potential 3D printing offered to improve the devices themselves and develop the business in new directions.

"This technology, it's not only important to change the way you make something, but also to digitize many other pieces of the business," Bogaljevic said. "It also opens the

door for other pieces, other elements of our business or supply chain, to be enhanced and improved and brought into the 21st century.”

Digital Manufacturing Perfected

Fifteen years later, Sonova’s digital manufacturing process is well honed.

Hearing care professionals mail in silicone impressions of a patient’s ears with an order form. A Sonova team member scans the impressions, which create an exact digital replica of those impressions.

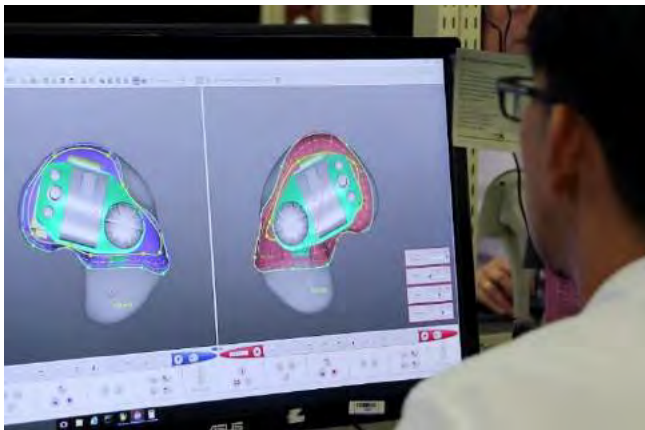
Then, the digital file is opened in special software and the specific device for the patient’s ear is designed, including placement of all the electronics and other components required for the patient’s hearing instrument.



“It's really important that we accurately reproduce that impression in order to make sure that we wind up with a very comfortable fit for the patient and good retention in their ear,” Lesiecki said. “There are ears that are very, very challenging. ... 3D printing is made for that kind of customization, so it can really have an impact.”

The final digital design is then sent to a printer and the shell is manufactured with EnvisionTEC’s accurate and smooth DLP printing technology. An identifying number on the shell indicates the patient’s identity and which ear the piece is made for, the left or right. After printing, the shells are removed from the print tray and cleaned, with assembly of electronics to follow before final quality control testing and shipping to customers.

"We are in an amazing business," Bogaljevic said. "What we produce here helps people to hear better, and that is truly life changing for them."





**FOR MORE
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