How NuVasive® Reduced Their Lead Time and Developed an Internal Process with ArtiosCAD
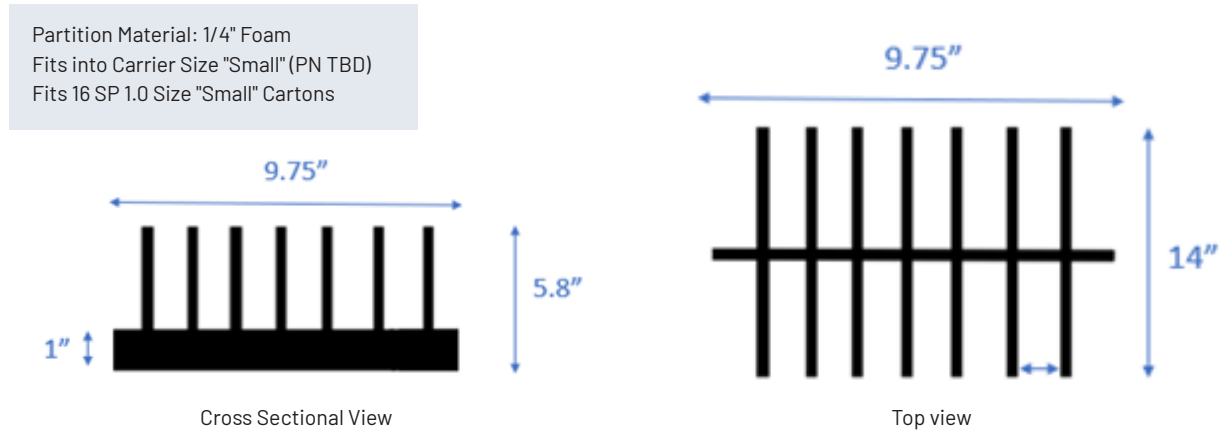
About NuVasive

NuVasive, Inc. (NASDAQ: NUVA) is the leader in spine technology innovation, with a mission to transform surgery, advance care, and change lives. The Company's less invasive, procedurally integrated surgical solutions are designed to deliver reproducible and clinically proven outcomes. The Company's comprehensive procedural portfolio includes access, implants and fixation systems, biologics, software for surgical planning, navigation and imaging solutions, magnetically adjustable implant systems for spine and orthopedics, and intraoperative monitoring service offerings. With more than $1 billion in net sales, NuVasive has approximately 2,800 employees and operates in more than 50 countries serving surgeons, hospitals and patients. For more information, please visit **www.nuvasive.com**.

The Importance of Quality Packaging

For NuVasive, creating safe packaging and maintaining product sterility are paramount. Each package undergoes a rigorous validation process to meet these objectives. Karsten Jensen, Packaging Development Engineer on the Global Packaging Development team at NuVasive explains that, "Validated means we've defined a product and package system and, after exposing them to the worst-case scenarios for manufacturing, sterilization, and distribution, they remain sterile. Testing to these extreme parameters gives a high assurance of product sterility during the normal distribution of product."

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Previous method of trying to communicate partition designs

Partition Material: 1/4" Foam
Fits into Carrier Size "Small" (PN TBD)
Fits 16 SP 1.0 Size "Small" Cartons

9.75"

5.8"

1"

Cross Sectional View

9.75"

14"

Top view

In addition to validation, NuVasive needed its packaging process to be both time and cost efficient. Karsten explained an implant can take thousands of hours to develop and the package design is just as important. Without an internal packaging design process, the overall time to develop packaging is greatly increased.

"...You devote all this time to developing an implant – cumulatively thousands of hours of development, prototyping, and test. The costs add up and, if you get down to the end and no one thought about the label, the product is not yet saleable. All of these disparate pieces come together to get a product to a viable state - packaging is a few of those pieces, and if you fail to give it thought early on, it will often give you problems, regardless of your industry."

Before using ArtiosCAD, Karsten spent a lot of time communicating back and forth with suppliers. Months could go by before a design spec was reached, and PowerPoint was the software of choice to convey changes, creating a lengthy and manual process for revisions.

The NuVasive team has to design a variety of packaging dividers to keep the product safe when they ship them together. Karsten works with suppliers to get the exact size and material for divider slots and packaging. Products range in size from a few millimeters to a few feet so it can be tricky to get the measurements just right.

"When I first joined the company, our packaging design process was just a constant back and forth with suppliers. I was literally using PowerPoint to try to convey 'I want this divider slot to be this big' ... it was just too time intensive, and we weren't really managing our packaging design process," Karsten said.

The Need for Structural Design Software

The biggest challenges NuVasive needed to solve with structural design software were:

* The time spent communicating with suppliers to produce accurate designs.

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- Back and forth confusion about design revisions, and inefficiencies in communications.
- Lack of an internal package design process and control over the process.

Karsten had used **ArtiosCAD, the structural design software from Esko | Brand Solutions** at his university and quickly realized how helpful the software could be for his day-to-day responsibilities at NuVasive. After completing a two-week trial of ArtiosCAD, and demonstrating the progress made in a mere few weeks, Karsten was able to make the case to invest in the product. "ArtiosCAD is a tool in which I can experiment, efficiently model designs, and fit check everything in an assembly before I even hand it to the supplier."

With more control over the design process, the dynamic between Karsten and suppliers completely changed. Before, suppliers would send designs to Karsten based on his requirements and communication took place over email and PowerPoint. "Now, the process has simplified and streamlined I can design something, make a detailed purchase specification, and the supplier will tell me if they can make it or not." Karsten and his team have more control over the process, the updates are more efficient, and the design lead time has been reduced.

The Benefits of Using ArtiosCAD

- The NuVasive PSP process and the way they draft purchase specs for suppliers has increased in speed.
- Collaboration has been enhanced internally and externally with suppliers in particular.
- The development has taken place more quickly and the company has more control over internal packaging design processes.
- Design lead time has been reduced. "As we've taken more control over our packaging design process, we've seen some packaging development go from months to weeks."-Karsten
- Creating 3D packaging designs and resizing them

New method of communicating and assemblies partition designs

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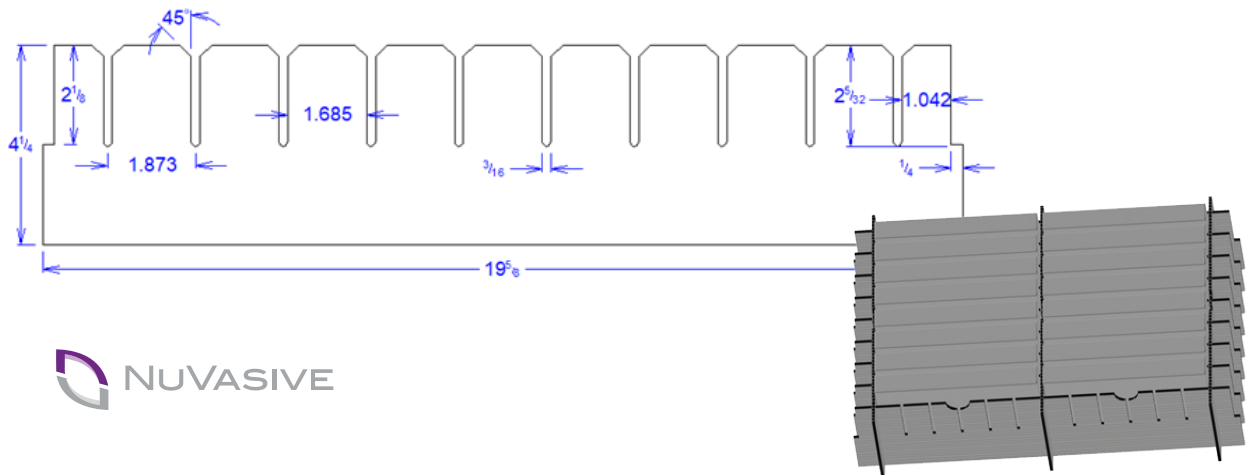
to fit product designs. "One of my favorite features of ArtiosCAD is converting a drawing to 3D in a packaging material of my choosing.," says Karsten.

- Checking math to ensure measurements are correct. "ArtiosCAD basically allowed me to do a sanity check on my math because I could spec out cartons and drop them right into the assembly," Karsten noted.

With the continuous success of using ArtiosCAD, Karsten plans to expand its use to his entire team, and to implement and incorporate ArtiosCAD into their daily workflow.

It's hard to quantify just how many hours ArtiosCAD has saved, but it's made me a happier designer.

– Karsten Jensen, Packaging
  Development Engineer, NuVasive

The Future of ArtiosCAD for NuVasive:

Karsten summarized that with ArtiosCAD continuing to be a primary tool in their carton, dividers, and box designs, it'll allow them to design more quickly and effectively, and specify with exactitude what they need.

Karsten concluded, "It's hard to quantify just how many hours ArtiosCAD has saved, but it's made me a happier designer."

ArtiosCAD clearly demonstrated how quickly and efficiently packaging engineers can produce designs and work with suppliers. Karsten looks forward to streamlining the internal process for not just him, but his whole team.

About ArtiosCAD

ArtiosCAD is a structural design software from Esko | Brand Solutions that helps packaging teams design virtual prototypes and handles manufacturing operations for POP displays. Creating 3D packaging designs and resizing them to fit a product helps designers check the physical limitations of their creations, reducing manual processes. Cut down on costly mistakes and waste by allowing seamless inspection of 3D designs for inconsistencies before going to print. ArtiosCAD handles the math, so designers can focus on their creativity.

The additional benefits of ArtiosCAD include the following:

- Designing virtual prototypes and handling manufacturing operations for POP displays.
- Creating structural designs in 3D, as well as calculating and testing metrics.
- Rebuilding custom designs by storing them as resizable templates in a corporate library.
- Seamlessly inspecting 3D designs for inconsistencies before going to print.
- Producing less waste and becoming more sustainable by adjusting measurements before production.

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