Thule Embraces Carbon Fiber 3D Printing

SPIRIT OF ADVENTURE DRIVES PRODUCT DESIGN

Active people know Thule. As a global leader in solutions that allow people to “bring with them what they care for most,” the Thule brand name adorns products from car racks and carriers, to luggage and bags, and kids’ accessories. With the Thule Group’s American corporate headquarters and U.S. manufacturing facility located in Seymour, Connecticut, product design and innovation are key drivers for this active lifestyle company.

Thule’s spirit of innovation drew them to early 3D printing for visual models to help with concept validation. But despite the conceptual benefits, these models lacked the functionality necessary for design verification and Thule made the decision to upgrade for greater materials range and higher-output, giving them the ability to print functional prototypes

> “Nylon 12CF has been game-changing for us. Nothing that we could get affordably or quickly has the properties that Nylon 12CF does. It lets us more accurately model our production parts, test faster, and get to market faster.
>
> Rob Humphries
> Thule

stratasys

Rob Humphries removing an FDM Nylon 12CF part from Thule's Fortus 450mc 3D printer.

Engineers and designers at the company whose slogan is "Bring Your Life," were fully on-board once they saw the printer's capabilities. "Our Fortus 360mcTM was at capacity, running for 16 to 20 hours a day," said Rob Humphries, prototype engineer, product development at Thule. "Besides that, our product development team grew here in Connecticut, and we started supporting other Thule manufacturing and design locations as well." However, one hurdle remained for Thule, the ability to print prototypes with the stiffness and strength of fiber- or glass-reinforced injection molded parts that would enable the company to perform functional performance testing.

From Concept Validation to Functional Testing

About the time Thule purchased the Stratasys Fortus 450mcTM, they learned of the Stratasys new material

Early Visibility Program for FDM Nylon 12CFTM. "We got great technical support with early Nylon 12CF," said Humphries. "Stratasys was really onboard with suggestions and tips to get this material up and running well," quickly validating for Thule the carbon-fiber reinforced thermoplastic's ability to meet the demanding needs of the production environment. "With the Nylon 12CF, we very quickly had a double argument for this new machine," said Humphries. "It wasn't just additional 3D printing capability, but suddenly we were able to conduct functional tests with prototyped parts. It's been a big advantage that materialized because of this new machine and material." Demand for new product prototypes continues to grow at Thule. "We've made rotating parts, like our clamp mechanism that has teeth that fit into each other that wouldn't hold up without the capabilities of Nylon CF12. They'd break-off or bend completely over, without breaking," said Humphries.

Another feature of the Nylon 12CF is its ability to withstand Thule's notorious rigorous functional testing. "Our testing is brutal," said Humphries. "I don't think everyone was aware of the possibility of being able to 3D print parts with this level of strength until they began seeing the capabilities of Nylon CF12." Demand for time on the Fortus 450mc shot up once engineers saw the strength and stiffness capabilities of the carbon-fiber material. "When people started to see the CF parts passing our more severe tests, engineers started saying 'oh, I really want my parts made with this material.'"

Thule Embraces FDM Nylon 12CF

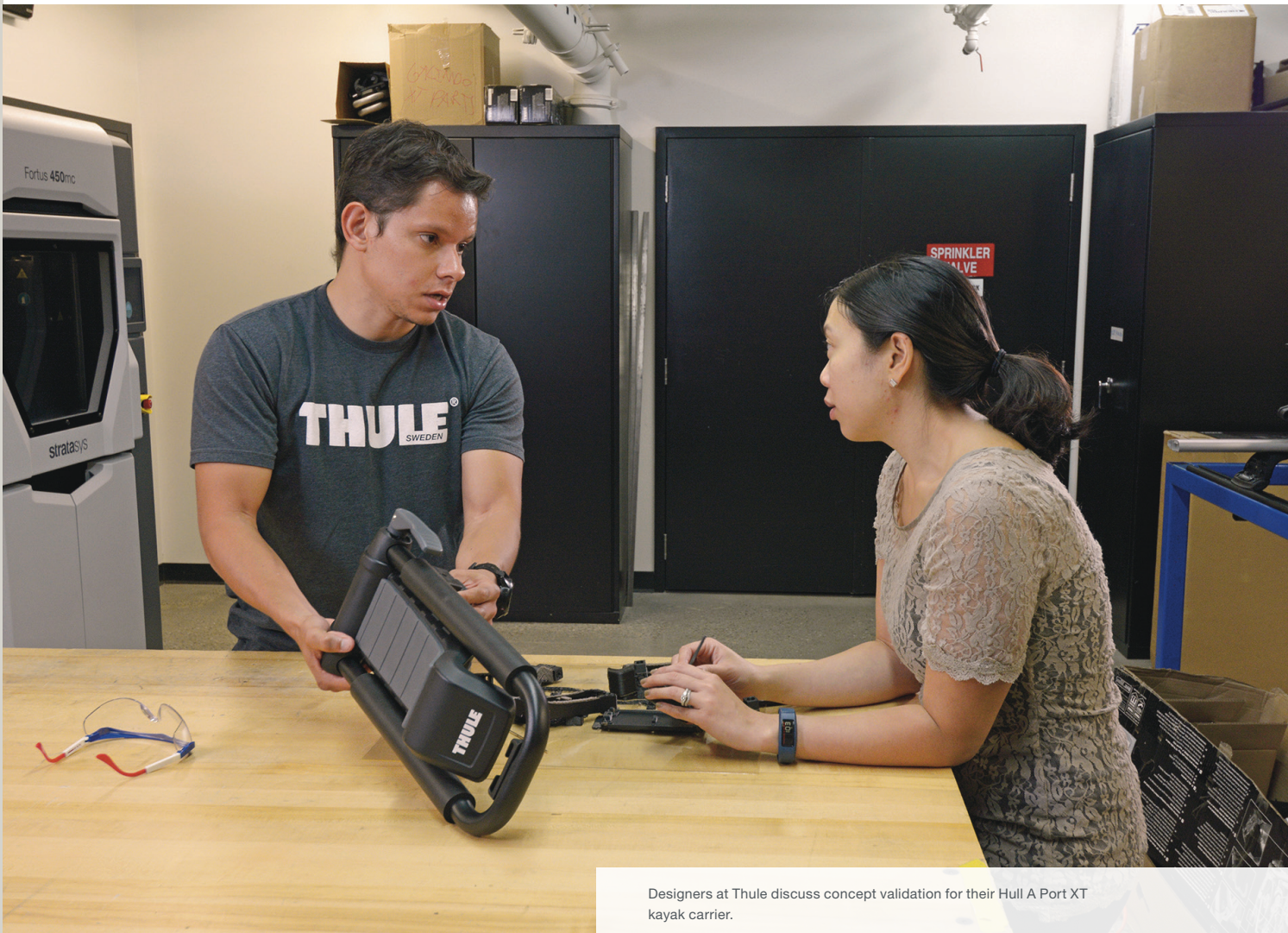
MATERIAL STRENGTH SAVES TIME, COST, DRIVES INNOVATION

Nylon 12CF has performed so well for Thule that the company has begun printing assembly fixtures and manufacturing aids for their Connecticut manufacturing plant, as well. “Nylon 12CF has been game-changing for us,” said Humphries. “Nothing that we could get affordably or quickly has the properties that Nylon 12CF does. It lets us more accurately model our production parts, test faster, and get to market faster.” In addition to being able to print parts capable of withstanding both static testing and drive testing, “every time we print a part in carbon fiber it takes two weeks off the time it would have taken us to send it out,” said Humphries. “It definitely helps

with the creativity at Thule.” Engineers print three to four iterations in a week, with the ability to print a new version every night and improve it the next. “If we had to wait two weeks between iterations, a designer’s project schedule would be shot,” said Humphries. “The speed with which we’re able to iterate puts better ideas into design.”

With less than a full year of the Fortus 450mc under its belt, and three years of 3D printing on the Fortus 360mc, Thule has already printed between 400-500 designs. “We’ve saved over $45,000 so far this year, and countless days of time,” said Humphries. In a further nod to cost savings, engineers at Thule recently sought quotes to print large production fixtures out-of-house. “Costs were going to be about $18 a cubic inch to print out-of-house, versus material costs of just over $4 a cubic inch. “Based on this quoted cost, our volume of printing on our two Fortus machines has already saved us enough to pay for the two printers.”

Humphries is already looking to the next step in Thule’s business process and foresees 3D printing playing a large part. Thanks to our success with Nylon 12CF and the time and cost it saves, “I get to start looking at options for my next 3D printer,” Humphries said.



Designers at Thule discuss concept validation for their Hull A Port XT kayak carrier.

Stratasys Headquarters

7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937-3000 (Intl)
+1 952 937-0070 (Fax)

1 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

stratasys.com
ISO 9001:2008 Certified