

WORDS: DAN O'CONNOR

# TESTING SLS TO SUBSEA EXTREMES

**A** feature in the March 2016 company magazine for Kongsberg Gruppen - one of Norway's oldest and largest companies - delves into the future of 3D printing within the multi-faceted technology manufacturer.

The article focusses on the in-house 3D printing by the R&D team at Kongsberg Maritime. Using the now defunct 3D Systems Cube Pro, Kongsberg fit and form prototypes. In the article, Alf Pettersen, Technical Manager at Kongsberg Aerostructures reveals a reluctance to invest in a more industrial solution.

"3D printing has come a long way in terms of medical devices and prototypes, but mass production is still a problem. This is because of challenges relating to repetition and quality. It is not good enough in so many areas, particularly in the aviation industry, where there are extremely strict requirements governing quality and the qualification of methods."

Fast-forward three years and Kongsberg Maritime now has an end-use 3D printing component in mass production. The company may not be using in-house machinery, but by enlisting 3DPRINTUK, Kongsberg has been able to produce the casing for low-volume runs of a very intricate piece of subsea measuring equipment - built to survive in extreme conditions.



**SHOWN:**  
PARTS ARE POLISHED  
AND DYED USING  
DYEMANSION  
TECHNOLOGY

"It's a transponder designed to sink subsea and attach to a diver or an ROV [Remotely Operated Vehicle]," Robert Kovacs, Senior Subsea Design Engineer at Kongsberg Maritime tells TCT. "It is used when you want to know precisely where it is located in relation to other subsea instrumentation on a work site."

Robert has a decade's worth of experience with 3D printing and applied design for additive principles to make the part as compact as possible.

The transponder's casing design allows for the battery and PCB to be encased with almost no wasted space on the inside, complete with screw holes for assembly and holes for zip ties for quick and efficient usage in the field.

"This part is a multi-functional product chassis, not just a simple bracket to join two things together," explains Robert in 3DPRINTUK's case study. "It has nifty features and

clever functionality that we would not get from a similar metal or injection moulded plastic part."

The decision was made to go with 3DPRINTUK's EOS SLS machinery due to nesting capabilities, the lack of support requirement, and the ability to number each part individually. It was printed in Nylon 12 for durability, vibro-finished (a service 3DPRINTUK offers for free) and dyed using DyeMansion's DM60 machine in carbon black colour. The result is a final part assembly that will be used in extreme subsea conditions.

Although it seems Alf Pettersen was quite down on the technology in 2016, he predicted the timeframe for this kind of product with Nostradamus-like fashion:

"I would estimate that within three to five years, mass production with 3D printing will have become more common."



**◀ LEFT:**  
CASE ASSEMBLY FOR KONGSBERG PRINTED IN  
NYLON USING 3DPRINTUK'S SLS EQUIPMENT