



PADT Awarded U.S. Army Phase I SBIR Grant for Combustor Geometry Research Using 3D Printing, Simulation, and Product Development



The Project Involves the Development of Sand-Plugging Resistant Metallic Combustor Liners

TEMPE, Ariz. - Aug. 15, 2019 - [PRLog](#) -- In recognition of its continued excellence and expertise in 3D printing, simulation, and product development, PADT announced today it has been awarded a \$107,750 U.S. Army Phase I Small Business Innovation Research (SBIR) grant. With the support of Honeywell Aerospace, PADT's research will focus on the development of gas turbine engine combustor liners that are resistant to being clogged with sand. The purpose of this research is to reduce downtime and improve the readiness of the U.S. Army's critical helicopters operating in remote locations where dirt and sand can enter their engines.

"PADT has supported advanced research in a wide variety of fields which have centered around various applications of our services," said Eric Miller, co-founder and principal, PADT. "We're especially proud of this award because it requires the use of our three main areas of expertise, 3D printing, simulation and product development. Our team is uniquely capable of combining these three disciplines to develop a novel solution to a problem that impacts the readiness of our armed forces."

The challenge PADT will be solving is when helicopters are exposed to environments with high concentrations of dust, they can accumulate micro-particles in the engine that clog the metal liner of the engine's combustor. Combustors are where fuel is burned to produce heat that powers the gas turbine engine. To cool the combustor, thousands of small holes are drilled in the wall, or liner, and cooling air is forced through them. If these holes become blocked, the combustor overheats and can be damaged.

Blockage can only be remedied by taking the engine apart to replace the combustor. These repairs cause long-term downtime and significantly reduce readiness of the Army's fleets.

PADT will design various cooling hole geometries and simulate how susceptible they are to clogging using advanced computational fluid dynamics (CFD) simulation tools. Once the most-promising designs have been identified through simulation, sample coupons will be metal 3D printed and sent to a test facility to verify their effectiveness. Additionally, PADT will experiment with ceramic coating processes on the test coupons to determine the best way to thermally protect the 3D printed geometries.

"When we developed new shapes for holes in the past, we had no way to make them using traditional manufacturing," said Sina Ghods, principal investigator, PADT. "The application of metal additive manufacturing gives PADT an opportunity to create shapes we could never consider to solve a complex challenge for the U.S. Army. It also gives us a chance to demonstrate the innovation and growth of the 3D printing industry and its applications for harsh, real-world environments."

Honeywell joined PADT to support this research because it is well aligned with the company's Gas Turbine Engine products. The outcome of this research has the potential to significantly improve the performance of the company's engines operating in regions with high dust concentrations.

This will be PADT's 15th SBIR/Small Business Technology Transfer (STTR) award since the company was founded in 1994. In August 2018, the company, in partnership with Arizona State University, was awarded a \$127,000 STTR Phase I Grant from NASA to accelerate biomimicry research, the study of 3D printing objects that resemble strong and light structures found in nature such as honeycombs or bamboo.

To learn more about PADT and its advanced capabilities, please visit www.padtinc.com.

About Phoenix Analysis and Design Technologies

Phoenix Analysis and Design Technologies, Inc. (PADT) is an engineering product and services company that focuses on helping customers who develop physical products by providing Numerical Simulation, Product Development, and 3D Printing solutions. PADT's worldwide reputation for technical excellence and experienced staff is based on its proven record of building long-term win-win partnerships with vendors and customers. Since its establishment in 1994, companies have relied on PADT because "We Make Innovation Work." With over 80 employees, PADT services customers from its headquarters at the Arizona State University Research Park in Tempe, Arizona, and from offices in Torrance, California, Littleton, Colorado, Albuquerque, New Mexico, Austin, Texas, and Murray, Utah, as well as through staff members located around the country. More information on PADT can be found at www.PADTINC.com.

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Source	PADT, Inc.
City/Town	Tempe
State/Province	Arizona
Country	United States
Industry	Aerospace , Defense , Engineering
Tags	3d Printing , Additive Manufacturing , Simulation , Cfd , Combustor , Helicopter , Turbine Engine , Honeywell
Link	https://prlog.org/12784419



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