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2016 SUCCESS STORIES

SMALL BUSINESS INNOVATION RESEARCH | SMALL BUSINESS TECHNOLOGY TRANSFER

TRANSIST

Creare LLC

Hanover, New Hampshire

SMALL BUSINESS HELPS DRIVE DOWN COSTS OF HIGH-IMPACT TITANIUM AIRCRAFT PARTS

The Air Force is pushing hard to generate fuel savings and cut the maintenance costs of its planes by boosting the use of titanium components across its aircraft programs.

While lighter and stronger than traditional aircraft materials, titanium parts are difficult to machine at high speeds so the cost is notoriously high and their applications are limited. Any improvement in the manufacturing of titanium parts could have a dramatic impact on affordability of aircraft, such as the F-35.

SBIR/STTR SUPPORT

Backed by an Air Force Small Business Innovation Research/ Small Business Technology Transfer (SBIR/STTR) award, New Hampshire-based Creare LLC made a significant leap in machining technology that could spur more widespread use of titanium in aircraft.

With a technology transfer plan in place and assistance from a commercialization agent, the company transitioned its system to a supplier of



Creare LLC made a significant leap in machining technology that could spur more widespread use of titanium in the F-35, shown here in production. (Courtesy Joint Strike Fighter Program.)

Lockheed Martin Aeronautics Co. for the F-35 Joint Strike Fighter program and demonstrated the affordability benefits for a specific part. The broad application of the technology – known as cryogenic machining – applied to titanium parts across the F-35 supplier base is expected to save the program more than \$260 million, according to Lockheed Martin's own conservative estimates.

TITANIUM EQUIPPING THE WARFIGHTER

BEHIND THE TECHNOLOGY

For decades, the manufacturing industry has relied on “flood cooling” as part of its standard machining processes. That doesn’t translate well to difficult-to-machine materials like titanium alloys.

Creare’s patented Cryogenic Machining System directs cooling where it is needed most in high-performance titanium machining, substantially reducing the temperature of the tool without unnecessarily cooling the part. The approach, which eliminates lubricant capture and recycling systems, provides dramatic improvements in processing speed to significantly lower processing costs.

The Air Force SBIR/STTR Program allowed Creare to perform a direct cost/performance comparison between traditional and cryogenic machining for

specific F-35 parts. This documentation of the newer technology’s value established a business case that will enable its more widespread adoption across the supply chain.

BUSINESS POTENTIAL

Creare’s licensing partner, Michigan-based 5ME LLC, has begun installing retrofit kits that convert any machine tool – old or new – to its Cryogenic Machining System technology.

The development of the Creare’s Cryogenic Machining System started more than a decade ago. Since then, the company has become very active in supplying advanced manufacturing solutions to challenging problems by focusing on their implementation in real-world manufacturing environments.

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