Air Force SBIR STTR

FIELDED OPERATIONAL CAPABILITY

ADDRESSES THE BIGGEST MAINTENANCE COST OF AIR FORCE TOWERS

TOPIC NUMBER:
AF04-267

TOPIC TITLE:
Advanced Composite Structural Members for Tall, Narrow Structures

CONTRACT NUMBER:
FA8650-15-C-5604

SBIR COMPANY NAME:
Composite Support & Solutions Inc.
San Pedro, CA

TECHNICAL PROJECT OFFICE:
AFRL Materials and Manufacturing Directorate, Wright-Patterson, AFB, OH

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The tower built by Composite Support & Solutions Inc. under the Air Force SBIR/STTR Program will provide significant short- and long-term benefits for Hanscom Air Force Base and its partners. (U.S. Air Force photo)

MATERIALS INNOVATION

EXPECTED TO BOOST MISSION, ENHANCE PARTNERSHIPS AND SAVE MONEY

Officials at Hanscom Air Force Base in Massachusetts faced a major setback in a key mission.

The Hanscom Collaboration and Innovation Center – charged with advancing cyber technology and enhancing critical public safety partnerships among federal, state and local agencies - requires an elevated and unobstructed path between communication systems. Also known as radio line-of-sight, that existing path was in jeopardy as obstructions, roof damage and weight issues during heavy snowstorms would soon eliminate the option of mounting antennae on the center's roof.

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With advancements made as part of an Air Force Small Business Innovation Research (SBIR) effort, California-based Composite Support & Solutions Inc. filled an immediate need with new technology while cutting maintenance costs, bolstering partnerships and attracting investment to the center.

INDIVIDUAL COMPONENTS SNAP TOGETHER

Corrosion is currently the biggest cost driver in the maintenance of communication towers throughout the Air Force inventory. That has created a pervasive need for the Air Force to address corrosion-related issues, fueling the drive to discover innovative corrosion-resistant materials.

The original SBIR effort helped launch a new generation of corrosion-free towers for the communications industry.

The 118-foot prototype tower created by Composite Support & Solutions for placement at Hanscom was made entirely of composite materials. It uses fastener- less joining technology where individual components, such as the lattice cross members, “snap” together during the assembly process.

While the joining technology has been used in plastics, it had not previously been applied to composite materials or for structural joints, said Dr. Clement Hiel, president of Composite Support & Solutions. The Hanscom tower project is unique because it required innovation at the micron level to work with composite materials on a structural application.

The result was a tower that could be assembled about eight times faster, thereby a cost-competitive solution.

With support from the Air Force SBIR/STTR Commercialization Readiness Program, the company validated its innovation by assembling, raising and mounting the tower adjacent to the Hanscom Collaboration and Innovation Center. The tower now provides significantly improved line-of-sight capability for the center - extending its communication range and enhancing its overall mission effectiveness – while eliminating the need for all roof-mounted antennae and the associated problems.

Officials say the extended range permits more military activities and defense contractor access to military communication networks. Local testing of items developed at Hanscom provides valuable savings for the Department of Defense, the Air Force and the Life Cycle Management Center.

“Cost and time resource reductions help our procurement activities to deliver fully vetted tactical systems to the warfighter faster,” said Steve Brown, lead associate for the Tactical Data Networks Lab at Hanscom.

THE OPPORTUNITY TO MAKE AN EVEN BIGGER IMPACT

Advancements made under the Air Force SBIR/ STTR Program helped the Hanscom Collaboration and Innovation Center attract a partner - the state of Massachusetts – which invested millions of dollars in the larger infrastructure project surrounding the tower.

An antenna was recently installed on the tower, boosting communication capabilities for first responders. In the coming years, the tower is expected to support a growing number of uses for first responders and law enforcement.

Composite Support & Solutions’ tower is being touted as the first of a new generation of tall composite towers that have the distinct advantage of being free from corrosion, significantly reducing long-term maintenance costs, while offering dramatically shortened constructions times.

The Air Force and other federal agencies should see a significant benefit from the new technology, which also will likely generate widespread commercial appeal among mobile service providers and make it easier to erect towers quickly in areas where a catastrophic event has occurred.

For its work, the company has been nominated for the prestigious 2016 Tibbetts Award by the chief technology officer of the Air Force Life Cycle Management Center.