Air Force SBIR/STTR

Innovation

Air Force SBIR/STTR Innovation Story

SBIR Topic Number:
AF06-205

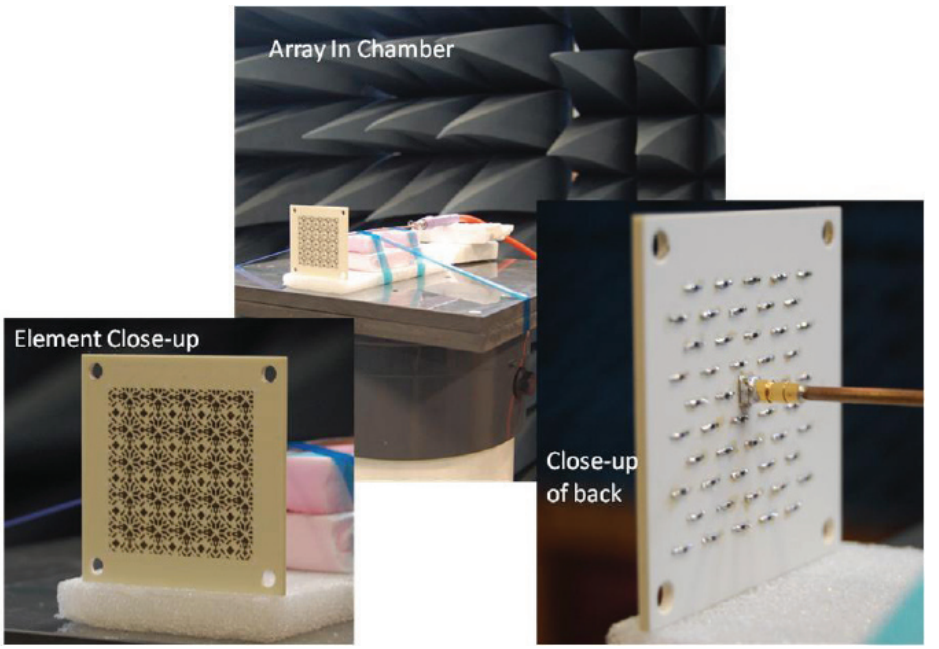
SBIR Title:
Multiband Array Radiators

Contract Number:
FA8718-07-C-0045

SBIR Company Name:
Spectra Research, Inc.,
Dayton, OH

Technical Project Office:
AFRL Sensors Directorate,
Wright-Patterson AFB, OH

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



Antenna Array Prototype

Multiband Array Radiators

- The Air Force is seeking technologies that allow sensor systems to operate across multiple frequency bands with a single conformal antenna array in order to have substantial savings in cost, weight, and power consumption
- Spectra Research, Inc., developed, built, and tested a composite antenna array system with radiating elements able to function efficiently in the 14, 20, and 30 GHz Satellite Communications (SATCOM) bands; the system further allows ease of manufacturing
- The developed antenna system, with its multiband capability, can be used to combine the operation of and to replace separate antennas currently employed on aircraft to communicate with military and commercial satellites operating on different frequency bands
- SATCOM system designs for both military and commercial airborne applications would benefit greatly from a conformal, lightweight antenna

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Air Force Requirement

The Air Force is seeking technologies that allow sensor systems to operate across multiple frequency bands with a single conformal antenna array in order to have substantial savings in cost, weight, and power consumption.

The antenna array could support communications between satellite and airborne platforms for both military and commercial frequency bands to enhance situational awareness to the warfighter.

SBIR Technology

Spectra Research, Inc., developed, built, and tested a composite antenna array system with radiating elements able to function efficiently in the 14, 20, and 30 GHz Satellite Communications (SATCOM) bands. The system further allows ease of manufacturing. The key component is a fragmented aperture design that is optimized through a genetic algorithm approach that results in optimizing the antenna for several key performance metrics, e.g., gain, impedance and scan angle at the targeted operating frequency bands.

The antenna technology was successfully demonstrated to achieve desired performance across three frequency bands. Antenna gain sufficient for satellite communication, a VSWR of 2:1, and a scan angle of 75 degrees was demonstrated across at each operating frequency.

Potential Application

The developed antenna system, with its multiband capability, can be used to combine the operation of and to replace separate antennas currently employed on aircraft to communicate with military and commercial satellites operating on different frequency bands. In particular, the uplink/downlink channels in the 14, 20, and 30 GHz SATCOM bands could be carried out on a single antenna array rather than on three distinct systems. In addition, SATCOM system designs for both military and commercial airborne applications would benefit greatly from a conformal, lightweight antenna.

Company Impact

The multiband array elements developed in this SBIR program extended the application of Spectra Research's technology to both commercial and military SATCOM systems. The company is structured and organized to develop leading edge products, and team with large business, to commercialize successful concepts. Spectra Research is ready to optimize and transition to market multiband array antennas.

Spectra Research was formed in 1998 to provide advanced research and development services for government and industry (www.spectra-research.com). The company specializes in quality engineering, design, development, testing, and limited production for advanced electronic, electromagnetic, and laser technology products and applications.

U.S. AIR FORCE

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Air Force SBIR Program
AFRL/XP
1864 4th Street
Wright-Patterson AFB OH 45433

AF SBIR/STTR Program Manager: Augustine Vu
Website: www.afsbirsttr.com
Comm: (800) 222-0336
Fax: (937) 255-2219
e-mail: afrl.xppn.dl.sbir.hq@wpafb.af.mil

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