

Northrop Grumman Corporation

Northrop Grumman is a global defense and technology company whose 120,000 employees provide innovative systems, products and solutions in information services, electronics, aerospace and shipbuilding to government and commercial customers worldwide.

Electronic Systems Sector

Electronic Systems draws upon a rich heritage of technological innovation to deliver the advanced defense electronics that protect U.S. armed forces and their allies. The sector provides some of the most sought-after radar, electronic warfare, and targeting systems in the marketplace today. Its sophisticated technologies form the backbone of the integrated electronic battlefield — from under sea to outer space and cyberspace — and include all facets of systems and technology development and systems integration.

Advanced Concepts and Technologies Division

The Advanced Concepts and Technologies division provides the most advanced research and development within Electronic Systems. The division's accomplishments include the renowned development of state-of-the-art sensors for manned and unmanned air platforms. The division maintains a strong focus on developing affordable, lightweight systems that enhance the war fighter's combat capabilities and constantly seeks to explore new technologies that bridge capability gaps. These systems include:

- High resolution synthetic aperture radar (SAR) with maritime and overland modes
- Multi-integrated sensor suites
- EO/IR sensors
- Sensor self/cross cueing
- Automatic target recognition capabilities

NORTHROP GRUMMAN TEAM POINTS OF CONTACT

Charles Brinkman

*Sector Vice President and General Manager
Advanced Concepts and Technologies Division*

Jim Armitage

Vice President, Sector Chief Technology Officer

Steve McCoy

Director, Airborne Systems

Drew Clark

Director, Joint Force Application Solutions

Jeff Woods

Manager, Airborne Systems – Strike

Brenda Johnson

AESA ManTech Program Manager

Lawrence Miller

AESA ManTech Program Manager

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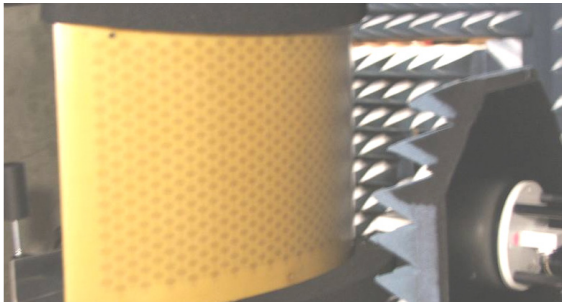
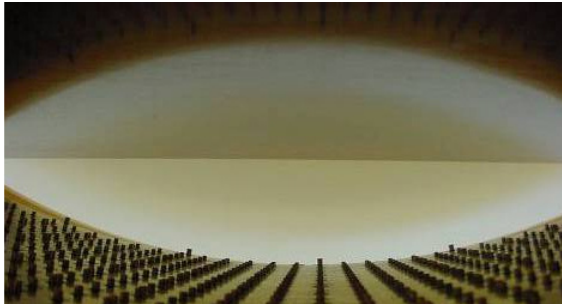
AESA ManTech Programs

*High Density,
Low Cost
Technology
Solutions*



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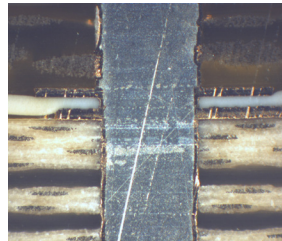
Conformal Aperture in Test

Conformal Aperture Technology

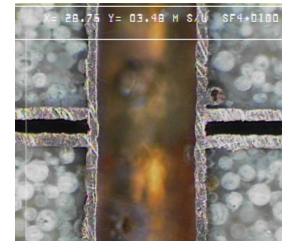
- Install active apertures where you want and in any shape that you want
- Variable radius allows integration into complex, non-planar vehicle configurations
- Embedded manifold/radiator increases function and performance into single part
- Radome integration allows for external surface mounting for environment protection
- Potential for 360 degree scanning
- Maximizes vehicle real estate by fitting assemblies into previously unusable areas

Advanced Printed Circuit Board (PCB) Fabrication Technology

- Custom materials development
- Multi-layer processing of non-traditional dielectric materials
- Multiple embedded resistor solutions for all families of dielectric materials
- High density, broad frequency capabilities
- Focus on improved capabilities, higher yield, lower cost



Plated Through Via in Advanced PCB

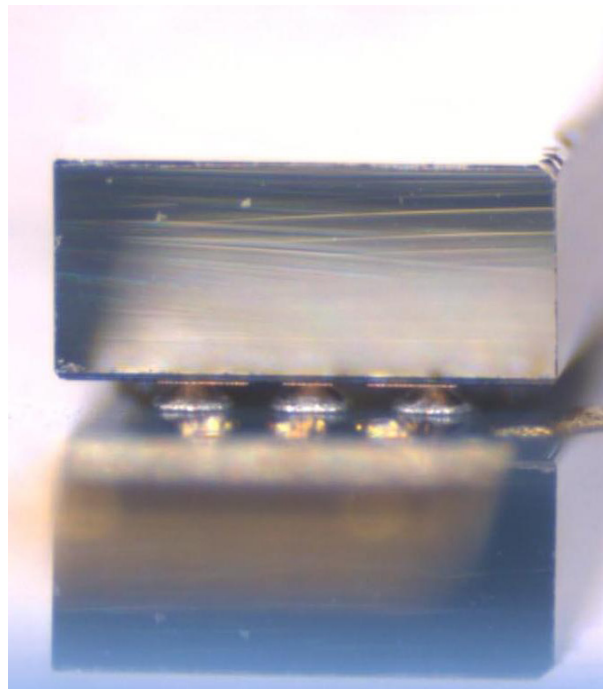


Filled Via in Advanced PCB

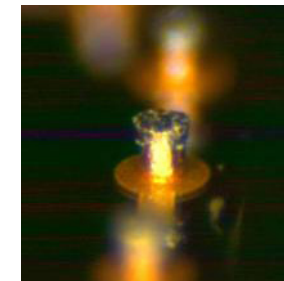


APG-80 F-16 Block 60 Array

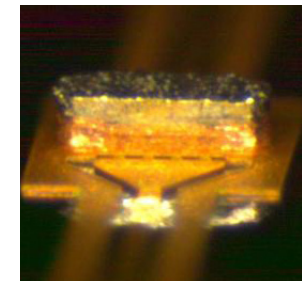
High Density, Low Cost Solutions Utilizing ManTech Innovations



GaAs To LTCC Flip Chip Soldered Interconnect



On Wafer GaAs Signal Bump



On Wafer GaAs Thermal Bump

GaAs Flip Chip Assembly to Low Temperature Co-Fired Ceramic (LTCC)

- Allows for higher level of integration in advanced antenna / RF module designs
- Low inductance allows for RF frequency operation
- High power version for power amplifiers to allow for thermal dissipation
- Low power version for logic and receive signals