



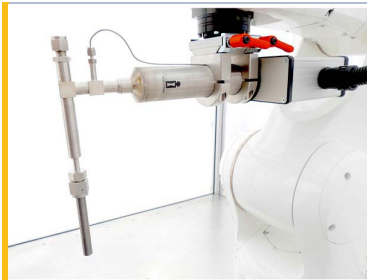
TOPIC NUMBER: N07-122

SBIR INVESTMENT: \$3,381,831

PHASE III FUNDING: \$525,000

DEPARTMENT OF THE NAVY

# NAVY SBIR/STTR SUCCESS STORY



## KINETIC METALLIZATION (KM)

*An innovative and superior metal spray technology to dimensionally restore complex and expensive NAVAIR aircraft components.*

**Innovative Technology, Inc.**

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## THE CHALLENGE

Current restoration methods such as flame spray, plasma spray, and traditional electroplating methods are less desirable because they change the properties of the metal by creating heat affected areas, limit the amount of metal buildup, have poor adhesion properties, and produces a substantial amount of hazardous waste.

## THE TECHNOLOGY

Kinetic Metallization (KM) is an innovative and superior metal spray technology to dimensionally restore complex and expensive NAVAIR aircraft components. KM uses a heated inert gas (i.e., nitrogen and helium) to accelerate a variety of fine, metallic powder compounds through a sonic nozzle and deposits the material onto the surface of aluminum, magnesium, or steel components to buildup and dimensionally restore worn, damaged, or corroded surfaces. The sonic nozzle allows KM to operate using dramatically less gas than competing cold spray technologies and the process does not produce any noxious fumes or hazardous waste. The KM technology operates at a low temperature and high velocity so as to not metallurgically alter the properties of the substrate material and to deposit a metal coating that provides exceptional adhesion to the repaired surfaces.

## THE TRANSITION

Using FY14 capital equipment funding, NAVAIR Fleet Readiness Center Southwest (FRCSW) North Island acquired a KM system that has enabled dimensional restoration repair of six unique components at the Depot. Working with Inovati, FRCSW engineers are advancing the technology and developing repair procedures along with test protocols for multiple components, including the E-2 Hawkeye's rotodome gearbox and the F/A-18 Super Hornet's main landing gear wheels.

## THE NAVAL BENEFIT

Using KM technology for in-service and depot repair of minor damages or corrosion repair of coatings on aircraft components reduces maintenance costs and allow the warfighter to remain in operational status. Commercial use of both robotic and hand held KM systems along with the development of different powder alloy formulations have allowed for the repair of mechanical and corrosion damage on more than two hundred parts. KM allows the Navy and Marine Corps to repair aircraft components that could not be repaired before. This puts parts back into supply and helps increase readiness.

## THE FUTURE

Establishing specific repair procedures for Naval applications and shortening the development cycle allows for quicker technology transition and implementation. The highlight of the next repair is the Super Hornet wheel. Data analysis showed almost 80 of these could be saved over a 9-month period if a KM repair existed. FRCSW is working with Inovati and the Air Force to test and qualify this repair, and reinforce the pool of spare wheels.

"THE RESEARCH INTO COLD SPRAY TECHNOLOGY HAS SUCCESSFULLY ALLOWED FOR OVER SIXTEEN AIRCRAFTS PARTS CURRENTLY IN PRODUCTION TO BE RETURNED AS REWORKED, SIGNIFICANTLY INCREASING AIRCRAFT READINESS AND SUPPORTING A MAJOR SUSTAINMENT INITIATIVE. WITH MATERIAL TESTING AVERAGING \$1.2 M AND TAKING UP TO TEN YEARS, SBIR FUNDING HAS ASSISTED IN COVERING THE GAP IN MATERIAL TESTING AND SPED UP THE PROCESS TO AVERAGE 3 YEARS TO TRANSITION - ALL RESULTING IN A SAVINGS OF OVER \$21 MILLION TO DATE."

Fred Lancaster  
Cold Spray IPT Lead  
NAVAIR