

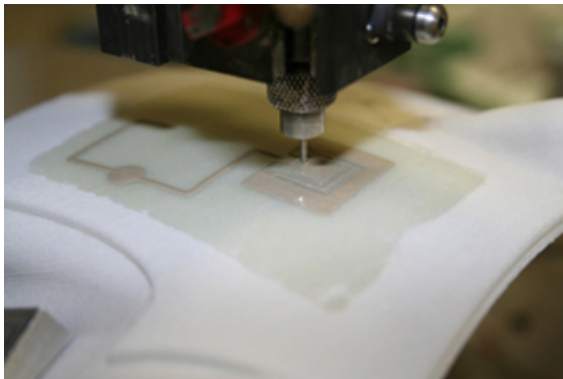
**LEAD ORGANIZATION: Lockheed Martin**

**PROJECT: Additively Printed Circuit Elements for Antenna and Microwave**

**ABSTRACT**

The industry and academia team of Lockheed Martin (LM), Binghamton University (BU), GE Global Research (GE), University of Massachusetts - Lowell (UML) and SI2 Technologies (SI2) is a working consortium whose vision is to develop and test Flexible Hybrid Electronics (FHE's) for new or existing Department of Defense (DoD) radar/antenna platforms and commercial medical/wearable products. Our design-build-test approach focuses on leveraging industry development tools, techniques, equipment and processes to create the design models, qualify the model performance, and then build the electromagnetic structures leveraging existing industry and academia additive manufacturing equipment. The objective of this project is to provide a material properties and additive manufacturing process database to the FHE community that can be used as a reference to reproduce reliable direct write additively manufactured electronics for antenna, RF and microwave applications in industry. The teaming partners will selectively and collaboratively work on the bulleted tasks listed for PC Topic MTA 3.1: Printed Circuit Elements for RF and High-Speed Applications.

- Low resistance conductors and low-loss dielectric material printing
- Printed RF transmission lines, differential pairs, waveguides
- Low-loss chip interconnections including all printed connections
- Printed power/ground planes for impedance control
- Antenna elements; broadband, narrowband, beamforming, phased array, metamaterials
- Cooling and heat management for high power
- Characterize conductor electrical stability over temperature
- Characterize conductor surface roughness and skin effect



Conformal Direct-Write printing of c structures using conductive ink/paste materials.

