

# Multi-Functional Substrates and Printing Integration for RF

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### Topic 1.2: Manufacturing for Asset Monitoring Systems

Researchers from UMass Lowell Nanomanufacturing Center and Raytheon in partnership with Dassault Systèmes SIMULIA, CST, Rogers Corp, FLEXcon, Bixby and Foster Corp. are teaming up to advance the manufacturability of printed RF electronics by achieving scaled processes for dielectric substrates and conductive patterning.

The 18 month project will accelerate the adoption of multi-functional substrates that are compatible with a broad range of inks and printing processes. This will be accomplished by creating a manufacturing process to scale the creation of these substrates and a manufacturing process to scale the printing on these substrates.

The processes will be used for the design of the next generation of adaptive printed RF and microwave components and devices required for future asset monitoring systems such as GPS asset tracking systems (MGUE) and globally deployed ground based radar systems and batteries, such as Patriot and TPY-2. The project will demonstrate advanced RF component and manufacturing technologies comprised of low temperature cure electronic inks and multi-functional substrates for various devices. Tailored substrates will be created by embedding nanoparticles into polymers utilizing industrially relevant, scalable methods developed at UML. Once, fully characterized, these multi-functional substrates will be integrated into conformal antennas and tunable conformal frequency selective surfaces, as an initial demonstration vehicle. This project will mature materials and processing technologies from MRL4 to MRL6/7 and prototype antennas moving from TRL4 to TRL7.

