

## Miniature Multiwire Systems (MMS)

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### Abstract

The Miniature Multiwire Systems IR&D will enable rapid packaging of small, complex electronics. This is done by breaking the conventional packaging paradigm, in which all chip-chip interconnects are made with as much as a couple dozen patterned redistribution layers, with a single layer of self-shielded wires (micro-coax). Depending on system requirements different types of wires will be needed. For digital signals, standard unshielded wire-bonds are sufficient. However, certain high speed signal will need miniaturized coax. In addition to signal handling, an MMS package will have a unique and novel way to handle power in low impedance micro-coax wires. The key integration challenges to realizing this technology include (1) creating a new power distribution network model, (2) fabricating and connecting sub-25 micron coax wires, and (3) building a custom tool that can automate the coax bonding process. In the first year of this research effort, we have made significant strides in understanding how to design an MMS system. We have proven that we can “rapid prototype” circuits with packaged components and eliminate costly fab time for multi-layer routing. We have also successfully created low impedance (0.5 ohm target) coax wires for power handling and methods to test these wires at high frequency. Over the next 2 years, we will take on the challenges of scaling up micro-coax wire fabrication, miniaturization of wires so we can move from package scale integration to chip scale, and process automation.