

## Building Better Sensors: Harris Partners with Consortium to Advance Next Generation Manufacturing

In August 2015, Harris signed a letter of intent to serve as the first industry member of the International Consortium for Advanced Manufacturing Research, or ICAMR. In early January 2016, Space and Intelligence Systems employees met face to face for the first time with their ICAMR colleagues to discuss the partnership, convening at the Harris Technology Center on the Palm Bay, Florida campus.

ICAMR is working to develop innovative manufacturing processes, materials and equipment for advanced sensors and other future high-tech products. The organization is initially targeting the high-growth technologies that will lead to more than 50 billion devices being connected by sensors at the beginning of the next decade.

And ICAMR's goals are right in line with the work of both Space and Intelligence Systems and Harris' Electronic Systems segments.

"ICAMR offers access to industry professionals who have research experience in semiconductors and high-density interconnect substrates with three-dimensional integration," said Dr. Mike Weatherspoon, Sr. Technologist in Space and Intelligence Systems' Microelectronics Core Technology Center. "As SIS and Electronic Systems look to the future, interconnecting devices that have thousands of signals is going to be critical to the development of next generation devices such as sensors, field programmable gate arrays, and high-performance computing tools. Our research interests are closely aligned."



Left to right: Tom Wells, University Research Manager, SIS; Dr. Mike Weatherspoon, SIS; Dr. Tengfei Jiang, University of Central Florida; Ankineedu Velaga, ICAMR; Dr. Christopher Carron, SIS; Amit Kumar, Associate Director of Research Programs, ICAMR; and Bill Summers, SIS.  
Pictured in the PowerPoint: Larry Smith.

As an industry partner, Harris is sponsoring ICAMR's first research project, providing both financial and technical resources. The project focuses on developing a roadmap for three-dimensional integrated circuits, creating the processes and technologies for fabricating a device capable of interconnecting one million signals – beyond current state-of-the-art technologies – using traditional semiconductor fabrication processes, Through Silicon Vias (TSV) and high-precision wafer-to-wafer bonding.

Integrating chips vertically in a single package multiplies the amount of silicon that can be crammed in a given package footprint and conserves device real estate. At the same time, it enables shorter chip-to-chip routing, which speeds communication between chips and wastes less power. Board fabrication and assembly are also simplified because there are fewer components to be placed on a board.

"These new technologies will help us provide the ultimate in device miniaturization in terms of reduced size, weight and power – improvements that are aligned with our customers' interest in developing smaller, lighter sensors and computing modules that still pack a lot of computing punch and provide higher memory bandwidth and image resolution," said Weatherspoon.

ICAMR CEO Chester Kennedy said that the partnership with Harris illustrates the value proposition of the consortium.

“We are excited to be working with Harris on the advanced wafer level integration project. As an industry-driven consortium it is imperative that we continue to build upon what the Harris project brings as we work with industry to overcome the challenges associated with making major technological leaps,” Kennedy said.