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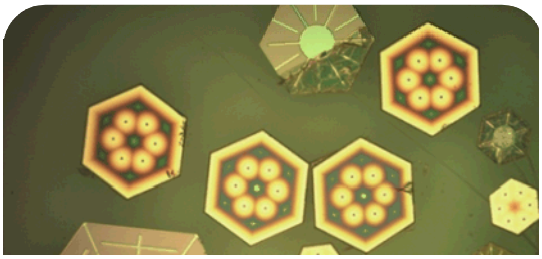
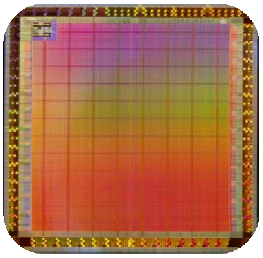
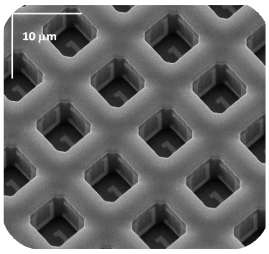

Microsystems & Engineering Sciences Applications (MESA)

Advancing the Frontiers of Science and Engineering

Problem

The issue of trusted components is increasingly important for defense industries and some commercial systems. In addition, certain technologies required for U.S. national security simply are not profitable for the private sector to produce because of their small lot manufacturing needs.

Why It Matters

Concerns about subjects like intellectual property theft, counterfeit parts, and Trojan Horses make it imperative that components used in high consequence systems come from trusted suppliers. Likewise, radiation hardened technologies are crucial for our expanding national security needs. Even further, advances made through scientific research and manufacturing capabilities help ensure U.S. national security and competitiveness. Avoiding technical surprise and staying on the front lines of innovation build an even better America.

Sandia's Approach

Sandia's MESA Complex is a suite of facilities encompassing nearly 400,000 square feet and includes cleanrooms, laboratories, and offices. It is designed to integrate the numerous scientific disciplines necessary to produce functional, robust, integrated, and trusted microsystems. It is also the only microelectronic foundry producing chips hardened to survive the nuclear battlefield and other radiation environments.

MESA is a Department of Defense (DoD) Category 1A Accredited Supplier of "trusted design and foundry services" and is ISO 9001 certified. With in-house capabilities in packaging, test, failure analysis and reliability, Sandia offers a total supply-chain solution for high reliability custom microelectronics in a variety of national security applications.

Research Accomplishments

Investments in nanodevices and microsystems research at Sandia have resulted in a number of recent achievements.

- First ever all-dielectric metamaterial in the infrared may enable compact, high performance optical devices for non-proliferation, industrial, and military applications.
- Advances in understanding AlGaN materials and processes may lead to ≤ 340 nm laser diodes, enabling fluorescence-based biosensing for pathogens.
- Discovered the Stimulated Mach-Wave Phonon Emission effect that promises chip-scale true time delay for ultra-wideband signal processing applications.
- Invented microresonator filters for next-generation wireless devices, offering higher performance in a smaller package with a lower price.
- First-ever fabrication of diffractive optical elements for cesium atom trapping and control and first ever robust micro ion trap pave the way for potential quantum information processing applications.

Research Funding

Laboratory Directed Research and Development, DARPA, and Other Government Agencies.

U.S. DEPARTMENT OF ENERGY | NNSA

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