

Organization(s): University of Illinois at Urbana-Champaign

Title: CAD Design Tools for an Integrated Millimeter Wave Wireless Comm.

Duration of Effort: July 1997 - August 2000

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MTO

Composite
CAD

Objectives:

To develop a CAD tool system for accurate and efficient design of integrated microwave- and millimeter-wave front-end modules with mixed technology.

Major Accomplishments:

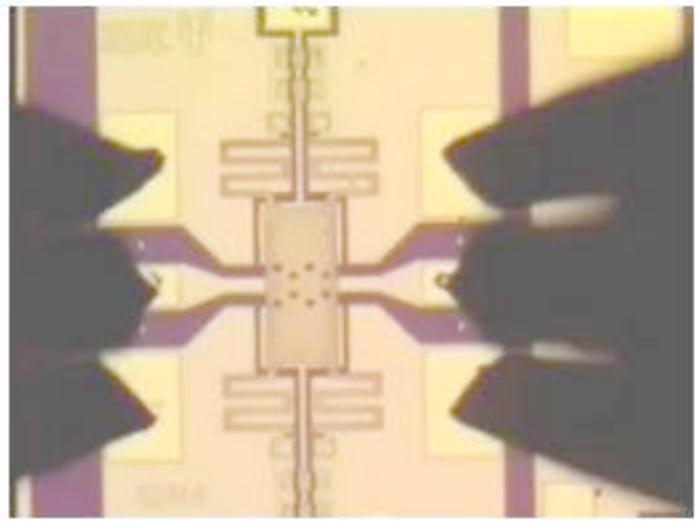
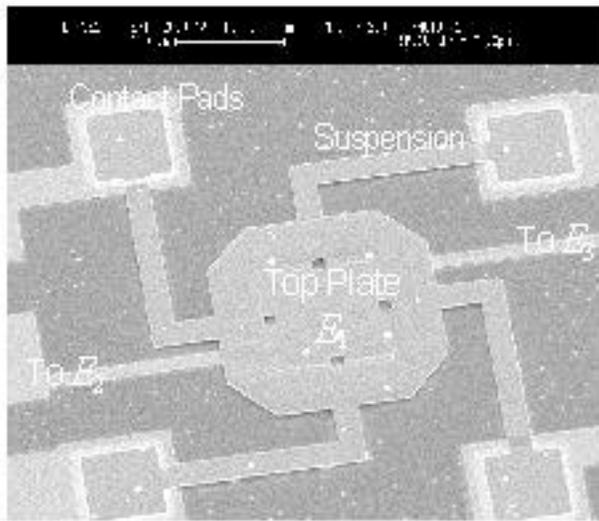
- Development of fast frequency- and time-domain antenna RF radiation algorithms and software for frequency and time domain analysis.
- Development of mixed-signal simulation algorithms and tools for understanding complex micro electromechanical systems (iMacSim) that contains multi-level, multi-technology IC and MEMS components.
- Development of high tuning range tunable capacitor design and fabrication process based on computer simulation results.
- Hinged micromachined RF switches with low actuation voltage (6 - 10 V.) developed.
- Development of a process simulation software for bulk anisotropic etching of semiconductor substrate.

DOD Impact:

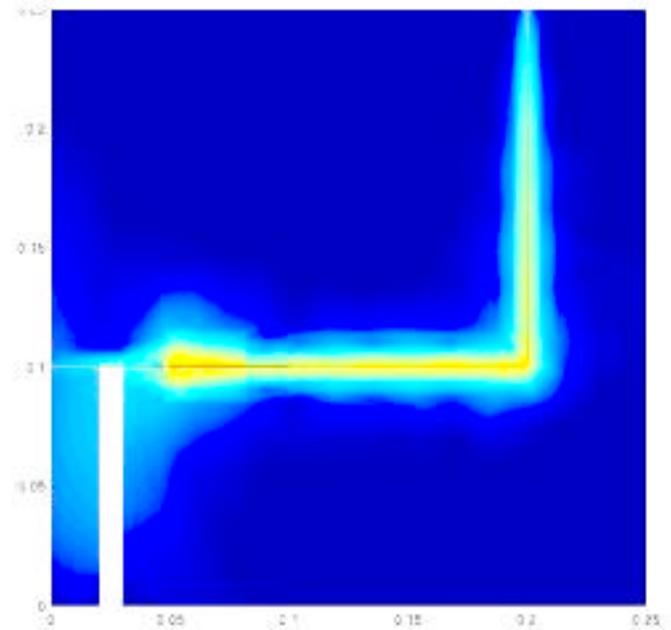
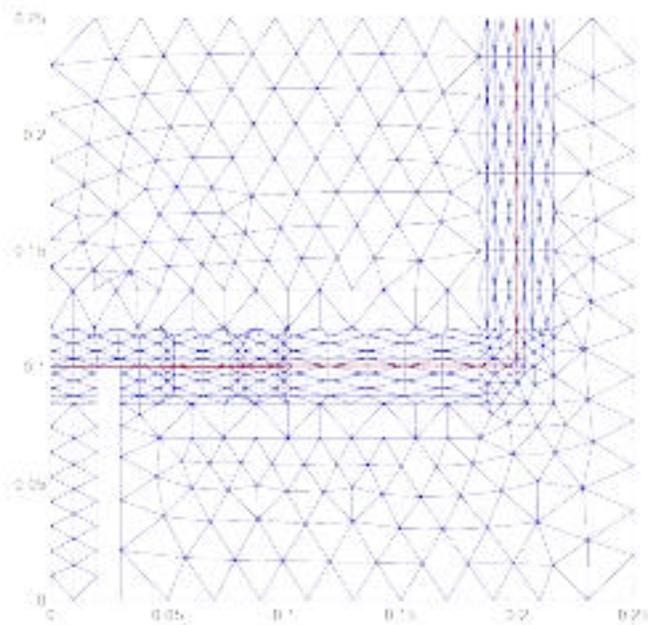
- New EM radiation simulation software enhances the DoD capability of designing advanced radar systems and weapon systems with low radar cross-sections.
- Micromachined RF switches inserted in true time-delay phase shifters for DoD platforms such as Reconfigurable Antennas.
- Advanced simulation tools significantly reduces the time for designing mixed-technology RF components and sub-systems.
- Anisotropic Crystalline Etching Simulation (ACES) software being used by more than 500 groups worldwide, partially for DoD related research and education.
- Architecture for parallel clustered super computer has been established at the University of Illinois to reduce the costs of computation platforms.

Technology Transfer/Products:

- iSIMS, a mixed-technology, mixed-level circuit simulation tool, is being commercialized and licensed.
 - ACES is a commercially available simulation software for MEMS reserachers.
 - EM-radiation simulation codes are being commercialized through local start-up companies.
 - Three US patents have been filed dealing with micro switches and tunable capacitors.
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CAD Design tools facilitates the development of advanced RF MEMS components such as tunable capacitors and switches.



Advanced radiation simulation tools provide fast and efficient time and frequency domain simulation for DoD applications.