

Radio Frequency Stealth Transmit/Receive Modules

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Problem

- **Battlefield operations are demanding sophisticated wireless equipment with more features yet smaller size, lighter weight, and lower cost.**
- **Similar challenges in the *commercial* industry are stimulating development of “system-on-a-chip (SOC)” integrated circuit technologies.**
- **Can the technological challenges of successfully merging radio frequency (RF), analog, and digital functions be met at a reasonable cost while satisfying practical military and government applications?**

Background

- Historically, economies of scale in the commercial market have favored Complementary Metal Oxide Semiconductor (CMOS) integrated circuit technology.
- Conflicting functional requirements of radio frequency (RF), analog, and digital circuits stand in the way of a single, optimum technology for all.
- Controversy continues over the value of implementing an RF/analog system *on a chip*.

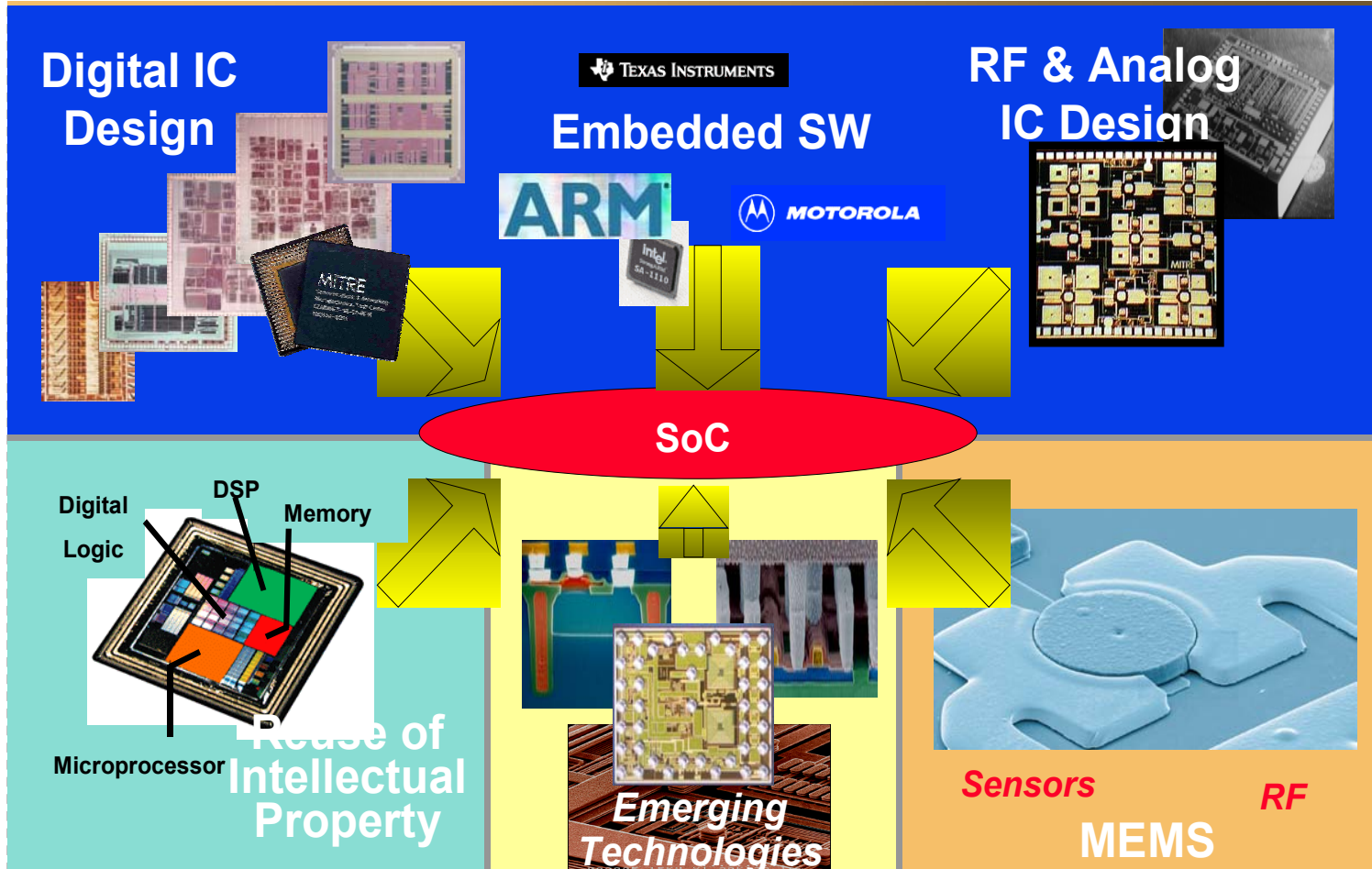
Objective

- **To create new applications by applying advanced microelectronics technology that addresses the requirements of future military and government systems**
- **To advance MITRE along the roadmap towards implementing RF/analog/digital SOC technology by fully engaging the practical challenges of design and development**
- **FY02 goal is to demonstrate an SOC-based RF tag module as proof of concept**

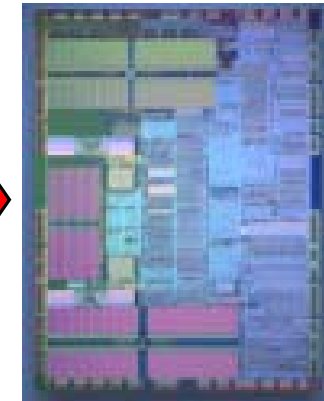
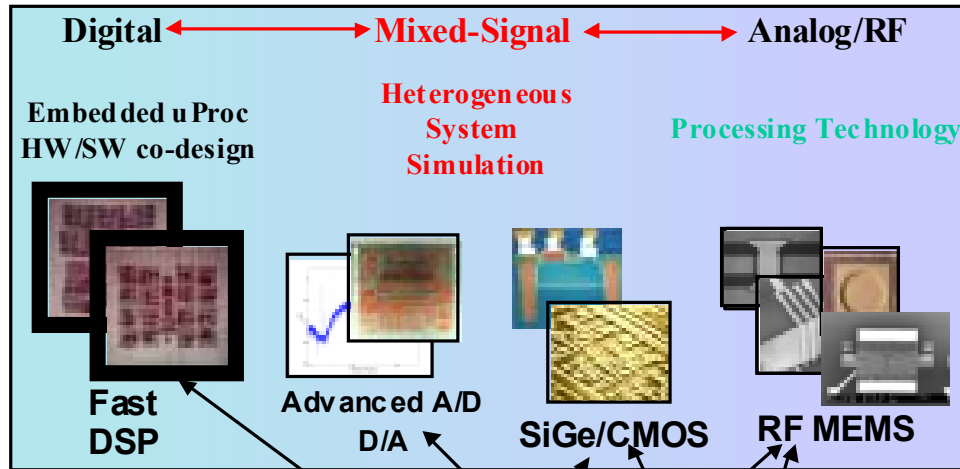
Activities

- **Survey competitive integrated circuit technologies for RF/analog/digital SOC**
- **Design and demonstrate a prototype RF tag based on the selected mixed-signal technology**
- **Explore the feasibility of 0.18m CMOS technology for mixed-signal designs**
- **Integrate intellectual property into MITRE's design framework with a focus on embedded microprocessor cores**

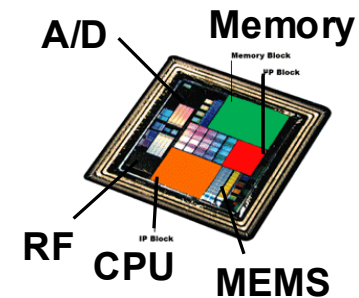
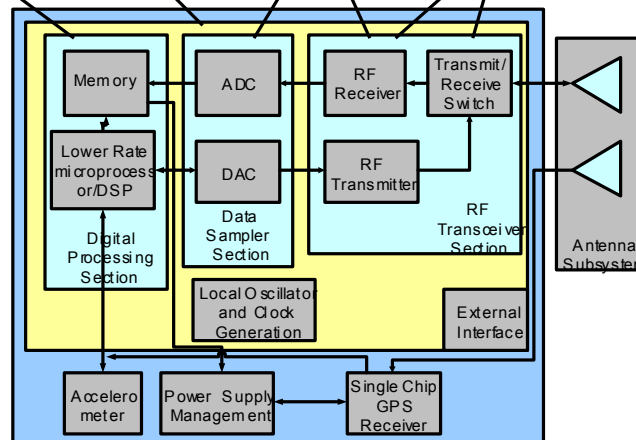
Highlight



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Single "Chip" Implementation



Impacts

- **Providing benefit to military operations in a variety of new and existing applications with proof-of-concept RF tags**
- **Contributing to industry-wide efforts in the leading-edge development of systems on a chip**
 - **Leveraging COTS development in SOC for military uses**
- **Exploring performance envelope of Si versus III-V semiconductor processes**
 - **Enabling lower-cost, mixed-signal ICs for the military**
- **Enabling higher integration promises greater DC power efficiencies, leading to smaller battery requirements/longer mission duration**

Future Plans

