



Sandia National Laboratories

Microelectronics and Microsystems

SAND2005-7323C

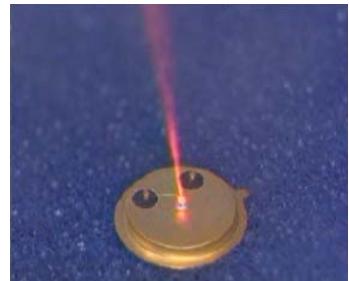
**Laminar Flow
Clean Room**



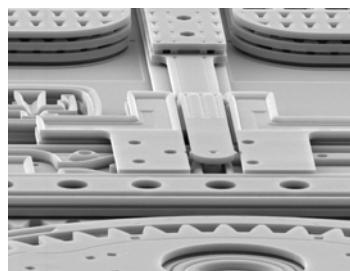
**Design/Build
Galileo ICs**



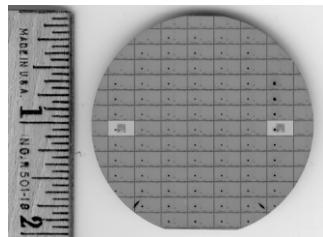
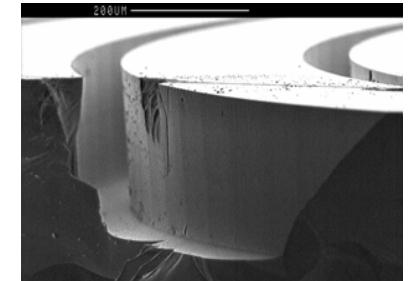
**High Efficiency
VCSEL**



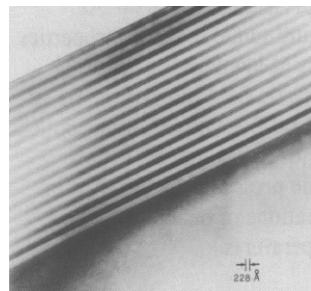
**5-Level
Surface
Micromachining**



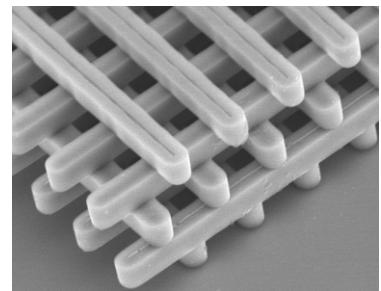
**Chem Lab
on a Chip**



**Radiation
Hardened
CMOS**



**Strained-layer
Superlattices**



**Photonic
Lattice**



**Extreme
Ultra Violet
Lithography**



**3-D
Microsystems
Integration**

1960s

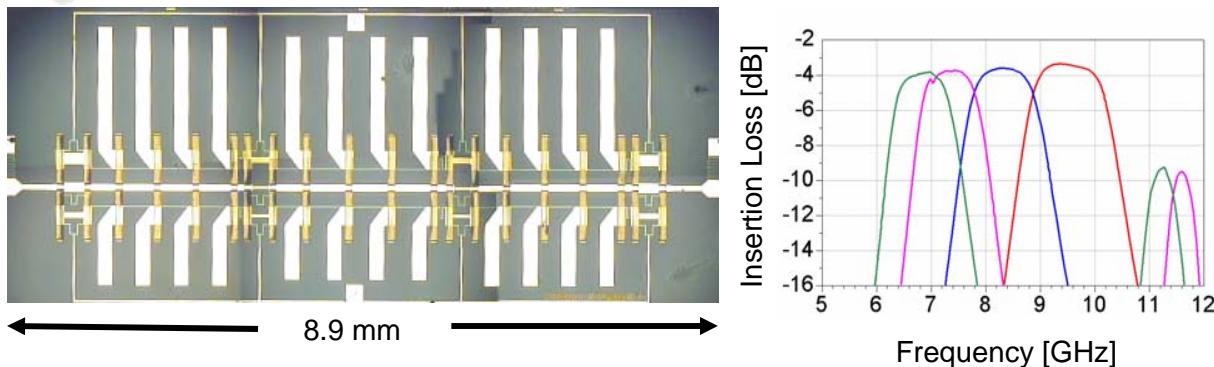
2000s

"Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000."

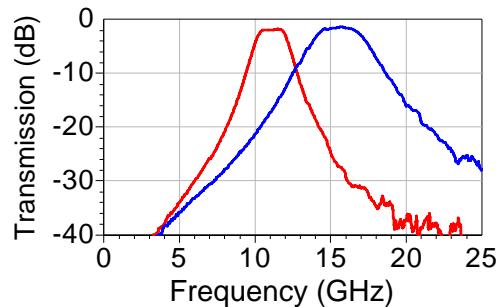
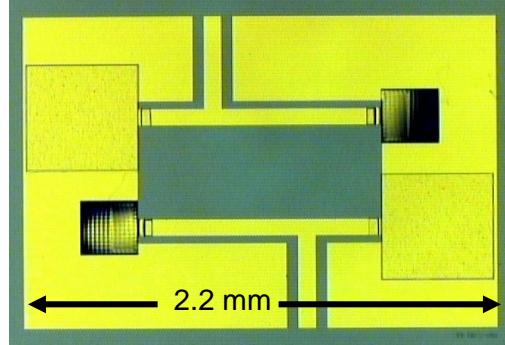


Reconfigurable Circuits and Devices

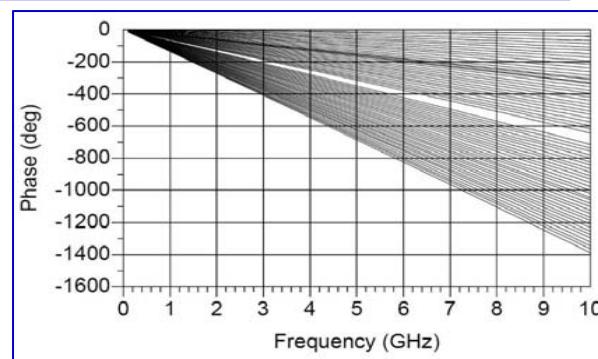
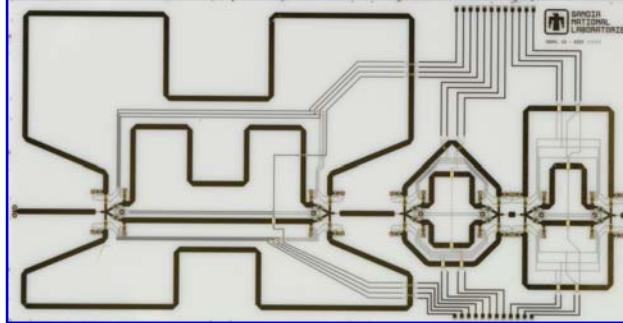
6-10 GHz tunable filter



X-Ku band hopping filter

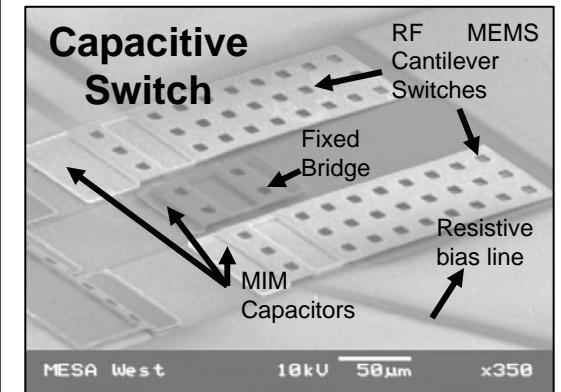
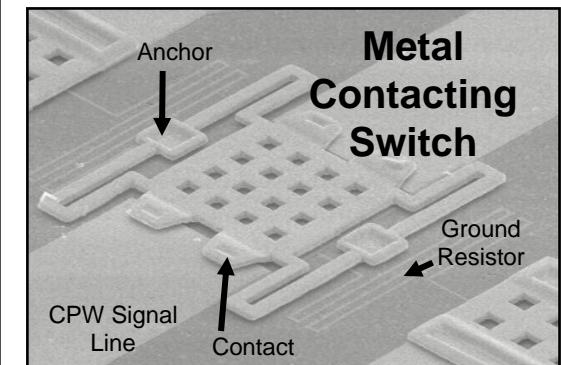


6-bit RF MEMS Time Delay

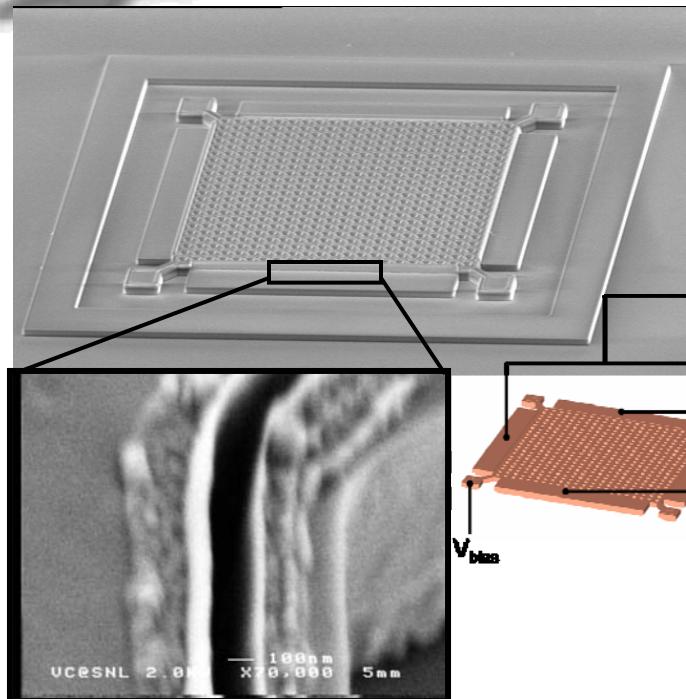


RF MEMS Switches

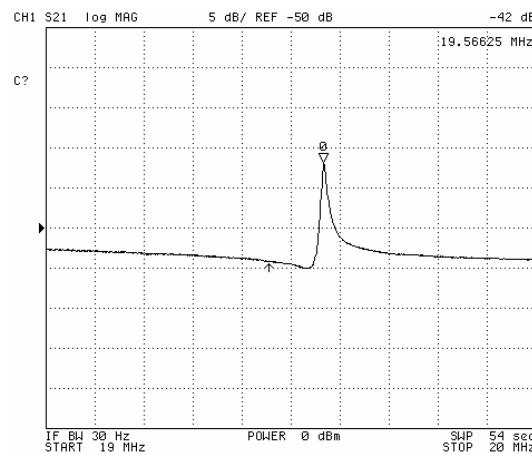
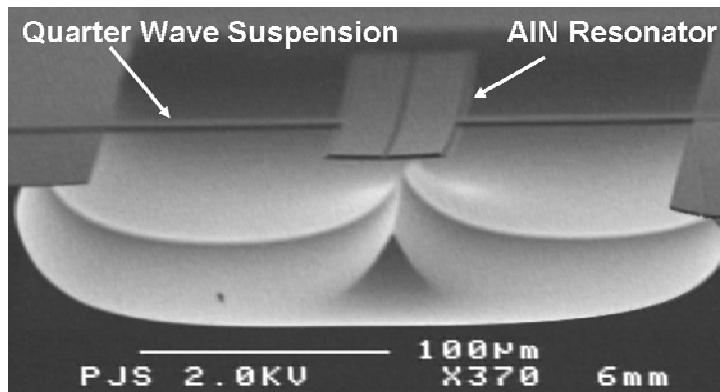
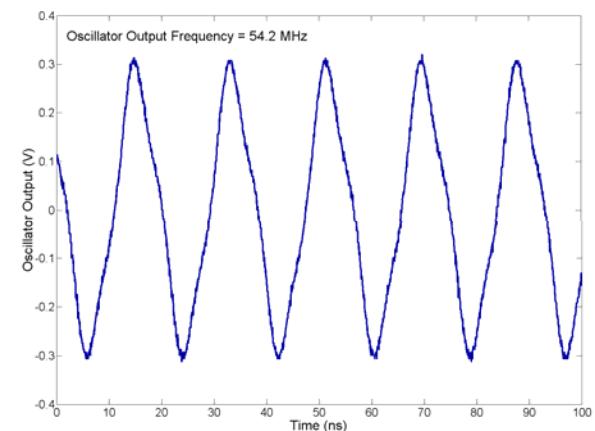
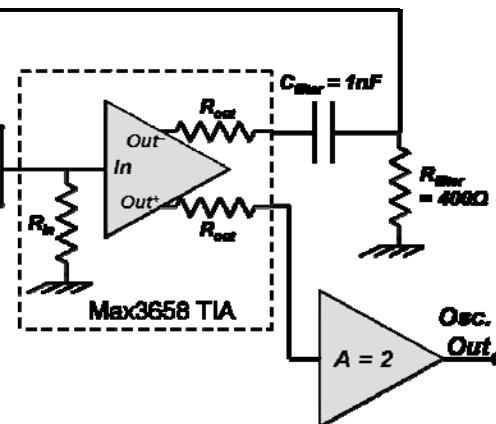
- Enabling technology
- <0.1 dB loss
- Near-zero Power
- High Linearity



Sandia μ Resonator Technologies

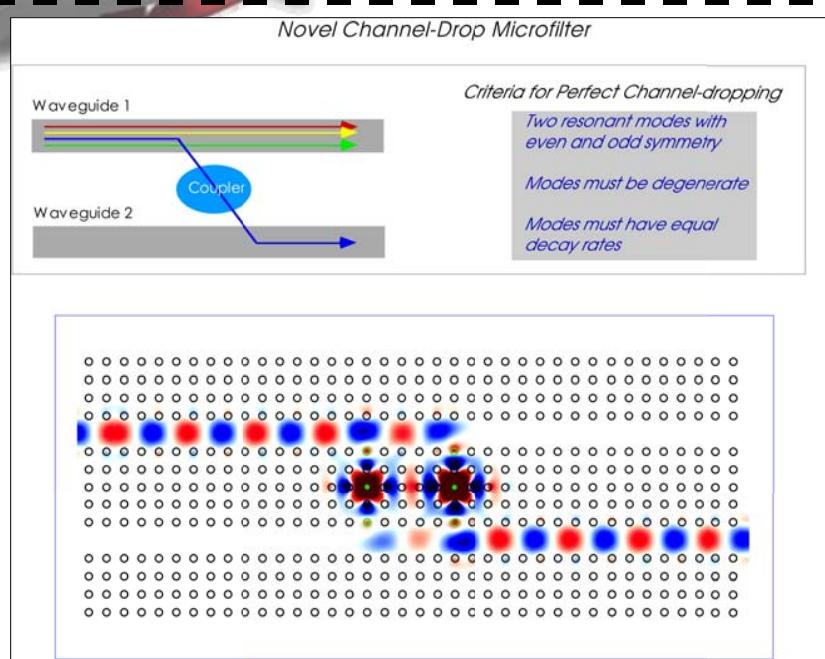


Narrow Gap PolySi Resonator Process for Miniature Oscillator References and IF Filters

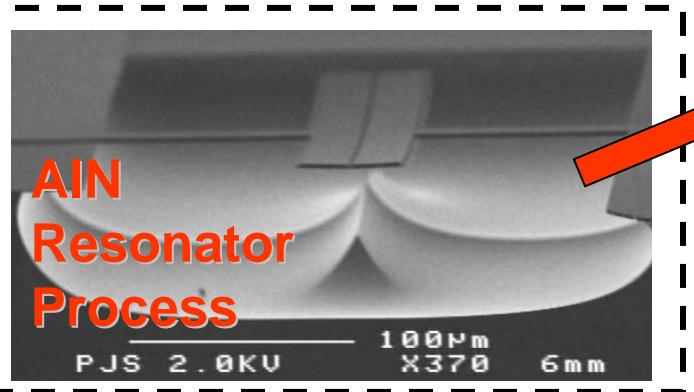
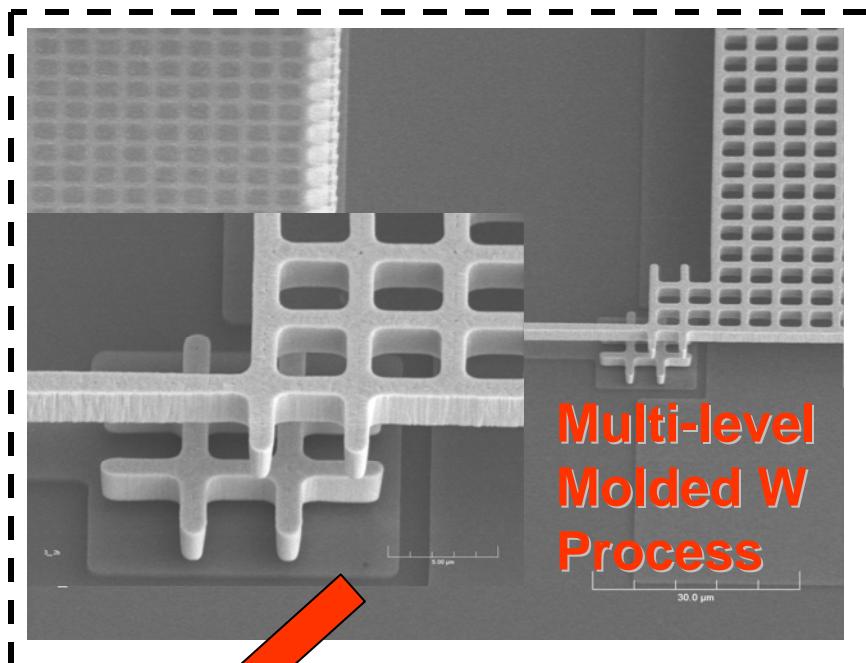


AlN Resonators for Low Impedance, Lithographically Defined Filters

Distributed Acoustic Circuits



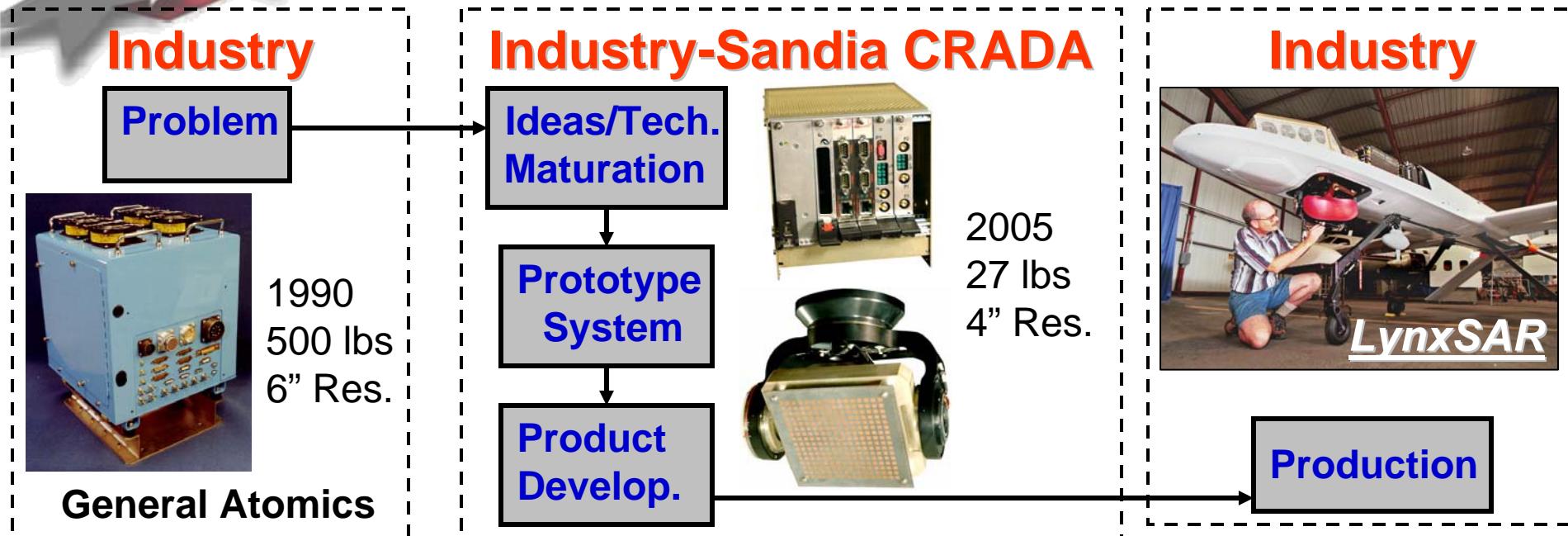
**Photonic Band Gap Circuits
and Modeling**



➤ Miniaturized Acoustic Circuits

- High Q Filters
- Phase Shifters
- Delay Lines
- Wave Guides
- Diplexers

Partnerships and Tech. Transfer



- **Why Sandia**
 - Infrastructure
 - Researchers
 - Secrets
 - Tax Supported- Partner with Many
 - Prohibited from Competing with Industry

**\$563 Million
MESA Complex**

