

Exceptional service in the national interest



**Sandia
National
Laboratories**

DARPA WIRED Proposers Day Sandia Capabilities

<http://www.sandia.gov/mstc>

Trusted Microelectronics

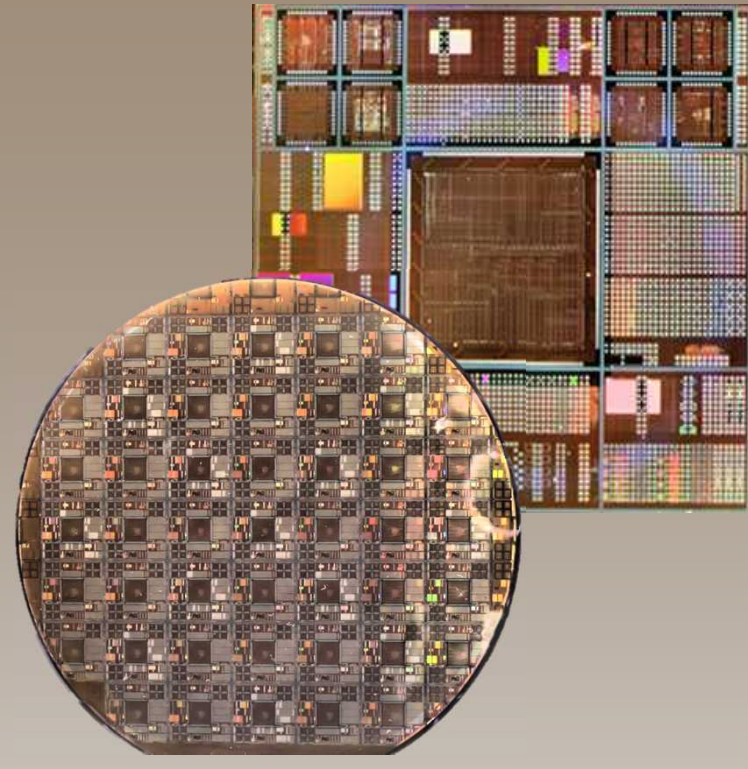
Custom & Structured ASIC Design & Fab
CMOS Multi-Project Wafer program

- Rad-hard mixed signal SOI CMOS
- ISO 9001:2000, high-rel. production

Trusted Design Services

- DMEA 1A Certification of Trust
- Internal & external foundries to 14 nm

III-V microelectronics production



Trusted Mixed Signal ASIC Design

Application Specific Integrated Circuit (ASIC)
Development & Production

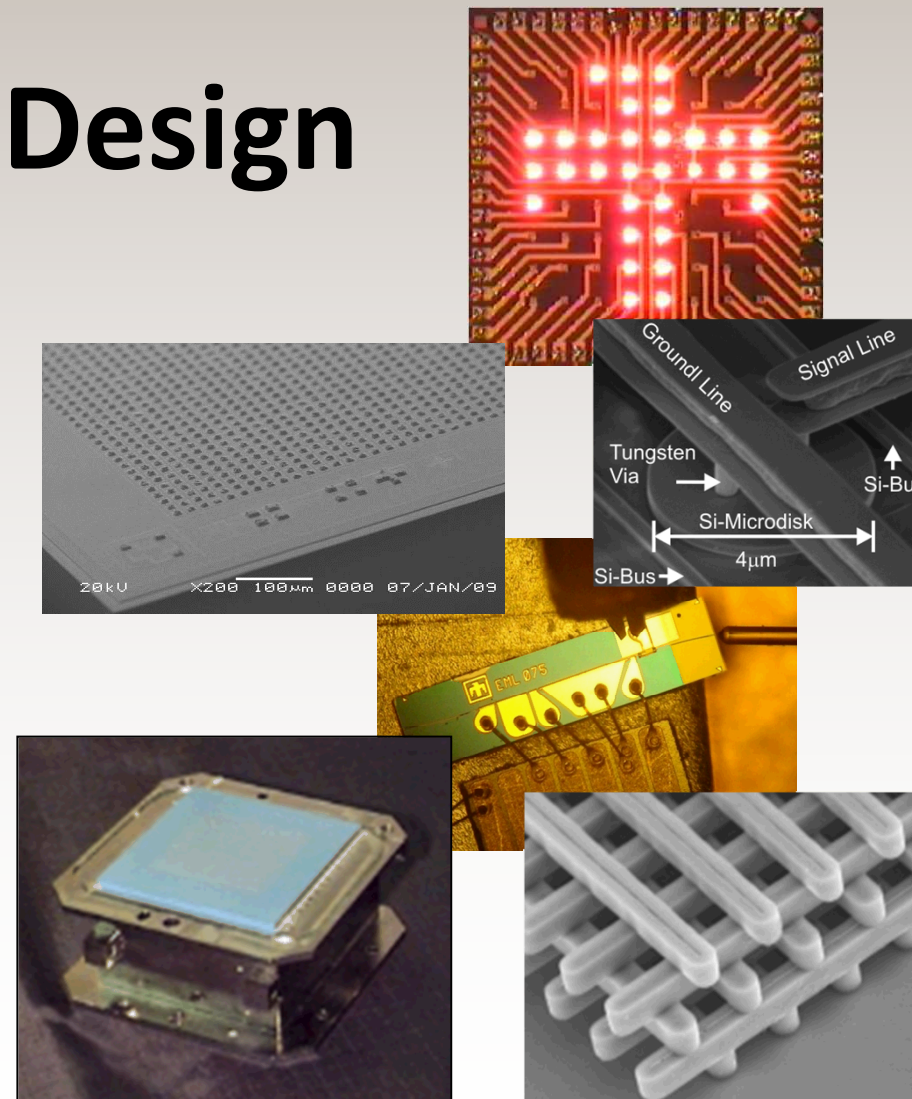
- Design
- In-house fabrication
- Packaging and test
- Qualification

Advanced Verification Methodologies

Process Design Kit (PDK) Development

Custom IP Development

CAD Tool Development & Expertise



Microsystem Facilities

MESA: 65,000 ft² Facility for silicon, III-V & Advanced Materials

- Si & III-V microelectronics R&D and production
- III-V and Si photonics, MEMS, and Si R&D prototyping
- nBn, GaN, graphene, memristor process & device R&D
- RF MEMS oscillators/switches and wafer-level packaging
- Heterogeneous integration and novel packaging

CINT: Center for Integrated Nanotechnologies

- National user facility devoted to nanoscale science
- Multi-disciplinary scientific community

Unique Failure Analysis Capabilities

Photonics and Materials

Extensive compound semiconductor capabilities

- 10 epitaxial reactors (MBE & MOCVD)
- GaAs, GaSb, InP, GaN and all related materials
- LEDs, VCSELs, PICs, modulators, SWIR/MWIR/LWIR FPAs

Advanced novel materials capabilities

- Conducting oxides, aluminum nitride, graphene, Ge
- Time-resolved lifetime, responsivity, XRD, Hall, AFM, CV...

20+ years in III-V & silicon photonics R&D

Potential WIRED Roles

Sandia is a DOE National Laboratory committed to development and production of microsystem components and technologies. We enter CRADAs with industry, and routinely team on BAA responses and collaborative R&D, ultimately transferring technology developments to industrial partners for production.

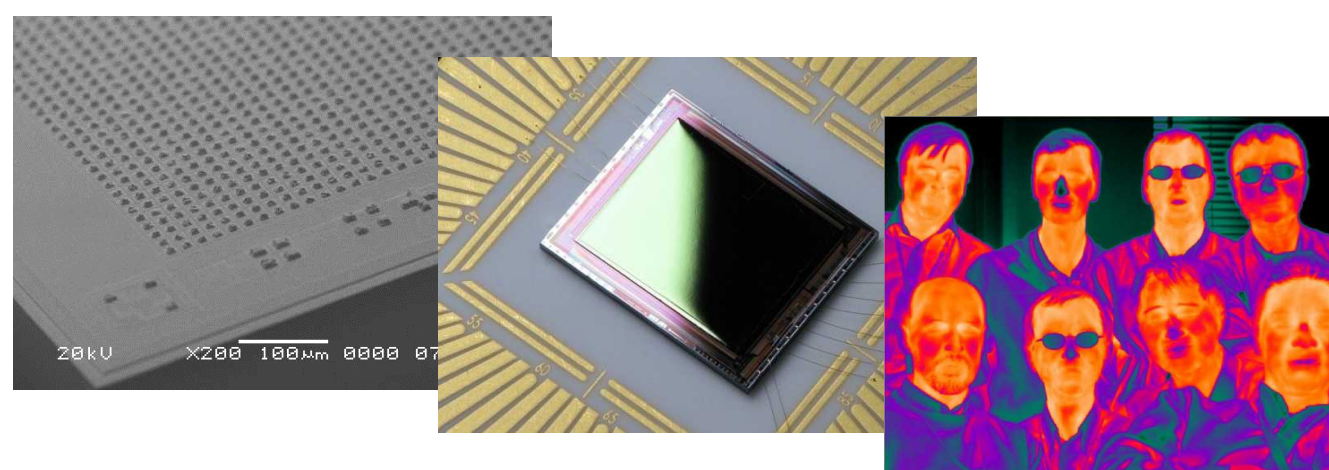
Key areas of contribution: Advanced materials & process development, custom ROIC design & fabrication, photonics/plasmonics R&D, physics modeling & simulation, and FPA prototyping & characterization.

Custom ROICs and Fabrication Processes

Specializing in design and realization of unconventional readout circuitry

- Ultra high speed
- Event driven
- Very deep well
- Fab in-house & advanced foundries

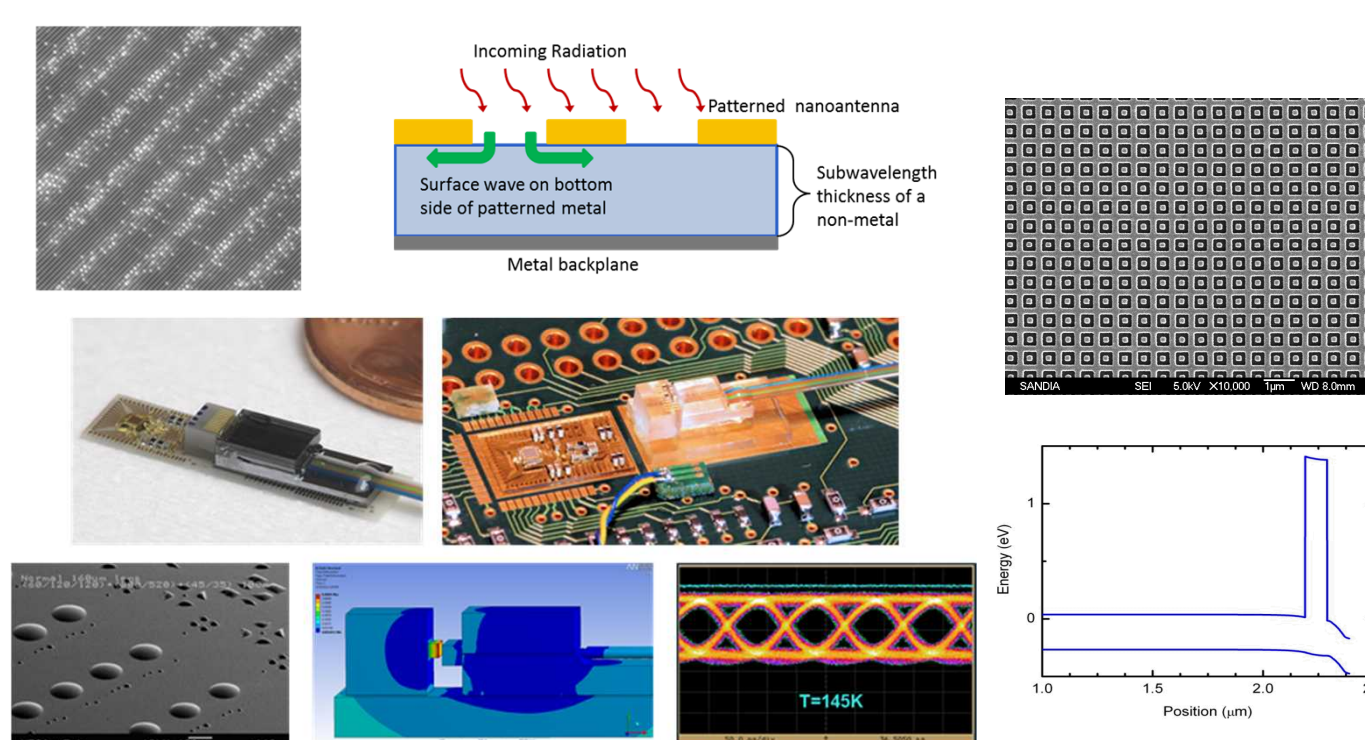
Extensive testing, FA capability, packaging, and novel integration processes



Photonic Devices and Materials

Expertise in photonics R&D, particularly new device concepts and novel materials

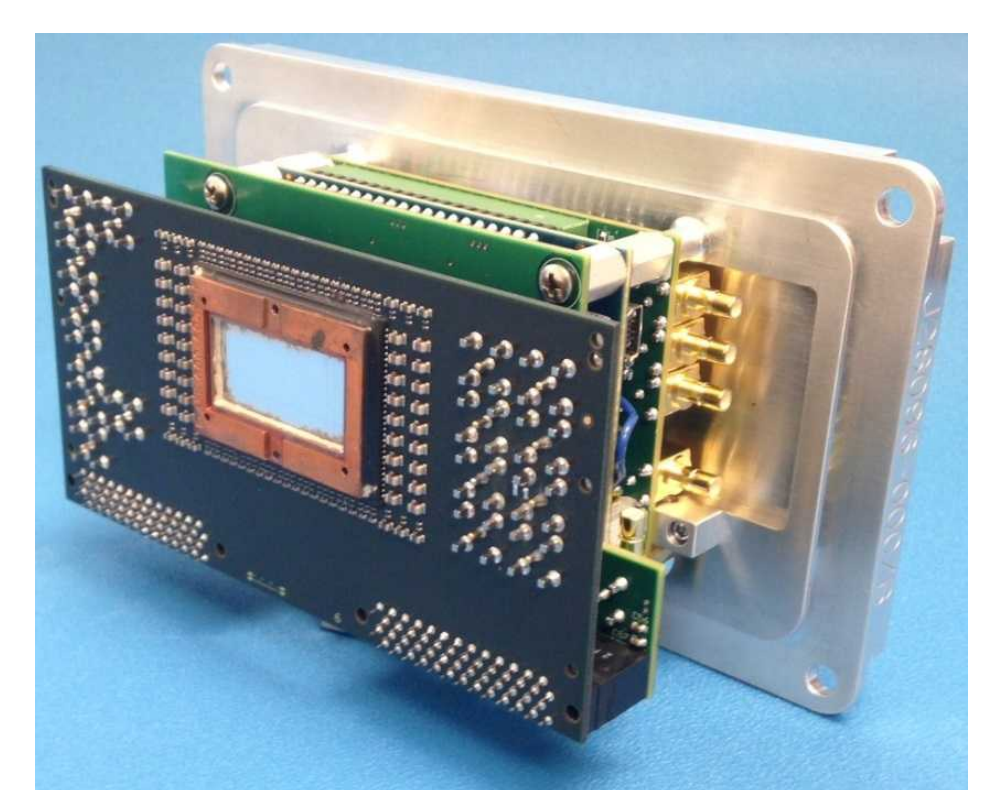
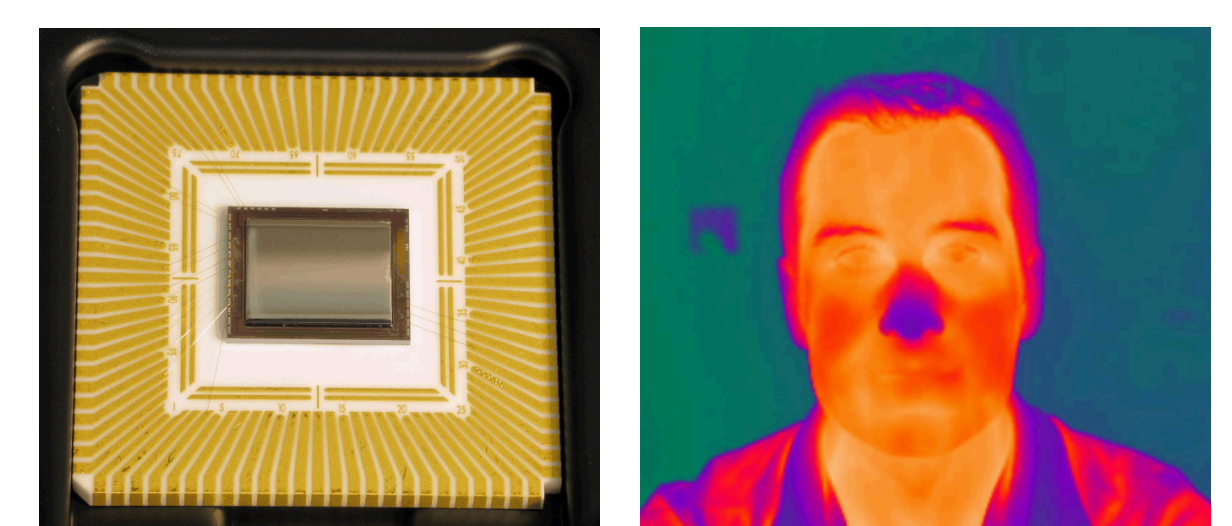
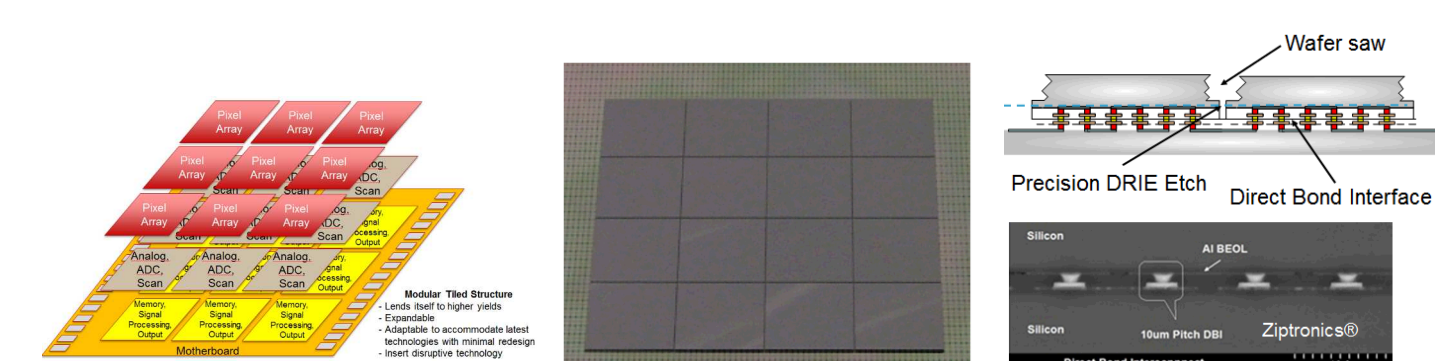
- nBn, plasmonics, SLS, LWIR rectennas
- Conducting ceramics, graphene, BN
- Extreme environment photonics



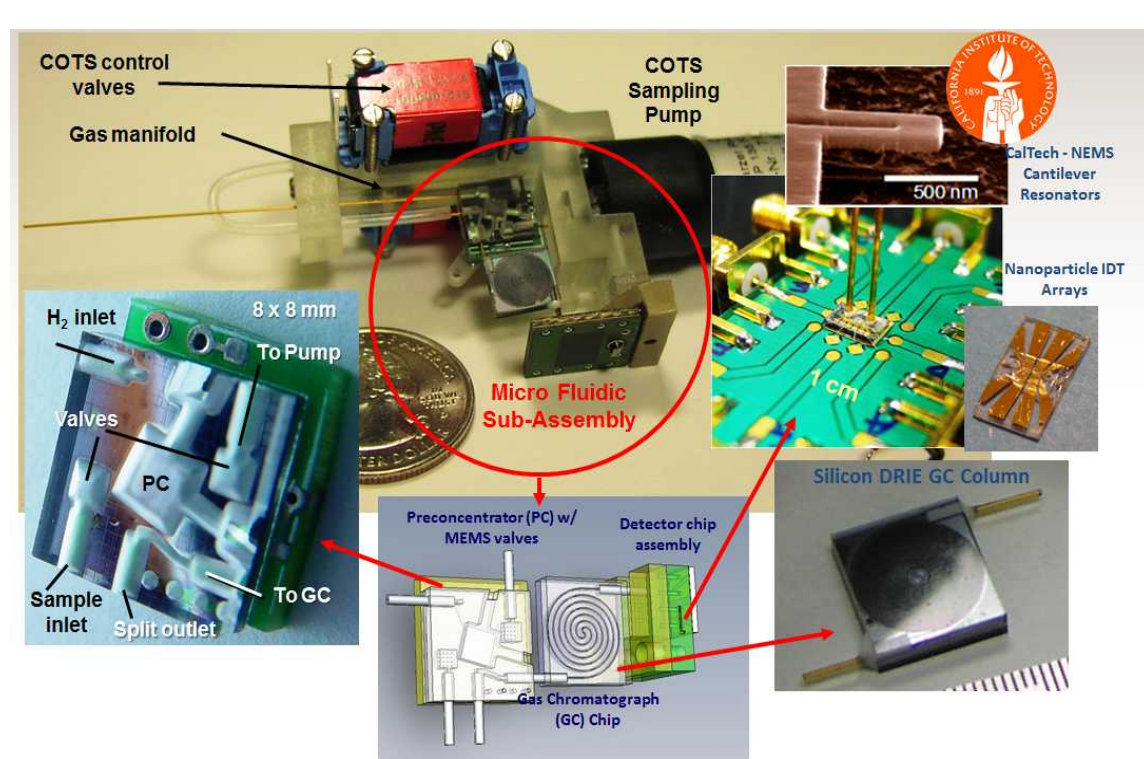
Advanced Sensor Development

Complete design, fabrication, and fielding of custom sensors and systems

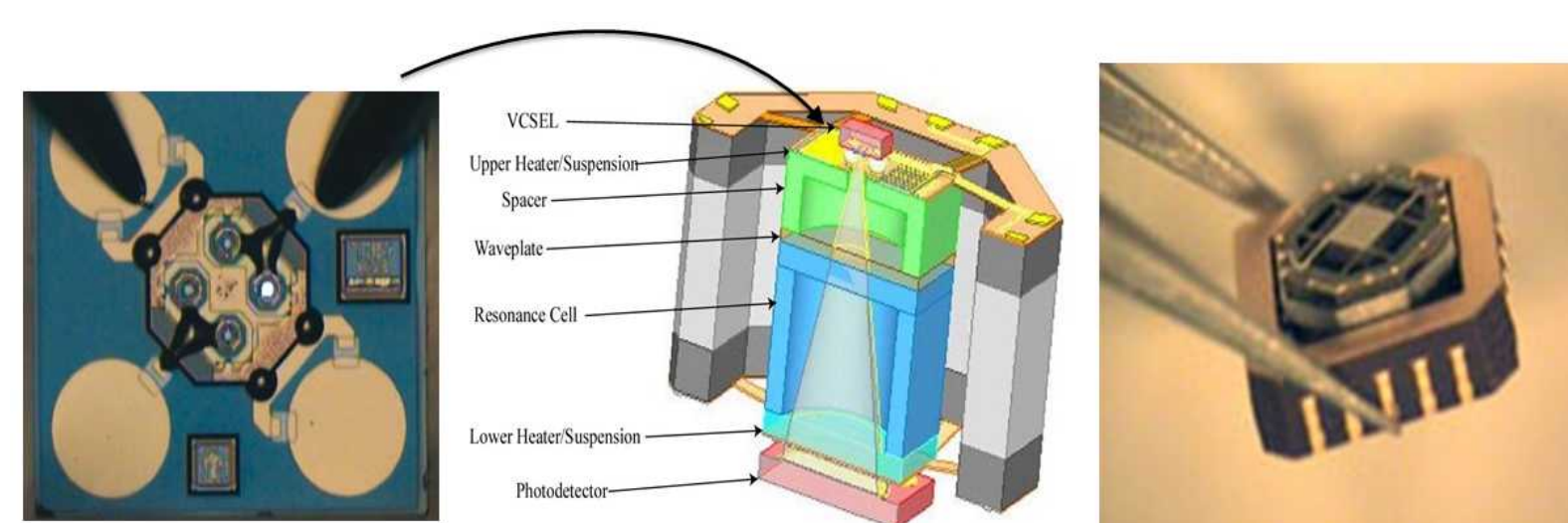
- Space and ground-based designs
- ROIC, detector, packaging innovation
- Plasmonic enhancement, hyperspectral and hypertemporal FPAs, x-ray imagers



DARPA Tech Development



Micro Gas Analyzer – DARPA Phase 4



Chip-Scale Atomic Clock – DARPA Phase 4
Successful tech transfer to commercial production

