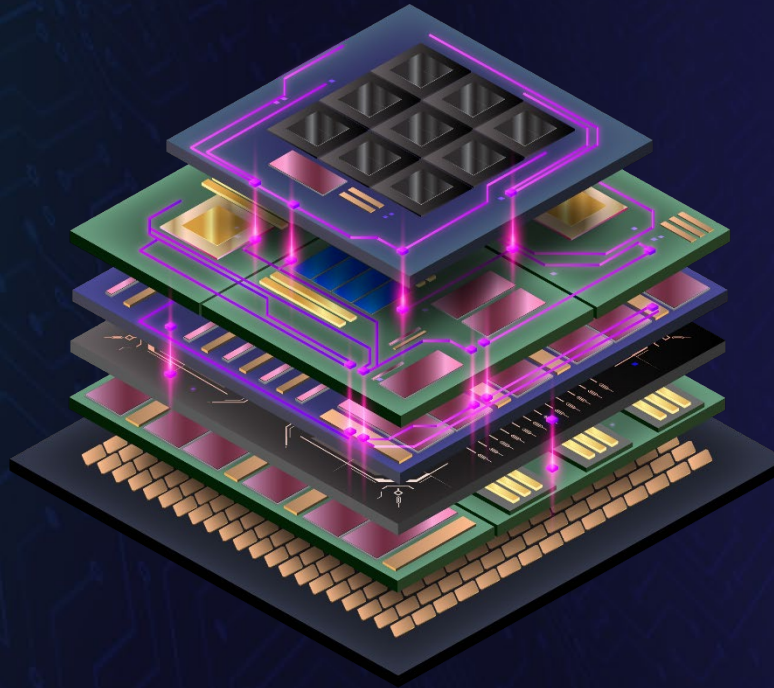


# NGMM: The Future is 3DHI

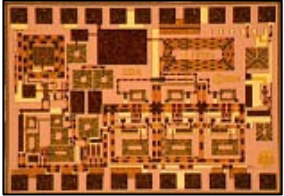
Whitney Mason

Director, Microsystems Technology Office (MTO)  
Defense Advanced Research Projects Agency (DARPA)



# System on a Chip: State of the Art Today

**MIMIC:** Microwave and Millimeter Wave Monolithic Integrated Circuits



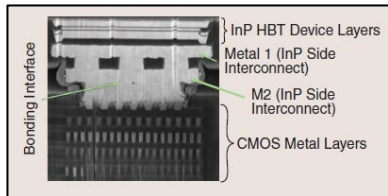
Source: DARPA

**WBGs-RF:** Wide Band Gap Semiconductor – Radio Frequency



Source: DARPA

**DAHI:** Diverse Accessible Heterogeneous Integration



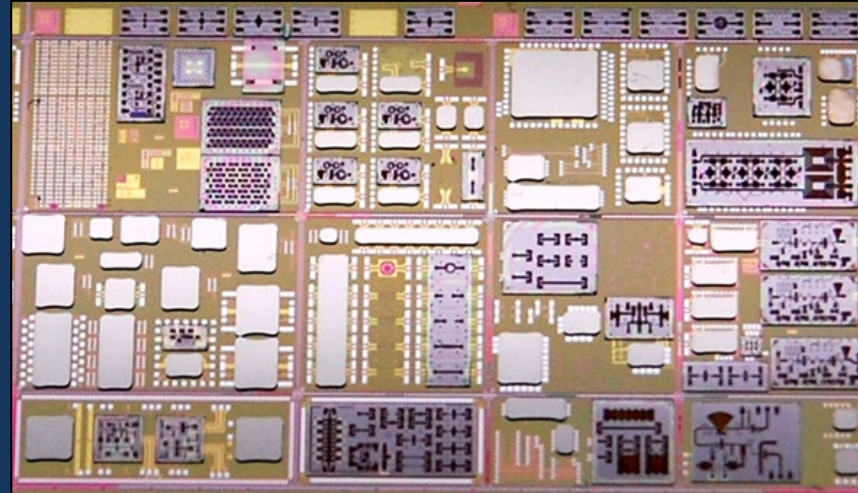
Source: IEEE Microwave

## Materials

Si, GaAs, SiGe, GaN

## Tools

EUV lithography (ASML)



Source: DARPA

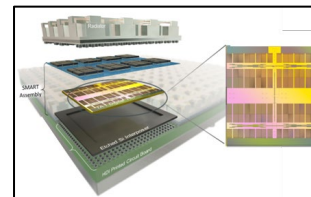
## Applications

AI Chips (NVIDIA), iPhone (APPLE), LEO Satcom (StarLink)

## Process

Advanced Foundries and Packaging (TSMC)

**SMART:** Scalable Millimeter-wave Architectures for Reconfigurable Transceivers



Source: DARPA / RTX / Teledyne

**VLSI:** Very Large-Scale Integrated Circuits



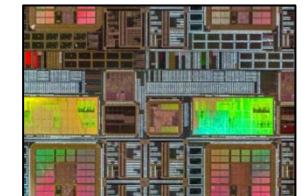
Source: SemiWiki

## Advanced Lithography Tools



Source: Canon

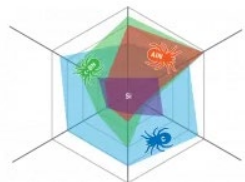
**MOSIS:** Metal Oxide Silicon Implementation Service



Source: DARPA

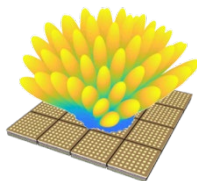


**UWBGS:** Ultra-Wide Band  
Gap Semiconductors



Source: DARPA

**MIDAS:** Millimeter-Wave  
Digital Arrays



Source: DARPA

**MFRF:** Multifunction RF



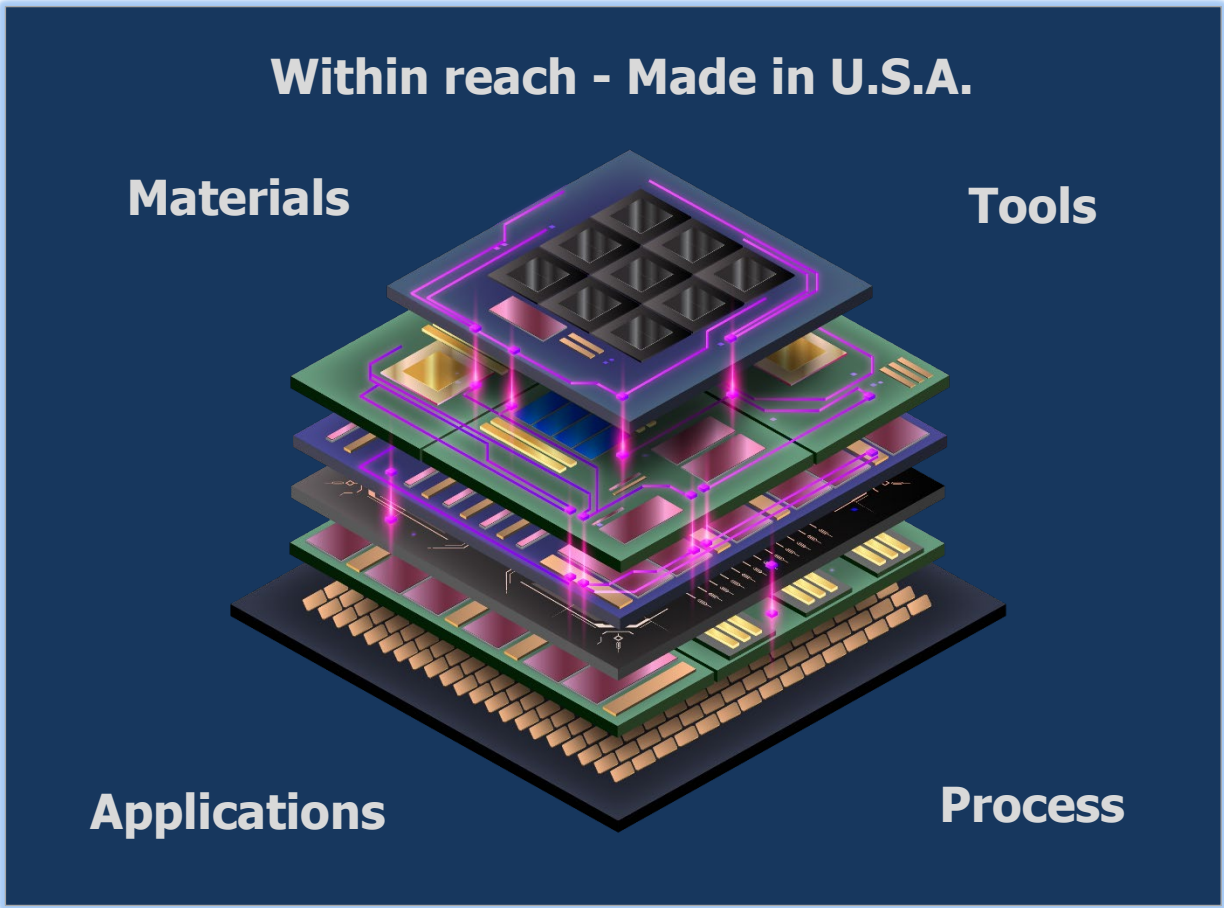
Source: DARPA

**FENCE:** Fast Event-based  
Neuromorphic Camera and Electronics

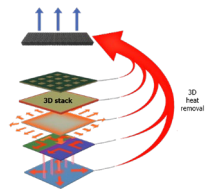


Source: RTX

# System on a Chip: NGMM Future

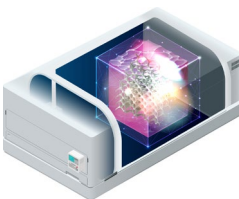


**Minitherms3D**

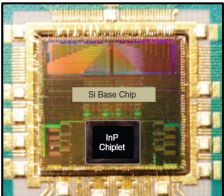


Source: DARPA

**AMME:** Additive  
Manufacturing of  
MicrosystemS



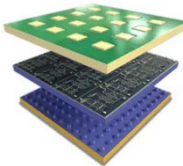
Source: DARPA



Source: IEEE Microwave

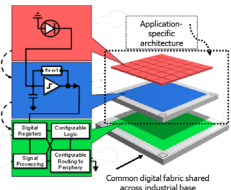
**COSMOS:** Scalable  
Millimeter-wave  
Architectures for  
Reconfigurable  
Transceivers

**ELGAR:** Electronics  
for G-band ARrays



Source: DARPA

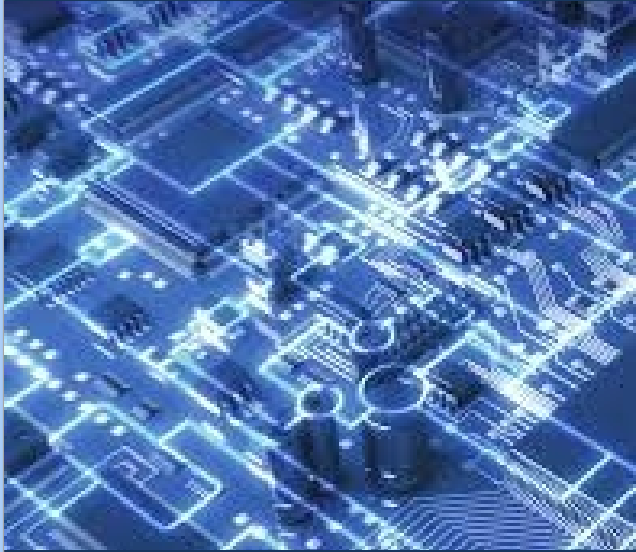
**ReImagine:**  
Reconfigurable Imaging



Source: DARPA

# What Does Success Look Like

## Push State of the Art



Source: darpa.mil

## Own the Innovation Ecosystem



Source: darpa.mil

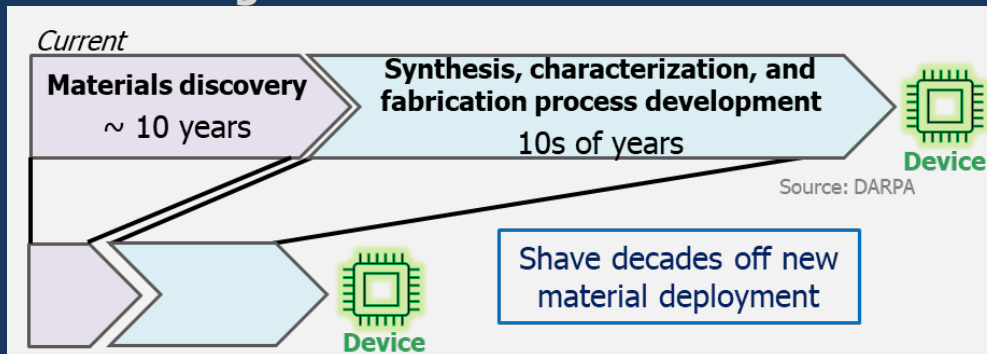
## Economic Impact



Partnership and growth

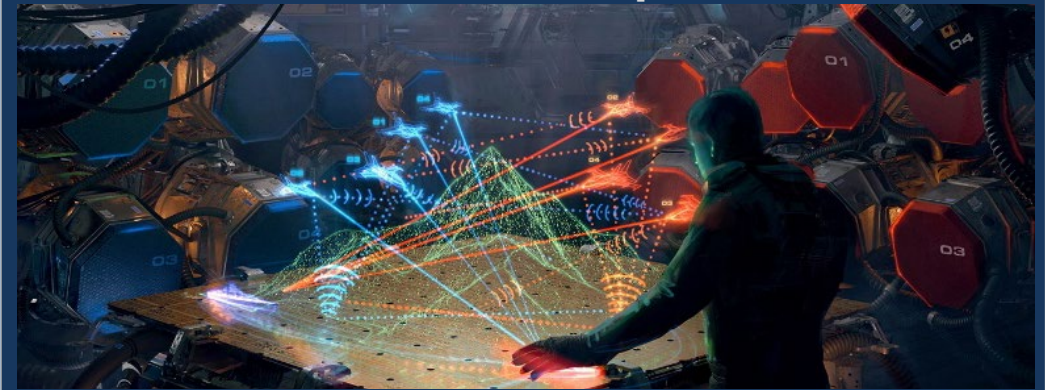
Source: darpa.mil

## Bring materials to market faster



Source: darpa.mil

## Future Battlespace



Source: darpa.mil