



# Heterogeneous Systems on Chip (HSoC) Aerospace, Defense & Government

Semiconductor technology is at the heart of virtually all Aerospace, Defense and Intelligence systems. The mission-critical role of these systems demands design solutions that leverage state-of-the-art commercial technologies and skills. However, the cost of custom Application Specific Integrated Circuit (ASIC) and System on Chip (SoC) development has skyrocketed to the point where most Defense and Military ASICs do not get built. Rather, a power-hungry/low performance Field Programmable Gate Array (FPGA) is used.

One solution to the high cost of developing efficient custom ASICs is to employ established heterogeneous 2.5D technology where chip-scale silicon systems are built up from pre-developed and tested “chipllets”. These chiplets are mounted on a silicon interposer forming a Heterogeneous System on Chip (HSoC) which has SWaP performance on par with a new monolithic SoC but can be delivered at a fraction of the cost in a fraction of the time. HSoCs rely on modularity and re-use enabling a more robust retrofit and upgrade path for deployed systems.

Intrinsix has provided semiconductor design solutions and services to Aerospace, Defense & Government (ADG) entities since 1986 and is an early provider of HSoC solutions. As a key member of DARPA’s CHIPS program, Intrinsix has developed a security chiplet which can be used in an HSoC to provide NSA suite-B cybersecurity. Intrinsix has also worked closely with Intel and several other companies to design and implement Intel’s high speed chiplet-to-chiplet AIB bus on multiple chiplets in various high-end processes.

## Capabilities

- Architectural Modeling & Analysis
- Chiplet Design & Integration
- Interposer Design and Integration
- Heterogeneous System-on-Chip “HSoC” Design/Verification
- Integrated Security IP
- ASIC, FPGA, & Board Design/Verification
- Digital, Analog, Mixed-signal & RF Design
- Advanced Node Physical Design
- Embedded Software & Firmware
- Full Suite of EDA Design Tools

## Applications

- Secure Encryption
- Flight & UAV Systems
- Satellite Systems
- Remote Sensing
- Retrofit of existing and EOL
- MIL-STD-1553
- Custom ASIC
- Radio Communications
- Portable Electronics
- GPS & Navigation
- Classified Programs

