

Research Innovation for Aerospace, Defense, and Government

Leading-Edge EDA, Semiconductor Intellectual Property, and Software Integrity Solutions



Highlight on Device Modeling with TCAD / DTCO

Synopsys enables process developers to reduce cost and time to market as well as model devices for different materials and extreme environments. The design technology co-optimization (DTCO) solution accurately models timing and power to deliver the highest reliability design with minimal IC over-design and design tool runtime. Synopsys Sentaurus TCAD also supports semiconductor material modeling for radiation environments and advanced materials like Silicon Carbide.

Create Superior Mission-Critical Systems and Semiconductors Faster

Delivering electronic design automation and semiconductor intellectual property [solutions for use by Aerospace, Defense and Government customers](#), Synopsys helps you build high-performance, low-power systems that are secure, safe, and reliable in a variety of environments.

Synopsys electronic design automation tools, IP, and services that support design teams in building semiconductors for a range of power, performance, area, and security while ensuring 1st time silicon success:

- Reduce design cost, integration risk and time to market with high quality, [silicon proven IP](#).
- For design of digital and analog integrated circuits, [IC design and verification](#) tools with built-in AI help customers raise productivity while accelerating time to market.
- For Heterogenous System-in-Package designs, [3DIC Compiler](#) supports complex package interconnect with power and thermal design.
- For [FPGA design](#), Synopsys offers synthesis to spin cross-architecture derivatives quickly.
- Synopsys' US-based services team is [DMEA-accredited](#), including ITAR and classified development support.

Synopsys [design](#) and [verification](#) solutions can increase productivity and reduce code defects, while improving security, safety, and reliability. Additionally, Synopsys is unique in its ability to manage the lifecycle of an integrated circuit, such as monitoring power, temperature, and voltage as well as predicting when maintenance or replacement is needed.

Unique AMS Emulation

The Synopsys verification flow is a full verification flow with strong code coverage, testbench and debug automation. It also includes simulation, formal property checking, emulation and rapid prototyping. Synopsys has a unique verification capability introducing AMS Emulation to market through the [DARPA POSH](#) program, available in 2023 Reduce integration risk, workforce shortage impact and time to market with high-quality, silicon-proven IP

Software Quality and Security for the Public Sector

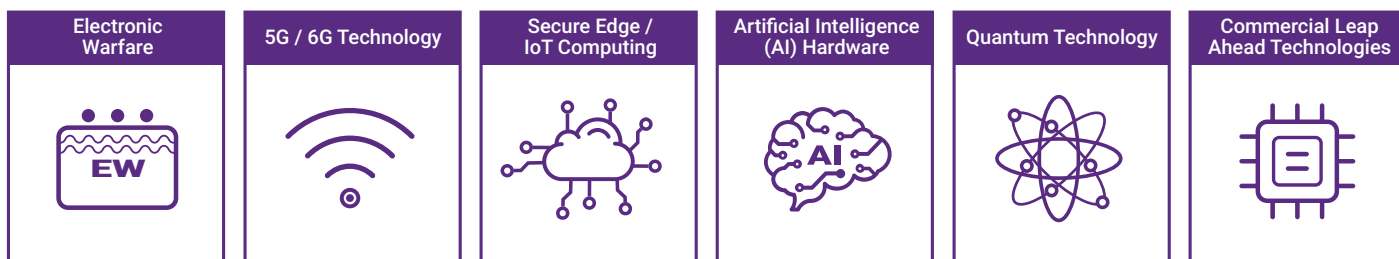
[Software quality and security](#) are critical for aerospace, defense, and government customers. To counteract persistent software threats, government agencies and contractors use Synopsys tools to address quality, security, safety, and compliance while lowering costs and deployment time.

Rapid Deployment with Cloud Alternatives

The US Government has called for agility in defense acquisition with a focus on rapid prototyping^[1]. Synopsys offers a cloud-based solution to meet this need. Synopsys has also supported programs such as the Rapid Assured Microelectronics Prototypes ([RAMP](#)) program that deployed EDA tools and flows in the Microsoft Azure Government Cloud. In addition, Synopsys offers rapid [prototyping](#) and server-level [emulation](#). To reduce analog/mixed-signal (AMS) semiconductor verification time and improve 1st pass silicon success, Synopsys will introduce AMS Emulation from the DARPA ERI [POSH](#) program during 2023.

Serving the Needs of the Microelectronics (ME) Commons

The US is investing in improving semiconductor research, design and manufacturing with the CHIPS and Science Act. A key part of that capability is the Microelectronics Commons effort. With the broadest set of tools, IP and services for microelectronics development, Synopsys can enhance research and development in all the ME commons technology areas.



Electronic Warfare

Synopsys solutions support not only the analog front end of EW RF design, but also RTRA (run-time reconfigurable array) processing and UWB materials. Synopsys vector and neural engine processing IP supports not only real-time reconfiguration for digital signal processing at low power, but also AI processing for quick recognition and response. Combined with memory, real-time scheduling, and interfaces, this platform can be a foundation for a Digital RF memory subsystem. Synopsys also has IP that supports standard cell foundations, security, and extreme environments. Our AMS and digital design tools are state-of-the-art to support the highest performance and switching at the lowest power in monolithic or multi-die packages. Additionally, we have a unique AMS Emulation capability that could be very helpful for EW application design. Finally, our services team is DMEA accredited and can perform classified designs at up to the secret level.

5G / 6G

The RF capabilities that work for EW also can be leveraged for commercial and defense communications applications, including support of low-SWaP RF design, efficient signal processing, UWB materials, and integrated photonics. Synopsys offers [device-level modeling](#) that not only works to understand silicon-based platforms, but also ultra-wide band gap materials like Silicon Carbide. Additionally, Synopsys supports low-SWaP communications solutions with capabilities like integrated [photonics](#). Finally, unlike competitive solutions, Synopsys partners with industry-leading tools from Ansys' and Keysight to address multi-physics simulation as well as antenna challenges in simulation, before tapeout or physical hardware.

Secure Edge / IoT

Synopsys supports development of low-SWaP microelectronics with safety, reliability, radiation hardening and security. A recent R&D focus is supporting radiation environments with tool automation that leverages our market-leading functional-safety capable automotive IP for use in space. Synopsys leads the effort to democratize secure silicon through its efforts as prime contractor on the DARPA AISS program as well as efforts to secure the supply chain in software, hardware and silicon lifecycle management. [Silicon lifecycle management](#) sensors and analytics can bring significant improvements to future Edge/IoT platforms. Finally, Synopsys broad IP portfolio enables a variety of solutions for secure device interfaces and high-performance AI processing in a small and low-power footprint.

AI Hardware at the Edge

Synopsys has a leading AI capability in HW design and verification tools as well as IP for AI platforms. This AI engine can be optimized for use by hub and core members. Additionally, Synopsys has a leading neural processor IP solution that can be leveraged for AI processing at the datacenter and at the edge of the network. This solution has performance from 100 GoPS to 3500 TOPS for a range of low power and performance applications.

Superconducting, Low-temperature, and Quantum Computing

Synopsys works closely with leading experts to advance new technology frontiers. As a prime performer in the IARPA [SuperTools program](#), Synopsys partnered with government, academic and industry experts to advance low-temperature superconductor electronics with a full stack DTCO-based TCAD and EDA tool solution. Under the [DARPA LTLT](#) program, Synopsys is part of an industry leading team to optimize Cryo-CMOS devices and circuits to advance high performance computing. Synopsys tools, expertise and experience offer our partners access to comprehensive strategic technologies, design automation tools and insights. These capabilities offer Synopsys and future research partners key enablers to advance SOTA research towards the implementation of Beyond-CMOS technologies including at-scale quantum computing.

Commercial Leap-ahead Technologies

Synopsys is the leading commercial EDA supplier with the broadest tool and IP offering. Thus, we are an ideal partner to bring commercial technologies to government customers. In fact, we have already crossed the 'chasm of death' with early commercialization of technology from programs like DARPA POSH AMS Emulation, IARPA SuperTools, NSTXL RAMP, and others.

We are excited about the opportunity to extend these successes to the ME Commons effort.

Synopsys Research and Partnerships

Synopsys has extensive experience as a large, non-traditional defense contractor in both prime and sub-contractor on government-sponsored research programs. This includes being a prime contractor for the DARPA ERI Automatic Implementation of Secure Silicon ([AISS](#)) program and a sub-contractor for the ([RAMP](#)) program. Another example is the SuperTools program, where Synopsys partnered with IARPA to automate design for superconducting electronics to go beyond the present physical limits of high-performance, energy-efficiency, and low-latency computing. As an early supporter of AIM Photonics and a member of the strategic advisory board, and advisor to the NSF EPICA, Synopsys supports photonics research and invests over 30% of its revenue in R&D.

As the leading EDA and IP supplier, Synopsys has strong heritage working on research programs with a variety of partners in the government, academia, and industry.

Synopsys' Investment in Education and Workforce Development

By enabling access to cutting edge technologies, developing shared programs, and partnering on advanced collaborations, Synopsys Academic & Research Alliances ([SARA](#)) is dedicated to supporting universities to build a diverse semiconductor workforce ready to invent the technology of the future. SARA's University Software Program offers academic institutions access to cutting-edge technology to advance their education and fundamental research with the intent to prepare highly skilled graduates. Synopsys also recognizes the driving force of researchers in the semiconductor industry and has formed research alliances with key universities, consortiums, and academic programs.

Please visit <https://www.synopsys.com/SARA> to learn more about Synopsys Academic & Research Alliances (SARA) and related program offerings that enable education, research, and more!

Building Blocks for Digital Transformation



Synopsys provides expertise, solutions, ingredients, and automation so government, aerospace, and defense customers can build the next generation of mission-critical and enterprise electronic systems for modern applications such as HPC, secure edge and quantum computing; RF, EW / ISR, 5G/6G; as well as autonomy and AI. We look forward to partnering with you on the next world-changing research program.

Please visit our web page and register to receive further information: [Synopsys Aerospace and Government](#), [Subscribe to the A&G Newsletter](#).

Footnote

[1] The Importance of Early Prototyping in Defense Research, Engineering, Acquisition, and Sustainment | DSIAC Prototyping the future | Article | The United States Army DoD Prototyping Guidebook, v2.0.pdf (dau.edu)