INNOVATIONS IN SECURITY, REPROGRAMMABILITY, AND MOBILITY

XILINX®

READY FOR THE NEXT MISSION

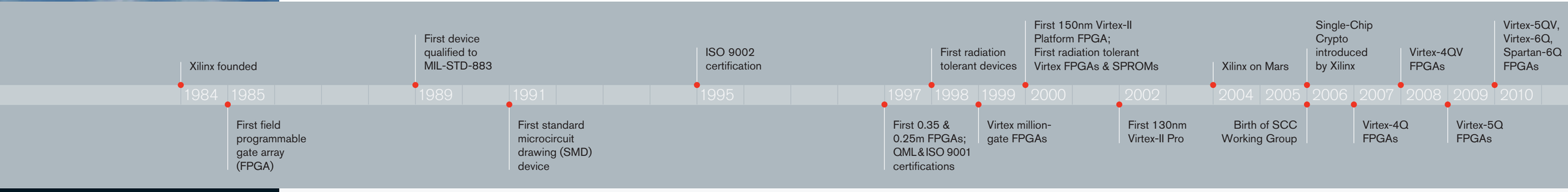
Addressing all of the operational requirements and environmental conditions for mission-critical aerospace and defense (A&D) electronic systems often appear impossible. Project teams feel compelled to sacrifice costs, schedules, portability, battery life, and more to meet certain goals. Modern design teams avoid these compromises by taking advantage of next-generation Xilinx solutions. For more than two decades, Xilinx A&D products and services have helped designers meet—and exceed—mission requirements.

Now more than ever, Xilinx solutions give contractors and agencies the choices they need to keep up with dynamic project specifications – on time and within budget. As the leading programmable logic supplier and a respected industry partner, Xilinx has evolved the broadest portfolio of commercial off-the-shelf (COTS) field programmable gate arrays (FPGAs) for A&D. The programmable solutions accommodate continually changing mission requirements without lengthy delays for refabrication of silicon. For applications that must operate in the harshest environments, Xilinx offers compatible defense-grade and space-grade solutions. Commercial, defense and space grade solutions come together within the Xilinx targeted design platform for A&D, which supports every phase of even the most long-term project lifecycles.

With advanced integration, Xilinx solutions make it possible to replace multiple ASICs or ASSPs with a single programmable device tailored to the application. The high performance, leading technology, and low-power attributes of Xilinx FPGAs significantly reduce total system size, weight, power and cost (SWaP-C), and therefore enable a new generation of highly efficient solutions.

A&D solutions from Xilinx also include industry-leading features and advancements tailored for defense-grade and space-grade products. For example, Xilinx was first to market with single-chip cryptography (SCC) and radiation-hard (rad-hard) solutions for reconfigurable FPGAs. Also anti-tamper solution development and related compliance efforts for military projects were first supported by Xilinx FPGAs.

Xilinx A&D solutions are backed by an extensive development ecosystem, and a commitment to long product life. The Xilinx support organization, with more than 20 years of A&D experience, has a proven track record for successfully partnering with key suppliers and government agencies. A complete range of services from design feasibility to full turnkey system design lets Xilinx A&D customers choose the best-suited implementation model for each project.



Xilinx Solution Benefits for the Aerospace & Defense Market

- Targeted design platforms
- Advanced security
- Lower SWaP-C for mobility
- Ruggedization
- Pin-compatible commercial, space, and defense-grade solutions

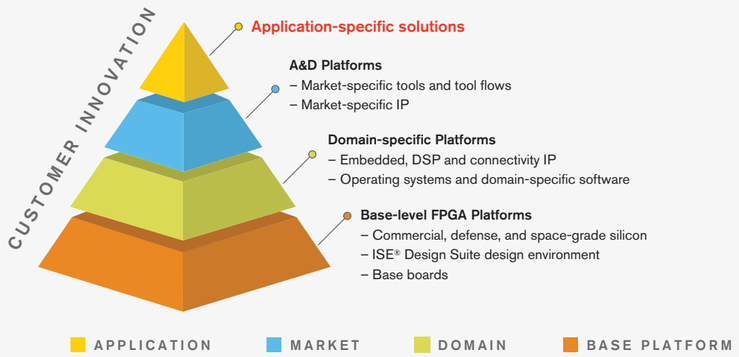
DISCOVER XILINX A&D PLATFORMS AND SOLUTIONS

THE PROGRAMMABLE ADVANTAGE

A&D contractors and government agencies, faced with severe global economic shifts, are under more pressure than ever to create increasingly complex electronics systems.

The Xilinx Targeted Design Platform for A&D accelerates system development, for shorter cycles and lower costs, and gives developers full access to the flexibility and power of programmable devices.

TARGETED DESIGN PLATFORMS



Defense Sub-segments:

- Electronic warfare (EW)
- Intelligence, surveillance, and reconnaissance (ISR)
- Missiles and munitions (M&M)
- Military communications (MILCOM)

DEFENSE: ACCELERATING SOLUTION DEVELOPMENT

In support of the broad range of defense applications, Xilinx off-the-shelf reprogrammable commercial and defense-grade devices are complimented with application-specific tools, IP, and boards that shorten cycles for productizing new capabilities or upgrading existing hardware.

Common development tools and methodologies save time for developers, and make Xilinx FPGAs more accessible for multiple or follow-on projects. The breadth of the Xilinx Spartan® and Virtex® defense-grade FPGA device families also allow perfect matching to applications with built-in functionality and features within the overall market.

THE XILINX DIFFERENCE IN DEFENSE

FPGAs in defense

Ability to match the right product family to the project:

- Low-power, secure devices tailored for MILCOM and other mobile applications
- High-performance, highly reliable reprogrammable devices with integrated secure features

Integrating more, while optimizing secure SWaP-C for:

- Smaller footprint
- Lower weight
- Longer battery life
- Lower cost

Meeting defense application requirements

- Highest performance and integration
- High logic density
- High connectivity and bandwidth for signal processing
- Industry-leading information assurance, with Single Chip Crypto Type-1
- Unique anti-tamper features (DoD 5200 Series)
- Pin-compatible migration path offerings from commercial-grade to defense-grade devices
- High reliability and long term support
- Fully tested for operation in extended temperatures
- Ruggedized packaging

SPACE: EXCELLING IN THE HARSHEST CONDITIONS

From satellites to deep-space exploration, space missions must succeed in the most severe environments.

Xilinx rad-hard reconfigurable FPGAs give designers robust, qualified devices that can meet the performance, reliability, and lifecycle demands of space. Supported by Xilinx targeted design platforms, these programmable solutions deliver the Xilinx trademark value: shorter design times, lower costs, and greater flexibility compared to traditional implementations.

THE XILINX DIFFERENCE IN SPACE

Reprogrammable FPGAs in space

- Significantly accelerated time to launch
- No mask re-spin risk
- Superior performance per watt
- High integration, resulting in fewer boards
- Low-cost prototyping with commercial-grade devices

Meeting space radiation requirements

- Rad-hard and rad-tolerant FPGAs
- Industry collaboration for single-event effects (SEE) testing
- Guaranteed total ionizing dose (TID) up to 700 krads (Si)
- Single event latchup (SEL) immunity
- Single-event upset (SEU) hard

Backed by industry-standard services

- Factory and field application support
- On-site Titanium-dedicated engineering services

Avionics Applications:

- Secure wireless communication
  - Telemetry, data link, identification, SATCOM
- ISR systems
  - Weather radar, EO/IR, SAR, GMTI, AESA
- Navigation systems
  - GNSS, INS, mission computers

AVIONICS: MEETING CERTIFICATION REQUIREMENTS

The contractors and government agencies in the field of military avionics face unique physical space restrictions and compliance requirements, in addition to the prevalent, industry-wide A&D challenges.

Cramped space and restricted cooling capabilities on military aircraft make it critical to minimize avionics footprint and power requirements. The latest government requirements, such as DO-254/ED-80, make it necessary to select solutions that simplify and accelerate solution certification efforts. And the exponential growth in demand for more data bandwidth in today's network-centric operations mean that integration, performance, security and flexibility are paramount. Xilinx FPGAs meet these current challenges.

THE XILINX DIFFERENCE IN AVIONICS

Support for industry and government compliance:

- Silicon and soft IP core enablement data package to support Federal Aviation Association (FAA) and European Aviation Safety Agency (EASA) DO-254/ED-80 mandate
- Functionally isolated fault-tolerant design flow for high assurance and high reusability
- Trusted leader in technology and SEU mitigation
- Active contributor to DO-254 Users Group

SECURITY: PROTECTING THE MISSION A SECURE FOUNDATION

Regardless of the specific type of project or application, virtually every A&D solution developer must address the increasingly complex security requirements put forth by key government entities. These include guidelines, directives and regulations for information assurance (IA) and anti-tamper (AT) programs. Xilinx FPGAs stand apart from the competition with industry-leading capabilities and built-in features for meeting today's defense-related high-level security requirements.

Secure Applications:

- Wireless communications
  - Secure UV data link and C2
  - Secure sensor network communication
  - Tactical radios
- Wired communications
  - In-line network encryptor (INE)
  - Management of data at rest
  - Hard-drive encryptor

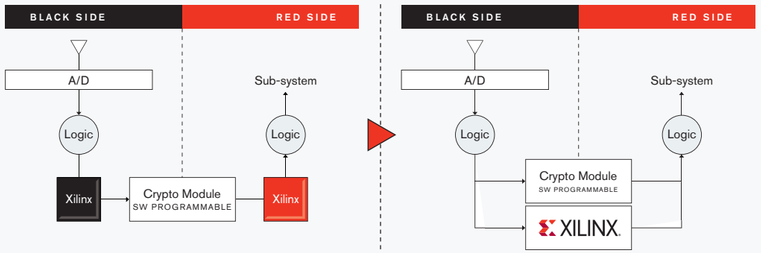
Information Assurance (IA)

Xilinx offers the industry's most integrated Type-1 capable single-chip cryptography (SCC) solution, for superior secure SWaP-C results. Now in its third generation, Xilinx SCC methodology helps designers build secure and reliable fail-safe designs from a proven supplier.

Anti-Tamper (AT) features

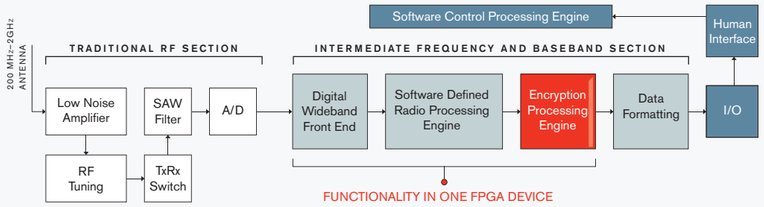
In support of U.S. DoD Instruction 5200.39 (Protecting Critical Program Information), Xilinx offers Security Monitor IP as well as key hardware features. These offerings help designers meet security and tamper-resistance requirements aimed at protecting U.S. critical technology from exploitation and loss. Xilinx AT features can reduce development cycle times and contribute to the progress of a program-specific AT plan.

Single-chip cryptography



Xilinx Single-chip Cryptography enables the highest level of information assurance with support for Type-1 systems, while optimizing SWaP-C.

Secure radio



Typical Software Defined Radio (SDR) block diagram.

PRODUCT OVERVIEW:
XILINX A&D FPGAs

As a leader in supporting COTS requirements, Xilinx enables the use of commercial grade devices to reduce costs, development time, and risks as mandated by governmental bodies.

Seamless migration from commercial-grade to defense and space-grade devices.

In addition to commercial grade offerings, Xilinx offers the industry's only defense and space-grade FPGA devices for extreme operating parameters.

VIRTEX

Virtex Family of FPGAs:
Highest Performance with Ultimate System Integration

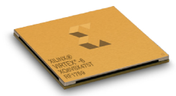
- MULTI-GIGABIT SERIAL TRANSCEIVERS
- HARD-CODED ETHERNET MAC AND PCIE® ENDPOINT BLOCKS
- HIGH PERFORMANCE DSP ACCELERATION ENGINES
- MEGABITS OF EMBEDDED RAM, CLOCK MANAGEMENT CIRCUITS WITH PLLS, AND MORE

SPARTAN

Spartan Family of FPGAs:
Low Power and Small Form Factors

- OPTIMIZED FOR LOW STATIC AND DYNAMIC POWER
- SOPHISTICATED POWER MANAGEMENT MODES FOR MOBILE AND BATTERY POWERED APPLICATIONS
- HIGH LEVELS OF COMPONENT INTEGRATION, INCLUDING EMBEDDED PCIE AND MEMORY INTERFACES
- LOWEST TOTAL COST
- MULTI-GIGABIT SERIAL TRANSCEIVERS

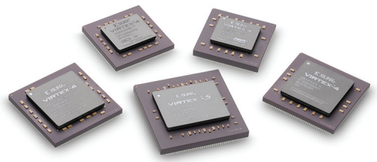
DEFENSE-GRADE



Defense-grade FPGAs

- ONE HUNDRED PERCENT PIN COMPATIBLE TO THEIR COMMERCIAL EQUIVALENT FOR SEAMLESS MIGRATION BETWEEN PROTOTYPING AND LOW RATE INITIAL PRODUCTION (LRIP)
- FULLY-TESTED EXTENDED OPERATING TEMPERATURE RANGES—INDUSTRIAL TEMP (-40 TO +100°C), Q-TEMP (-40 TO +125°C), AND MILITARY TEMP (-55 TO +125°C)
- RUGGEDIZED PLASTIC PACKAGING—WITH STANDARD LEAD CONTENT
- PRODUCT STABILITY GUARANTEED
- OFF-THE-SHELF—PREQUALIFIED AND READY TO ORDER

SPACE-GRADE



Space-grade FPGAs

- RADIATION HARD/TOLERANCE—RESISTANT TO SINGLE EVENT UPSET (SEU) AND LATCH-UP (SEL)
- GROUP TESTING—HIGH RELIABILITY
- CERAMIC PACKAGING—EXTREME ENVIRONMENTAL PROTECTION

KITS

Off-the-Shelf Prototyping

XILINX OFFERS AN EXTENSIVE PORTFOLIO OF DOMAIN-SPECIFIC KITS FEATURING THE NECESSARY BASE HARDWARE, EXPANSION CARDS, TOOLS, IP, REFERENCE DESIGNS, CABLES, POWER SUPPLY AND DOCUMENTATION TO ADDRESS UNIQUE SYSTEM AND TIMELINE REQUIREMENTS. FOR A FULL LIST OF AVAILABLE XILINX BOARDS AND KITS, OR FULL KIT FEATURES, PLEASE VISIT WWW.XILINX.COM.

Virtex-6 Kits	Description	Part Number	Logic	DSP	Embedded	Connectivity
Virtex-6 FPGA ML605 Evaluation Kit *(click on kit titles to view related web page)*	Evaluation and development kit for designs requiring high-performance, serial connectivity and advanced memory interfacing	▪ EK-V6-ML605-G ▪ EK-V6-ML605-G-J (Japan)	●			●
Virtex-6 FPGA Embedded Kit	Development kit for designs requiring high-performance, embedded parallel processing	▪ DK-V6-EMBD-G-XP1 ▪ DK-V6-EMBD-G-J-XP1 (Japan)			●	
Virtex-6 FPGA Connectivity Kit	Debug and development kit for designs requiring high-performance, high-bandwidth serial connectivity	▪ DK-V6-CONN-G ▪ DK-V6-CONN-G-J (Japan)				●
Virtex-6 FPGA DSP Kit	Development kit for designs requiring high-performance digital signal processing	▪ AES-V6DSP-LX240T-G (Available through Avnet)				●
Virtex-6 FPGA x8 PCI Express® Gen 2 Kit	Prototyping and development kit for PCI Express Gen1 and Gen2 designs supported by FMC expansion modules for high-speed connectivity applications	▪ HTG-V6-PCIE-L240T-2 (Available through HiTech Global)				●
Virtex-6 FPGA ML623 Characterization Kit	Basic characterization and evaluation kit for Virtex-6 LXT FPGA GTX transceivers	▪ CK-V6-ML623-G ▪ CK-V6-ML623-G-J (Japan)				●
Virtex-5 FX70T FPGA Embedded Development Kit – PowerPC® and MicroBlaze™ Processor Edition	Development kit for designs requiring high-performance, embedded processing	▪ DK-V5-EMBD-ML507-G			●	

Spartan-6 Kits	Description	Part Number	Logic	DSP	Embedded	Connectivity
Spartan-6 FPGA SP605 Evaluation Kit	Evaluation and development kit for designs requiring low-cost, serial connectivity and advanced memory interfacing	▪ EK-S6-SP605-G ▪ EK-S6-SP605-G-J (Japan)	●			●
Spartan-6 FPGA Embedded Kit	Development kit for designs requiring low-cost, embedded parallel processing	▪ DK-S6-EMBD-G-XP1 ▪ DK-S6-EMBD-G-J-XP1 (Japan)			●	
Spartan-6 FPGA Connectivity Kit	Debug and development kit for designs requiring low-cost standards-based protocol bridging	▪ DK-S6-CONN-G-XP1 ▪ DK-S6-CONN-G-J-XP1 (Japan)				●
Spartan-6 LX150T Development Kit	Basic development kit for low-cost serial connectivity	▪ AES-S6DEV-LX150T-G (Available through Avnet)				●
Spartan-6 FPGA DSP Kit	Development kit for designs requiring low-cost digital signal processing	▪ AES-S6DSP-LX150T-G (Available through Avnet)		●		
Spartan-6 FPGA SP623 Characterization Kit	Basic characterization and evaluation kit for Spartan-6 LXT FPGA GTX transceivers	▪ CK-S6-SP623-G ▪ CK-S6-SP623-G-J (Japan)				●

DESIGN AND DEVELOPMENT TOOLS FOR A&D

Complex A&D systems designs require sophisticated tools to streamline the product development process. Xilinx offers a variety of development tools with superior design and debug capabilities to provide the fastest means of designing, verifying, and deploying programmable solutions for defense and space applications.

ISE Foundation Software	▪ ISE® software provides a complete RTL design environment for Xilinx FPGAs ▪ Easy-to-use, built-in tools and wizards make I/O assignment, power analysis, timing-driven design closure and HDL simulation quick and intuitive
System Generator for DSP	▪ Integrated flow from design capture to FPGA hardware implementation ▪ Facilitates use of the Simulink® modeling and simulation environment ▪ DSP developers can easily exploit the performance and flexibility of FPGA-based signal processing without learning RTL
Embedded Design Tools	▪ Intelligent, platform-aware tools simplify design and accelerate the embedded development process ▪ Automated wizards walk engineers through the design process to reduce errors and ease learning curves ▪ Xilinx Embedded Development Kit (EDK) includes: award-winning Platform Studio tool suite as well as all the documentation and IP required to design embedded systems with Xilinx FPGAs and embedded PowerPC and MicroBlaze processor cores
CORE Generator IP Library	▪ Xilinx CORE Generator™ system provides a library of user-customizable functions for RTL design flows ▪ Range in complexity from basic building blocks such as memories and FIFOs to complex system-level building blocks ▪ Streamlines the design process, improves design quality, and helps designers to finish faster
Xilinx DSP IP Library	▪ Blockset IP library delivered with System Generator for DSP suite ▪ Produce optimized logic for Xilinx programmable devices ▪ Over 90 DSP building blocks available for the Simulink modeling environment
Xilinx IP Library for Embedded Design	▪ Pre-verified processor system IP catalog includes a wide variety of processing peripheral cores for customizing embedded systems ▪ Source drivers are included for all IP components
Xilinx TMRTool	▪ Industry's first development tool to automatically generate Triple Module Redundancy (TMR) for re-programmable FPGAs ▪ Xilinx Triple Module Redundancy (XTMR) simplifies the process of providing full SEU and SET immunity for high reliability FPGA designs

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