Explore, Acquire, Analyze, Decide. Deliver Sooner, Better.
System Expertise

Military Communications
ISR, Radar, EW
Avionics, Missile Defense
Intelligence / Cyber Security
Space

Productivity & Technology

Unparalleled Productivity
OpenCL™
Full-Throttle Performance
Best-in-Class IP

Design Flow

FPGA Designers
GPU Programmers
Embedded Developers

Altera
Military / Aerospace / Government
Solutions Portfolio
Explore **more ideas** quickly.

Acquire new concepts **easily**.

Deliver designs **sooner, better**. **You win**.

- First Floating-Point FPGA
- 10+ TFLOPS at 100 GFLOPS/Watt
- 500 GFLOPS FFT 50 Gsps FFT Generation
- Cholesky and QRD Up to 1,000,000 Matrices/Sec
- Industry’s Longest Product Life Cycle
- OpenCL Conformant
- Only On-Shore, High-End FPGA Fabric
Unparalleled Productivity
• Hardware in the Loop integrated reference designs
• DSP Builder Advanced Blockset is high-level, schematic-entry design:
  – Constraint-driven design (select f_{MAX}, latency, number of channels, device family, etc.)
  – Single datapath logic system clock
  – Automatic pipelining, register balancing
  – Fast, automatic timing closure

Best-in-Class IP
• Finite impulse response (FIR) filters
  – Support multichannel, time-division multiplexed (TDM), and sample rate >> clock rate
• Fast Fourier transforms (FFTs) fixed and floating point
• Cascaded Integrator Comb (CIC) filters and waveform generating or mixing blocks
• Largest, fastest portfolio of floating-point functions

Full-Throttle Performance
• Industry’s first floating-point FPGA
• 10 TFLOPS at 100 GFLOPS/Watt
• Up to 26 TMACs and 1 GHz fabric
• Common environment for system architect and design engineers

Productivity & Technology

Avionics, Missile Defense
• Support for DO-254 and DO-178C
• Package and radiation reliability report
• Guidance and control IP with reference designs

Intelligence / Cyber Security
• OpenCL accelerator FPGA cards
• High-performance IP for Cyber
• Enable software developers to program FPGAs
• Open Source Security and extensive ecosystem
• Expedite time to mission

Space
• Latch-up immunity
• Radiation test report and analysis
• LEO application-capable
• Custom screening and bare die

Design Flow

FPGA Designers
GPU Programmers
Embedded Developers

HDL automatically optimized
Design-visible COTS boards
Conformant to Open Systems
C-Tools direct to ARM
Real-time verification with System-in-the-Loop
Solutions & Benefits

**Integration**

**Digital Beamforming with System-in-the-Loop**

- **FPGA**
  - Target Emulation
  - Rx Noise Emulation
  - TxAx Time Delay Beamforming
  - Waveform Generator
  - Pulse Compression

- Matlab API

- Beamformed and Pulse Compression Output — Top View
- Beamformed and Pulse Compressed Output — 3D

**Altera Product Leadership**

- **Process Node**
  - 12x18 Mults
  - SP FP Mults
  - SP TFLOPs

  **Military Security**
  - NIST AES-256 bitstream encryption
  - NIST HMAC SHA-256 bitstream authentication
  - Hard configuration error detection and correction
  - On-chip voltage and temperature sensors
  - 64 bit unique device ID
  - Type-I and CSfC compliant solutions
  - Security Supervisor IP (SSIP)
  - Robust cryptographic partner IP

  **Commitment to Defense Industry**
  - Domestic fabrication — 14 nm Intel partnership
  - Dedicated engineering support
  - Pin-compatible migration (device migration)

**Reliability and Longevity**

- Industry’s longest product life cycle
- Test above industry standard for package quality
- Leaded packages
- Broad selection of military temperature devices
- Latch-up immune

**Ultra-Wideband Channelizer**

- **Input Signal**
- **Input Signal 2**
- **Target Input Signal**

- **Delay Techniques**
  - Perfect Reconstruction

**Pulse Doppler Processing**

- Data Snapshot Angle Doppler Response

**Space Time Adaptive Processing (STAP)**

- SMI Weights Angle Doppler Response

**Baseboard Digital Processing**

- **ALTERA FPGA**
  - Logic Elements
  - Ethernet (GigE, 10GE)
  - ARM Processor
  - User Memory
  - DDR2/3 Memory
  - HyperLink

- **RF Front End**
  - ADC
  - DAC

- **Data Converters**
  - ADC
  - DAC

- **Network Interface**
  - Packet-switch Interconnect (chip, board, backplane)
  - Point-to-Point Link Layer (chip, board, backplane)
  - General Purpose Processor
Test Drive Altera Today!

Military Solutions:
www.altera.com/end-markets/military-aerospace/mil-index.html

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