AMD
EMBEDDED
SOLUTIONS

Aerospace and Defense Markets:

- Avionics Cockpit Displays
- Communications, Command and Control
- Unmanned Vehicles
- Vehicle Navigation and GPS
- Security and Surveillance

Mission Success from AMD and Third Party Partners:

- Chip and MCM/MXM/PCIe® Packaging
- Software Development Tools and Drivers
- OS/RTOS support from leading suppliers
- Firmware and Drivers
- Evaluation Boards and Systems

AMD Aerospace and Defense Solutions:

AMD Embedded SOCs

AMD Embedded G-Series
optimized for low power

AMD Embedded R-Series
optimized for low power

AMD Ryzen™ Embedded V-Series
optimized for ultra-high performance, with support for up to four independent 4K displays

AMD Discrete Graphics

AMD Embedded Radeon™
AMD Radeon™ Pro
for enhanced graphics and compute

Case Studies:

REAL-TIME IMAGE PROCESSING

Application Brief: AMD Aerospace & Defense

High-performance, Power-efficient Graphics and Compute Processing Solutions for Mission-critical Aerospace and Defense Systems

Visual display and communications systems deployed for aerospace and defense applications are designed to meet arguably the most exacting performance requirements in the embedded electronics industry. From the cockpit to the command center, users depend on these systems to improve their situational awareness, enhance their decision making and accelerate responsiveness – mission success can hang in the balance.

Continued innovations in 3D imaging, synthetic vision, and video overlay capabilities demand a processing platform that can deliver photo-realistic visual clarity and 4K resolution, complemented with the high-speed parallel processing and multithreading required for compute for compute-intensive tasks like radar and sensor data processing, object recognition and 3D mapping. Size, weight and power (SWaP) remain acute concerns for the aerospace and defense system designer, who must also be vigilant against vulnerabilities that can compromise system security and integrity.

The AMD Advantage

AMD Embedded SOCs enable system designers to meet aggressive design targets for graphics and compute performance, with available 4K graphics support for up to four independent displays, and versatile parallel processing and multithreading capabilities that accelerate intelligence gathering and analysis, and optimize mission value. Leveraging AMD Embedded G-Series and R-Series SOCs, Ryzen™ Embedded V-Series SOCs and/or AMD Embedded Radeon™ discrete GPUs, system designers benefit from a wide range of performance-per-watt profiles and advanced features. As required by our customers, some AMD Embedded discrete GPUs and processors have also been certified by FAA, EASA and Transport Canada and are flying in many civil aviation primary flight display systems. With the help of our strategic partnerships, select AMD Embedded GPUs have been certified up to Design Assurance Level A for mission critical systems.

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Key AMD Benefits:

Safety Certifiable Graphics
UI for DO-178B/C and DO-254 up to level A with OpenGL® for the Embedded Radeon™ E8860 GPU is offered through our partners. Additional AMD product certification and support is in progress.

Breakthrough Performance
Processing performance up to 5.5 TFLOPS with AMD Embedded discrete graphic processors support the most demanding graphics and compute workloads – including advanced 3D visualization – with a wide range of performance-per-watt options to choose from. For designers seeking the combined benefits of a CPU and GPU on a single die, AMD Ryzen™ Embedded V1000 SOCs deliver discrete-caliber graphics processing and sustained compute performance up to 3.6 TFLOPS FP16 with versatile multithreading capabilities leveraging AMD's pioneering "Zen" CPU architecture.

4K Graphics Quality
Full 4K support enables consummate graphics and video quality, with hardware acceleration for 4K video leveraging supported next-generation video codecs like HEVC/H.265, and VP9[1], and multiple 4K display capabilities.

GPU Compute Versatility & Parallel Processing
The Radeon™ Open eCosystem (ROCm) compute platform, based on the GPUOpen initiative, equips designers to achieve breakthrough innovations in GPU-driven imaging and parallel processing capabilities leveraging open development tools and software. By balancing CPU and GPU workloads for optimal processing performance, system designers can achieve advanced machine intelligence capabilities for a wide range of applications, including improved airborne artifact identification, predictive maintenance for ground control electronics, and more. This feature is currently supported on select AMD Embedded solutions, with additional support in progress.

Power Efficiency
AMD Embedded processors and discrete graphics support a wide range of thermal design profiles (TDPs) – with embedded processors that scale to as low as 5W, helping designers optimize performance-per-watt, and minimizing thermal constraints.

Multi-display Flexibility
AMD Embedded solutions enable designers to achieve a wide range of display configurations for cockpits and command centers, allowing the display of independent content on multiple individual screens or the spanning of content across multiple screens in a number of different configurations. A single AMD Ryzen™ Embedded V-Series SOC can power up to four independent displays in brilliant 4K resolution.

Compact Form Factors
Available in chip and module packaging options, AMD embedded and discrete processors optimize space utilization inside and outside the system, accommodating designers' space constraints and myriad deployment possibilities – particularly in densely-clustered cockpit displays, and system configurations requiring redundant componentry.

Advanced Security
Each AMD Embedded processor features an on-board AMD Secure Processors designed to help create a robust security architecture, with secure Hardware Validated Boot to help ensure systems are booted from trusted software, and sophisticated anti-tampering capabilities to detect intrusions and/or code anomalies. Advanced capabilities available with the AMD Ryzen™ Embedded V1000 include Secure Memory Encryption (SME) for defending against unauthorized memory access, and Secure Encrypted Virtualization (SEV) for securely isolating hypervisors and virtual machines (VMs).

Error Correction Capabilities
Available error-correction code (ECC) support helps ensure memory integrity and resiliency in environments affected by alpha particle emissions and electromagnetic interference (EMI).

Supply Longevity
AMD's planned processor longevity extends to up to 10 years, providing customers with a long-lifecycle support roadmap.

Expansive I/O Options
AMD Embedded SOCs provide robust, highly integrated support for new and established interconnects, enabling myriad connectivity and configurability options. AMD Ryzen™ Embedded V1000 SOCs provide up to 16 PCIe® lanes, dual GbE, up to four USB 3.1/USB-C interconnects, with additional eMMC 5.0, SATA and NVMe support.

For more information about the specific features and specifications supported by select products in AMD's solution portfolio, or to learn more about AMD's aerospace & defense solutions, visit **www.amd.com**

AMD.com/embedded

1. HEVC (H.265), H.264, and VP9 acceleration are subject to and not operable without inclusion/installation of compatible HEVC players. GD-81

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