



PikeOS for MPU 1.1

Real-Time Partitioning OS for MPU Processor Architectures

PikeOS for MPU is a real-time operating system with a separation kernel designed for Safety and Security-critical applications. Unlike PikeOS, it runs on simpler MPU-based architectures without requiring an MMU. This expands its use to Aeronautics, Space, Automotive, and Medical industries.



At a Glance

Key Features

- **Safety-Critical Partitioning:** PikeOS for MPU utilizes strict time and space partitioning, preventing application failures from affecting other system components. It is compliant with Safety standards like IEC 61508 and ISO 26262, facilitating certification processes.
- Scalability and Flexibility: Designed for MPU-based System-on-Chips (SoCs) and heterogeneous SoCs with both MMU and MPU clusters, PikeOS for MPU provides a unified development environment. This allows for seamless management of complex systems within a single workspace, streamlining development and reducing costs.
- Development: Leveraging SYSGO's Eclipse-based Integrated Development Environment, CODEO, developers can manage both PikeOS and PikeOS for MPU projects simultaneously. This integration simplifies the development process for complex SoCs with heterogeneous processor cores.

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PikeOS Compatibility

+80% code reuse, enabling easy access to PikeOS docs and certification artifacts

Safe & Secure Real-Time Performance

In the rapidly evolving landscape of embedded systems, the demand for robust Safety and Security in microcontroller-based applications is paramount. SYSGO's PikeOS for MPU addresses this need by offering a separation-kernel-based realtime operating system (RTOS) for microcontrollers lacking a Memory Management Unit (MMU). This solution extends the proven capabilities of PikeOS to environments where only a Memory Protection Unit (MPU) is available, ensuring that even resourceconstrained systems can achieve highest levels of Safety and Security.

Customer Benefits

- **Safety & Security:** Strict partitioning prevents failures from spreading
- Real-Time Performance: Ensures deterministic behavior for critical tasks
 Health Monitoring: Detects and handles errors for reliable operation
- **Scalability:** Supports various architectures, from microcontrollers to SoCs





Trusted Platform & Services

More Product Features

- AMP multi-core processor support
- Hardware abstraction
- · First level exception and interrupt processing
- Thread management & scheduling
- Health monitoring
- Inter-partition comm. and synchronization
- ICCOM (Inter-Core Communication)
- I/O device abstraction and access control
- Large software and hardware ecosystem

MPU-Specific Multi-Core Features

- **Partitioned Execution:** Prevents interference between safety-critical tasks
- Efficient Context Switching: Fast execution of real-time processes
- Inter-Core Communication: Message-based data exchange for multi-core setups
- **Optimized Memory Usage:** Supports finegrained resource allocation
- Hardware Abstraction: Simplifies deployment across various MPU platforms

Advanced Scheduling Support

Features a hard real-time scheduler with ARINC 653 compliance. Supports switching between multiple pre-configured scheduling schemes for optimized CPU usage.

Security

- Hardware Security Module (HSM) management
- · Building a secure boot process
- PikeOS for MPU is ready for Space Security:

→ www.sysgo.com/mpu-esa



CODEO IDE for SYSGO Products → www.sysgo.com/codeo

Built-in Health Monitoring

Implements ARINC 653 health monitoring, detecting and handling both application errors and hardware failures to ensure predictable system behavior.

Industries & Applications

PikeOS for MPU is designed for embedded systems requiring high Safety and Security:

- Aerospace: Real-time operations in Avionics and satellite systems
- **Automotive:** Safety-critical ECUs, ADAS, and real-time vehicle control
- Industrial Automation: Secure control systems for smart manufacturing
- **Medical Devices:** Reliable execution for lifecritical healthcare applications

Support & Services

SYSGO is committed to ensuring the success of your projects by offering a range of support services:

- Training & Consulting: Expert guidance to harness the full potential of our products
- **Certification Assistance:** Access to certification kits and documentation to streamline compliance with industry standards
- Long-Term Support: Dedicated assistance throughout the entire product life cycle, ensuring sustained performance and reliability

Integrated RTOS & Hypervisor Ecosystem for MPU and MMU-based Processors → www.sysgo.com/mpu-mmu

Founded in 1991, SYSGO became a trusted advisor for Embedded Operating Systems and is the European leader in hypervisor-based OS technology offering worldwide product life cycle support. We are well positioned to meet customer needs in all industries and offer tailor-made solutions with highest expectations in Safety & Security. More information at \rightarrow www.sysgo.com/pikeos-mpu

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