

Connected • Protected • Certifiable



PikeOS

For a Safe & Secure Operation



Safety & Security first



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EMBEDDING INNOVATIONS

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Challenges & Pain Points

There are several challenges and pain points associated with real-time applications and real-time operating systems:

▶ **Safety and Security**

In Defense and Military applications, Safety and Security are critical concerns. Real-time applications and operating systems must be designed and implemented with robust Security measures to ensure that they cannot be compromised by unauthorized parties.

▶ **System Complexity**

Military systems are often complex, and real-time applications and operating systems can add additional complexity. Designing and implementing these systems requires a high level of expertise and can be time-consuming.

▶ **Integration**

Real-time applications and operating systems must be integrated with existing systems, which can be a complex and challenging process.

▶ **Cost**

Real-time applications and operating systems can be expensive to develop and implement, which can be a pain point for customers.

▶ **Maintenance and Support**

Real-time applications and operating systems require ongoing maintenance and support, which can be a challenge for customers, particularly in the military where systems are deployed in remote and challenging environments.

Challenges & Solutions



Best Practice Use Cases

Modern Frigate High-Performance Embedded Computing (HPEC)

Challenge

- Manage parallel computations for radar, sonar, optronics, and electronic warfare applications
- Address stringent Safety and Security requirements for modern frigates
- Deliver pre-certified turn-key platforms with rich software stacks for quick application development
- Ensure long-term support at the computer level for critical ship equipment

Solution

- Our PikeOS RTOS and certified to the highest Safety and Security levels in a single product
- Enables the integration of multiple applications on a shared hardware platform with high reliability
- Accelerates application development and reduces risk with pre-certified, turn-key solutions
- Provides a robust foundation for Safety-critical and Security-focused operations

IN A NUTSHELL

- **Safety and Security certification**
- **Pre-certified turn-key platform**
- **Massively parallel computation for HPEC**
- **Long-term support**



Advanced Naval Electronic Cabinets

Challenge

- Integrate advanced vision and targeting systems, autonomous platforms, AI, and electronic warfare systems
- Manage high-speed, high-availability Defense applications on efficient computing hardware
- Address challenges of significant heat generation due to higher hardware density

Solution

- PikeOS hypervisor optimally manages power, CPU, and memory for multi-core CPUs
- Allows efficient time-slot allocation for diverse applications running simultaneously
- Enhances thermal efficiency while supporting complex, high-performance systems
- Provides a secure and reliable platform for cutting-edge naval technologies

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- **Efficient power and CPU management**
- **Hypervisor-based scheduling**
- **Multi-core CPU resource optimization**
- **For high-density systems**



Engine Control Systems for Modern Vehicles

Challenge

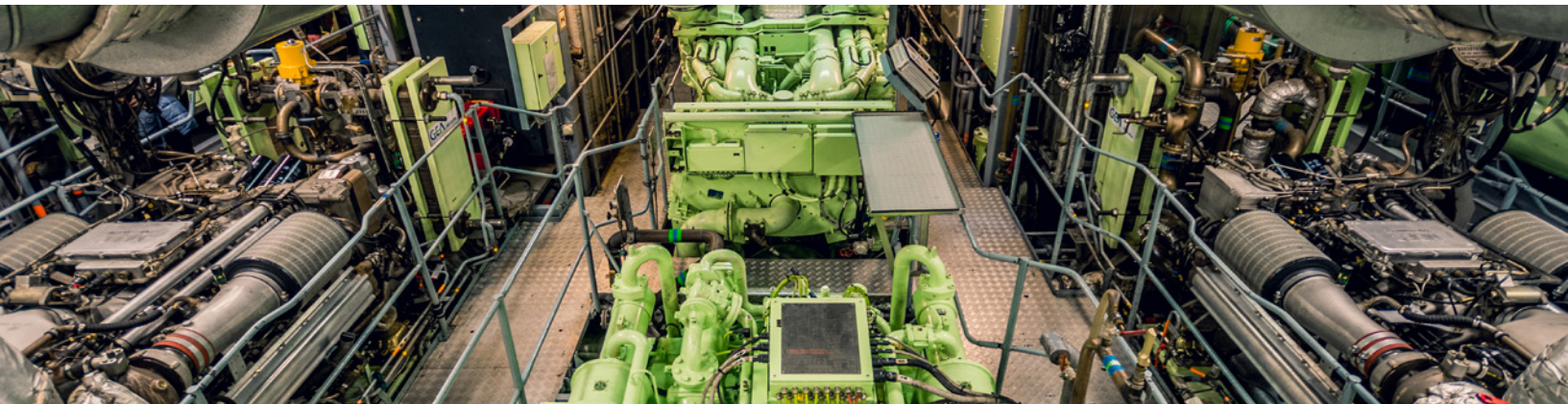
- Achieve real-time monitoring and control of engine performance for efficiency and reliability
- Ensure compliance with functional Safety standards (e.g., ISO 26262, DO-178C)
- Enable integration with other vehicle systems for predictive maintenance and remote diagnostics

Solution

- PikeOS provides deterministic real-time control for critical engine functions, optimizing fuel efficiency and performance
- Partitioned architecture ensures safe operation and isolates faults, meeting ISO 26262 or DO-178C requirements
- Supports connectivity for telematics and diagnostic systems, enabling remote updates and predictive maintenance

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- Real-time deterministic control
- Fault isolation via partitioning
- Functional Safety certification
- Telematics / remote diagnostics integration



Real-Time Gateways for Marine Defense Communication

Challenge

- Provide secure, high-performing real-time gateways for command and control
- Protect against cyber warfare threats and false information attacks
- Support new wide-area networks, high-bandwidth communications, and future Security trends

Solution

- PikeOS is security-certified at Common Criteria EAL5+ and supports a certified POSIX stack
- Handles high-performance Ethernet drivers (40Gbit+), ensuring reliable communication
- Enables integration of secure and efficient real-time communication systems

IN A NUTSHELL

- Security certification at EAL5+
- Certified POSIX stack
- Support for high-bandwidth Ethernet
- Reliable real-time communication



High-Performing Communication Systems in Marine Defense

Challenge

- Build real-time gateways for command and control while securing against cyber threats and false information
- Support high-bandwidth off-board communications and crew welfare networks
- Ensure compatibility with emerging wide-area networks and high-speed Ethernet technologies

Solution

- PikeOS is security-certified at Common Criteria EAL 5+, providing robust protection against cyber threats
- Includes a certified POSIX stack as a guest OS, enabling secure communication
- Handles 40Gbit+ Ethernet drivers on performant multi-core hardware for high-speed data transfer
- Future-proofs systems by supporting emerging communication trends
- PikeOS for MPU for mobile communication stations

IN A NUTSHELL

- **Security certification at EAL5+**
- **Certified POSIX stack**
- **Support for high-bandwidth Ethernet**
- **Reliable real-time communication**



Navigation Systems for Maritime and Aerospace Applications

Challenge

- Ensure real-time processing of complex navigational data from multiple sources (GPS, inertial navigation, star trackers, etc.)
- Provide high-accuracy navigation in GPS-denied or jamming-prone environments
- Maintain system Safety and Security while adhering to stringent certification standards

Solution

- PikeOS enables real-time data fusion from diverse sensors, ensuring accurate and reliable navigation even in GPS-denied scenarios
- Supports partitioning of critical navigation software to meet Safety and Security (Common Criteria EAL 5+) certification requirements
- Provides scalability for integrating advanced algorithms, such as AI-based navigation and predictive trajectory analysis

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- Real-time sensor data fusion
- High-accuracy GPS navigation
- Safety and Security certification
- Scalable for advanced algorithms



Radar Systems for Defense and Surveillance

Challenge

- Process high-volume radar data in real-time for target tracking and situational awareness
- Ensure secure communication and data processing to prevent cyber threats
- Meet stringent certification requirements for Defense applications

Solution

- PikeOS delivers high-performance real-time data processing, enabling accurate target detection and tracking
- Supports certified POSIX stacks and secure partitioning for enhanced data protection
- Complies with Security standard Common Criteria EAL 5+ for reliable operation in mission-critical scenarios

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- High-performance radar data processing
- Security certification (CC EAL5+)
- Real-time target tracking
- Secure communication and partitioning



Unmanned Underwater Vehicles (UUVs)

Challenge

- Enable underwater surveillance, mine detection, and multiple communication systems between land, air, and sea
- Support autonomous operations for reconnaissance, electronic warfare, and jamming/decoy activities
- Incorporate AI for self-learning, agile handling, and swarm-based operations
- Protect critical infrastructure such as underwater internet cables or enforce sea area lockouts

Solution

- PikeOS, proven in unmanned flight drones, offers a reliable choice for UUVs in civil and Defense applications
- Supports AI integration for adaptive and autonomous underwater operations
- Provides a secure and scalable platform for communication and Defense tasks
- Facilitates robust coordination in multi-domain environments, enhancing operational efficiency
- Multiple communication methods that need securing (Common Criteria EAL 5+)

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- **Proven use in unmanned systems (drones)**
- **Real-time multi-platform communication**
- **AI-enhanced agile handling**



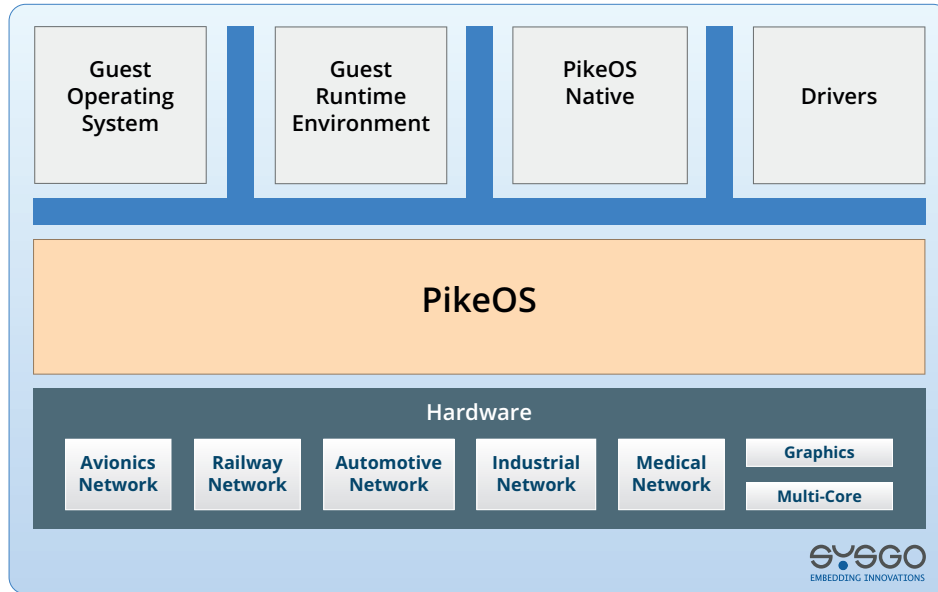
Certifiable Real-Time Performance



PikeOS

RTOS & Hypervisor

PikeOS – Certifiable RTOS & Hypervisor



CUSTOMER BENEFITS

▶ Application Separation

PikeOS offers strict partitioning and strong separation to provide built-in Security by design.

▶ Hardware Consolidation

Extreme flexibility provides independence from suppliers in the choice of hardware architectures.

▶ Use of COTS

The benefit of using Commercial-Off-The-Shelf (COTS) components is to lower overall costs for applications.

▶ Certification Kits

SYSGO offers the right certification kit in order to help facing the certification authorities.

▶ Common Criteria

PikeOS 5.1.3 is certified according to CC EAL5+ to fast-forward the approval processes.

▶ ITAR free

As an European company, our products have no export restrictions and are therefore ITAR free.

PikeOS – Certifiable RTOS & Hypervisor

PikeOS is a real-time operating system that offers a separation kernel-based hypervisor with multiple partitions for many other operating systems and applications. It enables you to build devices for environments with strong demands for Safety and Security.

- Separation kernel-based hypervisor
- Multiple and strictly separated partitions
- Guest operating systems and applications
- Compliant to the highest Safety & Security standards
- Aerospace & Defense, Railway, Automotive, Industrial Automation and Medical



PikeOS offers a separation kernel-based hypervisor with multiple partitions for many other operating systems and applications. It enables you to build devices for environments with strong demands for Safety and Security.

PikeOS is available for x86, ARM v7 v8, SPARC/LEON v8, PowerPC and RISC-V.



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