LYNX MOSA.ic.AI®

A Unified Execution Platform for Deterministic, Certifiable AI in Mission-Critical Systems

LYNX MOSA.ic.AI is a unified CPU and GPU software platform that provides a deterministic, certifiable execution environment for deploying AI and advanced workloads in mission-critical edge systems.

As AI adoption accelerates across aerospace, defense, autonomy, and industrial systems, organizations face growing integration complexity, certification burden, and non-deterministic behavior. MOSA.ic.AI addresses this challenge by transforming AI from an experimental capability into a deployable, operational system function.

From AI Innovation to Operational Deployment

Modern AI development ecosystems are optimized for rapid prototyping, model training, and high-performance execution. They are not designed to meet the requirements of safety-critical systems. Rather than replacing existing AI ecosystems, MOSA.ic.AI provides the execution discipline needed to operationalize them and turn AI from a prototype capability into a deployable, certifiable system function.

- **From Training to Deployment:** Enables AI models trained in frameworks such as PyTorch and TensorFlow to execute deterministically in real-world systems.
- **Execution, Not Experimentation:** Focuses on runtime inferencing, where timing, scheduling and system behavior must be guaranteed.
- **Deterministic AI Behavior:** Ensures bounded execution time, fixed memory allocation, and predictable system response.

One Execution Platform

- **Unified Architecture:** Combines CPU mission computing and GPU acceleration into a single, cohesive platform.
- **Governed Execution Model:** Applies consistent isolation, scheduling and lifecycle control across compute domains.
- **Heterogeneous Compute Support:** Operates across ARM and x86 architectures.

Two Configurations

- **MOSA.ic.AI Graphics Edition:** A unified, deterministic platform for mixed-criticality systems, enabling secure CPU/GPU coordination, visualization, and real-time processing within a certifiable architecture.
- **MOSA.ic.AI Compute Edition:** An advanced configuration that incorporates ComputeCore, enabling deterministic GPU-accelerated AI workloads aligned with mainstream neural network frameworks. This configuration enhances AI performance, supports hardware-accelerated inference, and provides a path toward certification for AI-enabled systems. See figure 1 below.

LYNX MOSA.ic.AI: Mission-Critical AI Solution Platform

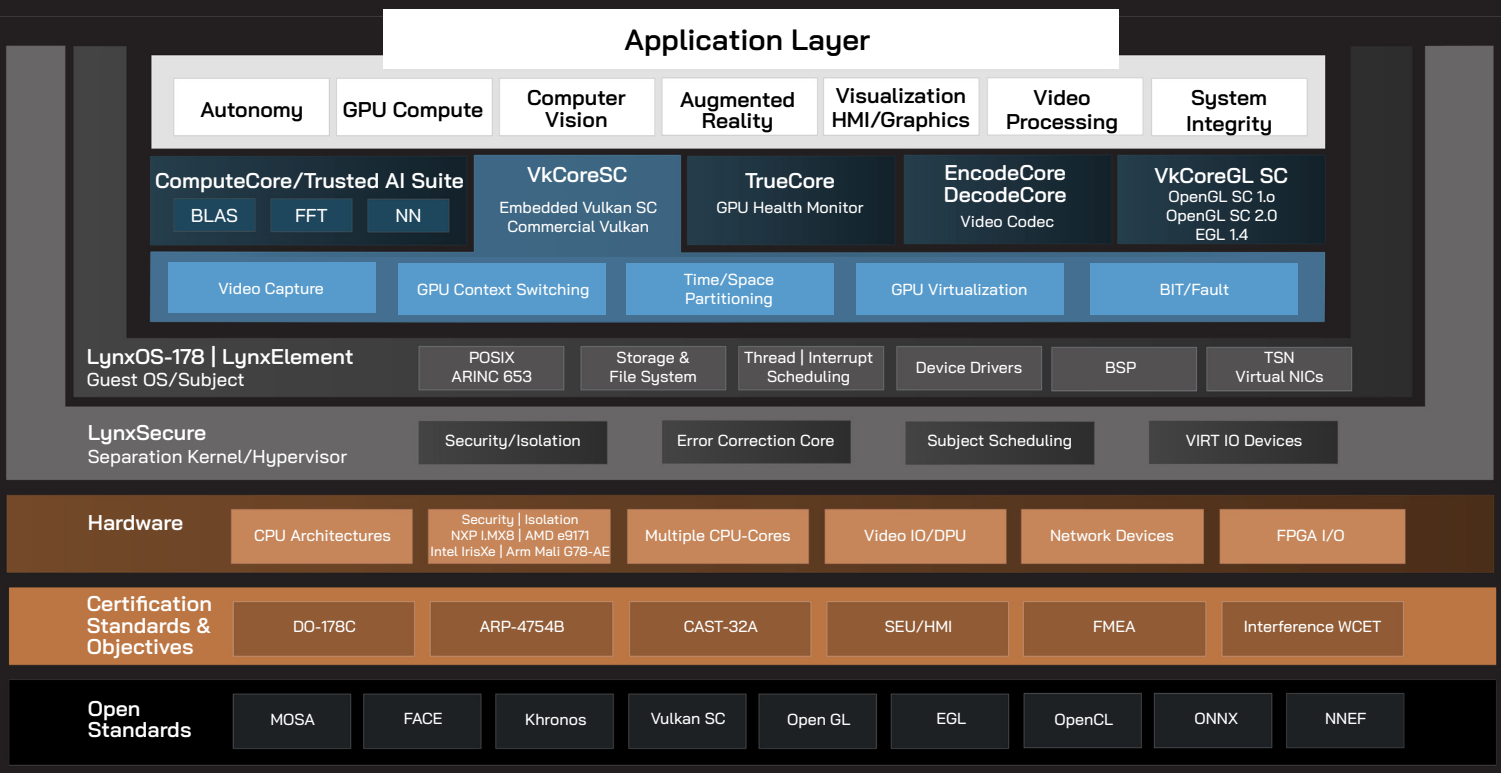

Figure 1: LYNX MOSA.ic.AI Compute Edition

Reduced Integration Complexity

- **Eliminates CPU/GPU Silos:** One platform, not multiple integrated solutions.
- **Simplifies System Architecture:** Consistent execution and safety model across all workloads.
- **Supports Lifecycle Evolution:** Update components without redesigning the system.
- **Future-Proof Design:** Leverage open standards, mitigate obsolescence, avoid costly rework and recertification cycles.

Deterministic Execution for AI and Real-Time Systems

- **AI Inference as a Deterministic System Function:** Controls scheduling, memory access, I/O timing, and partitioning to ensure predictable behavior.
- **Static Execution Model:** Removes runtime unpredictability through fixed configuration.
- **Bounded Performance Guarantees:** Ensures deterministic system behavior and worst-case executing timing.
- **Mixed-Criticality Support:** AI and safety-critical workloads coexist with controlled and bounded interference.

Assured Isolation and System Integrity

- **Separation Kernel Foundation:** Built on LynxSecure®, with hardware-enforced isolation.
- **Non-Bypassable Isolation:** Prevents cross-domain interference and protects system integrity.
- **Controlled Communication:** Secure data exchange between domains.
- **Concurrent OS Support:** LynxElement, LynxOS-178, third-party RTOS, Linux, Windows, and bare-metal applications.

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Primary Use Cases

- **Fault-Tolerant, Cyber-Resilient Platforms:** Resists cyberattacks and contains faults through hardware-enforced isolation and a trusted computing base.
- **Avionics Sensor Fusion:** Real-time perception and data fusion with guaranteed timing.
- **Autonomous Flight and Navigation:** Deterministic AI for UAV/UAM and mission systems.
- **Pilot Assist Systems:** AI-driven decision support within certified flight environments.
- **Defense ISR and Targeting Systems:** Predictable AI behavior under contested conditions.
- **Industrial Robotics and Automation:** Safe, AI-enabled automation with real-time control.
- **Edge AI Systems:** Deployment in disconnected, degraded or low-latency environments.

Why LYNX MOSA.ic.AI

The industry needs a way to safely operationalize AI. MOSA.ic.AI delivers:

- A deterministic execution platform for AI at the edge.
- A unified CPU + GPU architecture governed under a single model.
- A clear path to deploy AI safely in regulated environments.
- Reduced integration burden, certification risk, and lifecycle cost.
- A foundation for mixed-criticality, AI-driven mission systems.

Contact Us

edge@lynx.com | US: 408-979-3900 | www.lynx.com