Legacy Consolidation Technical Brief

Executive Overview

Many legacy defense platforms rely on federated computing architectures in which separate hardware systems perform specific functions such as flight control, mission management, and sensor processing. While this approach simplified certification in earlier generations of systems, it introduces significant challenges for modern platforms, including increased SWaP, integration complexity, and difficulty introducing advanced capabilities such as AI analytics.

A new architectural approach enables these traditionally separate workloads to run safely on a single consolidated mission computer.

The Federated System Model

Traditional systems often include:

- A dedicated flight control computer running a real-time operating system such as VxWorks
- A mission computer running Linux for applications
- A specialized processing unit for ISR or AI workloads

Each subsystem communicates across network interfaces, introducing latency and additional system complexity.

Consolidated Mission Computing

Using separation kernel virtualization, these workloads can be consolidated onto a single hardware platform while maintaining strict isolation. For example:

Partition	Workload
RTOS Partition	Flight Control / Fire Control
Linux Partition	Mission Applications
AI Partition	GPU-Accelerated Analytics

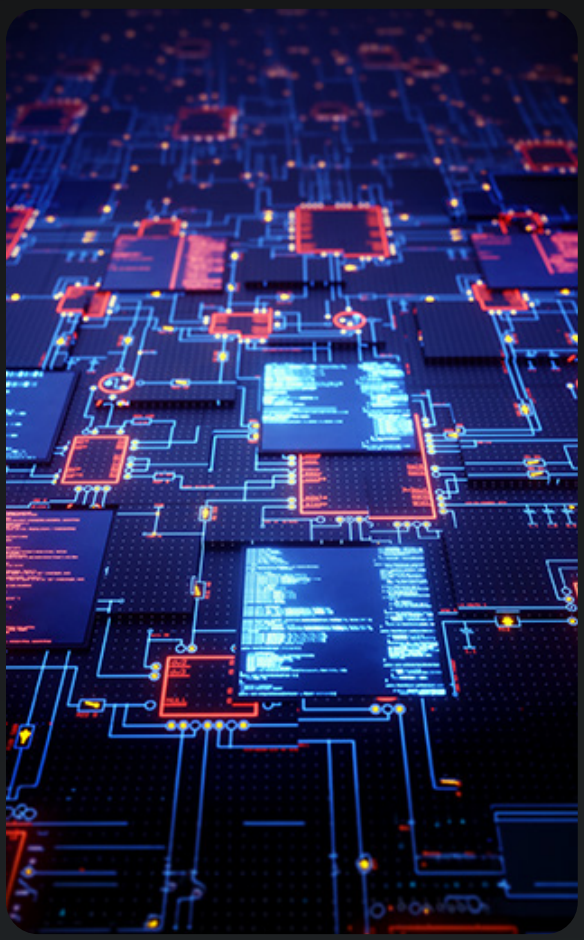
Each domain operates independently while sharing system resources.

Before: Federated Systems

- Separate VxWorks box (Flight/Mission)
- Separate Linux box (ISR/Apps)
- Dedicated AI accelerator box
- Higher SWaP-C

After: Consolidated via MOSA.ic

- VxWorks partition (Safety-Critical)
- Linux Partition (Mission/Apps)
- AI/GPU partition (CoreSuite)
- Deterministic Separation



Advantages of Consolidation

Consolidated mission computing enables several operational benefits. Platforms can reduce hardware footprint and power consumption while simplifying integration and maintenance. Data can flow more efficiently between system domains, enabling faster sensor fusion and improved situational awareness. At the same time, strict partitioning ensures that safety-critical workloads remain deterministic and unaffected by other system processes.

Enabling Safe AI Integration

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