



# Graphics and GPU Compute in Aviation and Defence

PikeOS RTOS & Hypervisor

## Safe & Secure System Operation



One  
SW-Platform  
for all  
Applications



Consolidated  
Functionalities



Graphics Power  
through  
Vulkan API

**CHALLENGE**

The evolution of graphical performance has enabled the consumer electronics world to deliver ever more complex and user interactive connected devices (like smartphones with up to 5 TFLOPS) enabling a level of user interaction and graphics performance that would have been considered impossible 10 years ago.

In industries that measure product life cycles in decades (rather than annual refresh rates as in the consumer sector), new technologies enable new use cases - but also bring new and more complex challenges. Facing the future, we need to have conversations about both traditional 'graphics use' of GPU Compute and AI (Artificial Intelligence). This challenge is made even more complex by some of the older 'less complex' technologies (such as PowerPC) not being adopted into future roadmaps.

Expectations forecast, that new capabilities will be enabled in critical infrastructure, such as Aviation, or will drive the consolidation of multiple use cases onto complex platforms combining Safety-critical / secure and non-Safety-critical / insecure requirements on a single SoC (System-on-a-Chip). The challenge of certifying the devices built using these technology advancements is to ensure the Safety and Security of users or passengers, an ever-growing problem for today's Engineers.

As an example: How do we ensure a primary flight display running terrain avoidance and synthetic vision is not putting the plane's pilot and passengers at risk? For SYSGO, the answer lies in the partnership with CoreAVI and a combined platform for a safe and secure operation of different applications.

**SOLUTION**

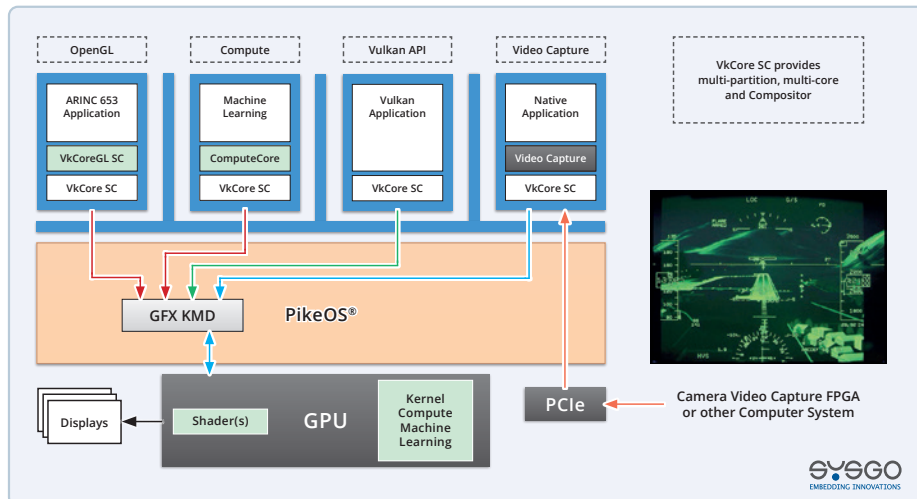
PikeOS is the European No1 software platform for highly critical levels of Safety and Security applications. As a common and certified source code base, it greatly increases flexibility and speed in application development. Modular CertKits for Avionics applications help to reduce time-to-market significantly and reduce certification cost.

PikeOS is based on a microkernel and combines a hard real-time operating system (RTOS) with hypervisor technology providing partitions which can host different applications on the same hardware platform, like graphical displays,

compute, machine learning or autonomous flight support systems. All applications are strictly separated from each other by time and resource partitioning and control of the communication channels. Applications with different levels of criticality can be co-hosted as well, as failures in one application cannot propagate to any other.

Certifiable Compute / Graphics: CoreAVI developed a customisable certifiable Vulkan SC-based library of compute functions for shader and kernel compute, offering shader filters, blur, contrast, gamma correction and more.

**PIKEOS SOFTWARE ARCHITECTURE**



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 [www.sysgo.com/avionics](http://www.sysgo.com/avionics)