CoreAVI and Intel®:
Enabling The Future of
Modern Mission Computers

PROBLEM:

Modern avionics applications need access to higher performance and more capabilities than ever before. For example, mission computers and display processors need to drive multiple screens at once, with applications of varying Design Assurance Levels (DALs) needing to exist in harmony without jeopardizing the safety criticality of the full platform. Traditionally, airborne platforms had separate computer hardware systems for each application with individual CPUs and GPUs. These individual systems are not only inefficient by today's technology standards, but their individual enclosure types can have a significant impact on the aircraft's design envelope. Furthermore, having to limit extra hardware weight also prevents newer technology or multiple applications from being used.

How can airborne platforms take advantage of the latest safety critical technologies in their mission computers without exceeding weight requirements? Furthermore, how can new applications with augmented reality, like Augmented Reality HUDs, accommodate the increasing need for safety critical mixed DAL displays?

SOLUTION:

Today's System on Chips (SoCs) and Graphics Processing Units (GPUs) offer far more capabilities in smaller packages, saving valuable real estate and cost in size, weight and power (SWaP) in constrained platforms. As display systems get more complex with overlaying views, terrain displays, and conformally aligned symbology, having a single SoC with embedded GPU, allows for higher performance as well as enhanced graphics and compute capabilities. In addition to the higher performance, the new SOCs still display all the content required, with safety criticality in mind to enable mixed DAL displays. This ensures a safer, immersive experience for the pilot.

CoreAVI has partnered with Intel® to provide a Platform for Safety Critical Applications (PSCA) with the new 11th generation Intel® Core™ i7 SoC. The Intel Core i7 SoC is targeted towards the embedded rugged Mil/Aero and industrial markets, is ideally suited to mission computers, and offers a high degree of functional integration and flexibility for advanced multi-display systems with low virtualization software overhead. This PSCA solution is stacked with CoreAVI's VkCore® SC safety critical Vulkan graphics and compute driver, VkCoreGL® SC 1 and SC 2 OpenGL® SC application libraries, and ComputeCore™ suite of compute libraries. It also has the option to include CoreAVI's VkCoreVX™ SC implementation of Khronos' OpenVX™ 1.3 industry standard API to enable and deploy neural networks for safe AI capabilities. With these features, the complete Intel Core i7 PSCA enables the best of modern safety critical technology in a single SoC, greatly enhancing SWaP-optimization.

All components of the PSCA solution for a mission computer, including the Tiger Lake SoC with industrial extended temperature range of -40° to +100°C and longevity of supply of 20+ years, are available from CoreAVI with required DO-254 and DO-178C data packages certifiable to DAL A to accelerate certification activities.

OUTCOME:

In addition to the obvious technology benefits, CoreAVI and Intel's partnership - one where the two companies work closely together - is extremely beneficial to the product developer's bottom line. The end user benefits of time and engineering resources saving in platform safety certification are clear. A pre-integrated solution reduces system integrators' risks and allows a quicker time to deployment. With a single source for silicon and all required software building blocks, the Intel® Core™ i7 PSCA solution reduces integration headaches and program delays typically encountered with multiple suppliers. To accelerate development, CoreAVI offers a reference system and the base design of the Intel Core i7 PSCA system that is scalable, providing reduced cost benefits.

For commercial and defense aircraft, CoreAVI's Intel Core i7 PSCA provides customers with increased performance, certification to DAL A, mixed criticality capabilities, and flexibility. All these features with the benefits of a one-stop-shop across a multitude of visualization, general purpose compute and artificial intelligence use cases.