

# TrueCore™

## Software Safety Monitor for COTS Graphics Processors

### INTRODUCTION

CoreAVI's TrueCore™ graphics processor safety monitor is designed to monitor the health and integrity of a GPU in order to prevent the display of hazardously misleading information in safety critical systems. TrueCore facilitates Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA) Design Assurance Level (DAL) A certification of systems using commercial off-the-shelf (COTS) graphics processors and addresses the concerns in Certification Authority Software Team (CAST) Position Paper 29 - *Use of COTS Graphical Processors (GCP) in Airborne Display Systems*.

The software monitoring architecture supports multi-core and hypervisor platforms ensuring the integrity of a graphics processor across multiple and independent partitions and guest operating systems.

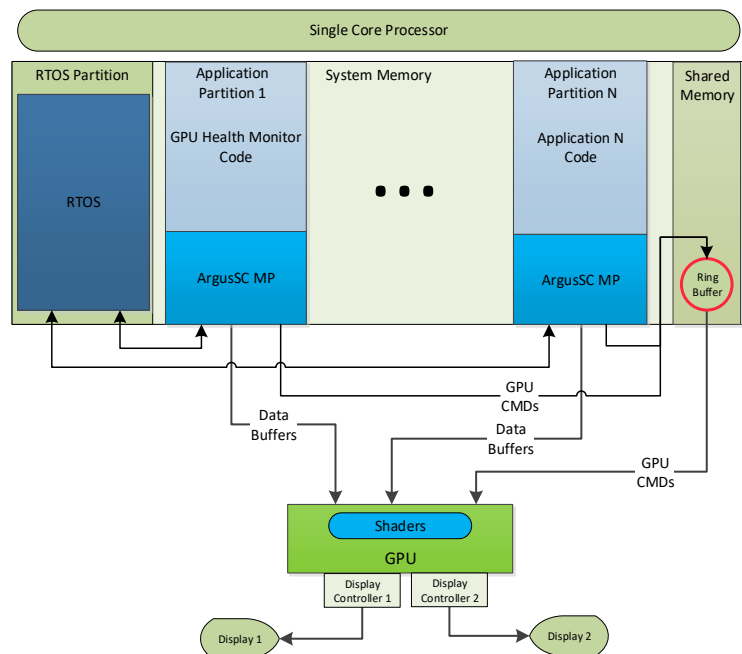
While TrueCore tests the hardware fixed function graphics pipeline functionality, it may not be testing all hardware used in the application's rendering due to dynamic allocation of GPU resources that is beyond external control of the GPU. That is, GPUs have functions that control the allocation of internal resources which cannot be configured or easily manipulated.

### Plug-in Modules to Certify Mixed Levels of Safety Critical Partitions

As part of the TrueCore product suite, CoreAVI offers additional GPU and driver monitoring modules to detect and prevent any erroneous rendering or overutilization of the GPU by one partition that could negatively impact the rendering of other partitions. The product facilitates the use of platforms with multiple software applications having different levels of safety certification running on the same hardware platform.

### FAA Review

CoreAVI completed a product design meeting on TrueCore with the FAA where it was concluded that TrueCore addresses the certification concerns associated with use of complex COTS Graphics Processors in systems requiring Level A compliance.



Typical Avionics Display System with TrueCore GPU Monitoring

## FEATURES & BENEFITS

- Eliminates the need for expensive external FPGA based monitor, reducing development time and system complexity while increasing reliability
- Allows application to have full control over GPU test execution and design flexibility for response to any GPU fault (reboot, pilot notification, fault log report, etc.)
- Allows continuous real time health monitoring of a COTS GPU
- Facilitates low GPU and CPU utilization impact
- Supports multicore and CoreAVI's HyperCore™ (hypervisor GPU manager) virtualized system configurations
- Supports RTOS, including Wind River VxWorks, SYSGO PikeOS, Green Hills INTEGRITY, DDC-I-Deos, Lynx Software LynxOS, Linux, and configurable for proprietary RTOS
- Operates in conjunction with VkCore® SC (CoreAVI's Vulkan graphics and compute driver suite)
- Operates in conjunction with ArgusCore™ SC (CoreAVI's OpenGL driver suite)
- Available with CertCore™ 178 (DO-178C / ED12-C Avionics) Level A safety certification packages

The information contained in this document is for informational purposes only and is subject to change without notice. While every precaution has been taken in the preparation of this document, it may contain technical inaccuracies, omissions and typographical errors, and CoreAVI is under no obligation to update or otherwise correct this information. CoreAVI makes no representations or warranties with respect to the accuracy or completeness of the contents of this document, and assumes no liability of any kind, including the implied warranties of non-infringement, merchantability or fitness for particular purposes, with respect to the operation or use of CoreAVI hardware, software or other products described in this document. No license, including implied or arising by estoppel, to any intellectual property rights is granted by this document. Terms and limitations applicable to the purchase or use of CoreAVI's products are as set forth in a signed agreement between the parties. CoreAVI, the CoreAVI tracer logo, VkCore®, ArgusCore™, TrueCore™, HyperCore™, CertCore™ 178, and combinations thereof are trademarks of CoreAVI. PCIe and PCI Express are registered trademarks of PCI-SIG Corporation. ARM and Cortex are registered trademarks of ARM Limited in the UK and other countries. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies.