Use of high performance GPUs in Aerospace and Defense applications

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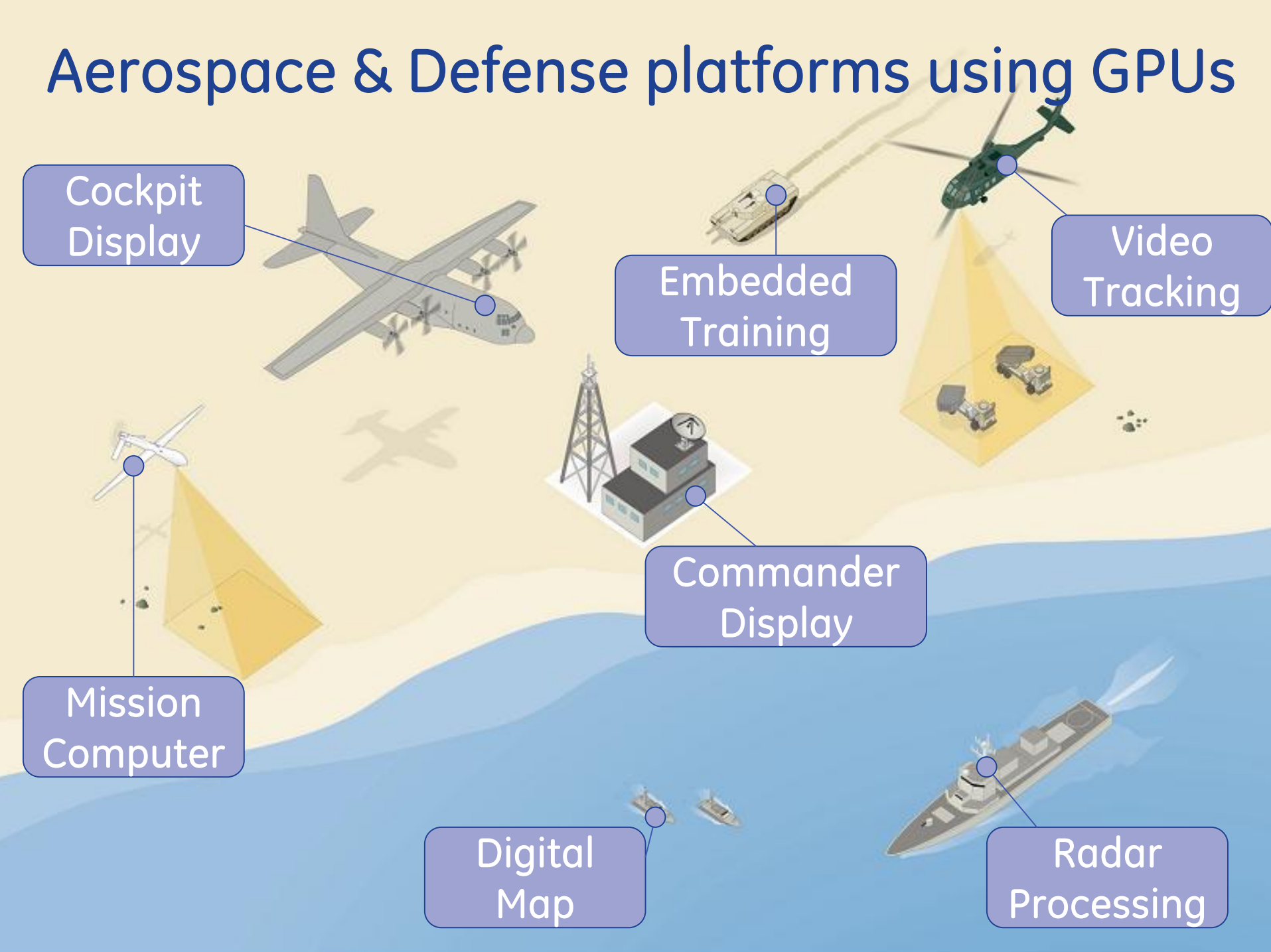
Use of high performance GPUs in Aerospace and Defense applications

- Traditional application of GPUs
- Emerging applications for GPGPUs
- Challenges unique to Aerospace & Defense products
- Conclusion

Aerospace & Defense platforms using GPUs

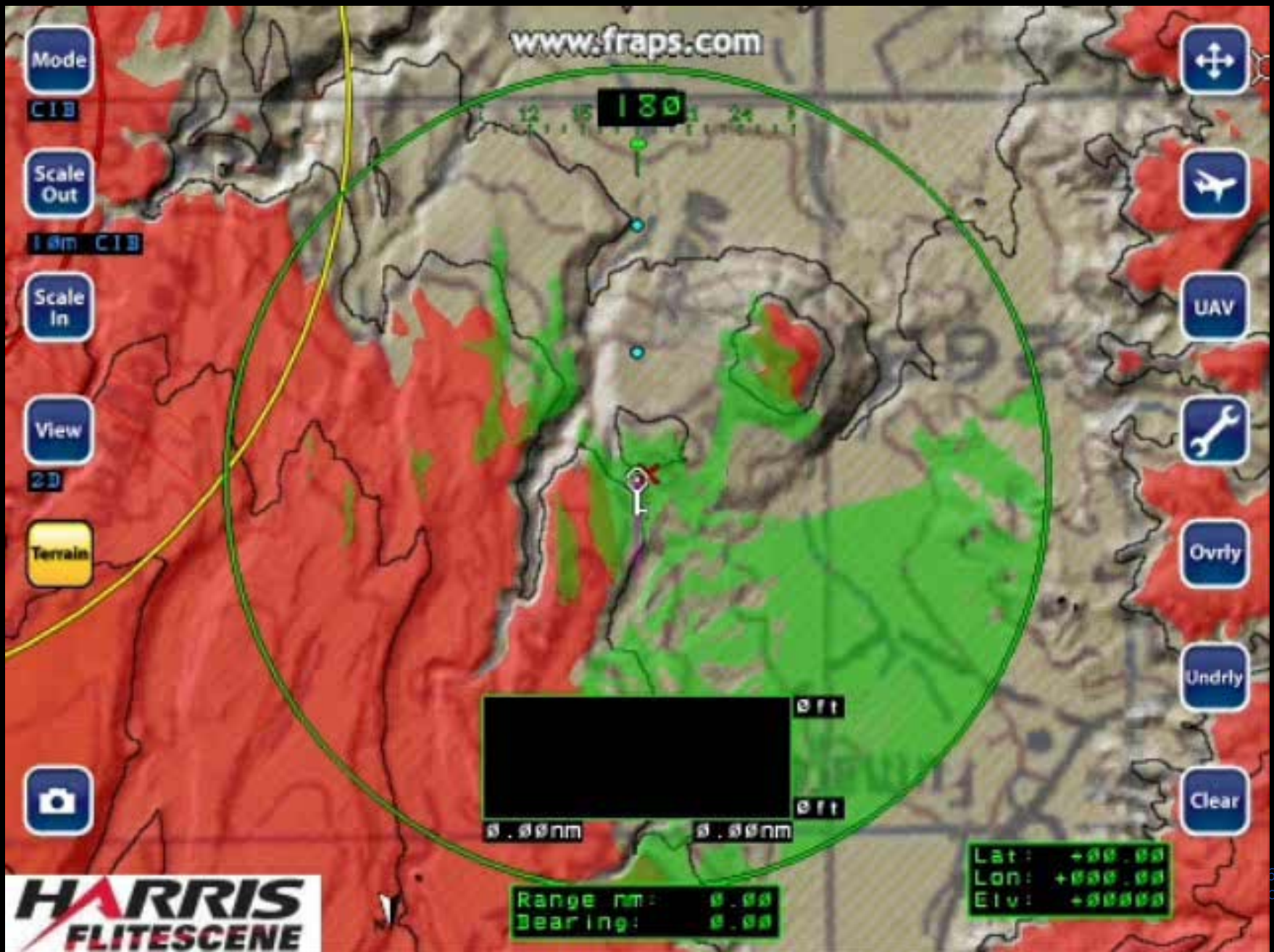


Demo courtesy of DiSTI

Cockpit displays

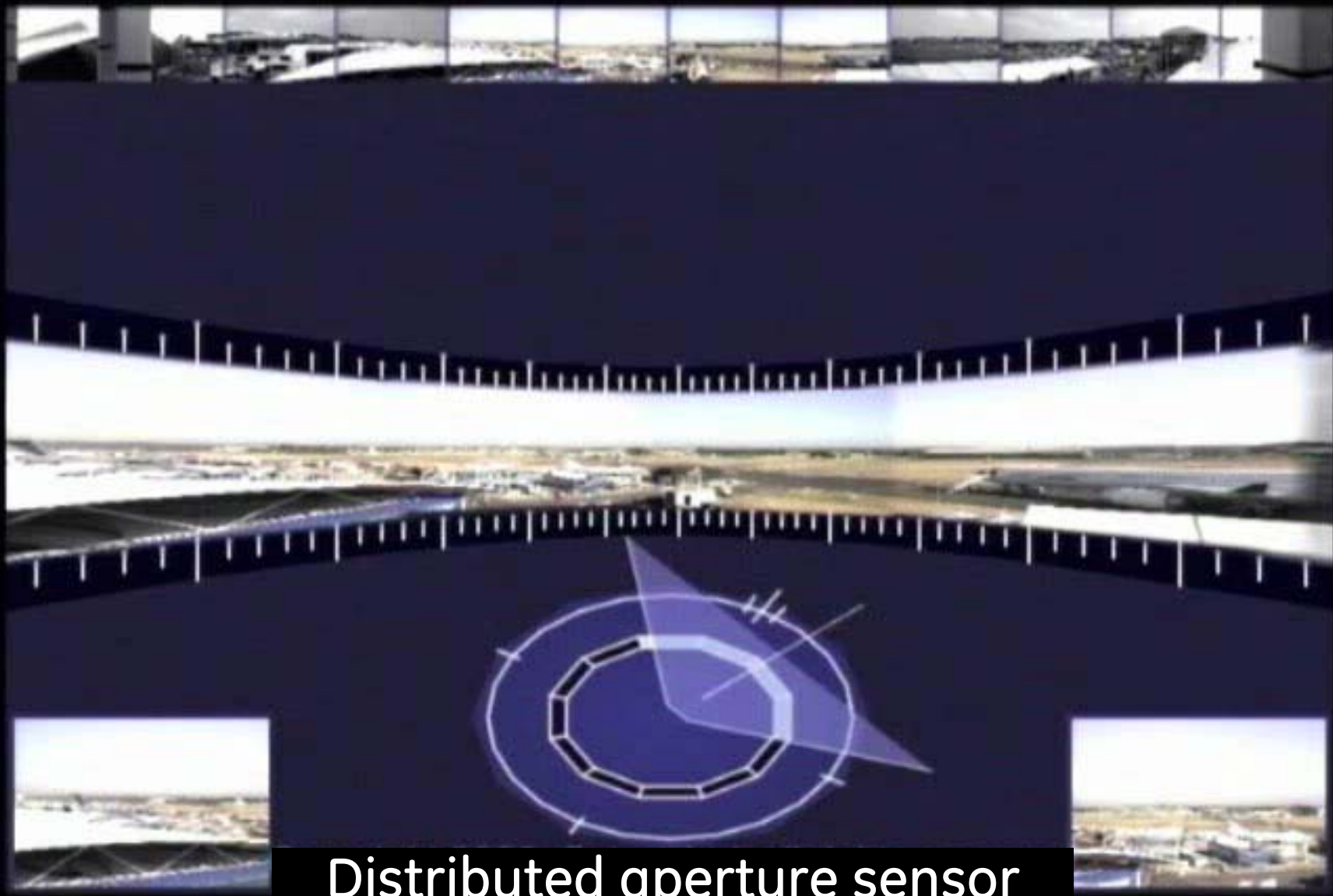
Radar displays

Digital mapping



Embedded Training

Demo courtesy of
Presagis and b.design


Distributed aperture sensor

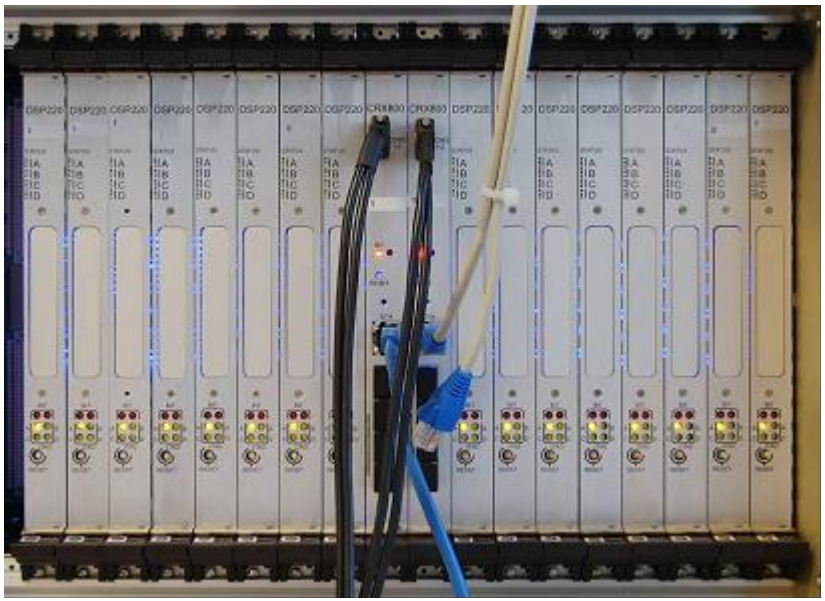
Rugged GPGPU solutions

Increasing functional capability

while

Decreasing size, weight & power (SWaP)

Radar processing



Typical older system:

4 cu ft., 105 lbs., 2000W

576 GFLOPS peak

New system:

0.8 cu ft., 10 lbs., 200W

574 GFLOPS peak

Video processing applications

The GPGPU will extend the range of functions that can be performed on a variety of platforms, with greater levels of autonomy

Video tracking

Image stabilization


ThermaCAM


ThermaCAM

What's special about A&D products?

The requirements for A&D products make regular commercial boards unsuitable

- Environment
- Configuration control
- Obsolescence management
- Long term support

Environment

Wide temperature range

-40°C to +85°C (*-40°F to 185°F)*

No air flow in many applications

Extensive thermal cycling

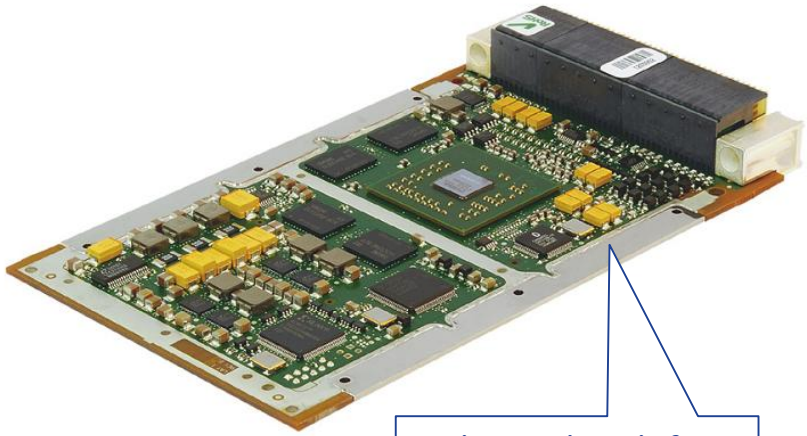
Boards must be designed to endure repeated

Boards must be designed to endure continuous

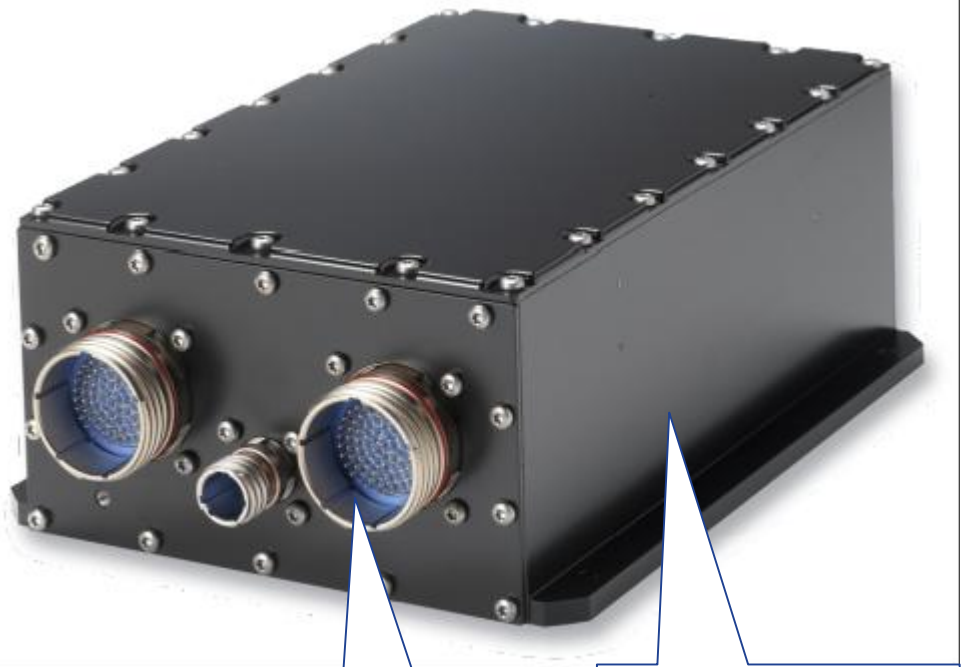
VIBRATION

Boards must be designed to endure repeated

Typical Aerospace & Defense products



Thermal path for conduction cooling



Hermetically sealed enclosure

Rugged MIL-STD connectors

Wedgelock restraint

Configuration control

- A&D platforms go through multiple phases during their lifetime
- Once deployed, full component traceability is required to ensure no changes are made
- GE Fanuc has teams dedicated to managing these lifecycle issues

Obsolescence management

Commercial silicon lifetimes do not support A&D deployment cycles.

Obsolescence planning is critical

- Close partnerships with silicon vendors
- Frequent “health checks” on component availability
- Storage of silicon following End of Life (EOL)

Conclusion

A&D products will always want more performance and less SWAP.

GPUs will change the A&D market.

Aerospace and Defense customers are ultimately the winners from this NVIDIA / GE Fanuc partnership.

http://www.gefanuc.com/cuda.html