DornerWorks

DornerWorks.com

FPGA DEVELOPMENT ACCELERATOR

Jumpstart development in **automotive and ground vehicle** projects.

Go green!
Download a copy.

TECHNOLOGY ENGINEERING

SO YOU CAN FOCUS

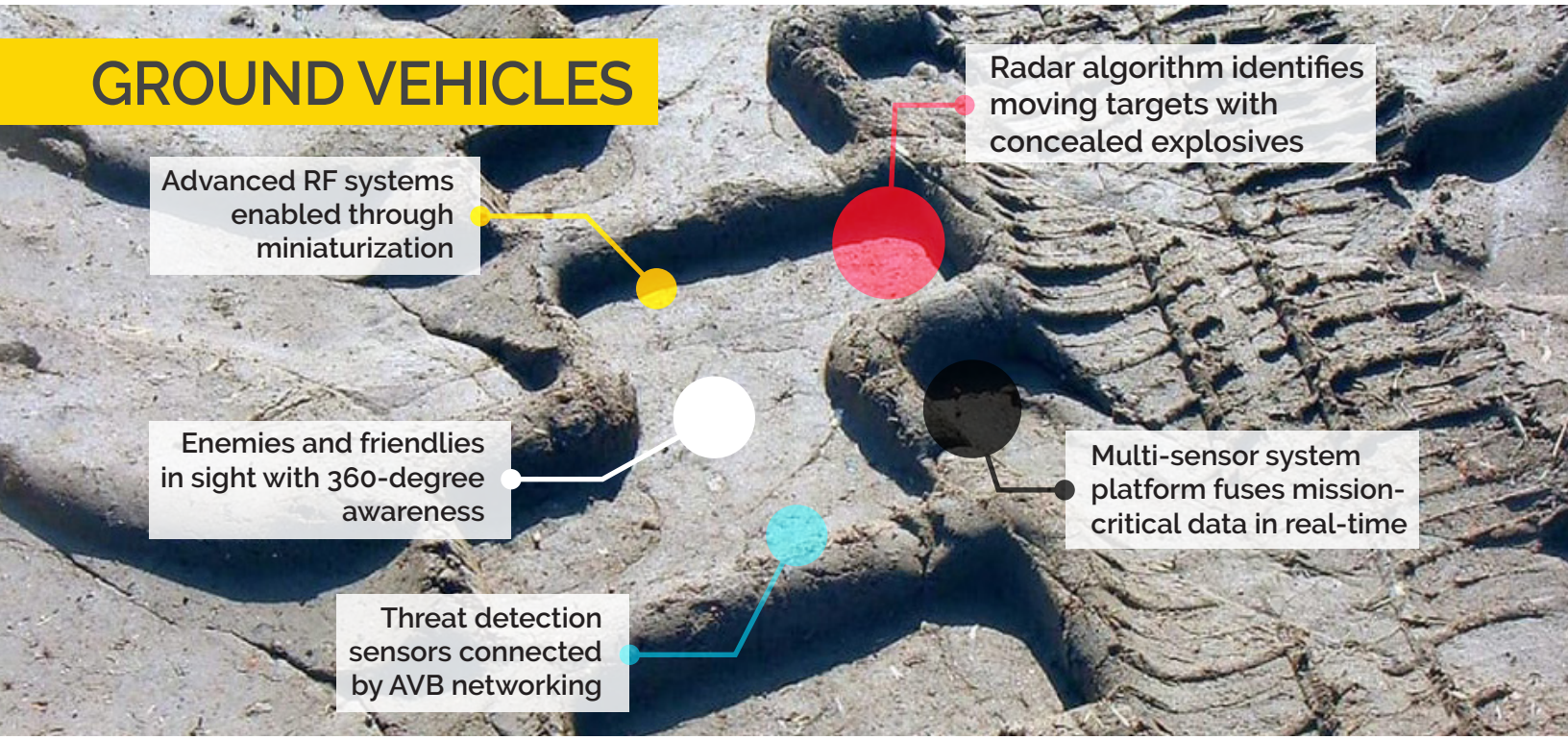
The complexities of configuring an FPGA shouldn't stand in the way of launching your new products and changing lives around the world.

DornerWorks engineers were some of the first to work with the Xilinx RFSoC, and have collaborated with Xilinx and others on its earliest applications and development tools.

We can help you:

- Quickly get your applications up and running on a working prototype
- Identify the FPGA capabilities that support your design goals
- Refine your FPGA configuration to accelerate your algorithms
- Grow your business

FPGA CASE STUDIES



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01 SYNCHRONOUS NETWORKING

WHEN YOU NEED IT

- When you need low latency and high throughput.
- When you need to support diverse traffic inputs over a common network.

WHY YOU NEED IT

IEEE standards-based networking enables high-accuracy time synchronization “behind the scenes,” freeing you to focus on your product design.

REAL-TIME

REAL PRECISE

Add time-synchronization and high-speed networking capabilities to legacy devices for everything from vehicle fleets to medical systems, or build a generation of new networked products from the ground up.

Rigorous Standards

- IEEE 802.3 - 1 Gbps full-duplex
- IEEE 802.1AS-REV slave profile
- IEEE 802.1Q-2014 - FQTSS strict priority or credit-based scheduler for up to 8 QoS

High Accuracy

- Synchronizes to a grandmaster with +/- 8-ns accuracy (double hop)
- Rapid time convergence

Versatile Interfaces

- Xilinx AMBA/AXI4 Lite and Stream interfaces
- MDIO and RGMII or SGMII interfaces to PHY

02 HIGH-SPEED VIDEO PLATFORMS

STATE-OF-THE-ART PLATFORMS

Frustration-Free Development

Like developers in automotive, aerospace, defense, and rugged industrial markets, you could be using hardware-acceleration and FPGAs to create robust video solutions.

Without them, you're just taking pictures

Multi-Camera Stream Fusion For ADAS

- A pair of Xilinx Zynq UltraScale+ devices was used to process up to seven 12MP 12-bit video streams, and up to three 1MP 8-bit video streams simultaneously.
- All video streams ran at 30 fps and was received via MIPI CSI-2 and parallel interfaces.
- The video was filtered, color corrected, color space converted, and multiplexed over a PCIe 3.0 x8 link to the system for additional video processing.
- The un-processed video was sent via a PCIe 3.0 x4 link to the system for logging.

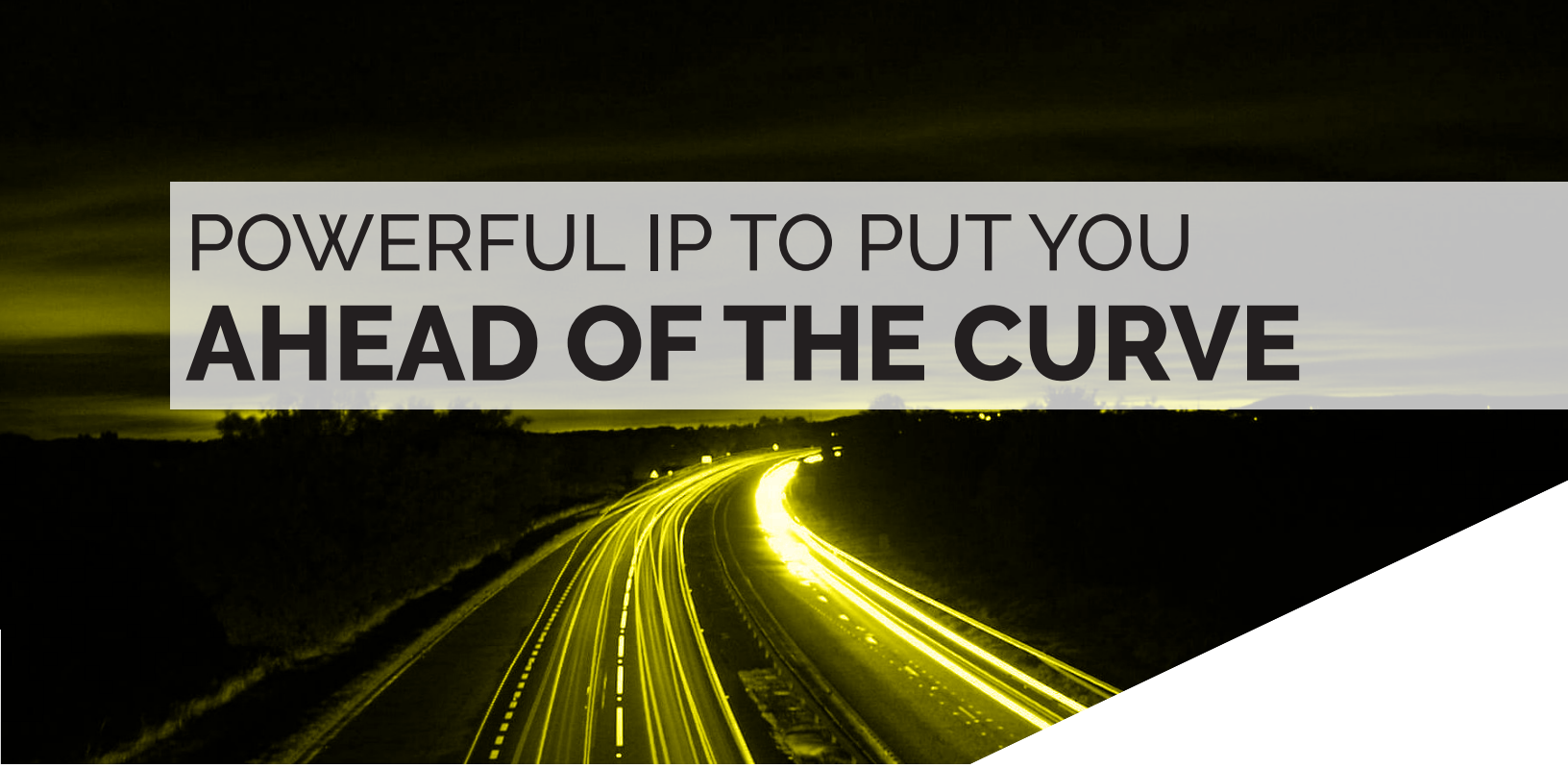
03 CUSTOM IP BLOCKS

ence on

ance your system by meeting
or requirements.

WHY YOU NEED IT

Custom IP can help you kickstart development on applications for any market, saving you the time and engineering hours involved in developing it alone.



POWERFUL IP TO PUT YOU **AHEAD OF THE CURVE**

Accelerate Schedule

Reduce Product Risk

Defeat Obsolescence

Maintain Momentum with a Custom IP Microprocessor Core

A customer came to DornerWorks looking to replace their obsolete and now-unavailable Intel microprocessor with a VHDL based soft core IP equivalent.

Porting (re-writing) the existing software to a new processor was cost and schedule prohibitive, but a soft core aligned with short term goals of providing needed updates to existing products.

DornerWorks implemented a modern FPGA to host the replacement soft core processor and replace the existing support logic the processor used.

The result was a “plug-and-play” solution that helped the customer maintain momentum on a mature platform.

04 MACHINE LEARNING

WHEN YOU NEED IT

When you want to trigger different processes in your system based on patterns in incoming data, with as little footprint as possible.

WHY YOU NEED IT

Autonomous solutions reduce long-term costs, optimize response time, and provide a seamless experience for users in ADAS applications, object detection, and more.

SMARTER, FASTER, BETTER
HARDWARE ACCELERATED MACHINE LEARNING

FPGA parallelization can accelerate neural network computations for machine learning platforms, and help companies build next-gen autonomous machines.

The problem is, FPGA development with neural networks can be extremely complex.

But that doesn't have to slow you down.

Shorten your time to market and leave your competition behind with FPGA engineering services for **Machine Learning** from DornerWorks.

Development & Acceleration

Niche Products

Wide Platform Expertise

- Microblaze
- Picoblaze
- ARM Cortex-A9/A53
- Xilinx
- Microchip
- NXP

05 DIGITAL SIGNAL PROCESSING

WHEN YOU NEED IT

When you have various forms of data streaming in, and want to be sure it gets translated and filtered before going stale.

WHY YOU NEED IT

Next-gen communication systems rely on complex digital signal processing (DSP) systems that transform and filter signals so other applications can respond.

MULTIPLY THE VALUE
OF YOUR DATA STREAMS

Advanced RF Systems RFSoC Engineering

A defense contractor wanted to miniaturize the SWaP-C and improve response time of their advanced radar systems that detected and mitigated oncoming airborne threats.

The design DornerWorks delivered was based on one of the first three Xilinx Zynq UltraScale+ RFSoC boards ever available.

The RFSoC system helped the client receive and process data almost instantaneously.

Signal Translation

- Transformation
- Filtering
- Windowing
- Radar Signal Processing

System Miniaturization

- Reduce the size, weight, and power (SWaP) of your advanced radar systems
- Direct signal conversion with RFSoC technology

Speed & Timing

Interface with different devices knowing your data will be processed and fused as needed, when needed.

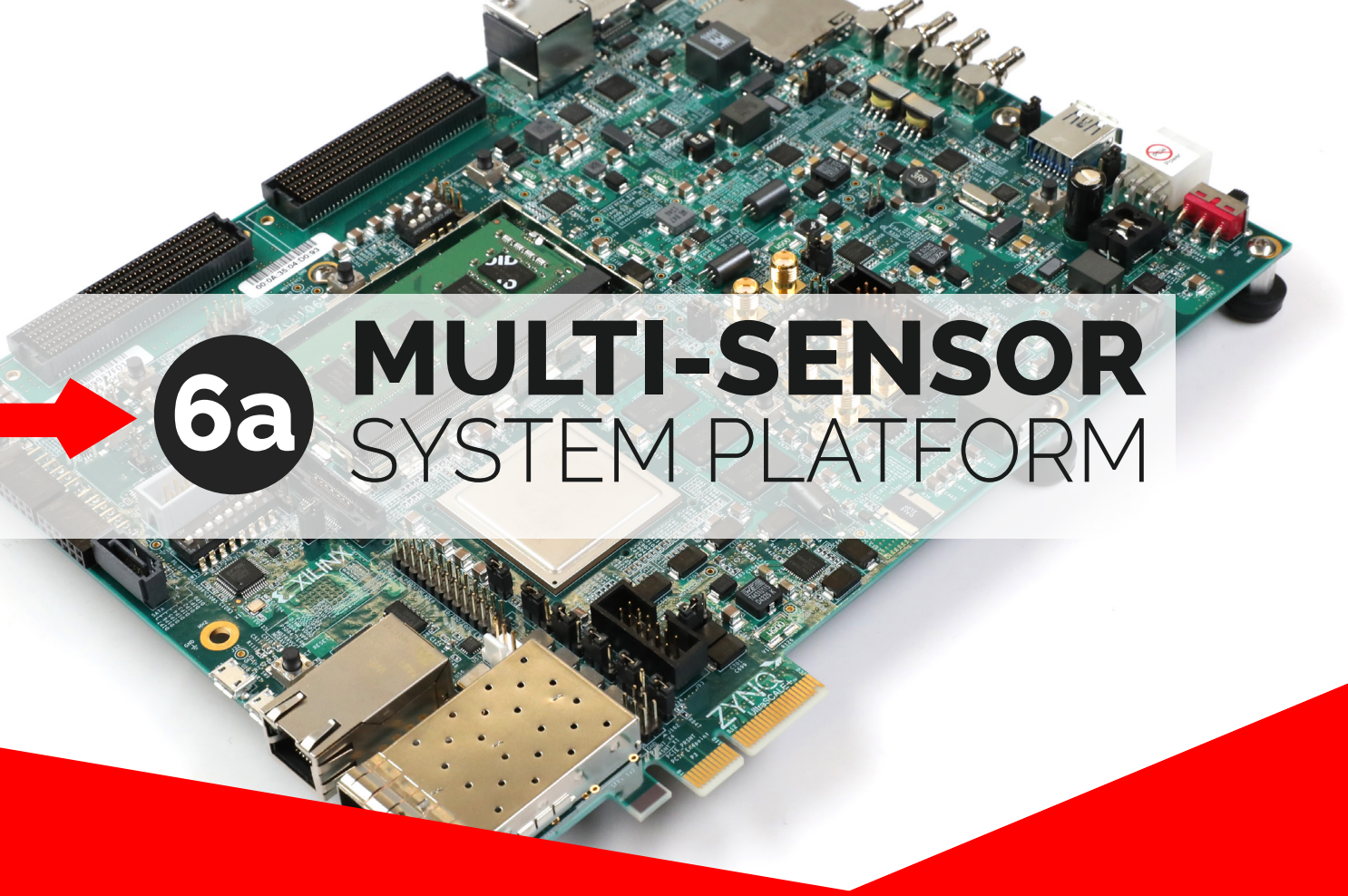
TURNKEY SOLUTIONS
TO ACCELERATE DEVELOPMENT

Multi-Sensor System Platform

Software-controllable FPGA-based networked video systems streaming through a Xilinx Zynq UltraScale+ MPSoC ZCU102 enabled by Xilinx IP.

Space-Qualified Multi-Layer Ethernet Switch

Whether for a nuclear submarine fathoms deep or a space station miles above, DornerWorks multi-layer Ethernet switch keeps devices connected to safety-critical communication standards in nearly any environment imaginable.



6a MULTI-SENSOR SYSTEM PLATFORM

WHEN YOU NEED IT

When you have a distributed sensor system and need to mix and transform the data from those sensors and stream it to a single display at minimal SWaP.

WHY YOU NEED IT

This time-synchronous platform accelerates designs for video conferencing, surveillance, Advanced Driver Assisted Systems (ADAS), streaming and encoding applications, and more.

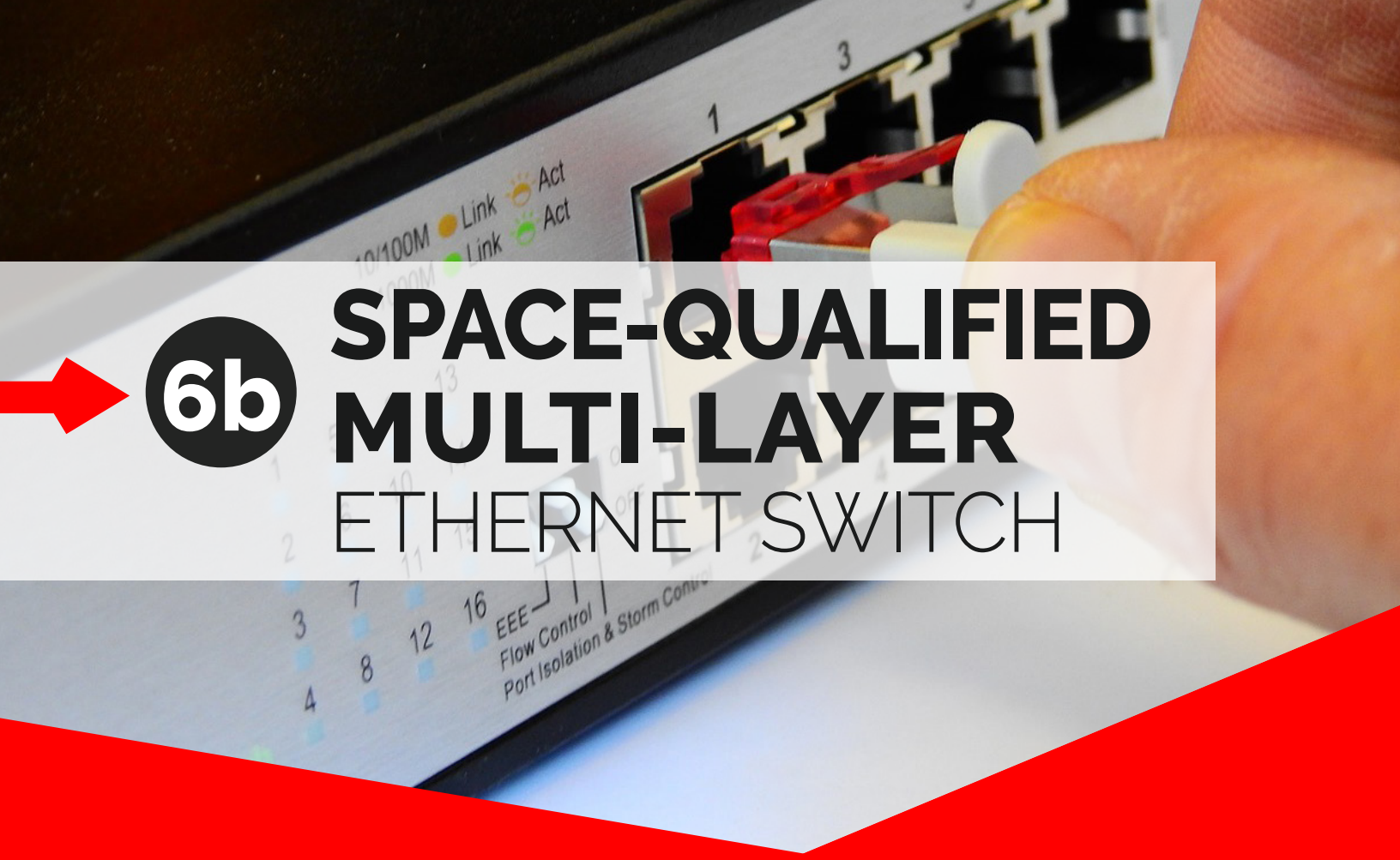
FUSE DISTRIBUTED SENSOR INPUTS INTO

DECISION-INFORMING, REAL-TIME OUTPUTS

The Xilinx Zynq UltraScale+ MPSoC ZCU102 accelerates designs for video conferencing, surveillance, Advanced Driver Assisted Systems (ADAS), and streaming and encoding applications.

With a time-synchronous video streaming solution, you can lead the market by delivering the real-time results your customers deserve.

- **Multi-stream capable DisplayPort input**
- **Software defined video overlay**
- **Alpha-blended mixing**
- **Mixed video output**
- **Mixed video encoding**



6b SPACE-QUALIFIED MULTI-LAYER ETHERNET SWITCH

WHEN YOU NEED IT

- When you need a networking solution for safety-critical applications, and don't have the time or expertise to develop the platform on your own.
- When you need a networking solution that stands up to radioactivity and the harsh environments of space.

WHY YOU NEED IT

- Based on radiation-hardened technology, so it can be used in any environment.
- Compatible with many commercial devices, so it fits seamlessly into users' lives.
- Based on RISC-V technology, so it can overcome obsolescence.

FOR LOW POWER
FOR HARSH ENVIRONMENTS
FOR ANY PLATFORM

If you need a networking solution for safety-critical applications, COTS devices could put stress on your system and leave you open to hardware vulnerabilities.

DornerWorks can help your business develop a customized networking solution for land, sea, air, or space, made portable with RISC-V architecture.

Safety-Critical Certification Artifacts

- NASA Standards
- ISO 9001 and AS9100
- ISO 13485

Minimal Footprint for Limited Resources

- Just 10% of the wattage of most COTS options
- IP routing handled in hardware logic
- RISC-V softcore is portable to any platform

Multi-Layer Enhanced Capability

- Limited IP routing
- VLAN tagging

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TECHNOLOGY ENGINEERING

SO YOU CAN FOCUS

We can help you accelerate product development at any stage in your timeline.

Get started with an **FPGA Service Package** that will help you overcome development challenges and grow your business. Contact DornerWorks today!

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