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RAPTOR®
INNOVATION
SUMMIT 2025

High Performance Compute for Smart Mobility

Powering the Future

Agenda

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01 Introduction to High Performance Compute Platform

02 Road To Raptor AI

03 Phase Details

04 High Performance Compute Hardware Roadmap

05 Q&A

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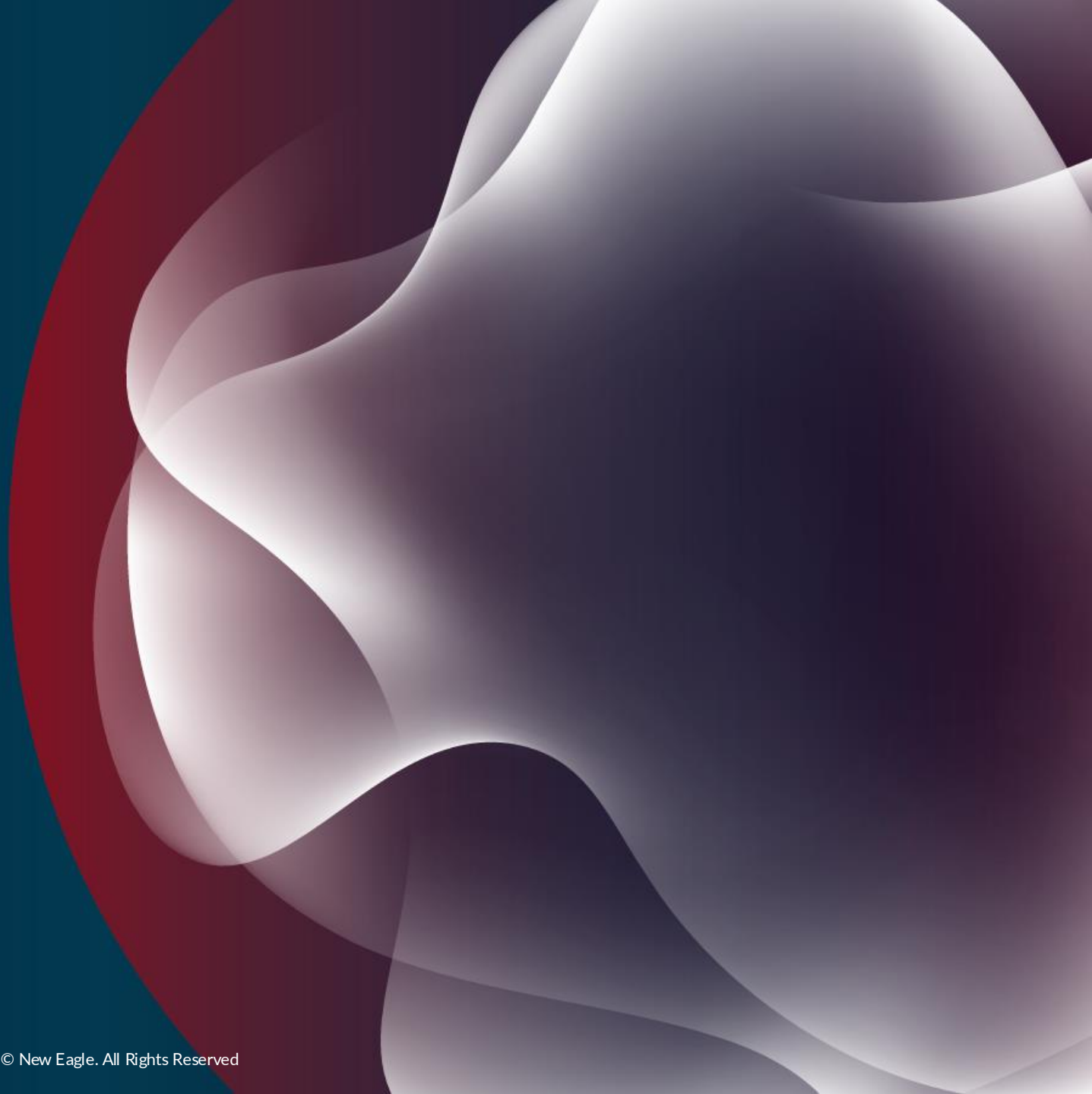
High Performance Compute Platform



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Raptor = Go Fast

Raptor is famous for its “single button build” workflow

New Eagle has expanded the capabilities of Raptor dramatically in recent years, without violating this fundamental concept

- Raptor-Dev supports all New Eagle ECUs, enabling executable generation through a single button build process
- Raptor-Safe is seamlessly integrated within Raptor-Dev to produce detailed stack, timing, and code quality analysis results alongside the single button build process
- Raptor-Cloud is bringing virtual ECUs into the same single click framework allowing for early testing and development

Goal is to bring the same speed, agility and simplicity to high performance compute.

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Raptor

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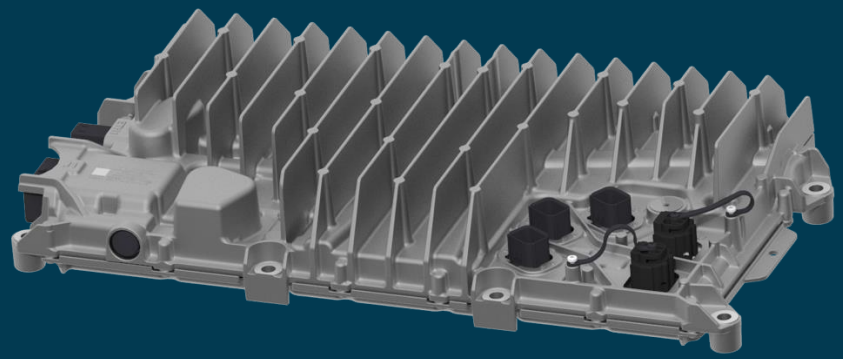

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Road to Raptor AI

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Road to Raptor AI

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Phase 1 – Available

Robust standalone Jetson platform

- Test on robust hardware using release candidate cameras
- VPU2 BSP to follow Jetpack Releases
- Support GPU Coder on Jetson test and deploy workflows in minutes
- Expanded CAN and T1 Ethernet support suitable of vehicle testing
- Reference projects to build a distributed system with Raptor ECUs

Phase 2 – Coming Soon

Jetson AI + CODESYS Control

- CODESYS PLC on board
- Native or Container Based
- AI Data available to CODESYS Control application
- Command distributed ECUs using CAN Fieldbus

Phase 3 - Active

Mathworks GPU Coder for MBD

- Automatic Generator of Optimized CUDA code
- Maximize performance automatically by leveraging NVIDIA CUDA libraries including cuBLAS, cuDNN, and TensorRT
- Conceptually “Raptor Lite”

Phase 4 - 2026

Full Raptorization

- Parameterized design choices for cameras and fieldbus data
- Single MBD Project for CPU, GPU and interfaces to Raptor ECUs
- Retarget from HPC VPU2 to HPC Medium or HPC Lite and future platforms in minutes.

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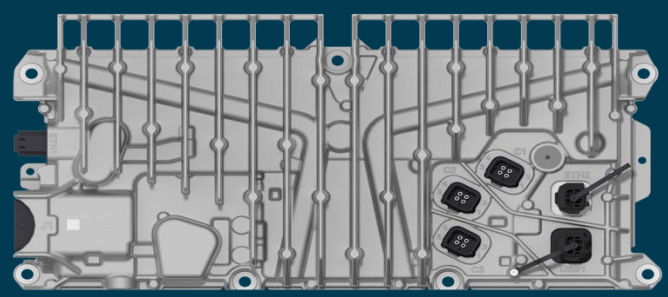
Raptor® High-Performance Compute Platform

- Build on John Deere VPU2
- NVIDIA® Jetson™ AGX Orin powers it and delivers up to 275 TOPS with 2048 GPU Ampere cores and 64 Tensor cores
- 12 core Cortex-A78 CPU for application processing
- 64GB Memory
- 1 Terabyte SSD
- 12x GMSL2 camera interfaces with Power-over-Coaxial (PoC)
- Automotive 1000BASE-T1 Ethernet & Gigabit 10G Base-T
- 4x CAN/CAN-FD
- Local I/O
- IP67 Environmental protection
- Passive Cooling solution validated for continuous GPU utilization



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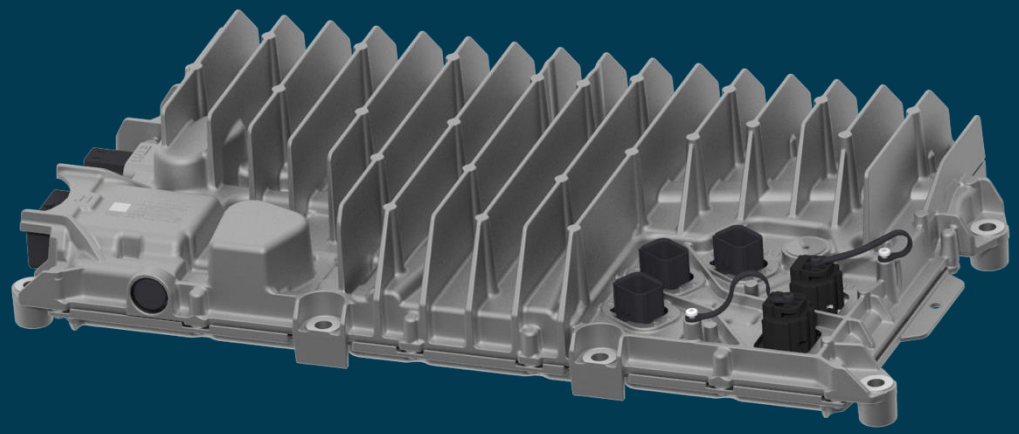
JOHN DEERE

NVIDIA JETSON



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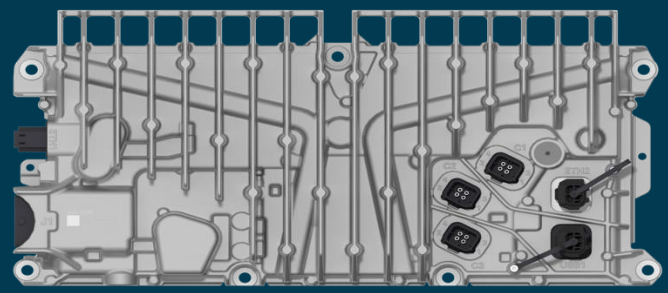
Raptor® High-Performance Compute VPU2 Software Stack

- Perception and AI solutions leveraging Nvidia Jetpack SDK and Mathworks GPU Coder
- Jetpack SDK - Complete development environment designed specifically for NVIDIA Jetson modules
    - Jetson Linux L4T
    - CUDA Tool Kit
    - cuDNN Deep Learning
    - Tensor RT
    - Video processing libraries and interfaces
- Linux application CPU including Nvidia Docker Toolkit



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ROS 2™

CODESYS

ubuntu

docker

NVIDIA JETSON

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Phase Details

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Start your application today!

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Phase 1

Production VPU2 Hardware

Proven John Deere hardware already deployed in production applications

- John Deere See & Spray Product
- Rigorously tested and proven in the field
- Robust IP67 and automotive connectors

This is not a carrier board in box that will disappoint your customers!

Default Camera Integration

Integration of 12 GMSL2 cameras, including

- Power over Coax (PoC) application control and diagnostics
- GMSL2 control and diagnostics

New Eagle has partnered with camera vendors to identify application specific support camera specific drivers and ISP functions

Development Jump Start with Jetpack SDK

Start application testing day 1.

- New Eagle provides a jump start to make HPC look like a NVIDIA Jetson AGX Orin Development Kit running Jetpack SDK
- Run application examples from Nvidia using provide Docker images
- Use Mathworks GPU Coder and connect directly to the VPU2 to generate code, build and run models as you would with the developer kit.

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NVIDIA Jetpack SDK

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Phase 1 - New Eagle HPC updates with Jetpack 6 releases!

Core Components

- Jetson Linux L4T
- CUDA Tool Kit
- cuDNN Deep Learning
- Tensor RT
- Video processing libraries and interfaces

- Specialized SDKs DeepStream for video analytics, Isaac for robotics

Containerization

NVIDIA Container Runtime enables portable, scalable GPU-accelerated applications across development and production

User Enablement

Developer tools

- Toolchain
- Bootloaders
- Flashing tools

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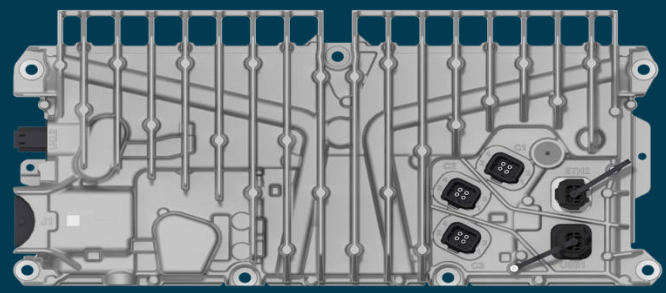
Phase 1 Reference Project coming to the Nest

- Perception for object detection created using Mathworks GPU Coder using Jetson Support Package
- Out of the box camera options
- Linux Application to summarize object presence and position to a Raptor Controller over CAN build using Embedded Coder for Linux
- Deploy a ROS2 Docker Container



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ROS 2™

CODESYS

ubuntu

docker

NVIDIA JETSON

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CODESYS

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Phase 2

Deploy on VPU2

Install CODESYS Control Instances

- Native Control ARM64
- Native Edge Gateway
- Virtual Control Instance via Docker
- Virtual Edge Gateway via Docker

Local Control

- Consume Jetson AI Perception Data into CODESYS Application
- Ethernet IDE connection for development, debug, testing
- Support Webserver based Visualization or pair with a DR10/12 CODESYS Display

Easy Distributed Control

Leverage CODESYS Fieldbus

- CANopen and J1939 to expand system using New Eagle ECUs
- Simple integration of expansion IO
- Extend to application specific supervisory control interfaces

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MathWorks GPU Coder: From MATLAB to CUDA on Jetson

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Phase 3

Automatic Code Generation

Generate optimized CUDA code from MATLAB and Simulink algorithms without requiring deep CUDA expertise or manual programming

- MATLAB Coder Support Package for NVIDIA Jetson
- Target aware optimizations including compiler and accelerated libraries such as TensorRT
- Video input device binding to model input

Saves thousands of manhours lost to iterative development when bugs are discovered later in the process

Comprehensive Function Support

Access 1,000s of GPU-Enabled Matlab Functions for AI, embedded vision, radar, and signal processing

- GPU Coder Interface for Deep Learning Libraries
- Image and Computer Vision Toolbox
- Maximize performance automatically by leveraging NVIDIA CUDA libraries including cuBLAS, cuDNN, and TensorRT

Streamlines conversion of public models or proprietary models from development environments to optimized deployable code

Seamless Deployment Pipeline

Enable end-to-end prototyping, simulation, and deployment on New Eagle High Performance Compute Platform

- Develop on HPC just like AGX Orin Developer Kits using New Eagle Developer Configuration
- Access to IO, CAN, and video streams
- Provided Deployment environment using New Eagle Deployment example.

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One Button Build for Raptor AI!

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Phase 4 – Raptor AI Experience

Raptor AI Project Experience

Interactive system configuration wizard

- Video component selection and parameterization for Raptor ecosystem cameras.
- Unified project for application and GPU
- Turn-key build system to target HPC developer mode or deployment mode build specs.

Develop, test, deploy with common workflows

Raptor AI + Raptor Distributed Systems

Focus on your application

- Blocksets to simplify interaction with Raptor ECUs
- Blocksets to simplify interaction with CODESYS vPLC both local on HPC and remote.

Forward Looking

Expanding system options with ecosystem partners while maintaining forward portability

- Camera Vendors
- ISP Feature Sets
- Real Time Linux Enhancements
- Safety

Move your application forward quickly as new platforms prioritize forward migration and abstract away low level software dependencies.

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High Performance Compute **HW** Roadmap

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John Deere VPU2

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Available Q4 2025

Key Functions & Applications

Key Functions:

- 1x Nvidia Orin AGX (12x ARM)
- 4x CAN2.0
- 1x 100base-T1 Ethernet
- 1x 10G Base-T Ethernet
- 12x GMSL2 Power Over Coax
- 12x GMSL2 6Gbps Camera
- 1 TB Internal SSD
- 64GB LPDDR4 RAM
- 64GB eMMC Flash

Key Applications:

- Advanced Vision Systems
- High-End Compute

Advanced Capabilities

High Performance Compute

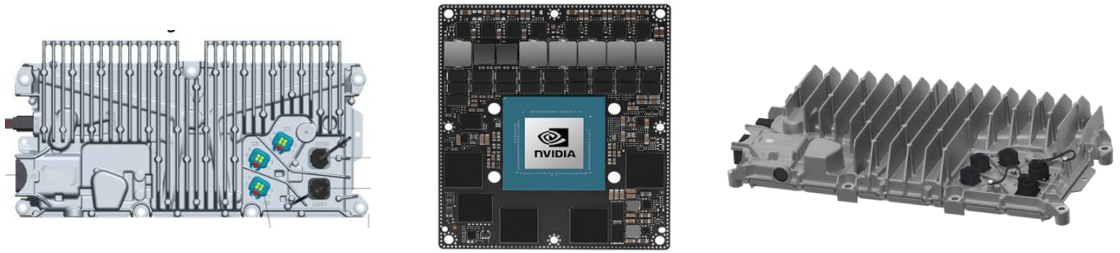
- 12x 2.2GHz ARM A78AE
- 2048x 1.3GHz Core GPU
- 64x 1.3GHz Tensor Cores

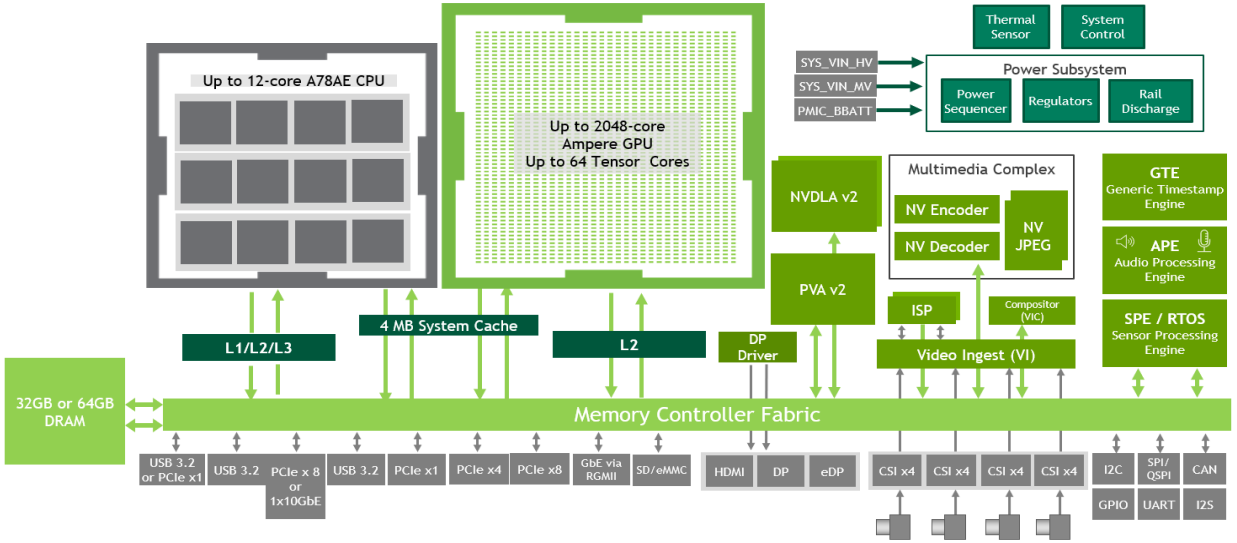
Cybersecurity Support

- Nvidia OPTEE

Environmental Features

- IP66/67
- -25C to +50C operational temperature range





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VPU Roadmap

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Available H2 2026

“VPU Medium”

Key Functions:

- 1x Nvidia Orin NX + AMD ZU7
- 3x CAN
- 1x 100base-T1 Ethernet
- 1x 5G Base-T Ethernet
- 8x camera inputs
- 256GB Internal SSD
- 16GB LPDDR4 RAM

Available H1 2027

“VPU Lite”

Key Functions:

- 1x AMD ZU7
- 2x CAN
- 1x 1000base-T1 Ethernet
- 1x 100base-T1 Ethernet
- 4x camera inputs
- 32GB eMMC Flash
- 4GB LPDDR4 RAM

Software Enablement

Linux SDK available initially, able to support the following additional workflows:

- Soft PLC capability through installation of CODESYS
- Ability to develop in Matlab/Simulink including GPU Coder
- Ability to develop in C, C++, Rust, etc

Raptor support will trail hardware availability by 6-9 months

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Q&A

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Presented by:

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Chief Commercial Officer
New Eagle

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