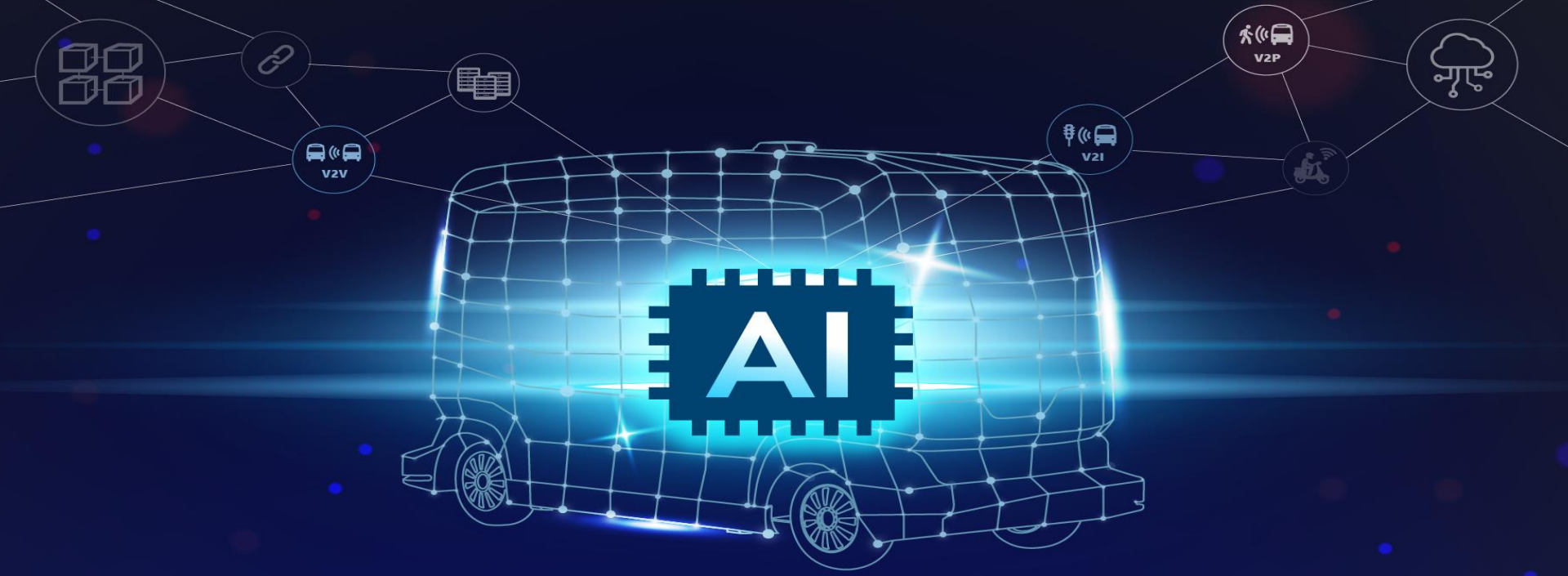
SELF-DRIVING DRIVE
AI INFRASTRUCTURE FORUM



7STARLAKE

intel. MARKET READY

intel.

NVIDIA.

Index

1. Successful Cases in L-4 Shuttle, L-4 Truck , L-5 Test Bed
2. ARM SOAFEE L5 Ampere Altra GPU Server
3. Military Unmanned Autonomy
4. Level- 4 Shuttle – TEC300S
5. Level-4 Truck – AA640
6. Level-5 Test Bed – AV400

AI Computing Platform – "Brain" of the Future Vehicle

01 PERCEPTION LAYER

LiDAR | Stereo Cameras | IMU | 3D HD Map

- Radar
- Laser Scanner
- Supersonic

02 DECISION LAYER

Image / Data Processing Computer

- Video Link
- C2-Link Command & Control

Driving Computer (RTOS)

03 EXECUTION LAYER

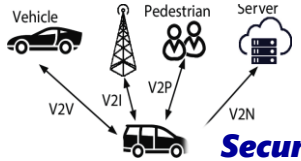
Control System
- Accelerator
- Brake
- Gear Lever
- Steering
- Other Device

BMS
- Battery
- Management
- System

Sensor Fusions

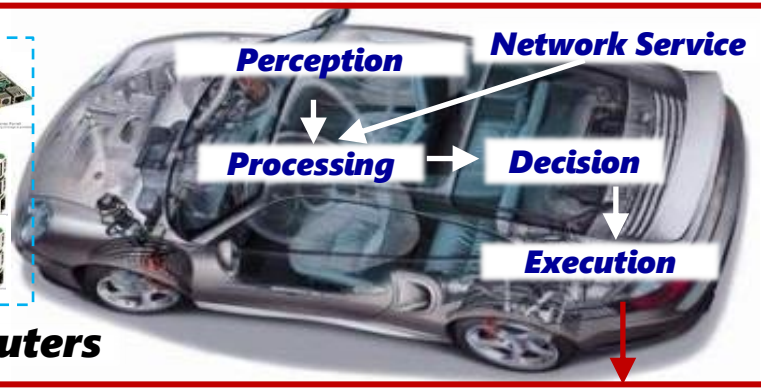
LiDAR	Camera
IMU	LASER
RADAR	GPS

V2X



Cloud Control Platform

Security



Computers

Pedals

ESC

EPS

AT

7STARLAKE

Guideline of Autonomy

AMPERE

intel

L5

AV400

M128 RTX A6000

AV1000

Xeon-SP 2xA100

intel Xeon PLATINUM

NVIDIA QUADRO

L4

AA640

M80 RTX A6000

CPT400

Core i9 , 2xRTX4080

intel CORE i7

NVIDIA GEFORCE GTX

L4

TEC300S

Q32 A1000

CPT300

Core i7, 1xRTX3060

intel CORE i7

NVIDIA GEFORCE GTX

PART 01

Level-4 Shuttles

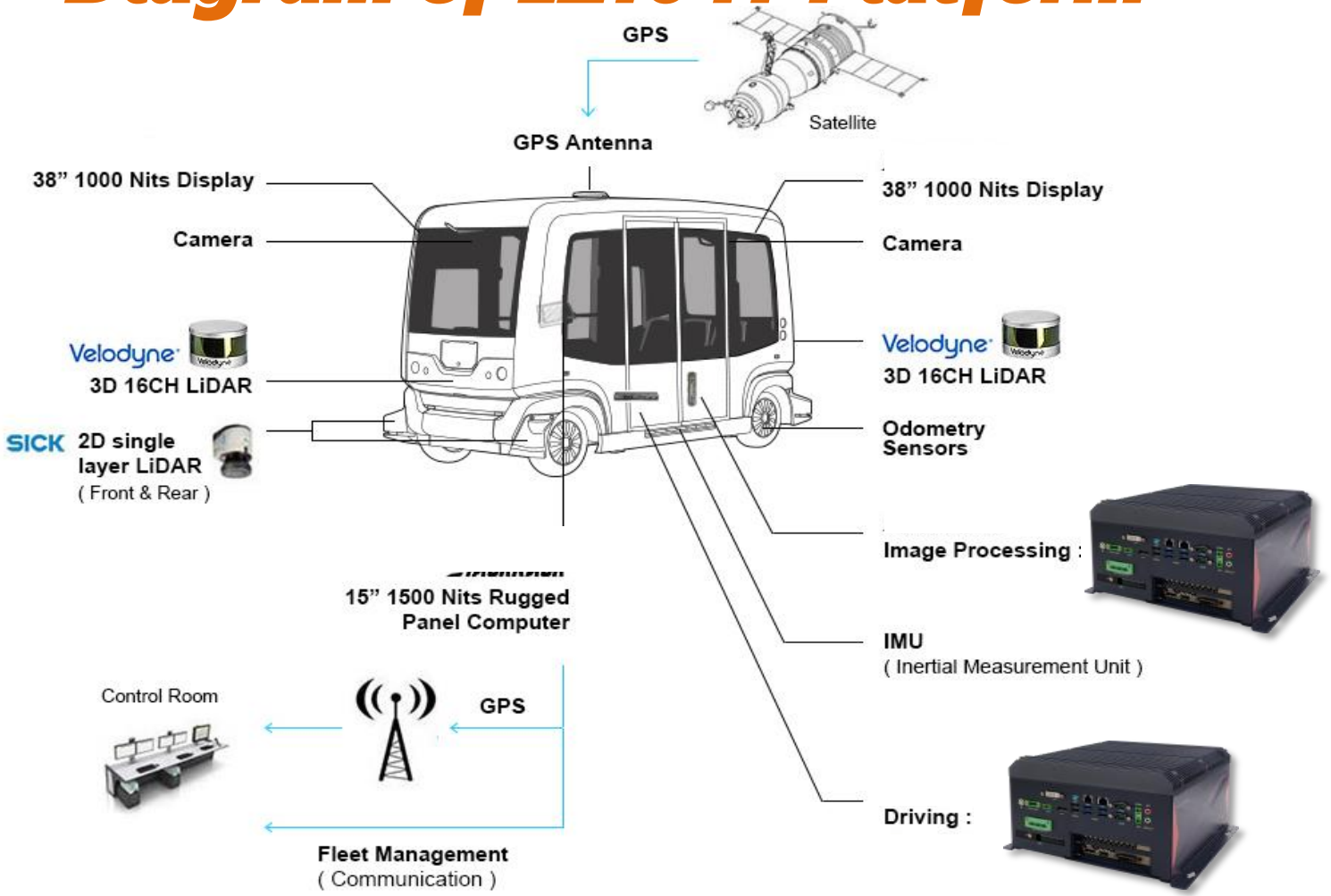
When Reliability is Key - You Need 7Starlake

Level- 4 Driverless Vehicle Successful Cases

navya

easy MILE

Diagram of EZ10 IT Platform



EZ10 IT Solution Overview

For EZ10 Gen1

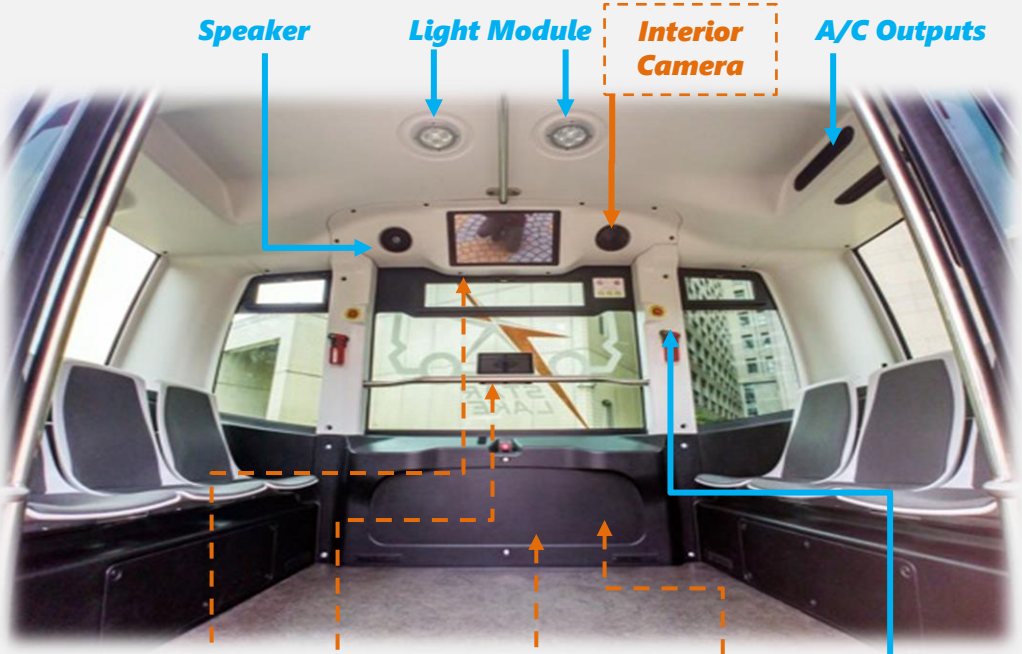
PER33A
Perception/ Driving Computer

Intel® Core™ i5-520M (2.4GHz, 2 cores, 4 threads)
6 x LAN Ports
2 x CAN Bus
1 x DP, 1 x HDMI, 1 x DVI, 6 x USB
9V~36V DC Input

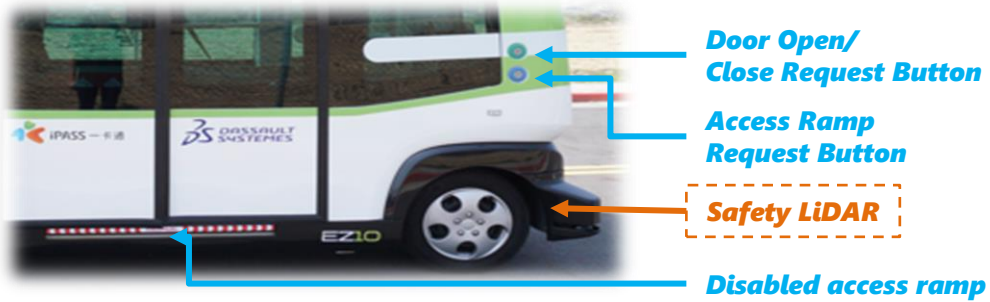
CPT330B
Perception/ Driving Computer

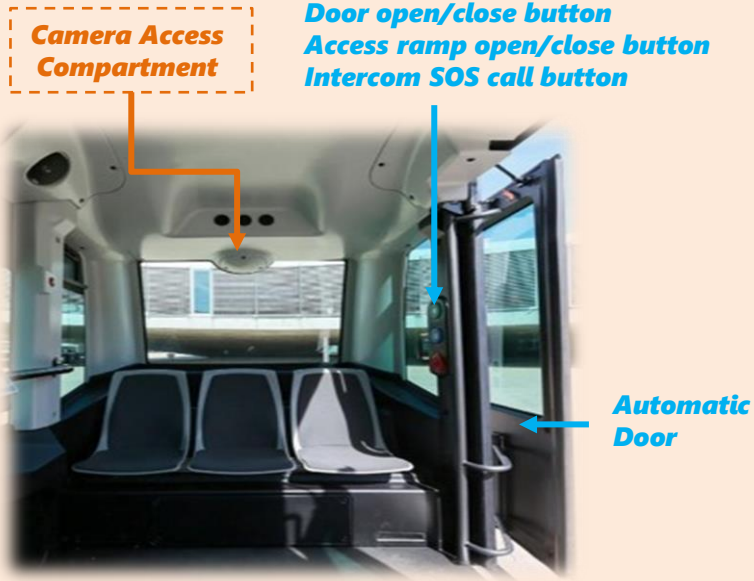
Intel® 9th Gen Core i7-9700TE (3.8GHz, 8 cores, 8 threads)
NVIDIA®GTX1660S
8 x LAN Ports
2x CAN Bus
2x SSD
9V~48V DC Input

For EZ10 Gen3

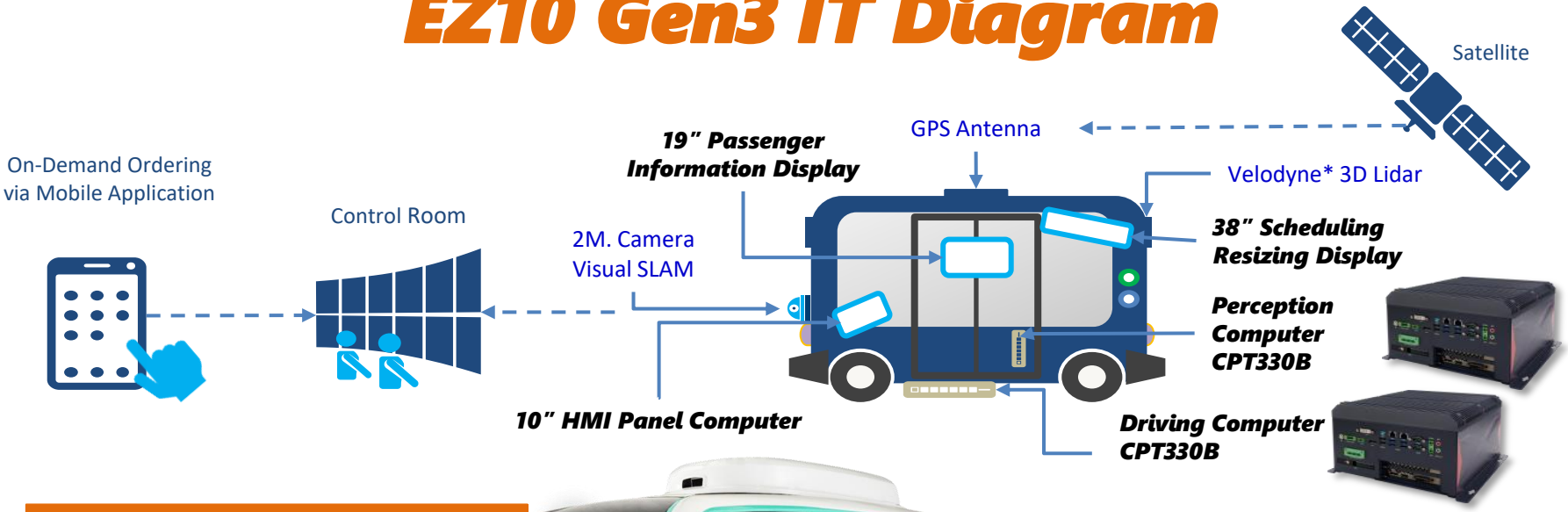

Speaker
Light Module
Interior Camera
A/C Outputs
19" Passenger Information Display
10" HMI Panel Computer
Driving Computer
Perception Computer
E-Stop Button


EASY MILE
3D LiDAR
Turn signal Rear lights Stop lights
Front light Hi-beam light


iPASS
DASSAULT SYSTEMES
EZ10
Door Open/ Close Request Button
Access Ramp Request Button
Safety LiDAR
Disabled access ramp


Camera Access Compartment
Door open/close button
Access ramp open/close button
Intercom SOS call button
Automatic Door

EZ10 Gen3 IT Diagram



IT Solution List

7STARLAKE

- 38" Scheduling Display
- 19" Passenger Info Display
- 10" HMI Panel PC
- Perception Computer
- Driving Computer

19" Passenger Information Display

10" HMI Panel Computer

38" Scheduling Resizing Display

navya

Camera x6

Outside LED panel + Inside Stretched TFT screen

Lidars 360° multi-layers

Car front

NVIDIA GEFORCE GTX 1050 — 7th Kaby Lake

HORUS330

HORUS330 — NVIDIA GEFORCE GTX 1050 — 7th Kaby Lake

Car tail

Passenger x6

3 Lidars 360° multi-layers

Radar x4

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ARMA IT Diagram

Multi Layer Lidar

10" HMI

Scheduling Display 38"

3D x 16CH Lidar

Rear Camera

Scheduling Display 38"

3D x 16CH Lidar

Front Cameras

PER335A

Driving Computer

PER335A

Perception Computer

PART 02

Level-4 Truck

When Reliability is Key - You Need 7Starlake

CPT330B – L4 Autonomy GPU Computer

Truck Platooning

CPT330B – L4 Autonomy GPU Computer
Truck Platooning

Processor

9th Coffeelake-R

Main Features

Intel Coffee Lake-R 9th Xeon/Core i

I. Ethernet Expansion Module

Option 1: 4 x Gigabit Ethernet (RJ45)
Option 2: 2 x Gigabit Ethernet (RJ45)
Option 3: 8 x Gigabit PoE (RJ45)
Option 4: 4 x Gigabit PoE (RJ45)

II. COM Expansion Module

- 2 x RS232/422/485 with isolated DIDO(4xDI,4xDO)
- 8 x CANBUS

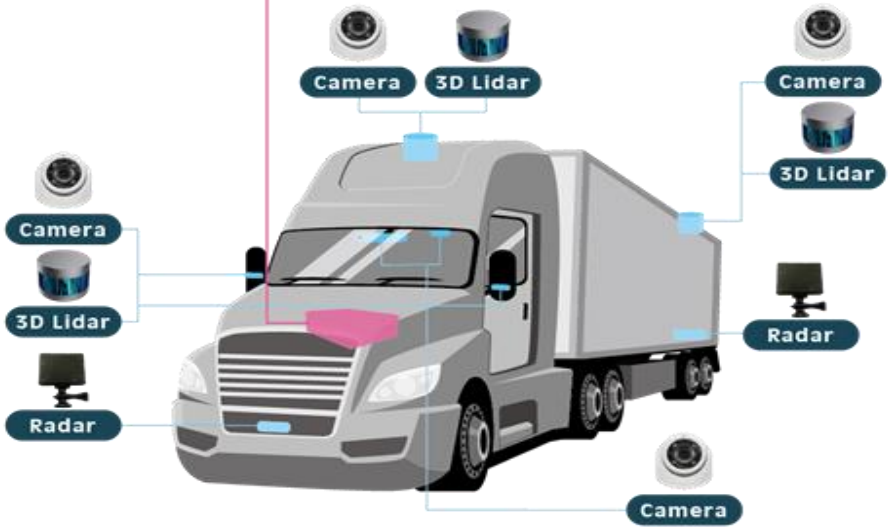
4x PoE module

4x RS232 / 422 / 485, Isolated DIDO module

4x RJ45 module

Autonomous Driving GPU-Computer

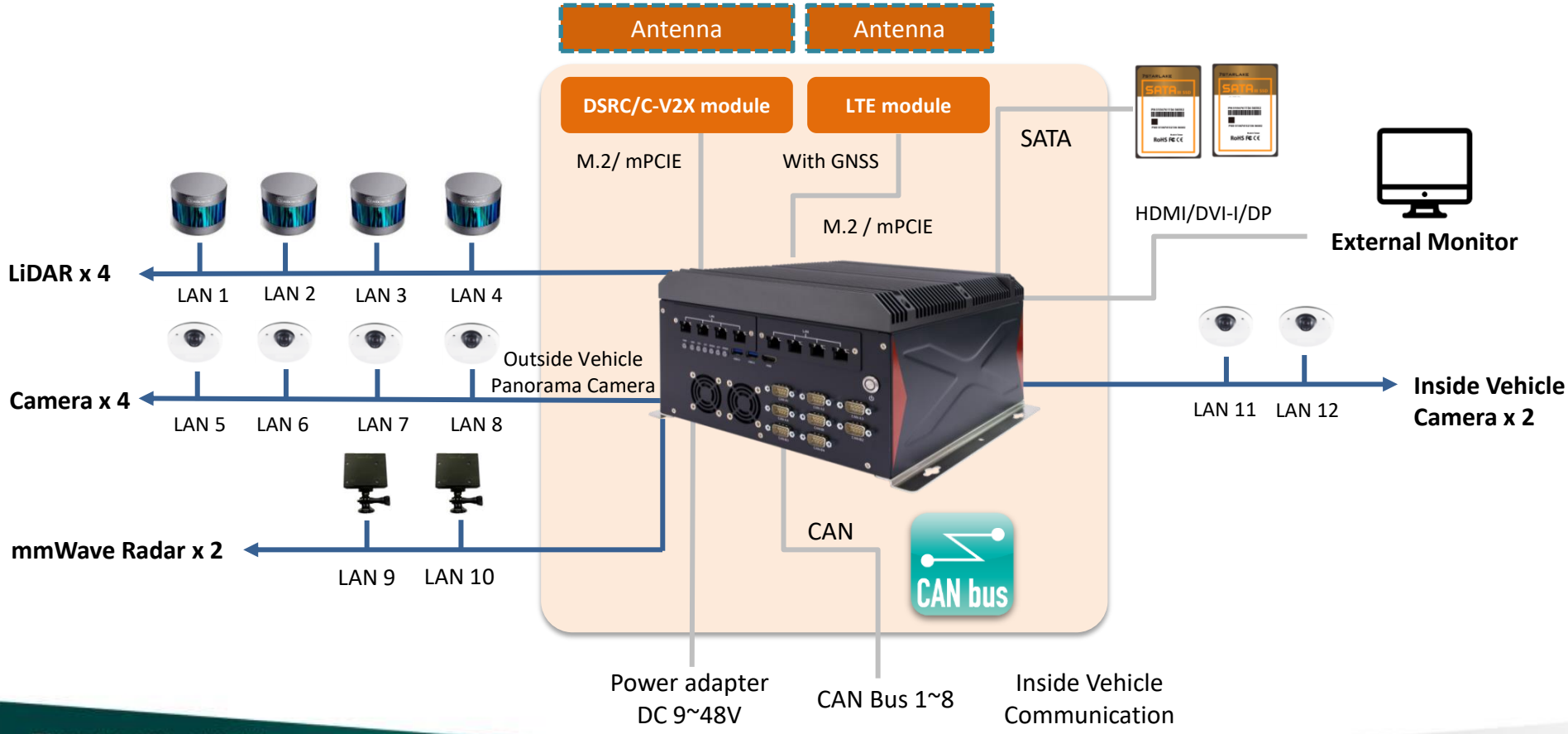
Automated Trucks Sensors



3D Lidar	Use pulses of light to measure distance.
Camera	Send visual information to automated system
Radar	Uses pulses of energy to detect and monitor objects.

CPT330B – L4 Autonomy GPU Computer

Truck Platooning



PART 03

Level-5
Test Bed SUV

When Reliability is Key - You Need 7Starlake

Level- 5 Test Bed SUV

Server 1

Server 2

HE4K
Heat Exchanger

HE4K Heat Exchanger

QUADRO RTX 2-GPU

1-Xeon-SP + 2xGPU

AV1000

1000W power consumption

NVIDIA QUADRO RTX 6000

Rugged Liquid Cooling

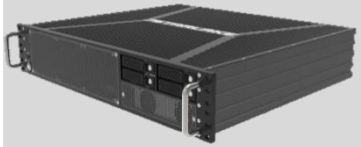
Processor	GPU	Storage	Power	Liquid Cooling
intel XEON PLATINUM	NVIDIA QUADRO		HIGH Volt. LOW Volt. Wide DC-in	LIQUID COOLED
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Intel 3rd Gen. Xeon Scalable (ICE LAKE) ® Platinum 8380 (40 x cores, 2.3 GHz, 270W)	◆ NVIDIA QUADRO RTX 6000 (4608 CUDA, 24GB GDDR6)	◆ 4 x 4TB SATAIII SSD ◆ 2 x 16TB NVMe (PCIe 3.0)	◆ DC 16V-72V 1000W	◆ Heat Exchanged by AIR with Radiator ◆ Heat Exchanged by liquid with Facility water

PART 04

ARM SOAFEE L4 L5

When Reliability is Key - You Need 7Starlake

ARM SOAFEE L5 Ampere Altra GPU Server

Military Unmanned	Level-4 Truck	Level-4 Shuttle	Arm SOAFEE Automotive
			
MIL-STD 810/461	Level 4 Autonomy	Level 4 Autonomy	Level 5 Autonomy
MIL-STD 810, MIL-STD 461	MIL-STD 810, LEVEL 5	MIL-STD 810, LEVEL 5	MIL-STD 810, LEVEL 5
			
AA320	**AA640**	**TEC300S**	**AV400**

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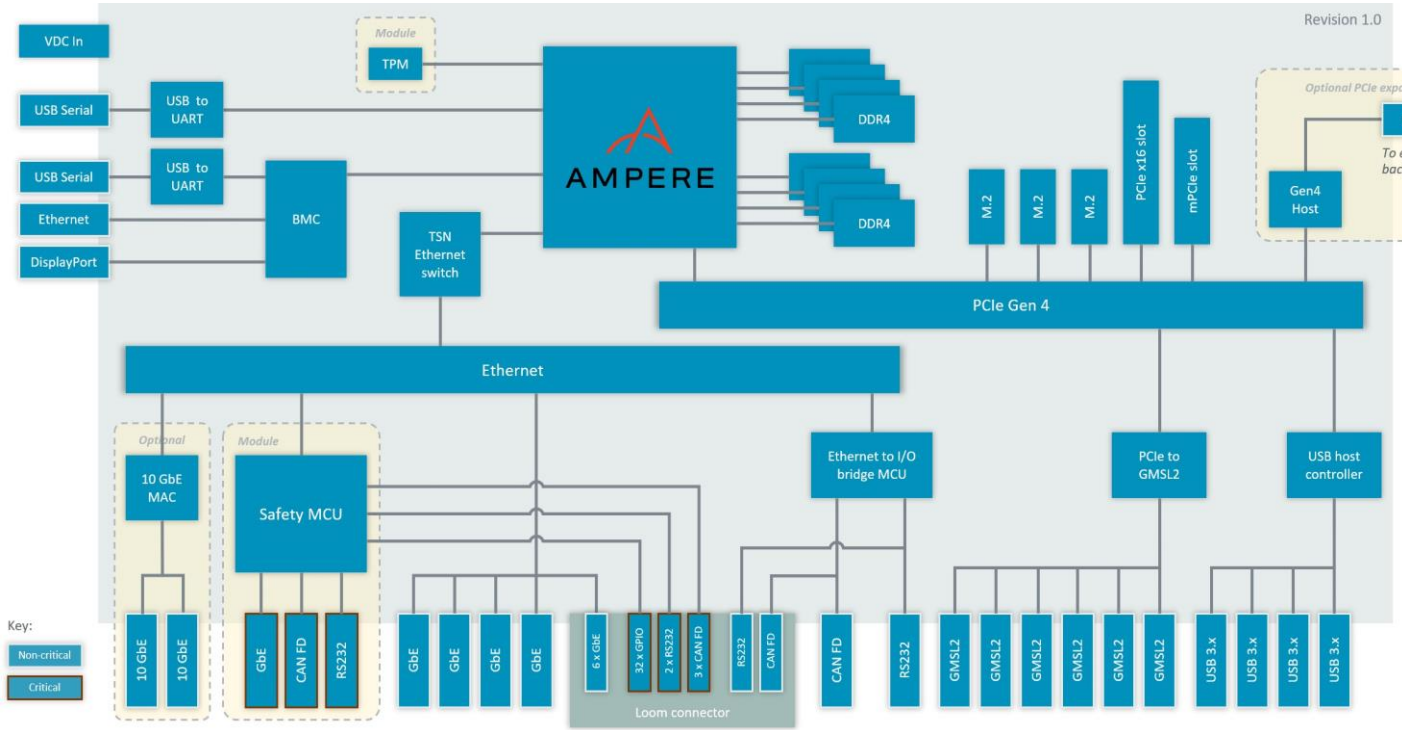
ARM Level-5 AV Platform



GPU

2x10G | Safety MCU | GPIO+RS232 | 2xCAN | 6xGMSL | 4xUSB 3.0

Arm® Architecture

miriac® MPX-S32G274A

The world's first NXP® S32G vehicle network processor based System-on-Modules

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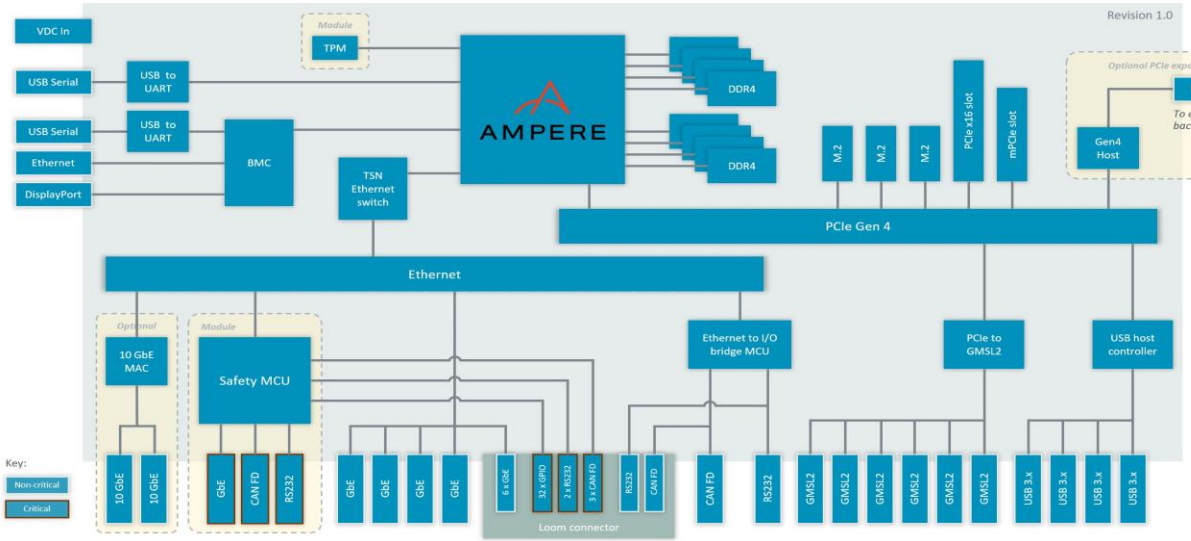
7StarLake Level-5 Reference Platform

MXM A2000

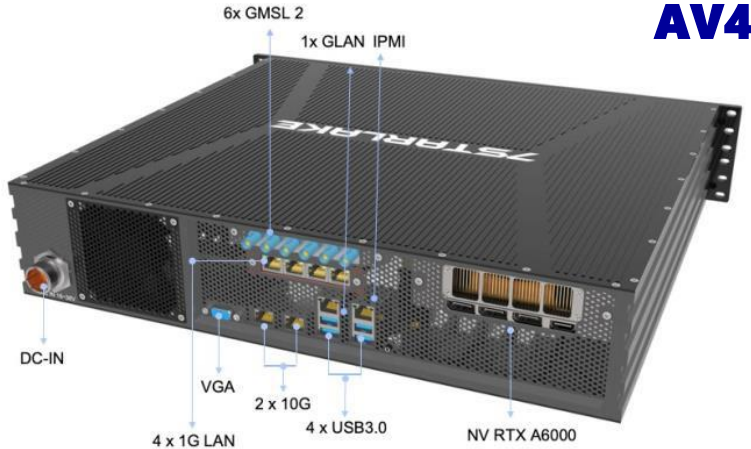


PEG A6000

2x10G | Safety MCU | GPIO+RS232 | 2xCAN | 6xGMSL | 4xUSB 3.0

TEC300S

AV400



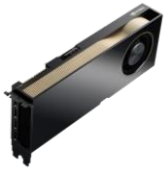
RLAKE

ARM SOAFEE L5 Ampere Altra GPU Server

AMPERE®

Use Scenario	L-4 Autonomy		L-5 Autonomy		Military Autonomy	Level-5 Test Bed	
Model	TEC300S-A10	TEC300S-A20	AA640-Q64A40	AA640-M80A60	AA320	AV400-A60	AV400-A100
CPU	Q64-22	Q64-22	Q64-22	M80-30	Q64-22	M128-30	
GPU	MXM A1000	MXM A2000	RTX A5000	RTX A6000	MXM A4500	RTX A6000	A100
RAM	Up to 2TB DDR4		Up to 2TB DDR4		Up to 2TB DDR4	Up to 2TB DDR4	
Storage-OS	2x M.2 NVMe		2x M.2 NVMe		2x M.2 NVMe	2x M.2 NVMe	
Storage-Data	4x SATA SSD	2x U.2 NVMe	4x SATA SSD	2xU.2 NVMe	2xU.2 NVMe	4xU.2 NVMe	
IO	2 x 10G 1 x 1G 1 x IPMI 1 x VGA		2 x 10G 1 x 1G 1 x IPMI 1 x VGA		2 x 10G 1 x 1G 1 x IPMI 1 x VGA	2 x 10G 1 x 1G 1 x IPMI 1 x VGA	
Expansion	1 x FHFL		2 x FHFL		By Request	3 x FHFL	
PSU	DC-IN 10V~36V		DC-IN 16V~72V		MIL-STD-461 DC-IN 18V~36V	DC- IN 16-72V	

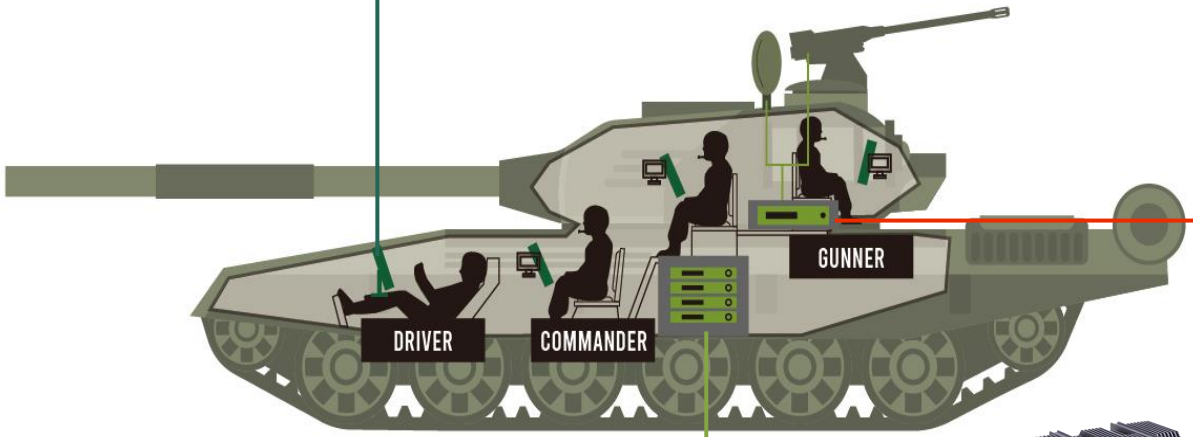
NVIDIA QUADRO



STARLAKE

Extreme Rugged Edge

MIL-STD 810/461/1275



Cloud12

Defense Display Computer

SR800

VMware Workstation

AA320

Extreme Rugged Edge

AMPERE®

Extreme Rugged Ampere Q64 GPU Server

AA320

COM-HPC™

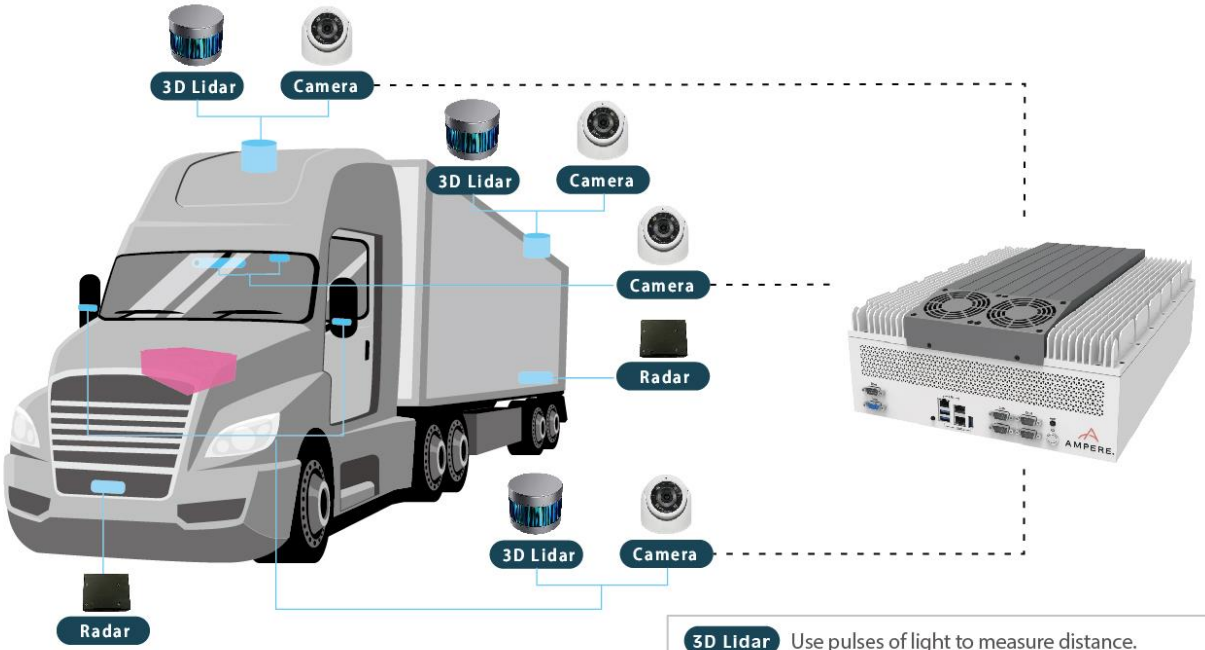
Ampere Altra Q64

MXM A4500

Processor	GPU	10GbE	MIL-STD810	MIL-STD461
AMPERE.	NVIDIA. QUADRO®	10G 10G SFP+ 1G 1G RJ45	MIL-STD 810	MIL-STD 461
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Ampere® Altra® Multi-Core 64-Bit Processor is 80 Armv8.2+ 64-bit CPU cores at up to 3.30 GHz maximum.	◆ NVIDIA MXM RTX A4500 5888 CUDA® Cores,	◆ 2 x port 10 Gigabit Ethernet with SFP+ ◆ 2 x 1 Gigabit Ethernet with RJ45	◆ Design to meet MIL-STD-810 Temperature, Shock, Vibration	◆ CE102 ◆ CS101 ◆ CS114 ◆ RE102 ◆ RS103

Automotive Edge

AI & Level 4 Autonomy Rugged GPU Server



3D Lidar	Use pulses of light to measure distance.
Camera	Send visual information to automated system
Radar	Uses pulses of energy to detect and monitor objects.

AA640

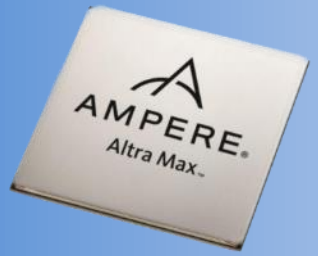
Automotive Edge Computer

GMSL 3.0

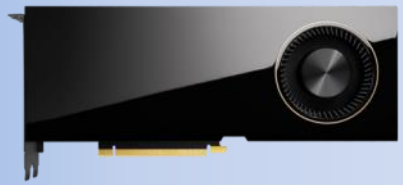
AMPERE®

Arm SOAFEE Automotive L-4 Rugged GPU Server

AA640



Ampere Altra M128

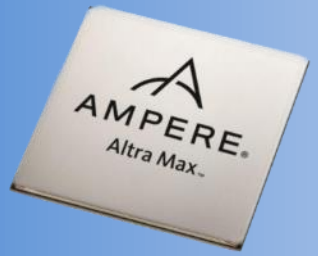


NVidia RTX A6000

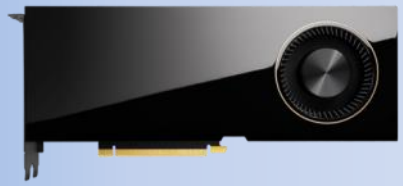
Processor	GPU	PSU	Storage	MIL-STD-810
AMPERE	NVIDIA	HIGH Volt. LOW Volt. Wide DC-in	× 8	MIL-STD 810
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Ampere® Altra® Multi-Core 64-Bit Processor is 64 Armv8.2+ 64-bit CPU cores at up to 3.0 GHz maximum.	◆ NVIDIA RTX A6000 48G GDDR6 768GB/s 10724 CUDA® cores	◆ DC 16V-72V 1000W	◆ 8 x SATAIII with RAID RAID 0, 00, 1, 5, 6, 10, 50 and 60	◆ Vibration Acceleration: 2.2 Grms ◆ Shock Acceleration: 20G

Arm SOAFEE Automotive L-5 Rugged GPU Server

AV400-Q64-D



Ampere Altra Q64

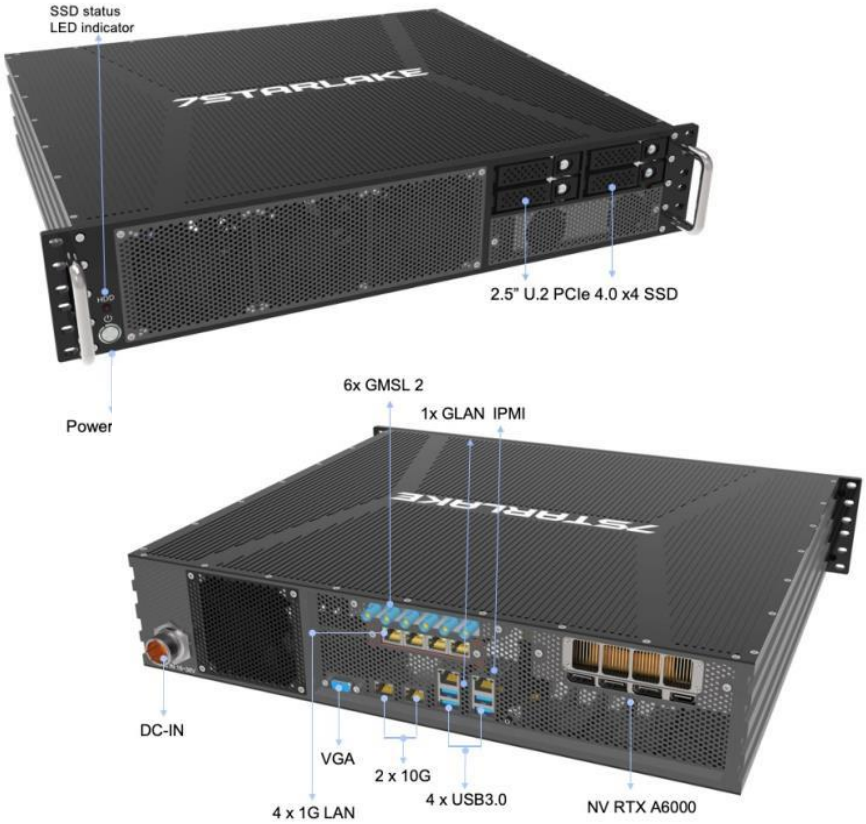


NVidia RTX A6000

Processor	GPU	PSU	Storage	MIL-STD-810
AMPERE.	NVIDIA.	LOW Volt. HIGH Volt. Wide DC-in	7STARLAKE NVMe SSD 8TB ✖ 4 = 64TB	MIL-STD 810
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Ampere® Altra® Multi-Core 64-Bit Processor is 64 Armv8.2+ 64-bit CPU cores at up to 3.0 GHz maximum.	◆ NVIDIA RTX A6000 48G GDDR6 768GB/s 10724 CUDA® cores	◆ DC 16V-72V 1000W	◆ 4 x 16TB U.2 NVMe PCIe 4 x 4 speed bandwidth with RAID RAID 0, 00, 1, 5, 6, 10, 50 and 60	◆ Vibration Acceleration: 5 Grms ◆ Shock Acceleration: 40G

Arm SOAFEE Automotive L-5 Rugged GPU Server

AV400-Q64-D



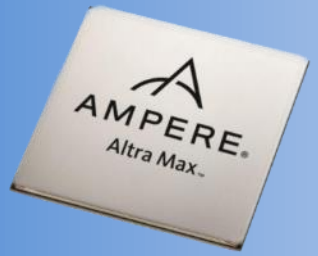
- ◆Ampere® Altra® Max Multi-Core 64-Bit Processor 64 Armv8.2+ 64-bit CPU cores at up to 3.0 GHz
- ◆Nvidia RTX A6000 48GB GDDR6 10724 CUDA Cores
- ◆128GB DDR-4 3200 RDIMM ECC
- ◆16 bit programmable GPIO
- ◆4 x U.2 NVMe PCIe Gen 4 (Up to 64TB)1
- ◆1x M.2 NVMe (OS)
- ◆I/O : 1xIPMI , 2x10G , 4x1G
- ◆1 x FHHL Slot Available
- ◆DC 16V-72V (1000W)

OPTIONAL

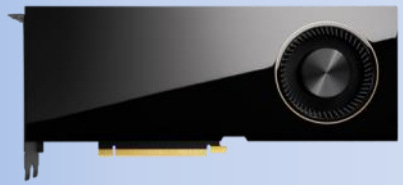
- ◆6x GMSL 2.0 inputs
- ◆RAID PCIe Gen 4.0 Tri-Mode Support RAID 0, 00, 1, 5, 6, 10, 50 and 60

Arm SOAFEE Automotive L-5 Rugged GPU Server

AV400-Q64-A



Ampere Altra Q64



NVidia RTX A6000

Processor	GPU	PSU	Storage	MIL-STD-810
AMPERE.	NVIDIA.		 × 8	MIL-STD 810
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Ampere® Altra® Multi-Core 64-Bit Processor is 64 Armv8.2+ 64-bit CPU cores at up to 3.0 GHz maximum.	◆ NVIDIA RTX A6000 48G GDDR6 768GB/s 10724 CUDA® cores	◆ AC 100V-240V	◆ 8 x SATAIII with RAID RAID 0, 00, 1, 5, 6, 10, 50 and 60	◆ Vibration Acceleration: 2.2 Grms ◆ Shock Acceleration: 20G

AV400-Q64-D

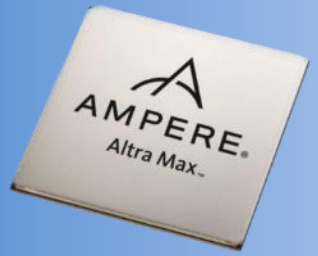
DC 16V~72V , NVMe 64TB

Rugged GPU Server

Model	AV400-Q64-D1	AV400-Q64-D2	AV400-Q64-D3	AV400-Q64-D4
CPU	Ampere Altra Q64	Ampere Altra Q64	Ampere Altra Q64	Ampere Altra Q64
GPU	OPTIONS	NV RTX A6000	NV RTX A6000	NV RTX A6000
RAM	2TB DDR4 ECC	2TB DDR4 ECC	2TB DDR4 ECC	2TB DDR4 ECC
Ethernet Card	4 x GbE PCIe card	4 x GbE PCIe card	4 x GbE PCIe card	4 x GbE PCIe card
GMSL2 Card	OPTIONS	OPTIONS	OPTIONS	6 x GMSL 2 card
GPIO	16 bit GPIO card	16 bit GPIO card	16 bit GPIO card	16 bit GPIO card
RAID	OPTIONS	OPTIONS	Broadcom RAID	Broadcom RAID
Storage (OS)	2 x 1TB M.2 SSD			
Storage (Data)	4 x U.2 NVMe SSD			

Arm SOAFEE Automotive L-4 Rugged GPU Server

TEC300S



Ampere Altra Q64

MXM A2000

Processor	GPU	PSU	Storage	MIL-STD-810
AMPERE	NVIDIA	HIGH Volt. LOW Volt. Wide DC-in	nvm EXPRESS® × 2	MIL-STD 810
Main Features	**Main Features**	**Main Features**	**Main Features**	**Main Features**
◆ Ampere® Altra® Multi-Core 64-Bit Processor is 64 Armv8.2+ 64-bit CPU cores at up to 3.0 GHz maximum.	◆ NVIDIA MXM A2000 4G GDDR, 2056 CUDA® cores	◆ DC 10V-32V 300W	◆ 2 x NVMe U.2 Up to 32TB	◆ Vibration Acceleration: 2.2 Grms ◆ Shock Acceleration: 20G


7STARLAKE
THANK YOU
When Reliability is Key - You Need 7Starlake