

Enabling Intelligent Solutions with Vecow

Machine Vision · Intelligent Surveillance · Artificial Intelligence · Vehicle Computing

September, 2018

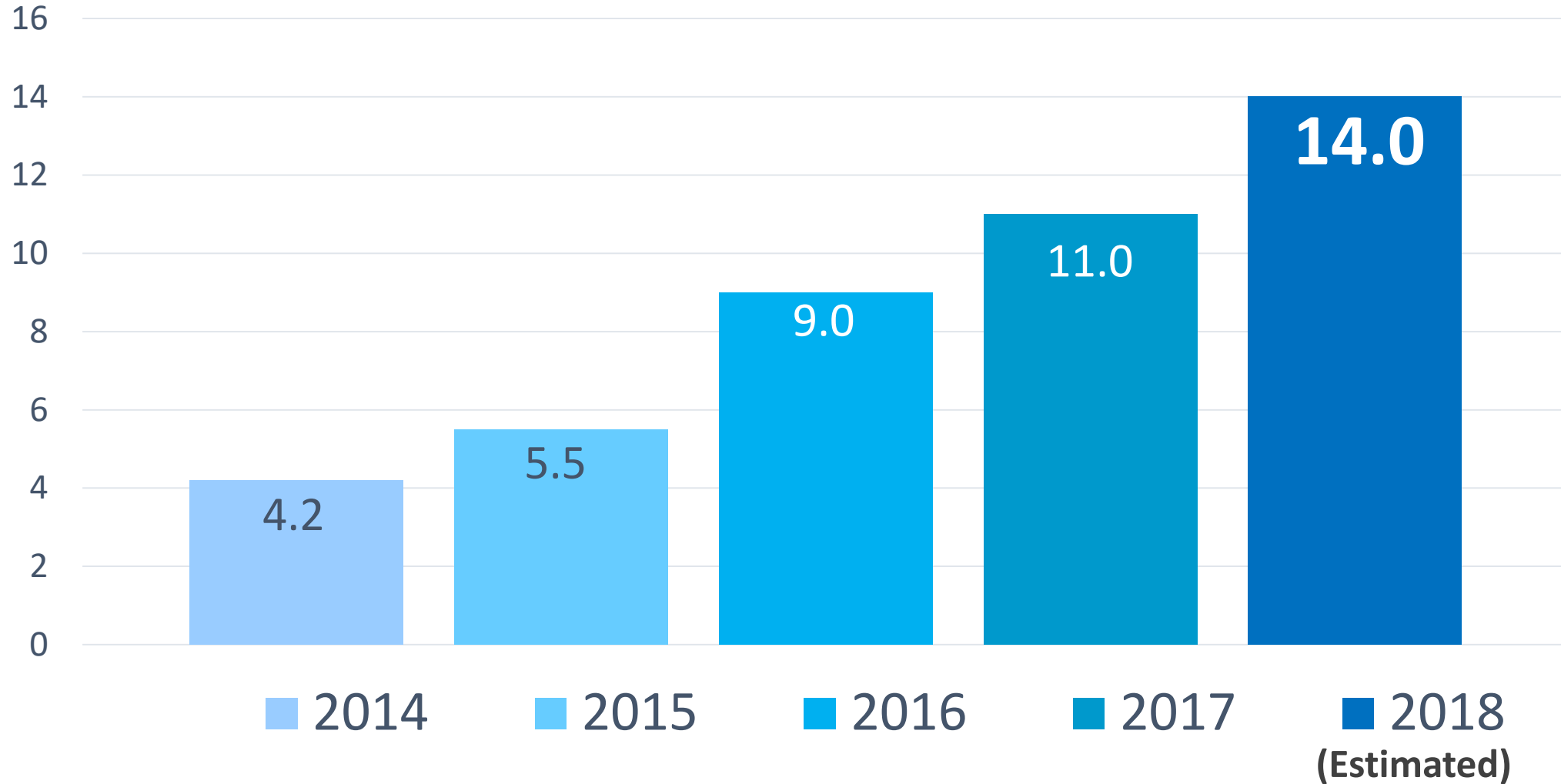


Vecow Brief

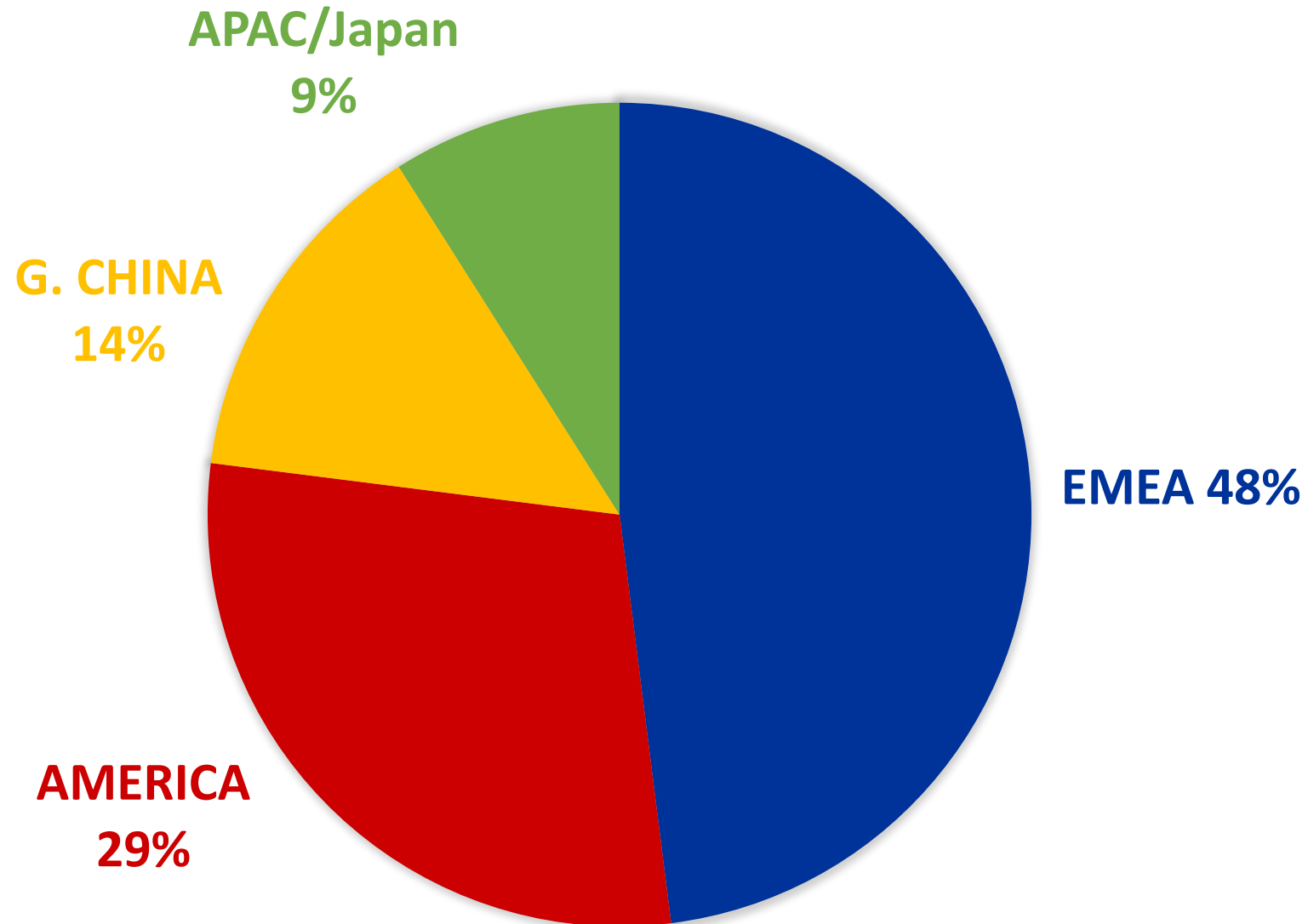
- Founded in **2010**
- **Headquarters** in New Taipei City, **Taiwan**
- **Service Center** in **Hong Kong**
- **Manufacturing** Force in **Taiwan & China**
- Overseas Office in **Shanghai**, China
- Business covers **EMEA, America, G. China & APAC**, more than **65** countries

Sales Revenue

USD (M)



Worldwide Coverage



Industrial Artificial Intelligence Solutions

Industrial IoT Applications



Surveillance



Power & Energy



Factory Automation



Robot Control



Rolling Stock



Deep Learning



Autonomous Car



Healthcare



Smart Logistics



Traffic Vision



Infotainment



Machine Vision

Embedded Systems

Panel PCs & Displays

3.5" Single Board Computer

Embedded Peripherals

Design & Manufacturing Services

Products & Services Go-to-market

Vecow Core Competencies

Leading Expertise

- Domain Knowhow
- Performance Driven
- User Oriented

Compact Design

- Integrated Features
- Small Form Factor
- High Reliability

Easy Customization

- Less Efforts
- Lower Cost
- Faster Time-to-Market

Flexible Teamwork

- One-stop Service
- Top-tier Ecosystem
- Win-win Partnership

Vecow Core Competencies

Leading Expertise

- IPC Domain Knowhow
- Performance Driven
- User-friendly Oriented

10GigE



Compact Design

- Integrated Features
- Single-board/Small Form Factor Solution
- Industrial-grade Reliability

Easy Customization

- Less Engineering Efforts
- Lower Total Project Cost
- Faster Time-to-Market



Flexible Teamwork

- One-stop Service
- World-leading Ecosystem
- Win-win Partnership



Leading Expertise

◆ IPC Domain Knowhow

- Seasoned IPC/Embedded Experts
- In-house Capacity : Hardware R&D, Software R&D, ME, Production, Quality Assurance
- World-wide Successful Stories

◆ Performance Driven

- Workstation-grade CPU
- Independent Graphics
- Leading Data Rate



◆ User-friendly Oriented

- Front-access Management
- Secured Device Support
- Flexible Customization, Less Setup Effort



Compact Design

- ◆ Integrated Features
 - All-in-one integrated features
 - Multiple I/O & expansion functions
 - Performance oriented
- ◆ Small Form Factor
 - Single-board solution
 - Ultra-Slim, Ultra-Compact design
- ◆ Industrial Grade Reliability
 - Board-to-board, Cable-less
 - Fanless -40°C to 75°C Wide Range Operating Temperature
 - Wide Range Power Input
 - Ignition Power Control
 - Surge Protection
 - IP67 Compliant
 - Anti-shock & Anti-vibration

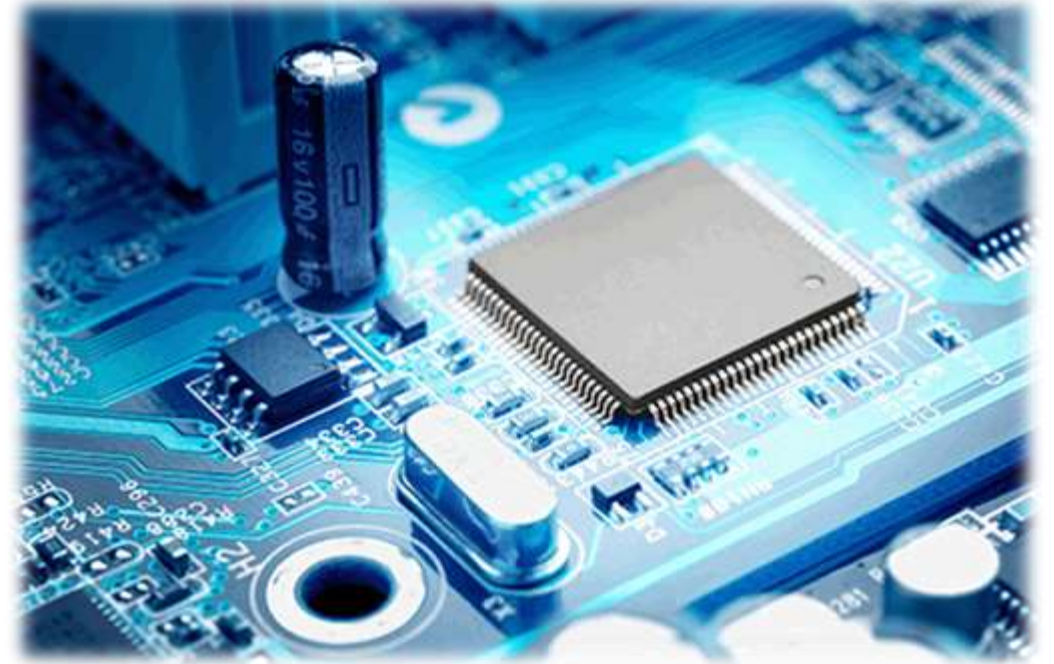


BC
AWARD



Easy Customization

- ◆ Less Engineering Change Efforts
 - Modularized Designs
 - Simplified Functions
 - Mechanical Customization
- ◆ Lower Total Project Cost
 - Less R&D Efforts
 - Smarter Project Management
 - Win-win Teamwork
- ◆ Faster Time-to-Market
 - SUMIT (PCIe)
 - PCI/PCIe
 - Mini PCIe



Flexible Teamwork

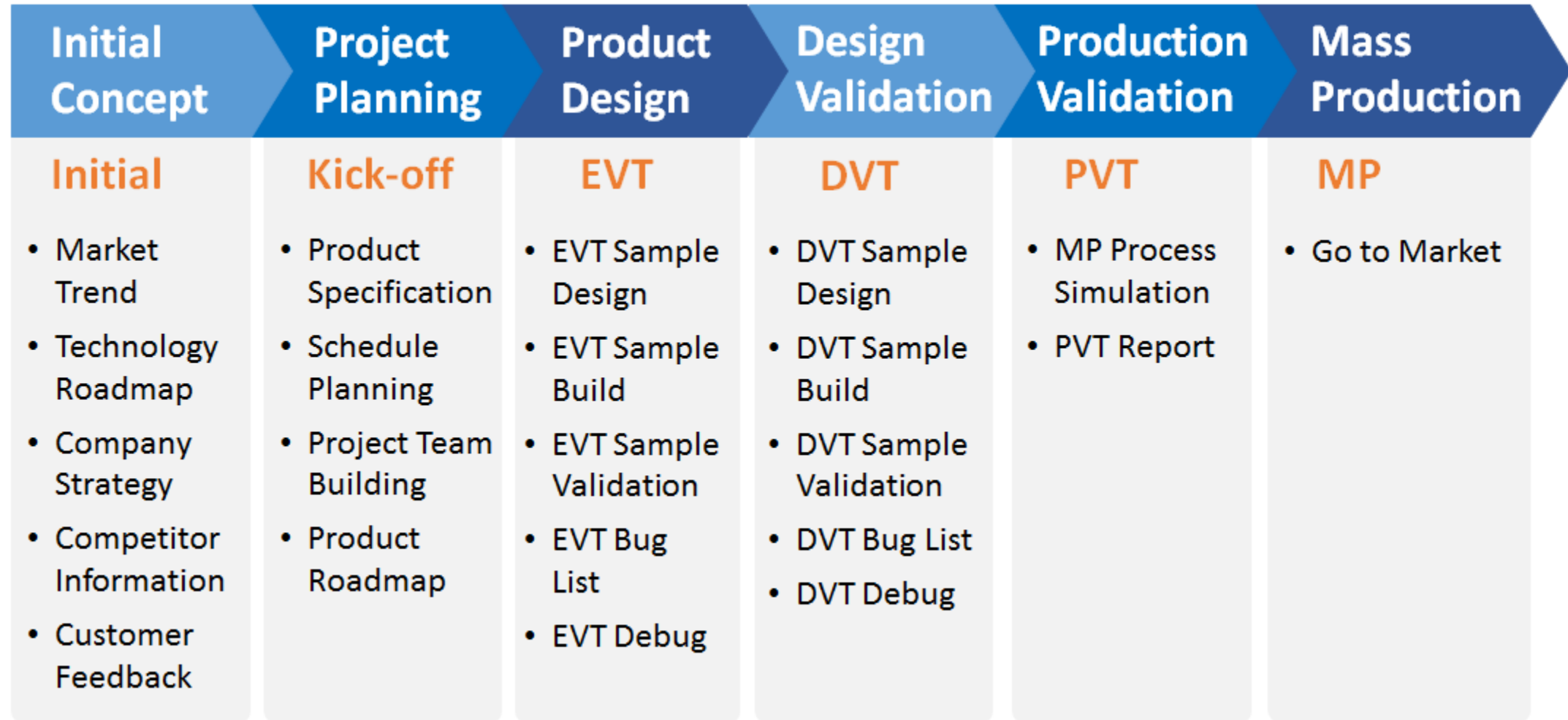
- ◆ One-stop Service/Solution
 - R&D, Project Management, Production & Quality Validation
 - Dedicated Manufacturing Capacity
- ◆ World-leading Ecosystem
 - Intel IoT Solution Alliance
 - VMware Elite TAP Partner
 - EtherCAT Technology Group
 - AIA Member
 - Windows Embedded
- ◆ Win-win Partnership
 - Less Project Leadtime
 - Seamless Teamwork
 - Quality Deliveries



IoT Solutions Alliance



NPI Process





Manufacturing Force

- Taoyuan, Taiwan
- Kunshan, China

Manufacturing Force Overview



System and Regulatory Certificate Approvals



ISO9001 Certification



UL Factory Certification



CSA Factory Certification



Nemko Certification



ISO14001 Certification



Demko Certification



TUV Factory Certification



CCC Factory Certification

Manufacturing Facilities

SMT Line



- ✓ Fully ESD & Climate Controlled
- ✓ AOI and 3D/5D X-Ray Inspection
- ✓ In-circuit Test (ICT), Burn in Test (BIT) & Functional Test
- ✓ ISO File Management
- ✓ Lead-Free & RoHS Compliant PCB and PCBA
- ✓ PCB & PCBA Assembly Annual Capacity of 2.8M pcs

Cleanroom Assembly



- ✓ ISO 9001:2008 Certified
- ✓ ISO 14644-1 Cleanroom
- ✓ ISO 3 Class 1 (Class 1,000) Cleanrooms and Controlled
- ✓ 4,000+ Square Feet of Cleanroom MFG Space
- ✓ IPC System Assembly Annual Capacity more than 500,000 Systems

Laboratory



- ✓ Scanning Electron Microscopy for SMT Quality Analysis
- ✓ High-performance Environmental Chambers
- ✓ Shock and Vibration Testing Equipment
- ✓ Spectroscopy Equipment for RoHS Compliant Testing
- ✓ Acoustic Equipment for Noise & Vibration Measure, and Sound Quality Testing

What's New in 2018 2nd Half



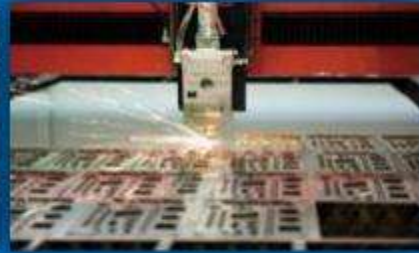
ECX-1000 8th Gen Intel Xeon/Core i7/i5/i3 Workstation-grade Fanless Embedded System



Robotic Control



Vehicle Computing



Machine Vision



Intelligent
Surveillance



Energy
Management



10GigE

Leading Integration

- ✓ Flexible Socket Type CPU
- ✓ DVI-I, DVI-D, DisplayPort
- ✓ 3 SIM Socket, 2 2.5" SSD Tray, 1 CFast Socket
- ✓ 6 USB 3.1, 4 COM
- ✓ 9 Independent GigE LAN w/4 PoE+
- ✓ 2 Mini PCIe, 2 SATA III, M.2, SUMIT A, B

Workstation-grade Performance

- ✓ 6-core Intel Xeon/Core i7/i5/i3 + Intel C246 chipset (Coffee Lake-S)
- ✓ Max 10% System Performance↑
- ✓ WiFi/4G/3G/LTE/GPRS/UMTS
- ✓ USB 3.1 (10G), 10GigE LAN (10G), PCIe 3.0 (8GT/s), SATA III (6G), USB 3.0 (5G), PoE+ (1G), GigE LAN (1G)

Smart Manageability

- ✓ Front-access : 2 2.5" SSD Tray, SIM Socket, CFast Socket
- ✓ Smart Power Protection
- ✓ Smart Circuit Protection
- ✓ Remote Power Switch
- ✓ TPM 2.0, iAMT 12.0, S/W RAID 0, 1

Trusted Reliability

- ✓ Fanless -40°C to 75°C Operation
- ✓ 6V to 36V DC-in with 80V Surge Protection
- ✓ 16 Isolated DIO
- ✓ 16-mode Programmable Ignition Power Control
- ✓ EN50155, EN50121-3-2
- ✓ Anti-shock, Anti-vibration

ECX-1200 8th Gen Intel Xeon/Core i7/i5/i3 Workstation-grade Expandable Fanless System



Machine Vision

Rolling Stock

Factory Automation

Intelligent Control

Smart
Manufacturing

System-oriented Integration

- ✓ Max 200W power budget for PCIe x16 expansion
- ✓ Smart Power Protection
- ✓ Smart Circuit Protection
- ✓ Smart Manageability : iAMT 12.0, TPM 2.0, PXE, Wake on LAN, S/W RAID 0, 1
- ✓ Remote Power Switch

Workstation-grade Performance

- ✓ 6-core Intel Xeon/Core i7/i5/i3 + Intel C246 chipset (Coffee Lake-S)
- ✓ Max 10% System Performance↑
- ✓ WiFi/4G/3G/LTE/GPRS/UMTS
- ✓ USB 3.1 max 10G data rate
- ✓ PCIe 3.0 (8GT/s), SATA III (6G), USB 3.0 (5G), PoE+ (1G), GigE LAN (1G)

Flexible Configuration

- ✓ Expansion : 1 PCI/PCIe Slot, 2 Mini PCIe/mSATA, 1 M.2, optional SUMIT A, B
- ✓ 6 Independent GigE LAN with 4 M12 PoE+
- ✓ 3 SIM Socket, 2 2.5" SSD Tray, 1 CFast Socket, 4 COM
- ✓ 32 Isolated DIO, 6 USB 3.1
- ✓ VGA, DVI-D, DisplayPort

Rugged Reliability

- ✓ Rugged M12 Connections
- ✓ Fanless -40°C to 75°C Operation
- ✓ 6V to 36V DC-in with 80V Surge Protection
- ✓ Smart Circuit Protection
- ✓ Ignition Power Control
- ✓ EN50155, EN50121-3-2
- ✓ Anti-shock, Anti-vibration

ECX-1400 8th Gen Intel Xeon/Core i7/i5/i3 Expandable Fanless Embedded Workstation



Machine Vision



Vehicle Computing



Deep Learning



Intelligent
Surveillance



Robotic Control



System-oriented Integration

- ✓ Max 200W power budget for PCIe x16 expansion
- ✓ Smart Power Protection
- ✓ Smart Circuit Protection
- ✓ Smart Data Protection
- ✓ Smart Manageability : iAMT 12.0, TPM 2.0, PXE, Wake on LAN
- ✓ Remote Power Switch

Workstation-grade Performance

- ✓ 6-core Intel Xeon/Core i7/i5/i3 + Intel C246 chipset (Coffee Lake-S)
- ✓ Max 10% System Performance↑
- ✓ WiFi/4G/3G/LTE/GPRS/UMTS
- ✓ USB 3.1 max 10G data rate
- ✓ PCIe 3.0 (8GT/s), SATA III (6G), USB 3.0 (5G), PoE+ (1G), GigE LAN (1G)

Versatile Configuration

- ✓ Expansion : 2 PCI/PCIe Slot, 2 Mini PCIe/mSATA, 1 M.2, optional SUMIT A, B
- ✓ 6 GigE LAN with 4 PoE+
- ✓ Storage : 4 2.5" SSD trays, 1 CFast socket, 1 M.2
- ✓ 3 SIM Socket, 32 Isolated DIO, 6 USB 3.1, 4 COM
- ✓ VGA, DVI-D, DisplayPort

Trusted Reliability

- ✓ RAID 0, 1, 5, 10 Data Protection
- ✓ Fanless -40°C to 75°C Operation
- ✓ 6V to 36V DC-in with 80V Surge Protection
- ✓ Smart Circuit Protection
- ✓ Ignition Power Control
- ✓ EN50155, EN50121-3-2
- ✓ Anti-shock, Anti-vibration

SPC-4010/4020 Intel Atom® E3950 Ultra-compact Fanless Embedded System



Excellent Energy-efficiency

- ✓ Quad core Intel Atom E3950 SoC (Apollo Lake-I)
- ✓ Intel HD Graphics 505 supports lockable HDMI & VGA dual display, max 4K ultra HD resolution
- ✓ 200% CPU performance ↑, 150% graphics performance ↑ over the prior generation

Compact Integration

- ✓ Small Form Factor
- ✓ Dual display interface: lockable HDMI and VGA, supporting up to 4K HD resolution
- ✓ 4 USB, 1 2.5" SSD, 1 SIM socket, 3 Mini PCIe, SATA III
- ✓ 4 COM RS-232/422/485 with 2 isolated

Industrial-grade Reliability

- ✓ Fanless -40°C to 85°C operation temperature
- ✓ Support 12V DC power input or optionally for 9V-36V wide range DC-in
- ✓ 4 COM RS-232/422/485 with 2 Isolated
- ✓ 16 Isolated DIO, TPM 2.0
- ✓ EN50155, EN50121-3-2

System-oriented Solution

- ✓ 2 independent GigE LAN with IEEE 1588 (PTP, The Precision Time Protocol) for real time systematic communication
- ✓ Versatile expansion: 3 Mini PCIe and 1 NGFF M.2 Key B socket for mSATA/PCI/PCIe/USB 3.0

SPC-4500/4600 Series Intel Atom® E3950 Ultra-compact Fanless PoE+ Embedded System



Machine Vision



In-vehicle
Computing



Factory Automation



Intelligent Control



Robotic Control



Excellent Energy-efficiency

- ✓ Quad core Intel Atom E3950 SoC (Apollo Lake-I)
- ✓ Intel HD Graphics 505 supports DVI & DisplayPort dual display, max 4K display
- ✓ 200% enhanced in graphics performance & 150% in CPU performance over the prior generation

Compact Integration

- ✓ Small Form Factor
- ✓ Dual display interface including DVI-I and DP, up to 4K resolution
- ✓ 4 external USB 3.0, 1 2.5" SSD, external SIM, 1 SATA III
- ✓ 4 COM RS-232/422/485, 2 Mini PCIe for PCIe/USB/SIM card

Rugged Reliability

- ✓ Fanless -40°C to 85°C operation temperature
- ✓ 12V DC power input or 9V-36V wide range DC power input
- ✓ Configurable Ignition Power Control
- ✓ 16 Isolated DIO, TPM 2.0
- ✓ EN50155, EN50121-3-2

System-oriented Solution

- ✓ 2 GigE LAN supporting IEEE 802.3at PoE+
- ✓ 2 independent GigE LAN with IEEE 1588 (PTP) for real time systematic communication
- ✓ Configurable Ignition Power Control for harsh environments

Product Categories



Embedded Systems



- ◆ High-performance Fanless Systems
- ◆ Ultra-Compact Fanless Systems
- ◆ Expandable Robust Computing Systems
- ◆ PoE+ Embedded Systems
- ◆ M12 Embedded Systems
- ◆ GPU Computing Systems
- ◆ 10GigE Embedded Systems
- ◆ LAN Switch Systems
- ◆ Arm-based IoT Gateway

High-performance Fanless Systems



ECX-1000
(Coffee Lake)



ECS-9000/9200MXC (M12)
(Kaby Lake-S)



IVH-9200 (M12)
(Kaby Lake-S)



IVH-9000
(Skylake-H)



ECS-8000
(Broadwell-H)



IVH-7700 (M12)
(Ivy Bridge)



ECS-7000/7800
(Ivy Bridge)



Ultra-Compact Fanless Systems



SPC-4010/4020
(Apollo Lake-I)



SPC-4500/4600
(Apollo Lake-I)



RES-1000 (M12)
(Skylake-U)



VIG-100 (M12)
(Cortex-A7)



ARS-2000 (M12)
(Kaby Lake-U)



ECS-4500 (PoE+/PD)
(Skylake-U)



SPC-3000/3500
(Skylake-U)



ECS-4000
(Broadwell-U)



SPC-2000/2900
(Bay Trail)



ABP-2000
(Bay Trail)

Expandable Robust Computing Systems



ECX-1400
(Coffee Lake)



ECX-1200 (M12)
(Coffee Lake)



ECS-9200/9100
(Kaby Lake-S)



ECS-9700/9600
(Skylake-H)



ECS-7700/7100
(Ivy Bridge)



RCS-9000F
(Kaby Lake-S)



RCS-9000
(Kaby Lake-S)



RCS-7000
(Ivy Bridge)



RCS-2000
(Bay Trail)



PoE+ Embedded Systems



SPC-4600
(Apollo Lake-I)
2-port PoE+



ECX-1000/1200/1400
(Coffee Lake)
4-port PoE+



ARS-2000 (M12)
(Kaby Lake-U)
2-port M12 PoE+



ECS-9000/9200/9700
(Kaby Lake-S/Skylake-H)
X-coded/A-coded M12 PoE+



IVH-9000/9200
(Skylake-H/Kaby Lake-S)
16-port PoE+/4-port M12 PoE+



ECS-4500
(Skylake-U)
4-port PoE+/2-port PD



ECS-8000/4000
(Broadwell-H/Broadwell-U)
4-port PoE+



IVH-7700 (M12, ICY)
(Ivy Bridge)
4-port M12 PoE+, ICY HDD Tray



ECS-7700/7800
(Ivy Bridge)
4-port PoE+



SPC-2845
(Bay Trail)
2-port PoE+



M12 Embedded Systems



ECX-1200 (M12)
(Coffee Lake)



RES-1000 (M12)
(Skylake-U)
2-port X-coded M12 LAN,
2-port M12 COM, 2-port M12 USB,
1-port M12 Power



VIG-100 (M12)
(Cortex-A7)
2-port M12 LAN



ARS-2000M/ML
(Kaby Lake-U)
2-port M12 PoE+



ECS-9200MXC
(Kaby Lake-S)
X-coded/A-coded M12 PoE+,
2-port CAN Bus



ECS-9200M
(Kaby Lake-S)
4-port M12 PoE+,
PCI/PCIe Expansion



IVH-9200MXC
(Kaby Lake-S)
X-coded/A-coded M12 PoE+,
2-port CAN Bus



IVH-7700-QRDM
(Ivy Bridge)
4-port M12 PoE+, 4 SSD Tray,
4 SIM Socket



IVH-7700-QRDM ICY
(Ivy Bridge)
4-port M12 PoE+, 4 ICY HDD Tray,
4 SIM Socket

GPU Computing Systems



EVS-1000
(Kaby Lake-S + GeForce GT 1030/GTX 1050)
Fanless, 8K resolution, max 6 HD displays



EVS-1100
(Kaby Lake-S + GeForce GTX 1070/1060/1050)
8K resolution, max 7 HD displays



RCS-9000F GTX1080
(Kaby Lake-S + GeForce GTX 1080)
8K resolution, 7 HD displays



ECS-9200 GTX1050
(Kaby Lake-S + GeForce GTX 1050Ti/1050)
8K resolution, max 7 HD displays & 8 PoE



ECS-9700 GTX1050
(Skylake-H + GeForce GTX 1050Ti/1050)
8K resolution, max 7 HD displays & 8 PoE



ECS-9755/9771 GTX1050
(Skylake-H + GeForce GTX 1050Ti/1050)
8K resolution, max 7 HD displays, 10GigE RJ45/SFP+



10GigE Embedded Systems



ECX-1055

(Coffee Lake)

2-port 10GigE RJ45



ECX-1071

(Coffee Lake)

2-port 10GigE SFP+



ECS-9071/9055

(Kaby Lake-S)

2-port 10GigE RJ45/SFP+



ECS-9771/9755

(Skylake-H)

4-port 10GigE RJ45/SFP+



SPC-3071/3055

(Skylake-U)

2-port 10GigE RJ45/SFP+



ECS-9771/9755 GTX1050

(Skylake-H + GeForce GTX 1050Ti/1050)

8K resolution, max 7 HD displays, 10GigE RJ45/SFP+



LAN Switch Systems

Everyone deserves a better system



ECS-9160

(Kaby Lake-S/Skylake-S)



Arm-based IoT Gateway



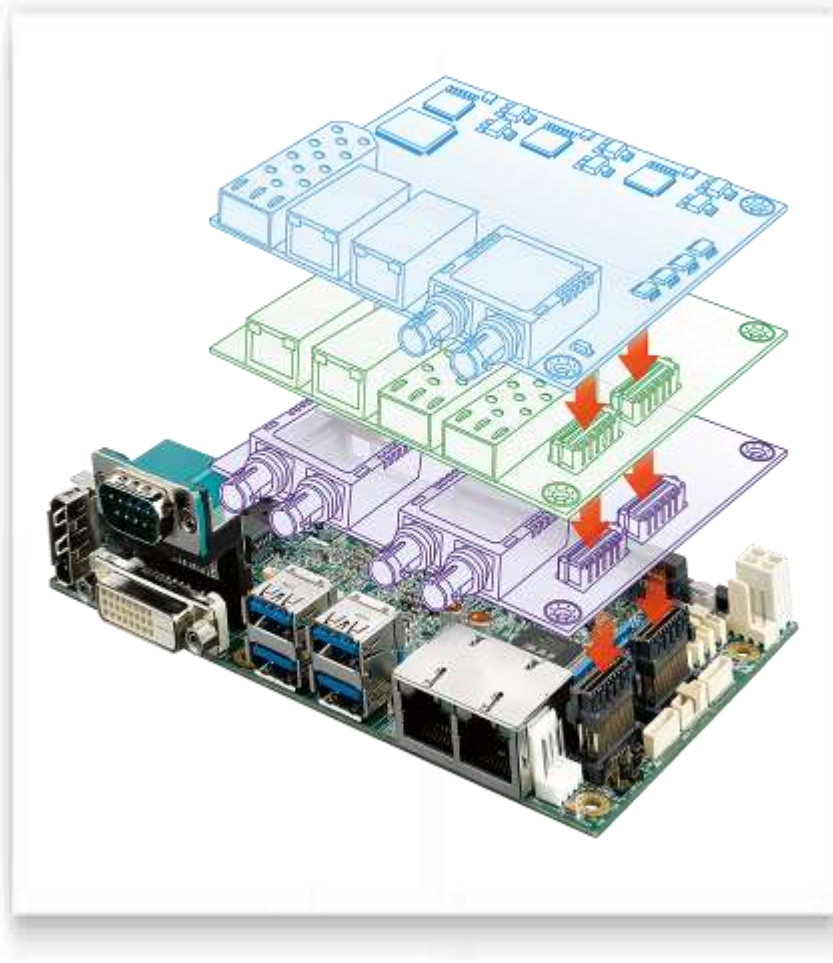
VIG-100 (M12)
(Cortex-A7)

Multi-Touch Panel PCs & Displays



- ◆ Industrial-grade IP65 Multi-Touch Panel PC (21.5"/19"/17"/15")
- ◆ Industrial-grade IP65 Multi-Touch Display (24"/21.5"/19"/17"/15")

Embedded SBCs & Peripherals



- ◆ 3.5" Single Board Computers (SBCs)
- ◆ SUMIT Expansion Cards
- ◆ PCI/PCIe Expansion Cards
- ◆ Mini PCIe Modules
- ◆ Industrial-grade Wide Temperature Accessories

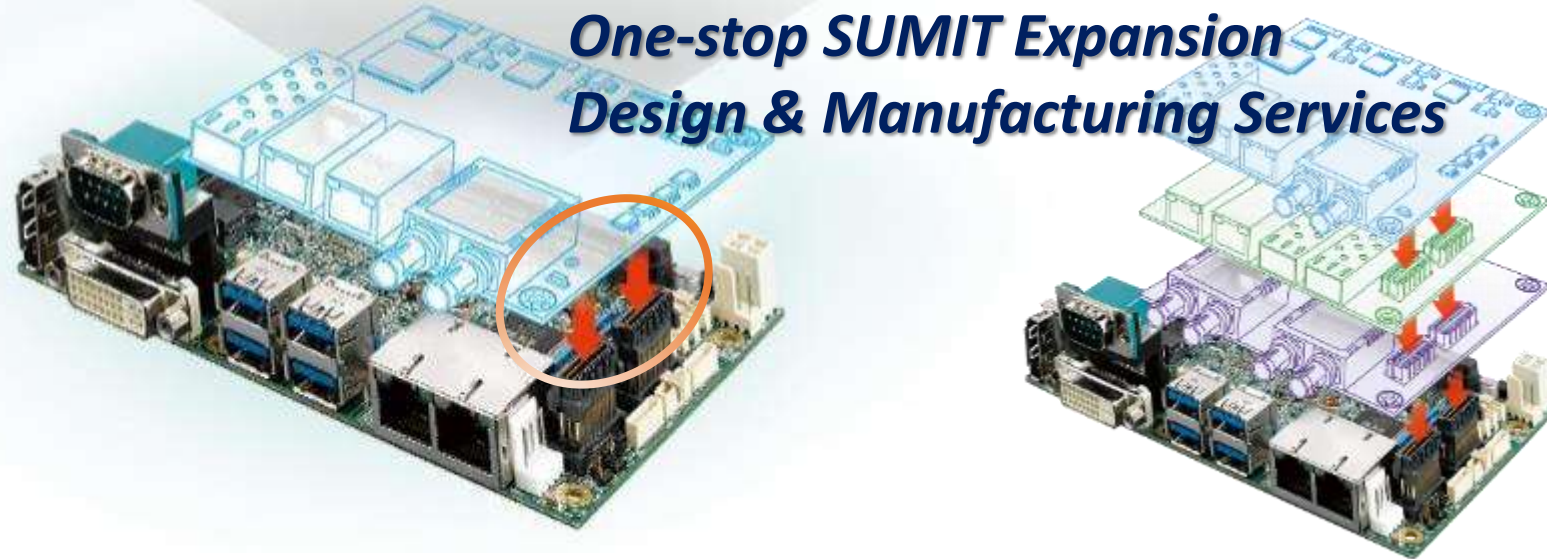
Versatile & Scalable SUMIT Expansion

- Multiple 10GigE LAN
- Multiple ST Fiber
- Multiple 10GigE SFP+ Fiber
- Multiple USB 3.1
- Multiple SIM Socket



**Customized
SUMIT Expansion**

**One-stop SUMIT Expansion
Design & Manufacturing Services**

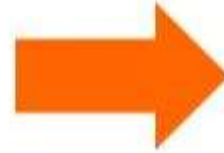


Slim Box PC Powered by SFF 3.5" SBC

Flexible COM Port Connection



EMBC-1000



Slim Box PC



Application Scenarios



Everyone deserves a better system



Smart Manufacturing
Logistic Management



Power & Energy
Real-Time SCADA



Intelligent Healthcare
Self-Service Kiosk



Logging & Mining
In-Vehicle Operation



Automated Guided Vehicle
Smart Retail

Vecow Worldwide Coverage

Traffic Vision
Real-Time Rolling Stock
Wayside Surveillance



Intelligent Automation
Factory & Production Management



Smart Retail
Guest Counting & Preference Analysis



Intelligent Traffic
Route Plan, Fleet & Parking Management

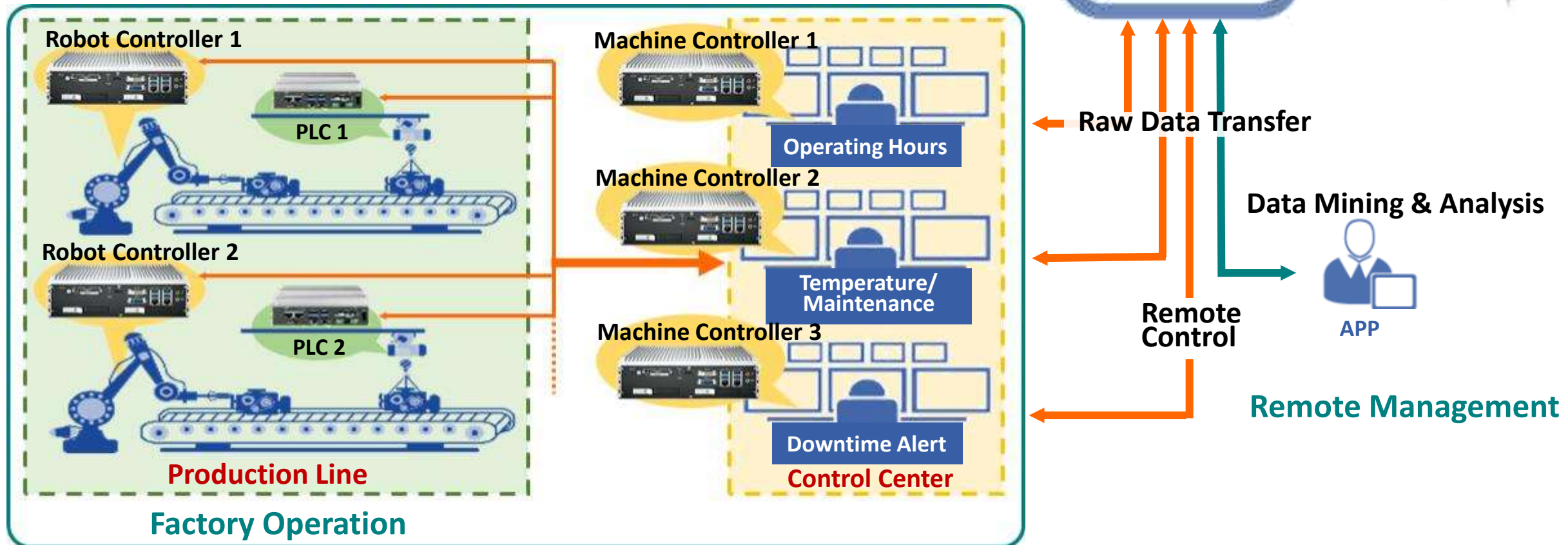


Industrial AI
Robotic Control



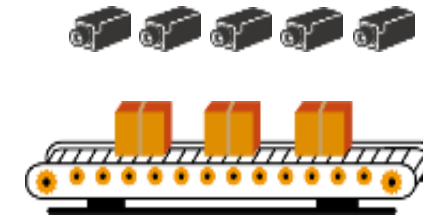
Intelligent Automation

- ◆ Venue: Factory in China
- ◆ Scenario: Smart Factory & Production Line Management
- ◆ Product: ECS-9000-PoER & SPC-3510



Logistics Management

- ◆ Venue: Warehouse in Germany
- ◆ Scenario: Intelligent Inspection for Logistics Management
- ◆ Product: **ECS-7000-6GD**



Surveillance Server



Control Center



3D Warehouse Surveillance

Inbound Goods Checking, Production Line Surveillance, Trouble Alarm, Action Commands

Inspection Server



2D Smart Inspection

Barcode Scan, Database Tracking (Content, Destination, Weight, Size), Trouble Alarm, Action Commands

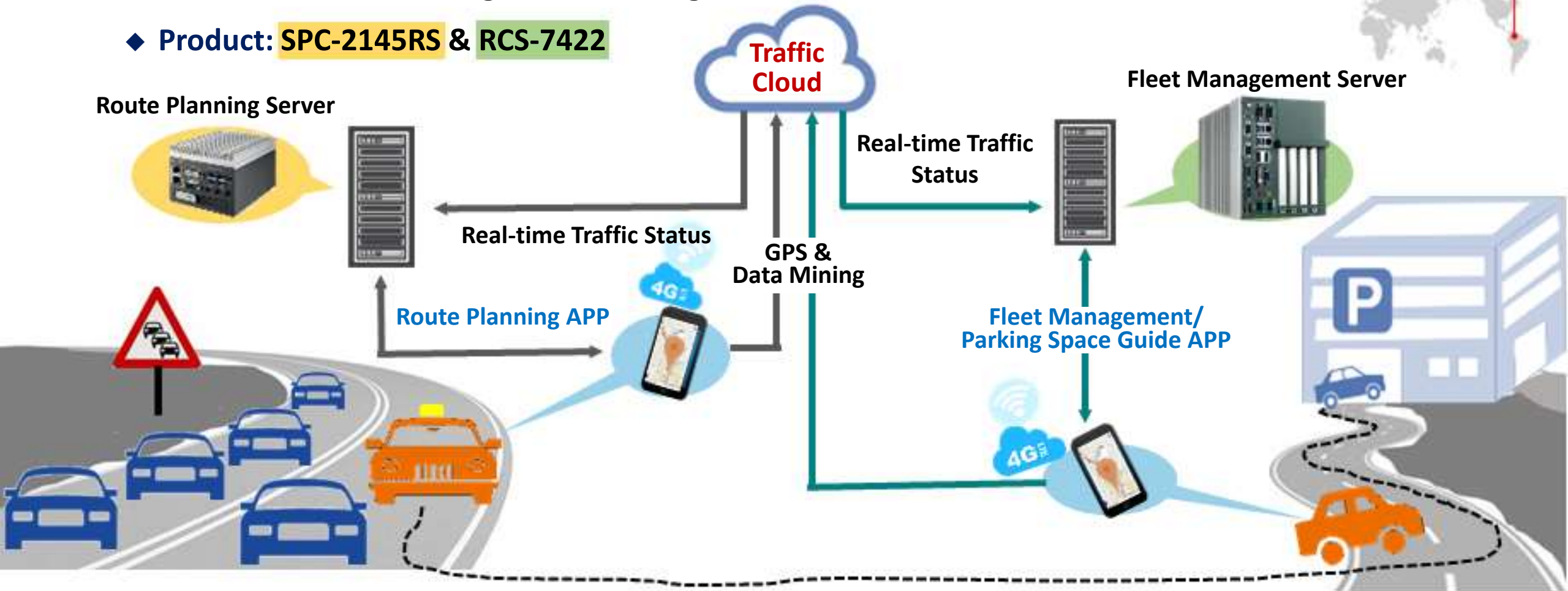


3D Intelligent Inspection

Box Outlook Checking, Damage Alarm, Database Checking, Action Commands

Intelligent Traffic

- ◆ Venue: Public Intelligent Transportation System in Brazil
- ◆ Scenario: Route Planning & Fleet Management
- ◆ Product: **SPC-2145RS** & **RCS-7422**



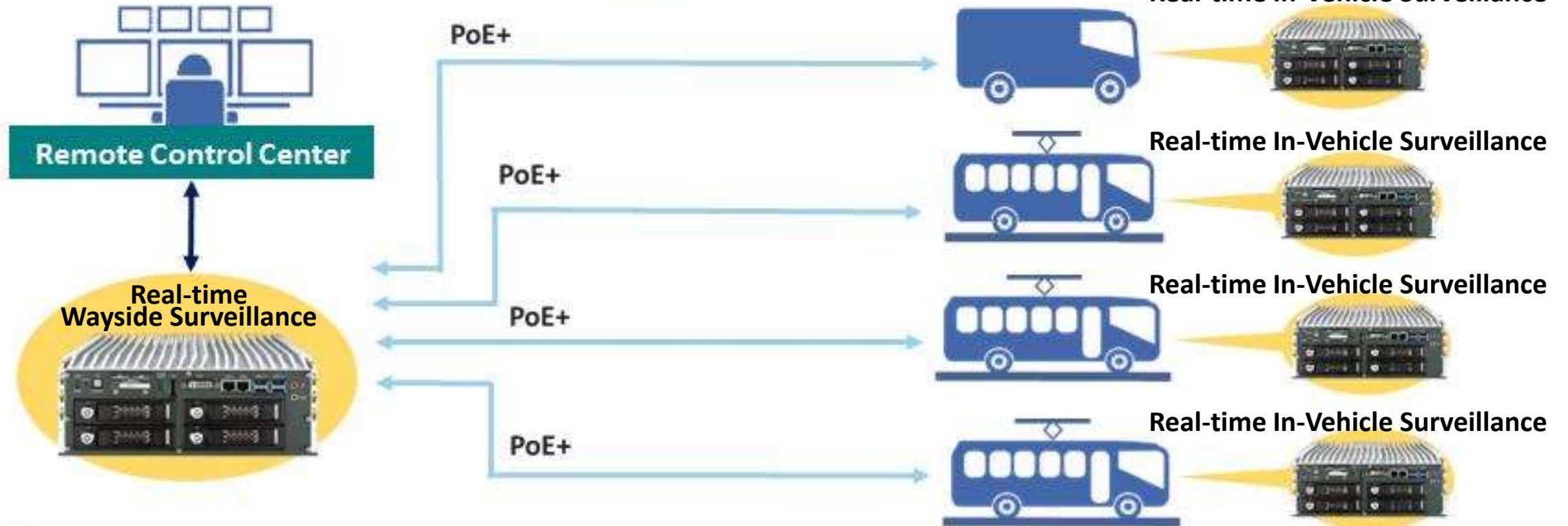
In-Vehicle Operation

- ◆ Venue: Rugged Terrains in North America
- ◆ Scenario: Logging & Mining Applications
- ◆ Product: **IVH-9016-PoER**




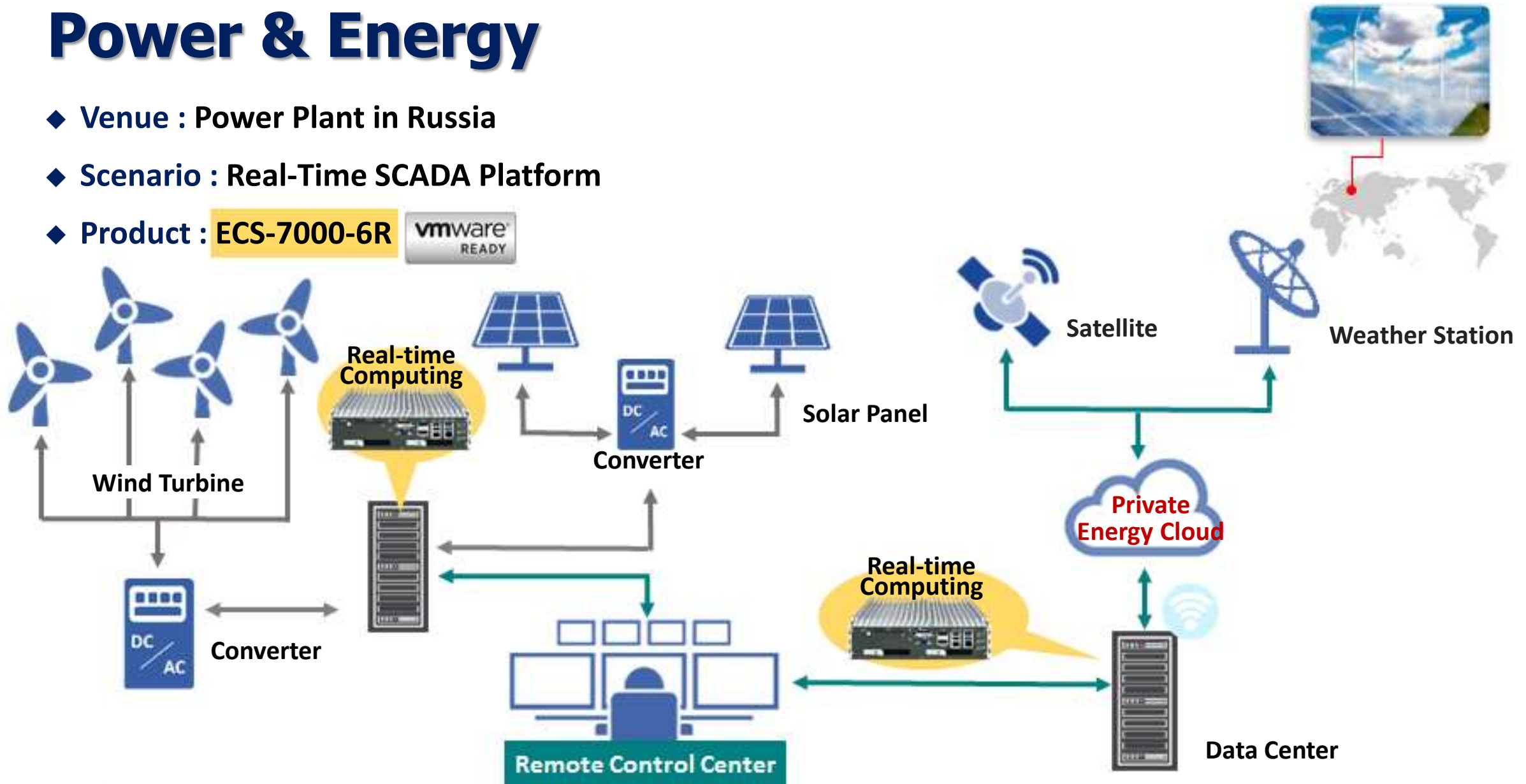
Traffic Vision

- ◆ Venue: Subway in Europe
- ◆ Application: Real-time Rolling Stock Surveillance
- ◆ Product: **IVH-7700-QRDM-ICY (M12)**



Power & Energy

- ◆ Venue : Power Plant in Russia
- ◆ Scenario : Real-Time SCADA Platform
- ◆ Product : **ECS-7000-6R** 



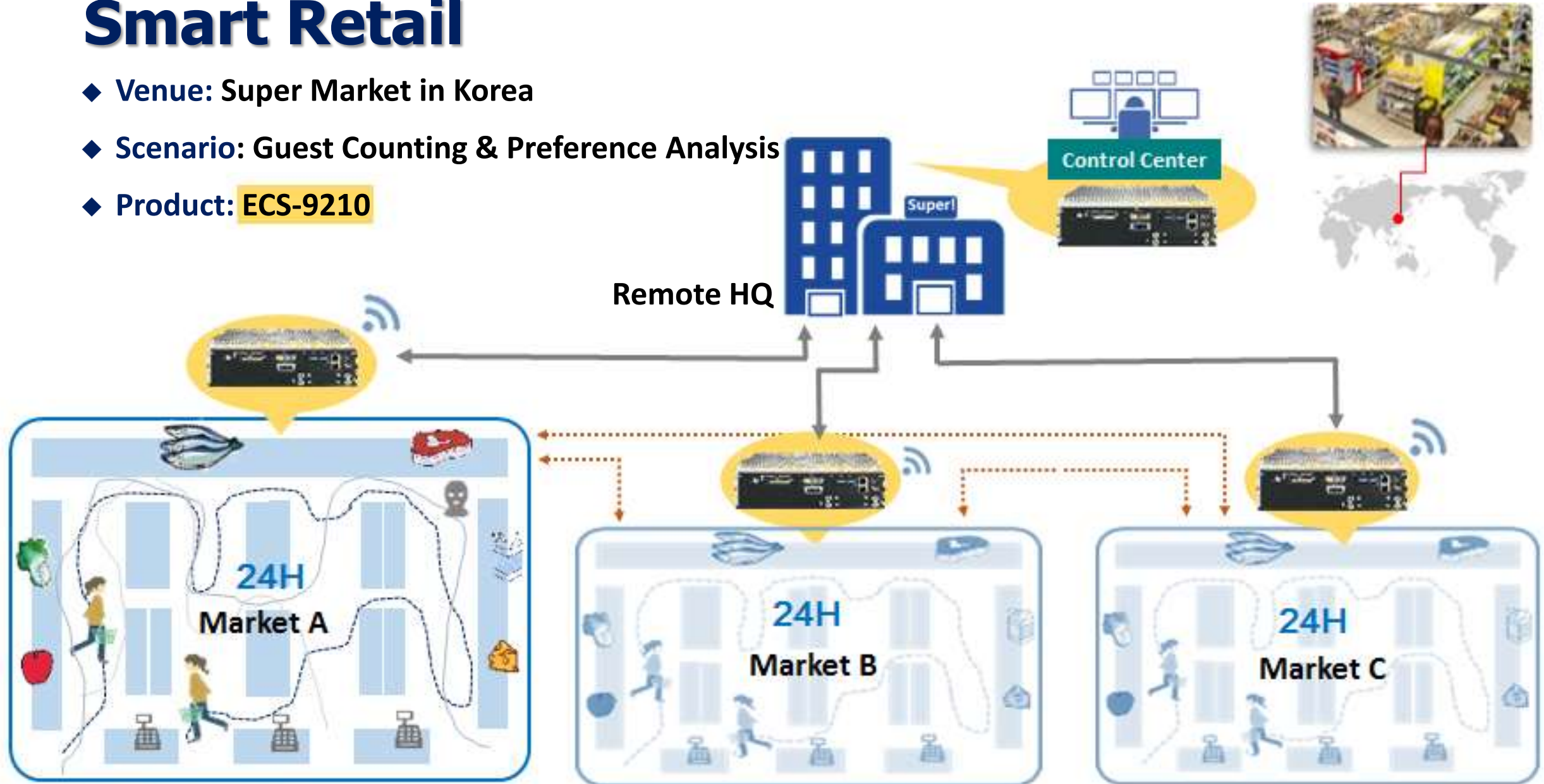
Intelligent Healthcare

- ◆ Venue: Hospital in Japan
- ◆ Scenario: Self-Services Kiosk
- ◆ Product: **SPC-3520**



Smart Retail

- ◆ Venue: Super Market in Korea
- ◆ Scenario: Guest Counting & Preference Analysis
- ◆ Product: ECS-9210



Automated Guided Vehicles (AGV)

- ◆ Venue: Warehouse in North America
- ◆ Scenario: Self-driving/Automated Guide Vehicles (AGV)
- ◆ Product: ECS-9000-PoE



1,500KG
Payload



Loading : Boxes/Carts/Shelves



Intelligent Control - Robot Controller



Key Features

- ✓ High Computing Performance for real-time Robot Control
- ✓ Multiple I/O Functions, 2.5" SSD Tray
- ✓ Up to 9 Independent GbE LANs for EtherCAT, TPM supported
- ✓ IEEE 802.3at PoE+ GigE LAN
- ✓ Isolated DIO for alert, sensor, motion control and circus protection
- ✓ Fanless, -25°C to 70°C
- ✓ 6V to 36V DC-in, 80V Surge Protection
- ✓ Compact Size, all-in-one design

PoE+ Real-time
Machine Vision

Real-time
Motion Control



Vecow
An AIS Company



License Plate Recognition



◆ Application Focus

Real-time image capture speed and accuracy integrates with gate controllers and alarms

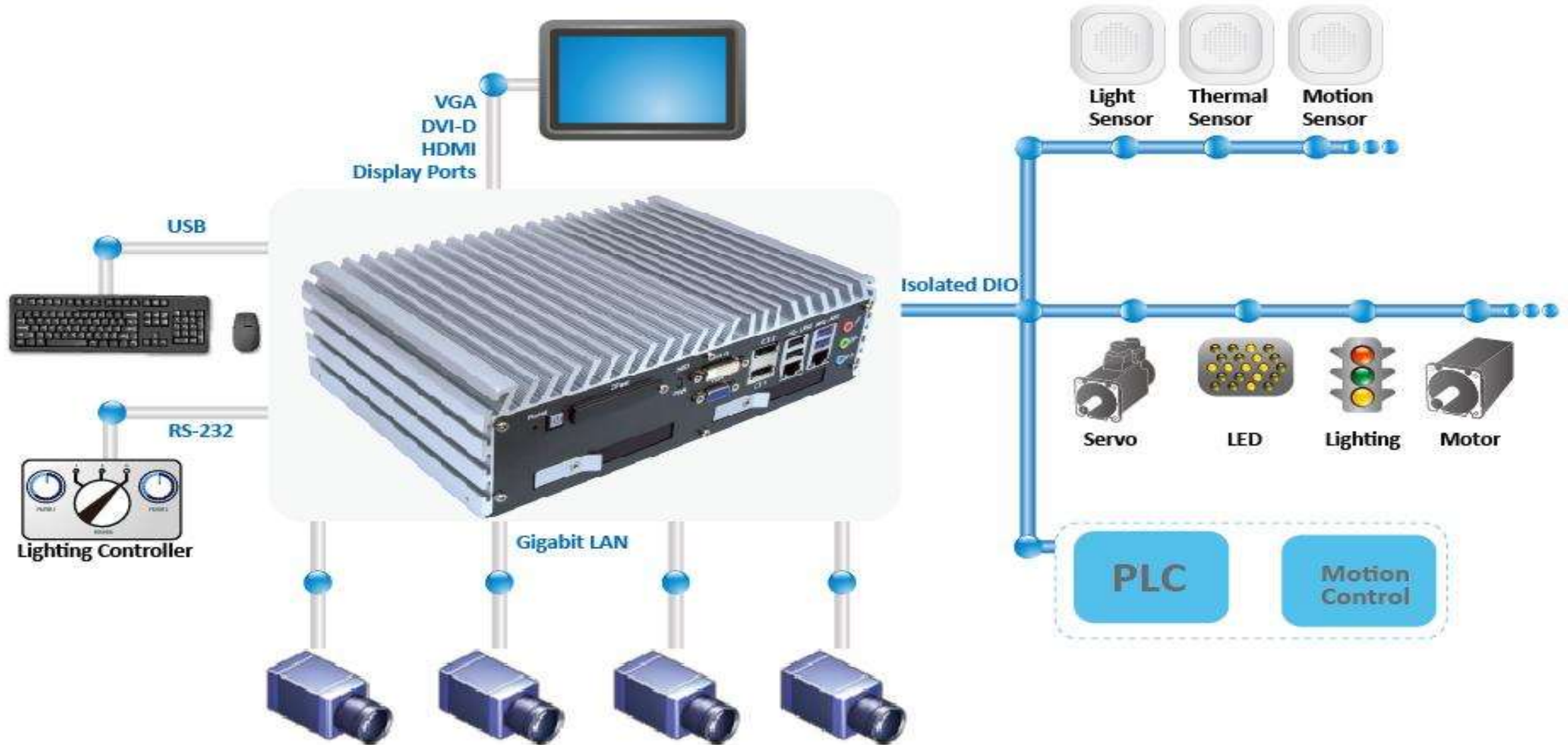
◆ ECS-7000 series provide

- ✓ Quad Core i7/i5/i3 CPU
- ✓ Up to 16GB Memory
- ✓ 2 2.5" SATA 6Gb/s HDD/SSD
- ✓ Rugged and Reliable
- ✓ Rich I/O Interface
- ✓ Compact Size
- ✓ Wide-range Operating Temperature

◆ Result

Speedy response and accurateness video with sufficient storage space

AOI, Automated Optical Inspection



In-Vehicle Surveillance & Security



◆ Application Focus

- Image resolution, storage capacities for long-time recording
- Data security

◆ Solution : **ECS-7000-2R**

- ✓ Quad-core Intel Core i7/i5/i3
- ✓ Up to 16GB Memory
- ✓ 2 2.5" SATA 6Gbps removable HDD/SSD
- ✓ Rugged and Reliable
- ✓ Rich I/O Interface
- ✓ Compact Size
- ✓ Multi Displays



Everyone deserves a better system



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Vecow