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NEOUSYS TECHNOLOGY

# Rugged NVIDIA® Jetson Edge AI Computers

Ready for Edge AI Application Deployments

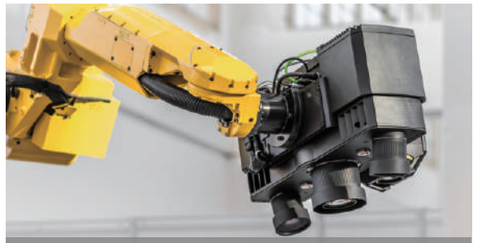
**www.neousys-tech.com**

# Robust AI-Powered Vision from Roadside to In-vehicle

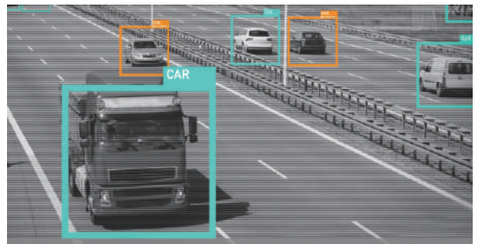
Environmental challenges come into play when deploying systems into the field, challenges such as temperature, dust, vibration, etc. When you throw in other field limitations like unstable power, need for ignition power control in a vehicle, insufficient connectivity/ function/ installation space, etc. These are what users encounter on a daily basis, and can slow down project developments. For a system to operate stably and reliably in the field, a lot of extra resources are spent, time to design, development and tests are done behind the scenes.

Neousys edge AI platforms powered by NVIDIA® Jetson system-on-module are fully integrated with Neousys DNA characteristics that are designed to thrive in harsh environments and operate in limited conditions. Neousys systems can easily be implemented into solutions and deployed into the field, saving cost, additional testing and development time.

By supporting various camera interfaces, the platform enables significant AI performance and vision capability for AI-based video analytics or pre-processing applications in vehicles, roadside or robotics.



Edge Inspection




Roadside IVA

Autonomous Mobile Robots

In-vehicle IVA & ADAS

## Ready for Deployment


**Rugged, Fanless and Waterproof**

Unique and efficient thermal design capable of operating from -40°C and up to 70°C in fanless conditions. Furthermore, the AWP series are waterproof and dustproof for extreme environment deployments.


**Versatile Camera Support**

Compatible with PoE/ USB3/ GMSL interfaces to support IP, GigE, PTZ, GMSL, and GMSL2 cameras for different vision-based applications that require image acquisition, and low latency in dynamic lighting conditions.


**Efficient and Powerful AI**

Offers significant AI inference performance up to 275 TOPS while consuming minimum power. This efficiency allows longer battery operating time in AGV/ AMR applications.

**Diverse Application Form Factors**

We design unique application-driven products that can add-on AI capability to existing x86 PCs. Products such as AI frame grabber, flattop heatsink computer in cabinet, or mission computer on drone, etc.

**Ready for In-vehicle/ Mobile Deployments**

Featuring damping brackets, screw-lock mechanism, wide-range DC input, ignition control, CAN bus, and wireless module for communication, NRU series is designed to operate reliably in in-vehicle conditions.

# Neousys Jetson-based Computers for Industrial to Extreme Deployments

Neousys Jetson-based computers powered by NVIDIA® Jetson AGX Orin to Orin NX variants. They support GMSL2 or PoE+ camera connectivity, robust M12 connectors, or IP66-rated design to fulfill different application requirements in factories, at roadside, or in mobile robots and off-road vehicles.

Jetson AGX Orin

Jetson Orin NX

## Edge AI Computer

**NRU-220S**

4x PoE+ shared GbE
2x 2.5GbE

**NRU-222S**

4x M12 PoE+ shared GbE
2x M12 2.5GbE


**NRU-240S-AWP**

4x M12 PoE+ GbE
1x M12 10GbE

**NRU-230V-AWP**

4x M12 PoE+ GbE
8x GMSL2, 1x M12 10GbE

PCIe-NX154PoE

PCIe-NX156U3

**PCIe-NX150 Series**

4x PoE+ 2.5GbE
6x USB3

**FLYC-300**

2x GbE, 2x USB3, 2x GMSL2

**NRU-50 Series**

4x PoE++ shared GbE
4x GMSL2

NRU-52S+

NRU-51V+


NRU-171V-PPC

**NRU-170-PPC Series**

4x PoE+ GbE
6x GMSL2

NRU-172S-PPC

**NRU-150-FT Series**

4x PoE+ 2.5GbE
6x USB3

NRU-154PoE-FT

NRU-156U3-FT


**NRU-160-AWP Series**

4x PoE+ GbE
6x GMSL2

NRU-162S-AWP

NRU-161V-AWP

| Frame Grabber | Flattop Heatsink Computer | Edge AI Computer | AI Panel PC |
|---|---|---|---|
| Add-on Card | Flattop Heatsink/ Fanless | Affordable Waterproof | |


# Edge Inspection

## Overview

AI overcomes inspection challenges traditional rule-based AOI solutions face, such as defects on transparent, reflective, and complex surfaces. It enables machine/deep learning-based vision inspection for AOI demands from automotive, semiconductor, food, metal treatment, glass industries, to increase the efficiency and accuracy of recognition and identification. However, to add AI computing capabilities to existing AOI-based x86 computers may consume and generate more heat, and is costly.

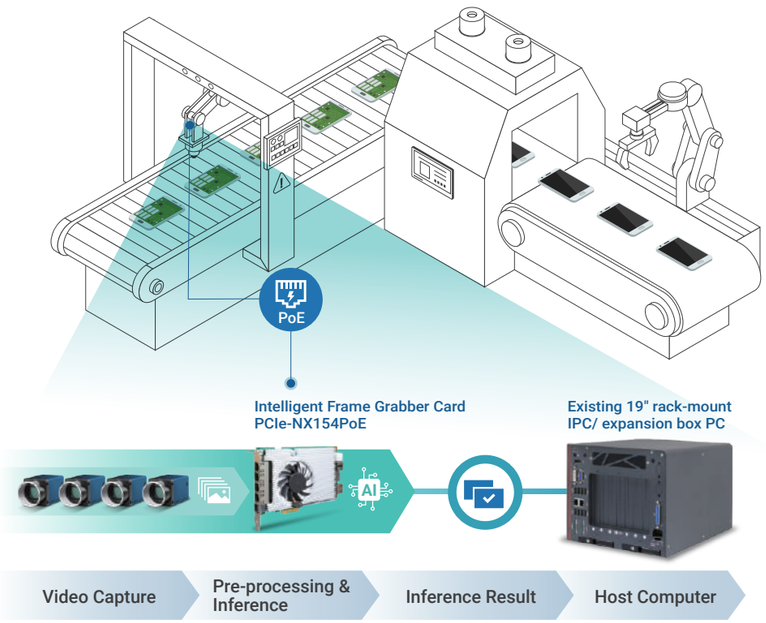
## Requirements

- Wide operating temperature for poor ventilation environments at the edge
- Industrial camera connectivity with prioritized independent camera bandwidth
- Fanless design and washable sealed chassis for dusty environments
- Add-on card to integrate into an existing computer for AI computation

## Solution

### Added AI-powered Inspection to Existing x86 Computers

The intelligent frame grabber card can operate independently and adapt to existing rule-based 19" rack mount IPC for more AI performance and camera connectivity while consuming minimum resources from the host PC.




## Product Selection

### PCIe-NX150 Series

**Intelligent Frame Grabber**

- 6x USB3 or 4x 2.5GbE (PoE+ capable)
- Compatible with Windows/ Linux x86 computers

### NRU-150-FT Series

**Flattop Heatsink Computer**

- 6x USB3 or 4x 2.5GbE (PoE+ capable)
- In-cabinet conduction cooling, -25°C to 60°C fanless operation

### NRU-172S-PPC

**IP66-rated 10.1” Jetson Orin™ NX/ Orin™ Nano Panel PC**

- 4x GbE (PoE+ capable)
- -25°C to 60°C fanless operation

# Roadside Intelligent Video Analytics

## Overview

Intelligent video analytics at roadside for traffic violation monitoring, traffic flow management or V2X applications are on the rise in smart cities. But due to the lack of camera connectivity, video processing, AI computing, and the ability to operate in harsh environments capabilities have limited deployments. This is where Neousys edge AI computer comes in, featuring power-efficient and true wide-temperature operation to enable real-time inference and analytics in confined cabinets or dusty roadside environments.

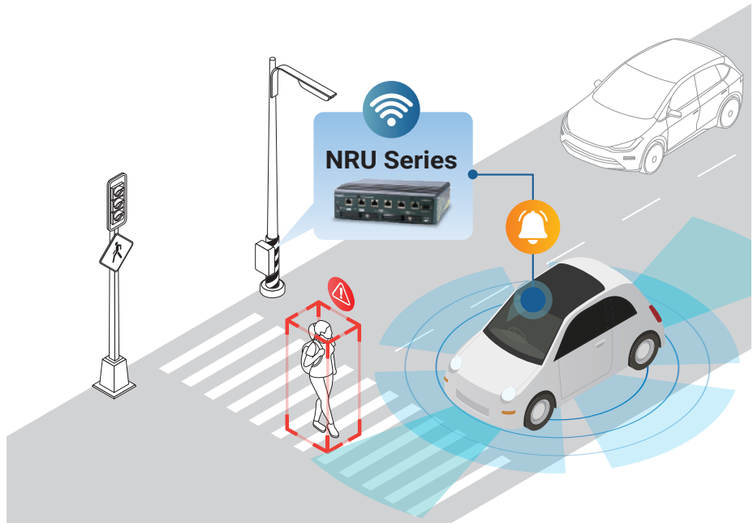
## Requirements

- Ethernet ports for sensors, IP cameras, and LiDAR
- Fanless wide temperature operation and waterproof design
- AI performance and video transcoding capability
- Storage for video and isolated RS485 for communication

## Solution

### Real-time Infrastructure-based Perception and Analytics

The roadside management system is to identify and predict possible dangers between pedestrians, vehicles, or other road users and offer full situation awareness and sends warnings to connected autonomous vehicles approaching the area. Our computer is integrated into the system to connect with IP cameras and sensors receive video and data to enable real-time perception for AI applications such as traffic flow monitoring, traffic violation detection and pedestrian safety.




## Product Selection

### NRU-220S

**Fanless Jetson AGX Orin™ AI NVR**

- 2x 2.5GbE, 4x GbE (PoE+ capable)
- 1x Isolated RS485
- 1x M.2 M NVMe, 2x 2.5" SSD (front-accessible)

### NRU-52S+

**Jetson Orin™ NX AI NVR**

- 4x GbE ports (PoE++ capable)
- -25°C to 70°C fanless operation

### NRU-240S-AWP

**IP66-rated Jetson AGX Orin™ Computer**

- -40°C to 70°C fanless operation (JAOi)
- 1x 10GbE, 4x GbE (PoE+ capable)

# Autonomous Mobile Robot

## Overview

Autonomous mobile robots (AMRs) applications can be found in warehouses, hospitals, hotels, farms, logistics, and airports, in indoor or outdoor environments. In lockdown scenarios, they help reduce infections by limiting human interactions, now its automated technology minimizes manpower and increases efficiency.

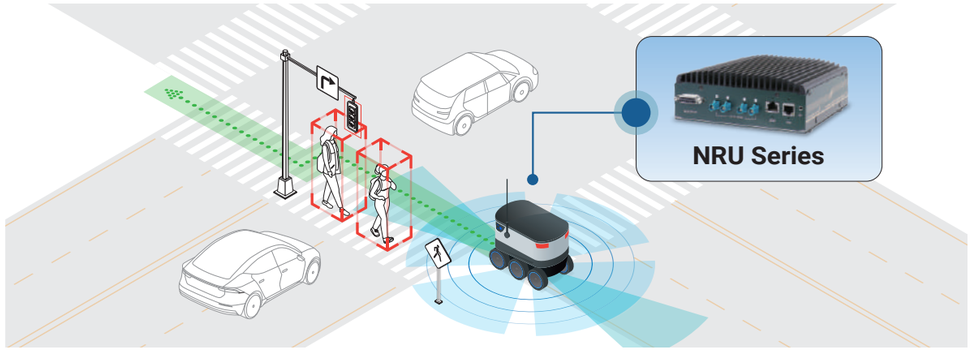
## Requirements

- IP or GMSL2 cameras connectivity
- Low power consumption offers extended battery time for daily operations
- Small dimensions for the limited installation space inside robots
- Wide-range DC and IGN input for mobile systems

## Solution

### Last-mile Delivery Robot

The autonomous delivery robot with edge AI computing can self-navigation through various traffic from A to B. NRU series supports various interfaces for sensors and cameras, and the AI computation power to sense, identify, learn, and react in real-time for obstacle or pedestrian avoidance and route planning. It is compact, fanless, and power efficient for extended battery operation time. The system can also withstand shock and vibration to survive in-vehicle like conditions.




## Product Selection

**NRU-51V+**

**Jetson Orin™ NX GMSL2 Computer**

- 4x GMSL2, 1x 10GbE, 1x GbE
- 8V to 35V with ignition power control

**NRU-161V-AWP**

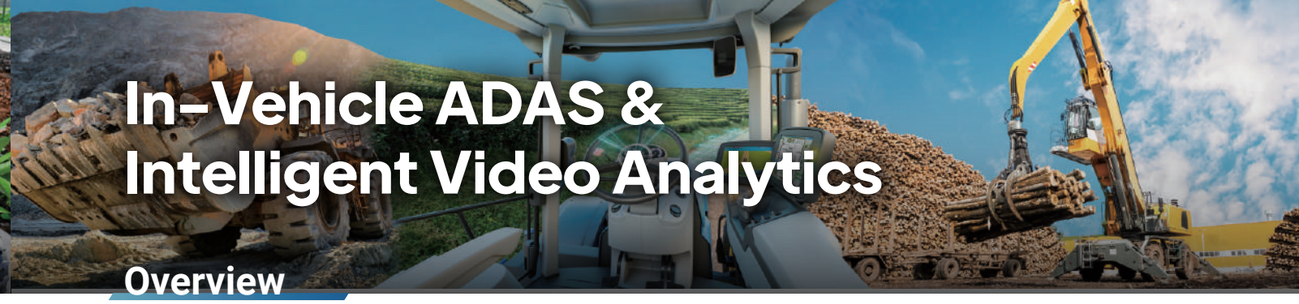
**IP66-rated Jetson Orin™ NX/ Nano Computer**

- 6x GMSL2, 1x GbE
- 8V to 35V with ignition power control

**FLYC-300**

**Low-SWaP AI Mission Computer**

- 2x GMSL2, 2x GbE, 2x USB3
- 124 x 123 x 30.5mm compact size



# In-Vehicle ADAS & Intelligent Video Analytics

## Overview

Intelligent video analytics in vehicles play a crucial role in implementing collision avoidance, recognition, and detection, thereby enhancing in-vehicle ADAS capabilities and overall safety. These applications extend to areas such as excavator teleoperation, law enforcement on police cars, blind zone detection on construction vehicles, smart mining trucks, obstruction detection for railways, etc.

## Requirements

- IP or GMSL2 cameras connectivity
- Fanless or waterproof for extreme deployments
- Robust M12 connectors, shock and vibration resistance
- Wide -range DC and IGN input for car batteries

## Solution

### Teleoperation of Off-road Vehicles

Teleoperation removes the operator from danger, reduces operation costs and increases efficiency for off-road vehicles in mining, agriculture, construction and logistics. With a single operator, it is possible to monitor and control a fleet of vehicles remotely and safely. By deploying NRU series into the vehicles, the GMSL2 protocol can support high-speed, 15-meter cables with low latency for video streaming via 4G/5G wireless network.


## Product Selection

**NRU-222S**

**Fanless Jetson AGX Orin™ AI NVR**

- 2x 2.5GbE and 4x GbE (PoE+ capable) in M12 connectors
- 1x M.2 NVMe, 2x 2.5" SSD (front-accessible)

**NRU-230V-AWP**

**IP66-rated Jetson AGX Orin™ Computer**

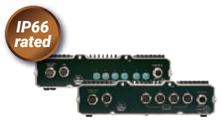
- 8x GMSL2, 1x 10GbE, 4x GbE (PoE+ capable)
- 8V to 48V with ignition power control

**NRU-171V-PPC**

**IP66-rated 10.1" Jetson Orin™ NX/ Orin™ Nano Panel PC**

- 6x GMSL2, 1x GbE
- 8V to 35V with ignition power control

# Specification Table



| | Model Name | NRU-230V-AWP/ NRU-240S-AWP | NRU-220S/ NRU-222S | NRU-161V-AWP/ NRU-162S-AWP | NRU-171V-PPC/ NRU-172S-PPC |
|---|---|---|---|---|---|
| Chassis | Dimensions (W x D x H) | 225 x 194 x 88.5 mm | 230 x 173 x 66 mm | 225 x 136 x 55 mm | 257 x 65 x 176 mm |
| | Weight | 4.4 kg | 2.6 kg | 3.0 kg | 3.8 kg |
| | Chassis Construction | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal |
| Panel | Touch Screen | - | - | - | 10.1" touch screen with 1920 x 1200 resolution |
| System | Jetson System-on-Module | NVIDIA® Jetson AGX Orin™, NVIDIA® Jetson AGX Orin™ Industrial | NVIDIA® Jetson AGX Orin™, NVIDIA® Jetson AGX Orin™ Industrial | NVIDIA® Jetson Orin™ NX, NVIDIA® Jetson Orin™ Nano | NVIDIA® Jetson Orin™ NX, NVIDIA® Jetson Orin™ Nano |
| I/O Interface | PoE+ GbE/ 10GbE | 4x PoE+ GbE via M12 X-coded 1x 10GbE via M12 X-coded | 4x PoE+ GbE, 2x 2.5GbE (NRU-220S: via RJ45) (NRU-222S: via M12) | 4x PoE+ GbE via M12 X-coded (NRU-162S-AWP) 1x GbE via M12 X-coded | 4x PoE+ GbE via M12 X-coded (NRU-172S-PPC) 1x GbE via M12 X-coded |
| | GMSL2 | 8x GMSL2 ports (NRU-230V-AWP) | - | 6x waterproof GMSL2 ports (NRU-161V-AWP) | 6x waterproof GMSL2 ports (NRU-171V-PPC) |
| | Video Port | 1x DisplayPort in Type-C | 1x DisplayPort | 1x VGA (via M12 A-coded) | - |
| | Serial Port | 1x isolated RS-485, 1x RS-232 (via M12 A-coded) | 1x isolated RS-485 2x RS-232 | 1x RS-232 (via M12 A-coded) | 1x RS-232 (via M12 A-coded) |
| | USB 2.0 | 2x USB 2.0 ports (via M12 A-coded) | 2 | 2x USB 2.0 ports (via M12 A-coded) | 2x USB 2.0 ports (via M12 A-coded) |
| | USB 3.2/ USB 3.1 | 1x waterproof USB Type-C | 1 | 1x USB Type-C | 1x USB Type-C |
| | Digital I/O | Isolated 1DI (GPS PPS input) + 1DO (via M12 A-coded) | 4 DI + 4 DO | Isolated 1DI (GPS PPS input) (via M12 A-coded) | Isolated 1DI (GPS PPS input) (via M12 A-coded) |
| | CAN bus | 2x isolated CAN 2.0 | 2x CAN 2.0 | 1x CAN FD | 1x CAN FD |
| Storage Interface | SATA HDD | 2x internal SATA ports 2.5" SSD | 2x front-accessible 2.5" 7mm SSD | - | - |
| | M.2 (M-key) | 1x M.2 M-key | 1x M.2 M-key | 1x M.2 M-key | 1x M.2 M-key |
| Expansion Bus | Mini PCI-E | 2 | 2 | 1 | 1 |
| | M.2 (B-key/E-Key) | 1x M.2 B-key | 1x M.2 B-key | 1x M.2 B-key | 1x M.2 B-key |
| Power Supply | DC Input | 8V to 48V DC | 8V to 48V DC | 8V to 35V DC | 8V to 35V DC |
| | Ignition Control | Built-in | Built-in | Built-in | Built-in |
| Environmental | Operating Temperature | -40°C to 70°C (JAOi) -25°C to 70°C (JAO) | -40°C to 75°C (JAOi) -25°C to 70°C (JAO) | -25°C to 70°C | -25°C to 60°C |
| | Certification | CE/ FCC, EN 50121-3, MIL-STD-810H | CE/ FCC, EN 50121-3, MIL-STD-810H | CE/ FCC, MIL-STD-810H, EN 50121-3 (NRU-162S-AWP) | CE/ FCC, MIL-STD-810H, EN 50121-3 (NRU-172S-PPC) |

| | Model Name | NRU-51V+/ NRU-52S+ | PCIe-NX154PoE/ PCIe-NX156U3 | NRU-154PoE-FT/ NRU-156U3-FT | FLYC-300 |
|---|---|---|---|---|---|
| Chassis | Dimensions (W x D x H) | 173 x 144 x 60 mm | 167.7 x 111 mm | 116 x 171 x 27 mm | 124 x 123 x 29.8 mm (Excluded enclosure) 124 x 123 x 30.5 mm (Included enclosure) |
| | Weight | 1.4 kg | 0.4 kg | 1.0 kg | 0.297 kg (Excluding enclosure) 0.345 kg (Including enclosure) |
| | Chassis Construction | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal | Aluminum alloy with heavy duty metal |
| System | Jetson System-on-Module | NVIDIA® Jetson Orin™ NX, NVIDIA® Jetson Orin™ Nano, NVIDIA® Jetson Xavier™ NX | NVIDIA® Jetson Orin™ NX | NVIDIA® Jetson Orin™ NX | NVIDIA® Jetson Orin™ NX |
| I/O Interface | PoE+ GbE/ 10GbE | 4x PoE++ GbE (NRU-52S+) 1x 10GbE, 1x GbE (NRU-51V+) | 4x PoE+ 2.5GbE, 1x GbE (PCIe-NX154PoE) 1x GbE (PCIe-NX156U3) | 4x PoE+ 2.5GbE, 1x GbE (NRU-154PoE-FT) 1x GbE (NRU-156U3-FT) | 1x GbE, 1x 2.5GbE |
| | GMSL2 | 4x GMSL2 ports (NRU-51V+) | - | - | 2x GMSL2 ports |
| | Video Port | 1x DisplayPort | 1x DisplayPort | 1x DisplayPort | 1x DisplayPort |
| | Serial Port | 1x RS-232/422/485 | 1x RS-232 1x isolated RS-485 | 1x RS-232 1x isolated RS-485 | - |
| | USB 2.0 | - | 2 | 2 | 1 |
| | USB 3.2/ USB 3.1 | 2 | 6 (PCIe-NX156U3) | 6 (NRU-156U3-FT) | 2 |
| | Digital I/O | 1x GPS PPS, 3 DI + 4 DO | - | - | Isolated 2 DI + 4 DO |
| | CAN bus | 1x isolated CAN 2.0 | - | - | 1x CAN 2.0 |
| Storage Interface | SATA HDD | - | - | - | - |
| | M.2 (M-key) | - | 1x M.2 M-key | 1x M.2 M-key | 1x M.2 M-key |
| Expansion Bus | Mini PCI-E | 2 | - | - | - |
| | M.2 (B-key/E-Key) | 1x M.2 B-key | - | - | 1x M.2 B-key |
| Power Supply | DC Input | 8V to 35V DC | 12V DC input | 12V DC input | 12V to 60V DC input & Supports 4S to 14S battery pack |
| | Ignition Control | Built-in | - | - | - |
| Environmental | Operating Temperature | -25°C to 70°C fanless operation -25°C to 60°C fanless operation (with 10GbE transmission) | -25°C to 60°C | -25°C to 60°C | -25°C to 70°C |
| | Certification | CE/ FCC, MIL-STD-810H, EN 50121-3 (NRU-52S+) | CE/ FCC | CE/ FCC, MIL-STD-810H | CE/ FCC, EN62368-1, MIL-STD-810H |