Neousys Technology
Seaport Automation

Neousys Technology Inc.

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Overview

The busiest ports in the world can move anywhere from 500 million to a billion tons per year. The deepwater ports are capable of loading up to the largest cargo ships, holding 24,000teus (twenty-foot equivalent unit) containers, and have a fast turn time to get ships in and out, quickly. Most have multiple gates entering and leaving the port, they are open every day of the year, and around the clock. One can only imagine the amount of man-power needed to sustain operation, day-in, and day-out.


Problem-solving

Getting the ships in and out quickly is one thing, but where do the millions of tons of containers go once they are offloaded from the ships? With the cranes off-loading containers non-stop, and each container weighing up to 28 tons (25,400kg), it is not an easy task to transport, place, and track. While not all cargo ships hold 24,000teus, but should the cargo hold even just half that amount, workers at the dock are looking at unloading approximately 10,000teus off the cargo ship.

Problem-solved

Seaport digitization started back in the early 1990s, but technologies and computing power for seaport applications weren't even close to half of what they are capable of today. One of the most popular digitization at seaport is crane automation or the ability to remotely control the cranes. The benefits of this digitization are multi-faceted: one, it saves manpower as experienced crane operators are expensive to hire and hard to find; two, safety, as a remote-controlled or fully automated crane systems does not require operators to climb up and down from the crane cockpit; three, not needing to climb in and out of cockpits saves time; four, remote crane operators have more freedom (eg. Bathroom breaks) whereas operators in cranes are often forced to take bathroom breaks at the end of a shift.
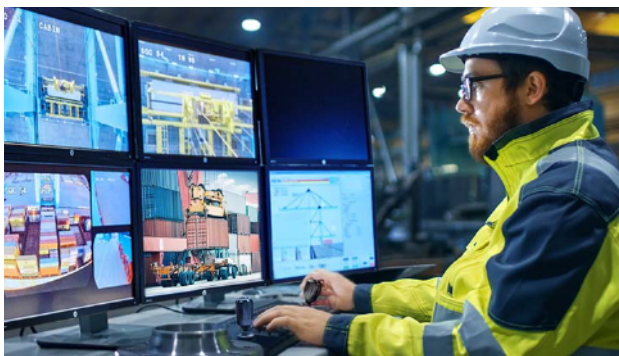
The remote crane operation capability offers operators safety and peace of mind during work hours knowing that the bathroom is just around the corner from the operating room, and not 200ft down, 300 yards away, when nature calls.

Another important seaport digitization that completes the container off-loading process is the transportation of containers. Much like crane operators, traditional means require a driver on the carrier to take the container to the designated spot. Previous digitization attempts saw the use of magnetic strip guided vehicles. However, implementing such a system requires a massive overhaul of the port to lay down thousands of magnets and requires annual maintenances.

Today, the off-loaded containers are carried away by intelligent guided vehicles (IGV) that utilize cameras, sensors, lidars, and radars which enable them to automatically drive to, avoid objects on the way, and off-load the carried container at the designated spot. This IGV carrier system knows exactly when and which container was picked up, placed, before coming back to pick up the next container. All of this data is uploaded onto the main computer in the control room.
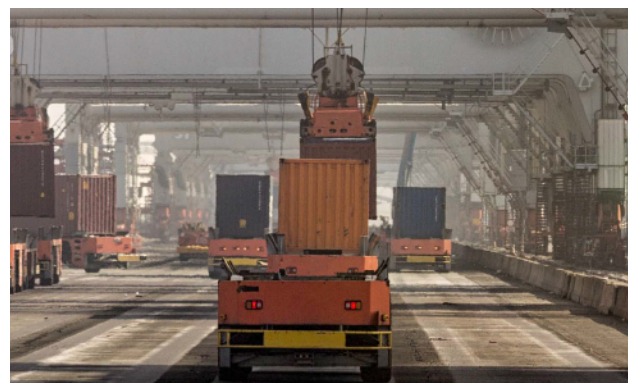

The combined effects of the two automation offer safety, efficiency, manpower, and cost savings.

Neousys Computer Platforms

In the crane cockpit, the embedded computer needs to be able to connect to multiple cameras, preferably through USB or PoE as the power source is scarce on the crane, to look down at the container from multiple angles, during the offloading process as the crane's angle of approach may be vital. In addition, the system's wide-range power supply acceptance is important as well as sustaining function in wide-range temperature environments as the cockpit will be exposed under the weather. The ability to withstand shock and vibration conditions is also important.

As for the IGV on the ground, the computer requirements are very similar to a vehicle computer. its ability to connect to sensors, lidars, cameras, wireless communication modules, resistance to shock and vibration, etc. are the main considerations for implementation.

Neousys offers a range of embedded computers, from GPU-aided to non GPU-aided, extreme-compact to compact, power-efficient to powerful computation platforms. The wide range of power and temperature compatibility are standard features and Neousys also have IP67 water-proof, extreme rugged computers that are made of monoblock stainless steel chassis, designed for ultra-challenging environments, you can be sure to find an embedded platform for your seaport automation needs.
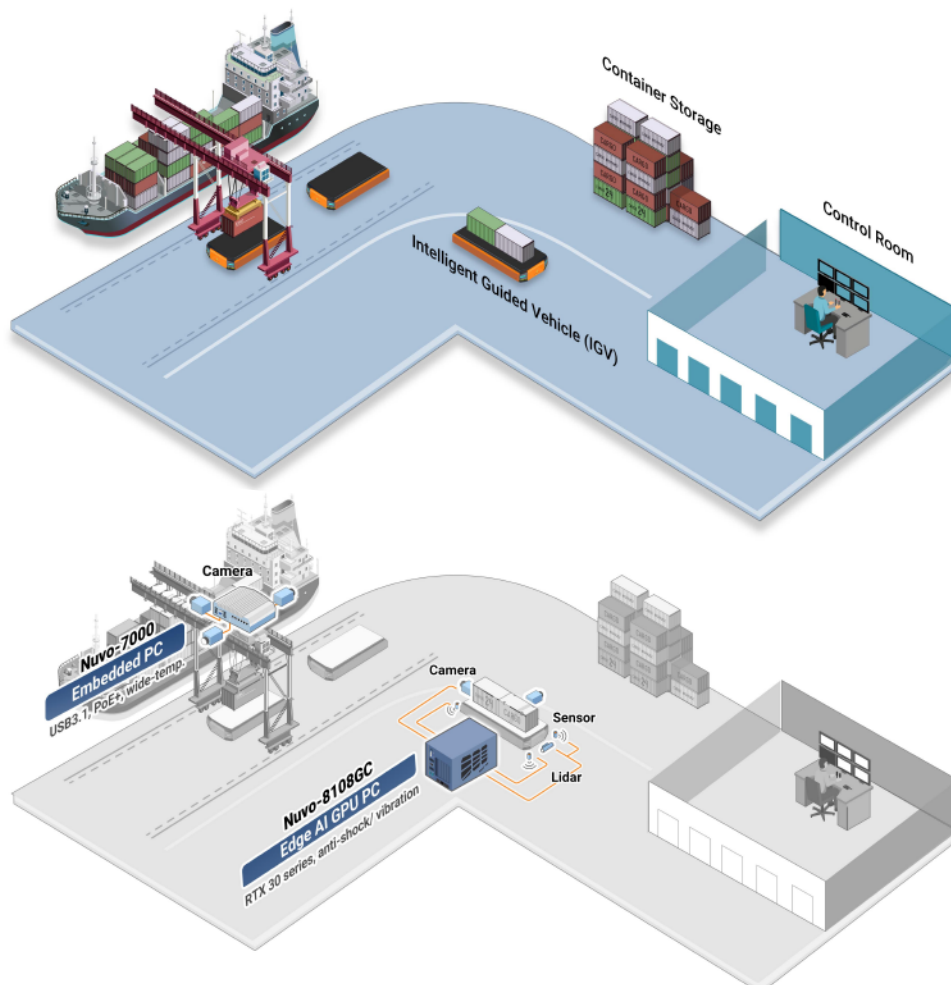
Benefits of Neousys Embedded Computers

Neousys rugged embedded platforms offer the following advantages:

Environmental

- IP67 water/ dustproof GPU computer
- Extreme rugged computers for extra volatile environmental conditions
- True -25°C up to 70°C wide-temperature operations for harsh, volatile environments
- Patented Cassette design for segregating thermal/ electrical interference
- Tri-axis tested patented damping bracket to withstand shock and vibration conditions
- Ultra-compact VTC systems to fit into tight spaces

Connectivity/ expandability

- PoE+ connectivity for GigE cameras
- USB3.1 Gen1/ Gen2 connectivity for USB cameras
- Connection ports with screw-lock for rugged connectivity
- WiFi 6/ WiFi 5/ 5G/ 4G wireless communication, expansion via mini-PCIe module

Inference processing power

- Support up to dual NVIDIA® RTX 30 series graphics cards
- Support up to NVIDIA® RTX 3080 graphics card
- Support up to NVIDIA® Tesla/ Quadro inference accelerators

Electrical

- Patented SuperCAP UPS to counteract unforeseen power interruptions
- Wide-range DC input

Expansion

- PCIe expansion
- PCI expansion
- mini-PCIe expansion
- M.2 B/ E key expansion
- Ignition control
- MezIO digital input/ output, COM, Ethernet, USB

Some features may be model-specific, please refer to the Neousys website for details.

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