Anybus®
BY HMS NETWORKS

Solution: Gateway solutions
Country: Belgium
Company: APM Terminals

Effects:

○ Communication possible between the straddle carriers and the monitoring system.

○ Better control.

○ Lower maintenance costs.

"A real advantage of the Anybus Communicator is that the configurations can be re-used. This means that by simply changing addresses, we can immediately apply a new Communicator on another straddle carrier."

Bart de Roo, Steven Lowyck
Control Engineers, APM Terminals

Making straddle carriers talk

APM Terminals in Belgium uses Anybus Communicators to enable 22 straddle carriers to communicate with a Modbus TCP-based monitoring system in the Port of Zeebrugge. The new system displays the exact location and status of each carrier at any given time.

The port of Zeebrugge just north of Bruges in Belgium is a growing hub for cargo and passenger transport in the North Sea. The terminal of the port is operated by APM Terminals — a part of the A.P. Moller-Maersk Group — operating shipping terminals in 74 locations around the world.
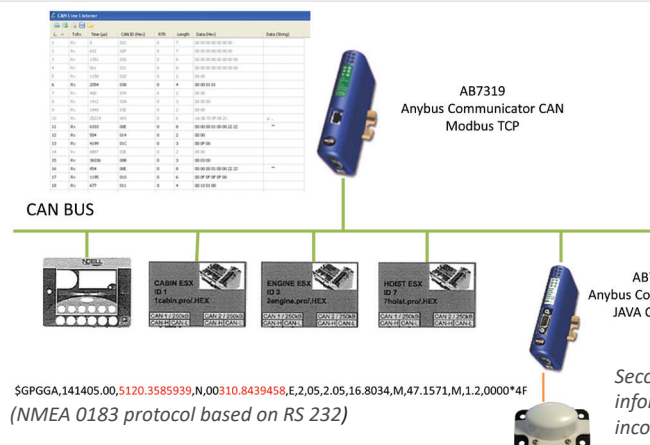
The port of Zeebrugge handles a whopping 50 million tons of cargo each year and employs 11,000 people. In a port of this size, there is a lot of machinery catering for the transportation of goods and cargo. One type of machinery is so called "straddle carriers" which are used to transport cargo containers around the terminal. The name "Straddle Carrier" comes from the fact that they "straddle" their load making them able to stack up to four containers on top of each other. The operators sit at the top of the machine with a view all around the carrier.

The problem

As the straddle carriers move around the terminal, it can be hard for the central administration to know the status of each unit. What is the fuel consumption, the oil level, the battery voltage, how many containers is it carrying, and maybe most importantly, where is it in the terminal? To enable the office to keep track of these things, APM wanted to install a wireless system which would enable communication between the straddle carriers and the central office. The problem was that the carriers use a CAN-based bus internally which could not communicate with the Modbus-TCP-based monitoring system that was to send the data to the office.

The solution

APM Terminals got in contact with PICS, a Belgian system integrator focused on communication between different PLC-systems andwwww industrial devices. These communication experts have long been working with Anybus products to solve tricky communication issues at different industrial sites around Belgium. They quickly

AB7319
Anybus Communicator CAN
Modbus TCP

CAN BUS

CABIN ESX
ID 1
1cabin.pro/.HEX
CAN-F/250kb
CAN-H/CAN-L

ENGINE ESX
ID 3
2engine.pro/.HEX
CAN 2/250kb
CAN-H/CAN-L

HOIST ESX
ID 7
7hoist.pro/.HEX
CAN 1/250kb
CAN-H/CAN-L

AB7018
Anybus Communicator
JAVA CANopen

$GPGGA,141405.00,5120.3585939,N,00310.8439458,E,2,05,2.05,16.8034,M,47.1571,M,1.2,0000*4F
(NMEA 0183 protocol based on RS 232)

There are two Anybus Communicators in each straddle carrier. Firstly, the Anybus Communicator CAN which converts the information from the straddle carrier to Modbus TCP.

Secondly, the Anybus Communicator JAVA which converts the information from a GPS tracker (using the NMEA protocol) and incorporates this into the CAN-bus.

deemed that the Anybus Communicator CAN would be a perfect fit to handle the conversion between the CAN-based network in the 22 straddle carriers and the Modbus-TCP network. The Anybus Communicator CAN works as a translator between the CAN-bus in the straddle carrier and the Modbus TCP of the communication system, converting each telegram through built-in hardware and software. Together with PICS, APM Terminals started mapping the communication between the CAN-bus and the monitoring system.

"We found the Anybus Communicator quite easy to use," says Bart de Roo and Steven Lowyck, Control Engineers at APM terminals. "After a three-month test period, we had the first system in place in a straddle carrier which could be monitored from the office. A real advantage of the Anybus Communicator is that the configurations can be re-used. This means that by simply changing addresses, we can immediately apply a new Communicator in another straddle carrier."

The configuration is made via the Anybus Configuration Manager, a windows-based software where APM Terminals can specify exactly how telegrams should be passed on between systems.

"The implementation went quite smoothly," says Berge Billauws, Managing Director at PICS. Installing an Anybus Communicator usually takes an hour or two and within a few

days, we had the 22 carriers communicating with the central office. What I really like about the Anybus Communicator is that it is so configurable and that you can tweak the messages as you wish. The fact that the Anybus Communicator CAN supports both 11-bit and 29-bit identifiers, was also a prerequisite for the success of the installation."

GPS connectivity solved with Anybus Communicator

Another issue that needed to be solved was that the GPS trackers in the carriers used an NMEA 0183 protocol (based on RS232) which couldn't communicate with the CAN-bus. But APM Terminals and PICS found an Anybus-solution for this problem as well. With the help of the configurable Anybus Communicator, they could establish communication between the straddle carriers' CAN-system and the NMEA 0183-based GPS system.

The results

APM's straddle carriers can now be monitored by the central office so they know the fuel status, exact position, wind conditions etc. for each vehicle. This enables better control and safer operations.

"A main advantage of the system is that our maintenance teams now know beforehand what they need to do with each straddle carrier when it comes in for service. This saves a lot of time and reduces the risk of accidents" finishes Bart de Roo.

Learn more: www.anybus.com, www.apmterminals.com, www.pics.be.
Anybus Communicator Gateways

Anybus Communicator can connect almost any automation device with a serial communication interface to fieldbus and industrial Ethernet networks. The Communicator performs an intelligent conversion between the serial protocol of the automation device and the chosen industrial network.

HMS