Humans in control

INTEGRATED FLEET MANAGEMENT IS A SOLUTION THAT ENABLES INDUSTRIAL VEHICLE OEMs TO LEVERAGE ONBOARD INTELLIGENCE FOR IMPROVED MACHINE-TO-MACHINE OFFERINGS
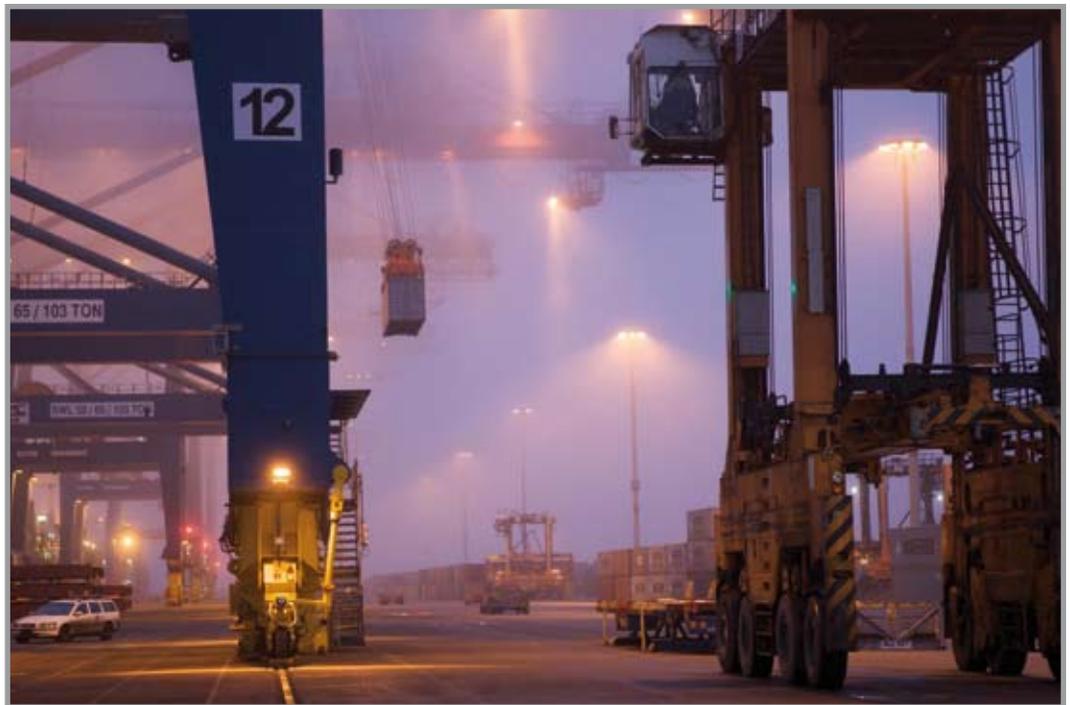
Operation of advanced, expensive machinery is gradually becoming a more qualified work task than it used to be – tomorrow's operators will demand more influence and responsibility. Fleet management solutions that leave the operator and onboard knowledge out of the loop do not maximise the potential offered by asset management.

By providing a system solution in which adequate onboard diagnostics and decision support is seamlessly integrated with traditional M2M and telematics, industrial vehicle OEMs have a solution where all stakeholders contribute and work towards common objectives. This is known as 'humans in control'.

For materials handling and industrial vehicle manufacturers, it can be challenging to get such system solutions in place due to system integration obstacles and system cost issues. CrossControl recommends its integrated fleet management concept, which combines its solutions for onboard controls and diagnostics with an industrial M2M and back-office server solution from Arkub.

Such solutions have been in place for years in the most advanced and high-value types of machines. In value chain contexts where a single machine's ability to perform is critical for total process performance, substantial increases in system cost associated with these kinds of solutions can sometimes be justified.

When adopting integrated fleet management, no additional system hardware is required and, with ready-made software components and platforms, the software development effort is heavily reduced. This means that industrial vehicle OEMs are able to provide a higher value offering to customers without additional cost.

As in other sectors, the trend in the industrial vehicle industry will be for continued development towards more functionality and value in machines being realised in the software. Integrated fleet management is another example of this.

Leveraging onboard intelligence
A control system, based on CAN, Ethernet, or other field buses, has information that can be used for machine diagnostics and prognostics. However, it is unwise to implement advanced diagnostics in a control system with high real-time requirements. A wiser strategy is to separate concerns and run diagnostics as a separate application that retrieves data through signal interfaces to the control system. The diagnostics application may include extensive calculations but these do not need to be conducted with the cycle times of the controls. In this way, advanced diagnostics do not drive performance requirements.

With modern controllers, such as CrossCore XA All-Integrated, diagnostics and controls can run on the same hardware, avoiding the need for additional hardware, and associated cost, in the system.

The diagnostics run-time is designed to interface easily with control system run times such as CoDeSys or other control system frameworks. This makes integration

FIGURE 1: **Onboard diagnostics and decision support seamlessly integrated with traditional M2M gives industrial vehicle OEMs a value-adding fleet-management offering**

FIGURE 2: **CrossCore XA All-Integrated is a controller, diagnostics device and communication gateway in one device**

and improving service levels for customers. It is also about offering more services and finding new ways of generating revenue.

On the plains of Ukraine, for instance, simply locating the agricultural equipment is a challenge for the service staff. For the container handling equipment in the port of Rotterdam, the ability to monitor condition and thereby being able to plan maintenance is crucial; unplanned maintenance can delay the ship at dockside, which causes great problems for the terminal operations manager.

Companies that embrace M2M can create a competitive edge. One example is the Nordic logistics business trucking contractors who need a fleet management system based on M2M to stay competitive. It is fair to assume that we will see a similar development in most businesses – each with their specific M2M solutions. The basic principles for these specific solutions will, however, be the same: productivity improvements, improved operational control, enhanced service levels and new revenue streams.

Changed conditions
Once technically immature and expensive, M2M solutions can now benefit a range of applications where machine intelligence is used to improve business. This is due to decreasing communication and network costs and the availability of hardware and software components for virtually any M2M solution.

easy. With the diagnostics in place, there is a system that can draw more refined and specific conclusions on machine health and even make prognoses to predict future behaviour and life expectancy.

This knowledge base, stored in a data repository (still in the same controller) is accessed by both the onboard GUI application and an M2M communication application that relays info to the back-office server. Through this approach, all stakeholders are connected and have access to relevant information for different levels of decision making. With onboard GUI, the operator receives diagnostics information 'in his face' enabling prompt, on-site action.

For the total concept to work, decision support to remote stakeholders needs to be reliable, concise and set up for different areas of responsibility and concern. Setting up communication with a machine and running a back-office server for collecting data is trivial. But there is a huge difference between this basic functionality and running fleet management on a large industrial scale as an integrated part of the business.

M2M objectives
M2M is not primarily about technology, it is about making machine operations more efficient

Asset management has changed radically since units became available online. The ability to supervise machines and other physical assets remotely at low cost has great impact on productivity, customer service and revenues, and thereby also constitutes a means of improving market position. The obvious advantages are improved reliability, reduced service cost, higher utilisation, higher used equipment value and an ability to provide new services.

Industrial M2M
In its integrated fleet management offering, CrossControl uses Arkubserver, a scalable software platform for M2M and telematics solutions. It is built for easy adaptation to different industries and applications and is deployed globally in container handlers, mining vehicles, electric utility, on-road vehicle fleets, compressors and manufacturing plant machinery. It is a fully commercial industrial platform for managing thousands of connected units and users.

The Arkubserver can provide information on virtually every aspect related to a machine's operation and well-being, such as service and maintenance status, production hours, geographical position, alarms and production stops, temperatures, levels and flows. The ability to receive a warning when a potential problem is emerging can often prevent an unplanned break in operation and

FIGURE 3: **The CCpilot range of display computers provides operators with powerful decision support**

the resulting loss of production. The solution also makes it possible to organise the whole service and maintenance chain via messages to technicians, as well as offering business system input such as the ordering of spare parts.

It also supports new business models where, for example, a compressor manufacturer could sell the service of producing X million cubic metres of 100 bar compressed air rather than just selling the compressor. Or a forestry machine manufacturer can offer service agreements with extended service levels, bringing in new revenue streams and customer loyalty.

Arkubserver is a standardised telematics platform, meaning it is easy to set up a working fleet management solution for specific application needs in short time. The platform supports features such as:
• Storage and presentation of all data in tables and graphs with powerful graphics support;
• Notification functions for all events through SMS and email;
• Data export functions to PDF, Excel, Word and Google Earth;

• Built-in mapping and positioning functionality;
• A service and maintenance module with planning, follow-up, alarms and log-handling;
• Statistics and analysis functions with graphical support;
• Handling of time zones and languages;
• Powerful safety functions for authorisation and breech protection;
• Ability to configure information access freely – i.e. who should see what info.

The system is securely hosted on a server cluster with 24/7 support, raid systems and backup. It is prepared for any fleet size as server clustering is deployed for load balancing.

The data carrier interfaces are supported with worldwide roaming agreements with operators or satellite subscription agreements. This helps to dramatically reduce the communication cost in comparison with standard SIM card subscriptions and means that manufacturers do not need to spend time on subscription handling.

The integrated fleet management concept was developed by Arkub and

FIGURE 4: **Integrated fleet-management system overview**

CrossControl in close co-operation with leading OEMs that have taken it into their respective markets, despite the downturn. The timing may not be favourable but the feedback is quite the opposite. It offers improvements in operational performance without increasing system cost – and even reducing it. Little wonder it has triggered strong interest in the current climate where there is a sign of an upturn resulting in new business. **ALT**

Erik Ljung is responsible for business development in the industrial vehicle sector at Arkub. Fredrik Lans is responsible for the integrated fleet management platform development at CrossControl

CONTACT
www.crosscontrol.com
info@crosscontrol.com