MATS KJELLBERG

All on board!

TO OPERATORS OF A NUMBER OF INDUSTRIAL VEHICLE APPLICATIONS, INTEGRATED-COMPUTER CONTROL, WIRELESS COMMUNICATION AND TOUCH-SCREEN DISPLAYS ALL CONTRIBUTE TO AN EASIER RIDE

LEFT: **The new CC Pilot XS onboard display computer**

BELOW: **The architecture for an integrated system**

RIGHT: **CC Pilot XS is today deployed in a variety of applications, including excavators**

▷ A new generation of onboard display computers designed to meet the challenges in modern vehicle controls were presented at Intermat this year. The new CC Pilot XS onboard display computer features CANbus controller functionality, a high-performance and general-purpose computing core, a high-resolution touch-screen graphical display, analogue video functionality and a range of wireless-communication options. It comes in a single, sleek package with different equipment levels to cater for a variety of functionality needs.

The Scandinavian control-system specialist CC Systems launched the first version of CC Pilot XS in 2005, and today it is deployed in a variety of applications such as mining equipment, container trucks, forestry equipment, cranes, waste trucks, fire-fighting vehicles and trains. With the new release, the wireless communication features have been extended and enhanced to cater for the growing demand for machine telematics and fleet management functionality.

Advanced onboard systems

The use of advanced, computer-based control and information systems in industrial vehicles is increasing. With even the basic, CAN-based controls, vehicle manufacturers can create added value in their machines by introducing onboard diagnostics, video surveillance, user-support tools and fleet-management functionality. This development is driven by market expectations of more efficient machines, more uptime and reduced cost of ownership.

Industrial vehicles are becoming more intelligent and, to some extent, building in intelligence is also a matter of branding. Increasingly, end users are considering modern controls and onboard computing as a factor in their evaluation of machines. The new generation of operators are accustomed to computers as a natural part of everyday life.

In the journey towards more advanced onboard systems, quite a few subsystems – each solving a specific need – may be necessary, and there are many vendors for the different systems and the devices required for each task. There is, however, a risk that the result will be a number of isolated subsystems, each running on unique hardware. This may well be an adequate solution for a given machine with a certain need at a particular point in time,

but OEMs and end users would benefit from integrated solutions as it means a reduced number of components, lower total cost for the machine and a platform that is versatile and can handle the needs of tomorrow.

In the earliest control systems, the display unit typically had one purpose only – to act as the interface for the controls. In next-generation systems, the display unit needs to be more powerful when, in addition to being the operator interface for controls, it assumes the role as host for a number of value-adding subsystems.

Data collection for system diagnostics and prognostics, operator support systems and communication with external systems are today becoming more closely integrated with the vehicle-control system. This concept is not new – it has been used in high-end industrial vehicles for many years, such as in John Deere's forestry machines and rock-drilling equipment from Atlas Copco. Now this development is being seen on a broader scale in the industry.

Integrated CC Pilot XS

The new CC Pilot XS is equipped with a powerful 533MHz Intel XScale CPU, which combines high performance with low power consumption. The standard operating system is Windows CE, and Linux is optional. For application programming there are several options: IEC 61131-3 with tools such as CoDeSys, C/C++/C# with tools such as MS Visual Studio, Linux with tools such as Eclipse, or UML with tools such as Rhapsody, etc. The open computing platform means freedom of

choice; OEMs and system integrators can implement their own, proprietary software framework or use standard, high-level application engineering tools.

CC Pilot XS is equipped with two separate CAN interfaces, making it easy to integrate two different CAN networks. CANopen, SAE J1939, or a proprietary protocol can be used. By using the unit as a gateway between the J1939 bus (typically used for engine and transmission controls) and the CANopen bus (typically used for working hydraulics), there is an integrated CAN architecture that covers the whole vehicle. This enables a total machine control system to be built.

The two analogue video interfaces, which are PAL and NTSC compatible, mean the CC Pilot XS can be used as a rearview and surveillance camera monitor. The video image from the cameras can be displayed in full-screen size or scaled to smaller size, sharing the screen area with the Graphical User Interface (GUI) for controls. A snapshot feature means photos can be saved for documenting events and situations in which the machine has been involved.

At the highest equipment level, the new CC Pilot XS has a number of wireless communication. These enable the unit to be used for machine-telematics systems, monitoring machine status, production, or diagnostics data from remote. The built-in quad-band GPRS modem is suitable for vehicle fleets spread just about all over the globe. The built-in WLAN is more suitable for fleets that operate in a limited area, such as a terminal or work site.

Another wireless feature is the built-in Bluetooth interface typically used for connecting accessories such as a keyboard or other operator input devices. It can also be used for wireless remote control; the CAN communication is simply transmitted via Bluetooth.

The optional built-in GPS receiver is useful when implementing a machine-telematics and fleet-management system. The onboard system can log machine location, and through the remote access by GPRS, the machines' movements can be tracked in a back-office mapping system, either in real time or on demand.

State-of-the-art interface

The high-resolution display in CC Pilot XS comes in either 6.5in or 10.4in configuration, giving a crisp, easy-to-use, premium feel to the GUI. Today's operators are accustomed to the user interfaces seen in advanced, mobile phones and PDAs, so it is more or less expected that the GUI in a machine should have a style and design that is perceived as up to date. Applying a state-of-the-art GUI helps to enhance the brand.

The display's robust touch-screen is suitable for rough environmental conditions, and simplifies user interaction with the different onboard systems. Although today's touch-screen technology is robust, it is not ideal for all applications, so push buttons are offered as an option.

The all-integrated concept that CC Pilot XS offers enables efficient implementation of the next-generation onboard systems for surveillance, diagnostics and machine telematics. It really is all on board… **iVT**

Mats Kjellberg is marketing & sales manager at CC Systems, which he joined in 2000