



Hall 16 Stand C01

In touch

NO MATTER HOW RAPIDLY TECHNOLOGY ADVANCES, PEOPLE ALWAYS WANT MORE. AN OPEN SOFTWARE TOOL CHAIN APPROACH FOR GUIs ENABLES EASY REALISATION OF A PREMIUM USER EXPERIENCE

RIGHT: GUI developed on the CrossControl software platform, running on a 10.4in CCpilot XM display computer

BELOW: Successful HMI systems assist the operator in making greater use of a machine's potential

With touchscreens that provide new, intuitive ways of interaction and a sharp GUI, smartphones represent a new reference for product usability. And now operators of industrial vehicles are asking for the same kind of user experience.

Observing first meetings between end users and vehicles confirms that operators are open to, or even expect, new HMI solutions – after getting seated in the cabin and fiddling with joysticks, their next move is to seek interaction with the machine by poking the in-cab display screen. In addition, little attention is given to the interface's graphical design – consumers expect a brand to be all-encompassing, so a well-designed user interface should not merely address the vehicle's usability but also the brand's visual appearance. This represents a major untapped potential for differentiation in the industrial vehicle market.

OEMs constantly tell how their machines are used at only a fraction of their potential. HMI systems are often designed from an engineering point of view, but successful design places more focus on the operator and translates 'low-level' technical features in the vehicle system into value functions that the operator can understand and use. This may often include automating certain operations, predefining operation modes and implementing easy-to-understand settings. The need for this approach is even more evident when moving into new markets with differing operator skill levels.

Software strategy needed

To respond to these challenges you need many things – but the software strategy is fundamental. Small and mid-sized OEMs in many cases rely on hardware suppliers who control the software functionality in displays and other devices. This may work fine in day-to-day business, but with more of the value in terms of user experience being realised in software, there is an eminent risk that the OEM is not in control of the value added.



Large OEMs will have usually secured this control, but often spend resources on low-level software and the application frameworks – resources that could instead be spent on value-adding applications.

With the well-established standards and open, powerful and hardware-independent frameworks and tools available, OEMs can now source electronics and software frameworks and focus system engineering on software application development.

In its software platform for displays, CrossControl carefully avoided creating a proprietary solution and instead set up an architecture that combines and integrates the most powerful – yet easy-to-use – commercially available frameworks for GUI and machine control.

The machine control framework handles the fieldbus, e.g. CAN, communication with other parts of the system and runs a controller inside the display, to compute the algorithms and value functions that help the operator use the full potential of the vehicle. In the standard packaging of the platform, CrossControl adopted the IEC 61131-3 compliant CoDeSys framework for this task. It is hardware-independent, widely adopted in the industry and provides an easy-to-use programming environment for typical controller functionality.

The GUI framework handles the graphics visualisation and user interaction on the display. Qt is used in the platform's standard packaging for this task, being a mature, open and hardware-independent framework. Qt supports very advanced GUI functions and mimics, and has a drag-and-drop type of programming environment that requires only basic programming skills. To integrate these two frameworks, the CrossControl data repository handles instant data exchange between them, so that GUI execution runs independently of the real-time cycles of the machine control system. To that has been added style sheets, day-and-night modes and ready-made components for gauges, alarm lists, warning lamps, etc, with a number of parameters that enable easy adaptation of behaviour and graphical appearance.

The result: an integrated software platform with a seamless toolchain to enable efficient engineering of advanced HMI functions. It has already been adopted by some leading OEMs, who deploy it for realisation of their next-generation solutions. By using state-of-the-art, open frameworks, it becomes possible to realise the premium user experience that will differentiate successful brands. **ivT**

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