

STATE OF THE SMART

ELECTRONIC CONTROL SYSTEMS HAVE BECOME INCREASINGLY COMMON IN INDUSTRIAL VEHICLES IN RECENT YEARS – AND NOW OPERATOR INTERFACES ARE TAKING A GIANT LEAP WITH THE SMART DASHBOARD



▶ Over the past few years, electronic control systems have become increasingly common in industrial vehicles, and are now taken for granted as a natural part of all modern designs. Electronic systems are smart: they are able to improve steering precision, reduce fuel consumption and manage complex control tasks that are impossible to carry out using other technologies.

Although control systems have rapidly gained greater importance in vehicles, the development of operator interfaces has lagged behind. Discrete instruments and physical controls that limit command functions and restrict the information displayed can still be found in many vehicles. But although some vehicles have displays as part of their instrumentation, few have fully exploited the potential offered by computer technology.

Dasa Control Systems works with complete control systems for heavy vehicles, in particular control units, I/O modules and visualisation. Forestry harvesters, the advanced applications of which place high demands on operator

communications, have become a specialist area for the company. "We've been working on the development of displays and touchscreen technology for many years," says Håkan Lavin, sales director at Dasa. "We are making special investments in this area, which is becoming increasingly important for customers as new technologies emerge."

As a full-range supplier, the company delivers hardware, software and services, all of which may be standard solutions, customisations or a mixture of the two. The company is involved from the beginning of a project and stays with the customer throughout.

A question of choice

When selecting a display it is important to know the type of data that will be shown during different operational circumstances, as well as the space available for a good location in the cab. These criteria both determine display size and resolution.

The ability to manage display brightness in varying ambient light levels is also important. Modern cabs

feature more glass than ever before, and as it is rarely possible to shield against sunlight from every angle, displays must be very bright, but with the ability to dim automatically for night operations. There are good displays available on the market, but each alternative must be carefully evaluated in practice, because there are several different characteristics that must work in concert for the desired visual experience to be achieved.

Touchscreens have seen the greatest display developments in recent years. A few years ago, resistive technology dominated because it functioned well and was inexpensive. Unfortunately it lacked a good, distinct feel and it also diminished display brightness. But the new technologies that have emerged in connection with modern smartphones have resulted in touchscreens enjoying a boom. Today's multi-touch and gesture-control displays feature new capabilities that make user interfaces even more user-friendly and appealing. The widespread use of smartphones also means that users feel at home with touchscreens and demand them in other applications.

Today's touchscreens largely eliminate the necessity for discrete buttons and controls, and can replace them with on-screen controls. These have the great advantage of not being limited to a single control array, but provide the ability to customise controls to suit a variety of operational applications.

Design solutions

During the early years of cab displays, it was often a matter of installing a more or less encapsulated unit somewhere suitable in the cab. Cabs were laid out practically, with no great effort devoted to design. But the pressures of competition have led to design becoming an important factor, and today an increasing amount of equipment is designed by OEMs who place great importance on style and appearance.

In principle there are three levels of integration: enclosed display units for installation on attachment fittings; displays for recessing in panels; and fully integrated units for installation behind the instrument panel. Displays in the latter can be installed behind a glass or plastic panel to provide a protected, uniform appearance. With the right technology, this can take place without the touchscreen function being impaired. In this case the designer has much greater latitude to adapt control system appearance, form and function to other functions that must be present in the cab.

One single display unit is usually sufficient for standard applications, but in many operations there is a need to access more information without having to then navigate through a sequence of windows. The driver must be able to see the important operational parameters connected with driving the actual machine while also monitoring one or more operational applications.

There is seldom sufficient space for large displays in vehicles, so a good solution is to spread the visualisation across several units. This is where the touchscreen has a unique advantage, with its strong link between image and control action. When multiple displays are used it is important to ensure the solution is homogeneous so that the connection between the various units remains synchronised.

Connectivity and infotainment

Great importance is placed on the ability to run a variety of standard applications from the vehicle. This applies not only to industrial vehicles, where the operator spends the majority of the day in the driver's seat and has a need to communicate with the outside world, but also in situations in which



ABOVE: Forestry harvesters are highly productive due to computerised control
RIGHT: The Smart Dashboard integrates many functions into one solid solution

there is a desire to transfer online data, radio, video and music to passengers.

There are great gains to be made in integrating MMI controls for the efficient distribution of these functions. A powerful processor platform in an environment that can manage the integration of the various desired applications will be necessary for this to be effective. It will be important to adhere to open standards such as Windows, Android, Ethernet and USB when building the platform and interconnecting resources. Therefore, there is always an ability to cope with any extensions and new functions, because demand for these types of applications tends to increase constantly.

Another important issue is the ability to isolate machine-critical functions from person-oriented applications. It may be possible to tackle this with today's processors but it requires special care.

Smart dashboards

The term 'smart dashboard' really means an amalgamation of the areas addressed above. It is a solution that fully exploits several available technologies, presenting them to the user in an efficient, well-adapted manner.

Today's requirements are not just for onboard systems that control a machine and its applications, but for systems with extensive communications and all of the server services normally available from a computer with an internet connection. Integrated fleet management systems, navigation and tracking systems based on GPS, production reporting,



transport orders and integration with server-based applications are just a few of the services available.

In such a complex environment, importance is increasingly being placed on the ability to rapidly adapt operational conditions to different driver language and comfort settings or operational situations determined by applications. This can be achieved by driver identification, login or RFID.

A smart dashboard is nothing less than the creation of consistent driver environments. These days it is not uncommon to find that a number of subsystems from different manufacturers have been slung haphazardly into a cab without any co-ordination. The best way to put an end to this is to choose a good platform and make sure that all the different subsystems are properly integrated into it. **IVT**

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