

Straight to video

AS PRODUCTS AND COMMUNICATION BUSES MATURE, DIGITAL NETWORK-VIDEO SOLUTIONS ARE OVERCOMING THE SHORTCOMINGS OF ANALOGUE TECHNOLOGIES FOR OPTIMUM FLEXIBILITY

RIGHT: Video feed window on CCpilot XM

Traditionally, video surveillance equipment – whether mobile or stationary – has relied on analogue CCTV solutions, where the standards are mature and incompatibility issues are few. But the drawbacks of these solutions include low flexibility and scalability, high cost, and limitations in image quality. The video surveillance-equipment manufacturers have responded by creating the next generation of solutions based on open-network technologies such as Ethernet and IP. These network-based video solutions are steadily growing and are now moving into the vehicle industry, where the technology has already been adopted in trains and buses.

A new technology leap normally means overcoming the drawbacks of the older system solutions, and network video is no exception. Primarily the image quality, system scalability and flexibility are driving issues, providing surveillance systems with more accurate and detailed data from additional locations but collected at the same instance. This also affects system cost, as several cameras normally share the physical network. It is also possible to use an already existing network, because these devices are based on common standards and can, for instance, share the same network as a network-based control and infotainment system. Network cameras may also be able to use power-over-Ethernet (PoE), reducing the need for extra power cabling and providing data and power with only one cable.

Image quality improves with the new type of digital-image sensors which are no longer limited to the fixed-line resolution of PAL and NTSC analogue video. Megapixel resolutions are therefore no longer fantasy, but reality. Deploying progressive scan mode over interlaced mode in cameras also improves quality, especially for fast-moving objects.

The same feature also provides better resolutions for image snapshots that can be retrieved from the video streams. Transferring images over the network normally requires



the use of compression techniques using video codecs such as Motion Jpeg, Mpeg-4 Part2, or H.264. These techniques reduce the bandwidth on the communication bus while still providing fast playback possibilities, as well as scaling the bus load to provide additional IP video streams.

Analogue CCTV solutions can still be used by integrating them into the digital video world with converters, preventing the loss of that previous investment cost, but gaining some of the benefits from the network video world. Unfortunately, not all of the benefits can be utilised with such a solution.

Multipurpose displays

Videos no longer need to be retrieved from a dedicated recording device – this can be achieved through various network-related access methods, both wired and wireless, either automatically or upon request. In addition, onboard display computers such as the CrossControl CCpilot XL and the new CCpilot XM can act as instant local viewers or control instances in vehicles, without disturbing recording and remote monitoring.

These onboard display devices also provide functions for displaying multiple video streams simultaneously, by being able

to scale the IP video streams seamlessly, displaying them overlapped, in full-screen mode, or fitted into multiple-view windows. At the same time, these devices can record videos locally upon request, or be configured to automatically do so. CrossControl display computers use hardware-acceleration features for network-video playback handling, reducing the computing power needed for the video feeds. This also enables additional video feeds to be seen simultaneously, with little degradation of the display computer performance, giving other multipurpose tasks enough computer performance.

Besides having capabilities for handling IP video streams, the CrossControl display computers feature CANbus-controller functionality and wireless communication, enabling them to be applied as total vehicle-system terminals, integrating human-machine interaction with all vehicle subsystems.

Safe surveillance

An additional 'spice' is that a system solution, using network video solutions, may be able to encode specific data patterns into the video streams already at the camera location. This specific data pattern can be used, together with the new safety-enabled

CCpilot XMs, as a system solution able to meet safety certifications such as IEC-61508 and ISO 13849-1, with aspect to video monitoring functions.

The cameras can utilise computer logic and software implementations, providing new features never before seen in the industrial vehicle segment. This means that with network-video solutions, surveillance logic can be distributed and automated to a higher level than ever before. For instance, it becomes possible to detect people movement around heavy machinery, and ultimately have automated safe-protection mechanisms, preventing harm to people.

Having a digital representation of an analogue world makes image processing easy. This is exactly what you get with network-based video – a digital stream that can be processed, viewed, stored or manipulated as you choose. More complex algorithms can be used, where classification, feature extraction and pattern recognition are the most common features in digital

image processing. The image processing can either be carried out locally by powerful vehicle-based devices such as the CrossControl CCpilot XL or XM, or remotely, with standard PC solutions in an office environment, enabling either direct feedback of the desired features, or office-based post-processing features without unnecessary delays for distributing the video material.

Classic video view remains

In the end, it is the viewer of the video feed, a driver, operator or other persons involved in the surveillance system, who require the classic video view to be able to perform their tasks. Network-video solutions provide them with richer details and improved functionality that can help them make better decisions based on the video information they are seeing, locally or remotely.

With video solutions based on open-network technology, OEMs can create more integrated vehicle systems where video, controls, and diagnostics utilise the same



network and hardware. This makes it possible to save cost and also to offer a more user-friendly human-machine interaction. **ivT**

ABOVE: **New features will make it possible to implement automated safety protection mechanisms, preventing harm to people moving around**

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