It's time to think differently when looking at upgrading ageing distributed control systems.

Thinking differently about process control strategies

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In the past, upgrading a Distributed Control System (DCS) typically involved ripping out the old system and replacing it with a new one from a different vendor, or undergoing a hardware or software upgrade.

While DCS reliability and total cost of ownership from different vendors can vary, there is a lot less variation today in the overall functionality offered by DCS suppliers and this poses a challenge in more mature European process industry – such as in the pharmaceutical sector – where the transition towards smart manufacturing has become key to survival.

An increased appetite for production flexibility and agility means well-established industries must strive for greater readiness to embrace new technologies, standards and trends.

Today, pharmaceutical production plants must embrace more flexible production and faster process implementation to reduce time to market for new product developments

They also need improved supply chain management to ensure better product quality and more stable/reliable product supply, and they need to reach target yields faster.

The issue of relatively little incremental functionality and (economical) value of replacement DCS systems is a major constraint for achieving these goals as companies seek to digitalise their operations, achieve smart manufacturing, and advance towards more autonomous operations. This is because the DCS is effectively a closed system, so cannot integrate easily into other systems.

Moving forwards

In moving towards autonomous operations, horizontal and vertical integration between and across systems is critical. **Horizontal integration refers to the integration of the different on-premise systems.**

Often these systems will employ different interfaces/protocols – such as OPC UA, Profibus DP, Modbus TCP/IP or the IEC61850. **Vertical integration refers to integration with the business domain, the Cloud** (for example, through MQTT interface), remote centers or Industrial Internet of Things (IIoT) devices where cybersecurity is crucial in supporting different architectures and protocols.

Another layer of complexity is added with **the integration of multi-site systems within a 'system of systems'.**

The limited ability of the DCS to connect, communicate and integrate with other non-DCS systems – essential for the realisation of autonomous operations – means the focus must change to implementing a new (autonomous) overall plant operating philosophy instead of a new DCS system.

The traditional DCS has reached a point of diminishing returns as a source of unlocking major incremental value (flexibility and agility) for transitioning to digital and autonomous operations. The implication of this is that plant owners and operators should now place more focus on roadmaps to autonomous operations, versus a DCS technology or migration roadmap. Of course, the DCS will continue to be important in how plants operate, but the next horizon of value in the DCS domain is in open platform architectures – for example O-PAS (Open Process Automation Standard) and MTP (Module Type Packages) – and less in the DCS technologies themselves.

So, there are some practical steps that plant owners and operators should take when considering future process control strategies. These include:

- Insert OPA gateway in current DCS and continue technology roadmap within the OPA space.
- Embrace new trends and standards like MTP, AI, ML and IIOT to improve machine integration, enhance operator support, reduce overall system complexity and pursue flexible, modular plants.
- Adopt a full data integration strategy that includes cybersecurity for data reliability/protection. As part of this, define own user roadmap for digitalisation and autonomous operations using, for example, the independent SIRI (Smart Industry Readiness Index) benchmark.