

'Open platforms' in glass-making process automation

The idea behind a tiny and cheap computer for children came in 2006, when Eben Upton, Rob Mullins, Jack Lang and Alan Mycroft, based at the University of Cambridge's Computer Laboratory, became concerned about the year-on-year decline in number and skills of A-level students applying to read Computer Science. Since its introduction in 2012, over two million Raspberry Pi computers have been sold. According to René Meuleman, this lean and cheap hardware device has all that is needed to carry and execute any intelligent idea. Call it an IP-container/executer.

A Dutch newspaper published an interesting article about the Raspberry Pi that described how 30 years ago, youngsters purchased a second-hand motor cycle and started to refurbish it. Today, they buy a Raspberry Pi and start converting their ideas into an application. Another great idea from 'Phonebloks', which goes beyond the iPhone idea, provides a hardware concept that allows every manufacturer to add specific hardware and functionality to a mobile phone platform. "Phone blocks are individual components, assembled together to create something bigger. In the same way, the Phonebloks movement is working to affect massive change on a global level but we will only achieve our higher purpose if enough people join."

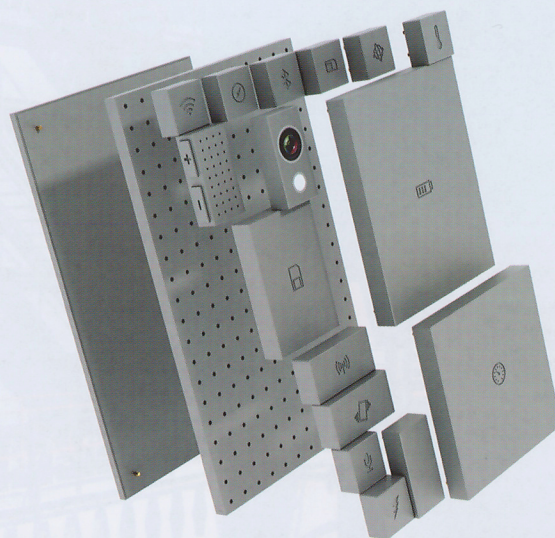
These specific products show perfectly how systems will develop in the future and Eurotherm clearly recognised those trends. The company understood future industry demands and faced the challenge, determined

to be one of the first to develop a 'professional, high performing' solution.

Combining the 'precision control' in Eurotherm's DNA with a strong belief in the future of open platforms, the R&D department started to work furiously on a range of products and their integration into the Wonderware environment. Some of these products will be introduced shortly as part of the E+PLC family, which combine the best of Eurotherm control and recording expertise with an open CODESYS programming environment. By embedding the company's precision autotuning PID, setpoint programmer, batch, secure recording and archiving functionality, Eurotherm has extended the usefulness of a PLC, creating different ways of accommodating, executing and protecting customers' valuable IP control strategies.

GLASS INDUSTRY FOCUS

It is no secret that the glass industry is conservative and it obviously has many reasons for being that way.

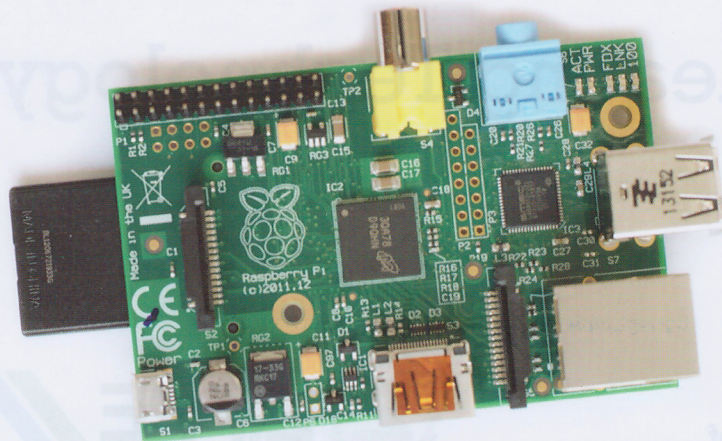


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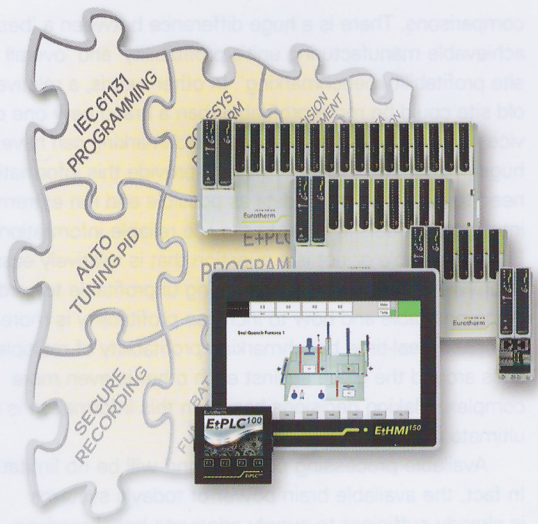
Over the last few decades, it has succeeded in continually extending furnace lifetimes until they reached sometimes unrealistic figures when measured against fast arriving innovations and customer demands. Adapting a furnace in full operation to changing demands and environmental legislations is difficult, in most cases even impossible. Most of these melters drag an over aged process control system with them, which is no longer able to provide the information needed to satisfy plant operations, management and perhaps even more importantly, the changing demands of young people entering the industry.

It is evident that the way young people communicate has changed dramatically over the last decade and communication technology has evolved spectacularly and much faster than process control. Since the future belongs to the young, is it time to consider a revolution in process control?

Recently, some initiatives have been seen that develop different ways of glass manufacturing aimed at smaller, more efficient and shorter campaign furnaces. Referring to the keynote speech of Scott Thomsen, of Guardian Industries, at GPD Finland: "We don't want to be launching new products every 15 to 20 years but coming out with meaningful innovation every five to seven years." That takes a completely different way of thinking and fortunately,



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the first sign of individuals and companies that have finally started thinking outside the box has arrived, mostly driven by a new generation of engineers. The revitalisation of this industry is vital to its future survival and at last, the glass industry is now heading for a step change.

Finding new ways of melting and manufacturing are not the only objective. It all comes down to the harsh facts of needing to be more productive, flexible, environmentally-friendly and more attractive, thus more competitive. In the end, the bottom line is that everything is money-driven and therefore needs to be controlled at all times. New ways of manufacturing need new methods of control. It requires a different way of managing data and providing information. It needs to provide an open platform that allows easy and quick implementation of innovations and be capable of protecting every company's greatest asset: Intellectual Property (IP).

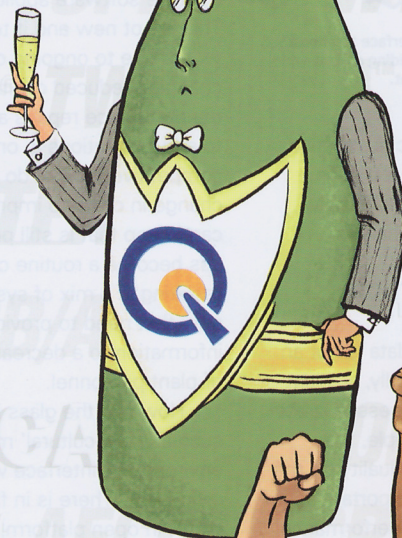
Even in so-called 'greenfield' situations, the dilemma is, do we want to choose a single brand for all automation-related equipment or do we want to profit from the best 'Intellectual Property' available? Does the one who decides to build a brand new factory want to limit himself by the straightjacket of a single vendor's hardware range or should he look for an open environment that gets the best of all worlds? Nowadays, the total added value that multiple suppliers can bring to the table for such a project should be higher valued instead of trying to achieve a standardised process control layer that does not add any 'intelligence'. In fact, standardisation has moved up several levels and should now be found at a data information layer that is capable of interfacing, collecting and distributing processing data between all manufacturing-related systems and all users.

Due to these developments, it is now that new and different ways of managing production facilities need to be considered and by doing that, the whole system needs to be taken into account; from top to bottom. The major show stopper in this process is that there are different people in different positions who are responsible for the whole 'manufacturing system' and it is difficult to get them all together at one table in order to move innovations forward, as their interests and specific knowledge is most of the time miles away from each other. Imagine the batch-oriented data coming from the batch house, next to the real-time data coming from the continuous process of melting, fining and conditioning, next to cold end quality figures and warehouse logistic information; all being brought together in one system. For a start, it would need a consistent and standardised naming system in order to manage the data storage. It would require different sampling rates and time stamping rules and above all, it would need all stakeholders to get >

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FORMING SYSTEMS

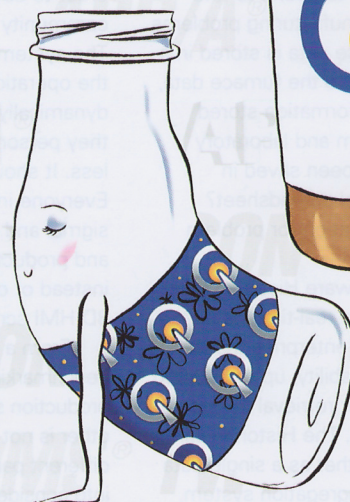
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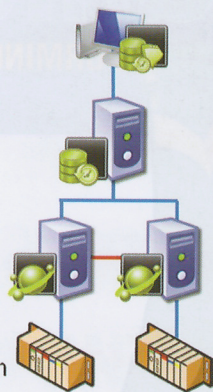
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Historian Client

Wonderware Historian

Application Server

Control System



Wonderware Historian can interface to almost every system, capable of providing a plant-wide, standardised open environment.

down or up to a specific abstraction layer in order to get the job done. The good news is that technically, there are no longer any barriers.

OPEN DATA COLLECTION AND STORAGE

Collecting and storing data is not an isolated task. Undoubtedly, all plant and even corporate processes relate to each other. For example, the impact of raw material quality on the melting process is as important as its impact on overall plant performance. Therefore, it really makes sense to consider the industrial database as the single core of a process data and information system. Having multiple data collection systems, provided by several subcontractors or packed unit suppliers will most probably lead to inefficient data interfacing and complex information production.

Imagine the time and effort people will need to spend to find solutions for manufacturing problems if the batch house data is stored in a different system to the furnace data, with cold end information stored in another system and laboratory samples having been saved in a separated Excel spreadsheet? A frustrating situation for problem solving.

The Wonderware Historian is a high performance real-time database for the industrial enterprise that offers unparalleled scalability, up to 500,000 tags, with greater retrieval throughput than ever before. The Historian can be configured either as a single data collection and aggregation system, or as part of a larger, multi-tiered architecture. Local facilities receive the high resolution data needed for detailed troubleshooting and corporate decision makers receive the aggregated data to compare the

performance of multiple facilities. All these features are very important, of course but perhaps the most important capability of Wonderware Historian is that it can interface to almost every system, capable of providing a plant-wide, standardised open environment.

OPEN DATABASE PLATFORM

At most glass manufacturing sites, multiple systems are found from multiple suppliers, containing multiple software applications. This is not new and it tends to get worse due to ongoing on-the-fly changes, reduced capital spending during furnace repairs and the need to add innovations in order to stay competitive. "What do I need to change in order to improve and what can I keep that is still profitable?" has become a routine consideration, resulting in a mix of systems old and new that need to provide essential information to a decreasing number of plant personnel.

How can the glass industry make such a 'multi-cultural' manufacturing environment interface with people efficiently? There is in fact only one way: An open platform, capable of interfacing with all systems, that provides a standardised data platform, accommodating all the functions that control, convert, add intelligence, display, store and report.

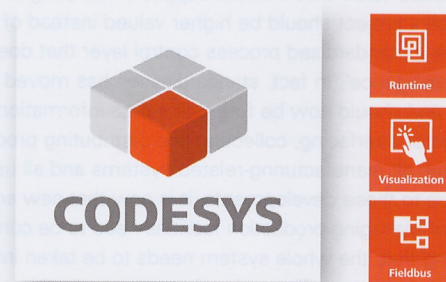
IP (Intellectual Property) needs an open and easy-to-use platform and process control should provide just that. As many obstacles as possible need to be removed from systems in order to better serve the developing community by hosting their ideas. The system then needs to serve the operational community by giving dynamically just the information they personally need; no more - no less. It should focus on the result. Everyone implemented 'lean six sigma' and therefore, lean intelligent and productive systems are needed instead of complex, multi-coloured 3D HMI screens.

From a corporate perspective, benchmarking glass manufacturing production systems against each other is not an easy task. Many different parameters need to be taken into consideration in order to provide factual information on performance. Reliable profitability benchmarking information will help corporate management to make the correct decisions, instead of frustrating site management by making unreasonable

comparisons. There is a huge difference between a 'best achievable manufacturing unit's profitability' and 'overall site profitability benchmarking'. In other words, a relatively old site could be more profitable than a brand new one or vice versa and since profitability benchmarking can have a huge impact, the systems that will provide this information need to gather as much data as possible and run extremely intelligent models in order to provide reliable information. Being profitable or not is a question that is relatively easy to answer. How to move from being unprofitable towards being profitable and how to increase profitability is more complex. Real-time benchmarking profitability of multiple sites around the globe against each other is even more complex. Making decisions based on this information is the ultimate challenge.

Available processing power is and will be no limitation. In fact, the available brain power of today's systems is already sufficient to supply adequate benchmarking information. According to Moore's law, the computing power of future systems will outperform the human brain before the end of the next decade. However, computing power will obviously not be able to outperform vision, heritage and experience. The challenge will be to develop strategies into systems in a way that they will add value in decision making and empower improvements, keeping in mind that the impact this information can have increases the higher it is deployed in an organisation.

Taking process control's development history as a benchmark for its future, it will obviously not develop as quickly as desired and as explained above. However, the latest generation of tech-savvy young people is entering our industry and they will push innovations and try to convert their ideas into useful applications. That is why everyone should be optimistic and understand that the industry has an obligation to support those initiatives the best it can. As always, readers can rest assured that, owing to its reputation for being ahead of the game, Eurotherm continues to drive innovation at whatever speed process control solutions are required, developing future proof technology that enables glassmakers to build intelligence into their process, protect their IP and take glass manufacturing into the next era. ■



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