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Image: Sven / Adobe Stock

"Survival of the Fittest"

Why the future belongs to Engineering Base and its users

The history of the dinosaurs shows that specialization is not everything. After all, it's "Survival of the Fittest" and not "strongest"or "biggest". Flexibility is the decisive keyword. Only those who can adapt quickly and optimally have the best prospects for the future.

Withstanding changes

Whether AUCOTEC's development team had this evolutionary theory in mind when first designing Engineering Base (EB) or had learned from its data model experience with the classic AUCOPLAN product can no longer be clarified today – some 20 years later. One thing is clear: the platform was designed from the outset to be so flexible that the data model on which the digital twin developed in EB is based can be expanded quickly and easily at all levels. This meant that not only the system was able to withstand all the changes in industry and technology. Above all, customers can rely on the fact that both EB and their EB projects, even with very long life cycles, remain viable for the future. Why is that then?

Freely expandable

From the outset, hierarchical boundaries were a "no-go" in EB's object-orientated data model and optimum adaptability was a must. This enabled AUCOTEC – originally from the mechanical engineering sector – to expand EB for the automotive industry as well. The example of "connectors" shows the expansion principle: connectors for on-board power supply systems are more complex and flexible than in mechanical engineering, with different contact types and surfaces as well as gaskets. EB is able to expand the object structure as required – for example, to add contacts and gaskets as sub-objects to connectors – or to map any number of types and attributes to objects, such as the various surfaces and colors. Models with a predefined structure cannot do this, and document-oriented tools certainly cannot. Thanks to EB's adaptability, it is not only manufacturers of a wide range of mobile systems that now benefit from the principle of a central, consistent data model for all participants. Another evolutionary step was the expansion to process engineering topics and disciplines, such as PFD and P&ID creation, as well as rule-based pipeline design including pipe class management. By linking with detail engineering and automation, the digital twin in EB is so comprehensive that it also tremendously reduces the time required for commissioning plant, for example, through the integrated handling of cause & effect.

Closer to the optimum, more sustainability

A further adaptation of EB accelerates the initial planning phase, in which the plant dimensions are roughly determined. Various scenarios are simulated in order to find the optimum. Transferring the results to engineering used to involve tedious manual work. Accordingly, planners could afford few scenarios and there was correspondingly little reliance on having achieved the optimum plant design. EB, on the other hand, also understands scenarios and statuses as linkable objects. Devices are not static entities, but can have status objects, for example pressures, temperatures, capacities, which can be assigned to a scenario. Consequently, in EB, simulation results – which were otherwise always proprietary – are simply clicked to become part of the digital twin, where they can be compared directly. No other system is capable of doing this because it lacks the abstraction capacity. Even if significantly more scenarios are now calculated, time is saved and the optimum plant is much closer to being achieved – which is also good in terms of sustainability.

Standards and know-how

EB's data model can also be extended at any time to meet the requirements of a wide range of standards. The most recent example is the fully integrated IEC 61850, a hot topic in the energy distribution sector (see page 3).

Continue on page 2

Editorial

The be-all and end-all for future viability

Dear Readers,

The energy transition remains a key issue in almost all parts of the industrialized world. The quote that the energy transition is taking place in the power networks has been circulating for years, because the many wind farms and solar parks are of no use if the electricity does not reach the sockets. On page 3 you can read how our software platform Engineering Base (EB) supports the planning of state-of-the-art digital substations in a unique way and thus contributes to the success of the transition. This much in advance: it is about the world's first integration of control technology planning into hardware engineering. Network operators and their service providers can thus effectively manage project pressure despite a shortage of skilled workers.

Similar challenges apply in the mobility (sector (interview page 3) or when converting plants to green energy. Here, too, the pressure is high, staff are scarce and our solution is as efficient as it is successful. From the largest rail vehicle manufacturer to the growth market of hydrogen: many leading companies rely on EB. This proves once again that adaptability is the be-all and end-all for future viability, including at AUCOTEC. The article on page 1 describes this mindset as the driving force behind our developments and how it benefits all our customers. Most recently also in Malaysia, our latest subsidiary, which you can read about on page 2.

Il hope you enjoy reading this issue – and stay healthy!!

Yours
Uwe Vogt
Management Board

Image: AUCOTEC

Further contents

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The adaptation succeeded within the regular release cycle – an enormously fast pace of evolution that was only possible thanks to EB's open structure. Implementing the requirements of standards is always a particular challenge, as they only describe a final state. But an engineering platform must pave the way for this. It is therefore extremely important to consider in advance when objects first appear, whether they are optional, their variability and much more. With the know-how from almost 40 years of engineering, the AUCOTEC team anticipates the dynamic process for setting up the digital twin so that it can be conveniently used in the context of standards

Model-based maintenance

As a final example of expansion, maintenance and repair support all sectors where EB is at home. This is because tasks can also be created as objects in the data model, i.e. the digital twin. In turn, any object can be assigned to a "task". For example, all affected devices can be linked to a retrofit project and the measure can be processed and monitored „model-based" and consistently, just like any engineering with EB.

Guaranteed upward compatibility

Despite all the adaptability, the basic database structure in EB always remains the same. It manages objects including attributes and relationships without specifying which objects these must be. EB thus is and remains always upward compatible. Decades-old projects can also be processed with the current version, even if they have been outsourced for a long time. This means that all EB projects are spared the fate of the dinosaurs. No matter what technologies, standards, device developments or industrial challenges you face: with EB, you are always fit for the future.

On foot into the future?

How Engineering Base is accelerating the hydrogen ramp-up

"It is no longer just a case of a spirit of optimism, the hydrogen industry has long since been up and coming," says Niclas Meier, H_2-expert in AUCOTEC's sales team. He has experienced this up-and-coming nature first-hand at various events on the subject of hydrogen: from the World Electrolysis Congress to the European Hydrogen Week and the Engineering Summit to the online congress, Hydrogen Dialogue. In industry, transport and energy supply, H_2 is seen as the key to the more sustainable future we are striving for, but all sectors urgently need support on the path they have initially taken "on foot", so to speak. Henry Bloch, product manager for the process industry, believes that progress is still slow.

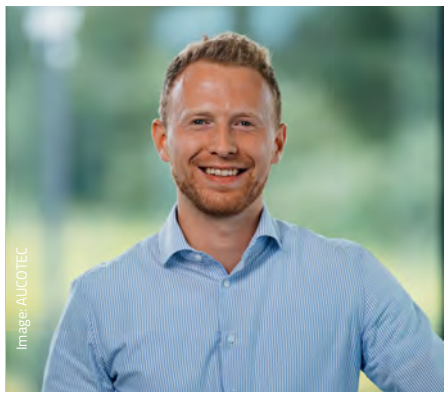

Image: AUCOTEC

> Niclas Meier

Project pressure

AUCOTEC's cooperation platform Engineering Base (EB) is a "vehicle" for reaching the goal more quickly in all the areas mentioned, despite the different requirements. As Niclas Meier reports, AUCOTEC was a sought-after contact at the congresses: for electrolyzer manufacturers who want to quickly produce more plant for more megawatts, for energy distributors who need to convert and expand their gas networks and for operators whose plant is expected to become "H_2-ready". They are all united by enormous project pressure. How can EB help?

From module to network expertise

As always, the cornerstone is EB's central, cross-discipline data model for consistent, agile engineering. "The various sectors also benefit greatly from the fact that we also contribute knowledge from other industries in which EB is successful," explains Product Manager Bloch. AUCOTEC's knowledge of modular design is a great asset for electrolyzer development. The planners and builders of the required H_2 gas network benefit from the combination of EB's comprehensive process engineering functionalities and the profound knowledge gained from decades of international success in electricity distribution. "For the upcoming H_2 infrastructure, process engineering is just as important as energy distribution expertise," emphasizes Bloch.

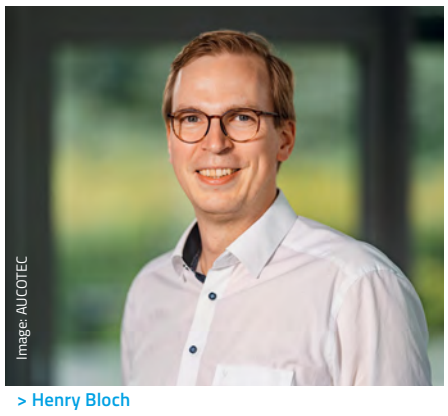

Image: AUCOTEC

> Henry Bloch

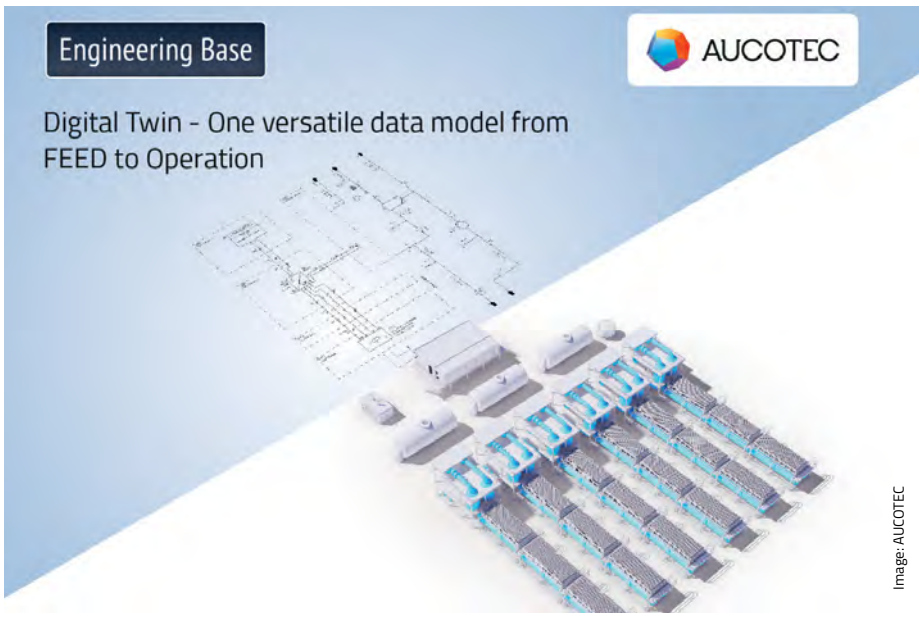

Image: AUCOTEC

Scaling by multiplying

In the electrolyzer sector, the first manufacturers are already benefiting from EB's data-centered modularization. They need highly standardized modules to "click together", because they scale plant and output by numbering up, i.e. multiplying the modules, not by increasing the size of containers and devices. "Once the modules have been designed in EB, 90 percent of the work is done," says Meier. "Simply select modules, put the project together and connect it. Everything, including connections, fits seamlessly into the overall concept – including the control system configuration. The documentation for this largely comes about by itself."

H_2-ready faster thanks to digital twinn

Other challenges face future customers of H_2 as an energy source for their plants. The necessary conversions require reliable as-built documentation, preferably a directly editable, cross-discipline plant model. This digital twin is in EB, either developed directly in the system or by migrating legacy data, whereby an interface digitally processes and enhances the existing information. EB's maintenance app also makes it easier to keep the twin up to date. This means that the usual confusing red entries and time-consuming searches in specialist silos are a thing of the past, says Henry Bloch. In this way, EB can lead electrolyzer and grid planners as well as operators from the footpath onto the highway – emission-free, of course – so that H_2 production and use can progress more quickly.

New subsidiary for the AUCOTEC family

Location in Kuala Lumpur as a hub for Southeast Asia

Together with India, the union of ASEAN states is the fastest growing economic region in the world. In 2020, its gross domestic product was the fourth largest after China, the USA and the EU and is growing by around 5 percent annually. A good place, therefore, for AUCOTEC to grow too. AUCOTEC is now also strengthening its presence in Southeast Asia with its latest subsidiary, which moved into its offices in Kuala Lumpur, Malaysia, in September. A subsidiary had already been founded last year in India to the west.

Promising neighborhood

Olaf Streit, Business Director Asia, who operates from the German headquarters and is responsible for the entire region, is delighted with the new member of the family: "In Southeast Asia, major investments in the areas of infrastructure and energy are upcoming – that fits in very well with the solutions offered by Engineering Base (EB)." Malaysia's framework conditions are ideal, not only in terms of location, but also in terms of language skills and training. He is also very satisfied with the location of the new offices. "The location is excellent; in the direct vicinity of well-known international companies. One of them is even our customer already," says Streit.

Think ahead, create trust, lead

The Managing Director on site, Jonathan Tan, sees enormous potential in EB. "We are targeting large operators, for example in energy distribution as well as companies in the food and beverage industry and the chemical sector. We want to establish ourselves there as a strong force, a pioneer that thinks ahead and a player." Kuala Lumpur is set to become a transnational hub for the entire region, and Tan already has ideas for other promising locations in Thailand and Indonesia. "The team will grow, so we have a good chance of consolidating our position as a leading engineering software provider here", he says, looking forward to the tasks ahead and adds: "For me, it is a passion to build up the location, gain the trust of customers and become an essential part of their value chain with EB." AUCOTEC as a whole will, of course, provide him with active support.

Image: AUCOTEC

From left to right: Adlan Faisol (Consultant), Jonathan Tan, Olaf Streit, Calson Chan (Technical Director), Irfan Ishak (Consultant)

Image: AaronAmat/ istock.com

When the hardware and software worlds merge

Substations according to IEC 61850

That's what you call genuine pioneering work: Engineering Base (EB) will offer the world's first full integration of IEC 61850-compliant control technology configuration for substations into plant engineering in 2024. This means that automation professionals can finally develop their standard-compliant data model directly on the engineering platform without lengthy waiting times or transfer chaos. "This completes the digital plant twin in EB in a unique way," says AUCOTEC's Product Manager Michaela Imbusch. The solution will be on show for the first time at the VDE congress "Schutz- und Leittechnik" 2024.

50 years in one system

Of course, the IEC 61850 standard is nothing new – the Infopaper already reported on how EB has supported it so far: via the integration of the Substation Configuration Tool (SCT) from AUCOTEC partner H&S, the understanding of the Substation Configuration Language SCL and automated generation of the normative SCD file. However, EB's latest version now enables all of this directly in its data model, which streamlines the system landscape and relieves the burden on IT. "EB thus keeps all developments over the course of a substation's life, i.e. a good 50 years, together in a single system – from the initial idea through detailed planning and construction to maintenance," says Imbusch. All disciplines can use the full range of the platform at the same time, for example creating their own libraries, finding objects in an instant and tracking the complete history. Every change is immediately visible and comprehensible for everyone, from now on also for the control technology. "A digital twin like this does not disappear frozen in folders or management systems like files, but remains dynamic and up-to-date," says the product manager.

Hardware and software world become one

IEC 61850 is not only an international standard for the vendor-neutral description of devices in substations and their communication, it forms the DNA of the plant. And in the digital substations of tomorrow, where bus systems instead of copper wires and servers instead of control cabinets are in charge, the standard will become even more important. However: "Where everything becomes virtual, fewer and fewer circuit or terminal block diagrams are needed – no problem for EB thanks to data centricity," emphasizes Imbusch and adds: "Linking the hardware and software worlds is also a real boon for project managers, as they always know where the data is and can rely on it being up to date."

"Key to future-proof Electrical Distribution System design"

How Engineering Base is conquering China

Electrical Distribution System specialists Leo Li, account manager at AUCOTEC's Chinese subsidiary in Shanghai, and Georg Hiebl, product manager for AUCOTEC's mobility division based in Salzburg, Austria, recently visited major customers in China. They talk about the challenges for Electrical Distribution System professionals there, about industry differences and why Engineering Base is so well received in China. Leo Li (34), who studied programming, moved to the sales department of an engineering software developer after a few years. He has been at AUCOTEC Shanghai since 2018, where he looks after major accounts such as the Foton Group, BAIC and Chery. Georg Hiebl (49) initially worked for AUCOTEC's Austrian partner TECHNODAT. After completing his studies in computer science, he joined the AUCOTEC subsidiary as a part-time software developer and also taught as a lecturer at the University of Applied Sciences for Software Engineering in Salzburg. Since 2013, he has dedicated all his time to Engineering Base Cable as the product manager in charge. What they both have in common is that they want to understand all aspects of the challenges facing customers in order to find the best possible solutions.

Image: AUCOTEC

> Leo Li

Image: AUCOTEC

> Georg Hiebl

You recently visited major customers and prospects in China together. What kind of companies were they and what are their most important issues?

Hiebl: We visited leading companies in the truck & bus and railway industries. They are all united by the desire to increase efficiency while maintaining high quality.

Li: The pressure on projects is enormous and they have recognized that EB's data-centered approach gives them optimal support in the face of this: the same database for all parties involved, which achieves the highest quality with automatic consistency

Hiebl: We also talked about AUCOTEC's latest development for process optimization, the EDS Design Center.

What is the EDS Design Center and what are its benefits?

Hiebl: This is a new central user interface in EB that offers functions for designing the electrical distribution system (EDS/Electrical Distribution System) like in a cockpit. With rule-based and automated EDS wiring and associated analysis options, you get optimized results that you might never have achieved otherwise, without any time-consuming drawing work. The tool creates an extremely high degree of automation for EDS design.

What are the biggest challenges for China's vehicle manufacturers?

Li: In our experience, these are the same as everywhere else in the world. International standards, system sustainability, maximum flexibility for customer-specific requirements and localizations, rapid technology development and growing complexity, integration capability in interaction with other systems, highly qualified specialists. And the pressure is always on to become even more efficient while meeting the highest standards of reliability. Global competition is tough, so we have to keep improving.

Hiebl: The time from order to vehicle delivery is extremely short worldwide. This often leaves only a few days or weeks for the EDS design. Wherever we go, those affected are telling us that this is no longer manageable with the conventional approaches of recent years. If development teams cannot react very quickly and reuse a lot of data, they have no chance of delivering on time and with the required quality.

Which EB solutions were of particular interest to the companies visited and why?

Li: With these challenges, it is not surprising that AUCOTEC's reuse and process automation solutions were the most popular. The truck and bus manufacturers were particularly impressed by the EDS Design Center, with which the Electrical Distribution System can be generated almost at the touch of a button based on various input parameters and which immediately calculates the effects on the entire Electrical Distribution System when parameters are changed.

Hiebl: The rail vehicle manufacturers, on the other hand, were most interested in EB's ability to modularize and configure vehicles. In both cases, it is clear that EB's data centricity – whether for analyses, a construction kit with tested modules or for other process optimizations – is seen here as the key to future-proof Electrical Distribution System design.

The world's largest rail vehicle manufacturer, CRRC, uses EB for its harness design. Why?

Hiebl: The optimization potential of data-centric development has convinced CRRC. The common database for different disciplines eliminates time-consuming transfer work and the associated errors. However, CRRC sees EB's flexibility in optimizing the development processes for its individually configurable vehicles as the most important advantage. Because modern rail vehicles are highly complex. The large number of electrical systems, from the drive to the lighting and air conditioning, through to the safety system, places the highest demands on the Electrical Distribution System design. System security and reliability are elementary. With EB, CRRC ensures right from the design stage that failure risks are largely minimized and the available space is optimally utilized. EB also supports the implementation of strict industry and safety standards or energy efficiency issues. And CRRC appreciates the data-based, accelerated troubleshooting in maintenance just as much as EB's exceptional consistency, which ensures that changes to components and cable bundles can be shown in the documentation in no time at all, and do so consistently for all disciplines.

What are EB's next steps and where are they heading?

Hiebl: Because efficiency and quality will remain the biggest challenges in the future, we will continue to expand the EDS Design Center in particular.

Li: Overall, the trip has shown that EB is on the right track. We are continuing to work on this.

Thank you both very much for the interview!

Image: TATRA TRUCKS A.S.

Project processing almost doubled

A faster way to individual diversity with Engineering Base

With some 170 years of experience, the vehicle manufacturer TATRA, based in Kopřivnice in the Czech Republic, is one of the oldest automotive experts in the world. Today, trucks for construction, forestry, mining, military and fire protection form the core business of the company with around 1700 employees. Its heavy-duty trucks are renowned for their reliability in the most difficult terrain and extreme climates, from Europe to the Middle East and South America to Asia.

Since every order, whether small series or special vehicle, contains individual specifications, TATRA's electrical design and construction must meet this diversity and variability. The recipe for success of the short delivery times adds pressure. Therefore, TATRA opted for AUCOTEC's platform Engineering Base (EB).

From the graphic to the data

"In the past, we developed documentation in a drawing system purely manually. This was error-prone and extremely tedious when making changes. With increasing order numbers, we needed to streamline and develop our workflows," says Robert Bolom, Head of Electrical Projection at TATRA. Modernization started in 2015 with EB. "The transition from purely graphical to database-supported, collaborative design on a central data model meant a big change, but TECHNODAT Elektro, AUCOTEC's partner in the Czech Republic and Slovakia, gave us optimum support. The decision for EB was exactly right," says Bolom.

Working graphically AND alphanumerically means changing only 1x

EB combines graphic and alphanumeric work. "This significantly facilitated and accelerated the design process as well as the service documentation," says Bolom. Reference circuit diagrams form the basis for order-related customization. However, the adjustments are not made by redrawing the circuit diagrams, but by changing the associated tables, such as component or wiring lists. Thanks to the unique synchronicity of data and drawings in EB, the individual documents are created directly from the changed data.

"Faster, easier, more accurate"

EB's openness and the associated ability to integrate into TATRA's IT landscape were also convincing – as was its adaptability to individual processes and requirements in the specialist departments. "Today, we process orders much faster and can complete up to seven vehicle projects in one working week. Without EB, it was three to four," emphasizes the head of department.

EB also accelerates the cooperation with external cable set manufacturers. Stanislav Calda, Technical Manager at ELBAS, also an EB user, confirms: "Tender documents are transferred in no time, as are the inevitable changes. With EB it's faster, easier and more accurate!"

From concept to operation

General contractor relies on integrated engineering with EB


Image: Julius Montz GmbH

Julius Montz GmbH, headquartered in Hilden, Germany, is part of Koch Engineered Solutions and is a leading supplier of thermal separation technology for the chemical, fine and oleochemical industries as well as for the pharmaceutical and medical sectors. Montz also offers solutions for renewable energies and the food sector. At the Landau site, Julius-Montz process technology also manufactures complete plants with a focus on thermal process engineering, alcohol technology and solvent recovery. The portfolio includes every-thing from engineering, component supply and assembly to the commissioning of complete plants. AUCOTEC's Engineering Base (EB) cooperation platform supports Montz in this.

Data records always up-to-date

"We weren't even looking for a new system, AUCOTEC approached us, and we're pleased about that," says Thomas Gratt, head of project management at Montz, "because EB's solutions address our challenges perfectly." Above all, the fact that everyone involved works with the same up-to-date data records at the same time is a decisive plus. This principle greatly minimizes the potential for error. "EB always shows the current data, we save a lot of consultation and transmissions," Gratt reports.

Consistent

From the PFD to the P&ID to the documentation of all plant components, the process professionals now work with EB. Thanks to the association of data records and flow diagrams, the project engineers have access to the current project status. They communicate directly with the design via the flow diagram and the stored information. For communication with external suppliers, Montz uses, among other things, EB's Asset 360 module, which can be used to create data sheets matching the apparatus specification in no time at all.

Change management also benefits from the consistency of the central model. Because the data records are linked to each other and to their graphical counterparts, changes can be tracked by data tracking over the entire course of the project and in every view.

Less work for special requests

"As a general contractor for a wide variety of customers with individual specifications, flexibility is particularly important to us," says the project manager. Whether part number ranges, media codes or pipe classes: "Thanks to EB's flexible attribute design, we can now implement customer requests more easily and quickly," says Gratt. To do this, Montz has adapted EB to its own needs. "We put a lot of effort into this – with very good AUCOTEC support – but it was more than worth it," he emphasizes. That is why they want to expand EB's use, for example for the tendering phase and instrumentation. "The platform has enough potential for the future," is the conclusion of the motivated team at Julius Montz process technology.

And we also welcome the following new customers to the AUCOTEC family:

Adam Automation Sarl
Fontaines NE | Switzerland

ALVAZZI GROUPE SA
Plan-les-Ouates | Switzerland

Aquacell
Busan| South Korea

Chinergy Co., Ltd.
Beijing | PRC

Hunan Changgao Electric Co., Ltd
Ningxiang City, Hunan Province| China

KTI Korea
Seoul | South Korea

NM LOKO Services s.r.o.
Prague | Czech Republic

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