



## Steady drops instead of a waterfall

How AUCOTEC's agile engineering significantly accelerates processes

**Parallelizing engineering processes increasingly has long been an enforced reality. AUCOTEC is now setting new standards in this area. With "agile engineering", enabled by the platform Engineering Base (EB), designers will be able to much more efficiently and effectively master the simultaneous cooperation of different disciplines in mechanical or plant engineering projects in future. What is agile engineering, how does it work and what does it require?**

Up to now, mechanical and plant engineers have lost a lot of time and data quality due to the change pitfall that arises from trying to achieve the necessary parallelization of processes with toolchains that are actually only suitable for waterfall processes. However, "the" waterfall process is long gone. No designer can wait until the previous project step is completely finished. Thus, he starts without the results of the neighbouring discipline in his tool. The other departments do the same. This requires interdisciplinary comparisons repeatedly. There are also

inevitable external corrections due to changing customer requirements or conditions, with an impact on all disciplines. This results in a lengthy, error-prone cycle of change transfers. It becomes even more complicated with parallel "waterfalls", where the new version of a released process step is edited, while other participants are still developing on the basis of an earlier release.

### Data pool secures information flow

Thus, the waterfall model is not only a thing of the past because of excessively long waiting times, but also because water does not flow uphill, i.e. backwards – and toolchains only support a predefined sequence. This is why AUCOTEC developed the cooperation platform Engineering Base (EB). It combines all core disciplines of machine and plant design into one system. Its central data model ensures that every change in each discipline involved is immediately visible to everyone and can be further edited directly. To stick with the water image: the model is like a pond in which circles of ripples spread out as a result of each new

drop of water. Likewise, each input into EB's single source of truth immediately reaches every discipline – an existential prerequisite for mastering complex scenarios.

### Parallel becomes agile

With a number of innovations, AUCOTEC has now optimized EB to such an extent that the next step, agile engineering, is possible. In addition to the established [data tracking](#) with complete change history in which it is possible to individually configure whatever changes you want to see, there is attribute-level rights assignment, which enables you to define who may see and edit which status. This only works because EB focuses on data instead of documents. Restrictive rights in relation to objects are not effective here, as each object exists only once, but different disciplines work on it, even in parallel. A process engineer edits a pump just like an electrical expert, but with respect to other aspects. EB is all about simultaneity.

In addition, the data and the entire plant structure are protected against inadvertent

changes. This applies below objects as well as above them ("glue to parent"). Agile work is only possible with this cross-disciplinary certainty, which does not require the "freezing" of data, but enables continuous visibility of progress in neighbouring disciplines and immediate usability of new data for one's own tasks. As a result, the much closer interlinking of the disciplines eliminates the need for waiting times and continuous changes back and forth between departments and contributes enormous gains in terms of efficiency. During the design stage, the modification of a plant engineering project is also possible at any time: what was envisaged a year or two ago does not necessarily have to be implemented. New insights can be implemented continuously and quickly, i.e. agilely, in the ongoing process. The result: the finished plant is state-of-the-art, and not from two years ago.

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## Transformation more important than ever

Dear readers,

The main topic of the last Infopaper was transformation. I had invited you to our new head office, to our subsidiaries or to the trade fairs that were still scheduled at that time in order to discuss it with you. Now, the COVID-19 pandemic has brought about changes in a faster, more drastic and more sustainable manner than we could have ever imagined.

We all had to adapt and persist in adapting our strategies, organizations and processes in order to continue to thrive under the fundamentally changed and dynamic – not to mention uncertain – conditions. The secure dynamic cooperation of globally distributed

teams on complex projects without face-to-face meetings is a huge challenge. This requires digital technologies and tools more than ever.

Fortunately, AUCOTEC was well prepared for this situation. In recent years, we have invested heavily in our IT infrastructure and systems. These systems include CRM, ERP, MS Teams, SharePoint Online as well as headsets and laptops for convenient remote communication. Thus, we have been able to successfully continue all major customer projects despite the special circumstances of the last few months. Process analyses run as remotely as the global rollout of our platform Engineering Base (EB) to customers.

We are proud to be able to make an important contribution to your success as a reliable partner and with EB's optimal support for worldwide online cooperation. Thus, I would like to invite you again to discuss effective transformation in engineering with us, albeit remotely.

Yours faithfully,  
**Uwe Vogt**  
Executive Officer



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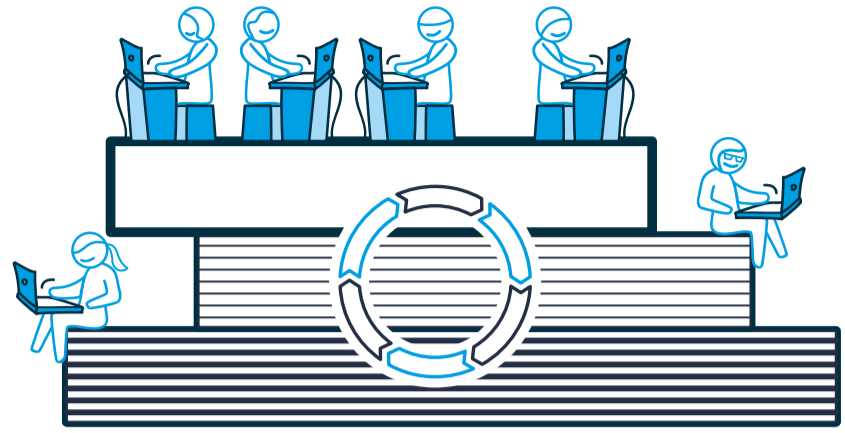


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**Benchmark for future viability**

"Agile engineering is a long-term strategy," explained Reinhard Knapp, Head of Global Strategies at AUCOTEC. "Of course, this is not a must, EB creates efficient cooperation, even without agility. However, the suitability of a system for agile engineering is today the benchmark for its future viability." Whoever has to parallelize more due to the ever-increasing pressure on time and efficiency and has to cope with more and more complexity through such Industry 4.0 requirements as the exploding variety of sensors, whoever wants to grow and invest in a future that cannot yet be envisaged exactly, they will

soon reach their limits with toolchains and synchronization platforms according to Knapp. EB is currently the only system that provides the basis for agile engineering. "It already contains the future," stressed AUCOTEC's chief strategist.



Agile engineering is parallel and simultaneous: direct information sharing with everyone involved through a central data model and secure change management

# The digitization of the construction site

## Up-to-date production data instead of infinite stacks of paper



Jan Lütje, Senior Project Manager, Wärtsilä Deutschland

The engineering of large industrial plants, power plants or even wiring harnesses for ships, cars or satellites resembled a barely manageable "paper chase" for decades. The development process with AUCOTEC's Engineering Base (EB) has been highly digital for some time. Outside engineering offices, however, test engineers and technicians still navigate in an analogue manner through the resulting technical constructions. AUCOTEC has now set its sights on the digitization of the construction site together with customers from various industries.

technicians took complete printed plans with them on the ship and repeatedly only noticed on site that the wrong section had been chosen or that the revision status did not correspond to the actual status of the construction. "With increasingly complex marine engineering, these challenges are also growing," concluded Lütje.

**Mobile and up-to-date**

The company intends to support the construction workflow in future with the platform Engineering Base (EB) and its web service and reduce time-consuming transformation losses in production. In future, every room on board is to be identifiable by a QR code. Thus, EB detects where the technician is currently located via a mobile device which provides appropriate lists of current tasks and cabling information for the specific location. Which harnesses pass this room, which cables have to branch off here with which destination, and which cable connections end right here? With this EB app, technicians would have all production-relevant information (including circuit diagrams) at hand at all times and would know it is up-to-date.

ed other customer solutions that provide digital assistance with EB to the inefficient analogue world of production and maintenance.

For example, a compressor manufacturer has been constructing and installing compressed air systems for decades; today, its customers can also obtain on request "only" a certain compressed air output instead of a system. The plant and maintenance remain in the hands of the manufacturer. Its sales representatives can already access the technical documentation of the respective device via the name plate data using the AUCOTEC app during the customer's visit. Based on this knowledge, customized and economically and technically feasible upgrade offers can be created on site. This only works because EB has an always up-to-date digital twin that can be reached via web services.

**Web service accelerates maintenance**

"EB can also support technicians via an app so that, instead of having unclear prints that may not be up-to-date, they can take the exact tasks that are due at the time with them to the site on a mobile device," added Richard Zielinski. Not only the concentration on urgently required data makes the on-site tasks much more efficient, but also direct on-site data access by simply scanning a name plate, e.g. in the event of a malfunction. Even more speed with even fewer errors should now provide live feedback of the revised state.

This real-time data transfer from the construction site back to the system is already in progress and will also help to secure the knowledge of an existing plant



Richard Zielinski, Team Leader Integrations, AUCOTEC

**Engineering digitally and constructing in an analogue manner?**

Printed plans or not quite up-to-date documentation manuals slow down construction progress. Finnish technology giant Wärtsilä also had to recognize this fact. Although its development engineers had been working digitally for a long time, the actual construction work, such as the cabling of ships, was largely analogue according to Jan Lütje, Senior Project Manager at Wärtsilä Deutschland, when describing the status quo there. "Our requirement is actually quite simple. We want to change that!" According to Lütje, analogue construction could be seen, for example, in the fact that

Equipped with this real-time information, the technical staff can carry out their tasks quickly and purposefully and then mark them as completed. EB's connection to SAP could also be used to procure and share information. The digital ship or wiring harness twin should also be updated in real time.

**Tangible future**

"We are talking about a vision of the future, and a very tangible one at that," explained Richard Zielinski, an AUCOTEC employee. The Team Leader Integrations has already support-

# Company-wide availability of engineering data

## New standard shortens ERP/PLM integration by 50%

Enterprise Resource Planning (ERP) and Product Lifecycle Management (PLM) are an essential part of modern corporate management. The larger the company and the more complex its products, the more complex the tasks and processes are in ERP. The relevant systems have numerous tools for various application areas. This set-up requires experienced experts.

**Standard for the exchange of expertise**

AUCOTEC developed the "ERP/PLM Integration Platform" for its software system Engineering Base (EB) in order to significantly simplify the exchange of knowledge with optimum data quality. It does not require any special ERP/PLM expertise from the engineering user. While the platform can be "docked" to any company's own middleware, it also offers all-round standardized integration for SAP, Windchill and TeamCenter in cooperation with the ERP experts from AUCOTEC's partner it-motive and their data hub IMAP. The interface always remains the same on the EB side, regardless of which ERP system is connected. This significantly reduces the necessary integration and maintenance effort: from set-up via implementation to configuration, it saves around half of the usual time for ERP integration projects.

– without multiple entries and update effort. The integration platform works in a service-oriented manner. All communication between systems can be done in the background via web services, as EB does not have to be started separately at the workstation. This enables the definition of time-based

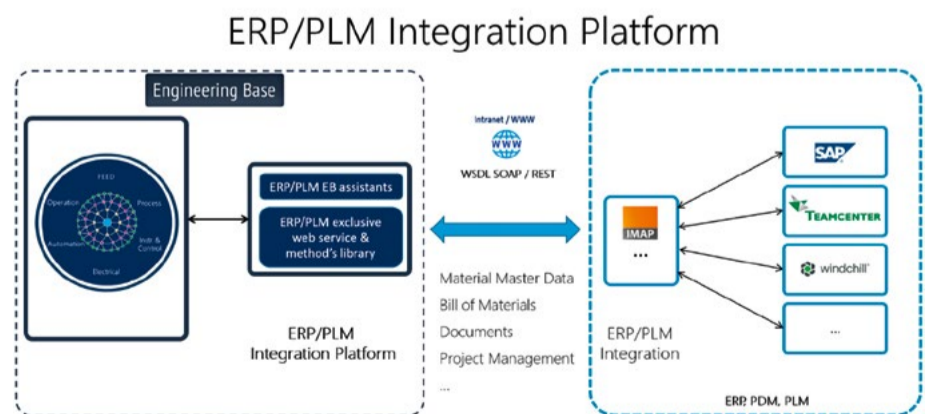
automatic processes which always ensure up-to-date data in ERP/PLM and engineering. The entire exchange process can also be controlled with EB's Workflow Assistant, thus ensuring that nothing can be forgotten or overlooked.

**Seamless from material master to project management?**

Engineering also has its specialists who know "their" systems like the back of their hand. To ensure optimal process reliability and data consistency, ERP and engineering must work seamlessly together. Regardless of whether material master, BOM, document or project management: both areas are always involved and must be able to rely on up-to-date data. However, data transfers, duplicate data maintenance and the expertise that is often required with respect to a system outside one's own area of expertise are significant hurdles that have to be cleared.

**Web service included**

From material master to project management, absolute consistency is ensured for the configurable, regular and bidirectional data exchange



The platform has already been tried and tested in practice, e.g. at PowerTech Converter (see page 4)



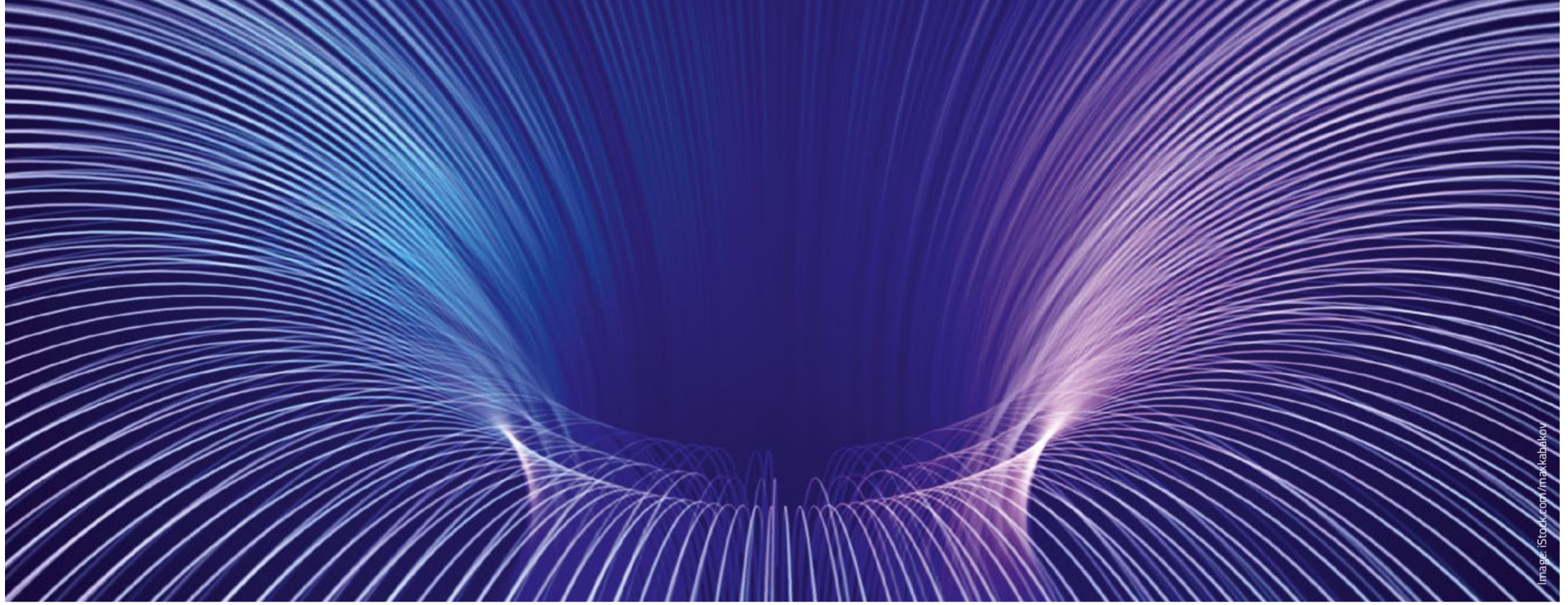


Image: iStock.com/makabakov

# The inside track

## New open standard for the fastest data transfers to EB

**The fact that the cooperation platform Engineering Base (EB) can handle the most diverse complementary systems with various standards, file and data transfer formats, and how it does so, has been known and verifiable for some time. AUCOTEC's developers have now used this openness to make it even easier for users to "funnel" external data into EB. You can feed the platform even with highly complex data using the new open format EBML, which works in an XML-based manner, without programming work or special EB knowledge.**

**Accelerating the transfer of legacy data**  
EBML not only simplifies the configuring

of the data transfer. The transfer itself also takes significantly less time – about 10 times less than an API (Application Programming Interface). This is a considerable advantage, especially in the case of legacy data transfers (LDT). If millions of pieces of information, also usually representing millions of euros economically, are to be transferred to EB in one fell swoop in order to make the most of them as quickly as possible, then time is of value in itself.

### The plant is always smarter afterwards

Now, reading data into an empty database is not rocket science. If, however, information about devices, containers or the like from a second source is already available in EB,

EBML can identify them and, for example, fill attributes of the objects with content or add sub-objects. This enables the digital twin of a plant or machine to be intelligently merged from a wide range of sources. The interface also detects discrepancies, but it can be configured so that they are only documented to prevent the data transfer from having to be restarted every time. This tolerance is unique – and the digital twin's data model ends up being much smarter than the old documentation.

### IT relieved

Data that is not huge in terms of volume, but which is regularly forwarded to EB – always including conflict control – can be trans-

ferred just as easily and consistently. This can also be as-is information from maintenance, IOT data for predictive maintenance or results from in-house calculation tools with individual algorithms in addition to 3-D, simulation or ERP data. Integrating EB into business processes and transferring external data has never been easier. EBML is thus the right track in every sense. This accelerates projects, relieves IT and all those who have limited programming abilities. The standard format to which all interfaces to EB will be converted in future does not require detailed knowledge, neither of EB nor of programming languages or methods. It is all about configuring.

# Tested flood of data

## Michael Wedde, BS | Netz, on data quality and what QA tools



> Michael Wedde

**It is thanks to Braunschweiger Netz GmbH (BS | Netz) that gas, water, district heating and electricity flow reliably and safely into the households and companies of the South Lower Saxony metropolis. Michael Wedde drives the digital network operation in the company and also maintains a close relationship with AUCOTEC for the energy supply industry. In early summer, he was able to take a look at the quality assurance tools of Engineering Base (EB).**

### What is your job at Braunschweiger Netz GmbH and which digitization project is currently on your desk, Mr Wedde?

I'm Group Manager for Digital Plants and Deputy Manager of the Digital Network Operation department. Digitization has been a ubiquitous process for us for more than 20 years – even if digitization was understood as something else in the early 2000s. Of the various projects on my desk, I'm currently challenged by our circuit diagrams in a single-line representation, which we are now setting up on a completely new basis in technical terms.

### As a member of AUCOTEC's energy supply working group ("EVU-Arbeitskreis"), you have been actively involved in the further development of Engineering Base for a long time. What exactly does the working group do?

This working group is an industry-specific exchange platform. Here, users can express their requests with regard to the further development of the software. In addition, AUCOTEC presents upcoming or planned topics and features to the users and obtains feedback from the user group. Prioritizations are made and problems are discussed and clarified as to whether they are generally relevant. The QA tools for EB are a good example of how suggestions and requests from the working group become tangible applications.

### As a beta tester, you already had access to Engineering Base's new QA tools a few months ago. What was your first impression?

The first version, which we tested in early summer, has already enabled us to take a huge leap forward. We are now surrounded by a veritable flood of data, which we have to handle somehow – within EB and also via systems connected by interfaces. This world of data will cause us a lot of trouble for the foreseeable future. That is why we urgently need a technical means via which we can check these mountains of data.

Projects become more expensive from the operator's perspective, especially because of the extremely complex and error-prone manual inspection of service provider data. In purely internal terms, it is intended that all users in our own projects will be able to let their work finally run through a QA process in future, thus ensuring flawless data.

### You know both the service provider's perspective and the operator's perspective. How can the new QA tools improve the interaction between supplier and customer?

Today, more and more suppliers are sending us our project data directly in EB. In this case, of course, our plant engineer can work directly with the QA tools and provide us with QA-tested information. At the same time, we are far better able to check that everything has been properly executed.

Here is an example: last year, we put a major engineering project out to tender with the then current version of EB. The QA tools were not yet within our reach at the time, so we couldn't specify them in the invitation to tender. We wrote definitions ourselves instead. This involved additional work for us, and the contractor sent us a substantial supplementary invoice. This may be of interest to the service provider, but it is naturally contrary to our planning reliability and the desire for budget compliance.

We now also engineer for other network operators. As a service provider, we are always a bit dependent on the goodwill of the client during the inspection and approval, as many things can also be discussed in great detail when talking about QA issues. We could use the QA tools to shorten such discussions.

### What impetus for the future of QA tools can we expect from you in the energy supply working group?

The QA tools only know the standards that we set in the working group. However, each user has their own editorial guidelines which they want to continue to apply. That's where it becomes problematic, as the approaches vary greatly from one municipal service company to another. I have colleagues who work for a network operator who, like us, has its own editorial guidelines. Colleagues have completely adapted to this world, and I repeatedly catch them inadvertently applying the rules of this network operator to us.

In the medium term, the QA tools need a link via which each company can integrate its own editorial audit. We could then use our BS | Netz-specific formal revision in one go, so to speak. An editorial audit would also be helpful in the context of a tendering process, as we could then ensure the plant engineer is obliged to perform a check according to these additional criteria.

If we talk about data from external systems that comes in via interface connections, or if data is further processed in other systems, then quality assurance will be given a completely different quality. It's probably in the nature of quality assurance tools that they are never quite finished. As soon as you incorporate new services into the system, you will probably also have to expand the QA tools. This is always "work in progress".

**Thank you very much for this interview, Mr Wedde!**





# Even more power for rail vehicle technology

## 2-D engineering, ERP and 3-D automatically communicate online at PowerTech Converter

**PowerTech Converter (PTC) has been offering innovative electrical supply systems for rail traffic, industry and research for years.** They set standards that also take climate and environmental protection into account. One area also ensures sustainable repairs and modernization of rail vehicles. Nearly 70 engineers from the Rail Engineering team support customers from all over the world throughout the wire harness design process.

### From 3 to 1

For this purpose, the engineers were not only looking for an engineering system that could display wires and associated details, but which would also allow a bidirectional exchange with the 3-D tool to automatically and consistently integrate routing and wire

length calculation. This is not the only reason why the Mobility division chose AUCOTEC's cooperation platform Engineering Base (EB). "EB has standardized our tool environment; we used to have to handle three systems and manually compare them," reported Robert Rehberg, Head of Design at PTC Rail OEM GmbH.

### Saving time with quality and transparency

EB now saves a lot of time there during the wire list creation, which also takes the fastening materials into account. "The data quality is significantly improved, and BOMs and circuit diagrams are also easier to trace," said the Head of Design. He also praised the transparency in the change process as well as EB's Workflow Assistant, which ensures completeness. The standardized entire

design template projects ("150%") in EB also save time and have only to be pared down to customer-specific requirements.

### The two understand each other: SAP and EB

EB meets yet another crucial PowerTech requirement: items such as BOMs are automatically provided for SAP and continuously updated via a highly efficient SAP connection. It also includes Inventor's 3-D information, which can be found as mechatronics positions throughout the entire project. All objects have the same unique ID in SAP, EB and 3-D.

For this standard interface, AUCOTEC cooperates with the ERP experts from it-motive, whose data hub IMAP always ensures seamless communication of the systems

without any update effort. On the EB side, the "ERP/PLM Integration Platform" can be easily implemented. The completely web-service-oriented solution works in a client-independent and automated manner. No one needs expert knowledge of the respective third-party system in order to obtain information.

### Convincingly flexible

"Thanks to AUCOTEC's targeted project management, the ERP and 3-D connections have been successful. The handling of the various players was convincing," said Rehberg. PowerTech Converter has been realigned since June 2020. "EB was a stabilizing factor during the restructuring, also due to AUCOTEC's flexible license handling," he added.

# All company processes integrated

## Engineering Base significantly accelerates project documentation at ProCS

**For more than 25 years ProCS s.r.o., based in Šala, Slovakia, has been providing comprehensive services and solutions for industrial automation and electrical plants.** The company is part of the Actemium network, which in turn is part of the VINCI multinational group.



Right from the start, ProCS relied on AUCOTEC engineering software. RUPLAN was used there for many years. In 2010, the management decided to switch to the new opportunities of a modern, central database system. For this purpose, the market was thoroughly examined. Employees were also interviewed, particularly about external experience with the systems in question.

### Comprehensive basic skills

The decision finally fell on AUCOTEC again, the reason being its cooperative platform Engineering Base (EB). ProCS engineer Martin Gálik, responsible for sales management, says that a whole series of arguments spoke in favour of this. "The open solution allows extensive connections and can integrate almost all company processes into the engineering," he enthuses. "Most ProCS engineering services are already covered by EB's basic capabilities." Gálik also praises the convenient module for substation design. Further very practical advantages of EB are the Smart PDF function as well as VBA and .NET for easy data import and export. "In EB we can do dozens of small programming jobs ourselves," says the engineer.

For ProCS, however, it was not only the software that was decisive: "One of the key factors for the choice of the new system was the support. We also decided in favour of EB because of the long-standing, reliably good relations with TECHNODAT," says Martin Gálik. TECHNODAT has been one of AUCOTEC's most successful partners for 22 years.

### Unique platform for diverse users

For the introduction of EB, something first had to change in the minds of the users," reports the Sales Manager. In contrast to the graphically oriented predecessor system, drawings in EB are only a possible representation of the objects that are edited centrally in the data model. "EB connects our various engineering departments on the basis of the common database," explains Martin Gálik. Each discipline can continue to edit all information directly, regardless of the workstation where the data was entered. This accelerates processes and improves data quality.

"We are significantly reducing our expenses for project documentation and at the same time increasing our competitiveness," is how Gálik EB sums up the benefits for ProCS.

In addition, we would like to welcome the following new customers to the AUCOTEC family:



Brockhaus Lennetal GmbH  
Plettenberg | Germany



Kyungshin  
Incheon | South Korea



Nanjing Kisen International  
Engineering Co., Ltd  
Nanjing | China



NHF Netzgesellschaft  
Heilbronn-Franken mbH  
Heilbronn | Germany



Nordic Sugar A/S  
Nakskov & Nykøbing | Denmark



Praj Industries Limited.  
Puna | India



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Imprint  
AUCOTEC-Infopaper  
Publisher  
AUCOTEC AG  
Isernhagen, Germany

Responsible for the content according to the law:  
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Press and Public Relations

Layout  
www.linienflug.design

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