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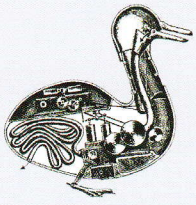

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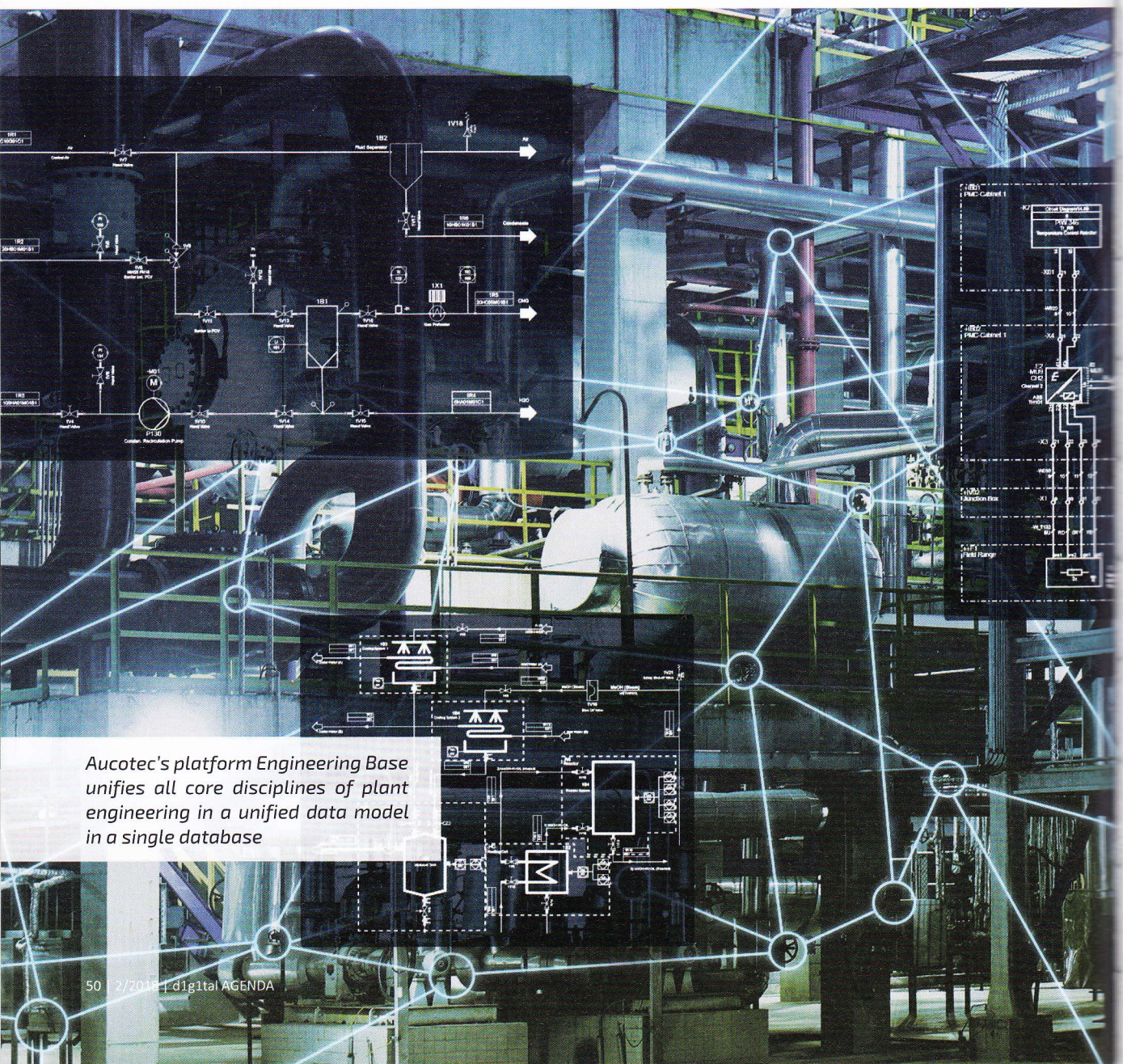
Neue Version AUCOTEC Engineering Base 2018

Redefining the term 'consistency'

At Achema 2018 fair in Frankfurt/Main, Aucotec AG (Hanover) will be showing for the first time the comprehensive expansion of its collaborative platform for plant engineering. Engineering Database integrates all core disciplines in a versatile data model in a single database.



Aucotec's platform Engineering Base unifies all core disciplines of plant engineering in a unified data model in a single database

During a press conference at last Hanover Fair, Uwe Vogt, Executive Officer with Aucotec, placed on record: "There is great demand in the market to tear down workflow obstacles created by toolchains," adding: "This is why we have now completed the range of the versatile data model." According to the executive, this enables a unique parallelisation of disciplines — from FEED via process and detail engineering to cause/effect, maintenance and consistent execution management for larger expansions. "Even the best interfaces and synchronisation mechanism don't shorten a toolchain. Engineering Base puts an end to the error-prone 'forwarding' of data that makes parallelization impossible," explained Pouria G. Bigvand, Head of Product Management with the vendor, at the same event.

Plant design is characterised by major projects with a variety of the most demanding engineering and management tasks. Since the various disciplines involved are often developed globally, however, it is also necessary to connect the many experts, from different time zones, with their different skills, languages, technologies and engineering cultures. Often, even the used engineering tools are different.

Engineering Base (EB) provides special conditions for this connection. The central data model at a separate application server level allows worldwide access to the entire plant documentation, also via the cloud. Thanks to the versatile model, EB is inherently collaborative, and the web connection also facilitates the necessary parallelisation of engineering. All core disciplines work with the same database. If desired, changes are immediately visible in all representations of the changed object, but can also be controlled, for example, via proposal fields.

Motorisation of engineering

With its now provided expansion, EB covers the entire engineering lifecycle in the plant design and later operation phase. The platform holds the versatile data model and manages the workflows. Functions such as Aspen data import, TÜV-certified pipe classes, DCS configuration for different DCS systems in parallel, project status management or cause & effect tables show at the press of a button the solution's degree of maturity. Networking with 3D, ERP, or PLM applications as well as a web connection are part of the standard product.

Highlights at a glance

The new version 2018 embraces a total of more than 40 new features and functions. Now, for the first time a structured unified plant data model for complete core engineering of industrial plants and access to auxiliary data sources have been included by the vendor, allowing creation of a comprehensive plant digital twin consisting of a 'plant digital body' and a 'plant digital soul', as Mr Bigvand explained during his presentation. The migration of legacy data into the structured plant data model can be performed at any phase in the project processing.

The provided management capabilities of scenarios and operation modes using overlay techniques allow automatic history documentation in terms of as-is and as-was states. With so-called shadows different modi of a plant can be run.

Rule-based P & ID design and logic diagrams creation are provided. Moreover, not only artificial intelligence and machine learning but also Google-like search engine capabilities are at the user's fingertips. The optional DCS portal data acts as a secure bridge between plant engineering and control system programming of Siemens, ABB, and Emerson hardware. The relevant parameters are transferred directly and go automatically into programming. The vendor has prepared Engineering Base for seamless integration with other 3D design tools and virtual reality platforms.

"Just start and add the rest later"

Aucotec uses a unique single-source-of-truth approach, including data migration but only when really necessary. Pouria G. Bigvand, Director of Aucotec's Product Management, looks behind the scenes of the comprehensive expansion of the vendor's environment Engineering Base 2018.

Mr Bigvand, please explain Aucotec's approach to realising a unified data model for plant industries.
Keep in mind that there are the mainly five core plant engineering disciplines in total: Conceptual design, process and piping design, instrumentation, automation, electrical design, and eventually plant maintenance. With Engineering Base (EB), we are providing a platform that covers these engineering activities: When you start with the conceptual design phase you should build the fundament in the data model as that in used in the later phases. The initial small data model should be increasingly expanded over the project lifecycle based on each discipline added to the project but should not be duplicated.

But what about other complementary disciplines such as 3D?
No problem, EB with its complete open architecture in terms of APIs and web services and its conformity to major state-of-the-art industrial standards provides integrations to those, such as for 3D detail design, stress analysis, HVAC design, and so on. From the plant engineering perspective, these disciplines are complementary aspects.

Should your client have to migrate all the other project data into your database?
Our data model into four different main aspects all deeply linked together: Equipment model, functional model, location model, and graphical model that can be a 2D or 3D representation. The first three types are combined together in something we call a 'unified plant data model' and such unified data model either can be built from scratch or can be formed used various migration paths of legacy data.

How do you handle the meta information of the objects?
For us, every object has a character in a 'society'. Like

a person, its character is scattered in different attributes – such as colour of skin and hair. These descriptions are instantiated to the corresponding objects.

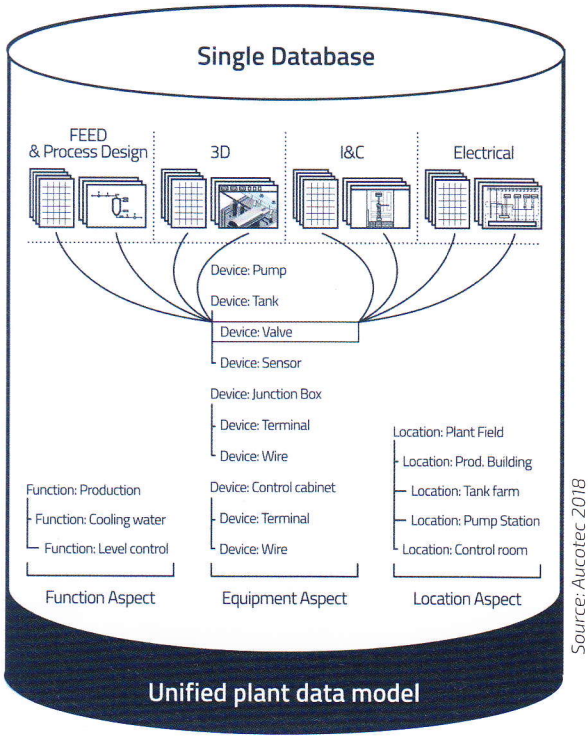
An example would help ...

... every electrical drive you create in EB gets an RPM – the attribute class 'rounds per minute'. Of course, this is just one aspect of the object. Another aspect is its linkage to other objects. It is just the same way as with us human beings: I have certain relationships within my family, another one to my friends, or to my boss. An object has some links to the environment it is existing in with different behaviours: When I am playing soccer I treat the other players differently than when I am in work. In the engineering phase, an object acts with a set of rules and relations in the conceptual phase, however, the same object can have additional but different rules and relations in the operation phase.

How do you handle third-party objects and information you bring in from other sources, let's assume at a later engineering phase?

The idea is not to migrate everything in the database of Engineering Base because this is not necessary. E. g. the geometrical representation 'dimension' of a tank is stored in the 3D CAD system. However, you can decide to see these values within your Engineering Base environment. Normally, we just deal with the overlap of information – there is a data co-existence in Engineering Base and other tools such as 3D. This is expandable during the lifecycle of the project.

Just to make sure: For the five core plant engineering disciplines mentioned before we include everything in our database. If you need more information you can get it – no problem! That is why we communicate in press releases that our approach is completely flexible and scalable because you simply can expand or shrink your data model depending on the necessities of the project ...



Source: Aucotec 2018

... sounds exciting. Does that mean you create a specific data model aligned with the needs of your clients ...?

... exactly! This is the situation we are faced with in every implementation project. It's all about how much depth of detail you're looking for and how seamless you want to have your integration with other tools?

How do you handle the adjustment that might be necessary in a later phase of the project processing?

One of the benefits we provide is that customers can start with their engineering immediately. There are no special time-consuming upfront activities to do to perform the customization nevertheless configuration of the environment is always helpful to increase the efficiency. You can start with the already existing data and then decide at any point in time to add or remove attributes, templates, typicals or links.

Is modularisation a topic for Aucotec?

Sure. For us, modularisation has two aspects: One is related to the process design phase where you can introduce modular plant design. The other one is in the instrumentation design phase where you can do modular control design. For the later phase we provide a Typical Manager to provide you the functionality of selecting options and variants. You are able to choose a control typical for every use case from a typical library.

And in process design?

There, another approach of modularisation comes into play. In process design, for instance, you have a modular tank with all its auxillary devices such as nozzles, valves sensors but also the control infrastructure behind such as cables, wires, control loops, I/Os etc. and you just drag & drop this module to the P & ID. With this action all the corresponding infrastructure of this module, such as I/Os, electrical cabinet equipment and so on, is automatically added to the

data model. To bring it to the table: Each part of the data model is basically a module.

Do you offer a rule engine taking care in the background that all the specifications are met?
Yes, we do. It's clear, rules can change or evolve over time: Knowledge-based engineering (KBE) is a rather lively affair. It's far from rigid. Since KBE has been around for many years, it is not a new topic, however, in the past it was only discipline-specific focused. The new thing is that you can now perform rule-based design deployed over the complete plant engineering: You can add a measuring point or another sensor type and be sure that all the corresponding diagrams look orchestrated.

Has Autotec created solely that framework of rules?
No, we haven't. We have created some basics available for all the plant engineers. However, depending on the industry different rules come into play. Our customers are invited to add more rules to our basic set.

How do you support data handover? Let's assume for operation reasons.
It depends on the situation of the customer and the engineering department delivering the data. One option is to send the engineering data model as a whole package. If the owner/operator is running Engineering Base as well, he is able to execute the project in his own Engineering Base environment. The underlying data model will be enriched during the operation phase of the plant. Another possibility is to get it as a package of smart editable PDF/XLS/DWG with all the objects in. Of course, the latter is what we regard as a 'worst case scenario' because you are dealing with dark information.

How long does it take to get started with Engineering Base?
As I mentioned before, you can start your work immediately! Normally, the customer goes live with a pilot project. After some weeks or a month or so he understands how Engineering Base supports him in getting his work done and after one year the customer is finally fully productive. The average time we have for rollout is twelve till fifteen months based on a complex Citrix environment with multi-site integration.

Thank you for the interview!

Interview: Bernhard D. Valnion

Scrolling through the annals of Computer-aided Engineering

Founded in 1985 in Hanover under the name of 'Automation and Computer Technology AUCOTEC GmbH', the vendor began developing and marketing the software product Elcad for the design of electrical components in machines and industrial plants. A year later, the PC version of Elcad under the operating system MS-DOS (designed for a storage capacity of rediculous 640 Kbyte!) was launched. The line-driven programming was also possible for Unix on a Motif interface.

As the first ECAD provider, Aucotec switched to MS Windows in 1993. The 640 Kbyte memory limit was lifted and Elcad 5.0 as the first pure Windows version ran much faster.

From 1994, Aucoplan, the ECAE tool for process control technology, combines a graphic system with tabular working for the first time.

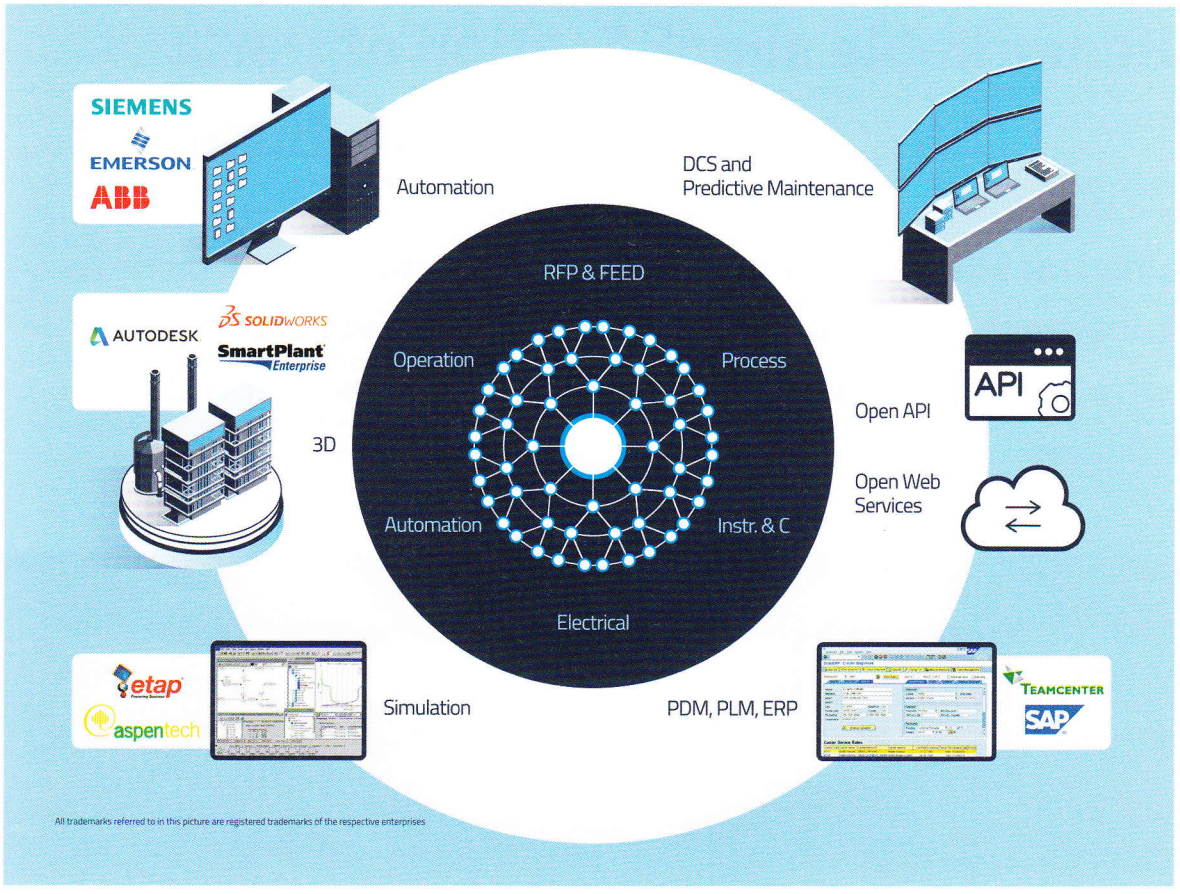
In 1997, the acquisition of all Ruplan assets including R & D team from Debis SSP followed. The tool addresses the energy generation and distribution market (EVU module) and harnesses the development market (Ruplan-Kabi).

Aucotec's latest technology generation, the database-driven, object-oriented platform with the codename 'Easylectric' convinced first clients in the test market of the UK in 1999.

2002 saw the founding of Aucotec Holding GmbH (Hanover) and its takeover of all Ltd.-shares of all founding members in 1985. One year later they renamed as non-listed Aucotec AG.

In 2004, Easylectric was branded to 'Engineering Base' (EB) and a year later Elcad Studio was intro-

Aucotec's member of the board Uwe Vogt



Source: Aucotec 2018

duced – providing modular design, object-oriented database engineering and direct tabular object processing capabilities. From now on, access to projects via the Internet was possible. About 24 months later, the Volkswagen group collaborated in a development partnership for EB.

A development partnership with Unitec (Hanau) for the first multi-vendor communication platform that combines 3D plant design and 2D engineering was launched in 2011. Incidentally, it is the same year in which the first series production car was launched with an on-board network that had been completely planned with EB.

In 2015, the vendor partnered with Siemens PLM Software (Plano, Texas) for a tight Teamcenter integration and also launched the world's first SAP integration via EB Web Services. For the 30th anniversary, the company presented itself with a new logo and a modernised corporate identity.

About twelve months passed when the sixth record result in succession was reported: EB product suite generated more than 70 percent of total sales and approximately 80 percent of new business. In addition, the company has hired around one third more employees over the last six years.

And now to the mega-event Achema 2018, a unique range of fully integrated engineering solutions for the process industry is offered. The latest version of the cooperative platform Engineering Base combines for the first time all core disciplines of plant engineering in a universal data model.

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