MPDV

N=WS

mpdv
WE CREATE SMART FACTORIES

PREDICTION

PLANNING & SCHEDULING

SMART FACTORY ELEMENTS

ANALYTICS

EXECUTION
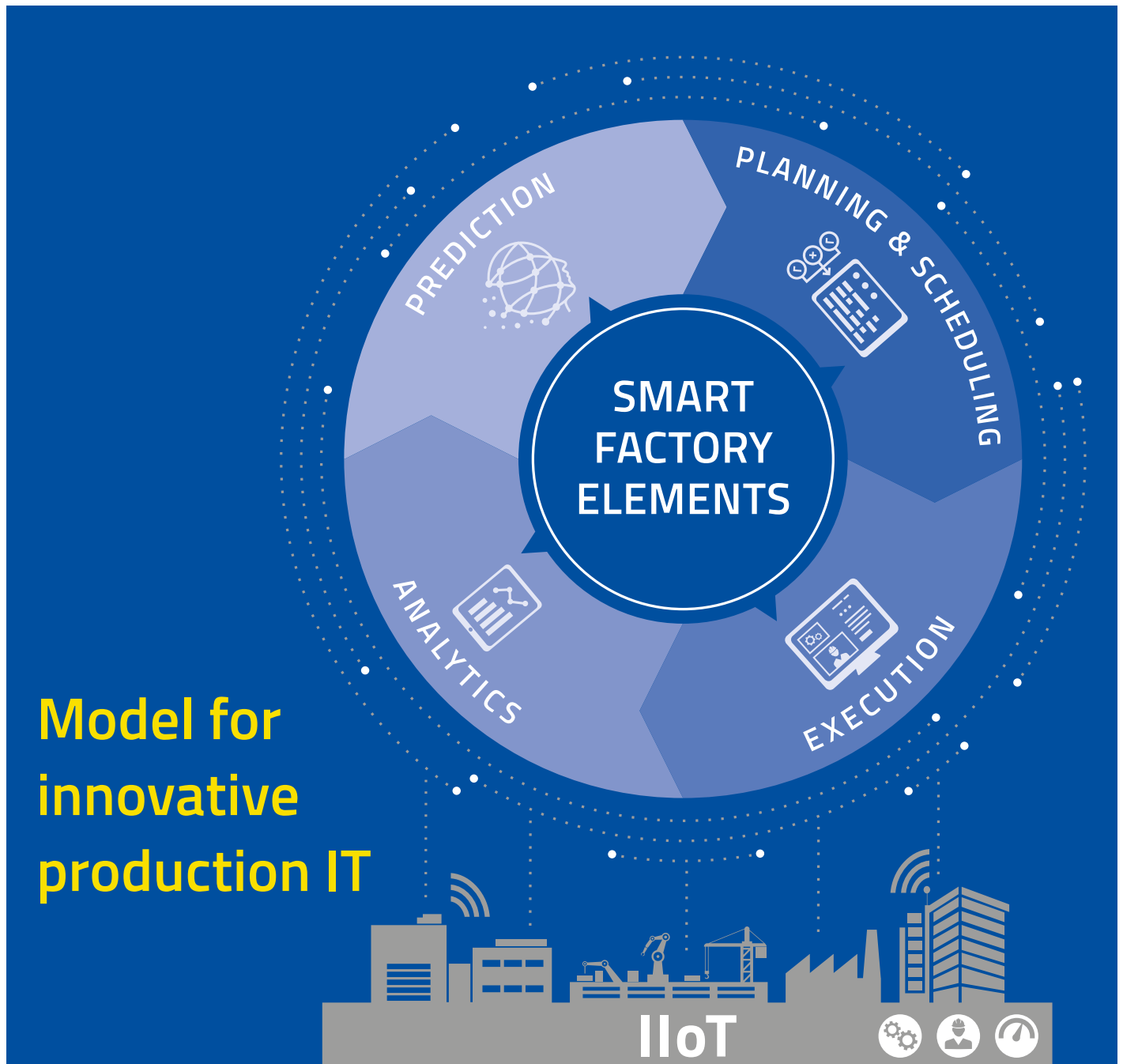
IIoT

Model for innovative production IT

HYDRA FOR LIFE SCIENCE
Between data integrity and regulation
New industry solution for medical technology

SUCCESS STORIES
MES HYDRA optimizes manufacturing
processes for users worldwide

MPDV WORLDWIDE
Expansion of the international research
activities using Asia as an example

THE NEXT STEP
TO THE
SMART FACTORY

Once again, the Hannover Messe is just around the corner and the world expects the next step from all suppliers for the Smart Factory in the form of new products, services and solutions. Many modern keywords like Analytics, Predictive „Something" or Industrial Internet of Things (IIoT) are used, and we want to give them a general structure with the **Smart Factory Elements.** Although we are not presenting a new product for the time being, we are presenting a model for the innovative production IT (more on this from page 6). At the same time, we present **Predictive Quality,** an application that allows product quality to be forecasted on the basis of recorded real-time data (more on this from page 24).
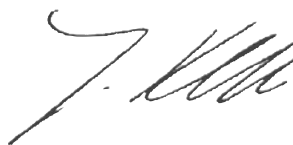
Even after the Hannover Messe the highlights will continue. We will launch our industry solution **HYDRA for Life Science** at the T4M, the new trade fair for medical technology in Stuttgart, at the beginning of May (more on this from page 22).

Also read about product innovations, new services, HYDRA success stories and other activities in and around MPDV in this redesigned issue of the MPDV NEWS.

Last but not least, MPDV is reinventing itself and is launching a new company slogan at the Hannover Messe: **We create Smart Factories.** (Further information on page 12)

Have fun browsing the MPDV NEWS 45.

Yours sincerely,
Jürgen Kletti

Prof. Dr.-Ing. Jürgen Kletti, CEO MPDV

EDITORIAL

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MODEL FOR INNOVATIVE PRODUCTION IT

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SMART FACTORY ELEMENTS

A model for the innovative production IT

The challenges facing production have grown enormously, leading to increased complexity like a high product diversity, short delivery times, fast process changes, smaller batch sizes up to batch size 1. In times of Industry 4.0, this is clearly a case for the Smart Factory – which in turn needs certain processes and functions to meet the growing demands: the Smart Factory Elements.

Manufacturing Execution Systems (MES) are still considered the pinnacle when it comes to efficient production and transparency in the shop floor. However, with a focus on the Smart Factory, more and more advanced manufacturing companies need more than today's MES can offer. Even today, the task-oriented approach of the VDI guideline 5600 is still capable to identify the IT requirements of production and to assign the suitable applications. The Smart Factory Elements extend this task-oriented approach to production IT and at the same time also incorporate new requirements for the Smart Factory. Based on many years of market experience, we are presenting a model consisting of five elements: Planning & Scheduling, Execution, Analytics, Prediction and Industrial Internet of Things (IIoT). Elements of the Smart Factory turn the vision of Industry 4.0 into reality and enable your manufacturing company to produce in a competitive environment even under complex conditions.
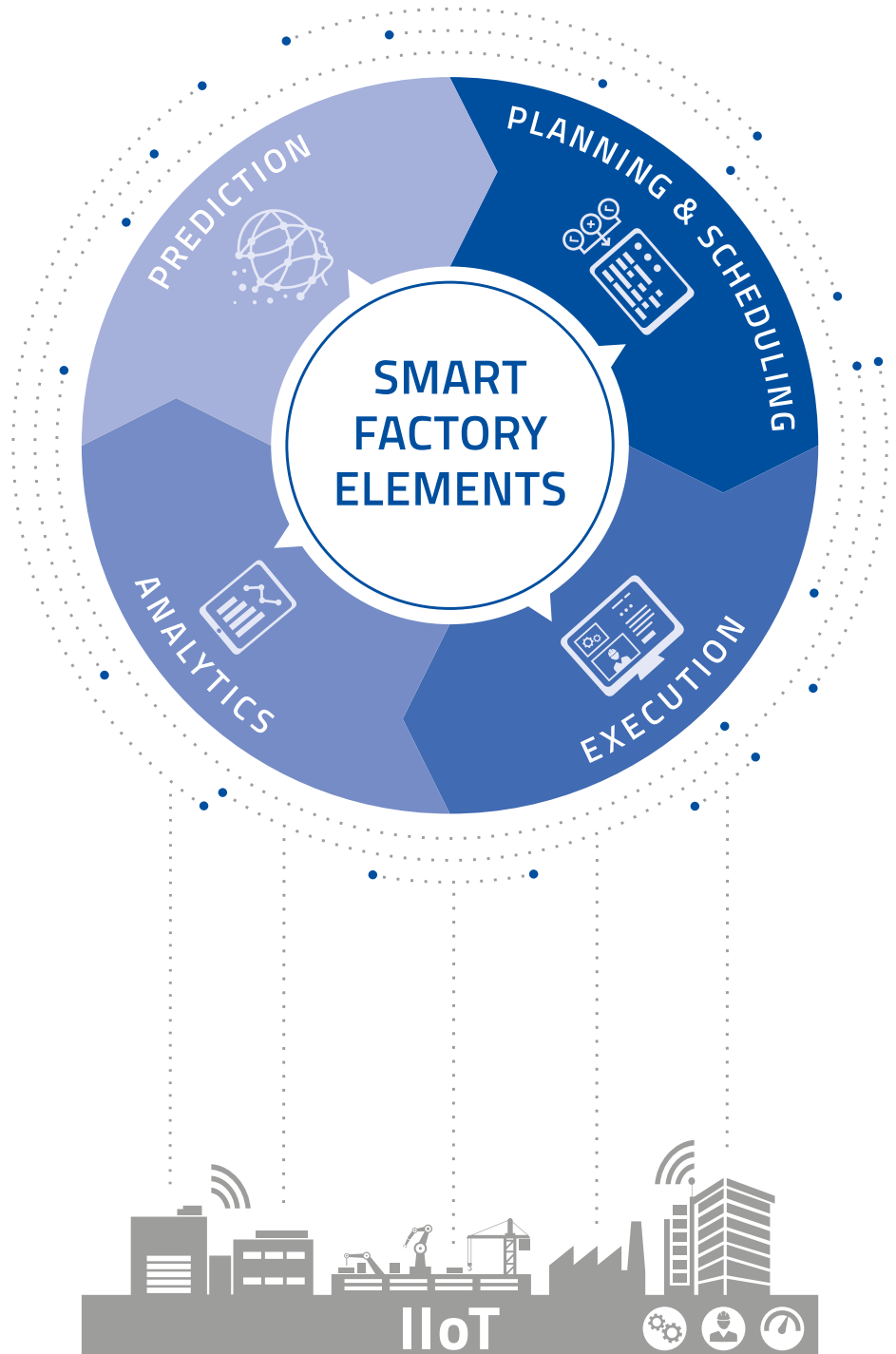
Smart Factory Elements in the control loop

The control loop according to the Smart Factory Elements envisages that production is planned (Planning & Scheduling) on the basis of specifications from different sources and that this planning is then implemented or executed (Execution). The data collected is analyzed (Analytics) in order to make predictions which, together with other findings, can then be included in planning. The Industrial Internet of Things supports this cycle by collecting and providing data.

Planning & Scheduling contains standard tasks of the work preparation. These are tasks like planning and preparing:

- orders and operations
- resources and employees
- quality assurance
- maintenance activities
- material and energy use

Execution ensures that specifications are implemented and documented efficiently and correctly. These are:

- production control
- monitoring process quality
- process interlocking
- online monitoring
- real-time monitoring and early detection of deviations

Analytics uses statistical methods and innovative algorithms to prepare collected data for:

- KPIs
- performance and correlations
- root cause analysis
- self-service analytics
- machine learning based on Big Data

Prediction enables the prediction of events based on executable models and artificial intelligence. Typical applications are:

- predictive quality
- predicting dates
- predictive maintenance
- calculating material ranges

Industrial Internet of Things connects the operator and the real world of production with the digital image of the Smart Factory by means of networking and edge computing. The following applications are used:

- data transfer from IIoT sensors
- digital machine connections
- manual data collection
- providing information to the shop floor
- flexible operator control

Work examples

A large part of these tasks can be perfectly implemented with an MES such as HYDRA – for the rest of the tasks, new products will gradually come onto the market. Below you can find an example from the everyday working life to explain this concept in more detail:

First, several production orders from the higher-level ERP system are transferred to the "Planning & Scheduling" element and forwarded together with the results from the "Analytics" and "Prediction" elements into a suitable planning tools (MES HLS).

Application example for "Planning & Scheduling" in the MES HYDRA
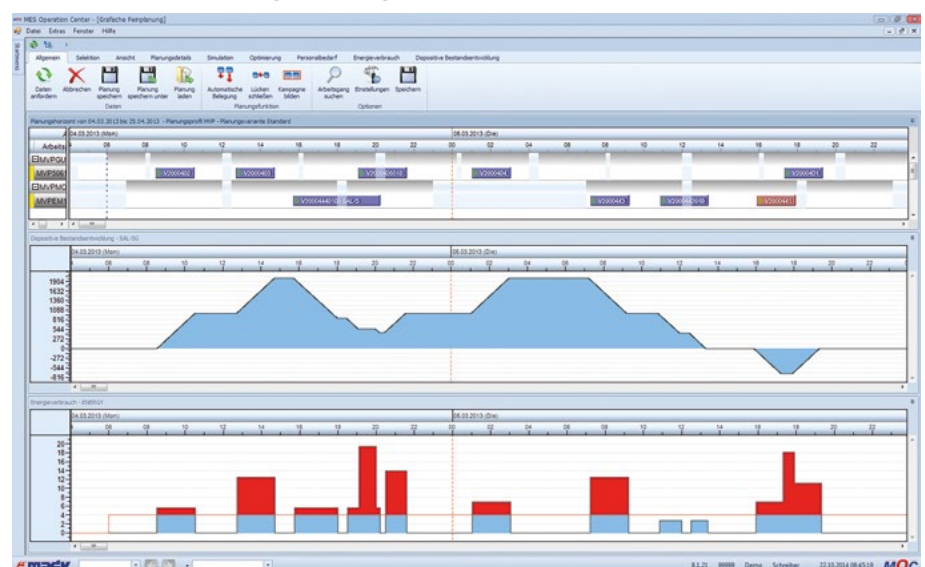
For example, "Analytics" has shown that article A can be produced 30% more efficiently on machine 1 than on machine 2, and "Prediction" has revealed that machine 3 will fail with a probability of 75% in the next three days due to worn ball bearings. Therefore, the responsible employee decides to schedule the accepted orders for article A on machine 1 and to distribute all the others to the remaining machines. At the same time, the employee schedules maintenance for machine 3 for the day after tomorrow in order to check the ball bearings and replace them if necessary. Some time ago, the quality management decided that every 500th item of all articles should be subjected to a test, whereby different dimensions must be checked.

These plans then go to applications of the next element: "Execution". The operators at the machines see the pending orders and log them on as soon as the preceding order has been completed. Simultaneously, an inspection order is logged. Current key figures and order progress are now continuously displayed. After the first 500 pieces have been processed, the system signals to the operator the outstanding inspection. The operator removes the relevant part and checks the specified attributes with a digitally connected caliper gauge. The system collects running production data and also quality inspection results via the "IIoT". If measured values deviate too much from the target values, production is stopped immediately and a setup technician is notified to check the settings of the machine and readjust the values if necessary. If the inspection order is completed, the system logs the next one. On the second day, a maintenance employee takes care of the scheduled maintenance on machine 3. The employee manually records working times with an app on his smartphone. In the supervisor's office, the shift manager uses the "Analytics" functions to obtain an overview of the productivity and scrap rate of the current shift. Meanwhile, the supervisor analyses the machine malfunctions of the last few days and correlates them with recorded process and quality data. In doing so, the supervisor finds out that machine 5 is also suitable for producing article A with a high efficiency rate. This insight is then returned to the "Planning & Scheduling". If the analysis reveals correlations that require immediate intervention, information is immediately forwarded to "Execution".

Application example „IIoT" in MES HYDRA

"Prediction" also works with data collected during „Execution" and calculates continuously the probability of a machine breakdown. The system also transmits these findings to the "Planning & Scheduling" in order to schedule early maintenance of the relevant machines and tools. Here, the new application "Predictive Quality" (further information on page 24) is also used. The process values recorded during the production of article A form the basis for predicting the quality of every single part. If a part is predicted with a high probability of a pass, it will end up in the box for the next work step. Parts that are predicted as rejects are immediately sent to the recycling box. All other parts are subject to an additional visual inspection and then classified as accepted parts or rejects. The results from "Prediction" go directly to "Execution".

In order for all this to work, different "IIoT" connect the machines, provide input screens for the operators and transfer all required documents and setting data to the shop floor.

FUTURE

Even if many of the examples mentioned seem trivial, their depiction with Smart Factory Elements leads to an increase in the networking of applications and the interlocking of processes, and this new approach finally provides more transparency and efficiency in the shop floor. The function range of today's MES systems already covers a large part of the applications mentioned here. New methods (e. g. Predictive Quality) are needed, especially for the elements "Analytics" and "Prediction", to generate further insights and prognoses from existing data.

Smart Factory Elements cover more than a classic MES. It is also evident that Smart Factory Elements are a good example that real added value can only be created by applications and that bare technology is often pushed into the background. Even in times of Industry 4.0, the focus continues to be on the actual task of production IT - and that is a good sign.

mpdv.info/newssfeen

INQUIRED

Smart Factory Elements

In an interview, Jürgen Petzel, Vice President Sales at MPDV, explains what is behind the Smart Factory Elements model and how this new perspective on production IT can benefit companies.

Mr. Petzel, MPDV presents the Smart Factory Elements at the Hannover Messe 2019. Is this a new product that you offer alongside MES HYDRA and the MIP?

Mr. Petzel: Definitely not. Smart Factory Elements is a model for innovative production IT or a modern perspective on it. It is intended to help companies planning for the future to formulate their own requirements in such a way that we as a software provider can offer suitable products and solutions with our portfolio. While many interested parties are already familiar with very common terms such as production and machine data or detailed planning, more and more companies are asking for things such as "Planning & Scheduling" or "Analytics". With Smart Factory Elements, we have an answer to this question and can show directly what we mean by it.

Are the Smart Factory Elements then a marketing product?

Mr. Petzel: Not really. They are rather an explanation of the connections in the Smart Factory. Naturally, we use contemporary wording – no question about it. Increasing networking of machines, systems and software applications are being neglected if we talk about such things as "horizontal integration". This is why we also refer to the Industrial Internet of Things (IIoT) as part of the new model. This meets both the opportunities and the requirements of today's world much better.

The Smart Factory Elements are arranged here as a circle. Does that have a deeper meaning?

Mr. Petzel: Yes, of course. As a result, the control loop of the Smart Factory can be visualized. According to this control loop, production is planned (Planning & Scheduling) based on specifications from different sources and this plan is then implemented or executed (Execution). The data collected can be visualized, evaluated and analyzed (Analytics) in order to make predictions which, together with other findings, can then be included in planning. The Industrial Internet of Things supports this cycle by collecting and providing data. Today, many manufacturing companies already live this control loop – unwittingly or not in full splendor. The Smart Factory Elements model is designed to help these companies identify where production IT support is needed in their daily operations.

What kind of production IT do you think can fill the Smart Factory Elements model with life?

Mr. Petzel: A large part of the tasks described in the model can be easily implemented with a Manufacturing Execution System (MES) such as HYDRA – for others, new products will gradually be launched on the market. Predictive Quality is an example of a new product that can be classified under the elements Analytics and Prediction. We will also introduce this application at the Hannover Messe 2019. On the basis of real-time data and an executable model, the quality of parts that have just been produced, can be predicted (more on this from page 24).

Sounds exciting. What final advice would you give our readers on the subject of Smart Factory Elements?

Mr. Petzel: The Smart Factory Elements are another good example that real added value can only be created by applications and that bare technology is often pushed into the background. Even in times of Industry 4.0, the focus continues to be on the actual task of production IT. So my advice is not to be blinded by technology-intensive innovations, but first to specify the application requirements and then to look for the right technology.

MPDV WITH A NEW SLOGAN

WE

„**We**" stands for the more than 420 employees of MPDV. After all, it is the people who define a company. Every day, MPDV's teams develop smart manufacturing solutions. With their passion for high-quality products, their knowledge and their team spirit, they have made MPDV to what it is today: The market leader for IT solutions for the manufacturing industry with more than 40 years of experience.

„**Create**" stands for what we do. We are driving digitalization in manufacturing and making companies competitive. We always have the finger on the pulse and know the needs of our customers very well. We operate competence centers, are in constant exchange with our users and develop our solutions further according to requirements. To do this, we focus on the essentials and thus stand out from the crowd.

CREATE

SMART FACT

„**Smart Factories**" is the vision of a self-regulating factory of the future where machines and logistics systems organize themselves as independently as possible. MPDV supports companies in turning this vision into reality. With our products, we make a decisive contribution to ensuring that traditional factories develop into genuine Smart Factories and keep abreast of the latest technological developments. The focus continues to be on people as an integral part of creating value.

ORIES

„WE CREATE SMART FACTORIES"

This is MPDV's new slogan. With this new slogan, the experts for IT solutions for the manufacturing sector want to focus even more on their mission. "It is very important for us to demonstrate that we actively support companies in the process of transforming their production into a Smart Factory. Of course, we still remain the specialists for MES," says Nathalie Kletti, Vice President Enterprise Development at MPDV.

MES TRENDS
2019

Keep an eye on future requirements and possible solutions

Current developments on the future project Industry 4.0 repeatedly call the MES into question and yet no alternative solution is available. Although the market offers innovative platform concepts, can they already be used in production? Nathalie Kletti, Vice President Enterprise Development at MPDV, takes a critical look into the future and conveys a feeling for the developments of the coming years.

A great deal has happened since the first attempts at manufacturing IT. The concept "Manufacturing Execution System (MES)" is now established worldwide, even if it is sometimes called Manufacturing Operation Management (MOM) or even Manufacturing Operation System (MOS), depending on the region and supplier. In contrast, the principle of production have not changed greatly since the industrialization: row materials are processed, reshaped to a finished product and then sold. What has changed are things like variant diversity, manufacturing depth, machining processes, manufacturing organization, length of the product life cycle, cycle times or business models. But what is production IT? Or better:

What does the future production need?
Even if it is the dream of many innovation drivers, not many companies are able to dispose of all old machines overnight and start all over again in the spirit of a greenfield approach. In reality, the brown-field approach is essential and here is one of the most important requirements for the production IT of tomorrow

1. The production IT of tomorrow must be able to handle both modern and older machines – how to do it is rather secondary.

A further indispensable aspect is the opening of systems, i. e. the provision of standardized interfaces. Nowadays more and more companies need special solutions, which have to work together with the existing standard system. Therefore, powerful interfaces are important. The REST principle, which enables extensive interaction between IT systems via service calls, has proven to be effective. This is the only way for networks to get the most out of effective applications. In short:

2. Tomorrow's manufacturing IT must be open and interoperable, with standardized interfaces.

However, people in production also have requirements for the IT that are based on available technologies. Data entry should be automated wherever possible, and the system should also support operators if they have to enter values manually. Evaluations and dashboards must be arranged clearly and flexible enough. Technical refinements such as the use of smartphones or tablets should be used systematically. Requirements could be:

3. Production IT should be user-friendly and ergonomic.

At this point, many will expect cloud computing or the Internet of Things (IoT) to place significant demands on manufacturing IT. The opposite is the case: production IT puts specific requirements to the IT environment. The focus should be on the availability of applications and the necessary security of the associated data and not on the desire to use the cloud. The IoT can be a useful tool for procuring and distributing data for the production IT. That means:

4. The production IT of tomorrow must clearly define its requirements for the IT environment and not vice versa.

When it comes to data, the step to "big data" and "analytics" is quite close. Of course, production IT also plays here a major role. In order to continue to produce efficiently and according to specifications in future, production IT has to record and process an increasing amount of data. To do this, powerful tools are required for their analysis. Depending on the IT architecture, analytical functions can either be integrated or connected as required. Therefore:

5. The production IT of tomorrow must include or be able to efficiently integrate powerful analytical functions.

An integrated MES such as HYDRA from MPDV already meets most of these requirements today – in order to fulfill all of these some manufacturer have to upgrade their system.

Open platform as an alternative approach:
Another way to tomorrow's manufacturing IT is via an open platform architecture. The purpose of such an approach is to combine arbitrary applications from different providers. Subjects such as interoperability or a semantic information model are of great importance. In any case, a suitable basis is needed on which an ecosystem of providers, users and integrators can emerge. A platform for tomorrow's production IT is not something you simply build from nothing. Such a platform normally profits from years of experience in the production IT. It is hardly surprising, therefore, that MPDV is venturing into this new field with the Manufacturing Integration Platform (MIP), and thus into a completely new market that is just beginning to appear.

On the basis of the MIP, manufacturing companies will be able to create their own individual production IT or have it created by a system integrator. In many cases, the range of functions that can be achieved will be identical to that of an MES system, in other cases it will go considerably further. The main difference between an MES and the MIP, however, is that the MIP itself does not include any applications – these can be combined with each other as required and connected to the MIP. An MES, on the other hand, is a turnkey system that can be used instantly with its applications. The future offers the manufacturing industry the choice between an out-of-the-box solution with an MES like HYDRA or a do-it-yourself strategy with a platform like the MIP.

What to do? Wait or invest?

Now many production companies of different sizes are going to ask themselves when is the right time to invest in manufacturing IT. Especially for smaller companies and medium-sized businesses, an unsuccessful attempt can have serious consequences – you rarely get a second chance. Therefore, the question of timing and the suitable approach is justified. What to do?

In many cases, the decision to digitalize one's own production and thus to invest in modern production IT cannot be postponed. The saying "A rolling stone gathers no moss" is especially true in a dynamic sector like the production industry. Therefore, production companies should act now and start defining requirements for a production IT immediately. Choosing the right solution is still relatively easy today, as most platforms are just beginning to emerge. Most companies will therefore be looking at the procurement and introduction of an MES – unless such a system is already in use.

Nathalie Kletti, Vice President Enterprise Development at MPDV, looks to the MES future

IN A NUTSHELL

Manufacturing Execution Systems are essential components for Industry 4.0 and for the Smart Factory. Our recommendation is: Act now with caution. Think twice about what you need and introduce suitable MES applications step by step.

NRW GOES DIGITAL

MPDV supports education campaign

NRWgoes.digital is an education project that supports further education in digitalization of more than 300 teachers and 300 trainers. MPDV supports the initiative and trains teachers on the subject "Digitalization in Production".

MPDV is an official partner of the education project NRWgoes.digital and takes part in the largest digitalization campaign for vocational schools in North Rhine-Westphalia.

Digitalization brings new challenges for teachers at vocational schools. This is why

the state of NRW has launched the NRWgoes.digital project and promotes the further training of more than 300 teachers and 300 trainers in various areas of digitalization. As a partner of NRWgoes.digital, MPDV's mission is to train teachers on digitization in manufacturing regarding Industry 4.0.

"We look forward to passing on our working knowledge to teachers. That's important, after all, they're training tomorrow's

young talents," says Jürgen Petzel, Vice President Sales and Branch Manager of MPDV in Hamm, Germany.

After a general introduction to the subject of digitalization in manufacturing, MPDV will focus its educational project on the four-step model "Smart Factory", the HYDRA Shop Floor Scheduling and Quality Management. Using numerous actual examples, teachers gain exciting insights into the functioning of an MES and learn about the advantages of the solution.

Train the experts of tomorrow perfectly
Officially, the project is supposed to run over the period of two years. After the extensive qualification measure, it is the teachers' responsibility to pass on the new knowledge to students and trainees and thus prepare the experts of tomorrow in the best possible way for future challenges in their professional life.

The project is under the patronage of North Rhine-Westphalian Prime Minister Armin Laschet. Coordination is managed by the Nachwuchsstiftung Maschinenbau GmbH (Foundation for the Education in Mechanical Engineering), based in Bielefeld. Other project partners besides MPDV include DMG Mori, Beckhoff Automation, Heidenhain, Fanuc, Siemens and SolidCAM.

More on the project at
www.nrwgoes.digital

NRWgoes.digital partner meeting with Ms. Yvonne Gebauer, Minister for Schools and Education of the State of North Rhine-Westphalia (Source: Foundation for the Education for Mechanical Engineering)

TWO THAT COMPLETE EACH OTHER

Co-operation between viastore and MPDV

viastore has been an official partner since 2019. In an interview, Philipp Hahn-Woernle, Managing Director of viastore GROUP, and Nathalie Kletti, Member of the Management Board of MPDV, talk about the beginnings, goals and joint projects.

MPDV and viastore have been working together for two years now. Both companies have already exhibited together at trade fairs such as LogiMAT. Now, the experts for customized manual and automatic storage systems are official partners of MPDV. How did the co-operation come about?

Mr. Hahn-Woernle: Nathalie Kletti and I first met at a VDMA event. We quickly got talking and noticed that our products complement each other very well because we are working in the same industries and already have common customers. Moreover, we have similar viewpoints and share the same values as a family business.

Ms. Kletti: I agree. We simply complement each other both professionally and mentally and that's what counts when it comes to good cooperation!

In which areas do you work together? Are there any joint projects?

Ms. Kletti: Well, let me go back a bit further. We frequently receive inquiries from customers who require solutions for logistics

and production and viastore is the specialist for IT solutions in logistics. We on the other hand are experts for IT solutions in production. That means, our products and services complement each other perfectly to meet such requests. Thanks to our

co-operation, we will be able to offer our customers solutions from a single source in the future, which has many advantages.

Mr. Hahn-Woernle: That's right! We have also proven this in a pilot project. Last year,

Nathalie Kletti

Philipp Hahn-Woernle

we jointly developed a transparent, integrated software solution for warehousing, picking, internal transport and production with standard interfaces between the systems for a supplier of vacuum components. The solution was greeted with great enthusiasm and has proven itself.

It's wonderful to hear that you've already had joint successes. What do you hope to gain from the partnership in the future?

Mr. Hahn-Woernle: Technically, a neatly integrated standard solution that provides our customers with a fully integrated, transparent and flexible value stream. Generally, I also look forward to a lively co-operation.

Ms. Kletti: I am also really excited about our next projects.

What's next?

Ms. Kletti: We are currently in the process of turning the solution from our pilot project into a standard one, which will benefit many companies and sets a new benchmark in the integration of production and material flow processes.

Mr. Hahn-Woernle: It's really pretty special what we're doing right now. That wouldn't have happened without this co-operation.

ABOUT VIASTORE

In more than 125 years of company history, the family business viastore has developed from a machine manufacturer to an equipment manufacturer and further to a worldwide system integrator and software house. Today, viastore is one of the leading suppliers for intra-logistics systems and software including supporting services. viastore's focus is on service and planning, implementation and continuous improvement of intra-

logistics solutions. viastore has been planning and implementing automated warehouse systems for more than 45 years. These solutions guarantee that warehouses require less space, energy consumption is reduced, processes run faster and error-free, and warehouse management can thus reduce their logistics costs in the long term. The viadat Warehouse Management System (WMS) is viastore's latest, high-performance,

tried and tested standard software for managing and controlling the entire intra-logistics portfolio. 550 employees work worldwide for viastore. viastore has locations is Stuttgart, Bietigheim and Löhne. Internationally, they are represented in the USA, France, Spain, Czech Republic and Brazil.

www.viastore.com

RESEARCH IN ASIA

MES HYDRA at Nanyang Polytechnic in Singapur
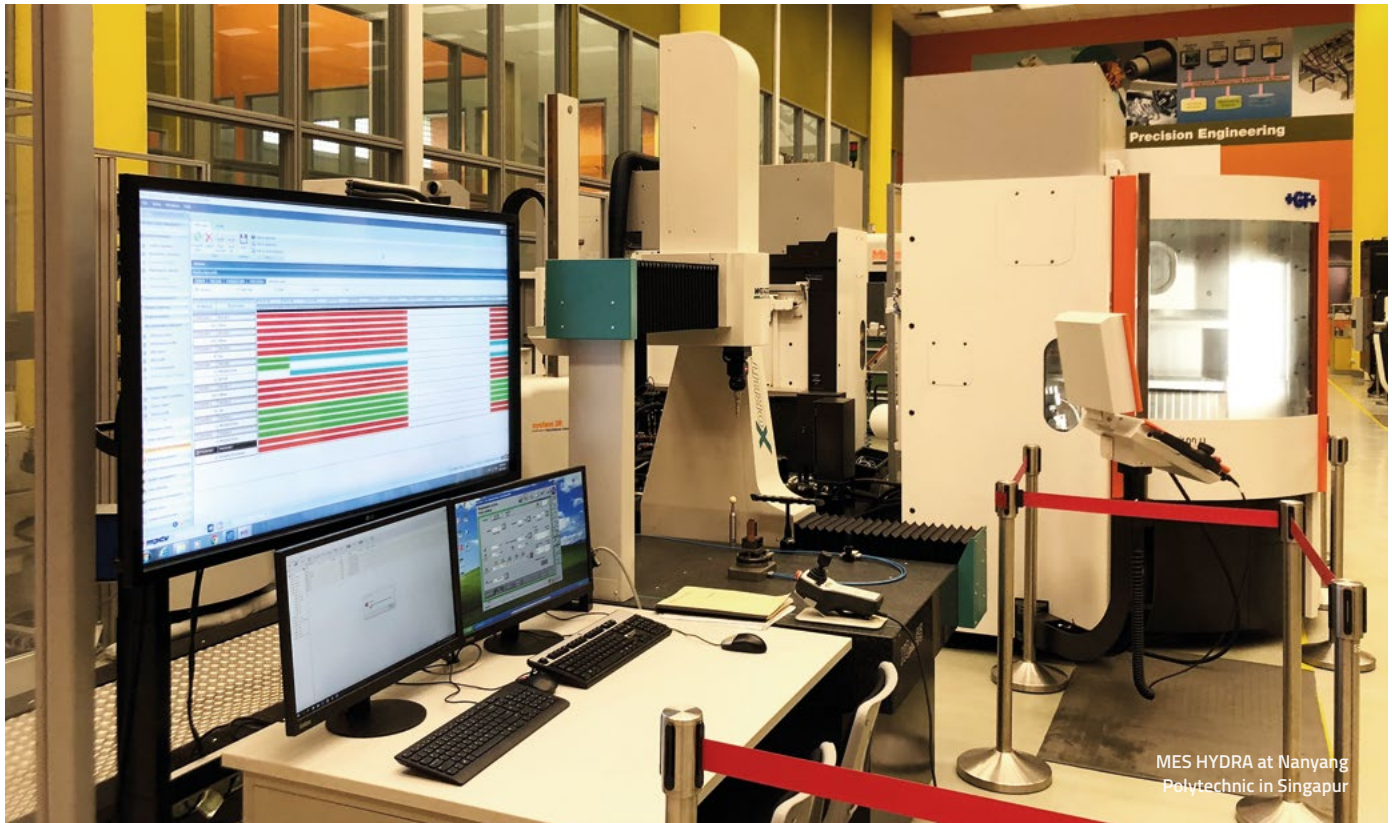
Strategic internationalization

During a one-week trip across Asia, Nathalie Kletti, Vice President Enterprise Development, and Laura Kirstätter, Research Coordinator, visited three educational institutions that MPDV already co-operates with. In addition to co-operations in Germany, further international research activities are planned.

Tongji University Shanghai

After the team around Prof. Bin Shen and Prof. Wang had translated the specialist book "HYDRA Guideline" into Chinese, the installation of a Smart Factory Lab is now on the agenda. The subject of MES will also be discussed and MPDV's MES HYDRA will be used. The Tongj University has numerous co-operations with German universities. The German language is on the curriculum at this university and is therefore something special in China.

Singapore Polytechnic

As a representative of a number of vocational colleges in Singapore, Singapore Polytechnic is currently in the process of setting up an Advanced Manufacturing Center. They also want to introduce MES HYDRA. In addition to connecting modern machines, the Department of Mechanical Engineering team also plans to retrofit older machines and have them communicate with HYDRA. The focus is on a realistic depiction of a typical production facility in Singapore. As in Germany, heterogeneous machine parks are standard in production.

2001
ROUGHLY
8 MIO
STUDENTS WERE REGISTERED
AT **UNIVERSITY** IN CHINA

2013
APPROXIMATELY
25 MIO
STUDENTS WERE REGISTERED –
AND **STILL RISING**

2017
CHINA HAD
2800
UNIVERSITIES AND
COLLEGES

The implementation of HYDRA is supposed to start at the end of 2019.

Nanyang Polytechnic

At Nanyang Polytechnic, the MES HYDRA has been running for around a year, including the connection of various machines. The team around Albert Wong, Manager of the Centre for Digital & Precision Engineering, operates a large touch screen in the "production hall" that shows evaluations on the HYDRA Office Client and it also enables orders to be planned. Around 50 students work each week in HYDRA's Smart Factory. In addition, Nanyang Polytechnic regularly receives visits from companies that visit the impressive Smart Factory and also get to see HYDRA at work. The progress and innovation at an educational institution of this kind is unique in Singapore.

Evaluations of large screens in the Smart Factory

HYDRA FOR LIFE SCIENCE

New Solution for the Medical Technology

The medical technology industry and other regulated industries face two key challenges: producing efficiently while complying with a wide range of requirements, including data integrity. The use of suitable software is almost compulsory. With the new solution HYDRA for Life Science, MPDV supports regulated manufacturing businesses to master the two big challenges.

Apart from the regulatory requirements, most medical technology manufacturers and suppliers are ordinary manufacturing companies – they process plastics, metals, paper and other raw materials into components and products of high quality. Therefore, it is hardly surprising that a Manufacturing Execution System (MES) is perfect to integrate and service standard production requirements. An integrated MES can also meet additional requirements such

as traceability, data integrity and special processes and terminology. However, the number of providers is dwindling when it comes to providing actual standard applications.
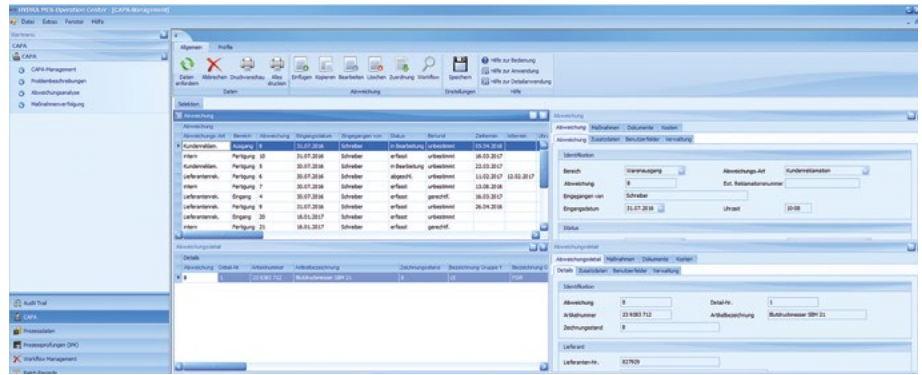
At the same time, the validation of process software – including an MES – with ISO 13485:2016 has become a mandatory requirement. Also, regulated manufacturers must operate a quality management system in accordance with this standard in order to pass the usual audits of FDA inspectors.

Software support of the CAPA process with HYDRA for Life Science

MES for medical technology manufacturers and their suppliers

The new business solution HYDRA for Life Science is based on the globally and industry-wide used MES HYDRA by MPDV. Many of the available functions can be configured or parameterized so flexibly that it is also possible to implement requirements that usually only occur in regulated industries. This includes in particular the Audit Trail and the integrated authorization concept, which enables manufacturing companies to safeguard data integrity across the entire value chain. HYDRA for Life Science also provides the necessary software support for the CAPA process (Corrective And Preventive Actions) and helps to manage the training for production-related employees. HYDRA for Life Science also supports the risk management with an integrated FMEA list.

Focus on standard functions

In addition to the functions configured specifically for the regulated market, MPDV's industry solution offers a wide range of applications in compliance with VDI Guideline 5600. This solution is now used by over 1,250 companies worldwide in a variety of configurations. The functional portfolio ranges from data collection in the shop floor to detailed evaluations of all kinds and the planning of orders, resources and personnel deployment. The documentation of the complete manufacturing process in line with traceability is also part of the standard range of functions. Complemented by applications for quality assurance and personnel management, HYDRA for Life Science makes an enormous contribution to more transparency and efficiency in the shop floor. The system is a standard software
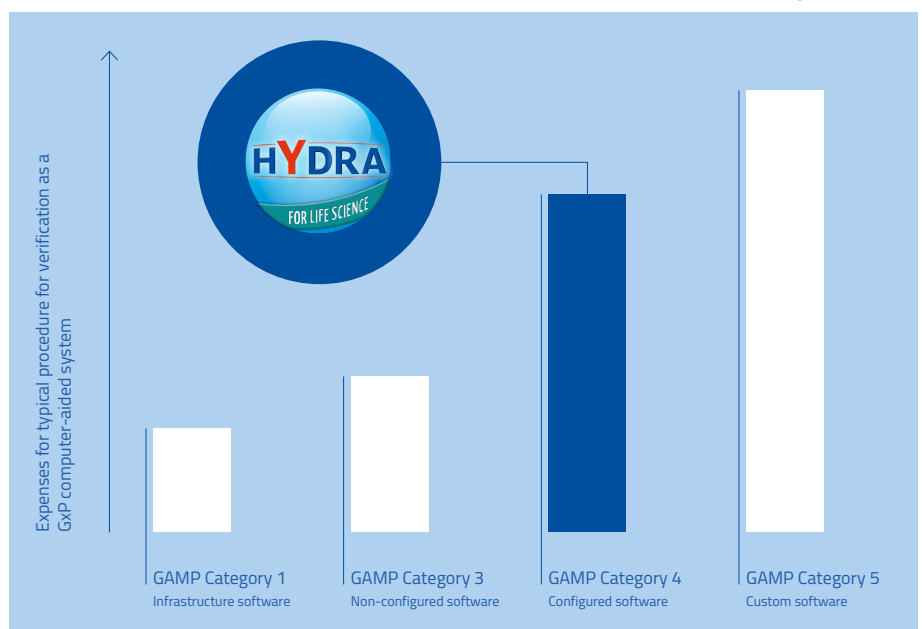
as HYDRA is used by a broad range of customers due to its configurability. Therefore, the software can be classified in the GAMP software category 4 "Configured products". This greatly simplifies the typical procedure for validation as a GxP computer-aided system compared to customer-specific applications (GAMP category 5). It is also beneficial that MPDV operates a Quality Management System (QMS) which is certified according to DIN EN ISO 9001:2015.

Support during the validation process

MPDV also provides a detailed package for documentation and specification of the standard software. The HYDRA functions for Life Science include GAMP 5 requirements and therefore supports the manufacturing companies in the validation process. MPDV's experts have successfully accompanied corresponding validation processes with various HYDRA users worldwide. The new industry solution was officially presented at the T4M, the new trade fair for medical technology in Stuttgart, at the beginning of May 2019.

Comparison of the costs for a typical validation as a GxP computer-aided system based on GAMP 5 guidelines

Expenses for typical procedure for verification as a GxP computer-aided system

GAMP Category 1
Infrastructure software

GAMP Category 3
Non-configured software

GAMP Category 4
Configured software

GAMP Category 5
Custom software

PREDICTIVE QUALITY

Real-time analytics and the power of data

People have always been interested in predicting future events. It is therefore hardly surprising that applications such as Predictive Maintenance are regarded as the flagship of Industry 4.0. But wouldn't it also be useful to be able to predict the quality of products that have recently been manufactured? Predictive Quality turns this wish into reality – MPDV will be showing how this works at Hannover Messe 2019.

Resource efficiency has been an important subject for the manufacturing industry for many years - not only for ecological but also for economic reasons. In addition to the economical use of raw materials and energy, topics such as efficient production processes or the early detection of deviations are increasingly coming to the fore. It is not unusual for a production manager to be dreaming of predicting defects in order to avoid them all together. Predictive Maintenance only fulfils this dream with regards to machines, equipment and the utilization of tools. However, if you could predict the quality of an article while it is being produced, you could decide early on whether it would be worth investing further cost and effort in the part.

Only a dream? By no means!

The basic assumption for predicting quality is that rejects or reworking can also occur if all process parameters are within the valid tolerances. Reasons for this are complex connections and interactions, which are often down to the actual production technology. Predictive Quality from MPDV takes these interrelationships into account and gives employees in production the opportunity to see immediately whether the part currently being made is a pass or fail. Below we explain how it works:

Step 1: Collect a broad range of data
It goes without saying that predicting quality does not work without an extensive collection of data. To be more precise, you

need the broadest possible field of process data that can be correlated with the appropriate quality data. Classical data collectors or an IIoT platform as well as an MES such as HYDRA can support to collect such data. The following applies: the more the individual process values change within their permissible tolerances and the more combinations of different extreme values are recorded, the better it is.

Step 2: Developing models

In the next step, available data is analyzed to develop a prediction model. Both statistical methods and artificial intelligence are used. The result are models that are stored in the so-called PMML standard for example. PMML stands for „Predictive Model Markup Language". This is an XML-based standard that can be used to define prediction models.

Step 3: Real-time analytics

If the model generated in this way is now integrated into Predictive Quality, the process data recorded during operation can be interpreted in real time and the Quality Prediction calculated. In addition to being classified as "pass" or "fail", the application also provides the probability that the prediction is correct. On the basis of these two values, rules can then be defined that enable an automatic quality decision. For example, plastic parts with a probability of more than 60% that the part fails can be straight away fed to the shredder to produce granulate again. Or castings made of special alloys are re-melted immediately if the probability of fail exceeds 75%. Similarly, parts can also be declared as a pass if the probability is over 90% – of course only if no 100% inspection of the parts is stipulated. All other parts can be re-inspected or can be sold cheaper as inferior goods.

Predictive Quality predicts quality on the basis of process values and an operational model

Use the predicted quality to classify produced parts as fail or pass

FIELDS OF APPLICATION

A reliable prediction is of great importance, especially when the quality of a manufactured article can only be checked later on by an inspection. Examples include the cooling process in plastic injection molding, mechanical post-processing in the casting of metal parts or assembly processes that allow the testing of individual components only in a finished state. This saves both time and costs that would otherwise be incurred in the further processing of presumed rejects or their use in further process steps.

NEWS ON THE MANUFACTURING INTEGRATION PLATFORM

In conversation with
Thorsten Strebel and
Jürgen Petzel

In the interview, Thorsten Strebel, Vice President Products and Consulting, and Jürgen Petzel, Vice President Sales, both from MPDV, explain how different companies can benefit from the ecosystem of the MIP and which technical aspects of the MIP are relevant.

What is the Manufacturing Integration Platform (MIP) for?

Strebel: The Manufacturing Integration Platform is a new and open platform for sustainable manufacturing IT. In contrast to today's systems, which are often characterized by fixed application packages, the MIP allows flexible combinations of applications from different providers. The result is a virtually individual standard software. In other words, the MIP combines the advantages of two worlds: the regulated life cycle of standard software and the flexibility of a modular system. Also, the semantic information model of the MIP is unique on the market to date.

For which application scenarios is the MIP suitable?

Petzel: Basically, we see three application scenarios for MIP: 1. The user develops their own applications on the basis of the MIP and then operates as an individual standard solution. 2. A system integrator combines different applications commercially available with customizations for a certain customer. 3. Supplier for machines and components for the shop floor develop applications for the MIP and offer these as add-ons to their products. As a result of these three scenarios, we see a continuously growing ecosystem of suppliers, users and integrators.

The MIP concept was introduced to the market in July 2017. How can you obtain detailed information as an interested company?

Strebel: First of all, on the MPDV website you will find introductory information and also a short video that outlines the principles of the ecosystem. For more details, I recommend reading the Competence Partner Book on MIP, which we published together with the Competence Site. This specialist book is also available in English.

If a company decides to become part of this ecosystem, how is the further procedure?

Petzel: Now would be time for this company to contact us – for example, by e-mailing us at mip@mpdv.com. Then we can provide the interested party with further information according to their needs. We are also happy to present the MIP live. The next step would be for the interested party to look at our starter kit in the cloud. This MIP Starter Kit enables developers to learn how to program mApps and how to use its services. For this reason, the Starter Kit includes the Software Development Kit (MIP SDK).

Strebel: To help developers to find their bearings, we offer a remote training on the object model of the MIP and support them in creating their own mApps in the form of development support.

This ensures that developers and their company have time to get into the MIP system properly. Can you tell us about experiences that people have made with the MIP?

Strebel: In each presentation, the effective structure of the MIP was praised and the available basic services were also

Thorsten Strebel

highlighted as very useful. The big advantage for the developer is that they do not have to develop the application from scratch each time. That means, application developers can focus on the application itself and on the specific business logic. MIP thus combines the best of both worlds: the flexibility of a modular software system and the application proximity of an established standard software. This is the difference between the MIP and other platforms on the market.

Petzel: This is also the reason why the MIP does not yet feature in any of the usual market reports. The MIP is totally different to anything on the market: the MIP is no MES system but also no IoT platform either but you can connect both with the MIP. The idea of an ecosystem fits very well here, because everyone involved gives something and takes something in return. In other words, all work with the same resources but with different perspectives.

In a recent press release from MPDV it was said that an mApp can have very different characteristics – how is this to be understood?

Strebel: Very simply! An mApp can be anything that communicates with the MIP via the services offered. For example, a PLC-based machine controller can call data on the current order logged to the machine and display it on the built-in operating display. Or a planning application from an ERP package analyzes the pending orders and work processes in order to put them in an ideal sequence and then send them back to MIP with updated deadlines. A mobile app for smartphone or tablet could also use the data from the MIP to extract key figures and dashboards and visualize them graphically. There are no limits for the creativity of an application developer – the app can be used in the broadest sense of the word.

What are the advantages of open architecture compared to a monolithically designed software?

Strebel: The flexibility for the user is tremendous, but still the advantages of a standard software remain unchanged. The open architecture enables the applications to work with the same data independent of

each other. That reduces the efforts for compatibility tests. In fact, applications initially conceived as individual solutions can be made available to other users. In the end, all participants in the ecosystem benefit from the open architecture. At this point, I must refer again to the semantic information model, which is a main component of the MIP and also plays an essential role for the interoperability of the individual applications.

Last questions: What is your current assessment of the market for the MIP?

Petzel: We are really at the beginning but we expect the MIP to be a great success. As is so often the case, the market does not even know that it needs something like the MIP. Consequently, we first have to do a great deal of groundwork. This is the reason why we are taking part at the #NextAct Event in Cologne on the 03.28.2019. All great players from industry will be there. We expect a forum to discuss the platform of the future – the MIP. I assume that the MIP will experience a significant upswing

as soon as we can welcome the first notable partners in the ecosystem. We're working flat out on that right now.

More on the MIP:
mpdv.info/newsmipen

Jürgen Petzel

PRODUCT
NEWS

Digital Production Meeting

With the new application "Digital Production Meeting" you can digitalize and integrate the planning, execution and the documentation of production meetings into MES HYDRA. As the Digital Production Meeting is a part of the **Smart MES Applications (SMA),** you can run the application on a tablet, or with an internet browser on a notebook or on a large touch monitor directly on the shop floor. All data is stored in the HYDRA database. The organizer uses the HYDRA HR master data to manage the attendees.

This allows manufacturing companies to digitalize another contemporary phenomenon – the multitude of regular production meetings. These meetings, which take place on different levels of the organization, often follow the same pattern each time: presentation of current key figures and evaluations, discussion of upcoming projects and clarification of current problems. The agenda is usually set in advance and minutes of the meeting are also available. It is not uncommon for issues to be delegated from one meeting to the next decision level. The Digital Production Meeting replaces paper and standard office software with an intuitive application that is fully integrated into MES HYDRA.

— **More on SMA:**
— mpdv.info/newssmaen

New functions for Quality Assurance

The **MES HYDRA Quality Management** was extended by a packet of useful functions. From now on, a so-called Final Part Inspection is available, which is due as soon as the operator interrupts or logs off an operation. It is also possible to identify the results of inspections in the setup phase in order to distinguish them from inspections in the production process when evaluating quality. It is also possible to display several inspection characteristics as a common control chart – either side by side or normalized in one diagram. The assignment of inspection equipment to individual measured values has also been improved so that the complete documentation of inspection processes can be implemented. New evaluations of inspection costs, inspection quality and processing time for entire inspection requirements or individual inspection points ensure greater transparency in the inspection process.

More on CAQ using HYDRA:
mpdv.info/newsfepen

Personnel Time Management updated

A new evaluation is available in HYDRA Personnel Time Management (PZW) with the so-called Bradford Factor. This is an indicator from the health management that can serve as a "warning sign" for overworked employees. Employees with frequent (often short-term) absences achieve a high score and are highlighted in red in the application. Employees with few (often long-term) absences achieve a low score and are highlighted in green. However, a high Bradford Factor can serve as an indicator to get in contact with the affected employee. The new PZW release also contains many improvements in the user ergonomics.

More on HYDRA PZW:
mpdv.info/newspzwen
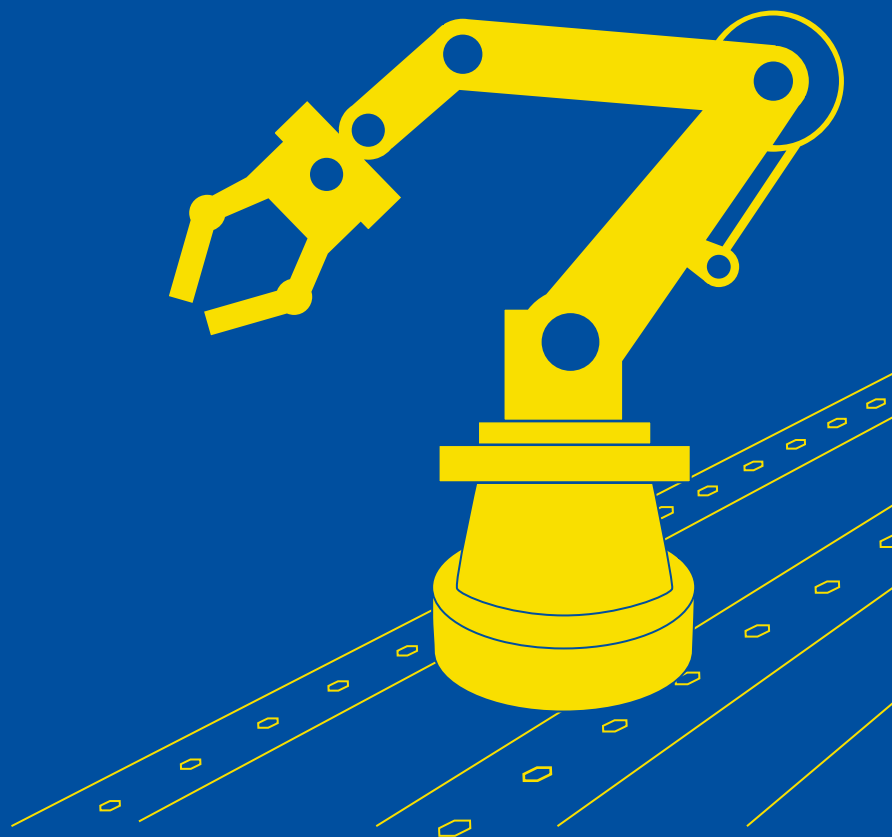
HYDRA PROCESS DATA EXTENDED

The new release of HYDRA Process Data (PDV) brings an improved architecture and more performance as well as new functions for the analysis of process values in correlation to other process values of the same sequence. This makes it possible, to record and display furnace characteristics, recurring pressure curves or torque curves. In addition, the online visualization of process data was converted to the lean Internet protocol MQTT. This makes it possible for other clients and systems to subscribe to the process data in order to conduct their own presentations or analyses.

More on HYDRA PDV: pdv.mpdv.com

COMPLAINT MANAGEMENT WITH HYDRA REK

To automate processes and reduce costs

Complaints are an unpleasant part of production but can often not be avoided. It is therefore all the more important that the procedure for dealing with complaints is standardized, transparent and largely paper-free – help is at hand with MES HYDRA.

Ideally, the complete course of a complaint, i. e. from the customer to the supplier, is mapped in one system across all departments. As a result, weak points in internal processes can be continuously eliminated. At the same time, you can always provide information to the customer.

In addition to processing external complaints, i. e. those initiated by the customer,

HYDRA Complaint Management (REK) uses recorded quality data including defect causes to automatically trigger internal complaints. Alternatively, you can create complaints on the Office PC or on a tablet using Smart MES Applications (SMA). The integrated workflow management then ensures that the specified processes are adhered to and documented. That means, you know at all times where the complaint is currently being processed or which activity is next. The likewise integrated Measure Management guarantees that the defect sources are eliminated in the long term - entirely in line with the Continuous Improvement Process (CIP).

HYDRA REK also offers powerful functions to evaluate and analyze complaints and costs incurred. Last but not least, we provide forms that can be individually designed and

used as required. A typical document would be the 8D report. MPDV offers templates for this report.

More about HDRA REK:
mpdv.info/newsreken

BENEFITS AT A GLANCE

- Cost savings through consistent and standardized processing of complaints

- Clear inter-departmental communication based on consistent information

- Increased customer satisfaction through the ability to provide immediate information

- Overall synergy effects through integrated response management

- Supporting the Continuous Improvement Process (CIP)

Examples from HYDRA REK: Analysis of complaint costs
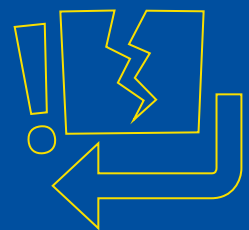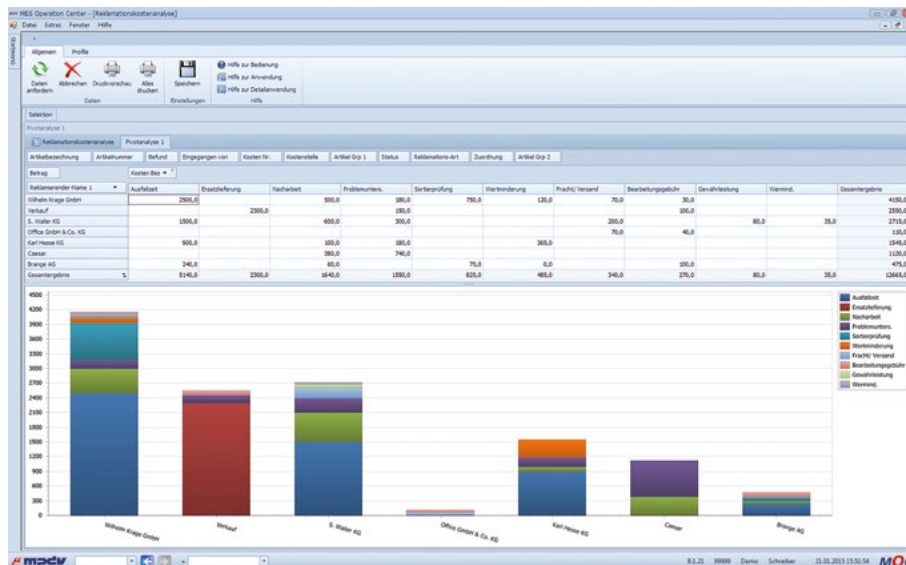
SERVICES
NEWS

Specific solutions for specific requirements

A growing number of companies are making specific requirements of their production IT. In such cases, extensive technical knowledge of products such as HYDRA PDM or our new RESTS interface is often needed. This is where our Technical Consulting steps in. The team of Joachim Raidl, Executive Manager Solution Development at MPDV, advises on technical solutions, supports the use of development tools and trains customers.

For example, if an automotive supplier wants HYDRA to automatically print the correct number of labels depending on the parts produced, then Technical Consulting develops a concept and implements it. "It is our task to find suitable solutions for speci- fic technical requirements," says Mr. Raidl. The team gives support for systematic analysis on data volume.

FIT FOR THE SMART FACTORY?

So where is my company on the way to the Smart Factory? What requirements do we already meet? Where can we optimize? The new **Readiness Check** by MPDV provides answers to your questions. Our shop floor experts check all production components, from the workplace to the machine to the control system, and analyze to what degree they already meet the requirements of a Smart Factory. The result is an action plan with precise recommendations for actions and innovative solutions that supports manufacturing companies in making their own production fit for Industry 4.0.

Contact: : info@mpdv.com
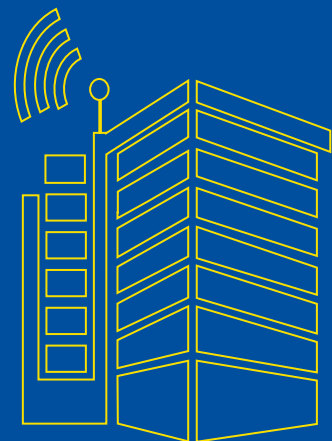
NUMEROUS PRODUCTS, HIGH PRODUCTION DEPTH, ONE MES

HYDRA Success Story

The lightning protection specialist DEHN + SÖHNE has been using the Manufacturing Execution System (MES) HYDRA from MPDV for more than a year. The project team has now connected more than 120 machines and manual workplaces.

Anybody who enters the production site of DEHN + SÖHNE with more than 20,000 sq. in Neumarkt, Germany, looks on to huge monitors. The monitors show the most important KPIs for each machine. This enables the employees to instantly see which machine currently produces small and large parts for lightning protection devices, which one is idle and the one producing the most scrap. This is a transparent production site that has been meticulously optimized.

DEHN + SÖHNE is a global manufacturer for lightning protection devices using different processes in their production. The spectrum ranges from metal and plastic processing to electronics production. The production depth is extremely high. DEHN + SÖHNE managed to integrate their complex and numerous production processes with the aid of the versatile MES HYDRA by MPDV.

DEHN + SÖHNE have been using the MES succesfully at their sites in Neumarkt und Mühlhausen, Germany. The team around IT project manager Christina Wecker and project manager Martin Wolf from DEHN + SÖHNE's central preproduction has connected more than 120 machines and manual workplaces with the support of MPDV experts. At DEHN + SÖHNE there is everything – from the punch to the injection molding machine, automatic assembly machines, presses and production lines.

"We wanted a solution that helps us to increase the transparency and at the same time to utilize capacities. We have achieved just that with HYDRA"

Increased transparency for a perfect machine utilization ratio

In phase one, the project team implemented the HYDRA modules Shop Floor Data (BDE) and Machine Data (MDE).
"We wanted a solution where we could increase the transparency and at the same time help us to utilize capacities and we have achieved just that with HYDRA," outlined Mr. Martin Wolf.In phase 2, the HYDRA Shop Floor Scheduling module was introduced.

Previously, DEHN + SÖHNE had no automatic data collection in production. Employees had to manually record the status of individual work orders. That consumed a lot of time and tied up resources. Also, repeated errors occurred or lack of information on the capacity utilization of individual plants.

That has been a thing of the past since DEHN + SÖHNE have been using the MES HYDRA. Employees now record all order-related events with HYDRA BDE. This includes logon, interruption and logoff of operations and posting quantities. HYDRA MDE ensures that the automatically recorded data like piece numbers, machine status or cycle time is supplied in real time.

"Thanks to the detailed evaluations in HYDRA, we can see at a single glance which machine is causing a problem and can initiate specific measures. The MES helps us to uncover weak points in the production process and turn these into strengths"

Focus on crucial KPIs

Thirteen planners manage and schedule orders in the ERP system, which is connected to the MES via an interface. The HYDRA Shop Floor Scheduling visualizes the planning of machine assignments approved in SAP, so that the supervisors always have

CHRISTINA WECKER

Has been working for DEHN + SÖHNE since 2015 as an Application Consultant. From 2016 onwards she is working as an MES project leader and has more than 15 years of experience in the areas SAP PP, MM and MES. She was involved in the introduction of the MES HYDRA from the selection of the software to its implementation in the production areas. She is also system administrator for the complete MES.

MARTIN WOLF

Has been with DEHN + SÖHNE since 1998 and started as an industrial mechanic apprentice. Later on he worked as a fitter and supervisor. Since 2014 he has been head of central pre-production with injection molding, machining, stamping and forming technology as well as workshop production. He was also project leader in the production during the introduction of HYDRA.

ABOUT DEHN + SÖHNE

More than **1,800** employees are working for DEHN + SÖHNE worldwide.

The cornerstone for today's success was laid in **1910** by master electrician Hans Dehn, founding a company for the installation of electrical systems in Nuremberg.

The **product portfolio** includes protective devices for installation in switchgears, counter stations, terminal devices or distribution boards. The products are also used as fixed installations or adapters in lightning current, multi-voltage or overvoltage arresters for information technology.

an eye on when an order change is due and how the machines are utilized overall. The conflict list in the HYDRA HLS (Shop Floor Scheduling) clearly shows all schedule violations, resource bottlenecks and other planning inconsistencies.

Once a week, all department heads and supervisors meet to discuss KPIs such as the OEE (Overall Equipment Effectiveness), which provides information on overall plant effectiveness, scrap statistics and status and performance reports. The focus is on which plants are particularly efficient and which are less. "Thanks to the detailed evaluations in HYDRA, we can see at a single glance which machine is causing a problem and can initiate specific measures. The MES helps us to uncover weak points in the production process and turn these into strengths", says Christina Wecker.

Free capacities

Since the introduction of the MES, DEHN + SÖHNE has managed to increase production efficiency by more than ten percent. The return of investment was achieved in under one year. In addition, with HYDRA the lightning protection specialists have managed to utilize their machines to such an extent that they have now capacities available and can produce even more parts with the same number of machines.

The team around IT project manager Christina Wecker is now working on connecting more than 200 manual workplaces and 36 other machines. For this reason, they are currently developing a detailed concept to integrate the HYDRA modules Time & Attendance (PZE), Personnel Time Management (PZW) and Premium & Incentive Wages (LLE).

ALLGAIER BACKS HYDRA BY MPDV

Allgaier is a global supplier for the automotive industry and delivers metal parts to all well-known car manufacturers. Allgaier Automotive processes more than 80,000 tons of steel and aluminum annually in Germany, France, Mexico and China. To bring the Puebla plant and the new factory in Aguascalientes (Mexico) up to date, Allgaier has now introduced the MPDV MES HYDRA.

"HYDRA is an all-in-one solution of a modular design that you can implement gradually. That was one of the reasons why we decided on MPDV as a partner," says Patrick Wolf, HYDRA project leader and local IT Manager for Allgaier in Puebla.

The experts from MPDV supported Allgaier to implement the first HYDRA modules in Aguascalientes on time for the opening of the plant. It was particularly reassuring for Allgaier to know that MPDV has a local implementation and support team and a training center in North America.

After the completion of the first project phase in Mexico, Allgaier want to introduce HYDRA at other sites worldwide. "The fact that MPDV has local teams on different continents makes us very attractive for multinational medium-sized companies," says Dr. Stefan Loelkes, CSO of MPDV USA.

Patrick Wolf (left side) and his Mexican colleagues at a HYDRA AIP terminal

MES HYDRA SUPPORTS THE LEAN PROJECT "MOVE" AT THE PELZGROUP

The pelzGroup introduced the Manufacturing Execution System (MES) in 2015 to automate the data collection in the shop floor. The reason the pelzGroup favored HYDRA was the wide range of standard functions and the scalability.

The pelzGroup is a manufacturer of high-quality articles for beauty and body care. They implemented the HYDRA modules Shop Floor Data (BDE) and Machine Data (MDE) to be able to process collected data faster. KPIs such as the OEE (Overall Equipment Effectiveness) can be calculated at the push of a button. Applications for leave could be digitalized completely as they are now using the modules Personnel Time Management (PZW) and Time & Attendance (PZE). These HR functions also form the basis for the Personnel Scheduling with HYDRA PEP. The integrated Access Control (ZKS) module guarantees that only authorized employees can enter the company premises as well as critical areas in production.

Image: pelzGROUP

Also, the pelzGROUP uses the integrated maintenance calendar for the strict compliance of i}nspection cycles for hoists and ladders.

"In order to pinpoint all the improvements and potentials, we have set up a lean project for our employees to identify with. "move" stands for motivation, organization, improvements and efficiency. The MES

HYDRA is for us the essential tool", says Tim Hamann, Head of Production Optimization at pelzGROUP

For the detailed success story:
mpdv.info/newspelzen

MPDV
WORLDWIDE

MPDV USA on track for success

MPDV USA has improved its market share with more than 100 HYDRA installations in the USA, Canada and Mexico. The USA team managed to win a new key account – ITG (International Gaming Technologies). The company is fully equipping its main manufacturing facility in Reno, Nevada, with HYDRA DMC. In a first step, IGT will connect over 200 assembly stations with nine production lines to HYDRA DMC. HYDRA DMC includes functions for modeling, monitoring and controlling processes and workflows, as they typically occur in assembly or in the multi-variant sequence production.

"This is a very exciting project. We look forward to implementation," says Dr. Stefan Lölkes, CSO MPDV USA.

Team enlarged

The MPDV USA team has gained new personnel in the areas Consulting and Support. Several consultants have also successfully completed their expert training in ERP interfaces and HYDRA CAQ. Ralf Sipmeier, Team Leader Consulting at MPDV USA: "It is extremely important for us to be able to answer our customers' questions quickly and in detail. That's why we decided to train more consultants at the MPDV Academy." A local level 2 support has been established to be able to react even faster and more independently.

"There are many potential HYDRA users especially in the Midwest of the USA. For this reason, we will continue to increase our headcount in 2019," said Lölkes.

Second customer day in the USA

The second customer day of MPDV USA takes place from **25th to 26th of June, 2019** at the premises in Chicago. Participants can look forward to best-practice presentations on the introduction of an MES and receive answers from HYDRA users on how they have solved specific technical problems. Demonstrations of new functions of the HYDRA modules round off the program.

We introduced for the first time a "HYDRA NA Power User Workshop" at our customer day. This is intended to appeal to key HYDRA users who want to actively further develop the MES and seek a direct exchange with the American HYDRA Competence Center and MPDV's product development. The evening event offers the opportunity to network.

Registration per email to info.usa@mpdv.com

The MPDV subsidiary in Chicago

MPDV Customer Day 2018

Magic Quadrant for Manufacturing Execution Systems

Gartner puts MPDV in the "Challengers" Quadrant

Gartner, Inc. put MPDV, the leading provider of production IT, again in the "Challengers" Quadrant for November 2018 Magic Quadrant for Manufacturing Execution Systems (MES).

"We see our inclusion in Gartner's Challenger Quadrant as a confirmation of our mission to enable manufacturers to increase productivity through greater transparency in the shop floor," said Nathalie Kletti, Vice President Enterprise Development at MPDV.

Gartner Disclaimer: Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.

Growth, growth, growth

MPDV opened a new office in Malaysia. The experts for IT solutions in manufacturing aim to further drive their growth in the Asian region. "The South Asian market is vast and the demand for software solutions for more efficient production is great. It is imperative for us as a supplier to be here present," says Nathalie Kletti, Vice President Enterprise Development at MPDV.

With locations in Singapore and China, MPDV has been active in Asia since 2007 and supports companies of all sizes and industries on their way to the Smart Factory.
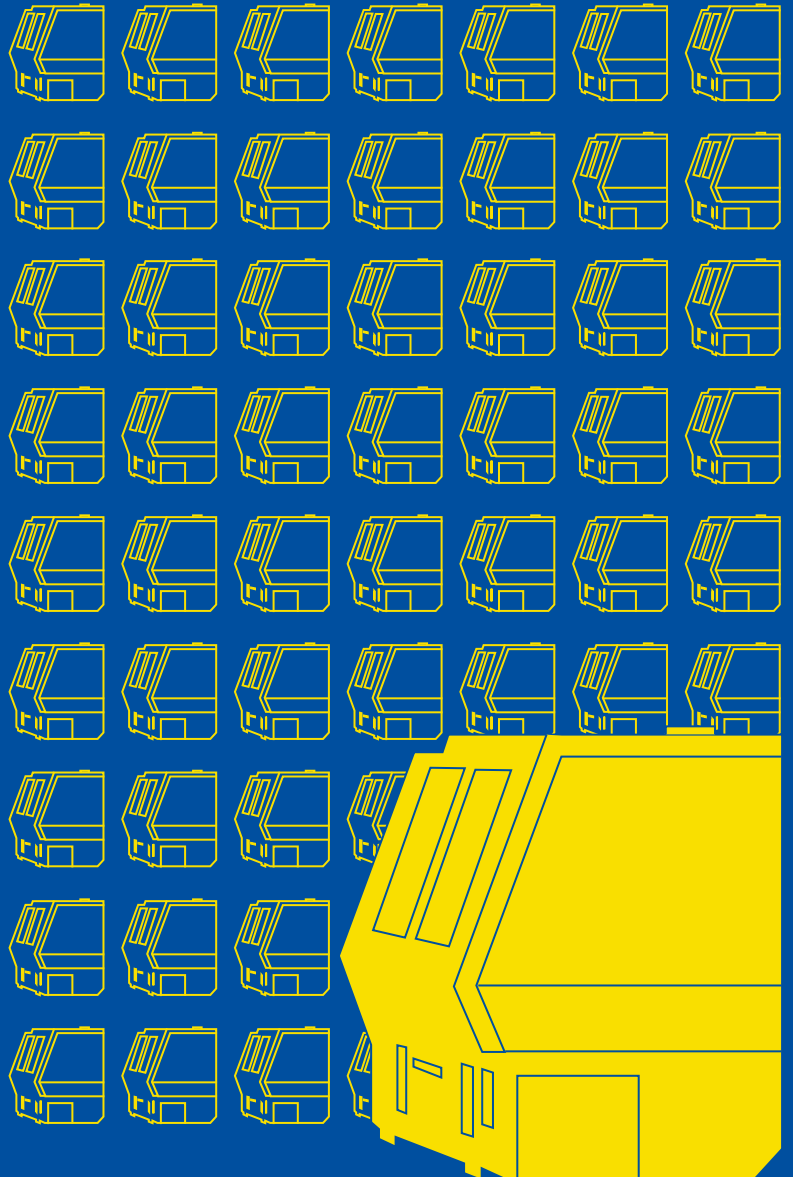
40,000

machines and more have been connected to the MES HYDRA by MPDV. The age of the machines to be connected does not matter. The so-called Process Communication Controller (PCC) supports different protocols and methods to communicate with machines. EUROMAP 63, OPC-UA, UMCM, serial interfaces and file transfer are the most common drivers used. The PCC also supports modern IoT protocols like MQTT or the more widely spread MT Connect.

SCIENCE PROJECT IN ASIA
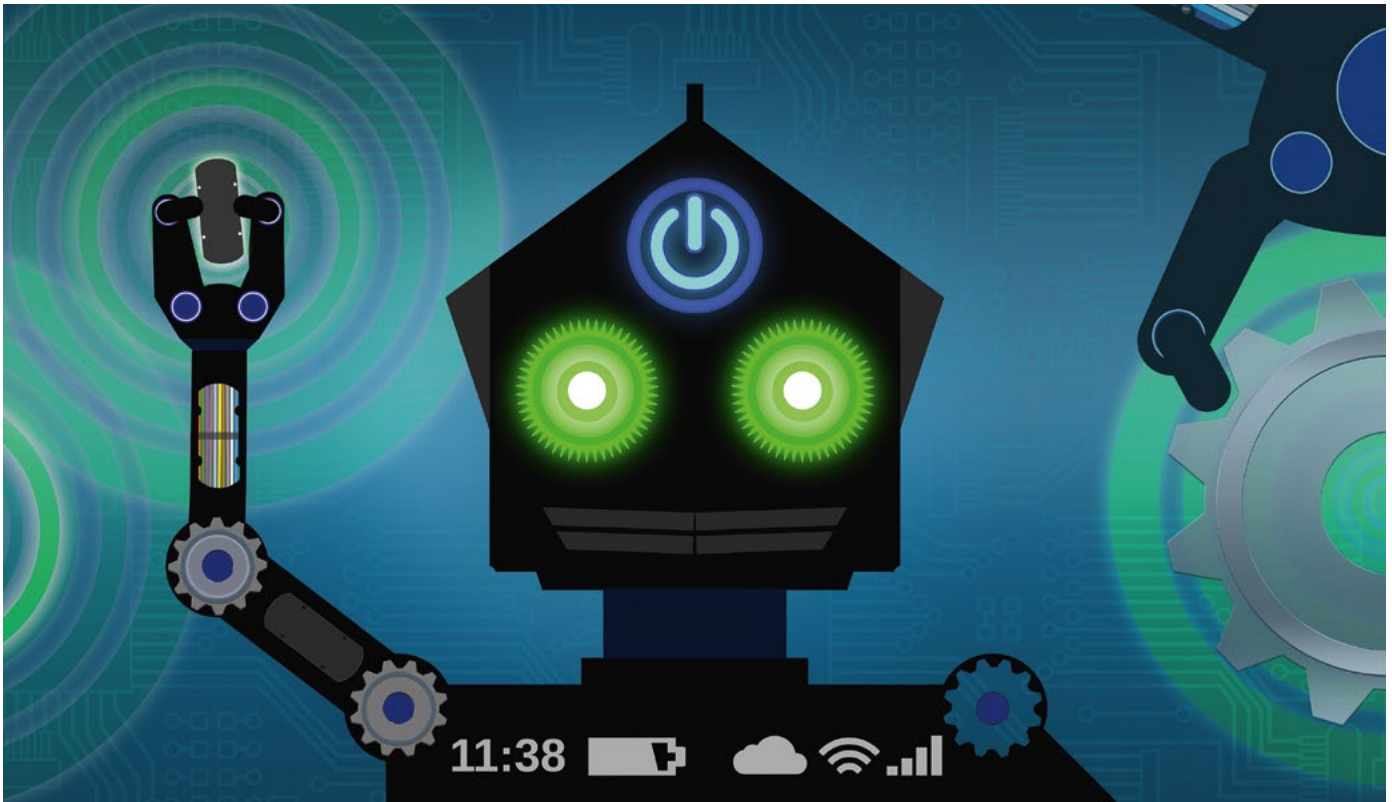
Predictive Maintenance

MPDV Asia cooperates with the Nanyang Polytechnic (NYP) and Singapore Aerospace Manufacturing (SAM) – Avitron. In a joint effort, the partners explore new requirements in the field of Predictive Maintenance.

Predictive Maintenance uses a multitude of measurable data from machines and plants to derive at precise maintenance information. The objective is to proactively maintain the machines and systems or even control them in real time to avoid breakdowns in the first place. In order to arrive at a reliable prediction for Predictive Maintenance, the storage and correlative analysis of large amounts of data from an extensive range of information is needed.

The Singapore Economic Development Board (EDB) has defined the **Singapore Smart Industry Readiness Index (SSIRI)** in conjunction with other partners from industry. You can use this index to see how far your business have come to comply with Industry 4.0. An evaluation matrix determines how suitable your own processes and technologies are for digitalization. MPDV's MES HYDRA already meets the production-related requirements according to SSIRI. But there is room for improvement especially in the area of Predictive Maintenance.

Science Project Asia

Many Asian manufacturing companies aim to incorporate the experience of their production and maintenance staff into their shop floor systems in order to define, implement, and automate their own Predictive Maintenance procedures. To meet these requirements, MPDV Asia works closely with the Nanyang Polytechnic (NYP). The objective of the cooperation is to research
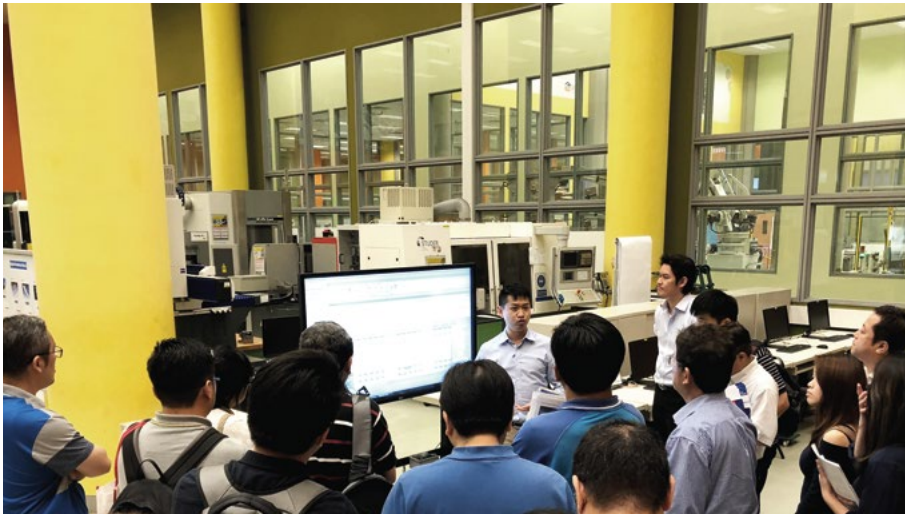
Engineering workshop at the Nanyang Polytechnic (NYP)

requirements in the field of Predictive Maintenance. MPDV also has with Singapore Aerospace Manufacturing (SAM) – Avitron an industrial partner in the CNC precision technology at its disposal who can contribute his practical experience.

"Our cooperation is evolving into a working group for the development of regional solutions with local users such as SAM. This allows us to become even more integrated into the local manufacturing industry", says Sascha Graef, Director Asia at MPDV.

Automatic maintenance orders

Due to the extensive integration of the information objects like machine, tool, order, material, quality, process and energy data, HYDRA offers the ideal basis for Predictive Maintenance. The first step is to develop a local environment that generates predictions based on the actual data of these information objects. The user is then informed about upcoming predictions via an escalation and if specified, the maintenance orders are automatically triggered.

A classic application is, for example, the trend development of spindle vibrations or energy consumption. In a correlative approach, further information objects such as tools, input materials or conspicuous scrap developments can now be used as input parameters.

ABOUT NYP

Founded in 1992 as a university of higher education, the seven academic schools of Nanyang Polytechnic (NYP) offer a comprehensive range of education and training opportunities. For many years, the NYP has worked closely with companies from various industries to enable students to explore workable solutions.

The NYP has received the highest awards for organization and business excellence in Singapore: the Singapore Quality Award, the Innovation Excellence Award and the People Excellence Award.

ABOUT SAM

SAM is an Accuron Technologies subsidiary headquartered in Singapore and employs around 2,000 people. The business area Precision focuses mainly on niche products like engine bearings, blades, engine housings and structural parts. Everything revolves around innovative technical solutions in the Equipment division – from the joint design and development through to assembly of the finished equipment.

Companies identify how far they have come on their way to Industry 4.0.
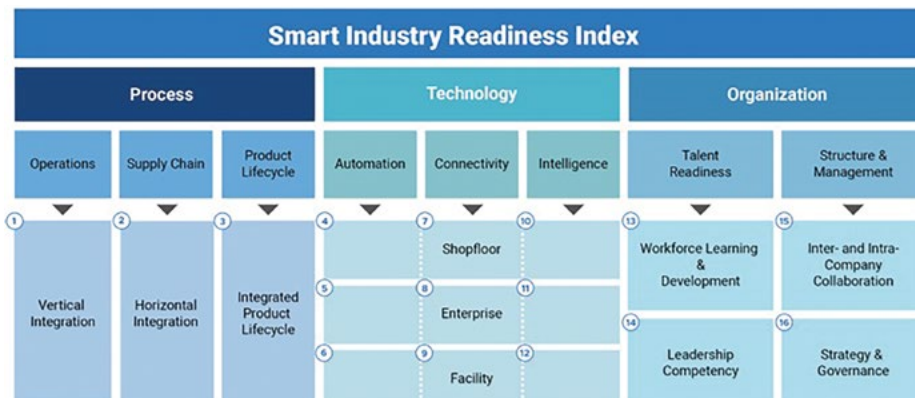
THE AWAKENING OF THE HIDDEN CHAMPIONS AND WHAT THAT HAS TO DO WITH PLATFORMS, ECOSYSTEMS, MPDV AND THE MIP!

Interview with Dr. Winfried Felser

Dr. Winfried Felser, CEO at Netskill and Competence Site Provider, outlines why he considers MPDV a Hidden Champion and why he sees a connection between his "Campaign for the next move" and MPDV or the MIP.

Dr. Felser, the term "Hidden Champions" is becoming more and more widely spread. What is behind it?

Dr. Felser: No other economic phenomenon characterizes Germany and its economic success as clearly as the often unknown heroes of our industry. The hidden champions are Germany's foundation for success and are often on the market with inconspicuous products. Prof. Hermann Simon, the father of the Hidden Champion concept, lists various success patterns of the Hidden Champions in his publications. For example, the leadership personalities of these secret market leaders are associated with attributes such as fearlessness, vitality and stamina, or focused determination.

The world is in a constant state of change, which is particularly noticeable in the transition of markets in other countries. Is it enough to be a Hidden Champion in the future?

Dr. Felser: The aforementioned attributes of leadership personalities will continue to

MANUFACTURING INTEGRATION PLATFORM (MIP)

The MIP is an integrative platform made by MPDV for the production IT. On the basis of a semantic information model, applications from different providers can be combined with each other as needed.

play an important role in the future. I am not so sure about other success patterns (high vertical integration with low collaboration, dominant focus on efficiency and quality).

I have long believed that in order to survive in competition with China and the USA, we need a continuation of this concept and its success patterns for the digital age. Again and again I am drawn to Hidden Champions who deal with this very issue. What will be the next act for the Hidden Champions? Will previous success patterns still carry us safely into the future or do we need complementary success patterns? As part of a campaign, all this flows into the discussions about #NextChampions.

Which main subjects are of great importance for the #Next Champions?

Dr. Felser: Two terms are paid special attention: platforms and ecosystems. These terms are the twins (technology and organization) of the new innovation and customer-oriented network and data economy. They help Hidden Champions to shape the value creation as uniquely and smoothly as is required today and take full advantage of the new opportunities. For this, Hidden Champions need efficient technologies, but above all also partners willing to collaborate in their ecosystem.

And what does this mean for MPDV?

Dr. Felser: Platforms and ecosystems are of double meaning for MPDV:

- MPDV's next generation MIP for the production IT is exactly the technology that can turn Hidden Champions into #NextChampions and into "platform" companies. Hidden Champions can thus create a data and integration platform for their production in the ecosystem which is individually, integrated and agile. In this way an individual solution with all the advantages of a standard solution can be created.

- This new logic of the MIP will also transform the Hidden Champion MPDV into #NextChampions. The MPDV will therefore build with partners an ecosystem to efficiently provide apps and other customizations for customers on the basis of the MIP. MPDV is no longer the sole developer of an MIP, but together with many partners in the ecosystem.

How would you sum up the importance of MPDV as part of the transformation campaign #NextChampions?

Dr. Felser: In a nutshell – the Hidden Champion or #NextChampion MPDV makes it possible for other Hidden Champions to become #NextChampions as well! The MIP is the tool for the next generation of production IT.

BIG MEETING ON THE 28TH OF MARCH, 2019 NEAR COLOGNE

At the #NextChampion-Event on March 3rd, 2019 Professors Hermann Simon, Andreas Pinkwart and Heribert Meffert as well as a further 500 heads of digitalization will meet to determine to what extent disruptive technologies, platforms or 3D printing farms require new solution patterns for our champions. MPDV is also on board!

https://nextact.site/

PERSEVERANCE PAYS OFF

Apprenticeship at MPDV

Selina Neureuther started her apprenticeship as an IT Specialist for System Integration at MPDV at the age of 16. She was the only girl among 30 guys at the vocational college. That wasn't always easy, but she rose to the challenge and didn't budge at all. „I always said to myself, what they can do, I can do as well, "says Selina.

During her three-year training, she learned what it takes to install devices, update programs and set up computers for employees. Since graduating successfully, the 22-year-old has been working at MPDV in the First Level Support for IT. She takes care of the installation and configuration of software and hardware, the allocation of access rights, solves technical problems and manages the IT infrastructure. What she enjoys most is working with her colleagues at the various MPDV locations. "I like to communicate with people and this is essential in my profession. By now, I know everyone in the company."

Affinity for Technology

From an early age on Selina was interested in all aspects of technology and was keen to learn how computer work. She did an internship during her school education at MPDV and the decision to apply for an apprenticeship in this area was the next logical step. "I am so glad, I decided to go for this profession."

Anyone dialing Selina's number at MPDV today knows that a competent young woman who actually understands what to do will pick up the line at the other end. Selina works with eleven other male colleagues in the IT support. She has long since got accustomed to the fact that she is the only woman in the team.

In her spare time Selina meets her friends and enjoys doing things that young women of her age do. For Selina, this is the means to support her work-life balance. She goes on a Caribbean Cruise in the summer. This is something Selina looks especially forward to. "I want to see something of the world and experience a lot of wonderful things."

Further information on vacancies:
jobs.mpdv.com

SOCIAL COMMITMENT

Corporate Social Responsibility

Climate change, skills shortages and digitalization are just some of the major issues that are currently affecting our society. As a medium-sized company, we see it as our task to act sustainably and consciously assume responsibility for society.

With our IT solutions for manufacturing, we improve the processes in companies, promote the growth of our customers and support the sparing use of all resources.

At the same time, we see it as our obligation to return part of our success to society. For many years we have been active in a wide array of areas - from culture to sports and also promoting talents. It is especially close to our heart to support young people who are enthusiastic about technology. That's why we develop digital skills, share our technical knowledge, and participate in educational projects in mathematics, computing, science, and technology.

As a traditional family business, we also strive to support local associations, educational institutions and cultural activities.
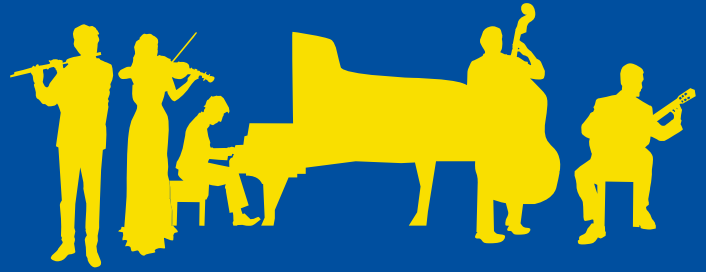
Our goal:
a sustainable social impact.

300 CHILDREN

have been trained at our
MPDV-Junior-Akademie
in the sectors robotics, micro controller
and automation.

6,000 PEOPLE

gained access to classical music with the
MPDV Classics.
The nine concerts featured international stars such as
the Russian National Philharmonic, Justus Frantz, star
pianist Haiou Zhang and the Berlin Symphony Orchestra.

14,500 KG CO$_2$

we saved the above amount of emission with the
photovoltaic system at our company headquarters
in Mosbach. We have also generated
23,000 kWh of electrical energy
with the plant as a whole.

1,250 STARTER

between the ages of 4 and 60 took part in the
MPDV Mountainbike Cup in 2018.
This number will double with the continuation
of the racing series in 2019.

FIRST LEGO LEAGUE

Little explorers, big time!

At the FIRST® LEGO® League robot competition in Obrigheim this year, MPDV put three teams into the competition with children of employees. The teams were called MPDV Robotstars, MPDV The Originals and MPDV Space Experts and the 21 girls and boys aged between 10 and 15 years showed what they are made of. The MPDV Robotstars won the first prize in the category Research Task. The MPDV Space Experts also won first price in the category Robot Game.

The boys and girls playfully approached the technical tasks. Weeks in advance, they met at the MPDV headquarters in Mosbach to plan, program and test their fully automatic robots together with their supervisors. In addition to building the robots from special LEGO bricks, they also solved a research task on the subject of Into Orbit and presented their results in a presentation.

"It was great to see how the children worked together for their success and to see all their enthusiasm," says school principal Fabian Hilgenfeldt from the Realschule in Obrigheim.

Practice makes perfect – early start for the ones wanting to become an IT expert
MPDV has been supporting the regional competition in Obrigheim, Germany, for many years. "Supporting youth development is very important to us. The FIRST LEGO League offers the opportunity to get children enthused about science and technology," says Nathalie Kletti, Member of the MPDV Management Board.

The MPDV Junior Academy, which was founded in 2014 together with DHBW Mosbach, Realschule Obrigheim and Pädagogische Hochschule Heidelberg, shows that MPDV places great emphasis on promoting young talent. Young students of different age groups have the opportunity to attend seminars on robotics, micro controllers or automation.

"As the market leader for IT solutions in manufacturing, we are always on the lookout for highly qualified employees. The promotion of young talents is therefore an important building block for us," says Ms. Kletti.

More on MPDV Junior Academy:
mpdv.info/juniorakademie

TRAINING
& CERTIFICATION

Get off to a flying start become certified

The **MPDV Certification Days** are again taking place this year. Users of the MES HYDRA have the opportunity to take an exam and show how knowledgeable they are with the system. If they successfully complete the course, they receive a certificate and an assessment of their personal potential with suggestions for further training.

MPDV offers customers to get certified in the areas of Manufacturing (MF), Quality Management (QM) and Human Resources (HR). The examination contains of a multiple choice test with technical questions.

"An increasing number of user must be able to prove their expertise. Our new certification program meets this demand," said Thorsten Strebel, Vice President Products and Consulting at MPDV.

Extended training portfolio

HYDRA users who want to know how to handle complex machine data should visit MPDV's new **Extended Application Training HYDRA Machine Data** (EAT-MDE). Participants can look forward to many best practice examples of different system configurations from the HYDRA machine data environment.

The new **Special Training MES HYDRA Project Management** (SPT-PM) is aimed at MPDV implementation partners, project managers and facilitators who are about to introduce or further develop HYDRA. Participants receive useful tips for system introduction and information on the individual project phases.

TRAINING & CERTIFICATION

50
COURSES

4
COUNTRIES

3
LANGUAGES

The next MPDV Certification Day takes place on the 19th of November, 2019 at our training center in Mosbach, Germany.

Further information and registration:
mpdv.info/trainings
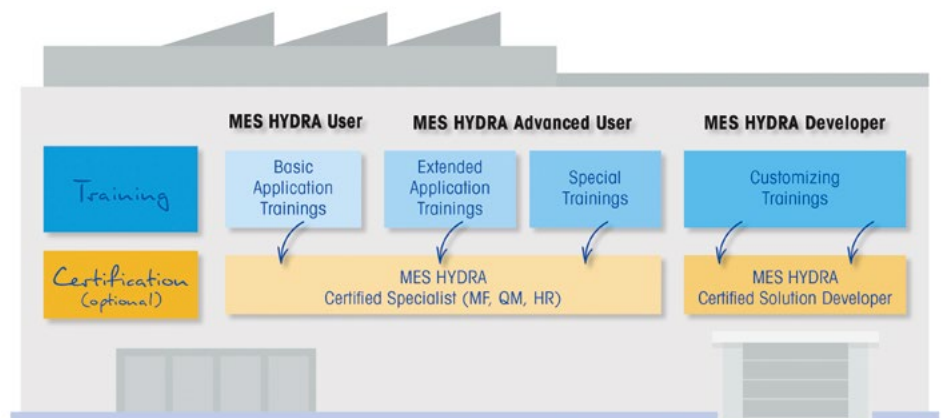
With the training program "MPDV Training & Certification", HYDRA users are perfectly equipped to increase the efficiency of their production

MORE RELIABILITY IN DECISION-MAKING DURING THE INTRODUCTION OF MES

Pre-study for more orientation

With a Manufacturing Execution System (MES), production processes can be digitalized, significantly increasing transparency, responsiveness and cost-effectiveness. The basic requirement for this is the ideal functional and organisational use of the system in the company. The experts of Perfect Production support companies in their decision making with a **pre-study.** Using proven methods, they analyse the application options of an MES in the company. They provide answers to questions on the best implementation strategy or the level of return on investment (ROI).

"With our pre-study we give orientation to manufacturing companies and provide more decision-making reliability," says Jochen Schumacher, Managing Director of Perfect Production.

Focus on MES fields of application
The attendees receive essential information during the Management Workshop around an MES and Industry 4.0. This is followed by a status quo analysis which includes the previous processes and the IT landscape. Based on these results, the experts identify MES deployment scenarios and assess costs, benefits and risks. Finally, the management obtains concrete recommendations for actions and proposals for a company-specific roadmap.

www.perfect-production.de

On your way to the Smart Factory

1.

Pre-Study
MES use
Perfect Production GmbH

Kick-off / Management Workshop
• Introduction to MES and Industry 4.0
• Definition of the target

Analysis of the status quo
• Analysis of a typical order workflow
• Integration of relevant processes and IT systems
• Current KPIs and control loops
• Industry 4.0 degree of maturity

2.

Draft concept
Specifications
MPDV Mikrolab GmbH

Fields of application of the MES
• Identification of MES application fields on the way to the Smart Factory

3.

Introduction to
the pilot
MPDV Mikrolab GmbH

Evaluating costs, benefits and risks
• Prioritization of areas of activities

Management presentation
• Results and recommendations
• Coordination of a company-specific roadmap

4.

Roll-Out
MPDV Mikrolab GmbH

Optional
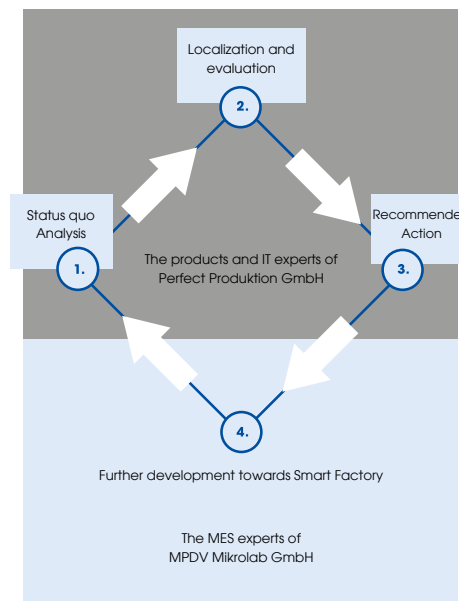• Monetary evaluations of identifiable potentials (Basis for ROI calculation)

RECOMMENDATIONS TO INCREASE PRODUCTIVITY

"The greatest benefit of an MES is generated when it is deployed in the best possible functioning and organizational way," says Jochen Schumacher, Managing Director of Perfect Production. The **HYDRA Performance Consulting** supports the user to exploit the MES HYDRA even further. In a first step, the Lean experts of Perfect Production analyze how HYDRA is currently being used. On the basis of the results, they identify targeted measures and draw up a recommendation for activities to improve the functional and organizational use of the system, including further development in the direction of Smart Factory.

www.perfect-production.de

ANALYSIS & DEVELOPING MEASURES

Status quo Analysis

1.

Localization and evaluation

2.

The products and IT experts of Perfect Produktion GmbH

Recommended Action

3.

4.

Further development towards Smart Factory

The MES experts of MPDV Mikrolab GmbH

Kick-off / Management Workshop
- Introduction to MES and Industry 4.0
- Definition of the target

Analysis of the status quo
- Analysis how HYDRA is currently used
- Planning, shop floor and secondary processes
- Current KPIs and control loops
- Industry 4.0 degree of maturity

Localization of further benefits
- Organizational measures
- Functional measures in the MES HYDRA

Evaluating costs, benefits and risks
- Prioritization of areas of activities

Management presentation
- Results and recommendations
- Coordination of the measures to be implemented

MES WORKSHOP FOR THE WORKS COMMITTEE

The introduction of an MES brings along changes. The works committee has to actively participate in the process. The Ruhr University Bochum (RUB), Perfect Production and the IG Metall offer an introductory course on "Recommendation of the Works Committee during the Introduction of an MES" on the 12th - 13th of June, 2019. Main issues are basics of an MES introduction, chances, risks and impact assessment from the perspective of the works committee. The workshop takes place at the Ruhr University Bochum (RUB).

www.igmetall-sprockhoevel.de

EVENTS

Management Forum
The Perfect Production 4.0

Use Lean & Digitalization Successfully

- April 4th, 2019
  BMW World Munich

- October 24th, 2019
  The Squaire Frankfurt

- November 21th, 2019
  Porsche Zentrum Leipzig

Management Forum
Manufacturing Excellence 4.0

Perfect Production GmbH & Rexroth Bosch Group

- June 5th & 6th, 2019
  Townhall Lohr

All events can be booked under:
www.perfect-production.de/ trainings/veranstaltungen

USER ASSOCIATION HYDRA USERS GROUP

We must work together to further develop the HYDRA standard

Mr. Mathias Schmälzle is the CEO of the HYDRA Users Group (HUG) since 2016. In an interview, the commercial manager of RUCH Novaplast talks about his commitment to HUG, objectives and very special experiences.

MPDV: Why do you get involved in the HYDRA Users Group?

Mr. Schmälzle: The MES HYDRA is a central pillar in the IT environment at RUCH Novaplast and it is our job to continuously enhance it. The HUG is the perfect platform to generate suggestions for the further development of HYDRA or to discuss special tasks for the future use in the system.

MPDV: Since when have you been a HUG member?

Mr. Schmälzle: In 2009 I took part for the first time at the HUG conference and I was so thrilled by the user association that I enrolled as a member of the IT working committee. Since RUCH Novaplast was a pilot customer for the HYDRA 8 migration, I was invited to give a presentation about our upgrade during the HUG conference. At the time, I seemed to give the board the impression of having a "degree" of enthusiasm for HYDRA and HUG. After a short time I was offered to become head of the IT working committee. Since 2016, I have been the CEO of the HUG.

MPDV: Tell us about your best experience.

Mr. Schmälzle: Cannot think about "ONE" event. Each HUG conference and meeting where users can actively exchange experiences is a winner for me.

MPDV: What is the main tasks of the user association?

Mr. Schmälzle: The main tasks is to improve and further develop the HYDRA standard from a user's point of view.

— Additional information
— www.hydra-usersgroup.com

SAVE-THE-DATE
Next HUG conference takes place on the September 18th – 19th, 2019 at the town hall in Hockenheim.

ABOUT THE HUG

The HYDRA Users Group was set up **2004** by HYDRA users as an independent organization.

More than **350 members** meet regularly in working groups on subjects like manufacturing, personnel, quality, IT and strategy to develop proposals for the further development of the MES HYDRA.

The HUG conference provides ample opportunity for users to exchange experiences about **HYDRA** and to make new contacts.

TRADE FAIRS

Hannover Messe
April 1-5, 2019
Hanover, Germany, Hall 7, Booth A12

Mte – Metal Technology Expo
April 24-27, 2019
Shah Alam, Selangor, Malaysia

Metaltech
May 15-18, 2019
Kuala Lumpur, Malaysia

T4M
May 7-9, 2019
Stuttgart, Germany, Hall 9, Booth 9A14

ITAP – Industrial Transformation ASIA-PACIFIC
October 22-24, 2019
Singapore

SPS 2019
November 26-28, 2019
Nuremberg, Germany

WORKSHOPS

Workshops MES & Industry 4.0

May 23, 2019
Eindhoven, Netherlands
Van der Valk Hotel Eindhoven

September 12, 2019
Bochum, LPS-Lernfabrik,
Ruhr University Bochum, Germany

October 17, 2019
Linz, Austria
Ars Electronica Linz

October 31, 2019
Zwolle, Netherlands
Van der Valk Hotel Zwolle

November 21, 2019
Switzerland

June 28, 2019
Singapore
Nanyang Polytechnic, Singapore

September 27, 2019
Singapore
Nanyang Polytechnic, Singapore

Workshops Best Practice MES
June 6, 2019
Switzerland

June 26, 2019
Hemer, Germany
GROHE AG

October 22, 2019
Schiltach, Germany
Hansgrohe SE

2019

WEBINARS

User webinar 4:
**Manufacturing Analytics
with HYDRA**
May 7, 2019, 2:00 pm

MES webinar 4:
**With KPIs towards
Efficient Production**
May 8, 2019, 2:00 pm

User webinar 5:
**Combining the Planning of
Orders and Staff with HYDRA**
September 24, 2019, 2:00 pm

MES webinar 5:
**Quality Assurance (CAQ)
Made Easy with MES**
September 25, 2:00 pm

User webinar 6:
HYDRA for Mobile Use
November 5, 2019, 2:00 pm

MES webinar 6:
**Production Control and
Workforce Management with MES**
November 6, 2019, 2:00 pm

User webinar 7:
**Guaranteeing Traceability
with HYDRA**
December 3, 2019, 2:00 pm

MES webinar 7:
**Industry 4.0 and Modern
Tools for a Successful
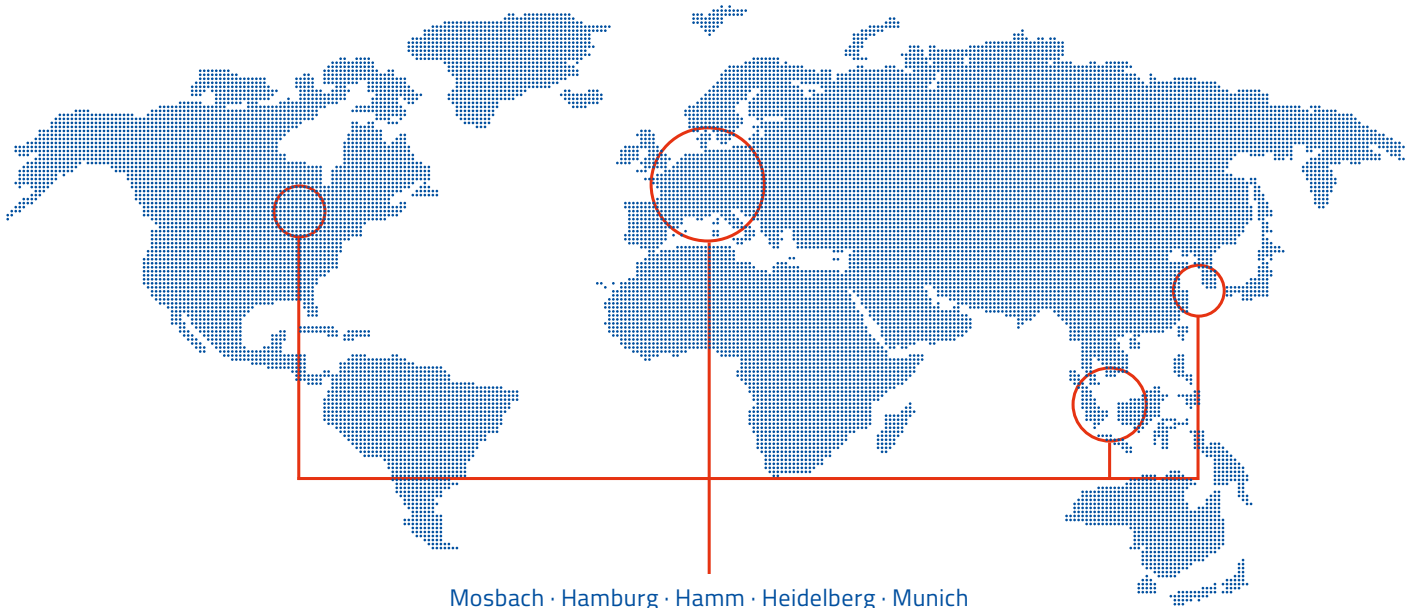IoT Strategy**
December 4, 2019, 2:00 pm

CUSTOMER EVENTS

MPDV Customer Forums
May 8, 2019
Rain, Germany, Customer Forum South

May 16, 2019
Hamm, Germany, Customer Forum North

HUG Conference
September 18-19, 2019
Hockenheim, Germany

HYDRA Inside
November 12, 2019
Hamm, Germany

November 19, 2019
Feldkirchen, Germany

November 21, 2019
Mosbach, Germany

Customer Day USA
June 25-26, 2019
Chicago, Illinois, USA

Mosbach · Hamburg · Hamm · Heidelberg · Munich
Stuttgart · Chicago · Kuala Lumpur · Shanghai
Singapore · Winterthur

mpdv

WE CREATE SMART FACTORIES