NEWS

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Cover Story

Smart Factory in four steps
Industry 4.0 disarmed
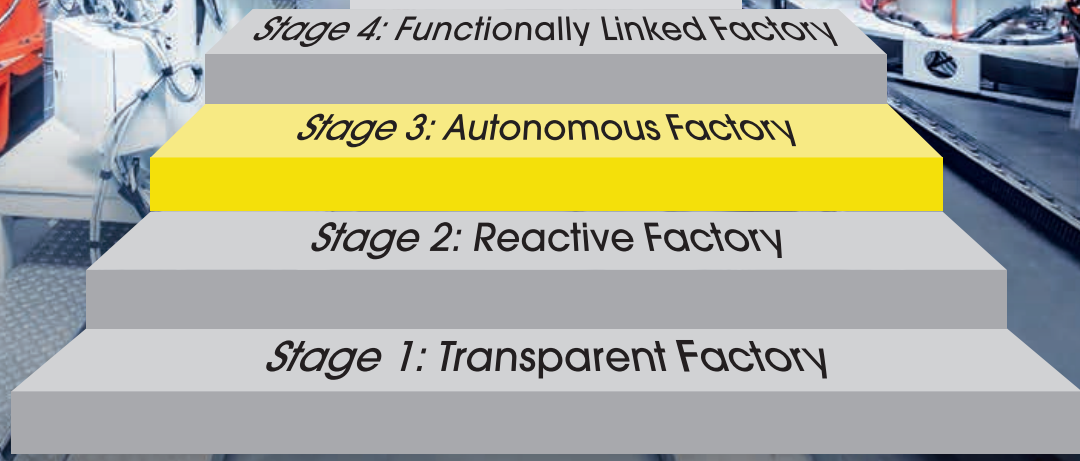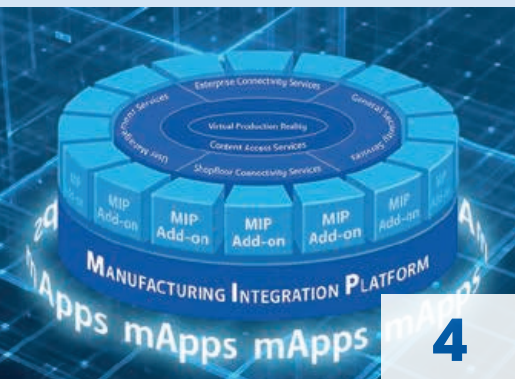
Industrie 4.0

Stage 4: Functionally Linked Factory

Stage 3: Autonomous Factory

Stage 2: Reactive Factory

Stage 1: Transparent Factory

Highlights

The MES Experts near you.

40 years of MPDV –
A practical approach to the Smart Factory

It's all over the news, in the trade press, at trade fairs and conventions – there's no doubt about it, Industry 4.0 continues to be a hot topic. Yet opinions are still divided when it comes to important definitions and transference into practice. That is why we continue to focus mainly on transferring theory into practice and on specifying in more detail what is understood under the complex topic of "Industry 4.0".

In the last NEWS International, we already introduced the four-stage-model "Smart Factory". We placed particular emphasis on recommended courses of action for the transparent factory (step 1). In this issue, we will discuss step 2, "Reactive Factory" and step 3, "Autonomous Factory".

Appropriately, this issue also features the product announcement as well as the application scenario for Dynamic Manufacturing Control (DMC), the latest extension to our HYDRA product family.

Moreover, we will be taking a look at the technology of the future, introducing you not only to products of the future, but also to a strategic innovation. The Manufacturing Integration Platform (MIP) is a revolutionary approach of software architecture, offering you an implementation variant that is open in all directions.

Aside the products and technology, this NEWS issue takes a look at the 40th anniversary of the company as well as on our cooperations and partnerships. Discover how we plan to deal with important market players in order to be able to satisfy your needs even better in the future.

Enjoy reading!

Prof. Dr.-Ing. Jürgen Kletti
Founder and CEO of MPDV

Content

Innovative software architecture for manufacturing

Manufacturing Integration Platform

Headlines like Industry 4.0, Digital Factory and Industrial Internet of Things (IIoT) embrace a series of new technologies and approaches. All these new technologies try to map the real physical world in a digital form. The trend-setting MPDV concept of the Manufacturing Integration Platform (MIP) regards the digital transformation in a holistic manner. MIP offers the possibility to link systems, to model objects and to map and integrate the respective production processes with high flexibility. The objective is to ensure an overall interoperability of all processes and systems.

The factory of the future will face great challenges. One of these challenges is to record all data necessary to create a digital model of the production. Unlike the Internet of Things (IoT), the Industrial Internet of Things (IIoT) is focused on manufacturing. It aims at displaying conditions of the real world in digital form using manifold types of sensors. In addition, machine and line control systems provide multiple data. However, these data do not cover all information requirement arising from human activities as well as from software systems (e.g. ERP). All things considered, manually recorded data and information from existing software systems are required to answer important questions like: What is the available capacity of a machine resp. machine group or what is the current scrap rate? In any case, pre-processed information is needed that sensors and machines cannot easily provide to a sufficient extent. We could also say that sensors provide data and humans want answers. In order to be able to convert digital information into useful results, you need appropriate methods.

If you want to meet the increasing information requirements, you need not only raw data, but applications that compress, aggregate and accumulate data. This is the only way for the user to obtain useful information. That is the task of today's Manufacturing Execution Systems (MES). The requirements for such systems are becoming more and more complex. The production-oriented departments need applications that include a growing variety of functions. Consequently, the

systems must offer a higher modularity and flexibility. The task to realize a standard solution that can cope with all these demands is challenging. Especially the rapidly rising number of participants (sensors, data providers and applications) call for a new architecture that must be open in all directions.

Consequently, the solution is an open integration platform, which links MES components and other production-related systems in a standardized manner. Such a platform would fulfill many of the above-mentioned requirements and enable the general use of applications. In addition, a completely new cooperation between development or implementation partners could evolve.

Manufacturing Integration Platform

The Manufacturing Integration Platform (MIP) of MPDV represents such an open platform that can integrate all kinds of production-oriented applications (Figure 1).

This platform
- integrates standard applications of different suppliers
- creates the basic premise for the seamless embedding of specific applications and in-house developments
- supplies a digital home for all objects in a production environment

In summary, the platform enables the user to combine in-house software developments with indivi-

dual special solutions and the available standard applications out-of-the-box. The user can decide at any time on the ratio of in-house development and external solution. At the same time, the platform ensures access to local resources and the ones linked via the Internet of Things.

Architecture

The Manufacturing Integration Platform consists of the following core components (Figure 2):

- Virtual Production Reality (ViPR): contains all shop floor data objects detached from today's categories like production, quality and HR.
- Content Access Services (CAS): enable easy access to ViPR data objects.
- Enterprise Connectivity Services (ECS): offer methods for connecting business IT systems (e. g. ERP, PLM,…).
- Shop Floor Connectivity Services (SCS): support the connection of machines, equipment and data collection systems.
- User Management Services (UMS): provide functions for user administration and rights management.
- General Security Services (GSS): offer security and monitoring mechanisms.

- MIP Add-Ons: extend the platform by additional functionalities.

The overlying Manufacturing Apps (mApps) contain the complete business logics and offer the required functions to the user.

In addition to the actual platform, the MIP Software Development Kit (SDK) allows an individual customization of different components and the creation of custom mApps and MIP Add-Ons.

MIP in detail

Each of the above-mentioned components offers important features to ensure the functioning of the Manufacturing Integration Platform as a whole. The interaction between the components is very flexible and yet standardized. For a closer look at each of the components, refer to our new MIP white paper. Download at: mpdv.info/wpmipnewsi

Figure 1: The Manufacturing Integration Platform (MIP) as an open link between shop floor and production-related IT applications

Maximum flexibility

With MIP, at any time, any recorded and calcula-ted data are available for any authorized mApp. As a result, you can extend or customize the ap-plication environment at any time irrespective of the origin of an mApp and the purpose it should meet. For example, a manufacturing company could combine components of the machine sup-plier to collect data with a production control sys-tem of another solution provider. At the same time, the company could implement the visualization of KPIs on its own. For this purpose, the strict sepa-ration of data, access methods and applications is crucial to the integrated concept of MIP: The UMS and GSS ensure that only authorized users and mApps have access to the data in the ViPR.

The whole infrastructure is generally open in all directions, but at the same time it is protected against unauthorized access. Characteristics like the highly acclaimed horizontal integration can achieve a high performance with the MIP. Data that are today assigned to categories like pro-duction, quality and HR might be evaluated in a completely independent manner and across all sectors in the future. Due to these characteris-tics, the Manufacturing Integration Platform is not only innovative, but also future-proof.

MIP or MES – to each his own

MIP combines the feature set of today's Manu-facturing Execution Systems with the possibility to merge applications of different solution provi-ders with custom parts of infrastructure. A func-tional separation of production, quality and HR is overruled.

Nevertheless, today's MES systems will be the preferred option for many companies for a certain time, as the provided features are largely suffici-ent and an additional flexibility is not yet required. In parallel, the development of an open world of mApps, MIP Add-Ons and service providers will take place, establishing the Manufacturing Integ-ration Platform step by step – quasi as a new me-thod to realize an MES. Thus, a suitable software architecture for production IT will be provided for any user and any scenario in the future.
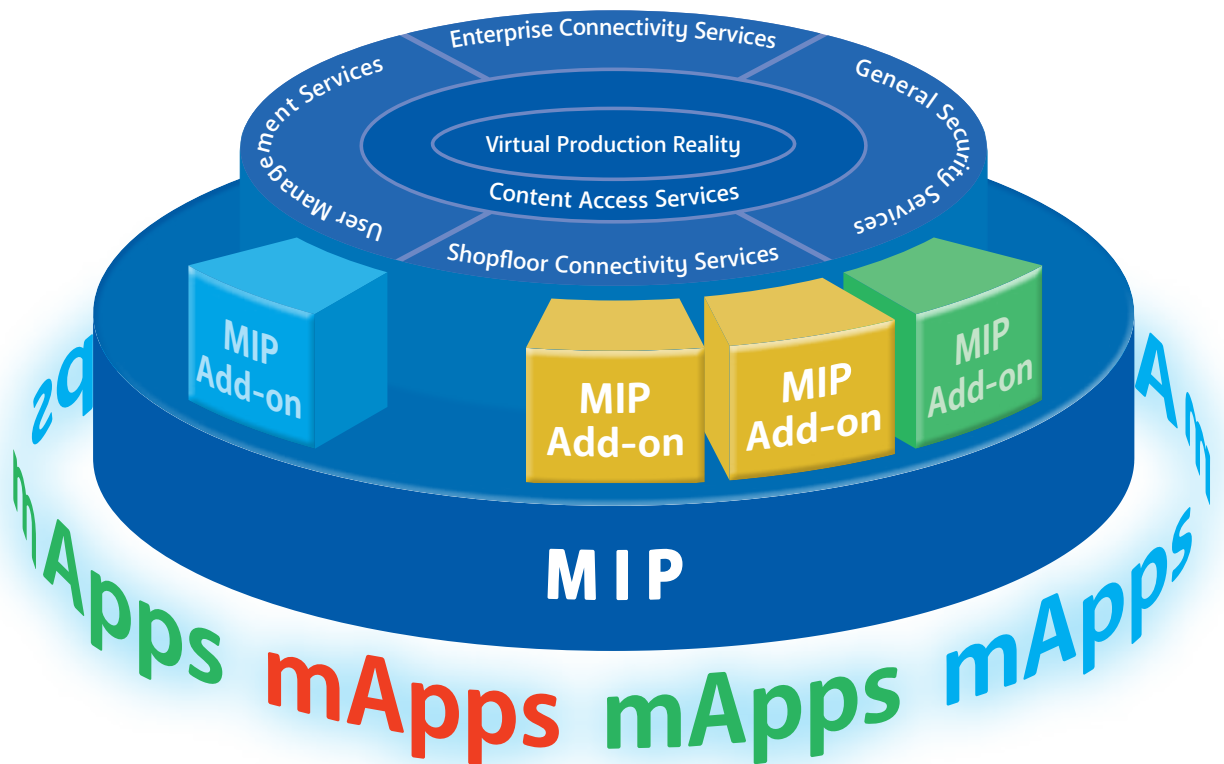

Figure 2: Architecture of the Manufacturing Integration Platform (MIP) in detail

Three questions to Prof. Dr.-Ing. Kletti
Manufacturing Integration Platform

Prof. Kletti, can you tell us why the MES experts from MPDV have been working on a new platform approach for some time? Isn´t the MES HYDRA well positioned on the market?

Kletti: This is in principle correct, however, we are increasingly observing that production companies want to integrate their own applications or to connect third-party systems - setting aside the customary ERP connection. Business-wide integration of production and IT systems is also on the rise. From this, we derive the need for a new, open platform architecture for MES tasks. In the future, we will also offer an open approach for production-oriented IT systems, in addition to the classic MES systems.

What is the difference between an open platform and an MES system like HYDRA?

Kletti: With an MES like HYDRA, companies can capture data both today and tomorrow, thereby controlling and optimizing their own production. With the new Manufacturing Integration Platform (MIP), all objects relevant to production are kept together with their data in a common data base. Apps of all kinds can access these objects and their data flexibly through standardized methods and functions. The possible spectrum of functions far exceeds the extent of today's MES. In particular, the underlying interoperability allows the user to integrate any application packages and systems via the platform. This is exactly what is meant by "open in all directions". Ultimately, the MIP is an innovative alternative to realize an MES.

What benefits does your Manufacturing Integration Platform offer against other platforms that currently spring up like mushrooms?

Kletti: Correct, you can spot platforms everywhere. The MIP stands out, as the platform is not all about availability and distribution of data, but is rather a digital image of production and all related data. At the core of the MIP, all objects are represented in a standardized manner, which allows a large number of apps to work with them independently of each other. Most other platforms only offer the option to exchange data. Knowing the meaning of the data is not imperative. The MIP is based on a semantic understanding of the data. If an app speaks of an order or a machine, it is clearly defined what is meant. This is an important requirement for the success of such a platform, especially for the integration of applications from different providers.

Most other platforms can be either located in the automation or in the management environment. There is currently no platform for the intermediate level on which MES operates today. This is precisely why we are pushing ahead with the development of the MIP.

Next steps on the way to the Smart Factory

The reactive factory and the autonomous factory

It is becoming ever clearer that the success of the vision "Industry 4.0" depends on how flexible and variable production companies are. On the other hand, Industry 4.0 involves tools that make this flexibility possible. To offer the necessary flexibility to the customer, the factory must be extremely reactive internally. But what do terms like reactivity or autonomous mean and what preconditions must be met for this?

First of all, it should be noted that neither Industry 4.0 nor the Smart Factory can be implemented overnight. For this purpose, an elaborate roadmap is required. For the systematic way to the Smart Factory, MPDV's MES experts therefore propagate a simple four-stage-model, which has met with great approval already both in the specialist press, on leading Industry 4.0 portals as well as among recognized experts.

MPDV's four-stage-model "Smart Factory"

In four steps to the Smart Factory

The first stage of the model is the transparent factory. This means that companies have to know promptly what precisely is happening in their production. The reactive factory relies on this knowledge. The recorded data is thus made visible and also usable, so that it quickly becomes identifiable what consequences a change in the shop floor will have. The goal here is to react to deviations from the ideal situation as quickly and targeted as possib-

le. This stage is followed by the autonomous factory in which one can develop a regulation of production processes based on reactivity. And as the fourth stage the functionally linked factory, which expands the view to neighboring processes such as PLM, energy and building management. Modern Manufacturing Execution Systems (MES) have proven to be a suitable and partly also indispensable tool to implement the individual stages of this model.

Transparency as basis

Already in the white paper "Industry 4.0 disarmed" it was shown how important reliable data is for production companies. It should be borne in mind that the recorded data has to be correct and up-to-date as well as relevant for the requested evaluations. An MES can only obtain usable information from relevant data. In the next stage, knowledge about coherences and processes can be generated through the further consolidation of information. Transparency and knowledge are the basis for all further stages on the way to the Smart Factory.

Stage 2 – "The reactive factory"

In the white paper "The reactive factory", manufacturing companies learn how to increase the responsiveness of production and why they need an MES for this. Based on the four-stage-model "Smart Factory", MPDV explains what is going to be important in production in the future and which functions an MES must have. This white paper discusses in detail how step 2 – can be

successfully implemented and what challenges need to be overcome. Especially the increasing variety and ever smaller lot sizes must be considered. The use of detailed planning and production control as well as integrated personnel scheduling will be discussed.

Stage 3 – "The autonomous factory"

In the white paper "The autonomous factory", manufacturers learn about increasing their productivity by using feedback control systems and why they need an MES for this. This white paper discusses in detail, how step 3 can be successfully implemented and what challenges need to be overcome. This involves both the targeted use of different forms of self-regulation as well as the role of humans as an "augmented operator".

Outlook to stage 4

In future, the dependencies of adjacent sectors, external service providers and other IT systems in the production environment will make it more and more necessary to exchange more relevant information with an MES in future. Stage 4, the functionally linked factory outlines methods and possibilities ensuring that "external" influences are also taken into account or ideally even benefit is drawn from them.

Recommended action

MPDV's MES experts still recommend to complete the individual stages one after another on the way to the Smart Factory. It is of course possible to work on selected topics from higher levels earlier if needed. However, it remains important to analyze and as far as possible slim down processes in the course of digitalization. Production does not become more efficient solely through the introduction of an MES. Rather an MES supports companies in discovering and revealing hidden potentials.

In the end, production companies need particularly this increase in efficiency in order to counter the new challenges of Industry 4.0 successfully. On the other hand, they also benefit from the technologies and methods of Industry 4.0. While the implementation of a reactive factory according to stage 2 may appear trivial, experience has shown that a large part of the production companies is still far away from this. As a result, it makes sense to ensure transparency in a first step, reactivity in the second step and then start with feedback control systems. Production companies thereby safeguard and increase their competitiveness in the long term – also and particularly with regard to Industry 4.0 and a constant globalization of the markets.
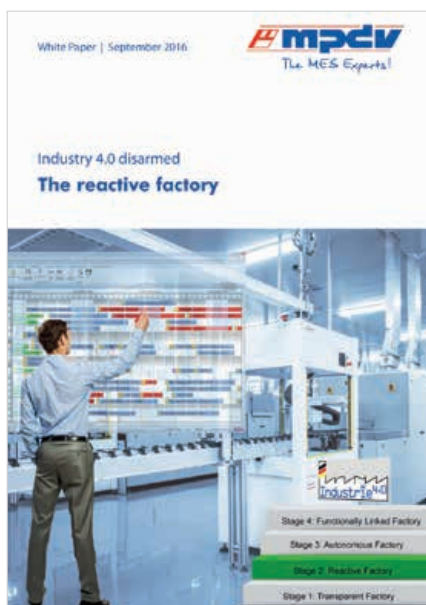
For more information you can download the respective white papers:
mpdv.info/wpnewsint

Success Story MPDV

The MES Experts celebrate 40 years

In the conservative manufacturing industry, 40 years is a long time for an IT company. Just one more reason why the MES experts at MPDV can be proud of this year's business anniversary. The continuing trend toward digital transformation has been spurring the MPDV success story. An increase in employees and in sales growth provides evidence of the successful vision for the future, as do the numerous expansions at the MPDV branch locations. Last but not least, the new building at the company headquarters in Mosbach, Germany, is a tangible symbol of MPDV's success.

"With catch phrases such as Industry 4.0, Smart Factory or Digitalization, more and more companies are realizing there is no way around the fact that their production processes, which in many cases are showing their age, have to undergo a modernization process. With a Manufacturing Execution System (MES), companies are able to take the leap into the new industrial age", explains Prof. Juergen Kletti, founder and CEO of MPDV. From a business standpoint, the increased demand for MES systems can be seen in the more than 380 MPDV employees worldwide and group revenue of close to 55 million euros in 2018. Yet MPDV has always grown organically from within and is proud of its continued financial independency.

The headquarters continues to grow

The expansion of the company headquarters in Mosbach in particular underlines the successful growth and innovative future planning of the company. The eight-story building of the now completed office tower impressively soars above other buildings in the area.

The new office building is characterized by state-of-the-art construction technology and a flexible space utilization concept. As planned, a large portion of the newly created space has been taken by today's employees – a consequence of the growing staff numbers. "The new building gives us a bit of relief with regard to our current multiple use of offices and, at the

Success and growth are evident at the MPDV company headquarters in Mosbach, Germany

same time, creates some free space for new employees," explains Prof. Juergen Kletti. "This will allow us to keep up with the rapidly growing market of Industry 4.0. However, it is important to me that we are able to retain the newly created jobs in the long term."

In addition to the expansion of the company headquarters in Mosbach, Germany, the branch office in Munich also relocated to a new, larger office building to create additional space for more employees. In August, the colleagues in Chicago moved into new office space to accommodate for the increasing business in the US (see article on page 22). In late November 2017, the branch office in Hamm, Germany, was re-opened in a completely new building including expanded capacities for MES trainings.

40 years of MPDV: a successful concept

Over the last 40 years, not only has MPDV grown to become a globally recognized MES supplier, but at the same time has also grown in association with the term "MES". To be more precise, the MES experts have contributed significantly to defining the term. The continuous success in the MES market proves that MPDV has placed its bets on the right horse.

In particular with regard to future topics such as Industry 4.0, MPDV is known for being able to develop practical solutions and ones that can be successfully marketed.

The secret to MPDV's success has a lot to do with the company's sustained and self-funded growth. Both in terms of regional expansion as well as expansions at existing locations, MPDV has always focused on the long-term market needs.

Celebrations with customers and employees

Both on the occasion of the HYDRA Users Group conference that was held in September 2017 as well as together with its employees right after the conference, MPDV celebrated its 40th business anniversary, while at the same time holding an inauguration ceremony for the new company building in Mosbach. In addition to the entertainment program, it was the personal speeches from the world of politics and science which illustrated the extraordinary success story of MPDV to those in attendance. Prof. Kletti proudly received the many congratulatory statements and gifts from the international subsidiaries, and praised the remarkable dedication of each of the MPDV employees, who arrived from places as far away as Shanghai, Singapore and Chicago.

Festive atmosphere at the 40th business anniversary of MPDV in Mosbach, Germany

Key Performance Indicators (KPIs) on all corporate levels
Knowledge is power!

You can only make sound decisions if you know what's going in in your own company. So, in times when the pressure from global competition is high, suitable tools with which to procure and process information are imperative.

The success of a company is usually defined using figures such as an increase in employees or an increase in sales and growth expressed as a percentage compared to the previous fiscal year. A stock is considered promising as long as its rate increases consistently. These indicators are KPIs used for the broad public to convert a corporation's success into a tangible figure that is easy to understand. So, KPIs can also be used to make complex corporate goals tangible for the employees. This makes it easier to identify with these goals and motivates the employees to participate in the company's success.

This is why MPDV has expanded the range of key figures in HYDRA for all corporate levels, thus comprehensibly reflecting the requirements stipulated in the VDMA Standard Sheet 66412:

- KPIs on the shop floor terminal as an overview for the operator on his machine
- KPIs on the shop floor monitor as general information for all employees
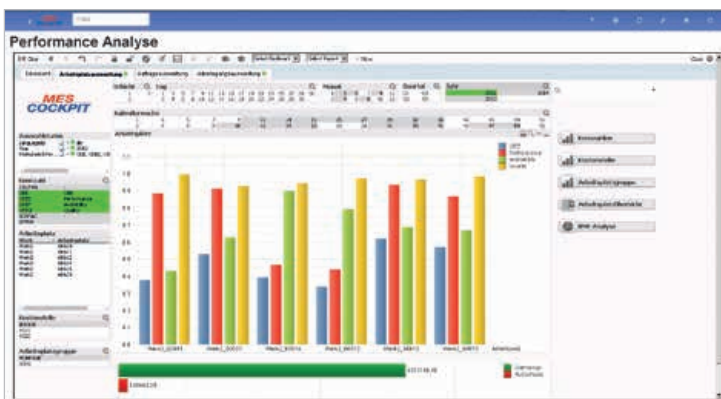
- New applications in the HYDRA Office Client: Lean Performance Analysis, OEE profile
- Presentation of KPIs for foremen, controllers and executive management on mobile devices

KPIs on the shop floor monitor, e. g. on large screens on the hall ceiling

More transparency with MES Cockpit

In addition, the MES Cockpit from MPDV also offers additional analysis options with its wide range of KPIs. Based on the rapid-response Qlik technology and in-memory computing, there is an option to analyze both online data as well as long-term archived data together.

The MES Cockpit is the ideal solution to increase transparency on all corporate levels: in addition to KPIs that are calculated based on all recorded HYDRA data, other systems can be connected as a source and various KPIs can be calculated from them – even across different locations. Supplemented by the many different graphic illustrations, the MES Cockpit is perfect for obtaining an at-a-glance overview of production targets and all processes.

KPIs with graphic illustration in MES Cockpit

HYDRA Dynamic Manufacturing Control (DMC)
Practical application in complex assembly scenarios

Since DMC has been available for several months, MPDV can now report on the initial application scenarios of the new HYDRA module. As expected, the first DMC users come from the automotive industry.

Product Information:

HYDRA Dynamic Manufacturing Control is an application for multi-variant sequence production. For better understanding watch our short video or refer to our press release.

**Video on YouTube:** mpdv.info/dmcvideo

Press release: mpdv.info/dmcpr

Because everyone wants to have exactly the car of their dreams in today's world, it has become commonplace in sequential production to gear up for a wide range of variants, especially in the automotive industry. When taking a closer look, the challenge for automotive suppliers is to be able to supply different varieties of products promptly and in a predefined sequence directly to the assembly line of the large automotive manufacturers and to produce them as cost-effectively as possible. To achieve this, suppliers require flexible software tools to control and monitor their own assembly lines. And this is exactly why HYDRA-DMC was designed - the MES application for modeling, controlling and monitoring complex production processes.

Specific customer project

For a specific user, who cannot yet be named due to contractual agreements, a new assembly line with a total of 50 stations is being planned and modeled. Because this will be a greenfield project in the broadest sense, which means that the line needs to be set up from scratch, the user has the possibility to optimally interlink the line with its stations and the control and monitoring software. Not only does the user have to control the manufacturing process, but must also be able to ensure that all products, materials and resources involved in the process can be traced. Moreover, he will also want to use meaningful key figures, such as OEE (Overall Equipment Effectiveness) and FPY (First Pas Yield), for example, so as to be able to continuously optimize the processes (such as improving the line balancing of each of the stations). Generally, due to the large range of variants specified by vehicle owners, the user produces with a batch size 1.

In the case of the aforementioned line with 50 stations, here we are looking at the production of instrument panels, commonly referred to as the dashboard. Depending on the features of the ordered vehicle, the instrument panel is fitted with different components, some of which are pre-assembled in the downstream sub-lines. This results in a complex and branched architecture of the assembly line. So-called Dynamic Line Panels (DLP) are connected at around ten of the stations, which on the one hand display information to the worker about the current work step or workpiece, and on the other hand provide instructions on what
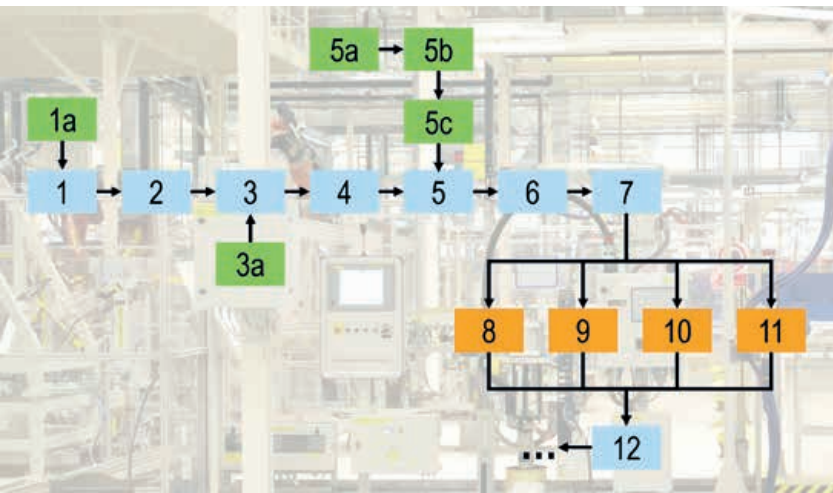
Example illustration of a branched production line

needs to be done next. DLPs also provide support when carrying out quality inspections.

Benefits and scope of functions

In summary, HYDRA-DMS ensures that the correct work steps are always carried out and that only those products are processed further that satisfy the relevant quality requirements. The integrated process interlocking takes effect here, which inspects in real time whether everything was correctly manufactured and, where necessary, interrupts the process flow. This is the only way that the user can ensure zero-failure production and thus fulfill the requirements relating to cost and lead time which originate from the demands of vehicle owners.

To define the sequence of the variants to be produced and to illustrate communication with the vehicle owner, the supplier will be using an external sequencing software that is connected to HYDRA-DMC via a bi-directional interface. At each of the work stations, the machines are connected via the OPC-UA, while the tools (such as a screwdriver) are connected via internal driver modules. All recorded data is stored centrally so that the manufacturing process is documented without any gaps, thus creating the basis for the required integrated traceability. Here, HYDRA combines the data entered from the assembly line with the data from the batch-oriented pre-production stage and also from downstream packaging processes.

Implementation and outlook

Although users with HYDRA-DMC generally assume the task of modeling and developing the driver modules themselves in order to connect to machines and peripherals, the customer in this case has specifically requested to take advantage of the expertise of the MPDV specialists, who will support the customer in completing these activities. The user will assume ownership of the components created as a result (e. g. DLP user interface and function modules) and will therefore be able to use them as a template in future projects, and also reuse them for other lines as well.

After successful commissioning of the aforementioned line, the user plans to equip six more lines with a total of 39 stations with HYDRA-DMC. Because these lines already exist, they will be connected to HYDRA retroactively as in a retrofitting scenario. The aforementioned new line with 50 stations will initially serve as a production pilot project and showcase, the goal being to build up the necessary confidence within the company to go ahead with the transformation of the six other lines.
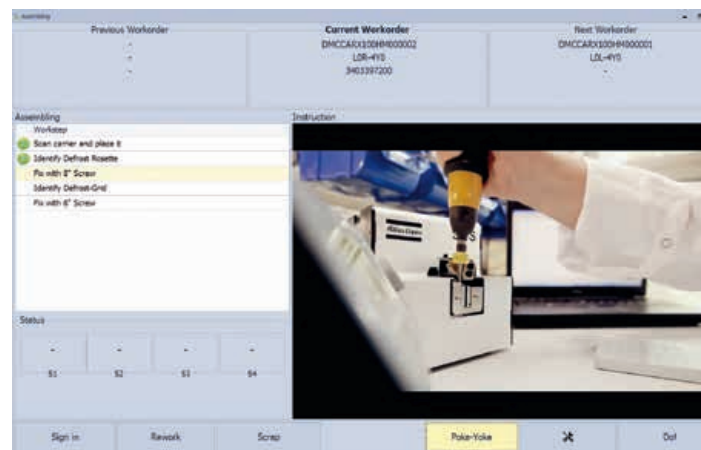
Dynamic Line Panels show work instructions in an ergonomic form

Extended CAQ functionalities in HYDRA
Optimized inspection processes

Manufacturing companies need flexible inspection processes in order to meet individual requirements. New functions in MES HYDRA support the user in the efficient processing of inspections in production, in test laboratories, in the processing of incoming goods and in the calibration of measuring instruments.

Inspections at special workplaces (e. g. in QA laboratories) have significantly higher demands on the IT than the now widely used employee's self-assessments performed at the machine. The system must especially safeguard, that both the part to be inspected and the notification of the inspection due date are "transferred" from the machine to the inspector. The MES HYDRA from MPDV caters for this by real-time data transmission. The employee in the inspection area can now see the next inspections as well as their inspection due date, which are displayed in the form of inspection points. That enables the inspector, to start the inspection as soon as the corresponding part is available.

Optimized display

In the event, that a large number of inspections are pending, the optimized user interface of the HYDRA shop floor client now offers a sortable and filterable list of inspection points. In the course of the inspection planning the system specifies beforehand, which inspection points are sent to which inspection stations. This greatly simplifies the workflow and allows for a clear inspection process.

General use

Apart from inspection stations in QA laboratories, the new display possibilities and the flexible processes also offer great benefits to the employees at the incoming goods department and to those responsible for the calibration of measuring instruments.

The inspector is perfectly supported by the inspection process that can be adapted to the different test environments at any time. This reduces the time to complete the inspection and reduces inspection efforts.

Like many previous HYDRA extensions, the new features are based on suggestions from the HYDRA Users Group (HUG), an association of dedicated HYDRA users.
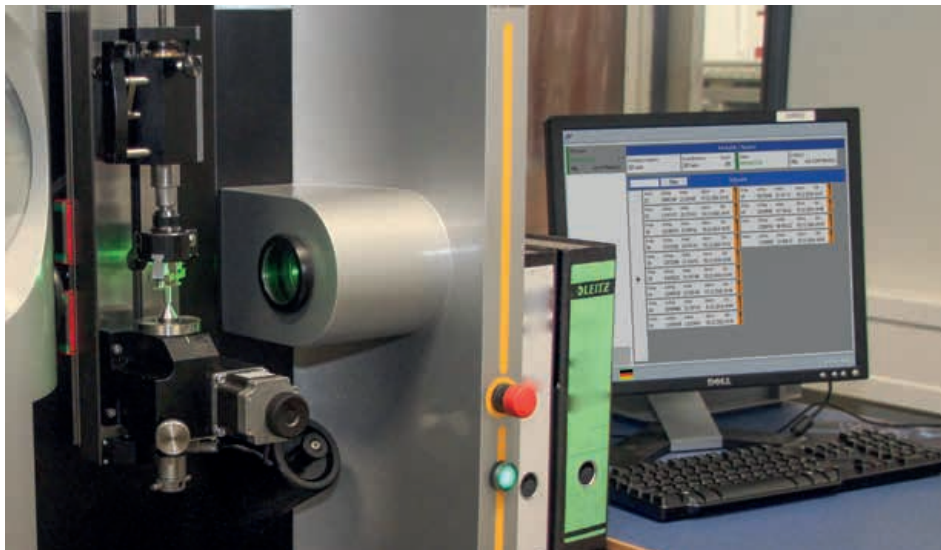
Optimized display of due inspections in the HYDRA shop floor client at an explicit inspection station

Extended CAQ functionalities in HYDRA

More information for operators and inspectors

In collaboration with the working group "Quality" of the HYDRA Users Group (HUG), MPDV has optimized the inspection process in the HYDRA Shop Floor Client (AIP). Additional displayed information support the operator during inspections and support.

The flexible design of the inspection data collection layout was determined as main requirement by the working group. It should be possible to display various quality data (objects) in parallel with the actual entry dialog. For this purpose, the HYDRA Shop Floor Client (AIP 8.2) now offers the option to flexibly arrange the user interface into any number of columns and rows. The single objects are then assigned to this grid.

Optionally, the following objects can be displayed in addition to the inspection list and along the actual collection dialog:
- List of documents with direct display of the marked document
- List of documents with an external document display triggered manually
- Static display of a configured document (e. g. drawing)
- Control charts (e. g. Xq, s, Median) with extensive diagram configurations
- Histogram
- List of failures, with optional filtering by different failure types
- List of measures

Here, the HYDRA user decides how the finished layout should look like. Of course, the configurations can be specific to either individual terminals or groups of terminals. In particular, the display of documents (e. g. drawing) directly next to the collection dialog provides a greater overview with less effort. In the past, a linked document had to be called up with several clicks, and it then also hid the collection dialog.
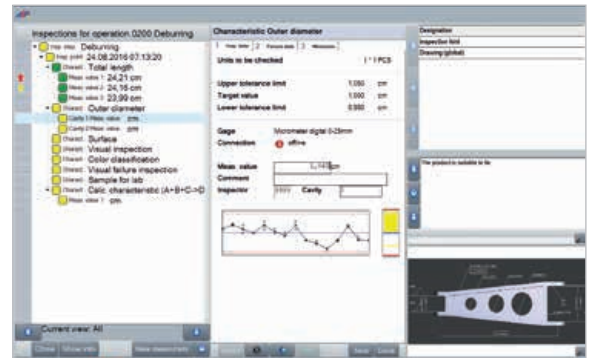
Extended inspection data collection with document display

In the illustrated example, the following objects can be seen in addition to the inspection list and the collection dialog:
- List of documents for the attribute or the inspection plan (top)
- Direct display of the entry marked in the list of documents (center)
- Display of a pre-configured document (bottom)

In turn, at the inspection point level, it is possible to display an overview of all failure types, failure causes, failure locations and measures that were entered in the current inspection relating to this inspection point. By displaying these quality data in parallel, the inspector can make a sound usage decision (OK or NOK).
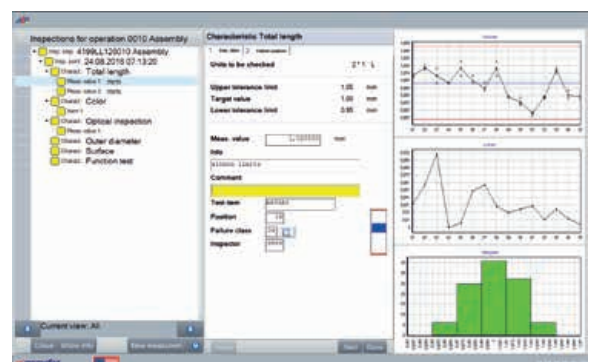
Alternative display with control charts and histogram

New functions in MES HYDRA
More transparency in the shop floor

Recording and processing business and machine data is a basic feature in any Manufacturing Execution System (MES). MPDV has now extended its MES HYDRA to include important key figures, new analysis options and other functions.

Key Figures – from shop floor to top floor

The VDMA Standard Sheet 66312 "Manufacturing Execution Systems (MES) Key Figures" defines key figures that are decisive for production operations. HYDRA now maps all relevant key figures of the VDMA Standard Sheet 66412.

Key figures are not only evaluated in HYDRA Office Client. There is now also an option to display them both on the Shop Floor Monitor as well as on the Shop Floor Terminal. The key figures as well as their displays can be individually configured so that, depending on the requirements, the appropriate indicators are available and can be highlighted in color on the display. For example, the operator can have the OEE for the current shift displayed on the Shop Floor Terminal, while on a large monitor in production, the Shop Floor Monitor displays the OEE, setup rate and scrap rate. At the same time, the foreman can evaluate the occupancy ratio of the machines allocated to him.

Lean Performance Analysis

The new HYDRA Lean Performance Analysis application can be used for a value flow analysis in terms of Lean Manufacturing. The analysis includes key figures about orders and also single operations. Among other things, these key figures indicate at which point the process can be optimized. If, for example, the "availability" is not ideal because of tool breakage during an operation, this may have an effect on the entire order. Weak points are identified

using the integrated value flow analysis, thus reducing the wasted resources target-oriented.

HYDRA supports optimization as in terms of lean production

HYDRA Messaging Services

There are many reasons why information needs to be shared between shop floor, foreman, maintenance and other departments. MPDV is now offering the new HYDRA Messaging Service application to enable this in all client applications. This new application allows messages to be created, while also showing their progress. Messages can be responded to and forwarded. Important notifications are shown in a pop-up window in the Office Client or are highlighted in the shop floor and on mobile devices. In addition, the information can also be sent as a classic email, for example, in order to reach those addressees that do not work with HYDRA constantly. The advantage here is that information that in the past was reported "on the fly" by phone, or that was "called across the floor" is now being documented in HYDRA as well.

Two real life examples:

a) The worker is working at several machines. One of the machines has a breakdown. The worker writes a message to the maintenance technician, who in turn calls up this message with his mobile HYDRA Client. The worker also sends a message to the foreman saying that it's only a brief incident and that production should resume in10 minutes.

b) The foreman notes that the machine must run a bit slower for the material currently being processed, to ensure that breakdowns are prevented. Because the logged on operation will continue running during the next shift, he sends the information to the Shop Floor Terminals of the relevant machine and also to the foreman of the next shift.

Mapping complex status models

In most cases, it is sufficient to know whether a machine is currently producing, being set up or has a breakdown. In the future, though, in addition to the actual machine status (main status), additional machine occurrences, meaning states or its secondary status, can be recorded as well. For example, the control unit of an automated machine not only supplies the main status "in production", but also other information such as automatic mode or manual mode. This means that several different states can now be entered and documented for one machine. Thereby, it becomes raeproducible as needed why, for example, longer production times occur or certain process parameters show peculiar behavior.

Chronological evaluation of OEE

In addition to the OEE report, the OEE profile is now available as well, which can show this key figure for selected workplaces over a selected period of time. For example, the foreman can compare his machines over a period of one calendar week and thus identify any machines with erratic performance.

These and many more functions are an integral part of the new 8.2 Release of the HYDRA Shop Floor Data and Machine Data applications. Extensive testing has already been successfully concluded and approval was granted.
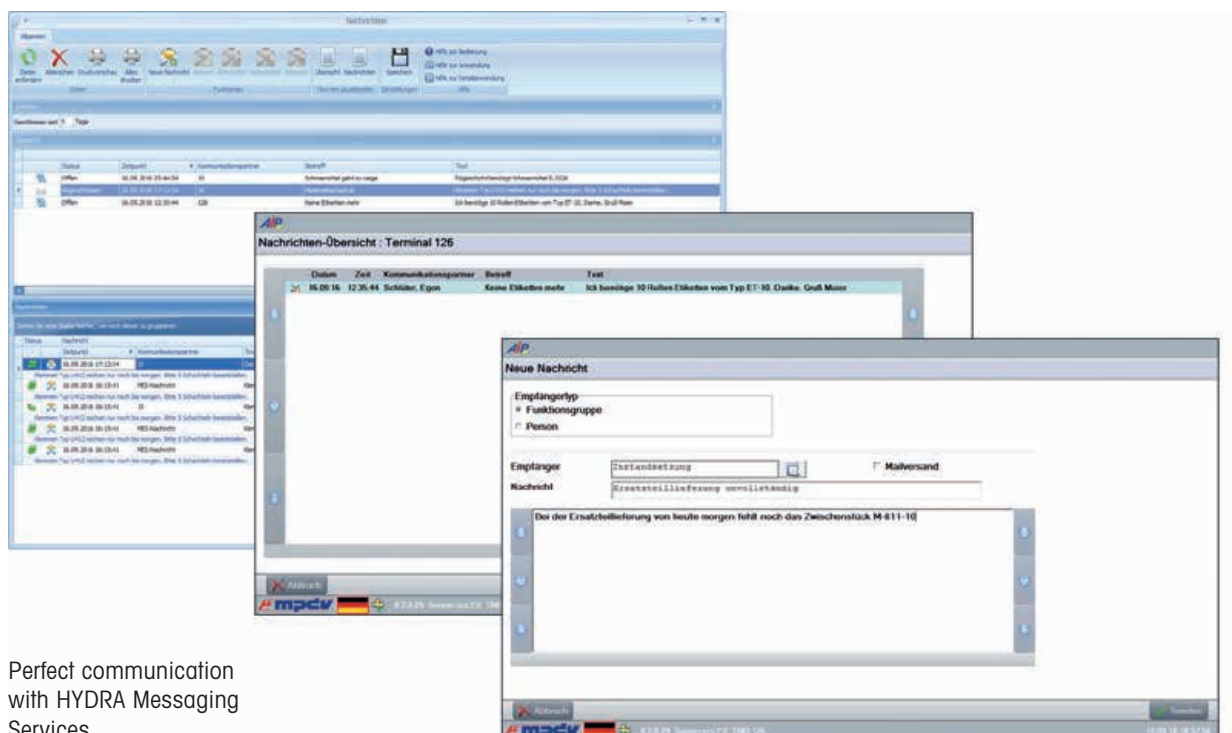
Perfect communication with HYDRA Messaging Services

To collect and visualize mass data in the shop floor
New MES applications available

The collection and visualization of mass data in the production environment is essential for Industry 4.0. Based on current technologies, MPDV launched two extensions of the Manufacturing Execution System (MES) HYDRA.

MES HYDRA offers two new products to handle large amounts of data much easier and more flexible than with conventional methods. The new products can be used in combination and also independently:

Edge Computing Suite

EdgeCS (Edge Computing Suite), the new collection infrastructure for mass data decouples the capture from the processing of the data. This allows large amounts of data to be collected and stored at a high speed - and that is what many people understand by Big Data in the shop floor. EdgeCS uses state-of-the-art technologies, such as OPC UA, Node.js (www.nodejs.org), noSQL databases, as well as the streamlined messaging protocol MQTT (www.mqtt.org) to provide effective data capture. The data is passed directly to process visualization via an MQTT broker. Consequently, EdgeCS can be used as a stand-alone tool.

Real-time process data monitoring

Process parameters can be visualized directly on the machine or on the office PC with the newly designed graphical elements of the Real-Time Process Data Monitoring. Thus, both operators at the machine and office staff are informed about the current status of specific machines or processes and can react quickly to deviations if required. Real-time Process Data Monitoring is based on communication via MQTT, which uses very few IT resources thanks to the simple Publish-Subscribe Procedure. In sum, individual customer requirements can be easily implemented.

Product availability

Both Edge Computing Suite and Real-time Process Data Monitoring from the HYDRA product group Process Data (PDV) are already available.

You will find further information under mpdv.info/pdven
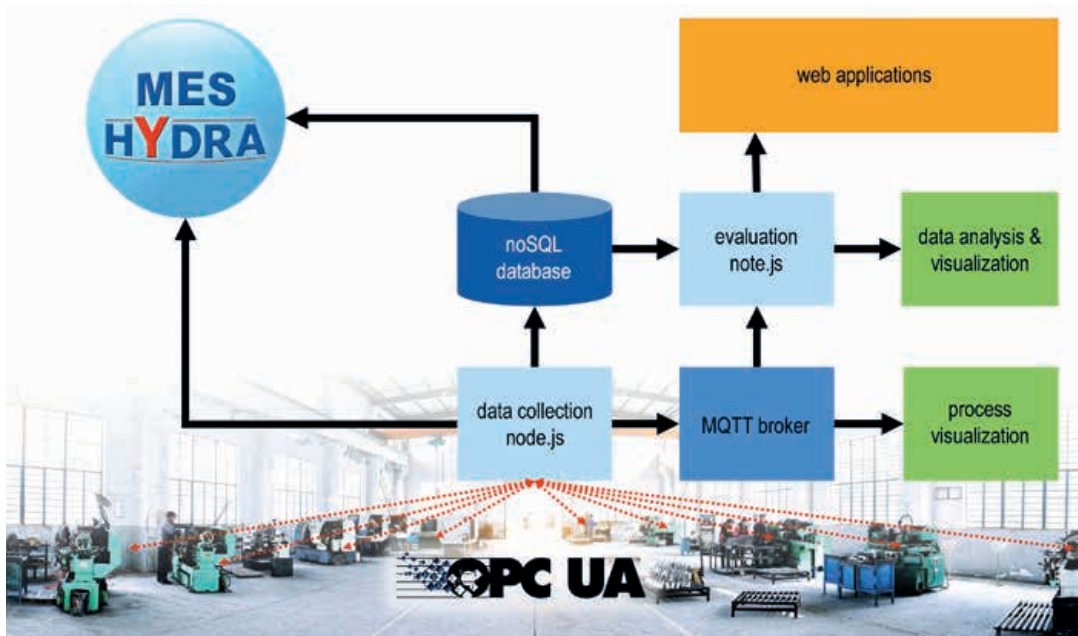
Collection and processing of mass data in the shop floor based on state-of-the-art technologies.
New visualization elements of the real-time Process Data Monitoring in the MES HYDRA.

MES supports Work 4.0
Digital Production Meeting

In times of digital transformation, classic meetings in towards will undergo change as well. The support provided by an MES is the first step toward Work 4.0.

In many companies, regular production meetings are the basis for providing employees with up-to-date information – for example during shift changes or at fixed times every day. At these meetings, occurrences of the last shift or the previous day are discussed as well as any relevant production results or machine downtimes. In addition, labor utilization for the upcoming shift is often discussed and/or optimized. These are all topics that a Manufacturing

a simple click of the mouse. Measures that are decided on are then immediately entered in the system and, where necessary, forwarded to the persons in charge. This ensures that nothing gets lost and that any relevant changes (such as in personnel scheduling) are effected immediately.

Based on the latest web technology, the assistant for your Digital Production Meeting offers

The Digital Production Meeting is interactive and can be used with any input devices

Execution System can provide valuable information about. It would therefore make sense to conduct production meetings of this kind with direct MES support.

In the truest sense of Work 4.0, MPDV has developed an application concept that can be used to map production meetings of any kind in the MES to correspond to practical daily operations. Starting with the scheduling and the embodiment of the agenda the application acts as a digital assistant and provides support throughout the entire meeting. In practical terms, what this means is that the necessary data and reports can be linked directly to each item in the agenda, allowing them to be called up with

a high level of flexibility. For example, the layout automatically adjusts to the size and resolution of the display being used. "Responsive design" techniques are used for this purpose. This means, the assistant can be used both on mobile devices, such as a tablet PC, as well as on large monitors. Operation is possible either via touchscreen or using classic input devices such as a keyboard and mouse.

"With the assistant for the Digital Production Meeting, we are taking an important step into the future while, at the same time, reinforcing the central role of the human as augmented operator", explains Matthias March, Executive Manager of PD Product Management at MPDV.

MPDV USA continues on its rapid growth trajectory
New office space

MPDV USA has grown in the last year to 16 team members. Therefore, it became necessary within a short time frame since the last movement to move into a new office. With the new rooms, MPDV USA rented a full building with 7,500 sq.ft. and therewith doubled the occupied space.

The new office building of MPDV USA

The new office space is built for a capacity of approximately 30 co-workers with which the continued grow will be filled within the next 2-3 years. With the larger office, came a larger training room area to improve the customer HYDRA training experience. The increase in square footage in the new office also provides several conference rooms compared to only one in the former building, and with a growing team size, the rooms are often booked for team meetings.

Thomas Riedinger, COO of MPDV USA and his successor Keith Spayth

New team members
MPDV USA continued growth and success made it necessary to hire additional team members to support the business. In 2017, the MPDV USA staff added several certified project managers, qualified consultants and technical IT support.

The current COO for MPDV USA, Mr. Thomas Riedinger will transition to Mr. Keith Spayth starting in 2018 in this position. Thomas Riedinger has led the MPDV USA team to success within his 4 years, from a small group of 4 employees to now its current size of 16 employees. With Thomas's return to MPDV Germany, he leaves with profound confidence in Keith Spayth as his successor: "It is important for us as international company to give also the leadership of our local offices step by step into local hands. Keith Spayth has an experience over decades in the American IT industry in managerial positions. He is exactly the right person to take MPDV USA to the next level in the upcoming years".

New projects
MPDV USA was able to acquire one of the biggest global packaging corporations as a roll-out customer. Currently, the template for the roll-out is being worked-out in a pilot plant on the east coast of the US. The modules to be implemented cover most of the HYDRA modules in manufacturing as well as CAQ. As soon as the multinational customer core team has signed off on the pilot, HYDRA is planned to roll it out to in total over 60 plants in Asia, Europe, and US.

A major manufacturer of building material also decided for HYDRA with a broad palette of

modules to be their MES of choice. In this case MPDV currently pulls up their MES Center Of Excellence (CoE) and sets up the first two plants. After the template is built, then the roll-out to 40+ plants over the next 5 years is on the list.

The first HYDRA Dynamic Manufacturing Control (DMC) at MPDV was also executed in the States. A major automotive supplier of dashboards and center consoles with highly automated line uses HYDRA DMC to support the complex Just-In-Sequence (JIS) manufacturing process. In this project, HYDRA DMC was able to show its extreme flexibility to cover over 50 stations in total with varying complexity from small assembly lines with a few stations to complex ones with side lines branching off of main lines.

Several existing customers (e. g. in medical industry, automotive supplier industry, metals and plastics) added additional functionalities to their HYDRA system and expanded to further plants to a total HYDRA installed base of over 75 plants in North America.

Events

On 10/13/2017 MPDV's account manager Courtney Heim was as invited panelist on the German American Chamber of Commerce of the Midwest "Digitalization Forum" where she discussed best practices how to transform businesses into the digital world.

Upcoming events

In, 2018 MPDV USA will celebrate its much anticipated 10year anniversary in a special celebration during the 1st customer day/HYDRA Users Group. The idea to combine the 10year celebration with the HYDRA Users Group meeting allows MPDV USA to say thank you to the customers who have helped the MPDV USA office grow. The customer day/ HYDRA Users Group meeting for MPDV USA, will allow HYDRA users to come together and can share in workshops and discussions best practices on how to use and implement HYDRA.
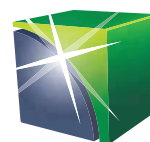
Also in 2018, MPDV will participate for the 3rd time in the International Manufacturing Technology Show (IMTS), in McCormick Convention Center, Chicago, IL from September 10th to 15th. IMTS is the premier manufacturing technology show in the US and attracts buyers and sellers from over 100 countries across the globe.

Courtney Heim, MPDV account manager, at the Midwest "Digitalization Forum"

Cooperation with Nanyang Polytechnic Singapore
MES HYDRA at NYP Learning Factory

Nanyang Polytechnic (NYP, www.nyp.edu.sg) in Singapore is a leading Institute of Higher Learning (IHL), with wide-ranging life-sciences, business- and engineering courses, teaching a total of 15,000 enrolled students. Within the School of Engineering, state-of-the-art manufacturing facilities are being maintained, such as various injection molding processes, CNC machining, robotics, 3D-printing, QC metrologies, together with related development & design works. NYP furthermore maintains close cooperations with various relevant industry players from plastics manufacture, medical devices, automotive, aviation & aerospace.

Integrated digital manufacturing information management has significantly grown in relevance in the field of engineering education, to unlock the overall synergy potential across all available technical competences that come together as a whole along the internal production chain. NYP has identified the high potential of Manufacturing Execution Systems (MES) for this digitalization purpose in the field of education, and has entered in a cooperation with MPDV to deploy MES HYDRA within a Digital Learning Factory setup in NYP's demonstration shop floor and lecture rooms.

In a first step, MES HYDRA will be deployed in the areas of:

- Shop Floor Data Collection: management of production order data

- Machine Data Collection: management of machine performance data
- Shop Floor Scheduling: production scheduling and finite capacity planning
- Material and Production Logistics / Tracking & Tracing: production inventory and batch tracking / tracing
- CAQ: management of quality data in production
- Escalation Management: management of escalations / event notification
- Smart MES Applications (SMA) including tablet / mobile-based data capturing

In cooperation with MPDV Asia, the existing machines and quality devices within NYP will be directly integrated into MES HYDRA through a mix of various machine connectivities, such as

MOU Signing Ceremony on NYP Campus on 31.10.2017, between Prof. Dr. Kletti and Dr. Edward Ho, NYP Deputy Principal (centre)

hardwired connections as well as OPC-based integrations through the local area network. A total of 30 teaching/lecturing seats will be made available. In a subsequent step, the areas of Process Data Management PDV and Tools & Resources Management WRM shall be added.

MPDV and NYP will cooperate together in educational seminars and best practice workshops for education as well as for information exchange with the Singapore manufacturing industries. Furthermore, student exchanges and internships in MPDV Asia and MPDV in Germany are being arranged. A Memorandum of Understanding (MOU) was signed in Singapore between MPDV, represented by Prof. Dr. Kletti, and NYP, represented by Dr. Edward Ho, NYP Deputy Principal.

> **❝ Sascha Graef, MPDV Asia Managing Director:**
> We are happy and honoured to have received the attention and appreciation of the high reputation institution NYP, and now being able to cooperate together. We are bringing state-of-the-art MES know-how to Singapore students today, where they become the production leaders of tomorrow. Together we are confident that our combined collaboration approach of education and industry will contribute to Singapore's and even ASEAN's overall Digital Manufacturing Excellence, to enable all participants reaching their Industry 4.0 ambitions, with MES as the foundation. We are proud to be part of this process. **❞**

MPDV review on IAS 2017

IAS 2017 has been held sucessfully from 7th - 11th November, and MPDV also took part with a booth located at the Standard Booth "Made in Germany" in A102. The highlight of MPDV presented this year, is MES HYDRA with its characteristics of an integrated, standardized and modularized MES system, illustrating the four approaches to Industry 4.0 clearly and perfectly.

During the show, MPDV is contacted intensely from different fields, including the production, the study and research institutes. The sum of visitors from home and abroad is added up to one thousand, who are welcomed at site by MPDV MES experts. They said they learnt a lot on HYDRA comprehensively and refreshed their mind on how to realize Industry 4.0 at site. Some visitors fetched MPDV brochures for future study, and some watched MPDV public Wechat for further follow-up.
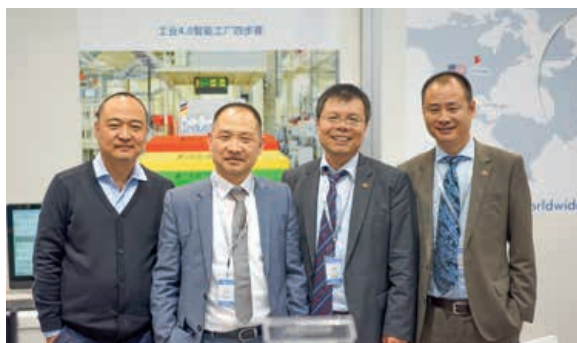
With fourty years of MES experience, MPDV is pioneering in the MES field all over the world with the open mind and the positive action to meet the high-end requirements of MES market. For example, MPDV has issued its new HYDRA module Dynamic Manufacturing Control recently, which can control the mass production or one-piece flow dynamicly. At present, MES HYDRA has been up near to 20 modules covering the production control, quality assurance and personnel management of discrete manufacturing.

This show is supported by MPDV HQ and partners strongly and has been a great success. With the philosophy of customer-first and harmonious cooperation of both sides, MPDV is always and will be the top supplier of MES all over the world and to help customers keep the driving competitiveness in the market.

New cooperations
# MPDV Asia expansion in Thailand

At its 10th anniversary in 2017, MPDV Asia Pte Ltd in Singapore extended the successful activities in the maintenance and support of HYDRA implementations across Thailand – focussing on the metal processing and electronics assembly industries. Until now, most installations originated as rollouts from Germany and from Singapore-headquartered companies. In order to expand the domestic businesses, we cooperate with two Thailand agents in future.

In early 2017, MPDV Asia directed their focus toward sales expansion into the Thailand manufacturing market, with its dominating industries of plastics/rubber, electronics, automotive components, steel/aluminum and textile production. Manufacturing in Thailand is predominantly export-driven and the most relevant clusters of manufacturing companies are mainly located in greater Bangkok area and the Eastern Seaboard (Chonburi, Rayong, Chachoengsao, Samut Prakan), amongst a few other regions elsewehere in Thailand.

MPDV Asia has entered into strategic cooperation alliances with appointed Thailand agents **E.S.E. – Extra Solution Engineering Co., Ltd.** (www.e-s-e.co.th) as well as **Riverplus Co., Ltd.** (www.riverplus.com).

E.S.E. is a young and flexible total solution provider providing high competence & experience in the industrial automation field, whereby Riverplus is recognized as an established provider of various hardware and software solutions ranging from industrial automation, Warehouse Management Systems (WMS), Industrial Computing and MES (HYDRA).
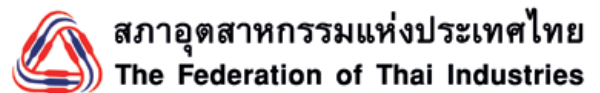
Cooperation with FTI – Federation of Thai Industries

The Federation of Thai Industries (FTI) is the nationwide platform to bring Thai industries forward, amongst others, predominantly to improve the Thai manufacturing industries by adopting best practice approaches from global sources. Industry 4.0-driven digitalization on the shop floor takes on a dominant position in this portfolio. Furthermore, FTI aims to bring the Thai manufacturing industry capabilities toward a global clientele.

Agent E.S.E. established the ties between MPDV Asia and FTI, to make MES HYDRA as backbone for Industry 4.0. Further activities, along with best practice sharing through international industrial delegation exchanges are being planned.

Educating the Thailand Industries about MPDV's 4-step approach toward Industry 4.0

In the framework of MPDV's educational seminar campaigns, various seminars have been conducted, also together with agent Riverplus, to address the Operations-Levels and C-Levels of manufacturing companies from the plastics/rubber and metal precision engineering fields in medical, automotive and white goods.

MPDV continues to take on a collaborative approach together with the partners, to specifically address local concerns and aspects within Thailand.

❝ Sascha Graef, MPDV Asia Managing Director:
Within our overall Asia Pacific strategy, where dominant manufacturing markets such as P.R. China are now being well served and growing, it is equally important to start supporting further markets especially in the ASEAN region. Besides Singapore, Malaysia and Indonesia, Thailand takes on a more important role for us in our sales expansion efforts in the short- to mid-term. ❞

Members of MPDV Singapore Team together with members of Riverplus Bangkok Team
4th from left: Vorapat Sirisatitwong, Sales Director – Automation Division

www.vtgarment.com

VT Garment Co., Ltd. with headquarters in Bangkok, Thailand, specializes in design and innovative manufacture of outerwear, casual wear and sportswear ranging from jackets, functional clothes, ski wear to jogging suits, shorts and vests. VT Garment deploys latest technologies in the production processes of pressing, screen-printing, engraving, laser cutting, pocket welding, sewing and embroidery. In addition to the Bangkok headquarters, VT Garment operates a manufacturing plant in Myanmar, with a totally combined workforce of 3000 staff.

HYDRA introduction background

VT Garment management has been leading the way in innovative textile manufacturing processes in Thailand for a long time. Being a very IT-driven industry champion, in 2013 VT Garment embarked on the journey to implement a company-wide ERP-solution, namely Infor Cloudsuite Industrial. Along further efforts toward Industry 4.0-driven digitalization of the complex textile production shop floor, it became apparent that additional shop floor control including machine connectivity is required. Two main objectives had to be fulfilled, as a foundation for all further improvement efforts from thereon:

1. Full transparency of actual production resources performance "Man and Machine", i. e. reliable management of labor time performance and machines' / workplaces' overall OEE performance.

2. Reliable finite capacity planning, in interaction with the ERP system, to have true real-time visibility about the current WIP situation and the short- to mid-term planning horizon.

MPDV Asia Pte Ltd in Singapore, together with appointed Thailand Agent E.S.E. – Extra Solution Engineering Co., Ltd. from the Industrial Automation (IA) field, cooperated together with VT Garment on concept definition and proposal during an initial pre-sales phase, leading to a project kickoff in July 2017, with a clearly prioritized & phased implementation strategy within MPDV's Industry 4.0 four stage progress model
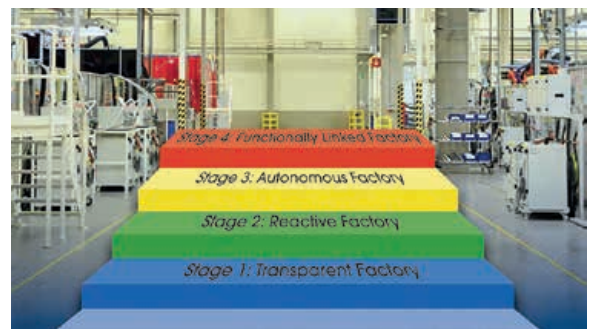
Step 1 Phase 1: Become transparent, through the deployment of HYDRA modules
Shop Floor Data and Machine Data including direct machine connection.
Step 2 Phase 2: Become reactive, through the deployment of HYDRA module
Shop Floor Scheduling, including ERP integration for planning.
Steps 3 & 4 are to be defined, when the time will be right in the mid-term future.
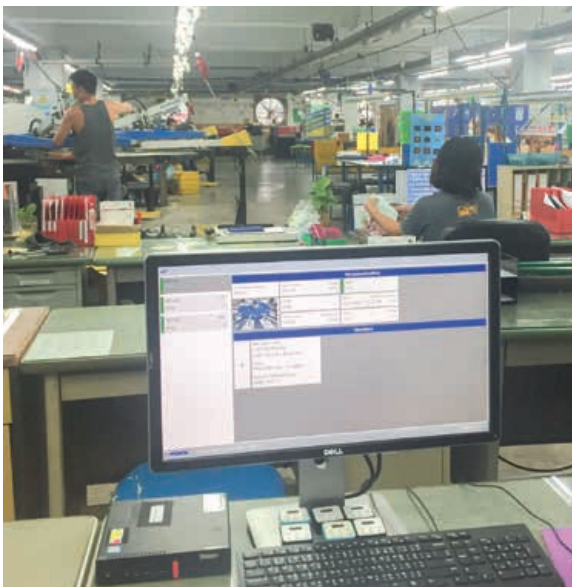
Implementation

The country partner E.S.E. had previously been trained in relevant HYDRA aspects for basic system deployment. Initial system configuration and trainings for step 1 were conducted in joint cooperation amongst MPDV and E.S.E., and the entire machine connectivity for status & cycle signal monitoring by MPDV's CT-UMPS machine interface was carried out solely by E.S.E.

Main application

In a very first step, VT Garment utilizes the HYDRA-internal workplan capability to maintain all relevant production routings and to generate their production orders. The priority is to obtain truthful figures about actual labor time incurrence and job duration. HYDRA Shop Floor Data offers this standard functionality out of the box with high configurability. Operations are executed on the shop floor, respectively.

Preparations for the integration with Infor ERP, for production order release and confirmation – are on the way and shall be realized in early 2018.

advanced machine systems available, with state-of-the-art machine controls, yet there are other production processes that are still very much manual labor based or mechanically driven. To provide a simple-to-deploy and easy-to-manage machine connectivity for various machine statuses in the processes of screen-printing, spreading, cutting and embroidery, MPDV's hardwired CT-UMPS interface provided the right solution that translated into simple configurability. MPDV agent E.S.E. provided the right skillset and experience for identifying the right source signals within each individual process and machine.

Within HYDRA Shop Floor Data and Machine Data, all OEE-relevant information of machine statuses ("Availability"), performance cycles ("Efficiency") and output yield/reject quantity ("Quality") is now available by mouseclick.

Additonal standard reports about labor times and job durations, along with necessary categorizations in productive- and various downtimes, are available, too.

The textile-manufacturing environment poses multiple inherent technical challenges when it comes to industrial automation and machine connectivity. In many areas, there are highly

" Mr. Chalumpon Lotharukpong, Managing Director of VT Garment:
HYDRA has provided us an easy-to-deploy standard solution, through its very high degree of configurability, within a reasonable budgetary framework in our local environment. We can see all the order and machine data we are looking for in our step 1 deployment, to make informed decisions. As we are looking forward to further Industry 4.0-driven digitalization of our textile shop floor environments, we are confident that HYDRA can help us in getting things done efficiently. Our step 2 actions are currently being planned, in order to become more reactive. **"**
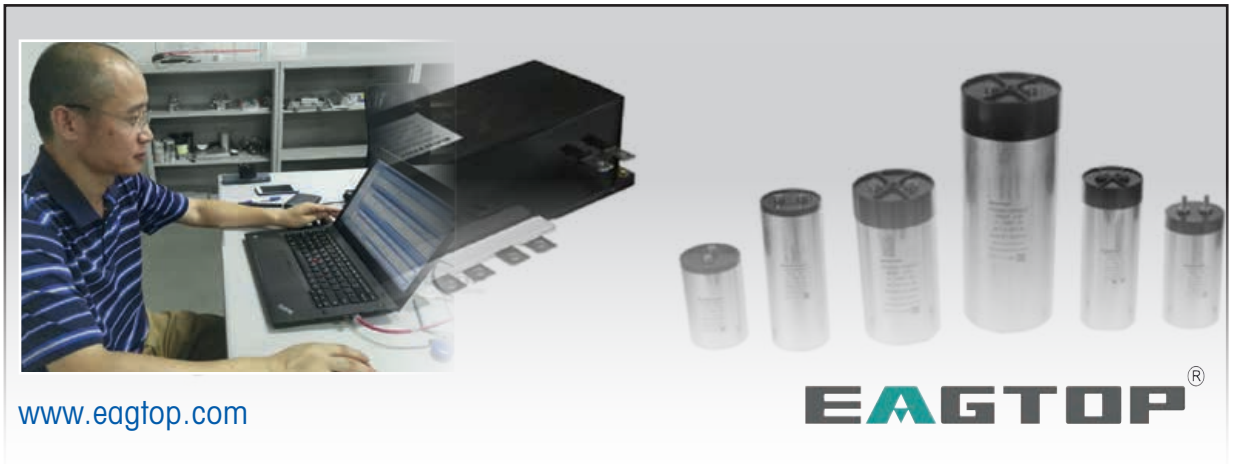
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About EAGTOP

Shanghai EAGTOP Electronic Technology Co., Ltd. specializes in research, development and manufacturing of passive power electronic devices as a leading solution provider in China. The product portfolio ranges from film capacitors, reactors, laminated busbars, liquid-cooling radiators, 3D phase change heat sinks and resistors. The typical capacitor manufacturing processes consist of winding, metal spraying, heat-treatment, charging, wielding, vacuum dosing, aging, final inspection and packaging.

引入HYDRA MES的背景

为了满足客户质量控制要求，鹰峰管理层决定在2014年底引入MES系统。同时也希望通过应用MES来打开生产现场的黑盒子，以提高生产效率。与许多传统的中小型民营企业一样，鹰峰选择相对来说初期投入比较低的国产定制化MES软件，以满足最基本的生产数据采集和追溯需要。然而，定制化软件的不利之处在实施过程中已经暴露出来，即实施周期比较长，厂商总是要问用户应该怎么做，而用户只能提出概要的需求。故而，在实施过程中，不断有需求变更。最终在双方妥协下，系统在一年后终于上线。

HYDRA MES implementation background

To comply with the growing quality control requirements from customers and to improve the overall production effectiveness, EAGTOP management decided to introduce an MES by the end of 2014. Like many small- to medium-sized private enterprises in China, EAGTOP instinctively preferred to invest rather less in software. In first consequence, EAGTOP chose a local vendor proving an entirely customized MES solution, given the seemingly low initial cost. The disadvantages of that customized MES solution soon emerged on repeated basis throughout the entire implementation period. Besides, a prolonged implementation timeframe due to time-consuming customizations, each new requirement or additional change request resulted in new additional delays and conflicts, due to miscommunications. Ultimately, the heavily compromised local MES solution started to go live after over one year.

2016年，随着新产品的导入，鹰峰引入一些新设备替代原先一些手工工位，并对工艺路线和物料流进行了优化。另外，管理层对生产控制与数据呈现也有了新的需求。这时，他们发现现有的MES系统无法灵活更改，必须要投入与首次导入系统时相同的时间和成本来重新满足新的管理需求。相当于现有的系统等于被废弃后重新建一套。鹰峰的管理层这时才意识到这种定制化的MES系统存在巨大的拥有风险，因为他们无法预测未来管理需求的变化。他们试图寻找一套能够在4个月内完成上线、灵活配置和扩展的系统，已满足鹰峰不断发展的生产管理要求。

In the course of 2016, EAGTOP commissioned new automated machines to replace older manual work stations. Production processes and material flows were optimized and adjusted for new products, too. EAGTOP management expected the necessary flexibility within the existing local MES solution. Instead, the existing architecture needed to be broken up and re-customized again, with a projected timeline of yet another one year. Now fully aware of the inherent risk for any future changes, EAGTOP management decided to look out for a new flexible MES solution that could be deployed in a lean approach in a short time frame of less than 4 months, with high configuration flexibility and expandability, to fit into the continuous growth strategy of EAGTOP.

实施
2017年4月，鹰峰的董事长开始和MPDV接触，并亲自主导了需求分析，且至始至终参与方案评审，包括系统建设目标、一期功能划分、物理实施范围以及项目实施计划。最终，项目在2017年5月正式启动，7月正式上线，8月完成最终验收。

Implementation
By April 2017, EAGTOP management started to engage in relevant pre-sales activities together with MPDV Shanghai, for target definitions, functional and physical scope definitions and final proposal generation. This ultimately led to a project kickoff in May 2017. Within a considerable short time frame of 3 months, HYDRA started to go live in July 2017, with final acceptance and sign-off by August 2017.

主要应用
复杂的制造流程对生产管控要求非常严格，对于每道工序每件产品必须确保其工艺参数的稳定和精确，并能实现完整的追溯。这是鹰峰对本次MES系统建设提出的基本要求。

Main application
The complexity of the production requires very strict production control. The essential requirements are stability of physical process values within strict tolerance limits and traceability of every single product.

系统集成
HYDRA系统的功能完整性使得鹰峰的IT系统非常简单：应用于商业管理的Kingdee ERP和应用于制造管理的HYDRA。而且两个系统之间的集成也非常可靠。

System integration
The broad and configurable HYDRA standard function scope has resulted in a very simple IT architecture at EGATOP: The ERP system Kingdee caters for the entire business management, whereas HYDRA caters for all aspects of production. The logical interfacing model and physical interfacing process between Kingdee and HYDRA turned out very reliable and robust.

HYDRA采集车间现场的生产、物料批次、工艺参数、质量和人员数据，并加以整理和分析。本期项目引入ERP系统集成（EIS-ERP）、生产订单数据管理（BDE）、和物料追溯（MPL&TRT），过程检验管理（FEP）。HYDRA办公室客户端MOC提供标准的、丰富的各类统计分析报表，无需任何报表方面的定制开发。

The HYDRA modules Shop Floor Data, Material and Production Logistics / Tracking & Tracing and Quality Assurance / CAQ collect and process the entire spectrum of relevant shop floor data. EAGTOP uses the available standard reports in the HYDRA HYDRA Office Client without any additional report customization.

为能够在生产中以及产品回召时清楚知道产成品的追溯记录，工人除了在车间终端AIP上登录工序信息，在生产中采集原材料批次信息和生产工位。对于每个半成品都分配一个新的批次或单件系列号，形成批次追溯树。如此，不仅可以反向追溯原材料批次，还可以知道相同缺陷材料的供应商信息。HYDRA提供批次树图和数据表两种方式查询追溯记录。

Operations are logged on by the operator at the HYDRA Shop Floor Client. All relevant

information objects of production order, work place/machine, operator ID and input material batch ID's are recorded. During execution, the actual process values and various quality characteristics are being captured. New output batches are generated along with their relevant unique batch ID's as well as serial numbers, through real-time reporting through user-friendly HYDRA Shop Floor Client transaction points on the shop floor.

HYDRA的产品追溯已经帮助鹰峰通过德尔福等主要客户的审核。

The entire HYDRA traceability has helped EAGTOP successfully pass the audit by their key customers like Delphi Automotive.

工艺参数管理确保工艺稳定
稳定的工艺参数确保生产可靠性。通过与赋能设备的集成，采集赋能参数值，并与每个元件号关联，充分了解每个电容的过程质量。

Process data control – to ensure process stability
Stable quality values ensure reliable production. HYDRA Quality Assurance / CAQ captures all charging data by integrating the charging machines, amongst others, and correlates the quality data with captured serial IDs. Users can efficiently obtain a clear and detailed view of their production process quality.

质量管理 – 一切尽在掌握
根据客户要求采用全检和抽检，由产线作业员和质检实验室分别执行。可以人工或通过接口自动汇报在线检测结果或实验室测试值。根据质检结果确定该批次产品是否合格并流转。由于与ERP的无缝集成，在开始生产工单时，检验计划也随之自动下达，使作业员及时知晓，以确保质检作业按时执行。

Quality management – all under control
The relevant inspection procedures can be set upon customers' request, and performed by operators online in the field (IPQC) or in separate QC labs. Inspection data is captured in HYDRA both manually at HYDRA Shop Floor Clients as well as automatically via connectivity protocols. Whether a single WIP unit is allowed to pass forward into next operation is dictated by the inspection results at the predecessor. A pre-defined inspection plan contains all relevant quality characteristics to be checked, and the relevant inspection points are triggered automatically, based on the defined sampling schemes. Thus, operators never forget to conduct necessary QC-inspections.

用户之声
董事长洪先生：集成式、模块化的产品架构有利于按需分步导入各种功能模块，而无需考虑各功能模块之间的系统集成。配置选项能够帮助用户灵活响应生产管理变更。丰富的MES应用功能让我们无需担心系统建设的滞后，和国际领先的MPDV合作能够让我们更好地把最佳生产实践经验和先进的数字化管理系统有效融合。

Voice of users
Mr. Hong, EAGTOP President: The integrated and modular HYDRA system makes it possible to implement MES applications step by step by real needs, without consideration of the weary integration between individual applications. The very comprehensive and configurable functional scope of HYDRA has eliminated our concerns whether it can meet our future demands. In our cooperation with MPDV as a leading global MES solution provider, we are now finally able to leverage on many best practice approaches and experiences from the digital manufacturing management environment.

生产总监丁先生：引入HYDRA后，生产环节更加稳定和可控，车间管理更为透明。原先的MES系统只是完成了数据采集功能。HYDRA系统不仅能够更有效规范生产现场执行，系统提供的统计分析信息能够帮助我们迅速发现改进之处并监控改进措施的落实效果。HYDRA帮助我们成为世界级制造工厂。标准的IT架构最大程度降低了实施风险。我们现在已经准备预算，将现在的应用成果扩展到其他车间。此外，我们还打算在下一期同步引入设备绩效管理和人员资质管理。

Mr. Ding, EAGTOP Production Director: The production has become much more transparent and hence more controllable and stable with the help of HYDRA. All shop floor activities are standardized and manageable. Precise statistic information are timely presented to management so that the right decisions can be made and proper actions can be taken. HYDRA helps us to build up a world-class manufacturing environment. We are planning the roll-out toward other EAGTOP plants as well as toward further HYDRA function areas, namely Machine Performance Data and Workforce Requirement Planning & Qualifications Management.

IT经理刘先生：HYDRA是一套真正让用户拥有的MES系统。在实施过程中，我们得到了MPDV顾问

的专业培训，我们可以完成其他车间的系统实施工作。这样不仅降低未来的实施成本，还为企业培养了一批MES运维骨干。我期待接下来能够参加客户化定制培训，把HYDRA系统的应用价值发挥到最大程度。

Mr. Liu, EAGTOP IT Manager: HYDRA really is a user-owned MES. After very professional training by MPDV, we can do the roll-out almost by ourselves. Thus, not only the future implementation costs can be minimized, but also the in-house MES expertise will be gradually developed. We plan further training in HYDRA customization in the future, because we want to fully leverage on the potential value of HYDRA.

MPDV Asia with increased exhibition activities

Fuelled by the Industry 4.0 thrust in the ASEAN region, our subsidiary in Singapore has been seeing significantly increased enquiry volumes for MPDV's MES solutions. What a stark contrast as compared to a few years ago, when "Software & IT" was a rather exotic subject that many were indifferent about.

One prominent example is the Singapore-based "Manufacturing Solutions Expo (MSE)", which is now located in Changi Expo with way bigger facilities, due to space requirements.

After a big participation success in 2016, MPDV Asia has yet again exhibited its entire MES Solution & Services Capabilities portfolio from 25.-27.10.2017. The visitors response was encouraging, and meanwhile first concept workshop appointments for MES Solutioning could be secured.

This momentum is not just confined to within Singapore borders, but is gaining all over in Southeast Asia. From 22.-25.11.2017, the Metalex exhibition opened its door in the huge

BITEC exhibition centre. MPDV Asia's Country Partner E.S.E. – Extra Solutions Engineering participated including accompanying educational seminars about "Industry 4.0 through MES 4.0", on the basis of MES HYDRA.

One of the seminar highlights was the demonstration and reference report from a real life MES HYDRA customer in Thailand, explaining how the MES has already helped them in turning their production into an innovative "Smart Manufacturing" environment.

www.vacom.de
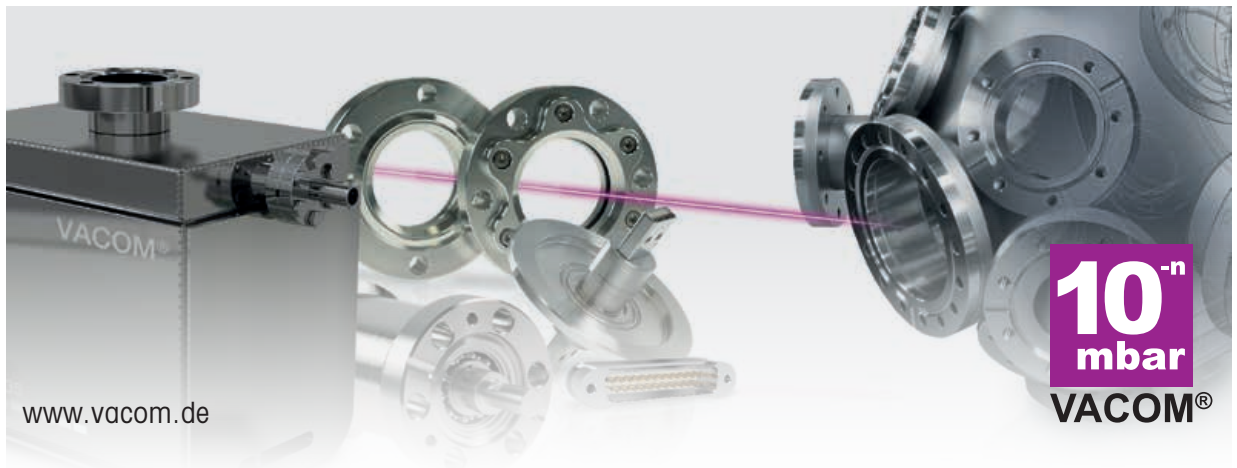
VACOM®

VACOM Vakuum Komponenten & Messtechnik GmbH is one of the leading European providers of vacuum technology and operates worldwide. The family business was founded in 1992 and employs today over 200 people. As a business partner of companies from the high-tech sector such as analytics, optics, semiconductor and accelerator technology, VACOM is specialized in the production of vacuum components up to complex chambers and has innovative cleaning processes with defined purity classes and reproducible cleanliness measurements.

At their production site in Großlöbichau, Germany, VACOM used a self-developed system for recording shop floor data and personnel times. This system was to be replaced by a flexible standard software in order to be ready for the future. In addition, the framework of SAP and the production-oriented IT should be supplemented by detailed order planning. Due to the wide range of standard functions and the versatile configuration and customizing options, VACON chose MPDV's Manufacturing Execution System (MES) HYDRA.

Since 2015, the MES applications were implemented step by step. VACOM started with the replacement of the personnel time system. This was followed by the introduction of HYDRA Shop Floor Data, which in turn improved transparency in production and at the same time enhanced the data reliability. On the other hand, many formerly paper-based processes could be replaced by the electronic provision of information and the digital data collection – also for machine data. Now, current KPIs such as the utilization efficiency are available at the push of a button.

In a second implementation phase, VACOM introduced HYDRA Shop Floor Scheduling for the detailed planning of production orders and HYDRA Personnel Scheduling. The horizontal integration ensured by HYDRA, enables the display of planned staff on the respective machines in the detailed planning. Also, checking availability of required staff is possible at certain workplaces. All in all, VACOM can now utilize machines much better and thus, can deploy personnel more efficiently.

For the future, VACOM is already planning to extend their HYDRA installation, e. g. with HYDRA Tool & Resource Management. For VACOM, MES HYDRA is a central pillar on their way to Industry 4.0.

❝ Matthias Ring, Head of Production Department at VACOM:
Thanks to HYDRA, our production and organization has become more transparent. The planned production targets can be viewed by every worker and the throughput times have been significantly reduced. In sum, we can now better exploit potentials based on exact evaluations. ❞

www.heinrich-huhn.de

Heinrich Huhn

The traditional company HEINRICH HUHN GmbH + Co. KG is located in the region Southern Westphalia, Germany, and is specialized in metal forming. For more than 100 years, the company has a reputation as an honest and authentic partner. The family-run company has successfully passed the transition from a metal processing company to a leading manufacturer of metal moldings and complex assemblies primarily for the automotive industry. Heinrich Huhn currently employs more than 450 well-trained employees at two locations in Germany and Slovakia.

For the efficient production of complex metal moldings, Heinrich Huhn was already looking for a suitable Manufacturing Execution System (MES) in 2004 to replace their aging software for recording shop floor and machine data. Therewith, the transparency in the shop floor as well as the necessary high quality should be assured. The decision at that time to introduce the MES HYDRA of MPDV, was based on the system's comprehensive range of functions and the option to have a broad software standard on the one hand, but on the other hand the opportunity to customize the system flexibly to their needs. In the meantime, about 20 transfer presses, punching machines as well as assembly and welding systems were connected to HYDRA via an interface.

In 2012, Heinrich Huhn decided to replace the previously used system for quality assurance (CAQ) and to integrate the functions in HYDRA. At the same time, the focus was on the idea of consolidation: The operation in the shop floor respectively in the quality area should be simplified for the employees without having to procure additional hardware for a separate CAQ system.

Heinrich Huhn uses HYDRA for inspections in goods receipt, for in-production inspections and in the quality lab. Additionally, HYDRA generates inspection certificates for each product.

In 2016, Heinrich Huhn undertook a release change to HYDRA 8 in a short timeframe. In particular, the high percentage of personal contribution as well as a consistent concept for the training of selected employees made this fast and largely smooth transition to the current software release possible.

> **⁣⁣ Jürgen Schneiter, Head of IT, and Dominik Wigger, Quality Planning at Heinrich Huhn:**
> With HYDRA, we are able to master all our challenges of transparency and quality with one system. The flexibility to easily customize the broad software standard is very important to us. 🙙

www.hensel-electric.de

Gustav Hensel GmbH & Co. KG, a medium-sized provider of electrical installation and distribution systems with more than 800 employees, was established in 1931. The range of products offered by the globally agitating company group, located in Lennestadt, Germany, includes cable junction boxes, power distributors and low-voltage switchgears. Today, these parts can be found in many buildings used for commercial and industrial purposes, in outdoor facilities or in photovoltaic installations 70 percent of its turnover derive from serial parts production. 30 percent derive from projects, made with low-voltage switchgears of all types and characteristics.

The most important goal that was to be achieved when the HENSEL Group implemented a Manufacturing Execution System was to improve transparency in production. More specifically, this meant on the one hand implementing a software that had the capability to consistently collect and manage recorded data on the shop floor. On the other hand, HENSEL wanted to establish a suitable tool for detailed scheduling and production control.

Since 2010, the company has been organizing all technical production processes with the help of MES HYDRA. For this purpose, HENSEL uses the HYDRA modules Shop Floor Data, Machine Data, Tool & Resource Management and Shop Floor Scheduling at three production sites. Cur-

rently, a total of 120 machines/manual workstations are connected to HYDRA. As HENSEL's operations are composed of a combination of plastics and metal processing, as well as assembly processes, the company really appreciates that HYDRA is able to map all kinds of production processes in one system. There are many industry-specific MES in which this is not the case.

After the successful change of release to HYDRA 8 in 2012, HENSEL made the decision in the spring of 2015 to also implement HYDRA Energy Management. On the one hand, this module supports efforts to meet the certification requirements of DIN EN ISO 50001, while at the same time monitoring the efficient use of precious energy resources.

In order to expand the MES range of functions by integrated CAQ functions, the HYDRA module In-Production Inspection is to be rolled out at all three production sites by early 2017.

> **Georg Schürholz, HYDRA Project Manager at Gustav Hensel GmbH & Co. KG:**
> In HYDRA, HENSEL has found an MES system for the entire company group. Because we had to map processes for both plastics production and metal processing in our company, we made the decision to go with HYDRA. Our goal was to use the various modules close-to-standard.

Industry 4.0 needs data

MPDV establishes competence center for shop floor integration

MPDV has established an inter-divisional competence center in its continued promotion of shop floor integration as an important topic for the future and its endeavor to serve the market accordingly. The center's members are tasked with promoting the topic both internally and externally and with developing suitable products, services and solutions.

For many months now, the future topics of Big Data and Industry 4.0 have been determining the MES market. Both topics require intense communication between Manufacturing Execution System and machines and equipment. "In MES projects, we are expecting there to be a significant increase in the number of communication partners in shop floor very soon", explains Thorsten Strebel, Vice President of Product Development & Consulting at MPDV. "In order to be able to manage this flood of data, extensive knowledge and the appropriate tools will be critical."

Shop Floor Integration Competence Center

With the newly established Shop Floor Integration Competence Center, the MES experts are combining their cross-process expertise relating to shop floor integration, thus concentrating the most important core competencies into one inter-divisional team. In the future, this team will be responsible for providing support and further developing products and services.

Innovative products in shop floor

As early as 2004, MPDV had already introduced a product to the market – the HYDRA Process Communication Controller (PCC) – which made it much easier to link machines and systems using standardized methods. At the same time, a team was established to provide comprehensive support to HYDRA users in all aspects pertaining to shop floor integration and to assist in the connection of machines and systems by means of configuration options or the development of individual drivers.

Another important step toward the simple, flexible and automated integration of machines and systems is the new Shop Floor Connectivity Suite, which is already available.

Thorsten Strebel (second from the right) offering his congratulations on the establishment of the Shop Floor Integration Competence Center

Think ahead and know where MES pays
Online ROI Analyzer

Investments need to be thoroughly considered – that also goes for software in the production environment. For this purpose, MPDV has developed the online tool ROI Analyzer: It offers manufacturing companies an easy and quick option to calculate the potential return on investment (ROI) of a Manufacturing Execution System (MES) before implementing one.

Regardless of the economic situation, it is beneficial to know the profitability of a planned investment in advance. The free ROI Analyzer of MPDV gives an overview of the savings that can be achieved in individual areas or throughout the company by implementing specific MES functions. The ROI calculation is based on selected business parameters. An assessment that is tailored to the needs of the user shows where cost savings can be achieved in the fields of lead times, machine productivity, personnel efficiency and quality.

If required, an extensive ROI report is sent by mail and used for a subsequent MES implementation project.

Now also available in English

Recently, the ROI Analyzer has been made available for companies outside the German-speaking countries. Thanks to an English language version, companies and globally operating industrial corporations can now benefit from the tool and check beforehand the profitability of a planned MES implementation. Access to the ROI Analyzer: mpdv.info/roien

MPDV's ROI Analyzer – helps to plan the budgets for MES projects

New image film in three languages
MPDV in motion pictures

The new MPDV image film has recently been made available in three languages: German, English and Chinese. The film serves to further enhance MPDV's reputation as a market leader and global MES supplier. The pictures on this page give you an initial impression.

The image film can be seen in full length on YouTube.

English:
mpdv.info/imagefilmen
Chinese:
mpdv.info/imagefilmcn

The HYDRA Guidebook – now also available in English
Publishing house Springer expands its MES textbook series

In the course of Industry 4.0, the importance of Manufacturing Execution Systems (MES) has greatly increased – not only in Germany but worldwide. In order to satisfy the international demand for practical MES literature, MPDV now issues the English edition of the popular textbook "MES-Kompendium – Ein Leitfaden am Beispiel von HYDRA" published by Springer Verlag.

With "MES Compendium – Perfect MES Solutions based on HYDRA", Springer now publishes a new textbook on the subject Manufacturing Execution Systems. The English edition will be available soon. You can already order the book directly from the publisher or use one of the common online bookselling platforms (ISBN 978-3-662-549827, 59.99 EUR). The author, Prof. Dr.-Ing. Jürgen Kletti, company founder and CEO of MPDV, confirms that the international demand is increasing: "Shortly after having published the German HYDRA Guidebook in 2012, we were soon swamped with questions, if an English version also existed." Since the end of last year, a Chinese version of the book has also been available.

The content

In the MES Compendium, Prof. Kletti and Rainer Deisenroth explain by means of practical use cases how a modern MES works and how a manufacturing company can benefit from the various functions. The authors illustrate these topics using exemplary images and screenshots from the MES HYDRA by MPDV.

Deisenroth adds: "MES is attracting so much interest in all industrial regions of the world that more and more textbooks are published on this subject. The MES Compendium is unique as it provides readers with detailed information on a field-proven product."

Click here to find an overview of all MPDV textbooks: mpdv.info/textbooks

Together we are strong
Better positioned for partners

Where in the past MPDV acquired new MES projects almost exclusively through direct channels, the collaboration with cooperation partners acting as multipliers will play a more significant role in the future. For this purpose, MPDV has developed a promising strategy and initiated a new partner model.

MPDV has recognized the sign of the times and drawn the correct conclusions: In the past, partnerships were not actively developed and often encountered problems. Analyses have shown that both MPDV as well as potential partners have to invest quite heavily in advance of a cooperation in order to create the necessary level of motivation and acquire the knowledge that is critical for the success of the further steps. For example, both the typical Agents (see box for explanations) and the so-called Value Added Resellers (VAR) go through a training and qualification process together with MPDV. The expertise acquired from this training is an important prerequisite for ensuring that the partner is able to provide meaningful information about MES and HYDRA in sufficient detail as early as the sales process.

What is certain, among other things: thanks to Industry 4.0, not only production companies, but increasingly also software producers and IT service providers are interested in topics relating to MES. This is a trend that Rainer Deisenroth, Vice President of Sales & Marketing, is observing more and more frequently: "Where in the past we generally had to approach potential partners and recruit them as collaboration partners, today we are receiving quite a few more inquiries in this direction without having to take action ourselves prior to this."

In particular with regard to the Value Added Resellers (VAR), MPDV has changed its focus considerably. Where in the past all services had to be provided by MPDV itself, with just a few exceptions, the MES experts from Mosbach are now offering partners entirely new possibilities. By establishing the three new divisions

of MES Products, MES Services and MES Solutions, today's partners are able to easily decide which MES products they can purchase from MPDV and whether they can implement them fully by themselves in offering their customers their very own MES solutions or implement them partially and with the support of the experts from MPDV. To enable partners to offer their own high-quality services, MPDV has recently begun offering an elaborate, modular training program at its MES Academy. It ranges from trainings on the configuration an operation of HYDRA applications through trainings on the topic of "professional project management" to teach software developers in the creation of new MES applications with the use of the MPDV Development Suite.

"We are certain that by adjusting our partner management and by cooperating with competent and well-trained partners in the future, we will be able to achieve many more win-win situations for all parties involved than we have today", is how Rainer Deisenroth sees the future as he predicted a significant upturn in this sales channel.

In its new partner model, MPDV differentiates between two partner types: **Agents**, who simply establish contacts between MPDV and companies interested in MES, and **Value Added Resellers (VAR)**, who purchase MES products from MPDV, create an MES solution with their own services and implement them at their customers' locations.

Examples of successful VAR partnerships: KHS, a leading international manufacturer of filling and packaging systems for the beverage and food industry, markets and implements HYDRA in its own specific version under the label "Innoline MES". KHS has successfully implemented this MES solution for customers such as Bitburger, Paulaner, Coca Cola and many other beverage manufacturers around the world.

From the German perspective, the Russian market is characterized by several special circumstances. For this reason, MPDV has for many years been relying on a cooperation with the Russian automation specialist CEPR with headquarters in Moscow. CEPR has successfully implemented major, ambitious projects on the basis of HYDRA, among others with NLMK and Sukhoi Aviation.

Extensive collaboration in plastics processing

MPDV becomes MES partner with Wittmann Battenfeld

In the future, the Austrian manufacturer of injection molding machines, Wittmann Battenfeld, will be recommending its customers the use of MES HYDRA from MPDV for increased transparency in the shop floor and more efficient production. At Fakuma 2017, both companies presented the joint solution for the first time.

The goal of the cooperation between the machine manufacturer and the MES specialist is, on the one hand, to make state-of-the-art production machines available to plastics processors and, on the other hand, to offer suitable management software for a flexible production. The increased transparency in the processes makes it possible to optimize both the operating sequences as well as quality assurance. MES HYDRA plays an important role in this.

MES offers a wide range of benefits

As a result of continuous data collection, HYDRA always has a good overview of running orders, the current status of connected machines and any pending maintenance work. This allows a quick response to any disturbances and changes in the process, which reduces unnecessary interruptions to a minimum. At the same time, all collected data is also available for demand-oriented reporting. Pursuant to VDI Guideline 5600, HYDRA includes functions for all production-relevant areas, including Quality and HR Management. These also include reactive production planning and control for improved utilization of the production resources, which are usually expensive in plastics processing, as well as in-process quality assurance.

Joint presentation

Wittmann Battenfeld and MPDV exhibited the combination of their own injection molding machines with MES HYDRA for the first time at the plastics trade fair Fakuma 2017, which took place in Friedrichshafen, Germany from October 17th to 21st. Thanks to the collaboration between the two companies, users can benefit from the vast expertise when it comes to increasing efficiency in plastics processing.

Wittmann Battenfeld recommends MES HYDRA from MPDV for more transparency and efficiency in plastics processing

MES for small injection molders
Collaboration between KraussMaffei and MPDV

In the course of Industry 4.0, transparency in the shop floor is gaining importance even for small businesses. With its MaXecution solution, KraussMaffei will be offering a special version of MES HYDRA from MPDV which is especially suited to plastics processing companies which have just a few injection molding machines.

Even small plastics processors are not immune to the advancing digitalization, but the efforts coming along with the implementation of a complete MES system often exceeds the capabilities of a small company. KraussMaffei will be addressing this market in the future by offering a combination of injection molding machines and thereon matched and tailored MES functions.

For this purpose, the machine manufacturer from Munich is offering the MES solution MaXecution in three configuration levels, which the MES supplier MPDV from Mosbach has derived from the already well-known MES HYDRA: starting with a basic package for hop floor and machine data collection through additional planning functions in shop floor scheduling to the transfer of set-up data and the monitoring of process parameters, the manufacturing company can decide demand-oriented, how many functionalities of an MES it requires. Thus, with KraussMaffei, MPDV continues to widen its growing network of partners.

Presentation at FAKUMA 2017

KraussMaffei and MPDV presented their joint solution that combines machines and MES for the first time at the FAKUMA 2017 trade fair. Visitors to the KraussMaffei booth in hall A7 were able to experience a live demonstration of how production data is collected and analyzed. In addition, KraussMaffei held short presentations several times throughout the day that focussed on useful MES functions in plastics processing.
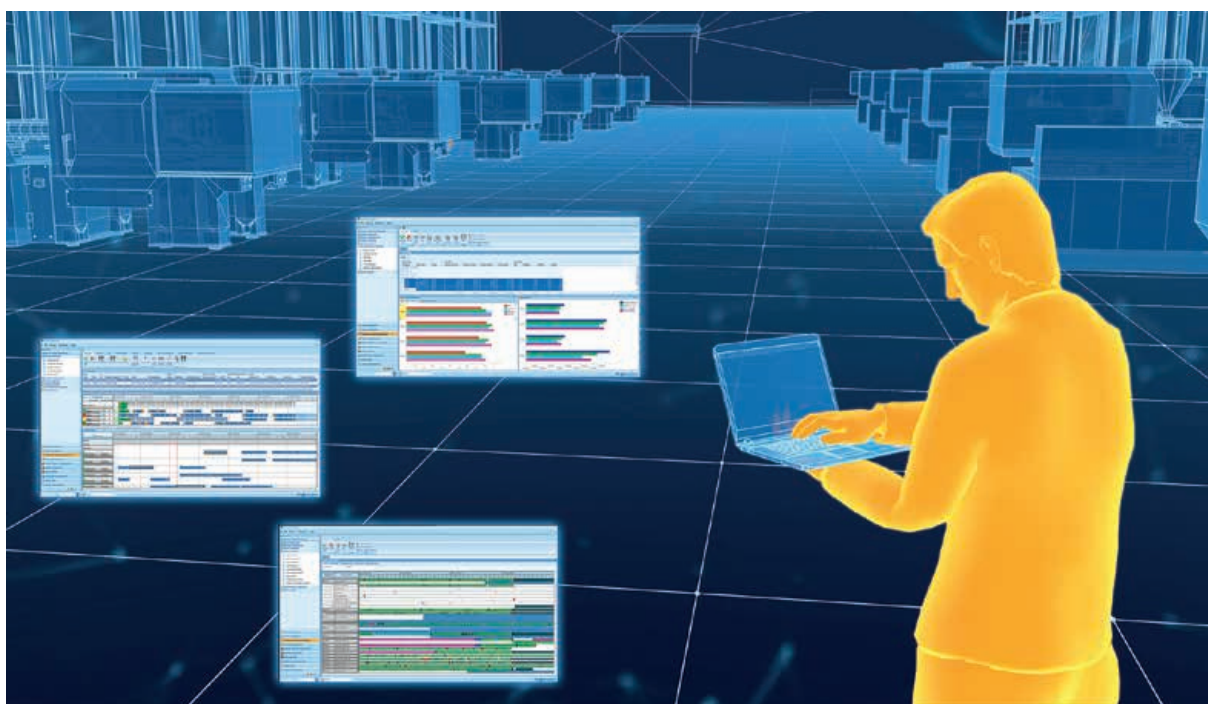
More transparency in production: the new MaXecution supports injection molders sustainably on their way to digital, paperfree shop floor scheduling

MPDV is DELL IoT Solutions Partner
Industry 4.0 is about using synergies

IoT Solutions **Partner**

The fact that Industry 4.0 needs a combination of hardware and software is demonstrated by the recent inclusion of MPDV in the Dell IoT Solutions Partner Program. Together they want to help companies realize the vision of the factory of the future.

"Just talking about hardware and software does not help us," explains Prof. Dr.-Ing. Jürgen Kletti, CEO of MPDV, "Industry 4.0 needs practical applications." Kletti considers the benefits for the user to be much more important than innovation for the sake of innovation. For this reason, he relies on collaborations with experienced technology partners such as Dell. "The industrial IoT products of Dell match the architecture of our MES solutions in an optimum way," adds Kletti. "This is a real benefit to the user." The Edge Gateway 5000 IoT solution is especially suited to the MPDV's decentralized data collection software in the shop floor providing together the basis for the necessary transparency in modern factories.

Jason A. Shepherd (right), Director of Strategy and Partnerships at IoT Solutions at Dell, together with Prof. Dr.-Ing. Jürgen Kletti at MPDV booth at Hannover Messe
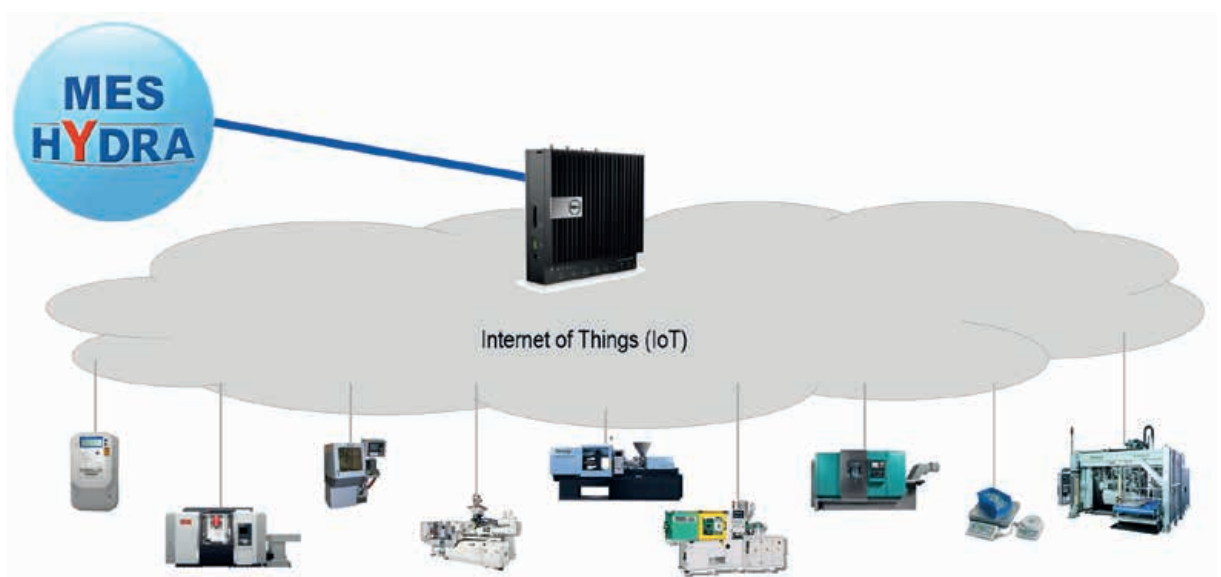
Joint activities

In addition to integrating suitable Dell products into solution scenarios with MPDV's MES HYDRA, joint workshops are planned. Here, the decision makers of German manufacturing companies of all sizes should be able to find out about the opportunities of Industry 4.0 and receive concrete recommendations for action. Under the motto "Think big – start smart", the inhibition threshold for industry 4.0 is to be lowered and the future user will have an economic benefit.

Future-oriented concepts

As early as the embedded world 2016, Dell and MPDV demonstrated in a common scenario how MES HYDRA from MPDV and the IoT Internet of Things optimally interact. The proposed architecture is now being intensively discussed in various committees and has also been awarded by Frost & Sullivan with Best Practice Award Global IIoT-based MES Platform for Discrete Manufacturing.

Possible MES-IoT architecture using the Dell Edge Gateway 5000

Cooperation with Balluff a success
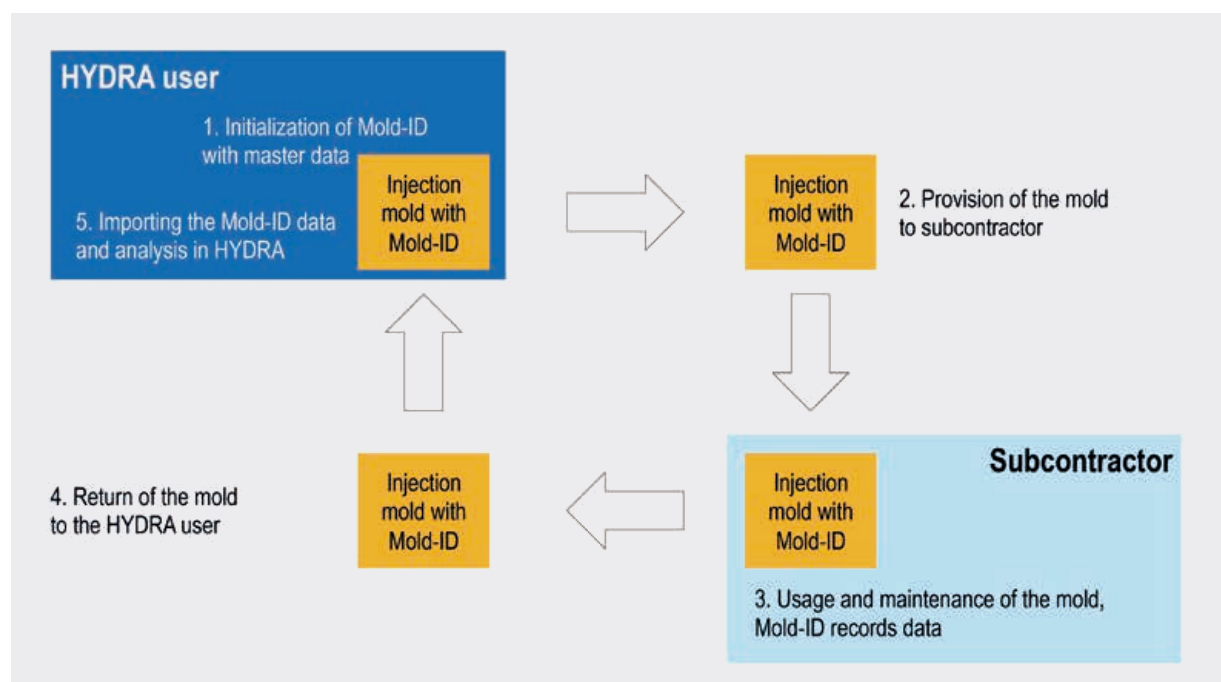
Mold-ID and HYDRA Tool & Resource Management

Around two years after announcing the cooperation with Balluff, the first production scenarios are being initiated by HYDRA users based on the combined solution for managing injection molds.

Efficient management of injection molds, which for the most part are quite costly, can be a decisive factor in giving plastic processing companies the edge over the competition. This is why Balluf offers Mold-ID, a simple RFID-based island solution which is designed to monitor cycles and maintenance intervals. Combined with HYDRA Tool & Resources Management WRM from MPDV, the solution can be extended to offer further benefits, as the data collected by Mold-ID are then further processed in HYDRA and can be analyzed in correlation to further prodution data. Thus, users of this combined solution always have an overview of their injection molds and their readiness for use.

Application scenario in production

Currently, MPDV is in concrete discussions with a HYDRA user who wants to use Mold-ID for the purpose of monitoring molds that he intends to make available to subcontractors. More specifically, this involves all data relating to cycles and maintenance being recorded at the subcontractor's location using Mold-ID and then being transferred into the MES when the mold is returned to the HYDRA user. In HYDRA Tool & Resource Management, the user can then monitor how many parts the subcontractor produced and whether the prescribed maintenance work was conducted properly and on time. The subcontractor does not need to have HYDRA installed, but instead just a few components are to operate Mold-ID. This means, the subcontractor has very little cost and the HYDRA user benefits greatly. Thanks to this increased transparency, the user can hope to enjoy significantly longer tool life and far fewer mold failures in its own operation and from use at the subcontractor.

Application Scenario of Mold-ID and HYDRA Tool & Resource Management

We report briefly in the Project Ticker about some of the companies having decided to use the MES solution by MPDV.

BAIC Hanyi (Chongqing) Automotive Trim Co., Ltd., China

The manufacturer of car doors implemented the applications BDE, MDE, MPL/TRT, HLS and WRM of MES HYDRA at their site in Chongqing, P.R. China.

DESSO Tarkett, Netherlands

The manufacturer of carpet flooring and artificial turf will implement HYDRA MES based on the template developed for TARKETT at the sites in Waalwijk (Netherlands) and Dendermonde (Belgium). The implementation includes the applications BDE, MDE, MPL, TRT and CAQ.

EMSA GmbH, Germany

The world-renowned German company looks back on a long tradition producing household and lifestyle products made out of plastic materials. EMSA has been an MPDV customer for many years using the MES modules BDE, MDE, HLS, WRM, ZKS and a PZE sub system. The company has now decided to upgrade to HYDRA 8 and is going to extend the system by the HYDRA application PZW/PZE. Since 2016, EMSA has been part of the international SEB Group.

Eppendorf, USA

The American sister company of Eppendorf Germany has only partially used the HYDRA system implemented in Oldenburg. As part of the version upgrade from HYDRA 7 to HYDRA 8.2, a separate system will be implemented at their site in Enfield (CT) including the HYDRA modules BDE, MDE, HLS and WRM. Eppendorf develops, produces and sells lab products around the world.

Grohe Siam Ltd., Thailand

The Thai subsidiary belonging to the leading supplier of sanitary fittings has decided to extend the HYDRA applications by adding FEP, PDV and ESK.

Kirchhoff Automotive North York, Canada

The long-term MPDV customer and their HYDRA competence team are going to roll out MES HYDRA almost independently using the applications BDE and MDE in their 19th site.

Model SA, Switzerland

The specialist for packaging solutions made of cardboard and corrugated board is rolling out the HYDRA modules BDE and MDE at their headquarters in Weinfelden (Switzerland) to monitor and control the production orders and the machines in the shop floor.

OVAKO AB, Sweden

The leading European manufacturer of engineering steel delivers to customers from the logistics and construction industry. OVAKO is going to implement the Manufacturing Execution System of MPDV at their production site in Hällefors (Sweden). The HYDRA applications BDE, MDE, CAQ, MPL, TRT and WRM will be used.

Paulaner Brauerei GmbH & Co KG, Germany

The traditional brewing company Paulaner of Munich is best known for their beer specialties around the world. In an attempt to prepare for the future, Paulaner will introduce HYDRA in a specific design, namely Innoline MES, developed by the MPDV partner KHS to control logistics and monitor filling processes.

Pfleiderer Group, Poland

Three companies of the Pfleiderer group in Poland are implementing the MES HYDRA already in use at the site in Leutkirch (Allgäu, Germany). The applications BDE, MDE, MPL and TRT are implemented. Pfleiderer produces wood-based materials.

SAF-HOLLAND GmbH, Germany

SAF is one of the leading manufacturers of axle and suspension systems for commercial vehicles. The company's headquarters are in Bessenbach, Germany. An individual HYDRA template will be developed and rolled out. The applications used are BDE, MDE, HLS, WRM, FEP, TRT, PEP, PZE/PZW, ZKS, and SMA.

Schlote Group, Germany / China

Two companies of the international Schlote Group are implementing MES HYDRA: Schlote Brandenburg GmbH & Co. KG and Schlote Automotive Parts (Tianjin) Co. Ltd. Both companies are automotive suppliers and produce machines and systems for die-casting.

Sealed Air Corporation, USA

The Food Care Division of Sealed Air wants to improve the production of packaging systems at their site in Simpsonville (South Carolina, USA) by implementing an MES. In the course of a pilot phase lasting 8 months, MES HYDRA was tested extensively and an individual template close to the standard was developed. The following modules are used: BDE, MDE, HLS, WRM, PEP, PDV, MPL, TRT, FEP and WEP combined with the mobile Smart MES Applications and the MES-Cockpit. After the successful pilot phase, a roll-out to further production lines and 67 further sites worldwide is planned.

United States Gypsum (USG), USA

North America's leading manufacturer of drywall and joint compound products and other related building products has decided to invest in MES HYDRA. The modules BDE, MDE, HLS, PDV, MPL, FEP, PMV, SMA and MES-Cockpit are implemented at their production site in Bridgeport (Alabama) to increase productivity, efficiency and quality. At the same time, HYDRA is implemented at the headquarters in Chicago and the Center of Excellence and for this reason a USG specific HYDRA template is developed. After successful implementation, the roll-out to further production sites and lines is planned.

Wrap Film Systems, Great Britain

The British company will use the HYDRA modules BDE and MDE at their site in Telford. The company produces films and foils for the food sector.

Legend of the abbreviations:
Access Control (ZKS), Complaint Management (REK), DNC & Configuration Data (DNC), Dynamic Manufacturing Control (DMC), Energy Management (EMG), FMEA (FMEA), Incoming Goods Inspections (WEP), In-Production Inspection (FEP), Machine Data (MDE), Material and Production Logistics (MPL), Personnel Scheduling (PEP), Personnel Time Management (PZW), Premium and Incentive Wages (LLE), Process Data (PDV), Shop Floor Data (BDE), Shop Floor Scheduling Detailed Planning (HLS), Test Equipment Management (PMV), Time & Attendance (PZE), Tools and Resources (WRM), Tracking & Tracing (TRT)

More about MPDV, MES and effiency in production

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