Pharmaceutical / Life Sciences Successes

Global References & Case Studies

Think Big

From super SCADA to on-prem & cloud-based MES to enterprise-wide industrial data management.

- **More than 1,600** Pharmaceutical / Life Sciences customers – with thousands of plants around the world
- **Tens of thousands of software users** in Pharmaceutical / Life Sciences – on nearly every continent
- 2500+ GE software customers have systems with >**500,000 tags**
- **#1 MES** out of 19 vendors for Continuous Process according to 2022 Gartner report
- **One seamless MES** for Process, Discrete and Diverse / Mixed Manufacturing
- SCADA with **99.999999999% availability**

90% of the world's top pharmaceutical companies use GE Digital software

Delivering Real Results in Pharmaceutical / Life Sciences

- 80% decrease in downtime
- 50% increase in OEE
- 93% faster downtime reason identification
- 25% reduction in the FAT-IQ stage of the project lifecycle
- 80% additional capacity
- 70% decrease in productivity losses
- 24/7 uptime for continuous operation
- 40% decrease in standard hours to operate packaging lines – per line, per shift
- 25% reduction in expansion lead-time
- 23% reduction in resources
- 16% increase in delivery compliance
- 20% reduction in investigation time
- 20% increase in OEE
- 20-30 times faster trending

Overcoming pharmaceutical and life sciences industry challenges

GE Digital customers have increased agility, adhered to regulations, and accelerated time to market by implementing proven automation, MES, and industrial data management solutions.

Aché Laboratórios

Aché Laboratórios Farmacêuticos S.A. implements batch execution system.

Read >

Alcon

Faster response times with Historian and high performance trend analysis.

Read >

Bifodan

Bifodan achieves revenue growth and more satisfied customers.

Read >

Coloplast

Minimal downtime saves vital resources.

Read >

GE Healthcare

Digitization of environmental monitoring at Austrian site.

Read >

Genzyme

Speedy data collection and production reports.

Read >

IMA Active

Meeting data integrity requirements in regulated industries.

Read >

JHP Pharmaceuticals

Now part of Par Pharmaceutical

Paperless manufacturing enables repeatable production.

Read >

Lek Pharmaceuticals

Solution to control and monitor environmental conditions.

Read >

McNeil in Sweden

Chooses Proficy to increase OEE of its packaging lines.

Read >

North American Pharma

Electronic quality checks and corrective actions.

Read >

Pfizer

Pfizer Cuts Downtime by Moving to Predictive Maintenance.

Read >

Pfizer Newbridge

Pfizer Newbridge drives business value with integrated automation.

Read >

Pfizer Puerto Rico

Building manufacturing efficiency.

Read >

Reckitt Benckiser

Optimization of control system with batch execution systems.

Read >

Yuria-Pharm

Implementation of manufacturing operations management system in the pharmaceutical industry.

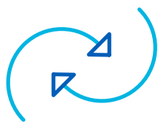
Read >

Zoetis

The Path to the Industrial Internet

Read >

Outcomes



Increase agility

Manage your batch execution for greater agility and reduced costs. You can streamline end-to-end operations, ensure product quality, and drive high-volume production, even when switching products between batches is a requirement.

Adhere to regulations

Complying with stringent regulations is a must. Support your traceablity, data management, reporting, and continuous improvement needs with proven, modernized technologies. Furthermore, enforce Standard Operating Procedures by guiding operators through the right steps and tracking performance.

Optimize operations

By integrating and analyzing the data being generated on production lines, improvements can be made across plants including on batch variation, ingredient consumption, quality costs, waste, and management of abnormal situations. Optimizing also alleviates knowledge gaps between experienced and new operators.

Speed time to market

Improve your ability to compete against generics, penetrate new markets, and leverage existing products prior to patent expiration with digital transformation. You can improve local production operations while meeting global requirements. With a connected enterprise, you can accelerate time to market and boost competitiveness.

Improve quality and output

By monitoring your equipment and production lines with industrial applications, life sciences and pharmaceutical manufacturers can shift from schedule-based maintenance practices to more condition-based or preventative maintenance practices. This helps eliminate vulnerabilities in the production lines – improving both product quality and output.

Transform data management

Digitize historically paper-driven processes and records, moving to electronic SOPs, specifications, BOMs, batch records (EBR), maintenance logs, and more. Additionally, a plant- or enterprise-wide data historian increases performance, boosts data integrity, reduces costs, and provides a foundation for IoT continuous improvement.

Aché Laboratórios Farmacêuticos S.A. Implementation of a Batch System

By Ronaldo Luis da Silva, Maintenance Engineer, Aché Laboratory; Moacyr Souza Júnior, Account Manager, Aquarius Software; and Sidnei Kolano, Technical Manager, Link Automação

This case study is an excerpt from an article in Portuguese that appeared in InTech.

Company Background

Aché Laboratórios Farmacêuticos S.A. is a 100% national capital company. Along its trajectory of more than four decades, Aché has become a dynamic company with strategic partnerships, inside and outside Brazil, for its expertise in similar medicines, management of a mature portfolio, knowledge of the Brazilian consumer market, and for the continuous development of products and services, in order to meet the needs of health professionals and consumers, providing health and well-being to the population.

With around 3.5 thousand employees, Aché has three industrial plants. The largest of them, located in the municipality of Guarulhos, in Greater São Paulo, also houses its administrative headquarters. The second is installed on Avenida Nações Unidas, south of the city of São Paulo, and the third in Goiás, with the acquisition of 50% of the pharmaceutical company Melcon, specialized in the production of female hormones.

In its strategic direction, to operate as a complete solution company, Aché operates in the three key segments of the pharmaceutical sector: Prescription, Generics and Non-Prescription Drugs (MIP). It maintains a broad portfolio, with more than 250 brands marketed in approximately 600 presentations.

Scenario Prior to the Implementation of the System

Within the liquid unit of the Guarulhos plant, there were numerous products to be manufactured and a great variability in production times. All steps specified in the prescription of a drug were performed manually. With great difficulty in stipulating a production delivery time for a given batch, previous batches were analyzed, and a difference in execution times was found between the handlers responsible for producing batches of the same product.

In order to standardize the operating times until reaching the final product, a study was developed to verify the need to implement a tool capable of automatically managing the batch production process.

After this analysis, it was found that with the reduction of manual interventions in the process, it would be possible to achieve a forecast closer to reality regarding the delivery time of a batch.

With an implementation date scheduled, the automation system of the liquid unit had the challenge of creating a standardized platform, based on international software development standards and in compliance with the main regulatory agencies of the pharmaceutical sector in the world.

To overcome the challenge, it was necessary to obtain a software platform that was built under the norms of the pharmaceutical sector, facilitating the adaptation of the production process and the personnel involved in the production of medicines to the new system.

In addition, the characteristic of being built under industry standards would facilitate the process of validation and qualification of the new computerized system.

Solution Adopted

With the choice of the Proficy product line from GE Digital, through its distributor Aquarius Software and implementation by Link Automação, all the resources available in the S88.0 construction standards, have earned their reputation and, with the property of building libraries, the classes, phases and operations of the system, it was possible to implement a complex project, in a very short period of time and with great quality, eliminating the risk of building errors.

The first step in implementing the system had already been taken successfully, but the software platform needed to be documented according to the requirements of good manufacturing and documentation practices GAMP and FDA 21CFR part 11.

As the platform was built under the guidelines of the pharmaceutical market, the software adapted perfectly to the resources requested by GAMP and 21CFR Part 11, making the documentation, testing and correction system a process capable of being accurately measured and with perfect adherence to regulations.

As the validation and qualification process in the pharmaceutical industry is rigorous and delicate, all settings must be documented with excellence in all stages. At this stage of the project, if the software platform is not fully compatible with the norms and good practices of the sector, construction errors or problems of adaptation of the new system to the production environment will be found, condemning the computerized system to failure.

With the second step successfully completed, it was necessary to create the recipe models (Procedures) that would be used in the new computerized system and plan the installation of the system.

The creation of the solution based on the S88 standard allowed the system to use all the physical resources installed in the production unit, transferring these resources to the drug production recipes.

At the same time as the recipes were created, another work team performed the tests of the recipes already implemented, validating the entire system in an almost parallel work format. The programming and connectivity resources with databases and objects provided by the software platform were fundamental for the success of the recipes to be achieved. In addition, the native Client / Server features and the ability to fully adapt to the operating system and the distributed architecture, with different levels of security, allowed the implementation to be carried out with several work teams at different levels of the system. With electronic work messaging resources, the construction of product recipes reached the highest quality standard and, at the same time, the operator's proximity to the system, facilitating the development and acceptance of the solution by the operation team.

In this stage of the project, the construction, documentation, testing and implementation steps had been successfully completed and the system needed to guarantee the return on investment and provide resources to optimize the process, through the analysis of the implemented revenue structure.

In order to resolve this issue, total compatibility with the S88 standard was essential, because through a detailed study of the recipe structure, it was possible to decrease the number of steps, reducing the software cycles and automatically shortening the production time for each product.

The recipes were created using the SFC (Sequential Function Chart) language, which facilitates the organization because it graphically describes the sequential execution behavior, facilitating the visualization of the actions that will be performed and the transition conditions that will be necessary for the next step to be initiated.

The availability of the system was guaranteed with a solid hardware and software redundancy structure, which offers the necessary security for the production process. With redundant database servers and supervisory systems, several process data recording locations, the system continues to operate even if many hardware items fail at the same time.

Currently, the data generated by the management system is stored and traceability reports are consulted by the supervisors of the production unit and quality assurance department, to monitor the quality of the production.

Benefits with the Implementation of the Management Tool

With the implementation of this system, which is easy to operate, where it is possible to monitor in real time all the resources that are being used and the products that are being manufactured, there was a significant increase in production capacity.

The use of electronic signature in all interventions carried out in the process with configuration of hierarchical levels ensures the registration of events and system actions, avoiding interventions by unauthorized people and ensuring that operations are being carried out consciously, with the user's confirmation and password. A typical example is the release of recipes for production that are carried out only by the Quality Assurance area.

With the reduction of human interventions, it is possible to define the start and end times of production much more effectively, considering the product and the lot size, guaranteeing precious information for an efficient and dynamic management of the production process. In addition, the possibility of human error has decreased, ensuring standardization and execution of all steps in the same sequence and time interval.

Due to the system being based on the ISA-S88 standard, its maintenance is easy to understand, saving time and technical resources, and ensuring a longer time of availability for production.

Bibliographic References

[1] ISA S88 – http://www.wbf.org/.

[2] GAMP (Good Automated Manufacturing Practice) – www.ispe.org.br/.

[3] FDA (Food and Drug Administration) chamada 21 CFR Part 11 – http://www.fda.gov/RegulatoryInformation/Guidances/ucm125067.htm.

[4] Guia de Validação de Sistemas Computadorizados – http://portal.anvisa.gov.br/wps/wcm/connect/d0dd69804745858b8f28df3fbc4c6735/Guia+VSC+ANVISA+FINAL+09_04_2010.pdf?MOD=AJPERES.

The original full article in Portuguese appeared in InTech.
Source: http://www.aquarius.com.br/wp-content/uploads/2018/05/InTech143-Batch.pdf

Alcon Puts Strong Focus on Validation for the Production of Eye-Care Products

Significantly Faster Response Times with Historian and High Performance Trend Analysis

Originally founded in 1947 by pharmacists Alexander and Conner, Alcon has grown to a world-wide pharmaceutical vision-care manufacturing and research company with over 10,000 employees. By expanding to multi-national production facilities and through continuous investments in research and development, Alcon has established a leadership in the eyecare field.

Alcon Belgium provides production facilities for specialized eyecare products. The production is organized into four divisions, each with very strict requirements for the automation layer. The pharmaceutical industry has always been subject to strict regulations. Production of medication and health care products must take place under the most severe registration rules, in order to comply with the regulating authorities. Following the trend for more automated production processes, the FDA has formulated an electronic definition of process tracking in the form of 21 CFR Part 11.

What does 21 CFR Part 11 mean in practice?

In an attempt to structure and guide line the continuous replacement of the current paper work flow in production processes, the FDA has formulated a set of definitions for electronic signatures and work-in-instructions. Working in a validated production environment basically means enforced security in combination with an extended audit trail. Every single change to the production system needs to be captured, recorded and archived into a closed and secured database.

"With the Proficy Historian product the response times are 20 to 30 times faster than with the traditional trending tools"

– Dirk Steeman, Automation Manager, Alcon Couvreur, Belgium

How to apply to these rules

Implementation of a validated electronic tracking system requires a structured approach from the bottom up, Alcon has adopted an object oriented control layer approach, starting with the organization of standard building blocks in the PLC. Each sensor value goes through a number of standard function-blocks to calibrate, check alarm boundaries and calculate before it reaches its final value. Set points and calibration can only be changed by authorized personnel and are checked continuously within the PLC.

Every non-conformity and deviation is automatically reported through the standard SCADA system iFIX from GE Digital to a central database from which daily reporting takes place. Authorization is enforced through out the entire system using the seamless integration-of security within iFIX and Microsoft Windows®.

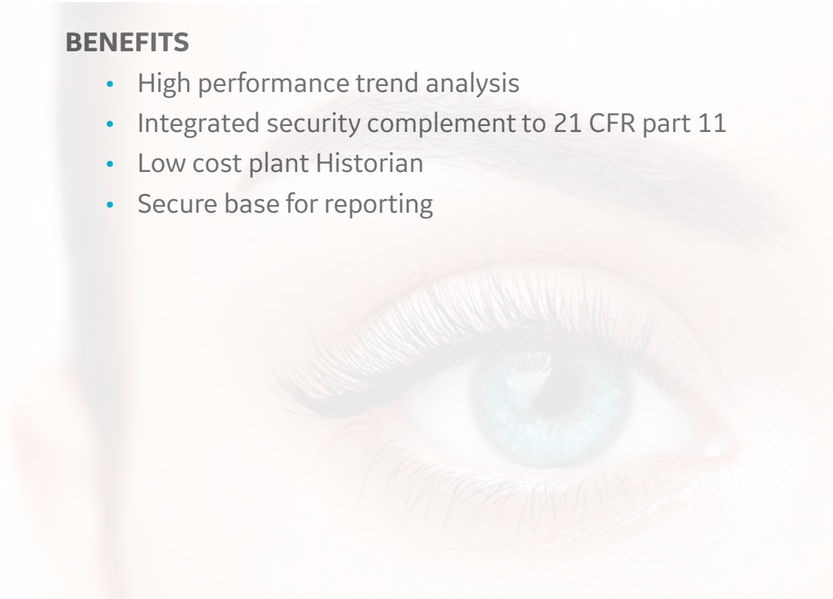
SUMMARY

COMPANY
Alcon Couvreur, Belgium

SOLUTIONS
Production Management
- Process Visualization
- Process Validation
- Plant Information

PRODUCTS
- iFIX
- Proficy Historian

BENEFITS
- High performance trend analysis
- Integrated security complement to 21 CFR part 11
- Low cost plant Historian
- Secure base for reporting



Validated Applications

From a hardware point-of-view, the network infrastructure is physically split into an administrative and a production network. The production-network itself is split into a part for validated applications and a part for non-validated applications. The validated applications deal with the continuous monitoring of the environmental production room condition (temperature, pressure, humidity, etc) and manufacturing equipment status. Within the validated part no changes can be applied without the explicit authorization of the internal validation department, again enforced by the system. The use of standard building blocks both structures and simplifies the validation process.

High Performance Data Historian

In their continuous search for process improvements, Alcon has adopted the Proficy Historian product. With a built-in 21-CFR-Part 11 compliancy the product is able to capture historical process values and store these into central archives. Historical values are often required for trend analysis and reporting by both the QA department and production personnel. The main reason for Alcon to purchase Proficy Historian was its tremendous increase in performance over the existing trending tools. Response times have increased enormously, while the impact on the existing installation is kept to a minimum. The sophisticated compacting functionality minimizes the required disk-space, which means for Alcon a disk-space requirement of only 0.5 MB for the recording of 30,000 tags per day.

Revenue growth and more satisfied customers at Bifodan

Bifodan A/S, now part of Deerland Probiotics & Enzymes, produces dietary supplements and medicine. The production consists of both Bifodan's own products and customers' brands. After working with Novotek and implementing ROB-EX Scheduler, Bifodan has improved their credibility as supplier and realized a 20% revenue increase.

100% confidence of effective management

The production processes at Bifodan include mixing of ingredients according to prescriptions, production of pills or capsules, surface treatment, packing, quality control, approvement, and delivery.

ROB-EX Scheduler provides overview of all processes, ensuring that production is scheduled so that resources and materials are utilized optimally.

ROB-EX has made a big difference in the daily work at Bifodan. Logistics and purchasing manager Steen Christensen says: “ROB-EX gives us control of our delivery times and our reliability as supplier is top notch. It is essential in our industry. Our customers have 100% confidence that their orders are in the best hands with us and that they receive the agreed goods delivered in the agreed quality and on time. Through an effective and strict management of our activities, from order receipt to delivery, it has been possible to increase both turnover and revenue without hiring more employees. ROB-EX has a share of the credit for this.”

” Our credibility as supplier is top notch.”

— ***Steen Christensen,***
Logistics and purchasing manager, Bifodan A/S

From order to finished product

ROB-EX is a graphical scheduling tool where the information to the production schedule can come from the ERP system. At Bifodan ROB-EX is integrated with NAV. When customer orders, production orders, and purchasing orders are set up in NAV, the relevant order information is exchanged with ROB-EX, and ROB-EX can afterwards automatically place the order in the production schedule. Changes will immediately be exchanged with NAV if the planner edits the production schedule.

Bifodan A/S
Hundested, Denmark

Challenges

To get as close as possible to 100% compliance with promised deliver because security of supply is an all-important factor in the pharmaceutical industry

Solutions

- ROB-EX PLANNER
- ROB-EX VIEWER
- ROB-EX PLUS
- ROB-EX PROJECT
- ROB-EX MANPOWER
- ROB-EX INTEGRATION
- ROB-EX SERIES & GROUPS
- ROB-EX MULTI-USER

Benefits

- Delivery compliance went up from 82% to 98%
- Increased credibility
- Contributory cause of 20% increase in turnover

Obvious benefits

There are a number of benefits related to giving relevant employees at Bifodan direct access to an updated production schedule.

- The purchasing department focuses on whether the ordered items arrive on time, so that scheduled orders can start on time.
- Optimization of planned purchasing, meaning that raw materials for production arrive as close as possible to the time of consumption. This reduces inventory levels and lowers handling costs.
- It calms things down and increases efficiency when you can take bottlenecks and other issues into account before it will affect the ongoing production in the form of sudden changes.
- Bifodan does not have to spend time discussing possible changes and delays with customers and internally in the company.
- No orders where the sales department promises a delivery time that Bifodan cannot comply with. In the production schedule employees can see what consequences a rush order will have.
- The workload graph in ROB-EX gives the sales department an opportunity quickly to see when there is capacity available to take in new orders.

Increased credibility and turnover

Bifodan meets delivery times on 98% of orders after implementing ROB-EX. Before it was around 82% of orders that were delivered on time. Now Bifodan has more credibility as a supplier, and they have also increased satisfaction among both customers and employees. Moreover, better scheduling of production has contributed to a 20% increase in turnover.

Minimal downtime saves Coloplast vital resources

At Coloplast, the innovative and world-renowned provider of healthcare products and services, the need for an efficient packaging flow for its wide range of wound care products is ever increasing.

By installing new Proficy OEE software on all its packaging machines and working with GE Digital partner Novotek, Coloplast is gaining unrivalled insight into the various causes of operational downtime. Simultaneously, automated production data analysis can speed up downtime diagnosis, providing production managers with more knowledge of what action to take to keep the vital packaging process up and running.

Fast Response Times

As packaging is at the end of a highly specialized production process, flexibility is vital if Coloplast's round-the-clock packaging operations are to keep running smoothly. Naturally, when short-notice shifts and unscheduled production halts occur during packaging, operators must respond immediately. With Proficy software automatically surveying every packaging step on every machine, problems can be identified and solved when they first arise, cutting response times to a bare minimum.

High Transparency

A detailed overview of several hundred downtime causes provides Coloplast with a fully transparent packaging process. Both scheduled and unscheduled stops are registered and analyzed, and numerous analytic options are presented. Management can then quickly isolate variables, detect downtime patterns and draw detailed downtime profiles for each machine and packaging step.

"Tried-and-true technology from Novotek has given us the flexibility and transparency we need to maintain superior quality in our dynamic packaging process."

— Birger Andersen, Project Manager, Coloplast, Denmark

Solutions

- Production Management
- Global downtime analysis
- Plant information

Products:

- Proficy Historian
- Proficy Plant Application—Efficiency
- iFIX HMI/SCADA

Benefits

- Increased line and machine efficiency
- Fast response times
- High transparency
- Realistic predictions
- Web-based reporting

Realistic Prediction

With the detailed historic data from each machine, combined with the in-depth downtime knowledge, management can also accurately predict future packaging capabilities. The Proficy data computation forecasts are accurate right down to number of units on a day-to-day and individual machine basis, so manpower is allocated most effectively and the budgeting process is enhanced. Predictions are no longer based on feelings and hunches but on facts and indisputable data.

Common Standards

By introducing the Proficy OEE machine downtime analysis to several packaging processes, Coloplast has reaped the benefits of having a single knowledge base. Comparisons of packaging quality between product lines and divisions reveal the causality needed to optimize every step and component of the packaging process, on single machines, at product-type level and on a company-wide scale.

More User-Friendly

Coloplast wanted to provide its production crew with easy to-understand functionality, so a tailor-made front-end user interface was integrated into the iFIX SCADA package. By way of a logic and intuitive control environment, operators know exactly where and why production has stopped. And as the touch-screen user interface resembles the familiar manual touch-button environment, operators can instantly report and correct OEE problems.

“Before we installed Proficy OEE software, it could take two weeks to manually pinpoint downtime problems from perhaps ten known causes. Today, we have a clear knowledge of over 200 possible causes from one day to the next.”

— **Birger Andersen, Project Manager**
Coloplast, Wound Care Div.

GE Healthcare Life Sciences - Austria Digitizes Environmental Monitoring

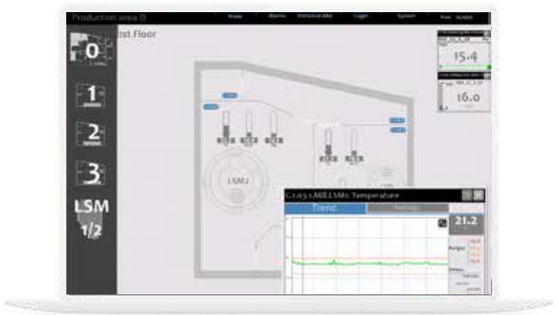
GE Healthcare Digitizes Environmental Monitoring at Austria Sites

GE Healthcare Life Sciences recently boosted its capacity for producing a critical material used to make life-changing therapies. The tenfold annual capacity increase for powdered cell culture media at its Pasching, Austria facility strengthens supply to biopharmaceutical companies in Europe. These companies produce biologics, including vaccines and monoclonal antibodies to treat cancer, now the world's fastest-growing class of medicines.

The Pasching expansion is part of a $17 million USD investment to create state-of-the-art facilities for cell culture media production. In addition to increasing capacity at GE's Pasching and Logan, Utah sites, the investment fuels updates to modernize and digitize production for continuous improvement. Consistent with these goals, the new Pasching production suite also has a new digital solution that streamlines environmental monitoring.

Products

- CIMPLICITY HMI/SCADA
- Proficy Historian



Challenges

Digital solutions support continuous improvements

Manufacturing cell culture media, the nutrients for cells that are used to produce biopharmaceuticals, is a complex process. Different formulations enriched with amino acids, vitamins, fatty acids, and lipids have been created to optimize the growth of a wide range of cell types. The production process, including the environment, must be precise to minimize variations that could affect cell growth in the biologic manufacturing process.

With continuous improvement in mind, the Pasching team aimed at boosting visibility of the environmental parameters (temperature, pressure, humidity, etc.) in the production area. The team wanted real-time notifications on multiple devices, allowing maintenance or engineering staff to respond even more quickly to changing parameters during the production run. It also wanted to improve the ability to identify trends and analyze data proactively. During the planning phase for the expansion, the team broadened the project scope to also include the implementation of a new monitoring system fitting these requirements.

"At GE Healthcare, we continuously aim at improving the quality of finished goods. As a life science company, we have very strict requirements on each supplier we choose. That's why only the high-quality technologies can be used in our initiatives," says Florian Zocher, GE Healthcare Pasching Manufacturing Program Manager. "And then, when we started our production extension, the natural choice was GE Digital, as a reliable software editor and solution provider. It was not the first project with GE Digital and after this huge success it won't be the last".

Solution

HMI/SCADA visualization across the plant floors

GE Digital partnered with ProKSE GmbH (Germany) to implement CIMPLICITY to allow Pasching staff to react even more quickly to changing parameters before production was completed.

"We needed an experienced partner with deep knowledge, who can provide GE-like level of services—therefore we have selected ProKSE," said Luca Galiotto, GE Digital project lead.

"CIMPLICITY, a core component of the solution, allows us to fulfill the requirements using maximum standard functionality of the software," indicated Maria Dudorova, ProKSE GmbH technical lead. "This means reduced TCO for the end customer."

CIMPLICITY's situational awareness technology, combined with an advanced notification system (via email and SMS), allows maintenance or shift leaders to receive notifications quickly. These alerts indicate the exact location of the environmental parameter in question and identify the cause. The notifications can also be received on multiple devices, including displays on the shop floor, desktop computers, and mobile devices. So, the right information is delivered to the right people at the right time.

Proficy Historian from GE Digital also enabled the quality department to visualize trends and then create the appropriate analysis. To provide greater visibility, plant floor data was collected from PLCs and reliably stored in the Historian server—preventing data loss in case of disconnection.

"The security aspects such as electrical signature, single sign on and audit trail were very important for us because we must follow the industry regulations – 21 CFR, for example," says Stefan Seyerl, GE Healthcare Pasching Digitalization Specialist. *"Since being involved in the project, I am contented not only with how the proposed solution fits our requirements, but with how GE Digital and ProKSE worked for us."*

To provide this high level of visibility, plant floor data was collected from PLCs and stored in Historian. The built-in features of redundant collectors, used for this aim, prevent data loss in case of disconnection between the PLC and the plant Historian server.

Results

Flexible implementation and reduced cost

With GE Digital's industrial applications, the Pasching facility personnel now have a powerful tool at their fingertips. They can select one parameter on a specific display to see and analyze the data in real time. This not only saves time and cost, but reduces waste and rework as well. The solution also allows Pasching staff to:

- Respond even faster by receiving early notifications
- Continuously improve trend identification and data analysis
- Reduce costs by pinpointing parameters to analyze

In the future, the team at the Pasching facility is planning not only to implement this solution in new areas, but also to update existing environments.

Genzyme speeds data collection and production reports

Genzyme Speeds Data Collection and Production Reports

Genzyme has been a fully owned subsidiary of Sanofi. As a subsidiary of Sanofi, Genzyme has a presence in approximately 65 countries, including 17 manufacturing facilities and nine genetic-testing laboratories. Its products are also sold in 90 countries.

Products

- iFIX HMI/SCADA
- Proficy Historian
- Proficy Workflow

Challenges

Quality, Maintenance and Performance Reports

- Server operations were slow and sometimes didn't complete while generating quality, maintenance and performance reports on long production runs.
- Secure and speed up Genzyme's data collection and production reports.

Solutions

New Plant-Wide Historian Added to Proven Automation Solution

In addition to its long-time use of iFIX HMI/SCADA from GE Digital, Genzyme rolled out an enhanced OT architecture, adding a new Proficy Historian module from GE Digital to two existing servers, archiving a total of over 20,000 tags.

Additionally, the team upgraded the existing Proficy Historian of 10,000 tags, providing Genzyme with advanced insights into their collected production data.

Furthermore, advanced adoption of GE Digital's Acceleration Plan for Support and Maintenance Services ensures Genzyme's production operates at its highest efficiency.

Architecture

Proficy Historian for Data Management Enhances iFIX HMI/SCADA Monitoring and Control

- Collect, archive and visualize production reports with no impact on the performance of the existing installation
- Automatic daily refresh of the data from the new Proficy Historian server and manual clean-up if upon request
- Integrate data to ensure information is traced, secure-by-design, accessible, and not lost
- Reduce costs by optimizing data storage cost

Results

Lower Data Storage Costs with Plant-Wide Historian

- Achieve fast time to value with simple installation and easy-to-use Web clients with integrated tag search and drag-and-drop features
- Supports high availability with server redundancy
- Leverage continuous and highly scalable data read-and-write functionality
- Reduce storage costs
- Save time and costs with seamless ingestion to HDFS, adding time-series data to your big data analytics
- Take advantage of the time-saving dashboard, whereby critical data finds you
- Real-time / Faster insights enables viewing data within trends and context of the plant data model to determine root causes and turn the data into actionable information.
- "Single source of truth" and real-time/faster visibility into process data and trending

IMA Active chooses iFIX HMI/SCADA and Proficy Historian to meet data integrity requirements in regulated industries

Results

100%

Data integrity

28

Machine families in just one division

Compliance

Machines for regulated industries

Easy customization

Specific global customer requirements

About IMA Active

Pharmaceutical products, cosmetics, food, tea, coffee: the IMA Group has been designing and manufacturing automatic machines for the processing and packaging of all these products for 60 years—since 1961 to be precise—and today it is the undisputed leader in this field.

IMA ACTIVE
Solid Dose Solutions

The company, whose name derives from the acronym of Industria Macchine Automatiche, is based in the heart of the Packaging Valley, the cluster of advanced mechanics and industrial automation in Emilia Romagna.

ServiTecno

Since the 1960s, IMA has achieved continuous growth thanks to its operations but also and above all to constant research and development of innovative technological solutions that the market appreciates.

Delivering maximum reliability, quality and compliance

iFIX HMI/SCADA and Proficy Historian, both developed by GE Digital and supported in Italy by ServiTecno, allow IMA Active to have a standard engine for the machine interface and industrial data management across its entire portfolio of machines for regulated industries.

Flexibility and reliability as values

For a company that combines organic growth and acquisitions (recently, the Emilian Group acquired 82.5% of Tissue Machinery Company, 70% of Ciemme, 60% of Perfect Pack , and majority of Atop, world leader in the automation sector for the production of electric motors for E-traction), it is essential to be able to make use of an ecosystem of partners who are able to support the company in its mission to add value to its customers.

In the sectors IMA addresses, there are many complexities and critical issues – very different from each other – and all must be given a solid and reliable solution, which delivers the highest quality and compliance of the final product.

For this reason, the partners must support IMA not only in technologies with proven effectiveness, but also high quality and, above all, reliable support in the long term.

Customers often turn to IMA in the Post-Sales phase even after tens of years from the original purchase, both for maintenance activities and for those "revamping" operations that allow these machines to remain in step with the continuous technological transformation and to reduce downtime and training time of less and less specialized operators. It is no coincidence that one of IMA's inspiring slogans is: “Different markets. One flexibility on a global scale.”

The pharmaceutical sector and the experience of IMA

In the Life Sciences and Pharma sectors, the Emilian company currently operates with four brands: IMA Active, IMA Life, IMA Safe and IMA BFB.

IMA Active, in particular, designs, develops and manufactures machines for the production of solid oral forms, while IMA Life deals with liquid drugs and freeze-dried products.

In these areas, "the times that mark the activities are often not short: everything must be planned and then proceeds in the order of months and even years," Marco Minardi, Automation Manager of IMA Active, points out. "In our sector, for example, it takes more than a year between the order of the machine and the first product being ready for patients, mainly due to the regulations that frame the sector. Vision, strategies and actions are therefore necessarily medium and long. With a view to an expected life of 15 or 20 years for machines and systems, having and being able to count on solid partners is a very important value: in our case these evaluations have a significant impact."

In the past, the IMA Group used custom technology platforms for the various machines in the Pharma and Food sectors. Then in the pharmaceutical sector, the Emilian Group made some acquisitions, including those of BOC Edwards, with plants in the Netherlands and the United States, and of the Zanchetta of Lucca, both companies that used the iFIX platform as an HMI solution.

Subsequently, the idea was born in IMA Active to create a new HMI solution that could be used on all the machines in its broad portfolio, which would provide brand recognition and a high standard of usability and reliability of the operator interface.

Choosing iFIX HMI/SCADA as the brain between machines and users

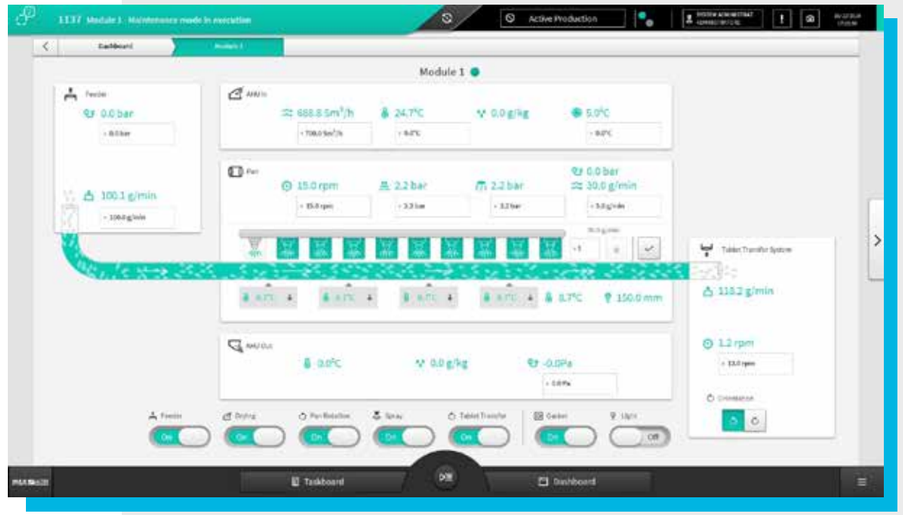
It is in this context that the collaboration between the IMA Group, GE Digital and ServiTecno (an Alliance Partner that distributes and supports GE Digital software in Italy) comes to a decision: after an intense analysis of solutions on the market, IMA Active decided to focus on iFIX as a pillar to build the Kortex MAX HMI/SCADA platform.

"The interface is the way in which the machine communicates with the operator: it is therefore a strategic element in the overall design of a product. It always has been, but it is even more so today, with the advent of mechatronics and the increase in the engineering complexity of the machines. All these conditions have determined the need to find an adequate, flexible and efficient product, which led us to choose iFIX as the technological base on which to develop our platform that we have called Kortex MAX with reference to the concepts of 'cerebral cortex and maximum usability,' which are two essential characteristics of the system," Minardi explains.

In choosing GE Digital and ServiTecno, a fundamental activity was the evaluation of the characteristics of the product and the profile of the two partners. "In our choices," underlines Minardi, "we look for both up-to-date technology and the reliability of the supplier, its ability to support us. What ServiTecno does is a fundamental value for us: it helps us to solve the technical and technological problems that inevitably arise, present by following us in the various design and implementation activities. This is for us a value at least equal to the technological specifications. "

And so today, within the IMA Group, the two divisions IMA Active (specialized in machinery and solutions for the production of oral solids) and IMA Life (specialized in the sector of liquid drugs), having partly overlapping characteristics and needs, are both standardized on iFIX as the HMI/SCADA platform.

"Focusing activities on a single platform also allows us to manage resources at production peaks in a flexible way, dynamically allocating them to orders, precisely because of the choice of a common platform," explains Minardi.



"With the continuous growth of the IMA Group, the industrialization of processes has become very important. Just to give an example, in our division alone we manage 28 families of machines for process and product treatment, each of which has various sizes and a considerable degree of customization.When we choose the solutions to use for our automation, we always make a 360-degree, holistic assessment of the technology, the product and its resources: the specific technical potential is obviously the basis, but the related services are no less important including long-term support," Minardi says.

Meeting Regulatory and End Customer Requirements with Automation

There are several technical characteristics of iFIX that led IMA to choose it as the pillar of its operator interfaces.

The first essential point to be addressed, when adopting a technology in the pharmaceutical field, is the management of Data Integrity. Here, GE Digital has accumulated over thirty years of product development experience, which makes the difference.

> *"In the world of Life Sciences and Pharma, iFIX has always been a recognized and recognizable player, its reputation was therefore a tangible value."*
>
> *– Marco Minardi, Automation Manager, IMA Active*

In a regulated sector such as the pharmaceutical sector, the data is fundamental: "Without the data, the lot must be thrown away," effectively summarizes Minardi.

iFIX also integrates seamlessly with GE Digital's Proficy Historian, an industry-leading process data management solution .

> *"Proficy Historian plays a central role in the qualification of process data and to keep track of data integrity, which includes data traceability, for both regulatory and process engineering purposes to optimize parameters and improve the quality and repeatability of operations."*
>
> *– Marco Minardi, Automation Manager, IMA Active*

iFIX and Proficy Historian also allow seamless integration with relational databases and contextualize the information collected and stored over time, such as for the purposes of alarming production systems.

Another added value of iFIX is its modularity and adaptability in relation to the machine and line architectures, characteristics that determine how the machines are proposed to the customer in terms of integration with the plant floor and with the architecture of the management systems. iFIX natively supports all the main standards in use in the pharmaceutical sector, thus making it relatively easy for IMA to propose a solution that easily integrates into all scenarios.

For example, iFIX also supports the Terminal Server architecture. "With the increasingly strong integration between the OT and IT world, the use of the iFIX SCADA system in Client-Server architecture with multiclients is a value capability, for example for customers who have to install our machines between two different environments or to improve general ergonomics," explains Minardi.

Since, as noted, IMA Active produces a considerable variety of solutions, another added value of iFIX appreciated by Minardi is the ability to configure the HMI/SCADA system: "As for configuring the interface for a specific machine, iFIX allows us to reflect the configuration chosen by the customer, automatically generating an interface that includes all and only the features you need."

A look to the future

In the pharmaceutical world, teams are cautious about making changes, and the full evaluation of final results are fundamental before every innovation. The speed of adoption of the innovations must also deal with delivery times ranging from 8 to 24 months.

However, this does not mean that innovations are not considered, quite the contrary. "We have a specific agreement with ServiTecno: at each revision of iFIX, they provide us with a pre-analysis on the impact of the transition in our specific case; then there are test sessions, evaluation and verification of the various operational steps, and a verification of the real effectiveness of the systems updating and development."

Although operating with longer timescales than non-regulated industrial sectors, "we can never allow errors of any kind, so, as mentioned, operational caution must always be maximum. The renewal and improvement of systems and solutions are in any case in order of the day, both as regards the 'hard' technological components, the machinery, the operational 'muscles' of production, and as regards the control and software part," Minardi says.

The team is looking at next steps in this successful collaboration that continues to innovate and always deliver maximum reliability, quality and compliance. This will be a "further strengthening of the path with GE Digital and ServiTecno," anticipates the Automation Manager of IMA Active, "for a collaboration that goes well beyond the final product, and necessarily brings together product and operational support in every phase and every evolution of the production systems."

Another possible area of development concerns frontier technologies such as Data Analytics and Artificial Intelligence. "In this field too, the IMA Group is moving with interest and attention: if there is an interesting software product, we will immediately take it into consideration," remarks Minardi. "These are technologies and solutions that must be highly customized, according to the specific needs to be met, and for this reason the availability of the technological and digital partner must be total. The goal is always very concrete: we must give the end customer a lot of added value, strong and tangible."

The quality of data in the pharmaceutical sector

In a highly regulated production environment such as pharmaceutical, quality and data integrity are critical elements because they are closely related to human health.

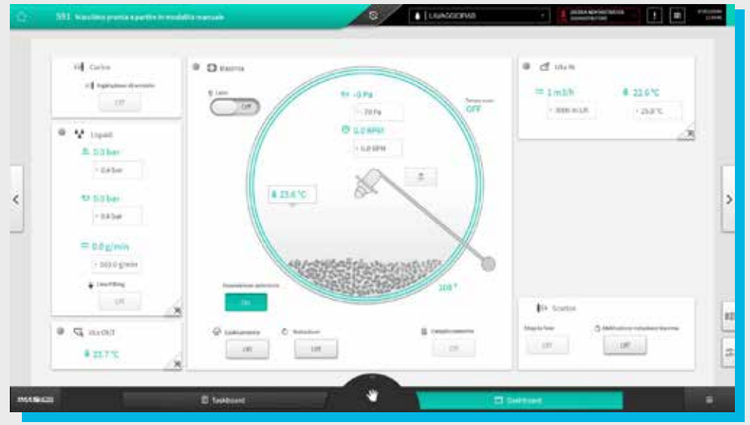
Data Integrity can be defined, in relation to data management, as the guarantee that a set of data is correctly managed during the production process and in relation to all operational areas (production, laboratories and warehouses).

To be considered healthy, data must meet various criteria throughout its life cycle. The Food and Drug Administration (the agency in charge of controls on the food and pharmaceutical sectors) provides for the ALCOA criteria, an acronym that derives from the initials of the five qualities that the data must have: Attributable, Legible, Contemporaneous, Original and Accurate.

In addition, ALCOA Plus (ALCOA+ or CCEA) criteria has also been defined, adding that the data must also be Complete, Consistent, Enduring, and Available.

It is clear that software technologies that natively support and manage these requirements in a standardized way, such as GE Digital's Proficy Historian, can be of great support in the system validation process.

Proficy Historian, for example, allows through its collector system to generate data records already associated with identifiers (e.g. product and lot) and time stamps and to send them, in a secure-by-design and encrypted manner, to the storage server. The data record, once generated, cannot be changed without codified procedures and is completely compatible with the reference legislation.



JHP Pharmaceuticals

(now part of Par Pharmaceutical)

Paperless Manufacturing Enables Repeatable Production

JHP Pharmaceuticals

Paperless Manufacturing Enables Repeatable Production

Pharmaceutical companies often manufacture more documentation than product. With Proficy Workflow, JHP, now part of Par Pharmaceutical, reduced paper consumption and operator errors by digitizing their standard operating procedures and creating an electronic master batch record.

Data is automatically populated into the forms from the plant SCADA system. Operators use E-Signature to sign off on every step, but the real value is a replicable solution that can be reused across the site with minimal retest.

"Significant opportunities exist for improving pharmaceutical development, manufacturing, and quality assurance through innovation in product and process development"

— **Mary Grow, VP ET & Business Processes, JHP Pharmaceuticals (now part of Par Pharmaceutical)**

Products

- Proficy Workflow
- iFIX HMI/SCADA
- Proficy Plant Applications
- Proficy Historian

Results

- Reduced paper consumption
- Reduced operator errors
- Improved product safety
- Real-time process data for decision making
- Reusable solution that can be applied across many different lines without full retest

Lek Pharmaceuticals leverages solution to control and monitor environmental conditions

"A synergy of two requirements–high reliability and rich functionality–was achieved by using the [GE Digital] industrial equipment and appropriate control algorithms implemented at different levels."

Saša Sokolić, Ph.D., Member of the Management Board, responsible for Sales and Marketing in Metronik

Results

- Solution for HVAC control and supervision was developed, tested, and commissioned on-site within eight months
- Production flexibility increase due to automatic process adaptation in case of new production demands, or modification of clean-room functionalities
- Synergy of two complex requirements, high reliability and rich functionality, achieved by using highly reliable industrial equipment and appropriate control algorithms implemented at different levels
- Configurable PC application fulfills all regulatory requirements, as well as recommendations, for the pharmaceutical industry
- Solution provides a complete overview of energy use, and consequently, operational costs, assisting management in analyzing and optimizing energy usage to reduce operational costs

Lek, a Sandoz Company, uses GE Digital's iFIX-based solution to control and monitor environmental conditions and energy usage

Founded in 1946, Lek is a part of Sandoz, one of the world's leading generic pharmaceuticals manufacturers. It operates as a global development center for products and technologies, as well as a global manufacturing center for active pharmaceutical ingredients and medicines. The company is also a competence center for vertically-integrated product development, including generic medicines along with pharmaceutical, and biotechnological active substances and anti-infectives, as well as development and manufacturing of biopharmaceutical products. It is the main supply center for the CEE, SEE, and CIS markets.

The OTO2 production plant is one of Lek's largest production sites in Slovenia, with specialized high-technology process equipment for producing generic drugs. Key product groups include antibiotics, treatments for central nervous system disorders, gastrointestinal medicines, cardiovascular treatments, and hormone therapies (for example AMOKSIKLAV, IBUPROFEN, KETONAL, LEKADOL, etc.).

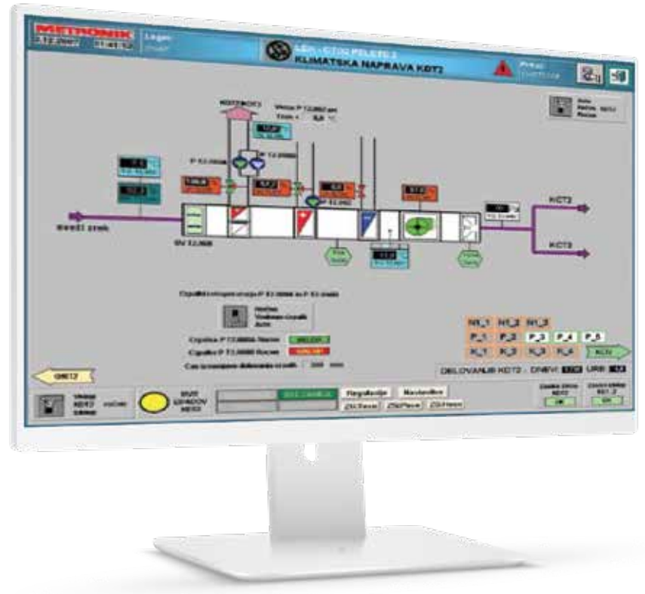
In recent years, Lek has been expanding, and has modernized its production capacity and strengthened its position inside the Sandoz group. Plant OTO2 follows high standards of sterility, safety, and quality to meet strict FDA approvals.

The production of pharmaceutical products requires specialized and controlled environments, where sterile conditions have to be maintained. Therefore, heating, ventilation, and air-conditioning systems (HVAC) are necessary for controlling these environments. A control system for HVAC is a critical factor, which affects the reliability of analysis results, experiments, and production systems. One of its most critical tasks is to prevent outside air from entering the facility.

Therefore, Lek required a validated and highly reliable building management system/environmental monitoring system (BMS/EMS) solution for HVAC control and supervision to provide precise, critical control of temperature, humidity levels, and airflow patterns at the OTO2 production site. The solution had to provide complete remote control of all HVAC systems, automatic adjustment of process parameters according to production demands, alarm management, efficient visualization, and trending, together with process data archiving and reporting.

Introducing the complete BMS/EMS solution for HVAC, Lek wanted to provide fully controlled conditions in OTO2 to enable effective production and energy management, increase the level of quality control, as well as increase flexibility and production adaptation to new demands.

Since plant and all production facilities have been designed ccording to GAMP[1] recommendations, the company's HVAC solution had to meet respective pharmaceutical regulatory requirements and recommendations.



HVAC system visualization

Trends of the process variables: temperatures (fresh air temperature, temperature behind refrigerator, etc.) and valves

Integrated control provided

Lek turned to GE Digital's solutions provider Metronik, a leading systems integrator for process control and automation for the pharmaceutical industry in the Eastern European region. Formed in 1990, Metronik has 17 years of experience providing more than 1,000 air-conditioning units automated, commissioned, and validated on more than 50 different production sites. The company, headquartered in Ljubljana, Slovenia, with offices in Zagreb, Croatia, Belgrade, Serbia, and Sofia, Bulgaria, employs more than 50 engineers for its project teams.

Metronik delivered a flexible, high-powered, integrated BMS/EMS solution for HVAC system in Lek's production plant OTO2 based on proven industrial equipment, such as GE PLCs (now part of Emerson) and iFIX from GE Digital to assure accurate and reliable control.

The GE PLCs come from a family of controllers, I/O systems and specialty modules designed to meet the demand for versatile, industrial solutions—helping businesses gain a sustainable advantage. With its single overall control architecture, this controller has been the PLC of record in more than 200,000 applications, such as high-speed packaging, material handling, and complex motion control.

With the power of leading technologies and patented techniques, GE Digital's iFIX is the ultimate tool for visualization, automation, and in delivering analytics to drive the lowest possible total cost of ownership. The software provides a comprehensive monitoring, analysis, control, and distribution of their plant-wide data. With applications in industries including pharmaceuticals, biotech, consumer packaged goods, food and beverage, oil and gas, water, waste water, power, and others, iFIX is the right HMI or SCADA solution for any automation environment.

"The environmental conditions have a strong impact on product quality in OTO2. Therefore, we had to establish a system to adequately control these environmental conditions," said Aleš Dolenc, Lek, Technologist Energetics Department. *"Together with Metronik, an integrated EMS/BMS solution for HVAC was deployed for the production plant. It enables flexibility of the production process, as well as more consistent and controlled HVAC system operation and maintenance, while eliminating the need for paper records."*

The main task of the Metronik solution is to provide precise control over environment parameters and conditions in clean rooms by implementing control algorithms for temperature, humidity, and pressure. Changes in production demands are handled automatically by special control algorithms embedded in the PLC blocks. They are used to facilitate automatic control of output process values based on predefined set-up values, as well as provide a very fast response, and consequently, production adaptation in a very short time.

The solution enables rich graphical visualization of processes, conditions, and sensor values in real-time. All key parameters, such as alarm boundaries, PID loops, and production parameters can be accessed through SCADA. Power-users have the option to define two-level alarm settings for GMP (Good Manufacturing Practice)[2] and non-GMP parameters. Two modules running in real-time process data collection and an archiving module are incorporated into the solution, as well as a module for maintenance support, including fault diagnostics for all HVAC installation. All key data are stored into the Oracle relational database, and can be used for analysis and reporting.

Results achieved

The high-powered EMS/BMS solution combines the accurate control of heating, ventilation, and air-conditioning systems, as well as EMS solutions. It is used to monitor and control the critical and non-critical parameters coming from plant technologies.

"Our GMP compliant HVAC solution combines the environmental parameters monitoring functionalities (EMS), with the central building management system (BMS)," said Saša Sokolić, Ph.D., member of the management board responsible for sales and marketing in Metronik. *"Production flexibility increases have been realized due to automatic process adaptation in case of new production demands, or when the functionalities of existing clean rooms are changed."*

Efficient visualization, alarming, and fault diagnostics for all HVAC equipment and installations in OTO2 provides plant personnel with efficient support for monitoring in real-time, and maintenance support in case of unacceptable or dangerous situations.

The validated Metronik solution fulfills the requirements for paperless HVAC system management, and complies with pharmaceutical regulations. And, the integrated BMS/EMS solution delivers lower TCO and maintenance of the complete HVAC system in OTO2.

"The Metronik engineering team has the knowledge and experience for implementing complex BMS/EMS building management systems for pharmaceutical production facilities," said Lek's Dolenc. *"Efficient visualization, alarm, and fault diagnostics for all HVAC equipment and installations provide efficient support for real-time monitoring and maintenance support."*

"A synergy of two requirements—high reliability and rich functionality—was achieved by using the [GE Digital] industrial equipment and appropriate control algorithms implemented at different levels," concluded Metronik's Sokolić.

[1] GAMP (The Good Automated Manufacturing Practice - GAMP Guide for Validation of Automated Systems in Pharmaceutical Manufacture). Metronik system is designed, developed and commissioned according to GAMP 5 based project life cycle approach: User Requirement Specification, Quality and Project Planning, Specifications (Functional, Configuration and Design), Risk Assessment, Design Reviews, Software Production/Configuration, Test strategy and testing, User documentation and training, system support and maintenance operation, GMP relevance, 21 CFR Part 11 relevance.

[2] GMP is a term that is recognized worldwide for the control and management of manufacturing and quality control testing of foods, pharmaceutical products, and medical devices. Metronik system provides visualization and monitoring of the critical process data in compliance with good manufacturing practices—so called GMP critical parameters. CFR Part 11 relevance.

McNeil in Sweden chooses Proficy to increase OEE of its packaging lines

Improving OEE in the Nicorette® gum production plant in Sweden.

World Leading Product

At a location that has been manufacturing pharmaceuticals for over 90 years in Helsingborg in the south of Sweden, McNeil AB specializes in the manufacture of over-the-counter healthcare products. It is the only plant producing the world leading Nicorette family of nicotine replacement therapy products.

" We have been able to develop a customised solution, paying only for the elements we need."

— Annette Cederhag,
Project manager Engineering Maintenance Utility, McNeil

Introduced in 1978, Nicorette gum provides the user with a source of pure nicotine while avoiding the harmful effects of tobacco smoke. By 2005, around 18 billion pieces of gum had been produced. Current production at Helsingborg is on a 24/7 basis of between 2 and 3 billion pieces per year, exported to around 80 countries worldwide.

Research and development takes place at the Helsingborg plant. In order to satisfy differing consumer demands, Nicorette has been developed into different formats which are also produced there. As examples, Nicorette Patch entered the market in 1991 to provide a continuous nicotine supply throughout the day; 1994 saw the introduction of Nicorette Nasal Spray for quick absorption of a nicotine dose; a Nicorette Inhaler was developed in 1996 which satisfies some users' demand to have their hands occupied; in 1998 Nicorette Microtab with a slow release profile for placement under the tongue was put on the market, and in 2004 a crisp coated, sweeter and softer mint gum was added to the Nicorette family, Nicorette Freshmint Gum.

OEE Under the Microscope

McNeil is continually looking at its working practices in order to improve the way it works. This comes under its 'Right First Time' concept. Small 'Right First Time' teams are looking at a number of the processes in Helsingborg to see if they can be improved, and the Overall Equipment Efficiency (OEE) of the packaging lines has come under the microscope. This includes packaging of all the products in the Nicorette family, as well as for other products manufactured on-site, which include Microlax, an enema, and for Treo, the long established Swedish effervescent pain relief tablets. Annette Cederhag, Project Manager in the Engineering Maintenance Utility at McNeil, Helsingborg, explained: *"For many years we had used a hand-written logging system of faults on the 32 automated packaging lines for all the healthcare products we manufacture here. As we operate 3 shifts 24/7, it is very important that we minimise downtime. The packaging machines were not designed to provide a sufficient variety of error code data to give us the detailed information we needed."*

Solutions

- Production Management
- OEE
- Management reporting

Products

- Proficy Plant Applications
- Proficy Historian
- iFIX HMI/SCADA

Results

- Accurate downtime logging
- Data 'released' to improve OEE
- Downtime data available in real time
- Management reporting via intranet
- Open Proficy software enables future system enhancements

Benefits

- It helps to identify and improve areas that are causing operational inefficiencies
- It allows analyses of root causes to make data-driven decisions
- It manages operations in real-time through comprehensive reporting, which can be made accessible via the web
- Gradual implementation of new lines

"Inevitably it was very difficult to try to obtain any true analysis of downtime, so we approached several automation suppliers in Sweden for a system that would give us the capabilities we were looking for.

"The pilot projects ran in parallel for 8 months. Right from the start we consulted with our packaging operators. We have worked with them all the way from initial investigations, through the pilot projects, and through the eventual conversion to our new system. The operators' input was invaluable and, of course, they have to operate the new technology so it was important that we developed a system they understood and that they felt they could work with."

Downtime information "released" by Proficy Plant Applications

The Downtime Information Reporting System (DIRS) that was eventually developed is based on the Efficiency module of GE Digital's Proficy Plant Applications plant performance analysis and execution software. Explaining the decision Annette Cederhag, commented: "*The local Systems Integrator, Novotek Sverige AB, proved to be an excellent partner throughout the pilot project and during the conversion to the live system. They had many good ideas which we were able to implement throughout the pilot scheme as it developed. Proficy Plant Applications provides the data analysis capability we were looking for, together with the ability to interrogate the system in real time via the McNeil intranet from any authorised location.*"

The DIRS provides a tool that helps the organisation to identify the source of breakdowns, problems during shift changeovers, and other disturbances that impact the OEE, and hence productivity, of the healthcare product packaging lines. Cederhag continued: "*The packaging systems are very diverse. Over 1000 different items are used for packaging. They include encapsulation of Nicorette gum, Nicorette Freshmint Gum and Treo tablets, followed by boxing and wrapping. Other processes include boxing of inhalers and spray dispensers. Boxes are date stamped, etc., and encapsulated in larger batches and put in boxes for bulk delivery to locations throughout the world.*" At the time of writing, 15 lines had been converted to the new DIRS. With pilots originally running on 5 lines, modifications had gradually been implemented and good practice acquired so that transfer to the live system was straightforward. New lines have been going live at 5-week intervals, with plans to accelerate the changeovers to 2-week intervals for the remaining 17 lines.

The Downtime Information Reporting System was added to the existing LAN which links into the company's intranet. The operators' terminals, usually one per packaging line except where the line is particularly long when there may be two, act as thin clients to a terminal server. A second terminal server provides redundancy for immediate back up should there be a problem with the first server. Mats Blohm, Automation Engineer in Engineering, Maintenance & Utilities, explained: "*This system runs under iFIX HMI/SCADA. The thin clients act as HMI inputs with a selection of on-screen buttons appropriate to the packaging line. These touchscreen buttons provide rapid input options for logging faults on the packaging line. This data, together with time stamping provided via the packaging machine's PLC, is captured and logged on the Proficy Historian database used by the whole production facility.*"

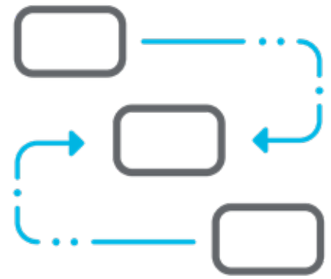
Real-time data on the intranet

"The Efficiency module of Proficy Plant Applications is now able to access this data and share it in real-time or as historical data with users at all levels on the intranet," he continued. "Each operator screen, for example, displays a table of the recent interruptions on that packaging line. Management reports can be accessed on the intranet by any authorised person. A wide range of analyses and charts is possible. For example, by packaging line, by fault type, by downtime length. From this, it is now possible to get an accurate picture of what are causing inefficiencies on each line so that the appropriate actions can be taken to increase Overall Equipment Efficiency."

As a pharmaceutical and health-care product manufacturer, McNeil follows the Good Manufacturing Practice (GMP) code of working. This ensures the overall quality of its products and is based on the positive effect, the purity, identity, strength, the production flow and procedures adopted. Standard Operating Procedures ensure that every batch of products at Helsingborg is sampled randomly, at the beginning in the middle and at the end. Stringent quality control tests have to be passed for purity, packaging, labelling, etc., before that batch is allowed to leave the plant. GMP also ensures that the company works well within the local and national environmental and health and safety requirements.

Proficy Plant Applications

The Efficiency module enables users to better utilize plant assets by providing a comprehensive view of Overall Equipment Efficiency (OEE). It is the ideal solution for managers trying to increase throughput without adding equipment, people or material costs.



"By choosing GE's software we have the reassurance of long term product support. We have been able to develop a customised solution, paying only for the elements we need. But it offers much more. Looking to the longer term, the package we are using is just one element in the complete Proficy intelligent production management suite of open programs. We can now look at our manufacturing lines with a view to easy integration using other parts of the suite."

— Annette Cederhag,
Project manager Engineering Maintenance Utility, McNeil

North American Pharmaceutical Company

Implements Electronic Quality Checks and Corrective Actions

North American Pharmaceutical Company

Electronic Quality Check

Corrective Actions On Out-of-Spec Product

A lack of efficiency with manual/paper processes meant that the company experienced slow resolution of quality issues. Operators were doing quality checks manually with a paper grid. Proficy Workflow improved efficiency by automating the quality checks and initiating corrective action— as an addition to the company's existing GE Digital HMI/SCADA systems. Proficy Historian provides data collection, archiving, and distribution for analysis. The company also uses Proficy Plant Applications as its standard Manufacturing Execution System (MES) along with Proficy Batch Execution. Proficy CSense includes a closed-loop with analysis for process optimization.

Solutions

- Proficy Workflow
- iFIX HMI/SCADA
- Proficy Batch Execution
- CIMPLICITY HMI/SCADA
- Proficy Plant Applications
- Proficy Historian
- Proficy CSense
- Proficy Webspace

Results

- Improved efficiency
- Reduced waste and costs
- Better quality information
- Faster resolution of quality issues

Pfizer Cuts Downtime by Moving to Predictive Maintenance

Improving operational performance

Secure and accurate data is critical to Pfizer to ensure compliance with regulatory commitments. Pfizer has been using GE Digital's Proficy Historian for years to collect data from their manufacturing sites, building controls, and utilities, combined as one OT data set. They are using this data to improve their operational performance.

> *"We are able to get a lot of benefit, a lot of reduced downtime, and a more reliable system."*
>
> **— Kevin Callahan, Automation Engineer, Pfizer Inc.**

Pfizer has integrated live process data for their maintenance systems and have gone from a preventative maintenance approach to a more predictive maintenance approach. It has reduced downtime and allows the team to have access to the data for review, which has helped them to increase productivity and resulting yield.

Pfizer has been working with GE Digital's partner, AutomaTech for over 15 years to help find the GE Digital suite of solutions that fit their needs. "We've upgraded historians, we've upgraded SCADA servers and client applications. They have been key in helping us choose the right product," Callahan said.

WATCH VIDEO

> *"It gives us one common format to look at and collect data and provides us with the ability to compare data from multiple areas."*
>
> **— Erik Westberg, Automation Engineer, Pfizer, Inc.**

Results

- Reliable integrated system with accurate and secure data
- Data collection and root cause analysis
- Reduced downtime with a predictive maintenance approach
- Increased productivity and yield

Products

- Proficy Historian
- iFIX HMI/SCADA
- Proficy Plant Applications

About AutomaTech

AutomaTech is a leading provider of industrial technology solutions focused on improving your operational performance. By harnessing the power of data, we enable significant gains, visibility across your entire organization, and increased profits for a competitive edge. Our product offering includes a flexible and scalable mix of hardware and software solutions to solve your toughest challenges while providing a roadmap for future improvements and growth.

Pfizer Newbridge drives business value with integrated automation

Pfizer Newbridge created outstanding business value by moving away from islands of automation using an integrated automation strategy from GE Digital.

Solutions

- iFIX HMI/SCADA
- Proficy Batch Execution
- Proficy Plant Applications
- Proficy Historian

Challenges

Pfizer Newbridge pharmaceutical products treat and help to prevent some of the world's most prevalent health issues. The product portfolio includes innovative treatments across a wide range of therapeutic areas.

The Newbridge facility produces 80 different product formulations packaged in approximately 650 different pack-to-market presentations, covering:

- Hormone Replacement
- Oral Contraceptives
- Central Nervous System

The site was established in 1992 and covers 120 acres at Newbridge, County Kildare, Ireland. As an organization, Pfizer is committed to applying science and its global resources to improve health and well-being at every stage of life. To support this commitment to delivering products of exceptional quality, the engineering team at Newbridge has put in place a world-class Batch automation scheme from GE Digital across both of its facilities for MHTs (Menopausal Health Therapy) and OCs (Oral Contraceptives).

Results

- 25% reduction in expansion lead-time
- 23% reduction in resources
- 20% reduction in investigation time
- Reduced time to maintain
- "Plug and Play" flexibility
- Increased scalability
- Automated "OEE for Batch"

Solutions

A Technical Approach to HMI/SCADA, Batch Execution, and MES

At inception, the project team made a fundamental decision to provide capacity in the project for upfront, low-level technical customization. This was done in order to drive future high-level flexibility. The team invested in strong controller and supervisory control and data acquisition (SCADA) standards as the guiding principle, which provide a structure that proved, during the course of the project, to give greater flexibility and agility.

The controller and SCADA standards are closely coupled to truly realize the power of the Batch Engine used to control production. The team selected iFIX HMI/SCADA and Proficy Batch Execution from GE Digital as they deemed it the best-in-class technology platform.

Another guiding principle was centralized, single point recipe management and execution, across all unit classes. This approach provides the ability to create, store and maintain control recipes within a controlled environment.

"Having all of our Master Recipes in one location, and the use of class-based recipes, reduces my time in maintaining and changing recipes and cuts down greatly on our paperwork. Our class-based approach has also led to greater repeatability."

— Eoin McMahon, Automation Engineer, MHT Pfizer Newbridge

The Technical Journey

iFIX HMI/SCADA and Proficy Batch Execution in Pharmaceutical

Once this project phase was complete, the Thick clients were obsolete and moved over to a centralized, thin client architecture within the control room. One Proficy Batch Execution and iFIX engineering thick client was kept for automation and maintenance activities.

This now provides for:

- Creation, monitoring, and execution of the control recipes
- Standardization of graphics across multiple vendors and a single source of alarm management while minimizing customization
- Unexpected process excursions alarmed for operator response
- Reduction in Paper Method through Electronic Batch Records (EBR)
- Real-time monitoring of exceptions occurring during the manufacturing process

"During the design and project phases every skid was tested off site and brought to a fully functioning state using localized iFIX SCADA and Batch recipes at our vendors' facilities. Once on site here at Newbridge, thanks to the 'Plug and Play' flexibility, it was connected to our central Batch and SCADA systems and commissioning could begin. Due to the level of activity and number of resources involved during this phase, each vendor team utilized a fully functioning and secured development node local to their process cell. This allowed speedy validation with teams working side by side but without crossover."

— **Alan Shefflin, Automation Site Lead**

Support

On-Site Services for HMI/SCADA and Batch Pharmaceutical Implementation

The site also understood the benefit of having GE on the ground. From early on in the project phase, Pfizer involved GE's services and contracted an embedded GE engineer to work full time with the automation team.

This allowed issues to be addressed on site as they arose, and now this relationship is helping Pfizer define its automation vision as they start to optimize and extract real value from the automation layer.

Secure-by-Design Data

Plant-Wide Historian for Pharmaceutical Manufacturing

The site puts a very high value on the data collected. This is held in a centralized data historian system (DHS) to 21CFR11 standards using GE Digital's Proficy Historian. The site DHS incorporates iFIX alarms collected through the iFIX Alarm Open Database Connectivity (ODBC) service, Batch event data archived into the Batch Journals and Process data is collected in Proficy Historian. This provides standard historical and real-time trending independent of equipment type or data source, which enables production staff to take insightful decisions across apparently disparate operations. The information is displayed and made available for analysis through one central Data Historian Server for all functions.

> *"By up-skilling our operations team through automation 'on the job' training, they were able to interact effectively with all technical systems for day-to-day operation and to aid troubleshooting," said Michael Howell, Operations Lead, MHT Operations, Pfizer Newbridge, Ireland. "This combined with the centralized control room has great benefit."*
>
> — **Michael Howell,**
> **Operations Lead, MHT Operations, Pfizer Newbridge Ireland**

Balancing People and Automation

The old school, heavy industry philosophy of "Hand-Mode" even found its way to a high tech facility like Newbridge. The engineering team understood the importance of allowing controlled, secure-by-design and safe manual control of equipment when required either for maintenance functions.

To support this, the manufacturing control system is able to perform direct control of local controllers if required through standard phase and control module level manual modes. This can be carried out from any one of 60 iFIX thin clients across the floor deployed with Citrix Technology.

Building Management

Building Management Systems in Pharmaceutical Manufacturing

To support environmental conditions for containment alongside all “non GMP” parts of the plant, the Building Management System (BMS) was divided into two portions: a non-qualified BMS and a qualified BMS.

Manufacturing Execution

MES and EBR in Pharmaceutical Manufacturing

To gain the most value from the highly integrated automation system, a Manufacturing Execution System (MES) solution was incorporated into the plant design to:

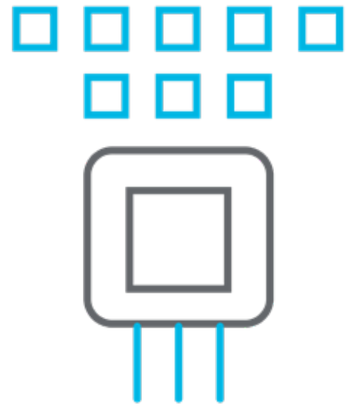
- Provide functionality through Electronic Batch Records (EBR) to guide the production in conformance to the batch record
- Ensure acknowledgement and commenting of Level 1, Good Manufacturing Practice (GMP) alarms during batch processing

Across both the MHT and OC facility, a Self-Guided Vehicles (SGV) system was installed, including standard intermediate Bulk Container (IBC) sizes across all units to reduce human interaction for material handling. This system interacts with all equipment through the Proficy Batch Execution system-enabling the process equipment to automatically request a load or unload during a recipe cycle.

With a standardized controller footprint along with one SCADA solution, a centralized software management system was used. This is responsible for maintaining oversight and management of the software versions of applications within the control system. Seeing the value in one storage location and moving away from “fire-safe” syndrome has led the automation team to expand this system to cover all automation related design documents.

“Because access control is managed using the site Active Directory and process data is managed automatically in the integrated automation environment, more time is available to the automation engineer for plant optimization.”

— Eoin McMahon, Automation Engineer, MHT Pfizer Newbridge



Learning

Batch Execution Adds Manufacturing Capacity

One of the biggest lessons learned was in the area of controller and phase logic. Proficy Batch Execution offers excellent integration using either full PLI phases or Direct Phases where required. Although Direct Phases offer a simplified and flexible phase/equipment interface, they were found more suitable for smaller systems that do not require a PLI. For greater future flexibility, where a higher degree of integration is required, the site will now use full PLI Phases.

This approach of low-level customization offering high-level flexibility was applied to all systems from controller and SCADA through to Batch.

"The standards we have invested in, and evolved, can now be used to scale up our existing facility. We have an estimated 80% additional capacity, and I estimate a 25% reduction in the FAT-IQ stage of the project lifecycle thanks to the flexibility of an integrated batch system like this."

— Fergal McTiernan
Engineering Manager, Pfizer Newbridge

The Future

OEE for Batch Execution and Batch Analysis in Pharmaceutical Manufacturing

"We are now looking to take the next steps with our N-SmarT (Newbridge System of Manageable Automated Results for TPM) program and are piloting an Overall Equipment Effectiveness (OEE) for Batch on our coater using Proficy Plant Applications in partnership with GE," said Paul Conroy, MHT OE Lead. *"The largest challenge here was breaking down a complicated batch process like coating into its discrete components and then applying standard OEE rules. GE was able to provide real insight with this. We are now reviewing further OEE requirements site wide and are also seeing the value in process understanding through the Batch Analysis reports within Proficy Plant Applications."*

A number of site-wide projects including the PWCAMS (Plant Wide Critical Alarm Management System) project are also being reviewed to see if a link to Proficy Plant Applications could be made and the information collected in PWCAMS could be used to trigger Work Instructions into SAP. The site is currently planning to pilot this concept.

"We also aim to leverage our investment made with GE and Proficy Plant Applications to aid in the site-wide water reduction program," Howell concluded.

"We are now working with GE to really understand how to gain the most value from all of our data. At the early stages we were data rich but knowledge poor. Understanding all of the data collected and how we can use it, both at the Enterprise and Quality layer, is enhancing our knowledge base and demonstrating ROI for our automation and engineering efforts."

— Claire Comerford,
MHT PPU Director, Pfizer Newbridge

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Pfizer – Vega Baja, Puerto Rico

Building Manufacturing Efficiency

ARTICLE BY:

Jose Marrero Diaz, Latin American & Puerto Rico region IT Director/Team Leader, Pfizer

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Today, many pharmaceutical plants typically operate at somewhere around 30% efficiency, with a few world-class operations reaching the 70% range. However, even these stars fall below the levels that other well-run conventional process manufacturing operations achieve, where efficiencies of over 90% are routine.

Globalization is forcing all companies, and especially pharmaceutical industries, to develop competitiveness strategies and deploy them quickly if they expect to remain in business.

All this tells us that we must not only look aggressively for ways to make our manufacturing operations competitive, but also deploy the technologies that will allow us to measure and substantiate that competitive advantage. Pfizer has found a way to put such processes into practice, with exceptional benefits.

Overall equipment effectiveness (OEE) is a key metric that many companies are using to measure plant or line efficiency. OEE calculation results can be used for many operational diagnostics:

- Understand how well we are performing with an objective yardstick;
- Identify and eliminate constraints;
- Define target areas for improvement; and
- Align those targets with larger business strategy.

OEE measurements allow managers to make more effective, more objective, and more informed decisions in real time.

In November, the Pfizer facility in Vega Baja, Puerto Rico formed a cross-functional team to focus on creating more competitive costs through implementing an OEE data gathering and reporting system.

This important initiative, a collaborative effort between the regional manufacturing engineering and technology (ME&T) team, IT, and Vega Baja packaging teams, set out to improve data collection and visibility for determining OEE for packaging lines in the Puerto Rico region. This initiative was identified as critical and imperative to manufacturing success in today's dynamic business environment.

Crude but effective

Experiences with OEE in the Vega Baja facilities started out as manual processes developed by Juan C. Figueroa, a packaging technical specialist, and Xavier Schlienger, a packaging team leader, when they implemented it successfully at two blister lines.

While the manual system was cumbersome, the value of the information it generated was clear, so the next step was to move the process to the next level and see how data collection could be automated. That process began with automating the forms but still having operators enter data manually into the terminals. This reduced the amount of data entry, provided OEE metrics much sooner, and generally improved the quality of the process.

In December, Figueroa joined Jose Santos, Mark Poham, Vik Sharma and Edwin Rivera in an effort to develop and implement a still more user-friendly system to collect additional OEE data that would provide visibility of the results to the shop floor operators and also to management. One of the major long-term requirements of the project was building in capabilities for the system to gather real time data directly from the equipment and be expandable to other areas of the manufacturing process.

Pfizer global manufacturing (PGM) corporate IT had worked on the development of a manufacturing data reporting system called PfindIT (Pfizer factory intelligence network dashboard-IT), but the system lacked a user-friendly graphical interface and OEE reports. A team consisting of colleagues from PGM IT, regional IT, and packaging was assembled to define user requirements and work with the system vendor to develop the graphical user interface and reports required.

The team brought in long-time vendor partner GE to assist with the project. GE's production management software system, Proficy Plant Applications, has an efficiency module that seemed to fit the bill. This module is able to identify and monitor all areas of manufacturing for inefficiencies, perform root cause analyses, compile historical data summaries, schedule reports, and control OEE.

The biggest challenge was to complete the development and deployment by the first quarter. Working over the year-end holidays, the team completed a pilot system in one of the packaging lines in Vega Baja which was working in January. Deployments then continued with the rest of the 12 packaging lines. The tool was accepted by the shop floor operators immediately, setting off a wave of friendly competition between operators to demonstrate whose line was the most efficient.

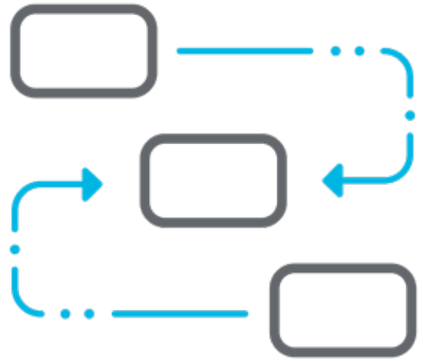
Implementing the new system brought a higher level of measurement consistency across the business. Different departments and sites had created their own techniques which made for results that could not be compared directly. With the new system in place, data collection was restructured for uniformity and aligned with the goals of the business. For the sake of consistency, the global packaging team with the help of Pfizer global engineering (PGE) defined two standard OEE calculations that are currently integrated into the system.

Real results, OEE

Watching improvements from these efforts is very rewarding. OEE numbers were only around 30%. But after, we were hitting 50% consistently, which is more than a 50% overall improvement. Perhaps that doesn't look like much, but an OEE of 30% is equal to 2.4 hours of productive time, while an OEE of 50% equals 4.0 hours of productive time, an improvement of 1.6 hours. The OEE monitoring system provides a tool for operators and supervisors to target areas of improvement continuously. We expect even higher savings since standard hours required to operate two packaging lines were reduced by 40% per line per shift. This is an example of the type of continuous improvement possible and achievable once you have visibility of your process and operations.

The development of the system has been such a success that the global packaging team has adopted it as the official tool for OEE measurement. Other Pfizer sites in Latin America, including Puerto Rico, Mexico, and Brazil have evaluated how they can implement the system as a way to build the competitive advantages within the Pfizer network.

The team next worked on Phase II of the project to collect data automatically, directly from shop floor PLCs and SCADA systems. The collaboration in this project has proven to be an excellent demonstration of what "One IT" is all about.



Reckitt Benckiser Optimizes Its Control System with Batch Execution Systems

Reckitt Benckiser

Reckitt Benckiser is a manufacturer for over-the-counter health and wellbeing products. Its manufacturing facility mixes, blends, and packs an over-the-counter branded indigestion remedy into glass bottles, stick packs, and tablets in 6,000 liter batches.

Challenges

Analysis, prognosis, and prescription

Astec Solutions, a GE Digital partner, was called in to help Reckitt Benckiser improve the performance of their manufacturing control system. The facility mixes, blends, and packs an over-the-counter branded indigestion remedy into glass bottles, stick packs, and tablets in 6,000 liter batches. Unexpected system crashes cost 30-90 minutes for every batch and system restarts had to be performed in a strictly regimented way, or entire batches of product could be lost. The system, which was installed by a system integrator six years previously, used GE Digital products in its architecture.

"After raw materials were mixed and blended they were transferred to storage tanks, before being sent to the packing lines," said Chris Barlow, Technical Director, Astec Solutions. Up to seven filling lines can be connected to the storage tanks. *"The system had not had a major update since installation. It was slow, unstable, suffered from periods of unscheduled downtime and was not producing reliable data. It was becoming a risk to the profitability of the site."*

The regular breakdowns were dealt with by giving the initial integrator the authority to call in and restart the system — a 'sticking plaster' solution that had been in place for three years.

The first step was to speak to the operators and gain a clear understanding of how the problems manifested. The Astec team also ensured the clear identification of the client's objectives and ideals. Unsurprisingly, avoiding breakdowns and minimizing downtime topped the list, as they most obviously affected operations, production and revenues.

"We looked at the system's architecture and analyzed the log files in order to identify errors in the system," he said. Astec had to work around the needs of a facility that was still in full production, so that process took around 10 days. Its first proposal was a slight change to the system's physical architecture. The servers were located in a control room and were subject to knocks and kicks, as well as being exposed to dust originating from the production process itself. The recommendation was to relocate them to an on-site data center, safe from accidental damage and atmospheric pollution. The next task was the software architecture.

"The previous integrator had implemented some of their own bespoke software components, in order to integrate the solution," said Barlow. *"In effect, the architecture had been 'bent to fit' and it was not ultimately the best solution."*

"Production had grown beyond the original solution, so demands were also a lot higher. The time was right to review and upgrade the whole solution. But it had to be achieved without shutting the factory down."

— Chris Barlow - Technical Director, Astec Solutions

Solutions

Astec's team recommended that Reckitt Benckiser should:

- Implement the latest versions of GE Digital's Proficy Batch Execution software as well as iFIX HMI/SCADA and Proficy Historian
- Remove the bespoke applications and configure the GE Digital solution to undertake those tasks itself
- Separate out the relational database and make them standalone, distinct from the Batch Execution software
- Implement Microsoft SQL Server Reporting Services (SSRS) in order to provide the customer with a reporting platform that was scalable, and could be enhanced and updated with additional reports as required

Implementation had to be achieved without interrupting production. Most of the work was undertaken between the hours of 2:00 am and 6:00 am, when the first daily shift arrived to start work. The process of preparation involved configuring all the hardware, then installing the software and checking connectivity.

We undertook bench testing and a lot of software preparation. When it came to the point of implementation we were pretty confident that it would work first time – and it did. It worked properly right from outset.

— **Chris Barlow - Technical Director, Astec Solutions**

Results

GE Digtial's integration, upgrade, and improvement enabled the customer to boost output and reliability. Specifically, it was able to end random offline incidents and unexplained crashes, as well as improved data collection. With the new system, the manufacturer was able to deliver accurate performance reporting, production analysis, and batch reporting.

The upgrade also extended the reporting platform with Microsoft SQL to other areas of the plant, providing a site-wide database for reporting. These new capabilities enabled the manufacturer to:

- Reduce risk, improve production stability and boost product quality, consistency, and traceability
- Immediately cut maintenance expenditure
- Minimize the cost of rebooting the system after crashes, which is estimated to cost more than £50,000 per year

Yuria-Pharm

Implementation of Manufacturing Operations Management (MOM) System in the Pharmaceutical Industry

With the support of the Association of Industrial Automation Enterprises of Ukraine

АППАУ

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DIGITAL TRANSFORMATION INDUSOFT

About Yuria-Pharm

Yuria-Pharm is an international specialized pharmaceutical corporation founded in 1998. Yuria-Pharm specializes in the production of infusion solutions, medicines and medical devices. The headquarters is located in Kyiv, Ukraine.

Yuria-Pharm is one of the ten leaders of Ukraine in terms of sales and is a member of the Association of Manufacturers of Medicines of Ukraine (AVLU). The company produces more than 110 million units of products per year.

Yuria-Pharm maintains its leadership among hospital distributors in Ukraine. The company accounts for 60% of sales of infusion solutions, which are equal to about 100 positions in the portfolio of Yuria-Pharm. The company also holds the leadership in the sale of medical devices – syringes, infusion systems and more.

One of the important directions of the strategy is compliance with international quality and production standards. The company has quality certificates: Ukrainian State Standard – ISO 9001-2001 (ISO 9001: 2000, IDT); Ukrainian State Standard – ISO 13485: 2005 (ISO 13485: 2003, IDT); ISO 13485: 2003 (BSI); GMP (Ukraine), GMP (EU). For achievements in the development of the pharmaceutical industry, Yuria-Pharm has received numerous awards at the national and international levels.

Project Context

Operational dispatch management systems have been the focus of managers for more than 20 years. Despite the stable interest, they are not very common in Ukraine. The reason for this condition is the complexity of the systems (at full implementation of functionality), their cost, as well as the combination of availability in the local market with appropriate service support. In modern design, manufacturers seek to install more complete production management systems (MOM – Manufacturing Operation Management), capable of performing not only operational and dispatch control of the state of production, but also of ensuring the performance of quality control functions, inventory, production planning, maintenance, etc.

The management of Yuria-Pharm expressed interest in similar systems. The main motivation was the following issues in the enterprise:

- The lack of full operational and dispatch control in real time made it impossible to react quickly to stops and changes in production.
- It was necessary to establish continuous processes to increase production efficiency by achieving the planned productivity of production lines, minimizing the number and duration of downtime and increasing product quality, and minimizing the number of shortages.
- With a large number of different lines and machines, it was difficult to understand the details and causal links of equipment failures and deviations of process modes.
- People play a significant role in the consideration and processing of production data – a lot of data was entered by operators manually.
- As a result, different services had different interpretations of the information received and, accordingly, there was no trust in the reliability of the data. This, in turn, did not contribute to teamwork to improve KPIs.

"To see all production in the palm of your hand, to understand the state of each line and the reasons for its shutdown, to control every important KPI and all this in real time – today, it is no longer a dream, but just standard requirements for managers and engineering management in the pharmaceutical industry. The lack of information on current offers or the cost of these systems is often troubled to meet these requirements. When we heard about the availability of such systems in our industry, we immediately organized a meeting with Indusoft-Ukraine, began discussions and joint development of a detailed Terms of Reference."

- Volodymyr Shevchuk, CEO, Yuria-Pharm

Systems such as ASODU (Automated Systems of Operational Dispatch Control, as a low-end segment in the category of MOM systems) have long been known in the market. At the same time, the quality of these systems does not always satisfy the customer. For example, grassroots automation at Yuria-Pharm includes a large number of controllers from different manufacturers – Siemens, Vipa, Omron, Owen and others.

The problem was that this logic of the controllers solves the problem of direct control of the machine only. Machine developers did not anticipate that data on the operation of major components, performance parameters, system errors, etc. will be needed by someone. Therefore, the main problem

was to highlight useful information and interpret existing data. For example, Yuria-Pharm set a task to determine the causes of downtime automatically. But how to do it when the machine control system generates a lot of opaque errors that are difficult to interpret?

In other words, if the data systematized in the PLC were not important for higher level KPI accounting, it would not be systematized in a user-friendly form. That is, they need to be found, "extracted," aggregated and systematized in the appropriate databases, accounted for and further – displayed, or transferred to other algorithms for further processing. When there are many such controllers (lines and machines), this task of automated real-time accounting is quite complex, including the difficulties of establishing a network connection. And without such a collection of accurate information "from below," it is impossible to establish accurate accounting of equipment and KPIs at the upper level.

Another aspect important for understanding this project is the balance of contractors on the part of the customer and the contractor. As always, close engineering or high-tech projects require close collaboration. Looking ahead, it should be noted that this was the case with Yuria-Pharm and Indusoft-Ukraine. At the same time, the number of available industrial automation specialists from the customer side was limited. This imposed additional requirements on the contractor in terms of implementing the tasks of collecting and dispatching grassroots information.

Summing up, setting tasks for Yuria-Pharm was quite classic in terms of the introduction of operational supervisory control as the main functionality of modern MOM systems.

At the same time, the variety of grassroots automation and networks, the limited availability of local staff were significant additional issues for Indusoft-Ukraine in implementing this project.

"The issues of Yuria-Pharm were quite familiar to us. We have been specializing in similar tasks of KPI scheduling and accounting for more than 15 years. Here we immediately saw that one of the main reasons for the inefficient accounting of OEE was the manual input of data. Actually, as the customer pointed out. That is, data on downtime were entered manually and often, quite subjectively.

At the same time, during the priority audit, we realized that the task of data collection will be non-trivial. The number of different grassroots controllers, different networks, unsystematized data and parameters, as well as insufficient level of automation on individual machines – all together, this complicated the task of collecting and processing information from the automatic process control system for issuance to MOM. As the course of work later showed, this aspect of the project was one of the most difficult ones."

- Volodymyr Patrakhin, CTO, Indusoft-Ukraine

The process of manufacturing ampoules at Yuria-Pharm

Decision and Progress of the Project

The proposed MOM system is a typical solution of the Ukrainian OT-IT integrator Indusoft-Ukraine for industrial enterprises, and which is based on its own developments and software and hardware from GE Digital.

The system is designed to increase the efficiency of production of the company, increasing the efficiency of equipment use, its productivity, product quality, reducing downtime and material losses, improving the transparency of efficiency and quality of decisions. The goal is achieved by increasing the efficiency of process and production processes of the company, the transition from manual to automated mode of tracking the work of equipment and personnel in real-time and further analysis of the state of KPIs and causation, with appropriate recommendations for managers.

For the pilot project, the decision to implement the MOM system was made at the site of the plant Yuria-Pharm in Cherkasy, and which included 2 production lines: 1) production of drugs in glass bottles, 2) production of drugs in ampoules.

After the audit and specification of the terms of reference, five main objectives of the project were defined:

- Implementation of a full-fledged system of scheduling and calculation and control of OEE in the production in a real-time mode.
- Tracking real-time downtime, performance and materials. Provision of access to operational information for all personnel of the company.
- Automatic tracking of important production events by signals from automation systems.
- Automatic receipt of orders for the production of ERP products, tracking the production process of individual batches and products.
- Provision of display of data on the efficiency of equipment use through the calculation of OEE in the intranet of the company with access through browsers and mobile applications.

Dispatching office at Yuria-Pharm

System Architecture

The solution has three levels. The first level – the level of local control and automation of process sections of the company, based on programmable logic controllers (PLC), operator panels (OP) and industrial computers (iPC), which perform the tasks of managing individual units and process sections. The purpose of the system at this level is to conduct the process. Within the project, the issue of data collection from the most important equipment of these local automation systems to the upper levels of real-time control was solved at this level.

The second level – the level of supervisory control, based on software and hardware of the process server of history and the computer of the dispatching workstation. The purpose of the system at this level is the automatic collection of real-time data, calculation of complex indicators, as well as the accumulation of production history. All important information from local equipment automation systems, automatic meters and terminals is stored in a single production data storage cell and provided to the dispatcher in a convenient and accessible form.

The third level – the level of analytics, based on the analytical server and the means of thin clients, which are involved in the implementation of tasks for the analysis of production data and are responsible for the efficiency of processes. The purpose of the system at this level is the visualization and analysis of production data.

Indusoft-Ukraine used the following from GE Digital:

- Analytical module Efficiency from the world-class MES software package, Proficy Plant Applications. It was used to create production models and identify production events of downtime, productivity losses, quality degradation, process alarms and product losses.
- Proficy Historian, best-in-class process historian archive of real-time data. It was used as an integration platform for automation systems (SCADA and others) and a tool for calculating current KPIs and their components.
- iFIX HMI/SCADA, also part of the Proficy family, as the software of the production management workstations.
- Production analytics display system based on a thin universal web client. It allows you to build a modern analytics display system using dashboard, customizable HTML5 and UAA technologies.
- Industrial Gateway Server(IGS) as a set of interfaces for access to production equipment management systems. ORS servers were used to connect to PLCs, operator panels and digital meters of products from different manufacturers.

Yuria-Pharm facility

Implementation Steps

- Determining the composition, characteristics and features of the implementation of control systems for each individual unit, which was planned to calculate the OEE. To do this, it was necessary to obtain information about the code running in the PLC / HMI / iPC, tables of variables in their memory with descriptors and parameters of access and unpacking (addresses, names, types, etc.). In turn, this task required the definition of a possible interface for data collection, selection of ORS servers for communication, and so on.

- At the level of SCADA nodes, work was carried out to determine the content of the Database (DB) parameters, which contain useful information about the equipment operation. At this level, it was decided to install ORS servers in the SCADA database to transfer information to the upper levels. Useful information was considered to be the parameters of the control systems, which indicate the operation or shutdown of the unit or its important components, performance, speed, number of defects, operating data or calculation of operating time, as well as alarms / messages / errors in the equipment operation, which can automatically determine the causes of stops or duration of loss of performance.

- Work has been carried out to install additional meters for products and shortages. According to the Terms of Reference agreed by the customer and the experience of Indusoft-Ukraine, the ideal situation is when there is a meter at the entrance and exit of each work center (unit) and a separate shortage meter.

- Data from ORS servers of SCADA nodes were transferred directly to the archive of real-time data collection (Proficy Historian) through the installed ORS collectors. For data from individual PLCs / HMIs / iPCs, additional data collection nodes were installed on the basis of an industrial computer with the Industrial Gateway Server software installed. This tool is a set of ORS servers and drivers for the most popular industrial controllers, interfaces and other means of automation systems. Proficy Historian OPC collector is installed on the same node.

- Based on the calculation core of Proficy Historian, validation was performed, primary indicators were calculated and logical data from the process equipment were processed. For example, the noise of discrete triggers of events is eliminated, indicators of counters of production and shortages are synchronized, current data of operating time of machines, integrated indicators of operating time, etc. are calculated at this level.

- Then it became possible to deploy the dispatcher's workstation, on the screens of which operational information about the production process, important production events, productivity, equipment loading, data from meters of finished products and shortages was displayed. The interface was developed in accordance with the requirements of the international standard – ISA101 in terms of information aggregation, graphics processing, structuring data on the model. It is important that the KPI of the dispatcher should be such that it can directly make an effect, and it is not OEE but the performance or speed of equipment operation, unit operating time, number of alarms by levels, shortage counters, plan / fact ratio and so on.

- Accumulated and processed through Proficy Historian , real-time data on the equipment operation became the basis for creating and debugging a system of models for detecting production events in Proficy Plant Applications. It is here that the general production and organizational model of the company is created; it is possible to analyze the data in the production context (in terms of the line, individual unit, product, batch, change, that is what). The normative and reference information database is developed (product specifications, content of hierarchical trees of causes of downtime and losses, levels of alarms by priorities, etc.).

- Then the task of integration with the existing ERP system was solved. At a minimum, ERP should provide the planned performance of equipment and orders for production (product, volume, time, production routes, etc.). If the ERP provides for it, it is necessary to transfer data on the progress of the manufacturing process, the transition of the batch from one unit to another, production parameters (products, production and loss, operating time and equipment hours in service, events of loss and downtime alarms, KPI values, etc.) back from the MOM. This can be in real time, or when the order is fulfilled and depends on the configuration of production control functions at the business level.

- Data on the status of KPIs (OEEs) and their components were derived for analysis by key specialists and management. For this purpose, it was necessary to develop the convenient interface so that it could be convenient to make parametric inquiries on sections of the separate equipment, products, performers, etc. Thin web client applications that are convenient to use not only on computers, but also on mobile applications are the best ones. Proficy Plant Applications HTML5 universal client was used within the project for the purpose.

The main challenge in the implementation of the system was the task of obtaining information from equipment automation systems in an objective production context. Control systems based on the PLC and SCADA were supplied by different manufacturers at different times as part of various equipment and did not provide for the transfer of information to external systems. It was necessary to find opportunities for connection, interpretation and retrieving useful information at each of the data sources. The decision was in a joint work with the customer's specialists to develop a technical solution in each case. These solutions included the installation of additional interface means of communication and sensors, modernization of existing control systems where possible, adjustments to the logic, careful analysis of the contents in the memory of controllers and SCADA databases of the engineering systems.

Separately, the solution of the MOM and ERP integration issue should be noted. The feature was in the need for integration with ERP class software that does not support database structures, models, methods and interfaces for data exchange in accordance with the requirements of the international standard – DSTU IEC 62264. The implementation took place through the use of web-services that use SQL-queries.

Packaging line at Yuria-Pharm

Features of Technical Implementation from Indusoft-Ukraine

As a result of the project implementation, Yuria-Pharm received numerous benefits and new production management opportunities.

1. Fast, full and independent integration of all devices of grassroots automation

"Zoos" (very diverse grassroots automation), difficulties in servicing various controllers and devices, as well as issues of integration into a single control system – a traditional issue of Ukrainian companies, was also present at Yuria-Pharm.

The solution used by Indusoft-Ukraine's specialists is based on three elements. First, the distributed Proficy Historian architecture allows the installation of remote archive collectors on data sources (Windows computers), automatic support for communication with the server and the provision of various interfaces (to ORS, SCADA, database, etc.), implementation of local buffering and data compression.

Second, the contractor has installed additional data collection nodes on the basis of an industrial computer with a data collection system directly from sensors and meters that are not included in the standard control systems of work centers. It also includes interface modules for communication with individual controllers over fieldbuses.

Third, the project uses Proficy Industrial Gateway Server (IGS) software, which is a set of almost 100 protocols, drivers and ORS servers to the most popular and used automation tools on the market.

Uniquely, IGS is the comprehensive driver set that can be configured to communicate with different devices.

That is, after the setup, the customer received a single IGS ORS server for the entire production line, in which, as separate channels, separate interfaces to production equipment management systems are configured. Otherwise, the integrator would have to install more than one industrial computer and a set of drivers, and then install a separate Historian collector for each one.

Accordingly, the customer has received significant benefits in performance, flexibility in expansion and ease of use

2. Highly efficient database, fully compliant with MOM requirements

Numerical production management modules (scheduling, quality, maintenance, inventory, etc.) are usually based on their own control subsystems and their own data. But a single management of all production at the MOM level requires the collection, archiving, coordination and uniform accounting of all data and their further processing!

Traditional approaches to relational database integration are not the best approach for industrial companies – they are slow, cumbersome and consume a lot of computer resources. Such technologies are not suitable for the modern MOM.

The solution for Yuria-Pharm is to use a professional product for similar tasks – Proficy Historian software. This software is a historical archive of real-time data – a real integration platform and, at the same time, a tool for calculating current KPIs and their components. The speed of data collection and processing, reliability, built-in data processing tools in

"This project stood out for its innovation, we already had experience in implementing ERP systems in production, but the implementation of the MOM system is the first experience for us, and I think it is successful. One project manager from each side was involved in the project, we constantly coordinated our actions or delays where connection, penetration and help was required. We helped Indusoft-Ukraine understand our difficult infrastructure, they in turn helped us understand the software products that were recommended according to the developed TOR.

As part of the project, we managed to build a MOM system that we can scale to the entire production; the system is currently giving good results to improve efficiency. At the first glance, the system looked complex, but it facilitated our work to collect the necessary process parameters with each day of work with it. We got the opportunity to form trends in critical parameters of production in real time.

In general, the project was not easy, but we learned a lot of new things within the project. In this case, I would like to note the high level of technical training of Indusoft-Ukraine's specialists and the level of their customer orientation. There were cases when we had new requirements and changes – the company always made advances. We will continue to be partners."

- Olexander Katrenko, Business Process Analyst, Yuria-Pharm

Proficy Historian are an order of magnitude higher than these parameters in traditional databases.

At Yuria-Pharm, this product is responsible for combining all important production data from various sources and qualitatively converting of raw data into economically significant information by calculating secondary indicators in real time. A real discovery for Yuria-Pharm was when the team saw how easy it is to work with Proficy Historian to connect and perform an archivation of data with its high reliability and performance. Therefore, it was decided to entrust the work with Historian specialists of Yuria-Pharm's own automation team in the subsequent stages of expanding the system to other lines and production.

3. Modern SCADA system as reliable basis for operational production management

The MOM as a management system of the entire production solves problems of the top level and for engineering managers of the company. But for operative management of technological sites, the traditional SCADA system is required.

It is a management tool for operators and dispatchers. At Yuria-Pharm, the dispatcher's workplace was developed with iFIX HMI/SCADA. This standard product from GE Digital has quickly created an easy-to-use and efficient tool for operational production management.

It was agreed with Yuria-Pharm that the development of control screens should provide for a use of the recommendations for a modern high-performance HMI (international standard ISA 101). According to this standard, control screens use less distracting graphics, contain only important aggregate data, and switch between screens according to a hierarchical multilevel production model. Now the dispatcher has all the necessary information about the progress of the manufacturing process and the results of the calculation of KPIs in real time.

Analysis of the system application has shown that it is important to display only those KPIs to dispatchers, which they can directly influence. For example, OEE was not very informative for them. It is more important for dispatchers to display data on operating and idle time of each unit of equipment, their current performance, speed, number of defects, promptly report important production events (alarms, stops, speed losses, data of engineering systems, etc.).

4. Modeling, full integration with ERP and advanced analytics of production process

Collecting, processing and displaying important production data in a timely manner is not sufficient to make important management decisions. Today's complex production requires high-quality, efficient and in-depth analysis of deviations from target indicators, failures and other unplanned situations.

In the implementation of the project at Yuria-Pharm, the stage of developing a set of production models, the logic of identifying important production events and the synthesis of databases of regulatory information was the most difficult and long. This work formed the basis of the application of

Sampling of screens from the dispatch system at Yuria-Pharm

analytics to improve the efficiency of equipment based on Proficy Plant Applications. Working with this MES software provided a detailed description of the production process. In essence, we are talking about a model of a virtual enterprise, which describes all the equipment, all production branches, the manufacturing process itself.

Due to the binding of system data (collected or calculated) to the parameters of the models, it is possible to analyze information in the production context, in terms of equipment, products, orders, personnel, etc. The joint careful work of Yuria-Pharm's and Indusoft-Ukraine's specialists allowed to adjust the models of detection and calculation of downtime and losses, calculation of components for availability, productivity and quality of OEE. In accordance with the existing system of accounting and analysis of KPIs at the company, the base of regulatory documents was synthesized, for example, the methodology of KPI calculations, the tree of causes and actions on downtime, losses, alarms.

Also, the issue of integration with the existing ERP system was addressed at this stage. Summarizing these points, it should be noted that the level of integration always depends on the implementation of production accounting tasks in the business system in general. For batch production, the planned performance of equipment and current orders for production (product, volume, time, production routes, etc.) should at least be transferred from the ERP.

If the ERP provides for monitoring of the production process and requires data of the "information loop," then it is necessary to transfer data on the progress of the manufacturing process, batch transition from one unit to another, production parameters (products, production volumes and losses, operating time and service time of the equipment, events of alarms, losses and downtime, the KPI value, etc.) back from the MOM to ERP. This can be done in real time, or when the order is fulfilled. In this project, Yuria-Pharm decided to concentrate the tasks of order management within the responsibility of the dispatcher. ERP orders are received automatically, the manager can manage the status of the order (active, pending, etc.), can edit parameters, combine or divide orders into parts, determine the process route and generate a final report.

5. Visualization and convenient dashboards in different monitoring and control modes

The availability of KPIs in real time and their high-quality visualization for a wide range of system users, ideally for everyone who needs it and remotely is another specific aspect of such projects. Quality criteria here: cost, convenience but also safety.

For tasks in this category, Indusoft-Ukraine offered a product of thin web client applications to Yuria-Pharm – Proficy Plant Applications HTML5 universal client. This does not require pre-installation of any software but uses a standard web browser of the OS. This solution allowed providing specialists with a convenient interface for generating inquiries about the status of OEE and its components in terms of individual equipment, products, orders, personnel, etc.

Dashboards (or visual panels) of the system have a hierarchical model, provide for a certain logic of analysis from a general to a specific one, some of them can be customized by users to their needs.

Work with the analytics system begins on the user authentication, determining the list of equipment units and the viewing period of interest. The root screen displays the OEE values and its components within the selected constraints.

"We installed 1 collection node on each line. The total number of connected data sources is 13, only about 350 parameters that are collected in real time with a frequency of about 1 sec, or per shift. In general, once the collection nodes were installed and physically connected to the data sources, the integration work took only 2 weeks. Prior to that, Yuria-Pharm performed extensive preparatory work to identify useful information in each data source, determine connection parameters (controller addresses, port parameters, etc.) and access to variables (name, address, type, range of changes, etc.).

The solution on Proficy Historian, collection nodes and IGS turned out to be very successful, clear and convenient for the Yuria-Pharm automation team.

Although at the beginning of the work, at the stage of the TCP protection, it was not easy to convince Yuria-Pharm to invest, but after they gained experience connecting individual machines with us, studied the detailed instructions provided to them, saw the high performance and reliability of the solutions used, they decided to do all further expansion of the lower level on their own. We are very proud of that. Because it is a confirmation of our technical solutions and a guarantee that our system will continue to live and develop."

Volodymyr Patrakhin,
CTO, Indusoft-Ukraine

Generalized OEE screen on a line consisting of two units

Availability Screen, part of OEE

The user can select the OEE component that interests him or her and see more detailed information. The "Availability" screen allows you to determine the root causes of downtime and their distribution by category. Statistics on the total number of downtime events, their total duration, mean downtime period (MTTR) and period between downtimes (MTBF) are displayed here. The horizontal Gantt chart shows the availability history of the selected equipment for the user-selected time period. When you hover the cursor over the chart, a tooltip appears that shows detailed information on the selected segment and the idle event recorded at that time. Very conveniently, with the mouse wheel, you can zoom the display of history data to take a closer look at the time period of interest.

Performance Screen, part of OEE

The "Performance" screen is designed to analyze the reduction in the efficiency of equipment use due to loss of performance.

Here are the root causes of productivity losses, their distribution by category and statistics on the ideal and actual number of products for the selected time.

Event Review Sequence Screen (left)
Batch Data Review Screen (right)

The Quality screen is used to analyze the amount of shortages. Here are the root causes of shortages, their distribution by category and statistics on the number of products produced and the resulting shortage for the selected time. The combination of these products from GE Digital together with their skillful adaptation by Indusoft-Ukraine specialists to the specific needs of Yuria-Pharm created a scalable, flexible and deeply integrated production management system, one of the best ones in the pharmaceutical industry of Ukraine.

Results of the Project

- Launch of a modern, unified system of production scheduling with MOM functionality per Terms of Reference. The customer received scheduling, equipment monitoring and management of the main process modes, with advanced analysis of downtime and other deviations from process regulations.
- Significant improvement in key operating indicators – in particular, the improved OEE indicator increased by 20%, particularly due to the reduction of productivity losses (by 70%) and downtime (by 80%).
- Qualitative changes in the production culture. In particular, the chief technology officers record a more responsible attitude of the plant's operators and technical services to the information from the dispatching system, which leads to more efficient and faster management decisions.
- A new level of flexibility and ability to respond to change. In the COVID-19 era, the capability of such a rapid response is ultimately reduced to the availability of certain functionality (such as remote monitoring – control, rapid reconfiguration of lines to new products, effective management of all KPIs, etc.) and training of plant personnel. The plant has reached a new level of production flexibility thanks to the new system.
- New knowledge and prospects for development. Accumulated experience and new knowledge allow us to see new perspectives. In particular, the management of Yuria-Pharm plans to scale the technical solutions obtained on 2 project lines to other sections of the plant. We are also talking about the unification of software solutions at the level of all production management.

"I am completely satisfied with the results of this project. We have received a modern production management system that complies not only with our Terms of Reference, but also with the best technical level that we see in Europe and other developed countries. From now on, our production is 'in the palm of your hand,' and it is easy for me, as a manager, to see what is going on and why, where the bottlenecks are and what the real reasons for the deviations are.

It is also difficult to overestimate the contribution of the system to the growth of production culture. Accurate and relevant data, ease of analysis, the ability to see everything in the dynamics – it not only leads to better management decisions. This significantly reduces the time spent by managers, but importantly – increases the responsibility of all staff."

- Volodymyr Shevchuk, CEO, Yuria-Pharm

Project partners at Yuria-Pharm

"During the project implementation, the entire stack of the system was built, including the ACS - MES and MES - ERP integrations, thanks to which there were reliable data for making correct and timely management decisions at each level. Well-established MES-ERP integration allows you to receive orders from the ERP, track their status, performance parameters in MES in real time, and transmit the necessary information to ERP.

Separately, the impressive results in improving the efficiency of production lines should be noted. Main issues that are present in any production where there are production lines include a large number of small downtimes lasting 3-8 minutes, they reach several dozen cases per day in some cases; in the absence of an automated system, they are not recorded or monitored. Another issue is the line productivity deviation from the planned one in a direction of a smaller indicator, which is also quite difficult to measure, and this leads to a significant reduction in production. After the introduction of the MES system at the company and calculation of the OEE indicator (the overall efficiency of the equipment) at once, specialists of Yuria-Pharm analyzed problem issues and operational actions allowed to significantly increase the productivity of lines with the approach to the planned values, and significantly reduce the number of short downtimes. This has led to increased production efficiency and a faster return on investment in the implementation of the system.

Sergey Yevtushenko,
CEO, Indusoft-Ukraine

To date, managers and key specialists of the company have received an effective tool for monitoring, control and promotion of production efficiency in general, in terms of individual lines, units, as well as directly the work of operators and specialists involved in the production process.

We express our thanks to the management and specialists of Yuria-Pharm for good joint work on this interesting project, which turned out to be very useful for both parties and the pharmaceutical industry at large."

Zoetis - The Path to the Industrial Internet

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Animal pharmaceutical supplier Zoetis uses radio frequency identification (RFID) and the Industrial Internet to help improve diagnosis and medical care of cows in feedlots.

Stuart Fisher, associate director of strategic initiatives at Zoetis, presented “The Industrial Internet at Work” at a GE user conference.

Fisher reported that Zoetis, which serves large populations, was spun off from Pfizer in 2013 and manufactures about 300 different pharmaceuticals for cats, dogs, cows, pigs and other animals.

To help cowboys find and care for sick cows in their feed lots, Zoetis developed a technical method for identifying ailing animals.

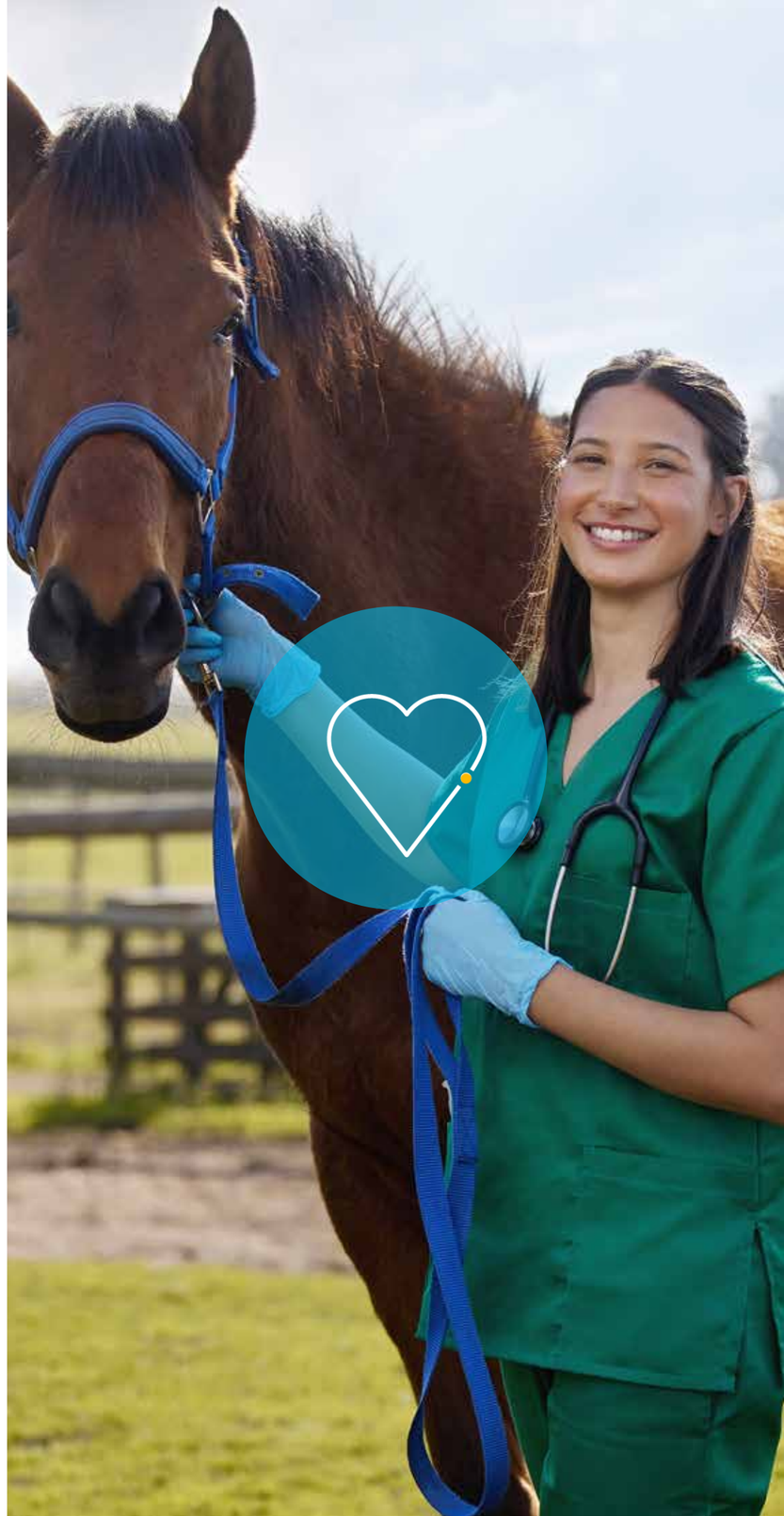
“The cattle-feeding industry has been affected by droughts that push costs up. Also, there’s a big labor shortage because today's cowboys are more reluctant to be out in the elements,” explained Fisher. “There are usually about 100 cows, and they require attention and care, including medication. Usually, the cowboys manually see which cows’ heads may be drooping or if they’re on the ground. These or other conditions may indicate that they’re sick and need to be pulled out and sent to a hospital pen.”

Consequently, GE, Zoetis and its users developed a solution that combines RFID tags and GE’s Proficy platform to help show which cows might be ill. This solution completed six months of early testing at a feed-yard operation in southwest Kansas.

“We were happy to find that, where the cowboys might pull about 115 to 128 cows for morbidity issues, the new technical solution only needed to pull 60 cows for morbidity issues, which was a 50% reduction,” says Fisher.

“Also, when two or three pulls were needed to treat cows a second and third time, our technical solution reduced pulls by 74% on second pulls and by 82% on third pulls.

“This means better health and performance for the animals and better economic results, including 8% better average daily weight gain and improved dry-matter conversion from feed to weight on the animals.”



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