INSIGHT
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CONNECTED WORKER
A MODERN STRATEGY

LIMITLESS TRAJECTORY
WWW, PPM & XALT

ECOSYS PROJECT
PREDICTABILITY OR SECRECY?

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INSIGHT

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DID YOU KNOW...

An interactive digital version of Insight magazine with added content can be found online. bit.ly/PPM-Insight
Boldly Go
Into the World of Digital Transformation

What a year it has been at Hexagon PPM! We’ve engaged with more customers this year than any on record, and the conversations have remained consistent across the globe. What our clients want from us is digital transformation (of course!), integration and overall productivity improvement.

In an industry that has seen its share of challenging years, there are unmistakable signs of productivity innovation, and gains are already apparent. In our core Oil and Gas market, customers are adapting, even without the tailwind of higher oil price levels. They have innovated their way into reducing project costs by a reported 51 percent and have established a breakeven of about $60 a barrel.

I am sure this change has required some challenging decisions.

Digital transformation is presenting similar tough decisions in all industries.

Companies need to be courageous – which means people need to be courageous – when they are making the big bets, such as adopting new business models and divesting from old ones. This pending uncertainty can be the enemy of change.

Uncertainty can be amplified in that unlike some strategic options, the embrace of digital transformation must be whole-hearted. I mean, it is a transformation, right? It’s important to set out and define what you want to achieve and be bold about how you pursue it. While actual steps and tasks leading to digital transformation can be incremental, the mindset surrounding it must be all-in.

This will have a profound effect on existing resources and the direction of your investments, BUT the boldness will also have a profound effect on the impact these changes could have.

We at Hexagon PPM are excited to partner with customers in this time of change. We have been helping them for many years adopt a digital-centric mode of operation to streamline their processes and to optimize productivity.

I am sure it won’t be a surprise to learn that we are digitally transforming ourselves, too – optimizing outdated processes, eliminating manual ones and introducing new ways to engage with the markets we serve.

We are all in this together!

Best Regards,
Hexagon strengthens its construction solutions portfolio for the AEC (Architecture, Engineering and Construction) market with the acquisition of Bricsys Belgium. Hexagon has long been a leader in plant and process design & engineering. Now, the Bricsys acquisition extends our domain expertise into building design, adding a unique Building Information Modeling (BIM) workflow, all in industry-standard .dwg file format.

BricsCAD is the familiar design platform for all your needs; 2D drafting, 3D modeling, Mechanical design and BIM.

www.bricsys.com
FROM THE PRESIDENT » MATTIAS STENBERG

THE 4 PILLARS

HOW HEXAGON PPM IS APPROACHING BUSINESS FOR 2019

Fifty years have passed since the founding of the company that begot today’s Hexagon PPM. There have been corporate name changes as well as the monumental shift from hardware production to software creation; and the technology landscape from the bits and bytes of yesteryear is almost unrecognizable.

Someday, our descendants may look back on 2018’s science with nostalgia, but for now, the horizon of 2019 is still being chartered as we enter Year 50.

President Mattias Stenberg shares his thoughts on what the next orbit around the sun will bring the customers of Hexagon PPM.

Insight: What is the top strategy that the leadership team is looking to employ in the coming year?

STENBERG: Our strategy has four pillars, and they determine how we will grow both in terms of our core business in traditional as well as new markets and also with new solutions that we are bringing to market.
The first pillar is how we will sustain and protect that core business, which is really engineering design tools. Our focus here is not simply creating more features and functions, but by investing in the user experience. We have learned that our current customer base uses far from 100 percent of the capabilities we currently offer. We can gain additional customers – and make life better for the ones we already have – if we make our current products easier to use.

There’s no doubt we have the most innovative solutions on the market, and we will continue to invest in making them faster and more user friendly.

*Insight:* Given its importance to customers, how would you describe the level of integration of PPM solutions across the lifecycle?

**STENBERG:** We truly are the only company that can do it all. This includes FEED (front end engineering and design), detail design, procurement, fabrication, construction, completions, project controls and operations/maintenance.

This is our unique selling point, and we are making our integration as consumer-driven as possible. Obviously, it is an ongoing effort, and we need to invest further to make the integration more seamless and have our products work as customers expect.

*Insight:* You mentioned that you are targeting new markets; is this the second pillar of the strategy?

**STENBERG:** Yes! We are investing significantly to expand what we do for owner operators. We’ve experienced innovation with our new HxGN SDx® and also through partnering with Luciad, which is now part of Hexagon Geospatial. Providing solutions for owner operators to help them in the operations and maintenance phase of the lifecycle is a key bet for the coming years.

*Insight:* Another market you have spoken about in the past is PPM’s role in the construction realm. How is that going?

**STENBERG:** Construction is a fast-growing market, and we are growing with it. We have a very strong product, Intergraph Smart® Construction, and we are investing to lower its cost, make it more automated and easier to use.

We’ve also put a lot of effort into HxGN SMART Build, which will go commercial in the second half of 2019. Skanska Sweden and a couple of companies in China are beta customers for us right now, and that’s going well, so we look forward to that release.

*Insight:* You recently announced the acquisition of Bricsys, a Belgium-based developer of CAD (computer-aided design) software. Why was this purchase made?

**STENBERG:** This is a good example of pillar three, new products. Bricsys is a growing company with really interesting technology. The potential is crystal clear; BricsCAD is a powerful alternative for customers looking for a modern CAD platform. It is also a development platform that application developers can use to build a vertical-specific business upon. Further to this, BricsCAD BIM is a newly released Bricsys product that, in concert with HxGN SMART Build, could represent a significant opportunity for construction customers looking to automate processes on a common platform and to increase construction productivity.

We are also reconfiguring a version of our EcoSys projects performance solution to make a more natural fit into AEC construction.

*Insight:* You mentioned how important it is for PPM solutions to easily integrate with one another across the lifecycle of industrial projects. Are you doing the same for PPM solutions to work in sync with other Hexagon divisions?

**STENBERG:** With our One Hexagon concept in mind, we have a long list of collaborations, such as laser scanning with Hexagon Geosystems, information management with Hexagon Mining and simulation strategies with Hexagon Manufacturing Intelligence. This is pillar four.

*Insight:* How will you regard 2018?

**STENBERG:** I will regard it as a good year. The business is growing, and growth is accelerating. We can see that the strategies and bets we have made have been good ones: SDx has a significant pipeline of business; improving our UX is paying off; and the digitalization of the way we handle our business – our inhouse HR, marketing, sales, IT – is creating a well-oiled machine.

And I feel just as good about 2019.

Patricia McCarter is Senior Content Marketing Manager and editorial director for Insight Magazine for Hexagon PPM. She is based in Huntsville, AL, USA.
A partnership enriching how Covestro provides raw materials for cars, shoes, construction and so much more
Germany’s Covestro plans to execute digitalized plant operations within two years, a goal that covers the entire digitalization program for engineering, operations and maintenance activities.

This is a sizable undertaking, even for a company as successful and innovative as Covestro, which is the world-leading supplier of high-tech polymer materials used in computers, phones, shoes, cosmetics, cars and hundreds of other consumer products.

Stephan Krebber, program director for digitalization, explained why the company made this significant decision, which will involve HxGN SDx® Operations creating a digital twin of a facility.

“We need to have one database to provide the updated information we have in reality,” Krebber said. “In a maintenance operation, we use these data sets with 30 to 50 people in parallel daily, the same set of information.”

He said these people work in various places in the facility – in the field and in the office, so it is crucial that the information is always up to date.

“We don’t just want to focus on the engineering part,” he said. “We want to use it over the whole asset lifecycle. And for that, we need to collaborate with other engineers in maintenance, and we also need to collaborate with other external companies.

“We want to use these tools not only for 100 engineers in my company but for 6,000 employees. This is a huge change ... I want to have a perfect, simple tool, which is easy to use, which is self-selling. This is the benefit I’m looking for that Hexagon should provide.”

Hexagon PPM President Mattias Stenberg said as Covestro’s technology partner to facilitate the digitalization of the engineering and operations landscape, PPM is providing 2D/3D design tools and information management solutions, as well as construction and supply chain management products.

“We will enhance the company’s existing asset documentation management practices to address duplicated data entry, delayed information exchange between engineering disciplines, manual work efforts, as well as insufficient possibilities for data analysis,” Stenberg said.

“By digitalizing its asset information, which will be one of the steps toward becoming a fully digital enterprise, Covestro expects to realize multiple benefits across all lifecycle stages. We are honored that Covestro has selected Hexagon PPM to usher it through this process.”

Krebber said the steps have been defined for the project he’s calling “OSI2020” (Optimized System Integration).

“I’ll do a yearly innovation workshop with the team and with Hexagon to define what comes next,” he said. “And I think this is just a start.”

Patricia McCarter is Senior Content Marketing Manager and editorial director for Insight Magazine for Hexagon PPM. She is based in Huntsville, AL, USA.
These are all questions that owners and contractors have been asking themselves for decades, but productivity and performance levels in the engineering and construction industry still lag behind other sectors by a considerable margin. What is responsible?

THE HUMAN FACTOR

In its report on improving project outcomes and predictability, the Construction Industry Institute (CII) identified the human factor as the most significant component of project success.

The human factor means not only the people working on a project, but also the organizational culture and the incentive structure built around projects. If not properly managed and aligned with organizational strategy, the human factor can have a negative effect on projects.

Some of the causes of low predictability and project ineffectiveness are directly attributable to the human factor:

- Insufficient effort or attention
- Inadequate experience and expertise
- Optimism bias
- Poor transparency and accountability

Now what? Realizing that human factor is critical to project success is a first step, but how can you ensure the human factor is improving rather than hindering project predictability and performance?

INCENTIVIZATION

While the human factor is notoriously difficult to change, improvement can be achieved through properly aligning incentives with organizational needs and goals.

Most organizations utilize an outcome-centric performance measurement – that is, the project team is measured based upon the deviation from cost and schedule at the end of the project, i.e. if it is close to planned budget and schedule at completion (good) or far away (bad).

But this is too simplistic, and it inadvertently sends the wrong message. It contributes to optimism bias, while limiting transparency and accountability.

To illustrate, imagine a project team discovers an issue that will likely cause a 20 percent overrun when the project is 40 percent complete. The team has two options:
Are You Incentivizing Project Predictability or Secrecy?

A) Report the issue to management  
B) Don’t report the issue and try to get back on track

CII found most often, project teams will choose Option B out of fear that if they report the issue to management, they will be subject to more scrutiny for the duration of the project and on future projects. Another reason they choose Option B is that they fall victim to optimism bias, telling themselves that they will be able to right the ship.

And why wouldn’t they choose Option B? If team members are measured solely on project outcomes, there is no reason to tell management the bad news early in the project. Nobody is eager to tell their boss bad news, especially when there is disincentive to do so.

Now imagine instead that the project team was measured based on predictability, incentivized to report project outcomes early, AND be as accurate as possible. The project team would be much more likely to choose Option A, leaving management with ample time for course correcting measures – possibly shifting resources from another project, valuing engineering efforts, renegotiating contracts, using contingency funds, etc. This proactivity, in turn, stands to significantly improve project cost performance across the enterprise, as organizational culture shifts to foster transparent and predictable projects.

THE MISSING LINK

According to KPMG, the missing link in transforming the performance of projects-driven organizations is integrating people, governance and technology.

“It’s not enough to address these components independently — we have to find new ways to make them work together in an integrated fashion ... When these three critical performance drivers work in harmony, the sum can truly be greater than the parts;” according to KPMG’s Global Construction Survey Report.

But how can integrating technology with your people and governance help improve incentivization and ultimately the performance of your enterprise?

Technology can help you accurately and consistently measure project outcomes. By utilizing a projects performance-based software system such as EcoSys, you can go a step further. The software serves as the basis for ensuring all the pillars of predictability are supported across your organization. These pillars encompass well-developed processes for (1) portfolio management, (2) integrated change and risk management, (3) project and contract controls and (4) performance management, including progress measurement and the “Living Forecast”. The software can then synthesize predictability metrics such as Normalized Cost Timeliness (NCT), measuring how timely cost variances are predicted and Cost Predictability (CP), a metric that combines NCT with overall cost variance. CP ensures both factors are taken into account in one universal metric that can be applied across the enterprise at any level of aggregation.

When teams are scored based on predictability, it becomes much easier to incentivize them based on early identification of issues and accurate forecasting of project outcomes. Another added benefit is the ability to analyze, benchmark and compare project teams based on predictability - knowing which project teams, divisions and regions are delivering the most predictable projects. That provides a catalyst to change the culture in an organization to one that rewards transparency and predictability rather than secrecy.

Even the best project teams face issues that are beyond their control; what matters is how you deal with those issues.

When properly integrated and utilized, technology can help change the culture of an organization, turning the human factor into a competitive advantage. By utilizing the predictability metrics available in software like EcoSys, you can incentivize early identification of issues and help drive better projects (and financial) performance.

Justin Lucas is the Marketing Manager for EcoSys projects performance software. He is based in Huntsville, AL, USA.
When extracting precious metals from unearthed ore, mining operations use cyanide as a solvent in the recovery process. It’s been done for decades, and while alternative agents have been tried, cyanide – a highly toxic acid – remains the favored, most effective choice.

Green Gold Engineering (GGE) is an engineering, procurement, construction management (EPCM) partner in Southeast Asia’s mining and minerals industry. It is also the innovator of the RECYN Process, a cutting-edge technology that recovers cyanide and dissolved metals from gold and silver process plant streams and detoxifies tailings.

The combination of recovery steps overcomes any need for further detoxification, changing a net cost to a positive return for their mining customers. The company, headquartered in Indonesia, has witnessed significant improvements in workflows and discipline integration using a new generation of engineering software to increase production efficiency in much larger complex projects.

To equip engineers from multiple disciplines with quick access to accurate project data and the ability to update new design modules into existing schematic drawings, Green Gold’s systems had to work with existing project engineering tools and reflect accurate 2D schematic designs into 3D models.

After an evaluation of the industrial engineering design tool market, Green Gold selected Intergraph Smart® 3D and Smart P&ID for their ability to support real-time concurrent design updates, intelligent rules and relationships, task-based modeling as well as the creation of automated deliverables.

GGE Engineering Manager Robert Cooper said these Hexagon PPM solutions provide value from a scheduling point of view, “and time is key.” Engineers can quickly generate accurate drawings and extract project data and material lists directly from the 3D model without extracting first to AutoCAD. This feature helps GGE deliver high-quality projects for its clients faster.

“It is all integrated,” Cooper said. “I can make a change to any one of the (engineering) phases, and everything else is updated, so our engineers and designers can focus on what is most important.

“... When you make a process that doesn’t actually cost the client money, but can potentially make them money while being good for the environment, that’s where the real value is. People are skeptical, but that’s half the challenge. We’ve got this technology. It works. You have to trust it.”

Smart 3D and Smart P&ID were immediately implemented by GGE into its live production phases, which gained immediate results in their project estimation. Future jobs were priced lower, making GGE more competitive by reducing risk from lump sum bids with accurate costing and timeline.

GGE will use Smart 3D and Smart P&ID in upcoming projects and is working to improve its engineering efficiencies with Hexagon PPM’s electrical and instrumentation modules and potentially Smart Materials to boost overall project outcomes.

Wijaya Sutantio is an Account Manager for Hexagon PPM based in Indonesia.
"WE’VE GOT THIS TECHNOLOGY. IT WORKS. YOU HAVE TO TRUST IT."

—Robert Cooper, GGE Engineering Manager
Two men – whose work with IBM helped create a portion of the technology that sent man to the moon – decided to open their own company that would provide intelligent graphics software running on their own enhanced terminals connected to host computers.

The name of this company was M&S Computing, reflecting the initials of their founders Jim Meadlock and Terry Schansman, and they headquartered it in Madison, Alabama, just down the road from NASA rocket propulsion operations that successfully got the Apollo 11 spacecraft to the moon, also in 1969.

In the 50-year history of the company that became Intergraph and is now Hexagon PPM, countless technological discoveries were made.

In this four-page spread, we highlight some of our corporate milestones in parallel and within the context of other global scientific breakthroughs.

You’ll see, it’s been a very busy 50-year stretch.
1969: Having helped Apollo 8 orbit the Moon, the founders of Intergraph leave IBM to start M&S Computing in Madison, Alabama, USA

1969: Unix operating system is derived from the original AT&T Unix

1969: C language development begins by Dennis Ritchie

1969: Developed first interactive CAD product, IGDS (Interactive Graphics Design Software), which becomes an industry benchmark

1969: First Concorde test flight conducted in France

1969: Chemical Bank installs the first ATM in the U.S. at its branch in Rockville Centre, New York

1969: The Boeing 747 “jumbo jet” is flown for the first time, taking off from the Boeing airfield at Everett, Washington, USA

1969: M&S fulfills first contract with the U.S. Army Missile Command, design-printed circuit boards

1969: Developed first interactive CAD product, IGDS (Interactive Graphics Design Software), which becomes an industry benchmark

1971: Intel releases the first programmable microprocessor

1971: Ray Tomlinson sends the first email on the ARPANET (Advanced Research Projects Agency Network), the forerunner of the internet

1972: Atari founded & 2600 or Atari VCS released

1972: Earliest M&S Computing terminal designed to create & display graphic information

1969: Apollo 11 astronauts Neil Armstrong & Buzz Aldrin become the first to walk on the moon
1972: Makes first commercial sale of an M&S system to the metropolitan government of Nashville/Davidson County, Tennessee, USA

1980: M&S Computing’s name is changed to Intergraph (short for Interactive Graphics) prior to an initial public offering the next year

1984: Intergraph launches the leading 3D plant design system

1984: First use of Ship Outfitting system

1985: Intergraph becomes second largest CAD vendor in the world ... after IBM

1986: Transitions from VAX VMS host-based software environment to a UNIX environment using networked workstations and servers

1986: PDS® debuts to becomes global market leader in 3D plant design; used across major plant design sectors for 3+ decades; represents a new approach to engineering design with focus on management of design data

1986: Becomes one of the largest employers in North Alabama at 5,100 employees

1977: Apple II starts shipping

1978: The LSI-11/2 microprocessor enables Intergraph to create the first primitive Local Area Network (LAN) in CAD history

1978: First satellite in the modern NAVSTAR Global Positioning System (GPS) launches

1982: IBM releases its personal computer

1984: Apple releases the Macintosh computer, with its groundbreaking Graphical User Interface (GUI)

1985: Microsoft releases first retail version of Microsoft Windows (Windows 1.0), originally a graphical extension for MS-DOS operating system
1987: Introduces the new GZ graphics accelerator

1987: Master Architect is released, a model-based design tool that uses object-oriented software development techniques

1987: Introduces a family of new workstations that still use a 5 MIPS C100 Clipper microprocessor


1996: Intergraph wins DARPA COMPASS program bid & IAI partnership (U.S. Navy contract)

1996: Intergraph wins DARPA COMPASS program bid & IAI partnership (U.S. Navy contract)

1997: Smart Marine Enterprise first used by shipyard outfitting departments

1997: Introduces the industry’s first single and dual Pentium II workstations both 266 and 300-MHz, also the first workstations to feature Macintosh compatibility

1998: Wildcat 3D graphics card exceeds 200 CDRS-03 View performance benchmark

1998: Intergraph offers the first data and document management system specifically for the plant design industry

1999: Intergraph releases SmartPlant® P&ID in collaboration with industry leading customers

2001: Apple releases iTunes & iPod

2003: Introduces its leading-edge, data-centric plant modeling software, SmartPlant® 3D

2003: Intergraph PDS & SmartPlant suite to support the engineering, design, construction & start-up of process plants

2006: Pebble Bed Modular Reactor Ltd. (PBMR) selects SmartPlant Enterprise for the development of South Africa’s first pebble bed modular nuclear reactor

2007: First iPhone released

2007: Odense Steel Shipyard uses Intergraph marine software to design & build the world’s largest container ship

2006: Named the No. 1 worldwide overall engineering design solution provider by ARC Advisory (now 12 years in a row)

2006: Odense Steel Shipyard uses Intergraph marine software to design & build the world’s largest container ship
2008: Saudi Basic Industries Corp. (SABIC) standardizes on SmartPlant tools as its engineering design & data management platform for all of its manufacturing affiliates.

2013: Intergraph Smart® 3D is used on Prelude FLNG, the world’s largest floating liquefied natural gas platform/largest offshore facility ever constructed, as well as the largest offshore facility ever constructed.

2012: Groundbreaking of new Intergraph headquarters, Madison, Alabama, USA.

2009: The bitcoin cryptocurrency network is founded.

2010: Acquires CAESAR II® to provide pipe analysis to the portfolio.

2018: Connected Worker Solution, inaugural “Mobile First” solution, solely focused on efficiencies for frontline workers in plants.

2015: Intergraph Smart® Materials Mobile Scan application introduced, enables barcode, QR code & RFID tag scanning in the construction yard.

2015: EcoSys acquisition adds projects control enterprise software to the portfolio.

2017: Intergraph PP&M rebrands to Hexagon PPM, signifying a deeper alignment with its parent company & the drive to serve industries beyond its traditional core.

2017: HxGN SDx® Projects, the first cloud based asset management tool released.

2017: Inaugural use of augmented reality for 3D model collaboration with the Microsoft HoloLens and holographic data DAQRI Helmet.

2018: Acquisition of Bricsys makes Hexagon the world’s largest AEC/BIM & CAD company.

2008: Hexagon acquires Intergraph; Ola Rollén becomes CEO of Intergraph.
A LIMITLESS TRAJECTORY

A Look at the Commonalities of the Worldwide Web, Hexagon PPM and the Xalt Platform

BY PATRICIA McCARTER

SOME HISTORIANS SAY THE ADVANCED RESEARCH PROJECTS AGENCY NETWORK, OR ARPANET, WAS CREATED TO CONNECT COMPUTER TECHNOLOGIES FOR MILITARY COMMAND PURPOSES AND TO SAFEGUARD CRUCIAL COMMUNICATIONS AGAINST NUCLEAR THREATS.
This much is certain: ARPANET was the precursor to the internet, and the first message was sent across the network in 1969 ... the same year the company that was the forerunner to Hexagon PPM was founded.

It is fitting that these two events occurred simultaneously. The internet remains revolutionary for communication, commerce and collaboration across all spectrums of life. And Hexagon PPM continues to expand its reach across the industrial landscape and throughout the lifecycle of digital assets.

The trajectory for both is limitless.

We know that 90 percent of the data currently shared on the internet has been created since 2016, and half of that data is accessed on mobile devices. The Internet of Things (IoT) is contributing mightily to this usage.

“This flow of data has been heralded as the greatest achievement in human history, promising efficiencies, productivity and safety at mind-blowing levels,” said Hexagon CEO Ola Rollén. “In the short term, it’s had somewhat of the opposite effect.

“The gap between data generation and data usage is growing exponentially wider. We need an accelerator to close this gap and put data to work for us.”

Rollén announced at HxGN LIVE 2018 that the company’s new Xalt platform would create Autonomous Connected Ecosystems (ACE), where data is connected seamlessly through the convergence of the physical world with the digital, and intelligence is built into all processes.

It is a radical approach. Xalt will accelerate digital transformation, in ways that are infinitely scalable.

Xalt can read and write, offering plug-in enterprise integration for legacy connections. It is also network-optimized for visualization of multiple geo-referenced 3D and 2D data sets, so events can be understood and interpreted as they happen.

It turns data processing into an intelligent decision-making engine that creates smarter businesses.

But Xalt itself is not a product for sale. It will be gradually embedded into Hexagon solutions.

“In the next four or five years, it will become a complete wraparound technology in all our platforms, systems and products,” Rollén said. “Our vision is to ultimately underpin all of Hexagon’s solutions with Xalt, so essentially, it will come standard.”

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NO MAN IS AN ISLAND

CONNECTED WORKER STRATEGY BENEFITS*

- 30% IMPROVED PRODUCTIVITY
- <1 Year PAYBACK PERIOD
- 209% ROI PER YEAR
- $3.9 M SAVED ANNUALLY

ASSUMPTIONS

- 200 FRONTLINE WORKERS
- 6 OPERATING UNITS
- 15 FRONTLINE WORKERS PER SHIFT
Imagine you’re stranded on a deserted island with plenty of food and water.

What is the one possession you would want with you?

Most people would choose their phones since they are our keys to the outside world – email, messaging apps, social media, news feeds – in other words, connectivity.

However, for many owner operators, these connectivity benefits are not yet relevant to their frontline workers. A day in the field can seem like being stranded on a deserted island. Connecting workers back to colleagues, and the information they need, shouldn’t be a search-and-rescue operation.

However, “Connected Workers” are employees who not only are empowered with wearables, sensors, smartphones or tablets, but they are able to fully exploit the data these devices produce to carry out their jobs as safely and efficiently as possible.

Launching a Connected Worker strategy can improve the effectiveness of the workforce by linking workers with access to the right information at the right time so they can make faster, better decisions, improving productivity and reliability to reduce operating costs.

This strategy connects workers by leveraging the technology they already know and use. Utilizing the mobility features of cell phones and tablets are the first steps in a long-term connected worker strategy.

Currently, most plants are still consumed with paper processes requiring significant manual efforts, such as routine asset inspections.

These time-consuming paper processes include abundant time-consuming administrative steps prior to inspections to keep information organized. Despite all the effort prior to inspections, once the records are filed, the information is difficult to find and inaccessible at-will. However, with a Connected Worker strategy, inspections could be completed in half the time, resulting in even better inspection information that can be accessed at-will by anyone.

Personalized interfaces link technicians with experts, resources and information to resolve pressing issues. Locating equipment, parts and tools is as easy as finding showtimes at the local theater.

Connected workers collaborate using pictures, videos and messages to update each other, engage experts and make decisions. Unplanned shut-downs are resolved with minimal damage by an empowered front line that can assess the situation, isolate the issue and keep the plant online.

Frontline workers eliminate hours of time-consuming searches with the mobile devices they love, working and collaborating in new ways. Supervisors at their desks, in the control room and in the field are connected to their workforce and to plant operations.

Management gets the productivity and reliability they demand.

Across the board, a connected workforce increases safety and makes operations more predictable.

Gena Hayes is a Marketing Program Manager for Hexagon PPM’s solutions. She is located in Huntsville, Alabama, USA.
Modern technologies for fabrication processes – such as laser scanning, sensors, wireless communication, robots, machine learning and artificial intelligence – have created a brand new world of opportunity for enhanced productivity and quality.

Modernization has created the digital transformation process, which aims at a future state of operating in a far more connected and automated way with significantly less paper and more electronic control of both data and processes.

With this comes a need for a comprehensive, modular solution that covers the most important work processes in shipyards and offshore fabrication yards. Enter, Intergraph Smart® Yard.

Each of the modules can be configured for use with other applications, depending on interface capabilities. This means that the journey towards a more modern and “digital” yard can be done in stages rather than with one big leap.

**ENABLING EFFICIENT WORK PROCESSES**

Hexagon PPM has worked with many customers worldwide to understand current workflows, which is crucial for development of software to support and potentially improve clients’ processes.

An efficient yard must have complete control of the entire project lifecycle – estimation of cost and time, receiving and managing materials, fabrication engineering and planning, generation of all required documentation and data, tracking of the fabrication process and quality control. This is what Smart Yard provides ... improved control and consistency of data throughout the entire fabrication process.

Standardization of materials and design can be enforced by implementing rules-driven systems for materials data and for 2D/3D design.

Consistency is a key word here; what you design should be what you buy, ensuring you have the right materials available when you need them and knowing that the pieces will fit together. Smart Yard offers rule-based commodity codes and material descriptions, reducing manual key-in to a minimum and feeding the design systems with a consistent set of catalog data. These rules go beyond the traditional interference checking and space allocation, as they cover manufacturability, capacity checks, equipment operability and potential safety hazards.

The fabrication process can be planned to optimize resource utilization, avoiding bottlenecks and allow for continuous monitoring of the status in the fabrication process.

Supporting “lean” and “Industry 4.0” principles, Smart Yard can help optimize the entire fabrication process while simultaneously reducing waste.

Mobile devices can be used to capture and report status, issues and progress – sharing data in real time so that management can get access to actual status as required and act in case anything, such as a machine failure, is disturbing the process. Efficient and controlled management of change is also a key aspect of Smart Yard, as the solution includes capabilities to evaluate the impact of design changes and help decide how to handle them.

Smart Yard also includes a unique 3D yard planning capability, which aids in speeding up the process to plan the assembly/construction process, including lifting and internal transport arrangements, scaffolding, painting and much more.

And digital transformation just got one step closer.

Arne Monsholm is the Vice President of Business Development for the Industry Solutions Group. Arne is located in Ålesund, Norway.
HEXAGON JUST BECAME WORLD’S LARGEST AEC BIM AND CAD COMPANY.

HEXAGON STRENGTHENS CONSTRUCTIONS SOLUTIONS PORTFOLIO with BRICSYSS ACQUISITION

The news of Hexagon’s acquisition of Bricsys in October reverberated throughout the CAD software industry. Cadalyst Monitor declared “Backed by a New Big Brother, Bricsys Eyes a Bigger Piece of the Pie.” Architosh, which bills itself as the premier online destination for Macintosh-based CAD/AEC and 3D professionals and students worldwide, didn’t mince words with its headline of the deal: “Hexagon Just Became World’s Largest AEC BIM & CAD Company.”

Veteran industry observer Jeff Rowe, in an article for MCADCafé, wrote, “Bricsys Acquisition Could Challenge Autodesk.” And Architosh, in a follow-up story, noted, “Hexagon Now Has End-to-End AEC Solutions Platform with Acquisition of Bricsys.”

Founded in 2002 by CAD entrepreneur Erik de Keyser, Bricsys’ singular focus has been building cost-effective, mission-critical CAD tools for many of the world’s most successful companies. The Belgium-based company is a growing developer of engineering design software brought to market under the flagship BricsCAD® brand.

Bricsys products enable the world’s most innovative companies to streamline complex design workflows daily. BricsCAD offers all the familiar CAD features using the popular .dwg format, which is the most common file format for CAD applications, including AutoCAD®, as well as time-saving tools and a powerful programming interface for application development.

De Keyser, in his message to the approximately 180 employees regarding the acquisition, emphasized the exponential growth possibilities for both Bricsys and Hexagon.

“We have spent nearly a year investigating options for growing the business,” de Keyser said. “We determined that the best decision was for Bricsys to become a part of the Hexagon family. “This is a major milestone in our evolution, but we’re still Bricsys. We have a clear, well-lit runway in front of us now. These are very exciting days for everyone at Bricsys and our new colleagues at Hexagon PPM.”

Hexagon and Bricsys first joined forces in 2016 and the following year announced Intergraph CADWorx® Plant 2017 would be available with BricsCAD or AutoCAD, giving customers the ability to choose their design platform. In 2018, Leica CloudWorx for BricsCAD was introduced, furthering the cooperation between the two companies.

BricsCAD offers a stronger, more vibrant alternative for CAD users and third-party developers of CAD applications, augmented by state-of-the-art artificial intelligence-driven functionality on a proven file format. The software currently boasts more than 1,500 OEM partners leveraging the best .dwg platform in the market for their vertical applications.

The deal also extends Hexagon’s reach each into the building information modeling (BIM) realm by adding BricsCAD BIM, an architectural design application.

“BricsCAD BIM ... is highly complementary with Hexagon’s growth strategy in this sector. The combination of these two aspects made it a clear acquisition target for us,” said Hexagon PPM President Mattias Stenberg.

Hexagon anticipates adding positions for much-needed roles within the Bricsys organization to support continued growth and expansion.

“We are a precious jewel in the expansive Hexagon family,” de Keyser said. “They are welcoming us with open arms. The upside of this announcement is enormous for everyone.”

Jerry Felts is the Global Communications Manager for Hexagon PPM and is based in Huntsville, Alabama, USA.
Since originally being applied to the oil and gas industry, process safety management (PSM) has evolved over the years. It is now used across all industries, for a range of facilities handling or storing potentially hazardous materials. In several countries, it is mandated.

This is especially important for process plants, which are inherently hazardous places, where the uncontrolled release of chemicals and energy can harm the plant, employees and the environment.

In 1990, OSHA defined 14 elements of the process safety management plan, including process safety information, process hazard analysis, operating procedures and management of change.

This was problematic as the elements were not mandated; they were only advisory.

“It’s vital that companies address PSM in a holistic way, rather than as a set of individual risk minimization processes,” said Hexagon PPM Engineering Director Ray Howarth.

In 2007, the Centre for Chemical Process Safety defined process safety management as the application of management principles and systems and identified four pillars that form the basis of robust PSM. That was followed by a similar definition from the United Kingdom’s Energy Institute in 2010.

“The harmonization of these pillars makes process safety easier to understand,” Howarth said.
PILLAR ONE: the management of health, safety, legal and regulatory requirements.

PILLAR TWO: the dynamic process safety information and process hazard analysis.

PILLAR THREE: integration of emergency planning, asset integrity, training, operating procedures, emergency planning and response.

PILLAR FOUR: auditing, review and reporting.

“In the past, some companies treated these individual elements as single objects and didn’t worry about the relationships,” Howarth said. “But it is getting better.”

PSM comprises a set of discrete but closely interrelated work processes that cannot be addressed in isolation that are managed to contribute to plant safety; this asset integrity management (AIM) program is only as good as the change management process.

Past industrial disasters have involved asset integrity management failure, management of change failure and safety review procedures failure, Howarth said.

With increasing pressure from regulators to ensure owner operators conduct safe and environmentally responsible operations, process safety management has become a hot topic.

The wide-ranging benefits of project safety management and asset integrity improved product quality, higher workforce morale, improved public reputation and associated goodwill. With the productive life of facilities being increasingly extended beyond the intended design, process safety management can help achieve safe, sustainable operation.

Howarth referenced the 1984 Bhopal, India, tragedy in which 600,000 people were exposed to 30 tons of a highly toxic methyl isocyanate gas accidentally released from a pesticide plant. As many as 16,000 were killed, and many children suffered birth defects.

The Centre for Chemical Process Safety was formed in 1985 as a U.S. industry response to the Bhopal tragedy. It is a not-for-profit, membership organization that identifies and addresses process safety needs for a variety of facilities involved with handling, storing, using or processing, and transporting hazardous materials.

Owner operators increasingly recognize that ensuring process safety and asset integrity is not an option; it’s a mandate. It is often a prerequisite to keeping their license to operate and can ensure safe, reliable production at the lowest sustainable cost.

Hexagon PPM’s SmartPlant® Engineering Integrity, Intergraph Smart® P&ID and SmartPlant Enterprise for Owner Operators can be used to create the ultimate process safety management solution for your facility.
he plant design industry is far from static. Understanding how the market shifts and adjusting to its demands is the foundation to any successful plant design project.

For more than 25 years, owner operators and EPC firms have been utilizing innovative tools available in CADWorx®, CAESAR II® and PV Elite® in their challenging plant design processes. However, as market demands shift, forward-thinking plant designers and engineers separate themselves from the rest by taking advantage of the latest technology and training available to get ahead of the curve.

Since the acquisition of PipingDesignOnline.com earlier this year, hundreds of designers and engineers around the world have discovered the highest quality online piping design training available, at a fraction of the cost for conventional classroom training. The website offers self-paced, in-depth training for CADWorx plant design software, CAESAR II pipe stress analysis software and PV Elite pressure vessel analysis software. Users from around the world can benefit from refresher training or quickly ramp up their skills at a low monthly fee.

"Before taking up this course, I was quite intimidated by the software," said Sulabh Kumar Singh, a user of PipingDesignOnline.com. “However, after going through the fundamentals course, I find that it’s not as difficult as we initially thought it would be.”

Said ser John Kim: “The course was great! I learned quite a lot on how CAESAR II works, and I am excited to use my new knowledge in a real-world setting.”

More than 450,000 videos have been viewed at PipingDesignOnline.com by users in 147 countries. Certificates of completion are available for users to document their training accomplishments. The website offers extensive training in the following products:

- **CADWORX** – 3D CADWorx Modeling, Intelligent P&IDs, Isogen Isometrics, Structural, Equipment Modeling, and Specifications, with 29 videos and a 431-page illustrated lesson guide.

- **CAESAR II** – More than 70 videos and more than 400 pages of lesson guides covering CAESAR II Fundamentals, Statics One (introductory) and Statics Two (advanced) training.

- **PV ELITE** – Working with Nozzles; Modeling Shortcuts; Vessel Skirts, Saddles, Legs, and Lugs; and Nozzle Reinforcement with more than 35 recorded training videos and a 320-page lesson guide.

> pipingdesignonline.com

Alex Timofeyev is Hexagon PPM’s Product Manager for CADWorx. He works in the company’s office in Houston, Texas, USA.
GOLDEN VALVE:
Recognizes the most innovative and well-executed uses of software supported by Hexagon, and the subject matter must relate to the process, power, offshore, shipbuilding or mining industries.

BEST OF SHOW
William M Fronheiser | Selas Linde North (USA)

JUDGES’ CHOICE
Offshore: Wang Zhe | Sinopec Petroleum Engineering Corporation (China) - pictured

JUDGES’ CHOICE
Shipbuilding: DoHyun Kim | Samsung Heavy Industries (Korea) - pictured

ANIMATION
1st Place: 3D Design System | Rekayasa Industri (Indonesia) - pictured

VISUALLY COMPLEX
1st Place: Yana Septiana | PT. Rekayasa Industri (Indonesia) - pictured
2nd Place: Rendering and Physical Modeling Group | PGESCo (Egypt)
3rd Place: Sudheer Velicheti | Linde Engineering India Pvt., Ltd. (India)

DISCIPLINE-SPECIFIC
1st Place: Ilham Ramadhan | PT. Rekayasa Industri (Indonesia) - pictured
2nd Place: Sudheer Velicheti | Linde Engineering India Pvt., Ltd. (India)
3rd Place: Huang Chen | East China Engineering Science & Technology Co., Ltd. (ECEC) (China)

PHOTOREALISM
1st Place: Huang Chen | East China Engineering Science & Technology Co., Ltd. (ECEC) (China) - pictured
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2nd Place: Hyeongsoo Jeon | Samsung Heavy Industries (Korea)
3rd Place: Liu, weisheng | Shanghai Waigaoqiao Shipbuilding Co. Ltd. (China)
Honorable Mentions: Wang Peng | China Tianchen Engineering Corporation (China); Nie Xuejun | Chinese Institute of Marine & Offshore Engineering HB. Co., Ltd. (China)

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