



# Getting Ready for the 2020s

7 TRENDS TO WATCH IN PROCESS MANUFACTURING DATA

**As fast** as the pace of innovation has increased over the past five, ten, and twenty years, it shows no signs of slowing. Rather, it seems to be jumping light-years ahead, to a universe we can barely imagine. Even if we can't completely envision where the 2020s will take our technologies and what that will mean for workflows in process manufacturing organizations such as chemicals, oil and gas, food and beverage, and pharmaceuticals companies, one thing is clear. Those who manage the forthcoming changes successfully will be the ones who take the time to watch, to plan, and to build the right frameworks for the future that will be upon us sooner than we think.

Here on the eve of the next round of massive technological innovations that are the harbinger of Industry 4.0, the burgeoning fourth industrial revolution offering new connected technologies with so much promise, it's obvious that industry will continue to encounter a rising river of data. There is no doubt that the Industrial Internet of Things (IIoT), offering a data motherlode through previously undreamt-of monitoring technologies, will combine with the potentially limitless capabilities of machine learning to dramatically expand the volume and availability of data that must be connected across numerous disparate data silos—and then fully leveraged. Additionally it's not hard to see where 3D data and building information modeling (BIM)

data are going. Process manufacturing organizations will need to find effective ways of managing and making use of this increasingly complex data by leaving proprietary data formats behind and moving to “format-agnostic” data storage capabilities that can accommodate open data formats, delivering a brighter future.

But even today, wild rivers of data wash over disconnected, antiquated systems, leaving an inadequate foundation for the onslaught to come from Industry 4.0. These problems are compounded by difficulties in accessing existing data, which even now creates obstacles in smoothly achieving deliverables and optimal performance.

Looking also to compliance issues, it's natural to feel that our existing, seemingly-powerful point-systems should be able to automatically track compliance, but these systems are often disconnected from each other and not yet optimally engaged to deliver everything that is needed. On an equally painful note, process manufacturing organizations face the critical need to fully master all the incoming IIoT data in order to reduce unscheduled downtime and increase the uptime at their production facilities, because that has the greatest impact on overall productivity and is ultimately what counts at the end of the day.

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**In short**, everything around the data management inefficiencies affects financial bottom lines industry-wide. In the coming decade, success will be all about learning to ride the flow of data. Success will mean effectively managing and leveraging the voluminous, multifaceted, magnificent data streams that will only multiply exponentially as Industry 4.0 more fully arrives.

The truth is that most process manufacturing organizations still struggle with fully leveraging the data in disparate, unconnected systems. In this paper we'll outline a set of data trends that process manufacturing plants need to prepare for in order to receive the potential benefits that Industry 4.0 technologies can deliver in the 2020s. We'll also explore the pain points that need resolution for four user types: Operations, Engineering and Maintenance, Project Management teams, and CIO/IT management. Although they share numerous points in common, each user of plant systems has mission-critical needs related to the management of process manufacturing data that will become even more complex and challenging due to the wealth of information delivered via Industry 4.0 connected technologies.

We will outline ways to gain optimal advantages from data in your existing systems as well as data that will become newly available via Industry 4.0 by making your current assets into "smart assets" managed via a highly secure, cloud-based Asset Lifecycle Information Management (ALIM) platform. We'll share the highlights of several case studies to document how process manufacturing companies have benefited from adopting ALIM solutions in different ways. Toward the end, we will offer a quick self-assessment as a tool to evaluate your organization's readiness for the 2020s, as well as our guidelines for choosing an effective ALIM solution for your data management.

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## PREDICTED TRENDS AND BENEFITS FOR PROCESS MANUFACTURING PLANTS IN THE 2020s

The wealth of data contained in the multitude of systems that process manufacturing plants operate can and should be utilized intelligently to dramatically optimize plant performance. Making the fullest possible use of available data insights will become even more necessary as we head into the 2020s that will be shaped by Industry 4.0 connected technologies. Mastering the data is the cornerstone of the coming phase. “[T]he collection, management, and use of data remain the most critical element of Industry 4.0,” says a Deloitte University Press report titled *Industry 4.0 and the Chemicals Industry*, “thus issues associated with data security, ownership, and interoperability are pertinent for executives planning Industry 4.0 deployments.”<sup>1</sup>

But already today, plant managers are confronted with serious inabilities to effectively access and leverage their existing data effectively, indicating that they are likely not in a position of readiness to fully digest the data to come from new systems. Primarily, the problem lies with unstructured data from multiple legacy systems that is hard to access, share, and interpret, but there are also secondary problems due to existing inadequate systems that cannot report, provide insights, or track compliance effectively.



**Given what's** coming down the pike in the next decade, today's problems should be addressed and remedied swiftly, with an eye toward forming a better foundation for the changes about to occur. But beyond preparedness for the future, addressing these issues today will enable plant managers to immediately reap great value from their currently unstructured data and begin using newly gained insights to set more meaningful KPIs, track compliance more easily, enjoying better safety records and benefiting from the cost-reductions that such solutions can already provide today.

Turning an underperforming set of data management systems into a powerful, connected platform that delivers effective data access and management can mean the difference between success and failure in areas such as compliance, safety, and optimized plant performance the next decade.

In this light, here are the trends—and expected benefits—we see coming as we head into the 2020s and gain greater ability to leverage the power of Industry 4.0.



## 7 KEY DATA-RELATED TRENDS

### 1. Increasing physical-digital connections.

Industry 4.0 brings together advanced digital and physical technologies to form a greater physical-to-digital-to-physical connection—and it has the potential to transform the process manufacturing industry by bringing strategic growth and streamlined operations. Industry 4.0's advanced technologies—the Internet of Things (IoT), advanced materials, additive manufacturing, advanced analytics, artificial intelligence, and robotics— are highly relevant to the process manufacturing industry and have already reached a level of cost and performance that enables widespread applications. According to the above-mentioned Deloitte report, these technologies are “far enough advanced that they can integrate with chemicals companies’ core conversion and marketing processes to digitally transform operations and enable ‘smart’ supply chains and factories as well as new business models.”<sup>ii</sup>

### 2. Plant assets will grow smarter.

Assets will be able to generate and interpret data, for instance by using asset data analytics to explore asset data completeness and report on asset data compliance. By properly integrating and learning from these smarter assets, operations managers can further optimize operational performance.

### 3. Data volume will increase exponentially.

The sheer volume of data from new technologies—the IIoT, advanced materials, additive manufacturing, artificial intelligence, and robotics, means stepping up the data management game in order to fully leverage that information to best advantage.

### 4. Connected information silos.

Leveraging the data effectively will mean connecting the dots across all the existing and new information silos, as well as and consolidating data sources wherever appropriate.



Fig. 1. 7 Data Trends in the 2020s



#### 5. Increased modularization.

As they adopt better, more powerful data management capabilities, production facilities will be able to more effectively modularize, choosing the best equipment and solutions from different vendors with the confidence that the information output by the different systems can be accommodated by the organization's data management system so that managers can get a high-level overview of everything they are responsible for. This will give increasing flexibility to organizations wishing to mix and match the best solutions for their individual needs and avoid having to buy a big, fully integrated system from one vendor that may not meet all their needs.

#### 6. Faster data analysis.

Managers will be able to connect and analyze equipment issues faster because of the greater availability of data, delivering on the promise of improved uptime and accident prevention through better insights.

#### 7. Growth in preventive and predictive maintenance

Capabilities for preventive and predictive maintenance will grow as the data from root cause analyses continues to shed light on problems and indicate potential solutions, enabling process manufacturing companies to minimize unplanned downtime.

## KEY BENEFITS FROM INDUSTRY 4.0 TECHNOLOGIES

### 1. Plant Managers Will Glean New Intelligence from Structured Data

Smart data from production systems will become a valuable source of management information and intelligence. As the data from enhanced technologies flows into more effective data- and asset-management systems, process manufacturing plant managers can take advantage of asset performance dashboards and access to more sophisticated reporting, enabling them to make smarter, better-informed decisions. With new insights from this data, managers can more easily identify opportunities for operational improvements and share this information across teams, management and plants.

### 2. Operations Managers Will Be Able to Set New Insight-based KPIs

With improved intelligence from unstructured data, managers will be able to set new benchmarks and KPIs to better manage and optimize performance. Furthermore, the improved intelligence will offer better ways to compare performance across plants. Plants will work from a source that offers “single point of truth,” thereby improving confidence in management information.

Once new technologies begin to enable improvements in MTBF (mean time between failures), this will help operations managers set better KPIs in that area.

As the continuous feed of data pours in from sensors on the newer

turbines, compressors, extruders, and other critical “smart equipment,” plant operators will be updated about any required maintenance, potential breakdowns looming, and parts that will soon need to be ordered. This also will enable them to set better KPIs for operations as the industry evolves from a world of reactive and/or scheduled maintenance to predictive maintenance.

Managers responsible for multiple sites will be able to collect and compare data from similar equipment installed in different sites and use that for predictive maintenance, performance optimization, and the design of new facilities.<sup>iii</sup>



Fig. 2. Key Benefits of Better Data from Industry 4.0 Technologies

### 3. Safety Will Improve Through Improved Knowledge

Understanding the root cause analysis (RCA) of accidents based on the insights provided by a greater availability of data will enable plant managers to improve safety and better prevent future accidents. An RCA requires data from all the events leading up to the failure, including instrument data, adequate history of engineering information (versions of documents and asset data), and the history of maintenance information (work orders). Investigators will need all of these types of information and must be able to understand how they relate to each other in order to piece together the complete story of what has happened. This task is impossible without effective data management.

### 4. By Becoming 'Smarter', Plants Can Ensure Better Compliance

Ongoing issues with tracking compliance warrant better tracking and verification systems. It is critical to ensure that information from the engineering project is checked against regulations and translated into the required maintenance and inspection regimes as part of the Management of Change (MoC) process. Currently MoC and engineering are done in separate systems, but improvement can be achieved by integrating them. With higher-quality data and an effective records-management system in place, it will become easier to set and monitor compliance metrics.

### 5. Smarter Maintenance Will Reduce Costs

When data from smart assets is used to optimize maintenance, engineers can get the maximum out of their assets and ensure optimized performance on maintenance, thereby keeping costs to a minimum. Other cost-reductions will be earned through more efficient coordination with external partners and automation of currently-manual tasks. Maintenance execution dashboards will deliver valuable insights and help reduce costly plant down-time.

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## COMMON SHORTFALLS AND PAIN POINTS

A quick look at where most plants are today versus where they need to be reveals the shortcomings that need to be addressed to create a more solid platform for efficient growth in the 2020s. The three top shortfalls are:

### Inaccessible data.

Reliable asset data is not available to those who need it, when and where they need it. Structuring access to data for external parties without compromising security, compiling reports that involve polling disconnected, antiquated data sources, and being able to quickly access critical information in a crisis or plant emergency are all ways in which inefficient data- and asset-management can frustrate or even cripple the responsiveness of a process manufacturing plant.

### Inconsistent handovers.

Unfortunately, today some plants still maintain outdated processes for handovers that make managing the flood of engineering data unreliable. Unless there is a product on board that can, through automation, assist with checking that the documents submitted by the supply chain are compliant to agreed-upon standards, organizations face the difficult task of never knowing, without significant manual checking, where they are with their data until it is too late.

### Need to reduce costs.

Organizations often waste money on human labor to make up for deficiencies in data management. The financial consequences of ineffective data management practices can be daunting and affect the organization in variety of ways. The need to reduce costs happen on a variety of fronts without effective data management. As a 2018 ARC Advisory Group report by Ralph Rio outlines, using outdated documents often leads to rework, project delays, cost overruns, and safety incidents—all of which negatively impact the P&L statement and balance sheet. “Effective ALIM avoids these problems,” says Rio, “and improves business performance.”<sup>iv</sup>

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## PAIN POINTS FOR OPERATIONS

Data management presents numerous challenges for Operations teams, mainly revolving around the need to access data to make key assessments, track compliance, and optimize plant performance. Shortcomings include the fact that asset data is simply not available when and where it's needed, and the time it takes to gather data, often manually, from multiple disparate systems. The sheer volume of human labor and brainpower needed to patch together information in the right ways, at the right time, so that operations can run smoothly creates a variety of workflow issues, not the least of which is employee frustration due to overly complex and laborious information review and approvals process. O&M departments also experience long-term pain points and costs post-handover when they find they must spend time fixing poor quality data in the weeks/months following a project closure—data problems that should have been caught and corrected earlier.

The inefficiency of being unable to share information across teams instantly and to automate review and approvals takes a heavy toll on project team members emotionally. It also comes at higher hard cost in terms of expenses for increased labor to do a task that should be more efficiently done through automation and effective data management. For example, team members can waste an inordinate amount of time looking for information that isn't where it should be, or duplicating efforts to re-create information that already exists elsewhere.

Without considering the huge variety of available data that needs to be harnessed, even something as simple as document management alone can become unwieldy for a large process manufacturing organization. In the case of AzkoNobel Industrial Chemicals, Europe's largest producer of vacuum salt and a leading supplier of chlorine-alkali products and derivatives used in the chemical, detergent, construction, food, pulp and paper, and plastic industries, the realities of continuous innovation and ongoing sustainable change projects to improve their environmental footprint and economic efficiency drove their search for ways to improve access for Maintenance and Operations to critical asset information contained in documents.



*Fig. 3. Top 3 Data-related Organizational Pain Points*

**With about** 1,700 employees working at production locations in the Netherlands, Germany, Denmark, the United States, China, and Japan, AzkoNobel faced challenges such as standardizing processes for engineering change management, clarifying document ownership and responsibilities assignments, assuring the integrity of documents in the as-built environment, and finding ways to leverage the value of the data in outdated legacy systems for document management. Moving to a platform that included secure vaulting, document lifecycle management and revision history capabilities as well as capabilities for managing the as-built, project, and archive documents and seamlessly transferring them across these categories, AzkoNobel solved the problem of how to manage all engineering changes in concurrent projects through one standard process.<sup>v</sup>

Additionally, with demands for streamlined budgets, success is contingent on narrow margins, and so efficiency becomes king. The need to do more with less is a chronic issue but sometimes challenging to resolve with disconnected data silos in existing systems.

Lastly, process manufacturing plants face numerous challenges in document compliance. Their supply chains often deliver contracted-for documents, which should comply with the standards defined by the operator (correct format, proper naming convention, etc.). The operator must manually perform these document compliance checks when receiving the documents from the supply chain. However, there is an industry-wide problem with this manual checking process because most process manufacturing plants do not have the resources to constantly perform these manual checks on every document received from their supply chain, and so incorrect or missing data is commonplace. Additionally, process manufacturing plants will need certain documents in place in order to be compliant to operating and safety regulations, a subset of which are critical to the safe operation of the facility.<sup>vi</sup> Ensuring compliance on all fronts is the key driver for ALIM solution implementation.

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**For example,** Kaneka Corporation, a global manufacturer of chemical products including resins, pharmaceutical intermediaries, food supplements, synthetic fibers and fine chemicals, faced many challenges to manage innovation and change, such as the need to make critical asset information more available to maintenance and operations team members, but they mainly had the need to meet regulatory compliance with VLAREM, PED and ATEX throughout the management of the asset lifecycle. Their selection of Accruent Meridian as the company's regulatory-compliant ALIM solution for the management of the asset lifecycle and change processes gave them additional benefits, including electronic track records with watermarking and electronic signatures as well as integration with AutoCAD, Microsoft Office applications, and SAP PM. With this implementation, the time required for Kaneka team members to access crucial asset information was reduced from several minutes to just seconds.<sup>vii</sup>

Another example of an organization facing challenging compliance issues is Netherlands-headquartered Bluewater, an engineering and operating company for large and complex Floating Production Storage and Offloading (FPSO) and Single Point Mooring (SPM) systems. Bluewater is required by regulatory authorities to be able to find, retrieve, and present the complete engineering information for their FPSOs and SPMs throughout the lifecycle of the assets, as drawings, vendor documentation, manuals, and specifications, in a timely manner. Bluewater therefore needed an Asset Lifecycle Information Management (ALIM) solution that would be able to manage and maintain the accuracy of as-built engineering information. The authorities also demanded proof of control of the ongoing engineering projects.



**A complication** is that during design and operation, the engineering information is generated by many parties in many formats. During new build and modification projects, many revision cycles need to be controlled. Bluewater therefore required an engineering project environment that could efficiently manage the concurrent engineering, procurement, and construction processes of the new build and modification projects. Choosing Meridian for these tasks, Bluewater was able to maintain the as-built environment of the operational FPSOs. Now, a direct relationship between equipment and engineering information creates an up-to-date as-built environment and ensures the license to operate. The engineering information is automatically linked to the asset, tags, and equipment in the maintenance management system. Through daily synchronization at the FPSOs, the as-built data is immediately available directly or through the integration with IBM Maximo.

According to Johan Bax, Bluewater's Section Head Process & Piping, the benefits of the Meridian solutions are visible and tangible across all departments and disciplines of the organization. "The document and data quality, including reliability and consistency, has improved and ensures that Bluewater is compliant with safety and integrity procedures.... The authorities are very satisfied with the achieved results and Bluewater's ability to demonstrate proof of control at any moment in time."<sup>viii</sup>

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## PAIN POINTS FOR ENGINEERING

Although many of the pain points faced by engineering are the same as those outlined above for Operations, there are some additional concerns. From both an engineering and a maintenance point of view, ensuring optimal performance is critical, as are accident reduction and the reduction of plant maintenance costs. Avoiding unplanned downtime is critical to meet budgets; with average downtime cost at \$50-200k/day (depending on what part of the plant is down), it's easy to see how these crises affect the bottom line.

As capabilities for preventive and predictive maintenance grow, and as data from root-cause analyses continue to shed light on problems and indicate potential solutions, process manufacturing plants will become better able minimize unplanned downtime. Flexible and agile planning can help a plant leverage unplanned downtime to perform scheduled maintenance and with that, reduce planned downtime. But it's very difficult to optimize downtime without an effective and comprehensive ALIM solution. According to a recent ARC

report, uptime improvement was the #1 driver for moving to an ALIM solution, followed closely by a desire to increase asset longevity and visibility and deliver greater cost control.<sup>ix</sup>

Lastly, better coordination with external partners is of concern, particularly to engineers but also to vendors and service providers (e.g., inspection contractors). Below, we'll outline how an optimal solution, implemented by chemicals company Trinseo as well as by oil and gas producer ExxonMobil in Norway, can make external partner coordination work very smoothly.

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## PAIN POINTS FOR PROJECT MANAGEMENT TEAMS

Project management teams also face the need to manage shared resources with external parties. Because project management teams are expected to be able to frequently report on the status of any project deliverable, being able to rely on a system that provides accurate status updates on project components is critical for them. In process manufacturing projects, project managers deal with vast amounts of data and if the systems are inadequate, they can be faced with incomplete resources to effectively manage contractors and vendors, and lack much-needed insight into external parties.

Just one of the problems faced is in manpower planning. A platform that offers ability to analyze a project in terms of manpower (for example, the workflow analysis capabilities of Meridian Analytics, a cloud service extension for the Meridian platform) can help process manufacturing plants optimize projects to ensure that suitable labor is available at the right time.

Another challenge faced is making sure the data that is coming into the system from all sides has complete integrity and is therefore reliable. Getting robust analytical capabilities from a solution such as Meridian Analytics can offer enhanced visibility into document metadata; the ability to navigate large datasets by time, location, contractor, asset and more; and the ability to diagnose areas for improvement, thus helping project managers—and organizations—quickly and effectively analyze data integrity and plan for improvement wherever needed.

**PAIN POINTS FOR CTOS / IT MANAGEMENT**

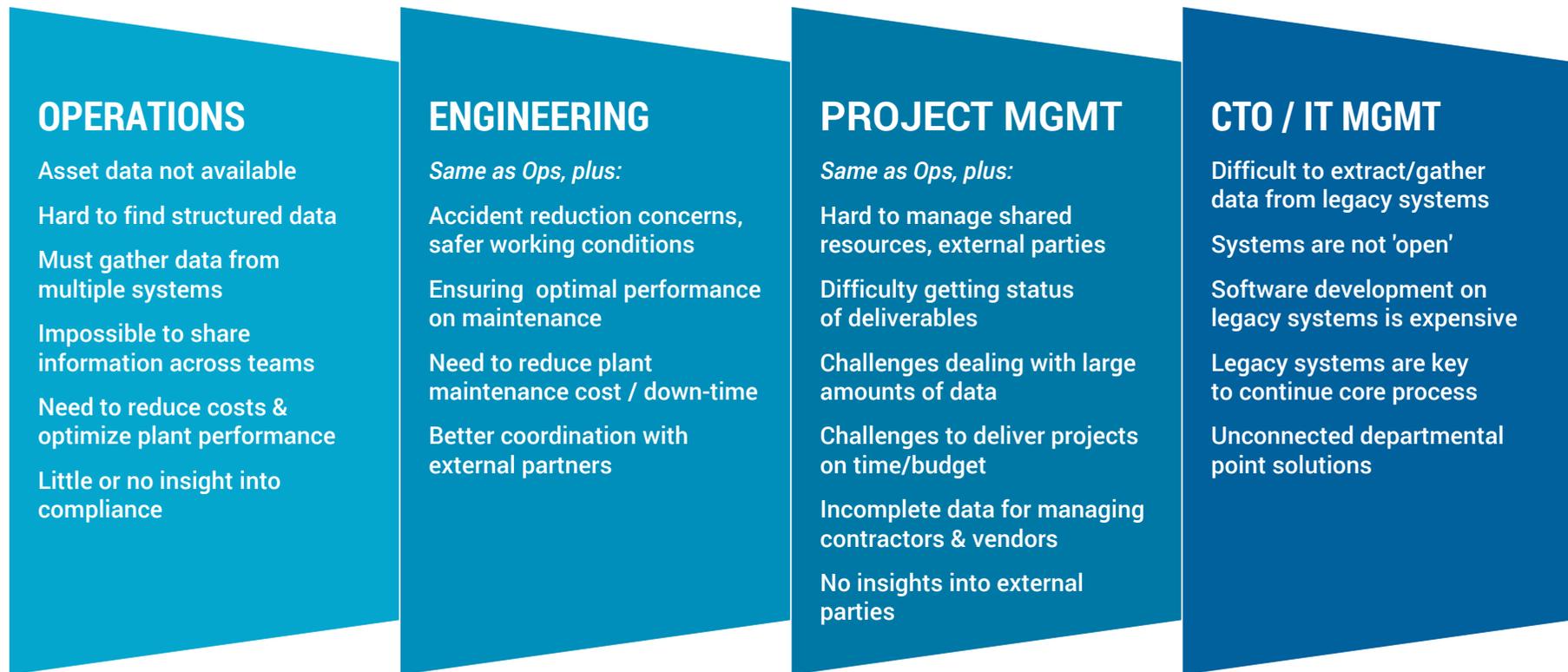


Fig. 4. Common Pain Points by User Type

**CIOs and IT** managers have a different angle on the same problems. Highly aware of the need for system users to be able to extract/gather data from legacy systems that often are not 'open', but aware of the heavy cost of software development, whether the solutions are outsourced or built in-house, CTOs and IT managers need to make legacy systems manageable and get them integrated. Often, these legacy systems and unconnected departmental point solutions are vital to continuing core process, but the chore of making them work in the modern and futuristic ecospheres seems daunting, and the result is creating cumbersome workarounds.

### **EXPLORING INFORMATION MANAGEMENT IN THE CONTEXT OF THE ASSET LIFECYCLE**

The above litany of pain points felt from different perspectives within organizations is a symptom of a larger problem: the lack of information management in the context of the asset lifecycle. Asset Lifecycle Information Management (ALIM) is a proven strategy that supports the creation, exchange, and distribution of technical asset information in all phases of the plant and asset information lifecycle.\* ALIM covers Enterprise Information Management (EIM), Enterprise Asset Management (EAM), Project Performance Management (PPM), Asset Performance Management (APM), and Asset and Project Portfolio Management.

ALIM solutions transform raw data into actionable plant information, connecting maintenance and engineering, and improving data handover. As such, we'll look at the ways that leveraging an ALIM platform can offer a leg up in getting to the next level.

### **2020s-STYLE WORKFLOW BENEFITS**

Above we've seen some trends that are likely to become de facto standard industry realities in the 2020s. What are these likely to mean for various stakeholders in this world of improved data- and asset-management?

Operations users will enter a world where they can finally start building a "single point of truth" system that can work effectively at the desktop, on mobile, and in the cloud, yielding confidence in the data and allowing for fast reactions in case of failures or unplanned downtimes. As part of the process, they can leverage a library of best practices as they implement a record management system. Following standard procedures now often depends solely on the diligence of employees, but as the cost of failure is so high, procedures should ideally be enforced by the system (as can be done with Accruent Meridian) in order to avoid potential catastrophes.

Unless all relevant engineering information is linked to each asset, O&M might miss critical information, including necessary safety precautions. Using Accruent Meridian to put changes to critical asset data (such as maximum operating pressure) under change control gives O&M managers constant access to the latest versions of critical asset data.

**Setting up** a “single point of truth” from scratch can be challenging. Trinseo, a global chemical materials solutions provider and a manufacturer of plastics, latex binders, and synthetic rubber formed in 2010 from four businesses of The Dow Chemical Company, had to move off the DOW-proprietary ALIM system after becoming independent. Initially they utilized an information management system involving a local systems integrator, but unfortunately, this solution had separate portals for the contractor and Trinseo’s internal organization. This made it difficult to keep the documents up to date, which led to the contractor using outdated documents causing rework, cost overruns, and project delays.<sup>xi</sup>

Seeking a remedy through building a single point of truth with Asset Lifecycle Information Management in order to wring clarity out of the chaos, Trinseo decided to use Accruent Meridian. Trinseo needed to support ALIM across the assets’ lifecycle from an upgrade project through to operations. Meridian was integrated with the other asset management applications used at the Trinseo development center in Terneuzen for plant design and maintenance, including purchasing, inventory management, and work order management. At the Terneuzen site, Trinseo now has an automated business process for synchronizing documentation changes among its own engineers and personnel at its various contractors. This extends into operations and includes operators, process control engineers, and maintenance technicians. Everyone authorized to read a specific document sees the current version. Depending on an individual’s authorization, they can mark up, edit, and/or approve changes.

All project team members at Trinseo can now access to the same version of a document, and there is no need to waste time ascertaining which among multiple versions of a document is the correct one to use. This reduction in the time spent searching for documents is really something valuable, since engineers typically spend about 30 percent of their time looking for the current and correct documents. Lastly, it effectively eliminates rework due to a contractor using outdated documents, which improves KPIs for project completion on-time, within budget, and within specifications.<sup>xii</sup>

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**Similarly,** ExxonMobil in Norway, the third largest oil and gas producer on the Norwegian Continental Shelf and responsible for almost 6% of ExxonMobil's production worldwide, sought improved accessibility, quality, and availability of engineering information to its internal teams as well as easy and secure access for external contractors. An extended network of contractors and suppliers needed to be able to access the appropriate engineering information at all times. All engineering information needed to be complete, up-to-date, and immediately accessible for maintenance purposes. All technical engineering information needed to be immediately and easily accessible from all onshore and offshore locations. Furthermore while maintaining the up-to-date as-built situation of all locations, ExxonMobil needed total control of all engineering information that was under revision, both internally and externally with contractor. Last but not least, ExxonMobil Norway also needed all safety, health and environment (SH&E) regulations of the Norwegian government to be met.



To address these requirements, ExxonMobil Norway chose to implement Meridian and stipulated an ongoing requirement that any additional configuration should not detract from the solution's built-in user-friendliness. Proof that the final solution is very user-friendly is illustrated by the fact that new offshore staff require only one hour of training to be able to use Meridian as its engineering information management system, which now manages approximately 120,000 technical documents regarding offshore installations.

**“It is** extremely important that all parties work in one system,” said Per Skarung, facility manager at ExxonMobil Norway. “This is the only way that, whether they are onshore, offshore, supplier, contractor or my own office, every party can be guaranteed fast and easy access so that document availability is never an issue.”<sup>xiii</sup>

In general, project managers will find easier project setup with the interconnections offered by an ALIM system, especially one that facilitates collaboration in the cloud. By automating task management, project managers can reduce or even end chasing status updates on deliverables. Easy-to-create status dashboards for deliverables tracking will keep projects and people on track. As the solution will work on mobile, desktop, and cloud, the project benefits greatly from the portability of information.

CIO/IT management faces different issues. Often needing to grow the organization’s IT infrastructure, they are, however, asked to “do more with less” expense. They also know they need to focus on their core business rather than constantly expanding and updating IT infrastructures. By removing the headache of upgrades, improving security, increasing availability of critical data, and reducing risks, a cloud-based ALIM solution offers a much-needed runway toward effectively managing today’s data as well as the data onslaught the 2020s will bring. Having a system that is highly configurable (both by organization and by user) so that it can align with business needs and support inevitable changes in the future is not only wise but necessary, and the best ALIM solutions are designed to do just that.

Expenditure reduction was a key benefit sought by Huntsman Corporation, a global manufacturer and marketer of differentiated chemicals. Its chemical products number in the thousands and are sold worldwide to manufacturers serving a wide range of industries, including chemicals, plastics, aviation, paints and coatings, and agriculture. Huntsman implemented Meridian as a comprehensive Engineering Information Management (EIM) solution to manage both digital information as well as existing archived documents. Huntsman not only needed to archive drawings, but also needed a system that was easy to use and would support information exchange procedures with external contractors.





**Thanks to** the implementation, Huntsman's key asset-related technical information is readily available to maintenance engineers, contractors and CAD designers, resulting in rapid response times in finding, accessing and changing drawings in instances when plant modifications are needed. In the end, Huntsman enjoyed a new operational efficiency and very low mitigation costs. They benefited from increased accuracy of engineering information, a complete audit trail for document tracking and revision control, immediate information availability for Regulatory, Health & Safety, and Maintenance Departments, and reduced their information management expenditure by five percent.<sup>xiv</sup>

In summary, the sooner a highly secure, cloud-based ALIM foundation for robust data management is implemented, the sooner a process manufacturing plant can reap the benefits we have been outlining above. When data becomes appropriately accessible for each user type—everything from having insightful master dashboards for management to AutoCAD integration for engineers down to making it easy to limit external contractor access to only the documents they need, thereby protecting access to master copies of data—then organizations whose data management technologies are behind the times will be finally able to start reaping the fuller benefits of Industry 4.0. Being able to trust that the data an engineer is working with is accurate, that compliance documentation is always up to date and easy to access, and that project managers have the tools they need to successfully manage status reports, document reviews and approvals, and handovers will bring the greatest benefit of all: significant cost reductions on a great many fronts, from saving the costs of inefficient, wasted human labor to significant improvements in uptime.

## Are You Ready for the 2020s? A Self-Assessment

Take this quick self-assessment to score your readiness for the needs of 2020s data management and asset information lifecycle management.

20 Readiness Indicators	Self-Rating Scale of 1 to 10 (1=low, 10=high)	Notes
<p><b>1. ALIM IS IN PLACE.</b> An effective and comprehensive Asset Lifecycle Information Management (ALIM) solution is in place to manage data and data standards.</p>		
<p><b>2. INTERCONNECTEDNESS.</b> Data interconnects across equipment as needed, allowing a view of relationships.</p>		
<p><b>3. DATA CURRENCY.</b> Each internal user type has appropriate, easy access to current versions of the data they need; a “single point of truth” guarantees that the document they have is the latest version. Time is not wasted searching to ensure that a document is the latest, correct version.</p>		

<p>4. <b>ACCESS.</b> External parties who need access to data (vendors, contractors) can obtain structured access to specific documents and data they need, with appropriate permissions for each user.</p>		
<p>5. <b>WORKFLOWS.</b> Data-related workflows are streamlined and appropriate for each level of worker.</p>		
<p>6. <b>VALIDATION.</b> Data validation systems are in place to foster reliable, accurate data on all fronts.</p>		
<p>7. <b>DASHBOARDS.</b> Pertinent data rolls up into insightful dashboards for management review.</p>		
<p>8. <b>OPEN FORMAT.</b> The data management system is open and format-agnostic (i.e., it does not require proprietary data formats to be used).</p>		
<p>9. <b>MODULARIZATION.</b> The organization is sufficiently able to modularize and choose the best equipment and solutions from different vendors.</p>		
<p>10. <b>EASE OF COMPLIANCE.</b> Compliance is generally easy to track and as automated as possible.</p>		

<p><b>11. COMPLIANT SUPPLY-CHAIN.</b> Contracted-for documents submitted by supply chains are automatically screened for compliance to organizational standards, so that the operator does not have to manually perform the document compliance checks.</p>		
<p><b>12. CLOUD-BASED.</b> Data management platform leverages an industry-leading, trusted cloud service that fully supports both mobile and desktop access.</p>		
<p><b>13. SECURE.</b> Data security level is high.</p>		
<p><b>14. FACILITATES PREDICTIVE MAINTENANCE.</b> The current data management system facilitates predictive maintenance.</p>		
<p><b>15. SUPPORTS O&amp;M IMPROVEMENTS.</b> Operations and Maintenance managers can gain new insights from data that help them identify opportunities for operational improvements.</p>		
<p><b>16. SUPPORTS PROJECT SUCCESS.</b> Projects are delivered on time and on budget, without hang-ups due to data-related issues.</p>		

<p><b>17. SUPPORTS SAFETY.</b> Access to safety-related data, warnings, and potential hazard flags is assured through effective data flows and automated analysis.</p>		
<p><b>18. FACILITATES RCAs.</b> The data management system facilitates the thorough reporting required to support a root cause analysis (RCA) of accidents, providing the necessary insights to improve safety.</p>		
<p><b>19. MINIMIZES DOWNTIME.</b> The current data management system minimizes downtime due to data chasing. Maximum uptime contributes to higher ROI.</p>		
<p><b>20. COST-EFFICIENT.</b> Operations, Engineering, &amp; Project Management are cost-efficient via maximum leveraging of available data.</p>		
<p><b>Total Score (out of a possible 200)</b></p>		
<p><b>Average Readiness Score</b></p>		

**How to Score.** Take your Total Score (above) and divide by 20. This is your average score across all items on a scale of 1 to 10. Your score provides an approximate indicator of how ready your plant is to face the coming data challenges of the 2020s.

## CHOOSING AN ALIM PLATFORM

To lay the optimal foundation for data management and streamlined operations, maintenance, and engineering in the 2020s, take advantage of Meridian Cloud, Accruent's Microsoft Azure cloud-based ALIM platform that is a specialized, proven solution with extensive industry-specific knowledge. Doing so will make it easy to implement best practices and get up to speed and start quickly seeing the return on investment.

Meridian Cloud is the world's first complete ALIM solution in the cloud. This secure cloud service for asset lifecycle information management ensures that users are informed, aligned, compliant and in control throughout asset lifecycles. Offered through a subscription-based model, Meridian Cloud reduces startup costs, simplifies procurement and operational budgeting, and enables costs to stay in line with changing requirements and actual software usage. Related products (in addition to a server version of Meridian) include Meridian Analytics, Meridian Portal, and Meridian Mobile.

## FOR MORE INFORMATION

- Accruent's Asset Lifecycle Information Management (ALIM) solutions — SaaS, Server, Analytics, Portal, Mobile: <https://www.accruent.com/solutions/asset-lifecycle-information-management>
- Accruent Internet-of-Things (IoT) solutions: <https://www.accruent.com/solutions/internet-things>



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- <sup>ii</sup> Thienen et al., *Industry 4.0 and the Chemicals Industry*, 1.
- <sup>iii</sup> Thienen et al., *Industry 4.0 and the Chemicals Industry*, 4.
- <sup>iv</sup> Ralph Rio, "Trinseo Establishes 'One Version of the Truth' for Asset Lifecycle Information Management with Meridian," Blog, March 2018, <https://www.arcweb.com/blog/trinseo-establishes-one-version-truth-asset-lifecycle-information-management-meridian>
- <sup>v</sup> "Managing Engineering Information Changes," a case study of Meridian implementation at AkzoNobel, <https://www.bluecieloecm.com/resources/case-studies/akzonobel-case-study-pdf-viewer>
- <sup>vi</sup> "Stay in Control of Your Hazardous Area Classification, Accruent blog, May 2018, <https://www.accruent.com/resources/blog-posts/stay-control-your-hazardous-area-classification>.
- <sup>vii</sup> "Achieving Compliance and Control throughout the Asset Lifecycle," a case study of Meridian implementation at Kaneka Corporation, <https://www.bluecieloecm.com/resources/kaneka-case-study-pdf-viewer>
- <sup>viii</sup> "Cost-Effective Asset Lifecycle Information Management," a case study of Meridian implementation at Bluewater, <https://www.bluecieloecm.com/resources/bluewater-case-study-pdf-viewer/>
- <sup>ix</sup> "Drivers for ALIM", from an ARC Advisory Group study by Ralph Rio (2018) (private communication).
- <sup>x</sup> Robert Mick, Valentijn de Leeuw, "Strategies for Asset Lifecycle Information Management," ARC Advisory Group white paper, passim, <https://www.bluecieloecm.com/asset-lifecycle-information-management-strategies>
- <sup>xi</sup> Rio, "Trinseo Establishes 'One Version of the Truth'."
- <sup>xii</sup> Rio, "Trinseo Establishes 'One Version of the Truth'."
- <sup>xiii</sup> "Engineering Information Management," a case study of Meridian implementation at ExxonMobil Norway, <https://www.bluecieloecm.com/resources/exxon-mobil-case-study-pdf-viewer>
- <sup>xiv</sup> "A New Operational Efficiency," a case study of Meridian implementation at Huntsman Corporation, <https://www.bluecieloecm.com/resources/huntsman-case-study-pdf-viewer>
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Contact Accruent Today to Get a Demo and Learn More

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#### **About Accruent**

Accruent is a global software company that helps organizations achieve superior performance by transforming how they manage their physical resources. Its innovative, industry-leading cloud-based software and services enable organizations to optimize all stages of asset management from capital planning through to IoT-based monitoring and control. With a proven track record across two decades, Accruent has created the only integrated SaaS-based framework and reporting platform for full lifecycle physical resource management. Over 7,000 global customers depend on Accruent solutions to drive out hidden costs, extend asset lifecycles, protect their brands, ensure compliance and deliver on the missions of their organization. Headquartered in Austin, Texas, Accruent operates in 149 countries serving customers in government, healthcare, education, retail, telecommunications and manufacturing.