The future of industrial asset management: New opportunities for oil and gas, power generation and aviation industries

Defining the right operating model for Industrial Asset Management (IAM)

Equipment condition monitoring and field service operations have been traditionally managed “in-house” by original equipment manufacturers (OEMs) for the aviation and power generation industries, and by operators within the oil and gas industry. However exponential growth in installations and geographically dispersed sites has increased the breadth and depth of requirements for these critical support services. Sophisticated big data management is now crucial for
monitoring and service analysis. And with the analysis evolving from reactive to predictive, and now to prescriptive, current IAM operating models cannot efficiently handle both business support services and high-end data analysis. The **right operating model** for IAM, therefore, decouples business support services from the corporate center, integrates them with high-end data analysis and technology, and runs them in an “**industrialized**” fashion to meet business objectives. Oil and gas OEMs across the globe are under intense competitive pressure to increase profitability, grow their businesses and notably in the United States move the country aggressively towards energy independence. But enterprises today are still not taking advantage of the sophisticated, remote, sensor-based monitoring and analysis that offers real time insight for collecting and using data effectively.

In the power generation equipment industry, advanced digital tools like prescriptive analytics is also not widely used. For aviation OEMs, parts inventory and delivery, effective service personnel management, and the ability to “fix it on the first visit” are critical to profitability and customer service. But industry experts say that especially for far-flung flying operations, present failure forecasting can be inaccurate up to half the time.

In all of these industries, the right IAM operating model can manage data to keep equipment serviced in a timely fashion, extend the useful life of critical machinery, keep maintenance costs down, develop optimal service centers, remotely fix troubled equipment and maximize the cost efficiency of capital expenditures.

In this paper Genpact brings three industry experts’ point-of-view on the challenges and steps that OEMs need to take towards developing world-class industrial asset management operating model.

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**Operating model that avoids production losses from forced outages**

The right model can ensure both topline and bottom-line growth for the oil and gas industry

**Forced outages** and **loss of production** are a constant concern in this industry. If a critical 2,000 barrel a day pump goes down with oil at $100 a barrel, a company can be losing $200,000 a day because of a single piece of faulty equipment.

Smart IAM improves asset uptime, extends asset longevity, and helps ensure that a company’s installed base is operating and maintained optimally. It can help improve equipment design and reliability, and ensure that service is managed cost effectively to keep field operations running smoothly. Most importantly it can save lives, by preventing potentially dangerous conditions when equipment breaks down.
Limited data analysis can erode operational efficiency and prevent timely equipment maintenance

The industries’ productivity and profitability depend on keeping heavy duty, critical assets working efficiently and serviced effectively. The full range of extraction, transport and storage machinery must be designed, maintained, and replaced for maximum operational productivity.

Key assets from pipelines and pumping stations to tank farms and transport centers are often located at great distances from one another, and therefore must be monitored remotely and accurately in real time. But the resulting data may be wasted if not analyzed appropriately with state of the art digital tools. Constantly changing regulations also require effective monitoring, and assessment.

The industry can get a far better return on its investment in IT monitoring and analysis

Naturally this varies depending on the operator. But studies show that many oil and gas enterprises are not getting the return on investment they expected from their IT, monitoring and analysis systems. More than that, the analytics fields are changing and improving rapidly offering better machine to machine (M2M) capabilities each year, often at more advantageous unit pricing. Oil and gas companies can be hard pressed, focused as they usually are on day-to-day operations, to keep up with these enhanced and vital electronic capabilities. The standard industry practice, failure modes and effects analysis (FMEA), may not be using the most efficient, insightful, up to date technology.

For example, the emerging technology that makes prescriptive analytics possible is only beginning to be embraced by oil and gas companies. This technology moves beyond descriptive and predictive analysis. Once a company has identified a problem (descriptive) and produced possible damage, failure, or maintenance options (predictive), prescriptive analytics can identify the right solution based on the company’s capital, operational and other requirements.

A modern IAM function can all but eliminate unanticipated downtime

Operators must develop up-to-date remote and onsite M2M monitoring with descriptive as well as prescriptive capabilities.

With the right data analysis support, the information received from M2M remotely and on-site can be used to produce optimal service and replacement schedules, parts inventories, reliability analysis, warranty tracking, cost analysis, and workflows to manage continuous operational improvements.

Also, insightful data assessment can create more effective safety and environmental management. This can reduce waste and optimize a range of compliance programs. The objective is to make operations better instrumented, more integrated and increasingly intelligent. A modern IAM function can all but eliminate unanticipated downtime and keep equipment running as long as possible without damage until required service.

An IAM service provider must look to minimize production losses by keeping clients current with evolving technology

Clients are looking for an up to date and continuously improving IAM operating model that will avoid production losses from forced outages and extend outage intervals. They’re interested in predictive, condition-based maintenance so that they can operate for as long as possible without risking damage to the capital equipment. They would want an IAM service provider that can keep them aware of value added hardware and software in the rapidly changing smart analytics fields.

Improve service performance and parts inventory control

Ensuring consistent output for the power generation industry

For this industry, failure is not an option. Lives and livelihoods depend on keeping the lights on and the electricity flowing, regardless of the mix of
generating units. Modern IAM functions enable utilities across the globe to track crucial operating metrics of their power units in real time whether widely dispersed or centralized. Smart IAM can dramatically increase the uptime, and reliability of generating units, optimize service effectiveness and inventory costs, and sharply improve the usability and accuracy of data collected across the enterprise.

**The industry's limited data analysis misses ways to avoid unscheduled downtime**

The power generation industry expects to operate with greater than 98% equipment availability. It relies on the OEMs that sell engines, turbines, alternators, and cooling systems for the M2M monitoring that tracks critical machine operating characteristics.

The OEMs generally install the remote monitoring systems, but the continuous data that is collected is analyzed mainly when an alert or alarm indicates that operational thresholds have been reached or some other problem exists. Data within thresholds is frequently not assessed for trends or for predicting potential issues. This means the industry still experiences avoidable unscheduled downtime, longer than necessary wait times for parts, and suboptimal service.

**Suboptimal IAM functions create inferior budgeting and operational efficiencies**

Although most equipment has remote monitoring capability and thus churns out a significant volume of data, too much data is simply being stored without anyone looking at it until there is an obvious problem. Which means that significant opportunities for diagnostic examination (what’s wrong), predictive assessment (what is likely to go wrong) and prescriptive (what’s the right solution) analysis are being missed.

Too many utilities do not look carefully, effectively, or consistently at performance trends across their entire installed base. An inferior IAM system too often means that a utility will not be tracking service contracts and performance, warranty applicability, or equipment history and performance as well as it could. The result is that the utility may not have enough useful data to accurately budget for equipment maintenance and replacement.

**Improving service performance and parts inventory controls**

An optimal IAM operating model would sharply improve service performance and parts inventory control as costs are increasingly based on timely, accurate data. An up to date information collection and management system enables a company to establish measurable operational improvement goals, improve risk management, and upgrade purchasing and ratemaking across the enterprise.

**Where an IAM service provider can help**

Significant improvement in asset uptime, availability, efficiency and longevity, more cost effective data driven service performance, and measurable returns on investment, are among the industry’s most important expectations. An optimized IAM function would eliminate unnecessary waiting for accurate equipment diagnostics, and service and parts delivery.

The industry would expect new IAM systems to help design, modify, and service equipment to comply with new and constantly changing emission regulations. More strategic performance trends analysis, would offer valuable insights into equipment design and maintenance that would make regulatory compliance more cost effective.

**Improving asset uptime is the key metric**

Smart IAM helps avoid “grounded” flights and missions

From general aviation to commercial, unexpected downtime wastes money, cuts productivity, erodes profitability, destroys customer confidence, and shreds valuable brand identity. Smart IAM, built
with up to date, well-designed data monitoring and analysis capability, can minimize equipment downtime, maximize service center performance, predict equipment problems, describe solutions and even prescribe the right solution according to a company’s business objectives.

**Aviation is deficient in predictive analytics and advanced M2M**

Aviation today is already, for the most part monitoring customer and asset data, hours of usage, past performance and equipment issues, contract costs and profitability estimates, and other key technical data. Much but not all of this is done remotely in some way. But there is considerable room for modernization, from enhanced M2M technology to the analytics that make it a transformative enterprise and asset management tool.

The main challenge seems to be developing fast and accurate insight about what can go wrong from engines to avionics, then determining what is wrong and how fast and how well it can be fixed.

Our experience shows that especially for far-flung flying operations, failure forecasting can be inaccurate up to half the time. Suboptimal service providers are unable to offer coordinated, integrated, timely maintenance that gets problems fixed on the first visit.

The **industry needs better integration between its data collection and analysis systems**

The M2M remote monitoring industry is growing significantly and increasing its penetration in aviation. Today’s products are remotely monitored if they have digital electronic engine controls and avionics diagnostic ports. But the sophistication and integration of big data systems across a given enterprise in aviation, generally does not yet match the performance of more digitally advanced industries.

Service platforms and software are used for monitoring most service operations. They are usually integrated with enterprise resource planning (ERP) systems like SAP. But too often there is not a robust connection between an analytics platform and either the service platform or the ERP system. These may even be entirely separate systems that do not or cannot talk with one another.

Advanced digital tools like prescriptive analytics are still not widely used.

**Reducing costs and increasing service effectiveness**

Best analytic practices coupled with advanced M2M capabilities are crucial for predicting and finding problems and fixing them as fast as possible. This means, successful IAM would keep M2M technologies up to date and on the most effective platform.

Smart IAM would also offer timely, accurate intelligence about what and where spare parts are required, and would reduce costs with lower and just in time parts inventories. It would significantly improve equipment uptime and customer satisfaction as well by increasing first-time fix rates.

**How a cost effective, high impact IAM service provider works**

Improving asset uptime, with engines and avionics at the top of the list, is the key metric. Upgrading service performance is therefore crucial as well. This, of course requires timely, accurate diagnostics and parts availability. It requires reducing service and maintenance costs while increasing service performance.

Companies should expect an IAM function that keeps M2M technologies up to date and on the most effective platforms. OEMs will want to utilize best in field M2M experts for this.

Aviation clients need absolutely accurate insight as quickly as possible. They need to know what is happening, what has gone wrong and what is starting to go wrong. They need a function that ensures problems are fixed fast with the best experts working on their problem immediately.
Conclusion

The experts have highlighted the significant challenges, often specific to various industries, facing the industrial asset management function. But they also see the measurable, significantly improved operating and financial results that a well-designed and efficiently implemented IAM offers. An OEM needs to retain its core focus on designing world-class products and delivering excellent service to customers. Also, reliable monitoring, forecasting, and failure prediction is needed to make timely and cost-effective decisions. Hence, a scalable, cost effective, end-to end industrial asset management operating model can help enhance value for the OEMs as well as customers. This industrialized model can often be partly realized through an IAM partner, who can integrate specialized process expertise, focused technology and in depth data analysis.
About Genpact

Genpact (NYSE: G) stands for "generating business impact." We architect the Lean Digital℠ enterprise through a unique approach based on our patented Smart Enterprise Processes (SEPSM) framework that reimagines our clients’ middle and back offices to generate growth, cost efficiency, and business agility. Our hundreds of long-term clients include more than one-fourth of the Fortune Global 500. We have grown to over 70,000 people in 25 countries, with key management and a corporate office in New York City. We believe we are able to generate impact quickly and power Intelligent Operations℠ for our clients because of our business domain expertise and experience running complex operations, driving our unbiased focus on what works and making technology-enabled transformation sustainable. Behind our passion for technology, process, and operational excellence is the heritage of a former General Electric division that has served GE businesses since 1998.

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