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2020 BEST PRACTICES AWARD

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2020 GLOBAL DIGITAL MANUFACTURING PLATFORM FOR AEROSPACE & DEFENSE COMPANY OF THE YEAR AWARD

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Aerospace and Defense (A&D) manufacturers must leverage their expanded supply chains and adopt digital manufacturing technologies to optimize production, increase product quality, and reduce energy consumption. Vendors offer multiple digital software platforms to streamline manufacturing operations, planning and scheduling, sales and distribution, marketing, disruption management, and technical operations. However, there is a lack of digital solutions that could resolve the current challenges of working amid physical distancing and offer more safety to the workforce in manufacturing/maintenance facilities.

The increasing reliance on key suppliers to consistently provide high-quality products is driving manufacturers to change their practices and monitor more closely for precise quality. This makes the lack of integration of quality assurance (QA) practices in the value chain is now a big challenge that needs to be better managed. Manufacturers want visibility of issues arising downstream in the value chain and the ability to take immediate action to reduce any potential impact.

Even though a single software platform for all business needs might be an unrealistic approach, aircraft companies are trying to consolidate critical enterprise-level applications instead of adopting more custom and commercial applications. It is typical for an A&D manufacturer to have product lifecycle management (PLM) software for engineering functions, an enterprise resource planning (ERP) tool for financial, procurement, and inventory control applications, and manufacturing execution system (MES) software to manage the production shop floor. Each of these has a significant role in the quality management system. But the data inconsistency between different teams managing quality in the value chain has to be checked and avoided. The combination of manual approach and unlinked data silos on the manufacturing floor increases the complexity in integrating the required data into a complete top-level view of operations.

Maintenance, repair, and overhaul (MRO) in the A&D sector can be unpredictable, taking several weeks to a few years to complete, depending on the product and the MRO requirement. MRO field service technicians in A&D manufacturing do not usually work on-site at the customer's location. Products may ship to different parts of the country from overseas or are in an area inaccessible to technicians. Technicians may not know how long the parts have been in the field, their conditions, or if some parts in the system have been replaced. Customers expect service providers to be able to execute MRO work from anywhere around the world. For instance, if there is a military vehicle overseas that needs MRO, service providers are expected to understand customer requirements, deliver instructions, and collect the relevant data from anywhere in the world. It must also be traceable back to the OEMs part to ensure the customer gets the refurbished product's entire history.

Companies offering solutions capable of addressing the challenges of manufacturing aircraft during a pandemic, unifying quality checks and business applications, reducing

data inconsistency and silos, and providing comprehensive information on parts for MRO in the A&D sector are set to capture significant market share.

Visionary Innovation & Performance and Customer Impact

Founded in 1986, iBASEt is a California-based provider of software solutions to discrete industries like A&D, electronics, industrial equipment, medical equipment, nuclear, and shipbuilding. iBASEt is renowned in the A&D industry, with eight of the top ten global A&D companies being its customers. This includes Lockheed Martin, Collins Aerospace, Northrop Grumman, Rolls Royce, Pratt & Whitney, and Textron.

iBASEt has developed Solumina, an integrated digital operations suite and management platform, to enable a single paperless system that manages work and quality processes for the production and MRO / sustainment of highly engineered products. The company provides three key solutions that are part of the Solumina platform, manufacturing execution system (MES), MRO, and supplier quality (SQM). The company's MES includes an embedded enterprise quality management system (QMS); manufacturing intelligence (MI) is an optional capability that can be easily added.

Addressing Unmet Needs with Manufacturing Execution System

Paper-based operations and internal applications have conventionally served A&D manufacturing processes. These methods cannot meet the evolving requirements for speed, agility, and traceability. Unlinked data silos on the production floor increase the complexity of integrating plant data into a detailed and accurate top-level view of operations.

iBASEt's MES overcomes this issue by providing A&D shop floor technicians with visual instructions and multiple data collection capabilities. Technicians represent 30%–60% of the assembly cost in the A&D sector. The lead time to deliver a completed aircraft can be between 3 to 5 years. Designed to adapt to the rapidly evolving needs of shop floor technicians, iBASEt's MES provides complete flexibility in integrating new technologies adopted in the process. While competitors' solutions require customization before being deployed on the factory floor, iBASEt's MES has 95% out-of-the-box functionality. This means customers do not have to recreate terminology or extend the application through modifications. Processes needed to make aircraft or any highly complex component, have been pre-established and outlined in logical roles. Customers can install the software, set up users, allocate necessary privileges, and begin authoring.

A leading manufacturer of aerospace, defense, arms, and security technologies that installed iBASEt's MES took only three weeks to author and deploy the work instructions. This is commendable as competitors' solutions take 2–3 months to go live. The MES also provides more than 3,900 standard features compared to the 500–1,000 provided by competitors' solutions. It offers a full information toolkit to every operator, ensuring the manufacturing process stays synchronized, focused, and productive. For example, an operator working in the QA department has complete oversight of all tasks. When an issue arises, the MES automatically notifies the operator on a virtual dashboard.

Virgin Orbit, a California-based provider of flexible and affordable satellite launch services, operated in a labor- and time-intensive paper-based environment. The company adopted iBASEt's MES solution on its production floor to overcome these challenges. It installed Process Planning, Shop Floor Execution, and Shop Floor Quality modules without customization, as an out-of-the-box solution. The integration with their current ERP and PLM systems went smoothly, resulting in the MES going live within four months. Virgin Orbit enabled end-to-end real-time visibility in manufacturing operations and other departments that made various planning and management reports now accessible.

Achieving Performance Value with Maintenance, Repair, and Overhaul

iBASEt's MRO solution enables repair teams to avoid common mistakes by offering a standard, repeatable method for developing and executing tasks. Unlike competitors' MRO solutions, iBASEt's MRO allows users to track components that are removed and sent to a supplier or OEM. These built-in features allow users to easily manage and control MRO processes. The paperless methods in Solumina help users increase productivity by eliminating the clerical and manual verification phase while offering faster turnaround for non-routine work approval and problem resolution on the shop floor.

iBASEt designed their MRO software to adapt to any organizational change, be it business process or critical engineering changes that affect service units. It ensures production floor operators can access the correct and latest drawings and revisions in supporting documents. Users can track and monitor any service unit, a removed sub-assembly, or a major component, ensuring service tasks do not fall through any process gaps.

Lockheed Martin Aeronautics (LM Aero) is a Texas-based provider of systems integration, production, and support services for advanced military aircraft and equipment. The company wanted to manage the rising cost of LM Aero F-35 Sustainment, a service program responsible for repairing and modifying the F-35 aircraft. The service team found it challenging to get all the critical information from multiple sites, schedules, and production status, making planning and scheduling the required tasks difficult. LM Aero adopted iBASEt's MRO solution and significantly increased its repair/modification execution quality within a few weeks of deployment. Modification planning instructions are now sent electronically to the right team for depot-level modifications and inspections. The service team captured maintenance hours for each completed planning step and total hours taken for the modification or inspection. This solution resulted in LM Aero solving 52% of identified quality issues and escapes.

Enhancing Customer Purchase and Ownership Experience through QMS

In addition to MES and MRO solutions, iBASEt also offers two types of QMS, a Supplier Quality Management (SQM) solution and an Enterprise Quality Management System (EQMS) that is an integrated component of the company's MES and MRO solutions. See Figure 1. Solumina is a digital platform with core capabilities that hosts each of the iBASEt solutions. Every iBASEt solution and add-on capability was organically created by iBASEt on a common data model, so interoperability is seamless.

SQM offers a fully paperless solution for defining, executing, communicating, and validating product specifications and requirements with suppliers. It enhances visibility into the supplier's QA and compliance, provides the ability to investigate real-time supplier status, constraints, and historical reports for tasks, and offers data-driven insights for improved planning and control throughout the value chain. iBASEt's SQM is a customer-centric solution that enables A&D manufacturers to control production costs, decrease variances, and allow compliance with quality standards. Reducing inspections and increasing traceability are critical strategies to lower production costs in the A&D industry.

Figure 1: The iBASEt Digital Operations Suite

The SQM software enables the investigation of product quality and production history processes in real-time. It illustrates quality-performance metrics in easy-to-understand charts and reports that give specific details, such as purchase orders and inspection records. Competitors' solutions cannot record inspection data on the suppliers' site. In comparison, iBASEt's SQM sends dynamic inspection and verification requirements securely online to the supplier site, recording all inspection data. The customer can use this data to identify areas and suppliers requiring process improvement, additional oversight, or corrective action. It gives every measurement or observation characteristic a sampling plan that identifies every inspection's frequency and sample size, with the choice to automatically switch to tighter plans or flexible sampling plans based on failure history. This is a unique feature of iBASEt's SQM.

iBASEt's EQMS capabilities allows a company's QA team to ensure its products consistently meet the highest quality standards while achieving operational efficiency and performance goals. iBASEt designed its software to enhance collaboration between an enterprise's teams, from individual facilities to complete supplier networks. While competitors' solutions lack quality monitoring capability throughout a product lifecycle, iBASEt's EQMS allows users to integrate and track quality management compliance of the entire product lifecycle from suppliers to production. The transparency and control gained by merging QA across the value chain means identifying and resolving issues before causing production
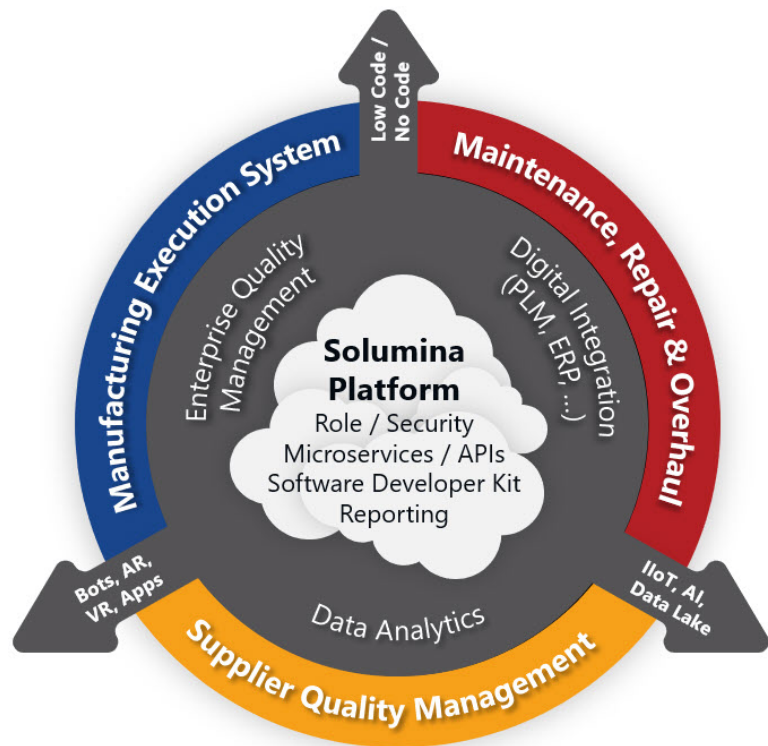
delays. Compared to competitors' solutions, which cannot identify the root cause of a problem, iBASEt's EQMS capability determines poorly managed processes, root causes of rework, and fields where increased collaboration will enhance efficiencies. With real-time insights and transparency of built and work-in-progress tasks, A&D manufacturers can quickly identify many process issues. Plant floor supervisors can have a fully traceable history of people, operations, and components to troubleshoot bottlenecks and out-of-spec products.

Meeting Visionary Scenarios through Manufacturing Intelligence

iBASEt provides an innovative reporting and analysis tool called Manufacturing Intelligence (MI) as an additional offering that can be added to existing solutions, run on the Solumina platform. It allows customers to enhance visibility of operations inside and across factories to align decision-making with enterprise targets. Competitors' solutions only offer visibility of a single plant or factory. The company offers MI at a fraction of the cost of an in-house built solution, which needs significant allocation of a company's IT resources to develop, deploy, and maintain.

With MI it is easy for an operator to identify, retrieve, and analyze Solumina data. MI benefits various users including planners, production managers, supervisors, and quality control managers. It clarifies issues holding back current work orders and gives information such as the hold duration, type, and impacted work orders. MI provides comprehensive metrics across key performance indicators (KPIs) and functional areas. Using data from Solumina, it enables users to determine operational segments that can be optimized for enhanced efficiency and prioritized for better ROI. MI provides backlog metrics that highlight reasons for task delays and the best corrective actions. Technicians can easily track and analyze defects as they have access to information such as number and type of defects, reject and scrap rates, and first pass yield. Since MI provides metric trends over specific periods, it eases the interpretation of process enhancement efforts' effectiveness. This eliminates manual guesswork of progress in process improvement.

Accelerating Growth with Strong Brand Equity

The advanced manufacturing operations management (MOM) software market, including MES, MRO, QMS, and analytics, is expected to register 10%–12% CAGR over the next five years. As such, iBASEt's integrated digital solution is likely to gain more popularity among customers whose products are based on disparate acquisitions and loose integrations. With over 80,000 users across a broad customer base, iBASEt counts eight of the top ten A&D companies as their customers.

While the overall market is struggling to meet 10%–15% of the revenue targets in 2020 because of the COVID-19 pandemic, iBASEt achieved a 30% growth rate in the prior fiscal year, with healthy gross profit margins and zero debt to date. In a market with thin operational margins, maintaining technology and solution stewardship is no easy feat. iBASEt's ability to deliver cutting-edge solutions over the years has helped it stay ahead of customers' expectations.

There are two factors hindering solution providers' growth in the current environment. They are the inability to maintain a strong workforce to bring in business opportunities and insufficient service staff to implement solutions for a wide spectrum of customers. To eliminate these obstacles, iBASEt has acquired competent partners who can identify and bring in value-added business. The company has strategic partnerships with Accenture, DXC, ATS, and HCL, who function as system integrators and solution design consultants to best deliver iBASEt solutions to end customers, adding value as part of the process.

The company most recently formed a strategic partnership with HCL Technologies, a leading IT services provider, in June 2020 to offer its solution as part of HCL's ExPAND 4.0 framework. This framework integrates an enterprise's engineering, production, and aftersales functions to accelerate digital transformation initiatives by simplifying the implementation of advanced technologies in operations. iBASEt has also partnered with top cloud providers such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud to help customers migrate to the cloud. With a cloud delivery model and a SaaS product, manufacturers can use native cloud services to build and deploy multiple applications quickly, and efficiently manage routine platform updates.

Conclusion

The top concerns of A&D manufacturers are lack of access to real-time visibility of ongoing tasks, resource availability, and historical data for performance analysis. iBASEt's Digital Suite, powered by Solumina, is designed for complex and highly regulated discrete industries such as the A&D sector. The Solumina platform is modular, enabling ease of implementation and offering quick time-to-value for customers. Based on a model-based manufacturing framework that integrates design, manufacturing, quality, and other disciplines with digital workflows, the solution holds production specifications on a digital platform. Providing more than 3,900 standard features compared to the 500–1,000 provided by competitors' solutions features, the company developed these features to meet A&D shop floor needs and issues. The Solumina platform offers the technology infrastructure required to use advanced model-based functionality, such as IIoT connectivity, data analytics, and supply chain collaboration.

For its strong overall performance, iBASEt Inc. is recognized with Frost & Sullivan's 2020 Company of the Year Award.

Significance of Company of the Year

To receive the Company of the Year Award (i.e., to be recognized as a leader not only in your industry, but among non-industry peers) requires a company to demonstrate excellence in growth, innovation, and leadership. This excellence typically translates into superior performance in three key areas, demand generation, brand development, and competitive positioning, that serves as the foundation of a company's future success and prepares it to deliver on the 2 factors that define the Company of the Year Award: Visionary Innovation and Performance, and Customer Impact.

Understanding Company of the Year

Driving demand, brand strength, and competitive differentiation all play critical roles in delivering unique value to customers. This three-fold focus, however, must ideally be complemented by an equally rigorous focus on Visionary Innovation and Performance to enhance Customer Impact.

Key Benchmarking Criteria

For the Company of the Year Award, Frost & Sullivan analysts independently evaluated each factor according to the criteria identified below.

Visionary Innovation & Performance

Criterion 1: Addressing Unmet Needs
Requirement: Implementing a robust process to continuously unearth customers' unmet or underserved needs, and creating the products or solutions to address them effectively.

Criterion 2: Visionary Scenarios through Mega Trends
Requirement: Incorporating long-range, macro-level scenarios into the innovation strategy, thereby enabling first-to-market growth opportunity solutions.

Criterion 3: Implementation of Best Practices
Requirement: Best-in-class strategy implementation characterized by processes, tools, or activities that generate a consistent and repeatable level of success.

Criterion 4: Blue Ocean Strategy
Requirement: Strategic focus on creating a leadership position in a potentially uncontested market space, manifested by stiff barriers to entry for competitors.

Criterion 5: Financial Performance
Requirement: Strong overall business performance in terms of revenue, revenue growth, operating margin, and other key financial metrics.

Customer Impact

Criterion 1: Price/Performance Value
Requirement: Products or services offer the best value for the price compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience
Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience
Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience
Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity
Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practice criteria. The reputation and integrity of the awards are based on close adherence to this process.

STEP		OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	Monitor, target, and screen	Identify award recipient candidates from around the world	• Conduct in-depth industry research • Identify emerging industries • Scan multiple regions	Pipeline of candidates that potentially meet all best practices criteria
2	Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	Invite thought leadership in best practices	Perform in-depth examination of all candidates	• Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best practices positioning paper
5	Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized award candidates
6	Conduct global industry review	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible award candidates, representing success stories worldwide
7	Perform quality check	Develop official award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	Reconnect with panel of industry experts	Finalize the selection of the best practices award recipient	• Review analysis with panel • Build consensus • Select winner	Decision on which company performs best against all best practices criteria
9	Communicate recognition	Inform award recipient of recognition	• Announce award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of award and plan for how recipient can use the award to enhance the brand
10	Take strategic action	Upon licensing, company able to share award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess award's role in strategic planning	Widespread awareness of recipient's award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit http://www.frost.com.