



**Dassault Systèmes Value for
Mid-Market**

*“ENOVIA SmarTeam’s Impact on Mid-Sized
Companies”*

July 2008

A CIMdata Review

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July 2008

Produced by
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Dassault Systèmes Value for Mid-Market

“*ENOVIA SmarTeam’s Impact on Mid-Sized Companies*”

Dassault Systèmes’ ENOVIA SmarTeam is focused on supplying collaborative Product Definition management (cPDM) solutions for small and mid-sized companies and engineering departments within larger enterprises. This paper provides a review of mid-sized companies’ challenges, a brief description of the ENOVIA SmarTeam solution suite, and customer reports based on CIMdata interviews with a select group of customers from various industries and geographies. The objective of the interviews was to better understand these customers’ experiences and the benefits that they have received as a result of their ENOVIA SmarTeam implementations.

1. Introduction

In the increasingly competitive global marketplace, companies around the world are developing and pursuing strategies to ensure that they can survive and thrive in their respective markets. In order to support these companies, Product Lifecycle Management (PLM) has emerged as one of the most significant technology-based initiatives to be introduced into industrial companies in the last several years.

PLM is a business strategy to effectively support the full lifecycle of a company’s products with processes that enable collaboration along the full product lifecycle and across partner networks. It is enabled with technologies that support product and process development, and processes that foster innovation at all stages. PLM has gained tremendous traction in many industries, and companies around the world have been increasingly investing in PLM to help them enhance their competitive position by improving time to market, reducing costs of product development, and increasing product quality.

PLM has been pioneered in larger enterprises; however, enterprises of all sizes can benefit from PLM and small- and mid-sized businesses (SMBs) have not been content to let PLM remain the domain of the behemoths of industry. Rather, SMBs demand the same support for global collaboration and creation of innovative approaches to their own product development problems and are investing in PLM at an increasing rate.

While SMBs have many of the same PLM requirements as larger enterprises, they also have characteristics that are especially challenging for successful PLM

implementations, such as limited resources and budgets along with a demand for fast impact and minimized risk. However, SMBs continue to invest at an increasing rate in PLM because the value and benefits are proven and the solutions are now being more effectively packaged for SMB implementations. Leading-edge companies are investing in PLM to improve their competitiveness—these companies will be the winners in the coming years.

A major supplier of PLM solutions, Dassault Systèmes (DS) is also a supplier of one of the leading SMB-focused PLM solutions; ENOVIA SmarTeam. This solution offering has been developed and has evolved over several years, achieving a substantial customer base—DS reports that this solution has been implemented in more than 6,000 companies. CIMdata has interviewed a number of these customers from various industries and geographies, and has been impressed with the positive experiences and level of value that they report from their ENOVIA SmarTeam implementations.

This paper provides CIMdata’s perspective on the ENOVIA SmarTeam program including the experiences of a selected set of customers. The following sections of this paper address:

- *Business Challenges*—An introduction to the business issues faced by mid-sized companies as they pursue success in their markets and why they seek support from PLM.
- *ENOVIA SmarTeam*—A brief description of the capabilities provided in the product offerings, along with a brief perspective on its approach to addressing the business problems of mid-sized enterprises.

- *Customer Experiences*—A brief review of the experiences of a select set of ENOVIA SmarTeam customers, with a focus on the value that they have received from their implementations.
- *Summary*—A brief summary of the findings.

2. Business Challenges

Companies around the world are developing and pursuing various strategies to ensure that they are successful in their own markets. They are striving to become more competitive in order to not merely survive in today's increasingly stressful markets, but to achieve a sustainable advantage and thrive in the coming years.

Pressures from globalized markets and supply chains, increasingly complex products, cost pressures, growing regulatory compliance, increasing competitive pressures, and many other factors are driving companies of all sizes to seek advantage wherever it can be found. One of the key sources of potential improvement is the better utilization of information technologies, particularly to enable vastly-improved processes that can transform a company's competitive position. PLM is one of the most significant technology-based initiatives to be introduced into industrial companies in the last several years.

PLM is technology-enabled, but it is not just a new computer-based application. CIMdata defines PLM as a strategic business approach that applies a consistent set of business solutions in support of the collaborative creation, management, dissemination, and use of product definition information across the extended and increasingly global enterprise, and spanning from product concept to end of life—integrating people, processes, business systems, and information. PLM forms the product information backbone for a company and its extended enterprise. It is composed of multiple elements including: foundation technologies and standards (e.g., XML, visualization, collaboration, enterprise application integration, etc.), information authoring and analysis tools (e.g., mechanical design, electronics design, software engineering, manufacturing process design, technical publishing, finite element analysis, etc.), core functions (e.g., data vaults, document and content management, workflow, product structuring, program management, etc.), functional applications (e.g., configuration management, engineering change control, simulation, etc.), and business solutions (e.g., new product introduction, supply chain collaboration, maintenance repair and overhaul, etc.) that incorporate best practices and methods.

PLM is an approach that has gained tremendous traction in many industries, and companies around the world have been increasingly investing in PLM to help them improve their competitive position. In 2007, worldwide investments in commercially-available PLM technologies and related services exceeded \$24 billion and are forecasted to reach almost \$40 billion by 2012 (from CIMdata's PLM Market Analysis Report for 2008). Among the companies that have been investing in PLM, SMBs comprise an increasingly larger share.

PLM has been pioneered in larger enterprises that have invested the resources necessary to understand the approach, improve the technologies, validate the benefits, and establish the organizational practices necessary to make PLM effective. However, enterprises of all sizes can benefit from PLM, and SMBs are using it to address the same pressures that have driven larger enterprises to invest in PLM over the past several years.

While SMBs have many of the same PLM requirements, they also have characteristics that are especially challenging for suppliers of PLM solutions, including:

- limited information technology (IT) resources.
- limited process improvement resources.
- demand for low total cost of ownership.
- demand for fast business impact.
- demand for minimized risk.

In order to effectively address the characteristics of SMBs, PLM solutions must be provided in the form of:

- cost-effective solutions (software and services) with low initial cost, and low ongoing costs
- limited installation/implementation support requirements to reach production operation
- packaged solutions with pre-configured processes to provide templates and guidance in achieving best practices with the solutions

Implementing PLM is not a trivial business initiative. It requires forethought and a clear strategy and plan to take maximum advantage in the shortest timeframe. However, with successful implementation, SMBs can anticipate many business benefits from PLM that make it a sound business investment, including examples such as described below, along with a few typical ranges of improvements that CIMdata has observed through research with companies that have implemented PLM:

- reduced errors and rework by having a single source of product definition information
- increased design commonality and data reuse supported by powerful and flexible search capabilities—reducing the number of new parts created by 10-25%

- simplified design release and engineering change workflows resulting in faster, lower-cost design processes—reducing the cost of engineering changes by 10-90%
- better management of design supply chain collaboration processes—reducing product design efforts by 10-45%
- better standard parts management—reducing inventory costs by 5-25%
- more accurate and managed bill of materials (BOMs) and configurations that ensure downstream quality—increasing product quality metrics by 10-85%
- convenient, authorized access to secure product information for people throughout the company
- enhanced bidding and cost estimation for new projects
- reusable project templates to capitalize on lessons learned

Benefits such as these are critical for companies seeking to improve their competitiveness. In this paper, we will describe the experiences and results that have been achieved by a variety of SMBs that have implemented ENOVIA SmarTeam-based PLM solutions in recent years. From these examples, it is clear why investments in PLM solutions are increasing at such a high rate in both SMBs and larger organizations around the world.

DS provides a range of components to support full PLM programs, including high-end solutions as well as solutions that are focused on entry-level implementations. DS' suite of offerings includes solutions focused on mechanical computer-aided design (MCAD), Digital Manufacturing, cPDM, Simulation and Analysis, etc. However, this paper focuses on DS' ENOVIA SmarTeam solution—a core of their mid-market-focused program.

3. ENOVIA SmarTeam for Mid-Market

3.1 DS and ENOVIA

Dassault Systèmes (NASDAQ: DASTY; Euronext Paris: #13065, DSY.PA) has a worldwide presence and is one of the major suppliers of PLM solutions to industry. Their software and related service revenues in 2007 exceeded \$1.7 billion. According to CIMdata's research, during 2007, DS was the largest overall PLM revenue generator among the PLM Mindshare Leaders. Mindshare leaders are the companies with the largest and most comprehensive

PLM implementations, and those perceived by customers to be thought and technology leaders.

As a comprehensive supplier to many industries, DS has developed, acquired, and enhanced solutions that address cPDM, 3D Mechanical Design, Digital Manufacturing, Simulation and Analysis, and solutions to extend the use of 3D information beyond engineering departments to users of all types within a company. More recently, DS has expanded their suite of offerings with technologies to enable even broader usage of product-related information with solutions intended to enable their customers to share information with the consumers of their products. This enables the use of 3D product information to enhance communication with consumers and other non-technical users of product-related information. Overall, DS' PLM market position is very strong.

DS' most recent expansion of their PLM vision and solution offerings is their V6 platform, which is based on their concept of PLM 2.0. V6 is not a product (or group of products) but an enterprise-level platform and applications designed to provide a single environment in which product-related information created in both DS and non-DS applications can be collaboratively used online by participants from all business functions and areas of the extended enterprise that are involved in the product lifecycle. The objective is to provide a consolidated or federated view of product-related information across a wide range of data sources, while gaining a life-like experience in 3D. ENOVIA is the core component of that approach, and is focused on delivering global collaborative lifecycle management solutions.

ENOVIA now encompasses an impressive suite of applications. The previous MatrixOne "Centrals" and SmarTeam applications are all intended to be provided as ENOVIA applications on a common V6 platform. The DS ENOVIA offerings for the mid-market are based on the ENOVIA SmarTeam solutions.

3.2 ENOVIA SmarTeam Offerings

As mentioned previously, DS' ENOVIA solution for the mid-market is based on the ENOVIA SmarTeam suite of offerings that has been available in the market for more than twelve years—one of the industry's longest-running commitments to SMBs. ENOVIA SmarTeam's offerings were originally focused specifically on mid-market engineering departments. Although the ENOVIA SmarTeam suite has been expanded substantially over the intervening years as DS used ENOVIA SmarTeam to support some larger enterprises, it has continued to be

primarily delivered to SMB companies. Upon DS' acquisition of MatrixOne, ENOVIA SmarTeam has returned to its original objectives and is again primarily focused on delivering collaborative PLM to SMBs and engineering departments of larger enterprises.

DS reports that ENOVIA SmarTeam currently has more than 6,000 customers, a truly substantial number in today's PLM market. One of the results of DS' interim use of ENOVIA SmarTeam for larger enterprise situations has been the development of an underlying technology base that is quite scalable for SMB situations.

DS positions ENOVIA SmarTeam as the cPDM offering within its portfolio that enables PLM for the mid-market. It is intended for mid-market manufacturers seeking PLM functionality to optimize their design and engineering processes throughout the product development lifecycle, including value chain partners.

Providing access to product-related information across disciplines and locations, ENOVIA SmarTeam supports a variety of roles and functions within organizations including marketing, product managers, designers, engineers, management, purchasing, and manufacturing. It enables authorized teams to manage and monitor processes in a collaborative manner to accelerate product development.

DS' objective is to deliver ENOVIA SmarTeam in a way that can be implemented with a relatively "out-of-the-box" approach that still provides enough flexibility to accommodate key customer characteristics and thus deliver significant value with a relatively low total cost of ownership. In order to accommodate this objective, DS positions ENOVIA SmarTeam with three primary "layers" to their suite of offerings. These layers are:

- *Express Packages*—intended to deliver packaged methods and applications for core development disciplines, such as Design and Engineering in order to enable relatively rapid initial implementations and return-on-investment. The Express packages embed a pre-configured, but tailorable, "best practice" environment for targeted scenario-coverage. They are based on the Role-Based Products core capabilities.
- *Role-Based Products*—a set of prepackaged suites of capabilities targeted at various user roles in an enterprise. These roles collaborate and interact with one another within three main collaboration domains; namely, design, engineering and enterprise.
- *Open PLM Foundation Platform*—a configurable Microsoft .Net platform with

appropriate tools to enable relatively quick installation and the ability to be integrated with other systems.

The Role-Based Product offerings are intended to address the basic capabilities needed by various types of roles in the organization. The current roles targeted by ENOVIA SmarTeam and their focus of capabilities include:

- Editor—manage, link, and release technical documents in the context of the product structure
- Designer—manage designs in a multi-CAD, multi-data environment
- Engineer—manage E-BOM, M-BOM, item lifecycle, engineering release and change processes
- Navigator—browse, view, print, share, participate in processes
- Community—secure access to specifically identified data—intended for external partners

DS' illustration to depict their ENOVIA SmarTeam offering, incorporating the different typical product development roles, is shown in Figure 1.



Figure 1—ENOVIA SmarTeam Core Product Portfolio
(Courtesy of Dassault Systèmes)

ENOVIA SmarTeam is offered with a modular implementation approach to PLM for SMBs. They can start with document management, and then extend to managing more complex product structures. Product development is accelerated by users collaboratively managing item lifecycles and manipulating Engineering BOMs (E-BOMs). These BOMs are automatically generated from the product structures in integrated CAD solutions and may be further manipulated by various filters and automated change processes (i.e., workflows).

To make initial implementations go more effectively, ENOVIA SmarTeam has leveraged knowledge obtained from their thousands of customers, and offers prepackaged Express solutions. These are standard offerings that function as quick-start PLM projects, providing a foundation for growing PLM functionality one step at a time. They include a prepackaged, simplified user interface, and a preconfigured environment and tools for scenario-coverage, plus methodology and installation guides for “best practice” implementation. The intent is to support the needs of SMBs that usually have less IT resources. The primary current Express offerings are:

- *Design Express*—manages design activities in an immersive multi-CAD, multi-data environment
- *Engineering Express*—manages concept to manufacturing scenario coverage, including E-BOM and M-BOM management, item lifecycle, engineering release and change processes

The collaborative Express offerings are built upon each other to add capabilities as the scope of the solution increases, so Engineering Express includes all of Design Express plus additional capabilities. DS reports that they intend to provide additional Express packages in the future.

Enterprise collaboration capabilities expand the scope by enabling PLM participation by additional user roles and disciplines within the global organization. For example, they extend access to product knowledge, and standardized processes to authorized enterprise and external workers, provide multi-site support and Gateway connectivity to other enterprise applications.

ENOVIA SmarTeam has a long history of success in the mid-market. This should be improved now that DS has committed this group to concentrate on SMBs and engineering departments in larger enterprises. DS’ announcement of V6 should be advantageous for their ENOVIA SmarTeam program and provides these offerings with more effective access to other aspects of DS’ ENOVIA Foundation technologies, as well as the common user interface framework provided through 3DLive, which is developed consistently with the DS suite of products, including ENOVIA SmarTeam. Overall, CIMdata likes the refocus of ENOVIA SmarTeam and believes that its long history and extensive customer base make it a solution that should be considered by SMBs investigating PLM solutions.

4. Customer Experiences

One of DS’ objectives for ENOVIA SmarTeam is to support its customers in developing excellent products in

their own domains. In other words, enable its customers to improve their ability to develop excellent products by optimizing design and engineering processes throughout the product development lifecycle, including value chain partners. This section includes a summary of CIMdata’s discussions with a number of ENOVIA SmarTeam customers from various industries and geographies regarding their business drivers, motivations for implementing ENOVIA SmarTeam, experiences during this process, benefits they have gained from their investments and their plans for the future.

4.1 Tesla Motors

Tesla Motors (www.teslamotors.com), a manufacturer of environmentally-friendly, high performance electric vehicles, was founded in July 2003 and is headquartered in San Carlos, CA, USA. They are privately owned and currently have approximately 250 employees. Tesla has three design centers, located in California and Michigan in the US, and in England. Their goal is to produce quick, good-handling, and attractive alternative energy vehicles. Tesla’s partnership with Lotus is an indicator of the type and quality of vehicles that they produce, and they have already received awards for their activities, such as “TIME’s Best Inventions 2006.” Tesla’s current product is the Tesla Roadster, while their next vehicle will be a four-door sedan; again with an electric powertrain, but at a lower price than the current Roadster. Producing environmentally friendly vehicles is not sufficient for Tesla to be successful; their vehicles must be of very high quality and embrace leading-edge technologies and innovative features to attract buyers.

Tesla views PLM in a broad context for their firm and expects it to embrace CAD data management, CAD document management, product structure management, workflow, etc. as components of an overall PLM environment. They consider a comprehensive PLM strategy a necessity for their business success both today and in the future to enable them to effectively handle engineering design and release for their complex products. Although Tesla is an automotive OEM, their business operations are quite different from the traditional OEMs in both scale and priorities. They are a mid-market company that focuses heavily on innovation and quality to be successful.

Tesla’s initial product development environment was not sufficient for their needs. They utilized multiple MCAD tools without any cohesive data management capabilities, integration with electrical/electronic design was completely manual, engineering processes were managed manually as well, and their existing environment was not capable of

supporting their product complexity or the increasingly-distributed scope of their design activities. In order to address these weaknesses, Tesla has decided to implement a unified PLM environment that they believe will provide the needed consistency, integrity, and management capabilities.

After executing a detailed benchmark and evaluation of alternatives, Tesla selected the DS' PLM Express (including ENOVIA SmarTeam) solution, provided to them by DS partner TechniGraphics (www.tgstech.com), to support their new PLM environment. As part of this decision process, they chose to invest in CATIA as their primary mechanical CAD tool. TechniGraphics also provided Tesla with direct implementation support and training. The initial objectives of this implementation were to provide:

- a “single source of truth” for information—based on a consistent and common vault for both CAD data and product-related documents
- a synchronized collaborative work environment—both internally and with partners
- consistent work processes—a managed environment
- coordination with Tesla's ERP system

Tesla launched this implementation in June of 2007 and went into “live” production in September of the same year. Tesla reported that during this three-month implementation, they devoted most of their efforts toward modifying the prepackaged templates (retaining as much standard as possible), adjusting the system data models to reflect their situation, and handling the logistics of hardware, networks, etc. The initial implementation work was conducted in California, but was then expanded to encompass the Michigan design center before going “live.” A further expansion to include the UK-based design center is planned. A key expansion of their initial implementation to incorporate ENOVIA SmarTeam's multi-site capabilities has been initiated to accommodate their distributed design facilities.

Implementing a PLM approach typically requires a business transformation in the attitude to managing data and standardizing business processes. No implementation goes completely smoothly though, and in Tesla's case (as with many others), the major frustrations were the result of organizational and process challenges. However, they reported that their implementation partner worked with them quite closely and “made things right.” To make the transition to the new environment easier, Tesla designed their new processes to be heavily based on the existing ones, with an expectation that these can be changed as the organization becomes more familiar with the new

environment and begins to recognize the value of additional changes. Tesla anticipates that ENOVIA SmarTeam's flexibility in developing and evolving process workflows will be very valuable to facilitate their process changes.

The full implementation of all target functionality is certainly not yet completed, but Tesla reports that good progress has been made. Integration with their ERP system will be tackled in a later phase. As they look toward the future, they plan to manage full product design activities, including both embedded software and electronics design activities as well as those associated with mechanical design.

Although it is still a bit early for Tesla to release specific financial benefits metrics resulting from their implementation of ENOVIA SmarTeam, they have reported very positively on its value to their organization. Paul Lomangino, Tesla's CAD/PDM Technology Manager, has commented on the fundamental necessity of PLM as an investment for their firm, and reinforced that with the statement “our PLM implementation is justified as a cost of doing OEM automotive work.” Tesla is operating in a very competitive industry, and as both an OEM and an SMB, they must be especially flexible in order to successfully compete over the coming years. A solid PLM environment is a necessity for them to support this type of business approach.

4.2 Aerosud Aviation (Pty) Ltd

Aerosud (www.aerosud.co.za) is a supplier to the aerospace industry, with a background in both defense and commercial markets. While involved in both markets, they are an internationally-recognized supplier for interior systems that are provided to major OEMs around the world such as Airbus, Boeing, BAE Systems, and others. Aerosud is also a supply chain partner in the Airbus A400 manufacturing program. As a Tier 1 supplier, they are responsible for design, development, manufacturing, and service support for the assemblies and components that they supply. With approximately 600 employees, they have become an established leader in the South African aviation industry, and are increasingly recognized in the international market.

The challenges that Aerosud faces in their focus on dominating a niche market sector within the highly-competitive aerospace marketplace have driven them to invest in PLM. They recognize that while expanding their portfolio of product offerings, they must significantly improve their design process; improve data integrity, reduce the time required to complete designs, and improve

the link between engineering and their ERP system. The changing dynamics of their industry are also forcing more risk-sharing between them and their OEMs. Essentially, they feel challenged to “eliminate mistakes and speed the process” according to Johan Steyn, Aerosud’s PLM Project Manager. PLM is viewed as the program that will provide the framework for them to build the engineering management environment that they need to both meet market demands and help them offset the greater risks they are forced to undertake.

To support their PLM initiative, Aerosud decided to invest in ENOVIA SmarTeam as their primary PLM environment because of its integration with CATIA (their primary MCAD design platform), their comfort with its flexibility to fit their operating processes, and the potential for long-term expansion of the system. Their implementation was focused on supporting their engineering domain of operations and was launched by CDC (www.cdcza.co.za), their DS VAR, in mid-2007 and was planned for four major phases, including:

- *Design Office Support*—to provide data control with a vault
- *Product Structure Management*—to provide bill of material (BOM) support along with management control and a minimal configuration management capability. In addition to serving their in-house personnel, the system also supports transmittal of information to both their customers (i.e., the OEMs) and their own suppliers enabling them to improve their own efficiency and traceability with customers.
- *Change Management*—to more fully manage the engineering release and change processes; providing support that can be mapped to the processes and terminologies of their customers and enabling them to more effectively communicate and coordinate with them.
- *Close ERP Integration*—to ensure a more effective link between engineering and manufacturing that eliminate mistakes and speeds the process.

Aerosud has completed the first two phases of this four-step implementation plan, and are in the middle of Phase 3. Although not totally completed, their ENOVIA SmarTeam implementation has already been effective enough to deliver excellent value to them. According to Mr. Steyn, “We’ve done enough to design and control our first project with PLM and its value has been clear.” He commented that it is a bit early to measure “hard benefits” but that the ease of use has enabled them to get new people involved in the processes much more easily and that they have been able to design and release multiple products concurrently—

essentially, ENOVIA SmarTeam has already become Aerosud’s “concurrent engineering engine.” The ability to get implemented and deliver initial benefits relatively quickly is especially critical for SMBs with their limited resources.

Aerosud reports that their implementation project has gone very well. According to Mr. Steyn, their implementation of ENOVIA SmarTeam has been kept “low key” by working in simple steps that build upon each other. They started with processes that were very similar to previous ones, modified them as people became familiar with the new environment, and have continued to add additional capabilities as available and appropriate. In this way, they have been able to expand the system while avoiding user resistance that might have arisen due to perceived complexity when “too much is changed too quickly.”

Aerosud is enthusiastic about their ENOVIA SmarTeam implementation and expect substantial additional benefits to result from its long-term use. It is becoming clear that the visibility and quick availability of consistent information will continue to have a growing positive impact on their operations into the future. The overall environment has enabled them to be prepared to effectively respond to the new complexities and demands from their customers. They anticipate additional value to result from enhanced design reuse and configuration management, leading to both internal and external impacts; reduced costs and improved quality, as well as better and timelier designs and services for customers—all requirements for Aerosud to successfully compete as a Tier 1 supplier in the aerospace market.

4.3 PIAB AB

Established in 1951, PIAB (www.piab.com) designs innovative solutions that improve the productivity and working environment of vacuum users around the world. PIAB manufactures a complete line of vacuum pumps, vacuum accessories, vacuum conveyors and suction cups for a variety of automated material handling and factory automation processes. PIAB utilizes COAX[®], an advanced technology for creating vacuum with compressed air, in many of its original products and solutions. COAX cartridges are smaller, more efficient and more reliable than conventional ejectors, and can be integrated directly into machinery. This allows for the design of a flexible, modular vacuum system. Originally family owned, Altor Private Equity bought the company 2006, PIAB employs approximately 400 individuals around the world.

To compete in their markets, PIAB must continue to be highly innovative to keep their products on the leading edge. Consistent with trends in many industries, market pressures demand that their products be even more energy efficient. In addition, PIAB's market position is based upon their products being of very high quality. Their brand recognition enables them to successfully compete with the large number of "copy cat" competitors. This market situation demands a continued focus on innovation, quality, and early introduction of new products in order to compete in an increasingly competitive global market with new competitors continuously emerging.

PIAB is not a new user of ENOVIA SmarTeam. They initially implemented the product in 2001 and have been a committed user since then. One of their earliest requirements was support for a multi-CAD environment, since they utilize AutoCAD, Solid Edge, and SolidWorks in their operations. In addition to CAD data management, they were determined to manage their BOMs and other product-related documents as well. ENOVIA SmarTeam was initially selected due to PIAB's confidence that its functional capabilities could meet their needs, and also because they did not want a CAD-connected cPDM system to manage their multi-CAD environment.

Since the initial launch, PIAB has implemented those capabilities that were originally targeted, plus they've developed integrations to a special configuration system and to their ERP system as well. The domain of their implementation is clearly focused on an engineering-wide scope, and it has been expanded to fit the growing needs of their group. Since their implementation is not new, PIAB has had the opportunity to further improve their work processes over time and credit ENOVIA SmarTeam's flexibility in helping them do this.

PIAB has been directly supported by SarCitus AB (www.sarcitus.com), a DS partner. PIAB reports that this has been a solid relationship with dependable support – an essential component of long-term success for their PLM implementation. PIAB also reports that their experiences with ENOVIA SmarTeam have been quite positive. Although no program is perfect, Ulf Karlsson, the head of PIAB's PLM program, reports that ENOVIA SmarTeam has "been a stable system that works well. We are accomplishing things today that we could never have achieved without it."

In discussing the value that PIAB has received from their ENOVIA SmarTeam implementation, Mr. Karlsson stated that "even after six months, we were wondering how we could ever work without it." In the last two years, PIAB has added engineering staff in multiple other locations outside

of Sweden, and these designers could not have been able to contribute effectively without the ENOVIA SmarTeam environment. Mr. Karlsson commented that "even the sales people in some distributed regions get daily value from the system. They are able to easily find information about our products without having to rely on someone from the central engineering office to answer their questions."

Karlsson summarized PIAB's experiences with ENOVIA SmarTeam by stating, "Thanks to ENOVIA SmarTeam, we have improved our efficiency and have total control over every part of our products." The PLM environment that PIAB has created based upon ENOVIA SmarTeam is enabling them to continue to differentiate themselves with high-quality products in an increasingly challenging market.

4.4 INFAC

INFAC (www.infac.co.kr) is an automotive parts supplier, focused on electronics components and systems for the major automotive OEMs. Their OEM customers include the Korean firms Hyundai Motors, Hyundai Mobis, Kia Motors, GM Daewoo, and Sangyong Motors, as well as other global leaders such as Isuzu, Mazda, Mitsubishi, Honda, and others. INFAC's products include cables, solenoid valves, switches, antennas, and injection molds, along with a number of systems such as tire pressure monitoring systems, electronic control supervision, lane departure warning systems, etc. With their headquarters based in ChunAn, Korea, INFAC employs more than 800 people and generates annual revenues of over \$250 million. In addition to multiple sites in Korea, INFAC also has manufacturing facilities in China and India.

INFAC focuses on R&D capacity (i.e., their ability to handle increasing levels of effort without increased resources) and cost-effectiveness for differentiation. They operate in an extremely cost-conscious industry where cost efficiency and customer responsiveness are the differentiators between success and failure. Additionally, each OEM dictates its own processes for product development and production, which INFAC must accommodate.

Due to these pressures, INFAC established an internal initiative to evaluate the engineering information management environment and related processes. They report that this initiative included heavy investments in many areas to achieve their objectives. As a key component of this initiative, ENOVIA SmarTeam was chosen to be the foundation of their new PLM environment based upon INFAC's confidence that ENOVIA SmarTeam could help

them establish the engineering information management environment that they needed. ENOVIA SmarTeam's Engineering Express methodology was utilized for their initial implementation.

INFAC's ENOVIA SmarTeam implementation was launched in mid-2007, provided initial support for operations late in 2007, and was reported to be fully operational in February of 2008. INFAC's implementation was supported by Inroot (www.inroot.co.kr), their DS VAR, who worked with them to ensure that the implementation met their objectives for the investment. In order of priority, INFAC's objectives for ENOVIA SmarTeam included effective CAD data management and drawing distribution, engineering BOM management, workflow and engineering process management, project management, and manufacturing BOM management (i.e., handling MBOMs prior to their propagation to the ERP system).

Although INFAC's implementation has only been in operation for a few months, they have already experienced benefits that are reinforcing their investment decisions. Project status monitoring and the resulting management decision-making have been improved. According to Mr. YoungDae Kwon, principal research engineer in R&D and manager of PLM projects at INFAC, "We have seen improved efficiency and cost reductions in R&D already. On two vehicle programs, we have experienced 20-25% cost reductions relative to similar prior programs." Additionally, he commented that the centralized database with BOM and CAD data now provides consistent and accurate product information to all individuals involved in the engineering processes, eliminating incorrect data, and preventing many errors. Further, compliance auditing has been improved as a result of increased visibility of information via the ENOVIA SmarTeam database rather than depending upon paper reports. INFAC reports that their overall initial results from the use of ENOVIA SmarTeam so far include an increase in the product development capacity, standardized new product development processes, and strengthened collaboration through information sharing.

Regarding INFAC's overall perception, Mr. Kwon reported that they have been pleased with their support and partnership with DS. He commented that, "With any tool, the most important thing is to determine the best processes and most effective human interaction to achieve the objective." Mr. Kwon emphasized that this process has been successful because of strong executive support and commitment to a clear direction. Regarding the end users that utilize the new environment in their daily work, INFAC reported that early resistance to process change has

been overcome due to improved work processes and to the value recognized by individual users. Mr. Kwon stated that, "Without PLM, the members of our engineering group could not do their jobs. PLM is fundamental to their main work processes."

INFAC has plans to extend the use of their ENOVIA SmarTeam environment in the future. Mr. Kwon stated that, "PLM is a journey for our company. The tool should meet our requirements and ENOVIA SmarTeam does that, but we also expect to expand our use of it to support program management and to serve personnel in marketing and sales." Their objectives are clearly focused on broader enterprise product lifecycle support to help them further improve their ability to meet and exceed their customers' requirements.

4.5 Viking Range

Viking Range (www.vikingrange.com) is a well-known, privately owned company in the consumer goods market that manufactures and markets premium, professional-grade consumer appliances, including ranges, refrigerators, freezers, ventilation systems, dishwashers, outdoor grills, stainless steel cabinetry, etc. Based in Greenwood, Mississippi in the US, they employ approximately 1,500 people and manage multiple facilities around the world. Viking's products are widely marketed internationally, with sales in over eighty countries around the world.

For Viking to compete in the upscale, premium sector of their market, their success is dependent upon their ability to establish and maintain a reputation for innovation and high quality. According to Dan Lyvers, VP Engineering at Viking, "We are not selling commodities. We are delivering the 'best of the best' to our customers. We focus on delivering leading-edge products with extremely high quality." To achieve this objective, "It all starts with the team having a vision of what they want to deliver, coupled with processes to ensure that the products are customer-focused, easy to manufacture and easy to service," he continued. Viking has recognized that achieving this environment demands that all participants in the product lifecycle be actively included in the processes of product development. Mr. Lyvers emphasized, "It's all about communication. Listen to your stakeholders, do something about their concerns, and then communicate with them so that they know what is happening."

Viking's motivations for implementing ENOVIA SmarTeam were very straight-forward; they wanted a major improvement in their business processes. Prior to their ENOVIA SmarTeam implementation, each division

operated relatively independently regarding processes; there was little consistency across the locations and this caused a number of issues. The ENOVIA SmarTeam implementation was pursued in order to enable consistent engineering processes and product-related communications across the Viking enterprise in order to improve their ability to deliver the high quality, innovative products in less time and ensure their continued market success.

With support from Rand (www.rand.com), their DS VAR, Viking launched their ENOVIA SmarTeam implementation in the summer of 2006 and began support of production operations later in the same year. Before this project, Viking managed CAD with multiple legacy solutions in different divisions and there was no standard version/release process or automated workflow management. Their first objectives were engineering process and CAD data management in a multi-CAD environment. As part of this implementation, they developed a consistent enterprise-wide engineering change and release process and environment to improve management, and ENOVIA SmarTeam's multi-site capabilities were required. Essentially, ENOVIA SmarTeam has become Viking's engineering communication tool. Today, more than 120 Viking personnel utilize ENOVIA SmarTeam, with over sixty of them being dedicated mechanical CAD users that now manage different types of mechanical CAD data in one system. The collaborative involvement of personnel from outside of engineering in product development-related processes has been substantially increased, as indicated by the number and types of users. Viking reports that this has improved decision-making and reduced the detection of design changes late in the process.

Viking reports that their experiences with the ENOVIA SmarTeam suite of technologies and with the support from Rand have been quite positive. No implementation is stress-free and Viking's biggest challenges were consistent with the experiences of many other companies; motivating process change and adoption within their organization. However, Viking reports that this effort has gone quite well and that their achievements have reinforced their efforts. Mr. Lyvers commented, "Our success comes from continuous improvement. We make process changes; they may not be perfect, but they are improvements, then we continue to evaluate and improve them over time. Continuous stakeholder involvement is critical."

Viking reports that their view of the future involves expanding the use of ENOVIA SmarTeam much more broadly across the organization. Beyond engineering, they are already providing some support for quality assurance. However, they would like to expand ENOVIA SmarTeam

use to include more support for industrial design, manufacturing and service, and eventually even for their marketing operations to further reduce time to market. This objective is consistent with their perspective of SmarTeam as a fundamental product-related communication vehicle that helps them continue to deliver the high quality products that attract their customers.

5. Summary and Concluding Comments

On a worldwide basis, companies are increasingly investing in PLM as a mechanism to help them become more efficient, more effective, more innovative, and more successful. Although pioneered by the world's largest organizations, PLM has matured and evolved substantially over the years, and today it offers the same type of value and return on investment for SMBs.

While the positive impact of PLM on an SMB may be relatively clear, the challenges for SMBs to successfully implement PLM solutions are not trivial. SMBs demand that PLM solutions accommodate their restrictions on resources and deliver benefits quickly and with limited trauma on the organization. In response to this need, PLM solutions specifically focused on SMB implementations have evolved to fit these needs.

DS has been a major force in PLM and has developed a worldwide presence as one of the major suppliers of PLM solutions to industry. DS revenues for software and related services exceeded \$1.7 billion in 2007 and represented the largest overall PLM revenue from among the PLM Mindshare Leaders (according to CIMdata's market analysis).

Early in 2007, DS announced their most recent vision for PLM, which they describe as PLM 2.0. Their new V6 platform is intended to enable companies to achieve DS' PLM 2.0 vision and gain life-like experience in 3D. ENOVIA V6 is intended to provide a single, open environment in which product-related information created in both DS and non-DS applications can be collaboratively used across the full product lifecycle and the extended enterprise.

A core part of this strategy is a focus on providing PLM solutions for SMBs, and ENOVIA SmarTeam provides the primary basis for DS' SMB solutions. ENOVIA SmarTeam was initially developed to address the needs of SMBs and has been expanded and evolved over the twelve years of its existence. CIMdata is pleased that DS has re-focused SmarTeam on SMB companies, and engineering

departments of larger organizations; the core of their development background.

Today, DS positions ENOVIA SmarTeam as the cPDM offering within its portfolio that enables PLM for the mid-market. It is intended for those mid-market manufacturers seeking broad PLM functionality to optimize their design and engineering processes throughout the product development lifecycle and across their value chains. It is critical to remember the reasons for investing in PLM, and to keep those objectives clear to the organization throughout the implementation.

DS focuses on delivering ENOVIA SmarTeam in a manner that they believe acknowledges the unique characteristics of SMBs. To accomplish this, their objective is to deliver a relatively “out-of-the-box” solution that still provides enough flexibility to accommodate key customer characteristics and can be expanded over time. Of course, their ultimate objective is to deliver significant value with a relatively low total cost of ownership and quick Return on Investment (ROI).

To make initial implementations more effective, DS offers Express solutions, which are prepackaged offerings that function as quick-start PLM projects. These include the basic software packaging along with “best practice” methodologies to make the implementation effective relatively quickly, a key requirement for SMBs.

CIMdata has interviewed a variety of ENOVIA SmarTeam customers across a number of industries and geographic regions. Some of these customers are relatively new to PLM while others have been ENOVIA SmarTeam customers for several years. These customers have reported positive experiences adapting the ENOVIA SmarTeam solution to meet the different challenges they face in their respective domains, expanding their implementations as needed, and working with the variety of DS partners that have supported their implementations. The value and benefits that they have reported are impressive, reinforcing our contention that PLM can bring significant gains to SMBs around the world.

In summary, CIMdata believes that mid-sized companies can benefit tremendously from the implementation of PLM strategies and solutions. We also believe that the lessons learned by mid-sized companies in their adoption of PLM will benefit all enterprises, regardless of size. We appreciate DS’ objective to bring PLM to SMBs and are impressed with their customer experiences. We look forward to continued development over the coming years.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic consulting to maximize an enterprise’s ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. CIMdata offers world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM enabling technologies.

CIMdata works with both industrial organizations and suppliers of technologies and services seeking competitive advantage in the global economy by providing world-class knowledge, expertise, and best-practice methods on PLM solutions.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through international conferences in the US, Europe, and Japan that focus on PLM. CIMdata serves clients worldwide from locations in North America, Europe, and Asia Pacific.

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