PLM: New Promise for the Aerospace & Defense Industry?

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Most enterprise software vendors promise to tie together your organization and generate great savings, even higher revenues. The need to share information and applications across the enterprise drives a big portion of IT spending.

But, existing packages don’t come close to meeting all the needs of the typical A&D company. To make matters worse, these deficiencies are often discovered only after implementation begins. Fixing them delays results and drives up costs.

You can solve many of these problems by automating Configuration Management tasks first. This strategy will bridge most of the functional gaps, extract immediate cash benefits, and reduce customization costs.

New revenue sources. Immediate responses to customer needs. Dramatic cost reductions. Reduced waste and re-work. Better use of engineering time. Seamless coordination with suppliers, partners and organizations spread around the globe. Higher design reuse. Improved quality. Bulletproof compliance. These are the promises of the latest software miracle: Product Life Cycle Management (PLM)

If you find these claims familiar and you find them hard to believe, you’ve got company. We’ve heard these claims many times before from numerous enterprise software vendors.

Most vendors promote the impression that their suites will solve all of your company’s software needs, automating every process, supplying the latest information needed by a global network of workers, suppliers, and customers, tying it all together in one neat package. Unfortunately, it’s just not true.

Is PLM any different?

Piercing The Information Technology Fog

Sorting through conflicting vendor claims and overlapping capabilities is a major challenge. PLM offers a new set of capabilities aimed at controlling the entire span of the product life cycle. But it doesn’t eliminate the need for other enterprise applications. It’s important to understand the role each application plays, how you can use PLM to close the gaps in the other packages, and how to allocate implementation resources.
A wide variety of software categories have been heavily promoted in the Aerospace and Defense Industry. Each is geared to support an essential management goal. (See Inset). Some packages automate core tasks and functions. Others are integration tools that bridge applications and provide ready access to information needed by users. To be effective you must have both. Most automation applications provide a little integration, and vice-versa. Unfortunately, the available offerings don’t do enough of either. As a result users become frustrated, installation projects get stalled and costs go up.

There’s a lot of overlap among the packages. Customer pressure has forced vendors to build “extensions” of their products, automating adjacent functions, making it appear as if they are a lot closer to supporting enterprise integration than they actually are.

<table>
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<tr>
<th>Software Group</th>
<th>Management Domain</th>
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<tbody>
<tr>
<td>Enterprise Resource Planning (ERP)</td>
<td>Efficiency of Internal Operations. Originally designed to guide and control manufacturing, these packages now link manufacturing decisions to inventory management, purchasing, receiving, payables, and accounting.</td>
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<tr>
<td>Customer Relationship Management (CRM)</td>
<td>Managing External Relationships and Transactions with the Customer (before and after the sale)</td>
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<tr>
<td>Supply Chain Management (SCM)</td>
<td>Managing transactions with suppliers, ostensibly to optimize the selection of supply sources and their related logistics resources.</td>
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<tr>
<td>Repair, Maintenance &amp; Operations (RMO)</td>
<td>Managing, scheduling and coordinating the maintenance and operation of complex equipment.</td>
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<tr>
<td>Asset Management</td>
<td>Tracking the location, status, and to some degree, the configuration, of critical assets and infrastructure.</td>
</tr>
<tr>
<td>Product Data Management (PDM &amp; Document Management)</td>
<td>Securing important company information, controlling access and preventing unauthorized user alteration. Specialized to manage CAD data and models.</td>
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<tr>
<td>Enterprise Information Integration (EII)</td>
<td>Generic tools to provide access to information embodied in the above.</td>
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<tr>
<td>Product Life Cycle Management (PLM)</td>
<td>Serves as the ‘integrator’, capturing and preserving information created along each step of the life cycle and providing a single “portal” into critical product information. Specialized to manage product data and models.</td>
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<tr>
<td>Configuration Management</td>
<td>Unique in its ability to identify and capture the critical details needed to manage product integrity and performance. Specialized to identify and manage inter-relationships, and control change throughout the life cycle.</td>
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You should avoid the temptation to choose one application over the others, because in fact many, if not all, are required. Each of these solutions is strong, even superb, within its scope. But the notion that you can adapt and expand one package to meet all your needs is an expensive and risky idea. The advantages of buying a single solution are more than offset by the extra cost of customization, diminished capability, and implementation delays.
Of these offerings, one stands out - Configuration Management (CM). It’s the only solution specifically designed for the Aerospace & Defense industry. CM overcomes many of the functional deficits in the other solutions and it forms an intelligent bridge between application packages.

*Where Applications Packages Fall Short: Controlling Product Content In A Complex Environment*

Typically, the application suites available fall short of the Aerospace & Defense industry’s basic needs. As a result, end-users spend a lot on large customization efforts or are forced to make major functional concessions. More importantly, the cost of simply meeting basic needs depletes resources better aimed at creating advanced functionality that differentiates your business.

Here are some of the shortfalls:

- First, the industry works with large numbers of parts configured into very large bills-of-material. Small changes make big differences. Existing packages don’t provide decision makers the visibility they need to manage these details.

- Second, the number of critical interrelationships among parts, process elements, documentation, requirements, regulations, and changes quickly overwhelms the change management tools built into the typical package. This problem is magnified by the sheer size of the bill of materials and the numerous sources of components. As a result, visibility into the impact of change is seriously impaired.

- Third, the information access tools provided by the Enterprise Applications contain dangerous loopholes. They ignore important rules that govern how critical product data and documentation is used and distributed.

As a result, configuration errors can emerge, and propagate quickly. These errors may not become evident until late in the life cycle – after much of the cost has been committed or incurred.

For example, few of these packages support complex rules governing when, and on what configuration, a new part can be used (effectivity). Or they can’t isolate those instances when an older version of a
document applies. This is important when you are concurrently building different configurations, and the product content of each is determined by contractual requirements rather than economic, engineering, or manufacturing concerns.

- Fourth, the industry’s contractual requirement to provide customers with data supporting their products is overlooked in these packages. Synchronizing this documentation with the realities in the product is a major challenge compounded by the volume and frequency of reporting requirements.

- Finally, A&D companies must maintain a dual focus. They need to keep one eye on maintaining fidelity to contractually controlled customer requirements and another on making decisions driven by their own economic and logistical considerations. These two perspectives often conflict and reconciling them is a major requirement that existing packages don’t support well.

**Curing the Shortfalls in Enterprise Applications**

Incorporating a robust Configuration Management (CM) capability in the application suite overcomes the deficiencies in existing application packages. The CM application drills down into the critical details and inter-relationships that affect product integrity and performance. CM allows users to see *all of the information* that impacts their decisions. Its rigorous change management rules allow management to synchronize many parallel and dispersed tasks and ensure they track both contract and corporate requirements. Most importantly, CM ensures that the data transferred to or used by each of the other applications is correct, current, and unambiguous.

**Integration: The Crucial Factor in Aerospace & Defense**

Automating key transactions will reduce costs, but tying applications together is even more important. Aerospace & Defense companies depend heavily on synchronizing their diverse operations. Its products consist of many inter-dependent components that change constantly. These deliverables are defined by numerous configuration decisions made in highly diversified and complex organizations.

When changes occur, many functions and tasks are affected. In this environment, you need complex information sharing protocols to make sure you get the right part on the right product, that the full impact of changes are immediately visible, and that everyone is on the same page. Generic integration tools cannot handle these requirements without extensive customization.
On the other hand, the Configuration Management application “understands” the connections between the data found in multiple applications and databases. It recognizes and highlights impacts, and it makes sure that information is used in the proper context.

Why PLM is Different

Of the array of software packages, PLM is different, and is especially important to the A&D company. Among your options, PLM is the only “true” integration tool. Other software packages have their origins and strengths in automating individual tasks that, while important, are not critical to the central value proposition that drives the industry.

PLM is the first attempt to define and support information requirements across all key functions and preserve information across life cycle stages. It goes well beyond competing generic tools. PLM does more than move and present data. It’s a framework for an integrated approach to business operations.

PLM is tailored to speak the language of the engineering development company. It provides a solid framework for capturing the interrelationships between the physical objects you are trying to manage and the data and documents that represent them.

But there are important functionality gaps in most PLMs. These products don’t come equipped with the rigorous controls you’ll need. They don’t support complex or conditional relationships and generally don’t provide the granularity needed in the industry. The resulting customization is costly and time consuming, most of which can be avoided by implementing a good Configuration Management package.

Robust Configuration Management: The Keystone A&D Application

Configuration Management (CM) is the missing ingredient in both the applications and integration tools available to the industry.

CM does triple duty in the Aerospace & Defense sector. It controls the detailed information exchanges needed to define, develop and maintain the industry’s products. It enables the industry to build very complex products and provides a simple protocol that ensures that activity across the entire supply chain is properly orchestrated.

Controlling complex configurations is the essential role of the industry. It’s not an overhead; it’s the value proposition. Its automation ought to be the first, not the last, priority.

Unfortunately, until now, configuration management has been relegated to a minor position in the IT strategy, often left to the end of the implementation schedule. And because these implementation schedules fall so far behind, it is rarely supported at all.
Because of the importance of its role, CM should be the centerpiece of both the application suite and information integration framework. Failure to properly automate here will cripple efforts to automate other functions.

On the other hand, a CM-centric approach to PLM implementation, and inserting CM logic at key junctures in the application suite, will get you much closer to the goal of the integrated enterprise. It may just save your entire IT investment.