

Differentiate Your Product by Reducing Sustainment and Supportability Costs – with ILS

Introduction

In the world of Aerospace & Defense programs, Sustainment & Supportability have become a major cost consideration within complex systems. These two facets of the A&D product lifecycle are now being carefully considered and, in some cases, are being given more consideration than the initial purchase price when making the acquisition decision. In fact, the total lifecycle cost is quickly displacing initial system or equipment cost as the criteria for awarding contracts.

With this increased pressure on defense budgets, fewer new weapon systems are being purchased each year. Along with the reductions in military manpower to affect cost-savings, equipment sustainment is increasingly being incorporated into contracts in the commercial sector. Consequently, equipment suppliers have turned to these sustainment contracts to generate program profits. Major manufacturers' program profits are increasingly being realized through sales of continued support and maintenance of the product over its lifecycle.

For many of the world's top A&D firms, the solution to the Sustainability and Supportability issue lies in Integrated Logistics Support (ILS). By installing and applying ILS tools and processes, A&D firms are able to significantly lower sustainment costs, such that they're able to easily differentiate their products in competitive situations, and win more profitable contracts. Read on and discover how ILS is reshaping the way A&D companies are now managing sustainment as part of the overall lifecycle.

Today, most major A&D sustainment contracts contain the requirement for Performance-Based Logistics, or PBL. The PBL contracting method places more risk on the supplier by putting the emphasis on the availability of equipment to perform its mission. Payment terms of these contracts are directly tied to system performance in the field. Therefore, support costs have become critical, since payment is dependent on achieving the customer’s desired availability levels.

The US Army is leading the development of a process to ensure that the supportability of a system is considered as part of the design and development process. This Integrated Logistics Support (ILS) process is the key to designing and creating products of long-lasting and maximum value. Boeing®, Lockheed Martin® and other large companies have created specific organizations to focus on this important line of business.

Through ILS systems, companies can achieve higher reliability, while lowering costs for supportability and maintainability. These logistics processes are fast becoming determining factors in the total lifecycle cost of a product. More and more, this total lifecycle cost data is required in order to effectively run a PBL contract.

Data developed in the ILS process is enormously valuable in reducing sustainment cost through influencing design. In addition, ILS data can be repurposed and reused to meet other logistical needs. This versatile use of data can lower your cost of production and help you deliver higher-quality training data and technical publications.

If you produce or supply equipment or components for the A&D sector, you must include ILS processes as part of your product development framework. Even where ILS considerations are not mandated, it is wise to consider these processes because they will allow you to design equipment of superior functionality and value.

This paper provides an overview of ILS requirements and examines key considerations for optimizing standards compliance as part of an enterprise’s product development environment.

Applicable Standards Worldwide

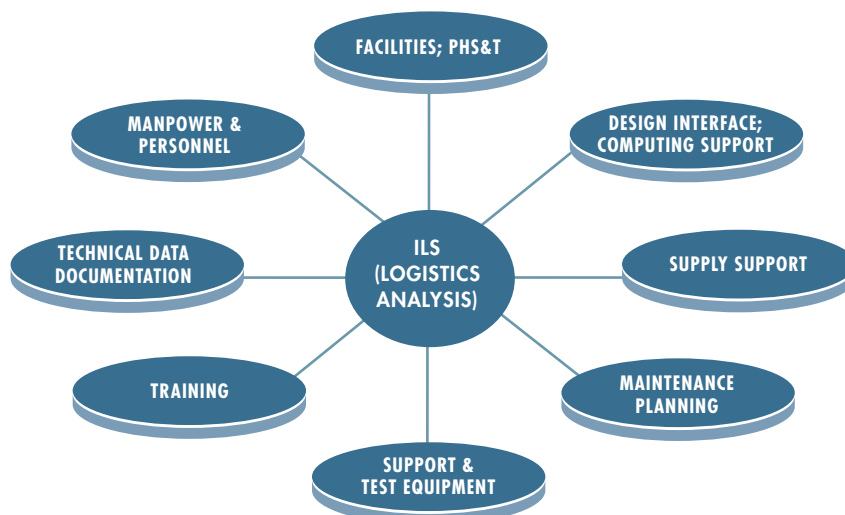
ILS standards are constantly evolving across the globe. Initial efforts to collect logistics information in a standardized way were accomplished by the US Army with the issuance of MIL-STD-1388-2B. In Europe, the Ministry of Defence of the United Kingdom adapted the specification to meet their own needs and issued DEF-STAN-00-60. This was the first specification to formally link the previously separate disciplines of Provisioning, LSA and Technical Publications under a common specification, and also the first to attempt to formalize a product lifecycle as part of an acquisition process.

The United States subsequently developed and released MIL-PRF-49506 Logistics Management Information (developed from, and eventually replaced, MIL-STD-1388). This change reflected a shift towards identifying a project’s performance outcomes, rather than recording the detailed technique to achieve them.

Added to these standards, the emerging International Standards Organization (ISO) Product Life Cycle Support (PLC) standard provides for the creation and management of Assured Product and Support Information (APSI). APSI can be used to specify and control required support activities throughout a complex product’s lifecycle. (PLCS is identified as ISO-10303-239).

PLCS provides an application-specific, flexible information model. This information model is designed to be tailored by industries and organizations using Reference Data Libraries (RDL). RDLs are used to complete the semantics of the PLCS model, necessary for deployment in a specific industry. The US Army has already begun to implement this standard with adoption of GEIA-STD-0007.

The Elements of Integrated Logistics Support



The AeroSpace and Defence Association of Europe (ASD), in conjunction with the Aerospace Industries Association (AIA), is creating standard S3000L. The first draft is expected to be released soon. S3000L, the Logistics Handbook for Performing LSA, is based on PLCS, and is specifically tailored for Aerospace and Defense, and is a clear indication of the importance of this area.

Based on these international standards, the Logistics Coherence Information Architecture (LCIA) and the Through Life Support Standard are being developed and will replace DEF-STAN-00-60 in the United Kingdom.

Today, compliance with some ILS process is often mandatory, and frequently key to winning contracts.

Overview of ILS Process Requirements

The Logistics Support Analysis (LSA) process provides the basis for the Integrated Logistics Support (ILS) program. Through the LSA, the source data and maintenance plans are generated and documented.

This information is often documented in a Logistic Support Analysis Record (LSAR). The LSAR may derive its format from several specifications. The specific data elements are defined in MI-PRF-49506 (same definitions found in MIL-STD-1388), GEIA-0007, and DEF-STAN-00-60.

The LSA is designed both to examine the product design and to recommend improvements in design that can result in increased maintainability, reliability and supportability of the equipment or system. This is accomplished by defining and recommending changes in design that will result in:

1. Reduced time to perform maintenance
2. Greater reliability of components
3. Maintenance procedures requiring little or no specialized support equipment or specialized training

When the optimum design is defined, other ILS elements, such as training, technical publication and provisioning, are planned, guided and completed. This process ensures that the maintenance protocol will meet the program maintenance concept. It also ensures that supportability requirements are considered and incorporated into the design of the equipment or system early in the product design phase.

The ILS process typically begins with an LSA Plan. This document gathers and defines program requirements and objectives. This plan would detail the activities to be accomplished to ensure that these requirements and objectives will be met. The plan would include the scheduling of LSA activities relative to program scheduled events, such as the Preliminary and Critical Design Reviews.



Through life support is an essential component of assessing and scrutinizing overall program cost and performance

The LSA is not an isolated, internally-based activity. Instead, it requires data/input from subcontractors, vendors, engineering, and the customer. At a high level, there are specific areas that are included in LSA. These include:

1. Maintenance Planning
2. Supply Support
3. Support and Test Equipment/Equipment Support
4. Manpower and Personnel
5. Training and Training Support
6. Technical Data
7. Computer Resources Support
8. Facilities
9. Packaging, Handling, Storage and Transportation
10. Design Interface

Benefits and Value of ILS

This data, if developed in an integrated logistics environment, will be used as part of the analysis and design improvement process. It will then be leveraged to produce the training, provisioning and technical publications required to support the system or equipment. Here are some specific examples of realized benefits:

Initial Design Improvements

The Maintenance Task Analysis (MTA) looks at each and every repair task to be accomplished. It details the step-by-step approach for every component fault isolation, repair, inspection, servicing, removal, and installation procedure. It examines every spare part and tool along with the personnel required and the time required to perform the procedure. This information allows the engineer to examine either potential changes in design, or improvements that could reduce the time required to perform the task or reduce the requirements for special tools or training. Much of this data is common to technical publications, and therefore can be directly reused to drive the technical publications.

Provisioning Data

Even with the best design and manufacturing practices, equipment will eventually fail and malfunction. Over the life of a program, the provisioning process must identify the correct spare parts to ensure quick repair of equipment to the desired performance level. Both military and commercial Aerospace & Defense organizations are focused on accurately defining the necessary spare parts, while at the same time reducing the logistical footprint and cost.

In Europe, compliance with S2000M, as the standard for spares and provisioning, is mandatory. S2000M is increasingly being used by other organizations worldwide. S2000M defines the process and provides the mechanism for communicating and exchanging provisioning data between contractors, partners and government agencies. This information is a key component of the required ILS data set.

For a more in-depth examination of S2000M-compliant data, please check the Additional Resources section at the end of this paper.

Technical Publications

S1000D is fast becoming the de facto standard for Technical Publishing in the A&D industry worldwide. S1000D defines how content for technical publications and manuals should be created, managed and published. Compliance with this standard is becoming mandatory for manufacturers of A&D equipment and components, and will impact virtually all companies supplying equipment to commercial and government agencies.

The Maintenance Task Analysis data from the Logistics Support Analysis process is the required textual information for the Technical Publications Procedural Data Modules. As well as reducing cost through reuse, these standards and processes ensure that the quality of the technical information is not compromised by re-input or interpretation.

The provisioning data contains all the information needed to create the Illustrated Parts Data Modules required in an S1000D technical data system. In a fully integrated system, the provisioning data is reused and repurposed to meet this need. As above, this reuse and repurpose reduces the cost of data development and increases quality because the data is not re-inputted or interpreted.

For a more in-depth examination of S1000D-compliant data, please reference the Additional Resources section at the end of this paper.

Training and eLearning

Training is critical to the operation, maintenance and successful utilization of A&D modern equipment. The increased complexity of today's equipment elevates the importance of thorough and dynamic user training, particularly eLearning capabilities. In rapidly changing, global working environments, training must be affordable and available anytime, anywhere. SCORM (Sharable Content Object Reference Model)-based eLearning is a cost-effective technique that can effectively meet the needs of both lead contractors and sub-contractors.

Compliance with SCORM has become mandatory for many A&D industries delivering equipment to government agencies. SCORM ensures that training and training materials are consistent and can be consistently implemented, delivered and utilized in Learning Management Systems.

The Technical Publications S1000D Data Modules can be repurposed into SCORM-compliant SCOs. This reuse and repurposing of data results in substantial savings both in data development and improved quality, since the data is not subject to re-input and interpretation.

Furthermore, if the eLearning information is derived from, and tied to, the technical publications data, it can be placed under the same level of configuration management, thus ensuring that the training content always reflects the same technical standard as the technical publications.

For a more in-depth examination of SCORM-compliant eLearning, please see the Additional Resources section at the end of this paper.

Implementing an ILS Solution: Pitfalls of a Point-Solution Approach

It is clear that ILS offers tremendous benefits to manufacturers, hence its adoption as a best practice for the A&D industry. Since compliance is increasingly being demanded by customers, the question that needs to be answered is: What are the most common pitfalls in an ILS implementation, and how can they be overcome?

To meet ILS requirements, organizations must deploy specialized and highly structured solutions. These must include several core elements:

- a basic LSA sub-system
- a provisioning sub-system
- a technical publication development sub-system
- a training/eLearning solution sub-system
- an information publishing/delivery system

Many companies approach an ILS implementation using “point” solutions. In this approach, companies will select multiple, different software solutions specifically targeted to meet both their own needs and the multiple parameters mandated by the various specifications and specialized subsystems. In this approach, companies assume the burden of integrating the point solutions and maintaining these integrations over time. This approach is fraught with risk and increases total cost of ownership because the integrations between point solutions are very “brittle”, so that each time a vendor revises its product, the integration “breaks”. This pitfall limits the opportunity to accept new capabilities and increases the cost of adopting them. Training costs are also higher with point solutions because each application has a different user interface as the applications were not designed to work together.

Even when a point solution is architected and deployed within an organization, it is often incomplete and lacks the necessary automation. Thus, organizations are left to define the processes of:

1. Accessing and reusing design information in the various sub-systems
2. Creating graphics and illustrations specific to product configurations
3. Triggering documentation updates when designs or configurations change

Furthermore, a point-solution approach for ILS doesn't leverage rich provisioning and logistics information, or maintain a relationship between this valuable information and the documents being created. The absence of this linkage triggers quality issues and increases cost.

Without a tight connection between this information and the associated publications, provisioning or logistics data can change without product information authors realizing that the technical documents must also be updated. Where this linkage does not exist, authors must continually review logistics data to find changes, and then analyze the publication data for conformance to the changed data. This results in increased cost, slower time-to-market, and poor-quality technical publications.

Optimal ILS: An Integrated, Single-System Approach

As a result of working closely with the leading A&D firms across the globe, PTC understands the challenges of selecting and deploying within an organization an ILS solution that complies with the appropriate standards and best practices. Rather than forcing customers to wrestle with a point solution approach, PTC offers an integrated, single-solution approach that meet the user's needs of reusing and capitalizing on data that's been developed for one purpose, which can meet the needs of many other areas of the organization. This leveraging of data includes the Maintenance Task Analysis data acquired and developed during Initial Design Improvement, the Provisioning Data, the Technical Publications, and Training and eLearning.

Summary

The application of ILS tools and processes can be a key driver of sustainment costs. And today, lower sustainment costs can be the product differentiator.

To maximize the value of ILS data, A&D companies should seriously consider an S1000D technical information delivery system. This solution will lower cost and improve quality of the technical information. It will also result in lower costs to author, maintain and manage the logistics and technical data throughout the lifecycle of the product.

An S1000D technical information delivery system also promotes reuse of data, and through its rigorous structure and use of neutral, international standards, it promotes easy data interchange among partners, contractors, subcontractors and customers. Lastly, it provides the net-centricity demanded by today's national and international forces.

PTC not only offers an S1000D-compliant solution with strong links to ILS products and standards, but this proven solution optimizes and automates the end-to-end, related data management process.

PTC's solution for S1000D is based on an architecture designed to support the full lifecycle of the product. This capability can be elevated by linking logistics data and technical publications with content stored in PLM systems, and by leveraging the associated change management synchronization benefits. Through this systems approach, PTC offers a lower total cost of ownership.

By offering a complete solution for ILS and S1000D – complemented by a comprehensive set of service offerings – PTC is well positioned to help A&D organizations overcome typical implementation hurdles. The result: you realize maximum value from your Logistics Support Analysis and S1000D initiatives.



To learn more about how Arbortext can help your company create and delivery high-quality product information, please visit our website at: <http://www.single-sourcing.com/>

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