Defence Logistics Information Systems

Information Systems' Driven Capabilities Redefining Logistics

A Frost & Sullivan
White Paper

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TABLE OF CONTENTS

INTRODUCTION

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Around 500 B.C., Sun Tzu quoted, "*The line between disorder and order lies in logistics.*" More than 2,000 years later, the maxim still stands in the battlefields of today. Globalisation has created a complex web of interdependencies and threats. To protect the economic and geopolitical interests, countries are focusing on creating a battle-ready force that is responsive to the asymmetric nature of threats and are designed to be extremely agile in the battlefield. Recent events have indicated the growing importance of acting together (with allied forces) rather than conducting independent missions. This demands a high level of interoperability, both at the command and systems levels. Such operational requirements and trends are driving investment in advanced logistics information systems, aimed at providing the decision-makers (on and off the battlefield) a complete visibility of available inventory of assets and resources to plan and execute missions.

Defence Logistics Information Systems (DLIS) are at best fragmented, and for many armed forces, still a distant reality. Although we cannot discount the efforts (including ongoing efforts) of some nations that are going through somewhat of a "quantum" leap in advanced logistics (information systems), there is much to achieve.

This paper focuses on presenting an overview of the global DLIS, with an aim to identify and analyse the main drivers and challenges in implementing information systems across all military segments, seamlessly integrating all echelons. The paper also explores the complex competitive landscape, which has both traditional information technology (IT) service providers and the OEMs competing for lucrative (and in today's economic times, much needed) contracts globally.

EVOLVING END-USER TRENDS: THE CHANGE CATALYST

What is driving change in the defence industry?

Potential issues affecting the global defence market are driving the adoption of cost-effective processes to better manage information and optimise day-to-day operational needs. Withdrawal from Afghanistan would have probably not had such negative connotations if the state coffers were not drained due to the ever-prolonging economic crisis. The consequent austerity measures have not only struck the future order books, but also impacted the research and development (R&D) spending.

Sustained investment in R&D drives innovation, potentially driving procurement of new products and technologies in the long term and at the very least supporting the industry in the short term.

In such challenging times, the end-user and the industry are exploring alternate methods of funding future R&D and procurement. This need is driving the adoption of effective management systems throughout the product lifecycle, from development to operations, focusing on supply chain management, cost, and operational efficiency. As a result, Total Cost of Ownership (TCO)/Through-Life Cost (TLC) and Performance-Based Logistics (PBL)/Contracting for Availability (CfA), have become the buzz words for defence stakeholders and decision-makers. The figure below summarises the potential impact of these (and other) market trends in the defence industry.
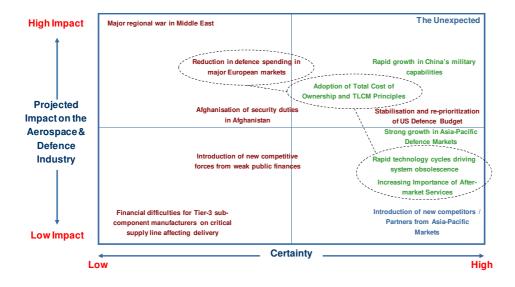

Figure 1: Defence Trends Driving Change, 2012

Source: Frost & Sullivan

Integrated Environment: Platforms, Sustainment, End-Users and Industry

Absolute Cost, Sustainability and Life-Cycle support are the future procurement priorities of Ministry(ies) of Defence (MoDs) across both developed and developing markets. However, regional dynamics, political and industrial, dictate somewhat varied approaches to reaching the end goals.

European (and North American) countries like the United Kingdom (U.K.), Norway, Canada and United States (U.S.) are driven by an imminent need to reduce costs, whilst not risking operational capabilities and national security. This has led to the adoption of alternate procurement models, such as CfA and Total Solution. This shift away from the traditional procurement models is aimed at reducing the burden (and risk) for the end user, sharing the risk (and benefits) with industry. The success of these models is based on "real" integration of the industry within the end-user environment, including operational environment. In such markets, both OEM and the end user no longer look at platform and platform sustainment as separate, and are moving toward undertaking an integrated approach toward procuring these capabilities to ensure improved availability.

In Middle East and Asia Pacific (APAC) markets like Saudi Arabia, UAE, Singapore, Indonesia and India, there are indications of similar trends for integrating industry and end users (and in some cases platforms and sustainment). However, the trend is primarily a capability gap issue, rather than cost (although, not discounting the impact of economic climate on these markets). Procurement of complex nexgen platforms and adapting to the evolving defence doctrine (lessons learned from experiences of ISAF in Afghanistan and the Iraq wars) demand industry skills to be applied directly into the end-user environment, albeit somewhat limited in comparison to the Western countries due to the socio-political factors in most countries.

Latin American countries have similar challenges. However, obsolete inventories, relatively modest defence budgets, and low industrial base are limiting the uptake of a revolutionary approach to military procurement and operations. Brazil is an exception to the rule (where there are currently 09 PBL contracts across various platform and system levels), and countries like Chile and Colombia are working to imitate similar investments in integrating (and developing) the domestic industrial base.
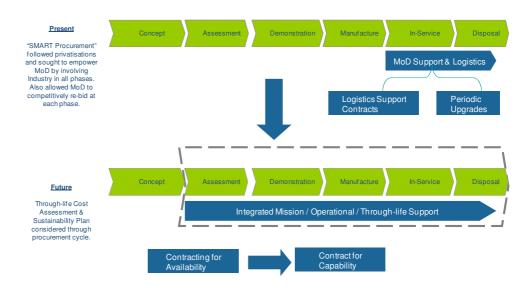

Figure 2: Land Defence Market: Changing Trends in Procurement (U.K.), 2010-2017

Source: Frost & Sullivan

The evolving trends are reflected in the figure above, showing the evolution of procurement trends in the land defence market for the U.K. End users are exploring avenues to move from today's "Smart Procurement," which allows higher flexibility in procuring, to "Dynamic Procurement," which further allows flexibility and scalability not limited to procurement only, but also encompassing the lifecycle of the products. Such a shift toward integrating the industry into defence operations is reliant on the availability of information (near real time) to all stakeholders involved. This requires advanced information systems capabilities designed to enable such integration. Before looking into the advanced information systems, it is important to consider that despite the promising shift toward integrating the industry as an active participant in the defence environment, most end users are not yet ready to embrace such change, at least for now.

This is evident from the figure below depicting the evolution of the U.K. support in-service (SIS) models in comparison to most European countries, including France and Germany. France is a relevant example, wherein the challenge is to overcome the dilemma of national sovereignty. In other words, coming to terms with potential loss or control of the defence environment and national security.
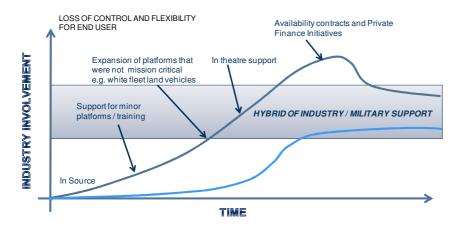

Figure 3: Comparative Assessment of Integrating Industry with the Defence End Users

Source: Frost & Sullivan

The "secret" of outsourcing effectively is in striking the right balance between control and cost.

In light of these concerns, it is essential that the industry works closely with the end users to allay any such concerns. Experiences can be leveraged from adjoining markets, such as the proven and measured benefits gained by the U.K. forces in terms of cost and operational efficiency achieved by engaging the industry in projects such as the ATTAC program (Availability Transformation: Tornado Aircraft Contract).
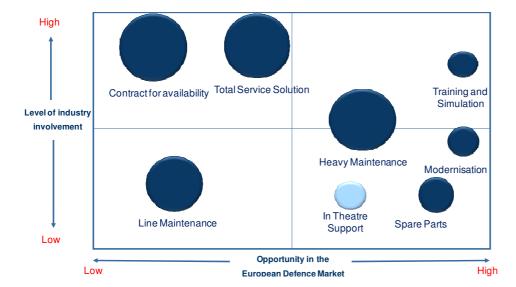

Figure 4: Industry Involvement vs. Opportunities, 2011-2020

Source: Frost & Sullivan

The "secret" is in striking the right balance between control and cost. Figure 4 above indicates the anticipated evolution of the aftermarket/in-service support market.

DLIS: INVESTMENT OR COST?

Cohesive Solutions: Operational Requirements Drive New Capabilities

The technological evolutions across the defence logistics information environment are leading the way for adoption of new business models within the aftermarket support market. It is essential that the IT systems not only support, but manage the entire value chain. In a way, IT systems are the nervous system of the modern defence force. End users have strongly indicated that an efficient and integrated IT system is central to successful implementation of new capabilities into the operational environment and to redefine the operational requirements.

The figure below presents the role of the IT solution in seamless integration of new capabilities and operational requirements.

End users have strongly indicated that an efficient and integrated IT system is central to successfully implementing new capabilities into the operational environment and continues to redefine the operational requirements.
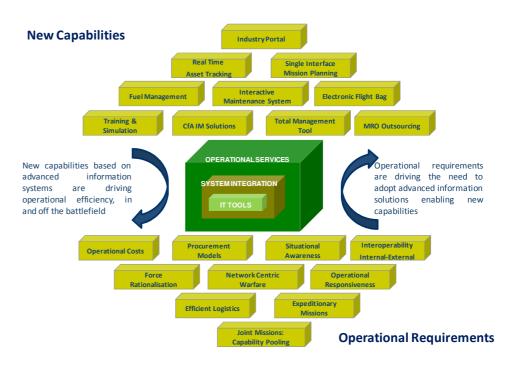

Figure 5: Seamless Integration of Operational Requirements and New Capabilities

Source: Frost & Sullivan

The effective implementation of new capabilities to meet the evolving operational requirements is driving end users to invest in future IT architecture. As indicated in the figure below, Frost & Sullivan research of the U.S. DLIS spending estimates that circa $400 billion will be allocated toward defence IT; nearly a fifth of that will be on DLIS (circa $75 billion).
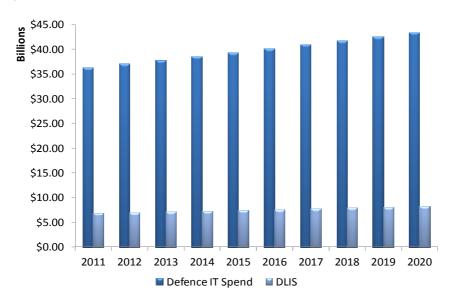
The system is assumed to have an average lifecycle of seven years, and operating costs throughout the system lifecycle constitute about half of the total cost of ownership.

Figure 6: Spending Forecast, United States of America (U.S.), 2011-2020

Source: Frost & Sullivan

Research indicates that Obsolescence Management is a significant challenge for end users. The U.S. DoD continues to incur $14 billion per year in development, operations and maintenance costs to sustain its Cold War logistics information infrastructure.

Frost & Sullivan segments the DLIS spending across Operational Services, System Integration, and IT Infrastructure (Tools, etc.). In the near to medium term, we anticipate a significant investment toward IT infrastructure and system integration, as the U.S. defence departments work toward phasing out legacy systems and introducing integrated solutions. This is by no means an easy task, considering that there are currently more than 2,500 systems (circa 100 systems for DLIS and related functions) implemented across various departments and teams, some interconnected, others silos.

It is essential to note that the defence logistics (information systems) contracts are long term in nature because they include frequent upgrades as software and Web technology evolves over time. The revenues over the contract period include those generated from maintenance, support and upgrades of the systems. The system is assumed to have an average lifecycle of seven years, and operating costs throughout the system lifecycle constitute about half of the total cost of ownership. However, the cost of information loss, both financially and operationally, itself would justify the investment toward a leaner and more capability-driven information system.

The streamlining logistics and the underlying network of systems are considered primary to this revolution in military logistics.
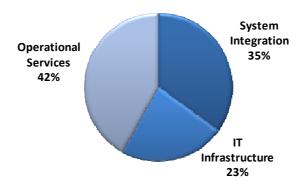

Figure 7: DLIS Spending Allocation Assessment, Global, 2012

Source: Frost & Sullivan

The largest allocation is toward operational services, which includes the actual distribution and analysis of the information collated through an integrated network of legacy and new IT systems. The operational services are essentially the "gray matter" that facilitates informed decision-making at all levels.

What is Driving the Market Despite the Restraints?

Enhancing situational awareness and providing real-time information for efficient mission planning and resource allocation are driving the active adoption of DLIS in military operations. Aligning defense logistics with future network-centric warfare has become mandatory. Most logistics transformation programmes aim to improve the efficiency and effectiveness of support delivered to their military services. For this, various militaries desire to have a harmonised and integrated IT infrastructure to enable the quick transmission of accurate information. This will result in greater efficiency, streamlined processes and improved operational performance.

The main drivers for the adoption of advanced DLIS include the need for operational and cost-efficiency (cost reduction); a move toward a service-oriented architecture; enhanced asset visibility; end-to-end integration of core and non-core logistics functions; predictive MRO operations; flexibility to be scalable and responsive in a fast changing geo-political environment; and improved Web-enabled logistics systems. However, the drivers alone would not lead to successful design or implementation of the future systems. End users and the industry need to overcome restraining factors such as reduced defence spending, dependency on legacy systems, end-user apprehensions to change, and security concerns. In the short term, to successfully introduce innovative solutions within this domain, the industry needs to find solutions to overcome challenges such as:

- Fragmented and non-optimised supply chain

- Extended and complex supply chains

- Lack of state-of-the-art, in-house IT capabilities

- Need for open logistics networks

- Need for visibility on a global scale

- Challenges with deployment

    o   Technical challenges

    o   Obsolescence management

    o   Management of change

    o   Time and cost constraints

Based on our research on the global DLIS market, below are some of the examples summarising the main benefits (anticipated and actual) of implementing advanced DLIS into the defence environment.

Singapore

As a result of introducing advanced DLIS, Singapore Air Force has improved responsiveness and reduced process cycle times by more than 50 percent for some key processes, such as supply chain management, engineering and maintenance, and financials. Within the Singapore Navy, an evaluation of the process before and after the implementation of the enterprise system shows a 54 percent reduction in procurement cycle time and a 57 percent decrease in the required number of manual interventions throughout the process.

Belgium

A major reduction in logistics depots, a direct supply chain from the global network of suppliers/OEMs direct to the units/end user, not only reduced the process time (turnaround time), but also reduced considerable numbers in man resources and higher availability rates. For example, efficiencies gained from the DLIS (ILIAS) has enabled circa 50 percent reduction of the F-16 fleet (from 120 to about 60), with flight hour reduction of only about 7.5 percent. Furthermore, the serviceability and availability of the fleet are at about 70 percent. The savings enable ongoing modernization of the defence force by procuring the latest equipment.

Italy

The Italian Air Force's requirements for the information system led to the provision of a full outsourcing service, where the supplier is responsible for the realisation, distribution, operation and management, including maintenance for all hardware and software parts. This kind of service also foresees the increasing integration with other subsystems already in use, the centralised management of information flows, and the coordination of the different operational phases for the system and the aircraft.

The examples above, and similar benefits realized by other end users, are shifting the perception of the price tag of DLIS from a cost to an investment.

COMPETITORS—OEM'S ENCROACHING THE SERVICE DOMAIN

Global DLIS Programs and Suppliers

The recent experiences in the war zone have driven the defence stakeholders to rethink core processes and systems supporting frontline and command operations. Streamlining logistics and the underlying network of systems is considered primary to this revolution in military logistics. Research indicates that this is a global trend, although the degree of success and/or the stage of implementation of these systems vary significantly.

In-depth experience and understanding of the defence environment and the operational requirements provides a leading edge against established IT specialist competitors.

Figure 8: Global DLIS Overview, 2012

As noted earlier, in Europe the U.K. leads adoption of advanced DLIS, driven primarily by its move to new procurement models, which demands an integrated (and measureable) environment designed to map activity progress across industry and defence departments. There are similar trends across other European countries, including France, Germany, Norway, amongst others. The new capabilities are anticipated to give way to operational requirements such as fully outsourcing aftermarket support. The figure above gives an overview of the global DLIS and the competitors globally.

Research indicates that, in the past few years, the defence OEMs have ventured into taking ownership of the services domains, which has meant prioritising new domains and activities, in addition to its core business. Figure 9 below shows how important IM is becoming. Most M&A activities involved either the service or IT companies. Northrop Grumman is an example of such an organization, which is a prime contractor for the U.S. defence information system, GCSS-Army.

In-depth experience and understanding of the defence environment and the operational requirements provides a leading edge against establi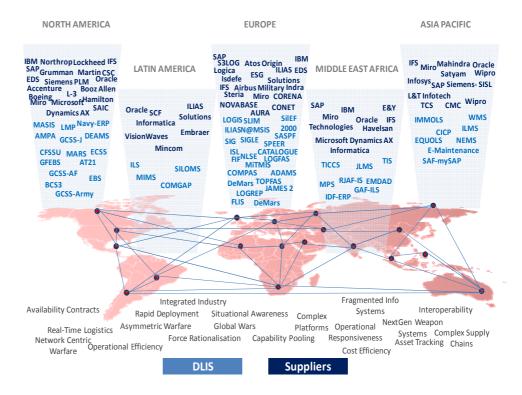shed IT specialist competitors. However, this is not always the case, as is evident from the success of IT-focused organizations such as CSC and Oracle. Secondly, the defence primes will, in most cases, have to engage the specialist knowledge and product patent of the IT organsiations to create an apt solution for the end user.
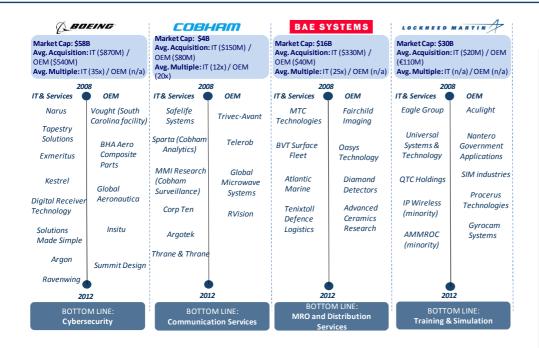
BOEING

Market Cap: $58B
Avg. Acquisition: IT ($870M) / OEM ($540M)
Avg. Multiple: IT (35x) / OEM (n/a)

COBHAM

Market Cap: $4B
Avg. Acquisition: IT ($150M) / OEM ($80M)
Avg. Multiple: IT (12x) / OEM (20x)

BAE SYSTEMS

Market Cap: $16B
Avg. Acquisition: IT ($330M) / OEM ($40M)
Avg. Multiple: IT (25x) / OEM (n/a)

LOCKHEED MARTIN

Market Cap: $30B
Avg. Acquisition: IT ($20M) / OEM (€110M)
Avg. Multiple: IT (n/a) / OEM (n/a)

2008

IT & Services	OEM	IT & Services	OEM	IT & Services	OEM	IT & Services	OEM
Narus	Vought (South Carolina facility)	Safelife Systems	Trivec-Avant	MTC Technologies	Fairchild Imaging	Eagle Group	Aculight
Tapestry Solutions	BHA Aero Composite Parts	Sparta (Cobham Analytics)	Telerob	BVT Surface Fleet	Oasys Technology	Universal Systems & Technology	Nantero Government Applications
Exmeritus		MMI Research (Cobham Surveillance)	Global Microwave Systems	Atlantic Marine	Diamond Detectors	QTC Holdings	SIM industries
Kestrel	Global Aeronautica	Corp Ten	RVision	Tenixtoll Defence Logistics	Advanced Ceramics Research	IP Wireless (minority)	Procerus Technologies
Digital Receiver Technology	Insitu	Argotek				AMMROC (minority)	Gyrocam Systems
Solutions Made Simple		Thrane & Thrane					
Argon	Summit Design						
Ravenwing							

2012

BOTTOM LINE: Cybersecurity	BOTTOM LINE: Communication Services	BOTTOM LINE: MRO and Distribution Services	BOTTOM LINE: Training & Simulation

Figure 9: Shifting Focus towards the Service Domains

Source: Frost & Sullivan

Nonetheless, the trend continues, as the figure above indicates that investments have been shifting to services, be it IT or aftermarket. Although in comparison to other defence verticals, the DLIS market is still commercial and IT-oriented in nature. As a result, the market is largely populated by major commercial suppliers and integrators of Enterprise Resource Planning (ERP) systems rather than defence specialists.

CONCLUSIONS

"*I don't know what the hell this 'logistics' is that Marshall is always talking about, but I want some of it.*" — Fleet Admiral E. J. King, to a staff officer, 1942

Some 60 years of echoes of similar aspirations can be heard across military corridors globally. To make this aspiration a reality, it is essential that the operational environment is backed with an efficient information system that can provide real-time information for effective decision-making, on and off the battlefield. However, adopting information systems as an integral part of the defence force architecture is at the very least a mammoth challenge. Frost & Sullivan research concludes that it is essential for the industry to take into consideration the critical success factors (CSF) driving procurement of advanced DLIS.

Figure 10 indicates the primary considerations taken by end users when selecting an apt solution (and the supplier) for advanced logistics information systems. A software solution that is scalable and well integrated drives the procurement decisions in the short term. Conversely, central to these capabilities is to develop and introduce open architecture solutions, which can be seamlessly integrated and scaled in an interoperable military environment, nationally and internationally. Supplier brand and experience, as well as the nationality are not the primary factors considered, although preference for domestic participants (or global participants with domestic partnerships) is commonly practiced.

Operationally, the key decision-making factor is based on the ability of the IT system to fully integrate the operational support activities across the three services. Secondly, addressing the national security issue is a critical factor, as private partnerships are not historically viewed as an alternate solution for the defence.

Full integration of the new system with a legacy system is also considered key. Evaluating the current progress of the system, some of the most critical decision-making factors would be an efficient and realistic timeframe and cost management. Training and consulting also are important, as these activities ensure successful adoption and correct use of any new systems.
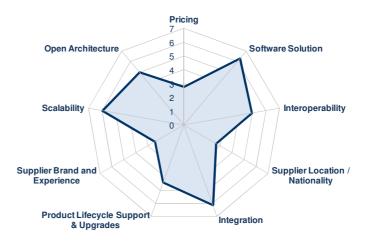

Figure 10: CSF: Essential Considerations in Designing and Marketing a DLIS, 2012
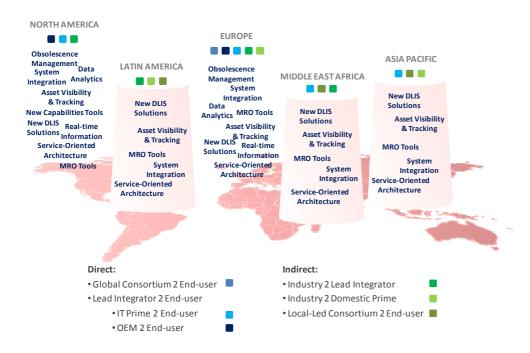
Source: Frost & Sullivan

Rating Scale: '1' Least Critical; '7' Most Critical

Qualitative benefits include improved visibility of parts, asset, maintenance activity and movement; more efficient inventory management (reduced stock quantity), planning maintenance schedules (more reliable, less breakdowns, higher availability rate); and near real-time budget (including cost) analysis. However, to realize these benefits there is a need for the system to be able to link in specific OEM-delivered support systems.

Opportunities and the Potential Routes to Market

Frost & Sullivan research suggests that defence OEMs in the coming decade will continue to play a leading role in the DLIS market. Although as the specialist IT organizations gather a better understanding of the defence operational requirements, OEMs and IT firms will shift toward complementing rather than competing in this domain.

In markets like the Middle East, APAC and Latin America, OEMs will have a secondary role to the likes of SAP and Miro, more due to the end-user perceptions rather than lack of capabilities. Figure 11 presents an overview of the main segments to focus on by region and potential routes to markets. The North American market provides ongoing opportunities in sustainment, system integration, and new IT solutions. Organisations that have not capitalised on the ongoing revolution in this domain can still focus on introducing niche applications/tools to better integrate the legacy and new systems, and to improve efficiency of the systems and operations in a cost-efficient manner.

Figure 11: Potential Routes to Opportunities

Source: Frost & Sullivan

The key focus of end users is to improve distribution and service levels across the full spectrum of operations, and integrate functions across the supply chain to improve responsiveness of logistic operations and reduce costs. Achieving interoperability and asset visibility through end-to-end integration of the supply chain and replacing legacy systems with service-oriented architecture are driving the market. Frost & Sullivan recommends that the industry participants propose IT solutions that directly address the operational requirements of the end users, whilst addressing the complexities arising from legacy systems/existing infrastructure, as well as other implementation challenges such as cultural and industrial issues.