



SIGMA LOGISTIC SOLUTIONS SERVING THE SA NAVY

INTRODUCTION

The untimely breakdown of key plant, systems and equipment hits all organisations hard. This is true, be it a business running a factory failing to meet production targets and deadlines, or a naval vessel unable to complete its mission. The more frequently such breakdowns occur, and the longer the time taken to restore them, the greater the negative impact will be on either the bottom line (as with a factory), or in the ability to accomplish a mission (as with a naval vessel). For a naval vessel, the breakdown of key equipment leading to the inability to perform a required function, can result in an entire mission being aborted (e.g. radar scanner, necessary for a surveillance mission). That is, if the equipment cannot be rectified at sea with the available logistic support resources carried onboard (e.g. personnel with requisite skills and know-how, applicable technical documentation and spares, etc).

So whether it is plant, equipment, or military systems, determining a relevant maintenance concept is a vital starting point for the proper resourcing of associated support facilities, to empower such facilities to fulfil their intended maintenance and support roles.

Note: A maintenance concept describes how a system and its breakdown of sub-systems, equipment and items will be supported in-situ, as well as at the various supporting maintenance lines, depots, or workshops, as applicable.

In the determination of an optimum maintenance concept, the primary driver needs to be the "availability of required equipment at minimum cost". How maintenance levels/facilities (as applicable) are resourced is therefore vitally important. The old logistic support saying: "have the right resource at the right place at the right time, no more, no less" holds true, standing the test of time.

OUR BUSINESS

Sigma Logistic Solutions (Pty) Ltd (hereafter referred to as SIGMA) is a South African support information services company serving the commercial and military sectors. Our business is to assist organisations to operate optimally, through an integrated and systematic approach to logistic support/maintenance needs and challenges. Customised solutions ensure that support products and services fit effectively and efficiently into Customers' operational environments.

In providing support products and services, for example technical manuals and associated configuration management services, SIGMA follows an integrated approach. When defining and developing the optimum support solution, this takes into consideration all elements of logistic support. For example, to successfully perform a maintenance task, one needs:

- ❖ Correct and easily understood task procedures, with (where applicable) Safety Warnings and Cautions appropriately positioned in the text to prevent injury/death and/or equipment breakage;
- ❖ The right spares and consumables to do the specific task;
- ❖ Personnel with the prerequisite skill levels and training to perform the specific task;
- ❖ Adequate facilities, including common and/or special tools and required support and test equipment; and
- ❖ Dependant on the task category, possibly also computer support resources.

An Integrated Logistic Support (ILS) approach to complex support information challenges unlocks the synergy of complementary support elements, to realise effective and affordable logistic support solutions. In following an ILS approach; looking from a whole system, whole life, whole cost perspective; the following are important:

- ❖ A clear and comprehensive understanding of Customer needs and requirements;
- ❖ A good understanding of available relevant technologies, including those in use within the Customer's operational/support environment. With the focus on providing cost-effective support solutions, it is important to minimise the need for additional infrastructure and expensive staff training (e.g. by minimising need for new computer applications and IT infrastructure, etc);
- ❖ A team approach to developing and implementing support information solutions. This is done by having Customer personnel (e.g. key personnel and end-users) work together with SIGMA personnel, in defining and developing the final support solution. Besides building good working relationships, this approach facilitates a proper understanding of the Customer's requirements and needs, as well as obtaining the required source information and vetting and acceptance of logistic deliverables. A team approach furthermore provides a sound basis for the implementation of the support solution into the Customer's operational environment, where participative end-users, having already played a part in the development, are familiar and more accepting of the implemented support solution.

SIGMA's most tangible support products are Technical Manuals, which address Operating, Maintenance and Training information, as required. Technical Manuals are developed to varying standards (e.g. AECMA 1000D, RSA-MIL-SPEC 53 and commercial standards). This service includes enhancements and/or updates to existing Manuals. Besides traditional hard copy versions, cost-effective interactive documentation solutions are also provided that can be used as electronic media (e.g. on PC's, CD's, and the Internet). Interactive Electronic Technical Manuals (IETM's) can be provided as Class 1, 2 or 3 using PDF, HTML, XML or SGML approaches, as applicable to the Customer requirement.

Other services include:

- ❖ ILS and Project Management (including configuration management services);
- ❖ Logistic Engineering, including Fault Tree Analysis, Failure Analysis, Maintenance Task analysis and Level-of-Repair and Cost-of-Repair analyses, all designed to focus Reliability, Maintainability on improving Availability, and focus maintenance support resourcing efforts;
- ❖ Support needs analysis and supportability assessments;
- ❖ Maintenance planning, including the development of maintenance concepts and maintenance task procedures, and the population of maintenance management systems;
- ❖ Training Solutions, including training material development and training management. Electronic solutions often provide for cost-effective training solutions, by integrating applicable technical documentation in a training perspective.

In short, we serve the information needs of our Customers, through providing appropriate and cost-effective value adding support information solutions.

HELPING THE SA NAVY DO ITS BUSINESS

In the Cape Town based Maritime Systems Business Unit (BU) of SIGMA, our largest and longest standing Customer is the SA Navy. This business, growing since 1991, involves the development and implementation of logistic support products and services for land based systems, as well as naval vessels. Over the years, this has included the Dockyard Fuelling System, Shipborne and Shore Based Communications Systems, Strike Craft and Submarine Life Extension Programs, Supply Ship SAS OUTENIQUA, Type 351 Minesweepers, SAN A-200 Corvette Acquisition Program and SAN Type 209 Submarine Acquisition Project. In the course of this work, SIGMA have assisted the SA Navy in setting their ILS Standards and Procedures applicable to all acquisition and upgrade projects. Through this long-standing relationship, SIGMA have built up a good working knowledge and experience of the SA Navy's needs, support policies, procedures, practices, and in-house support systems.

Since 1991, we have enhanced our specialised skills, assisting the SA Navy and other major commercial Customers with successfully completing local and international projects, and providing ongoing specialised assistance as required during operation.

Founded on mutual understanding, trust and track record, SIGMA has several international logistic partnerships resulting from long-term business relationships with ship suppliers. The case of the SAN A-200 Corvette Acquisition Program is an example.

SAN A-200 Corvette Acquisition and Implementation

Numerous ship suppliers from various countries bid in the latter part of the 1990's on the Tender to supply the SA Navy with new Corvettes. Based on SIGMA's good working knowledge and understanding of the SA Navy's logistic requirements and standards, SIGMA was requested by the German Frigate Consortium (GFC) (specifically Blohm+Voss GmbH in Hamburg) to assist with the preparation of their Logistics Proposal. The Logistics Proposal formed an important part of the GFC Proposal on their Tender submission for the new vessels.

This initial assistance, successfully completed in Germany, was the start of an ongoing long-term relationship with Blohm+Voss GmbH (now Blohm+Voss Naval under Thyssenkrupp Marine Systems). Part of the GFC's logistic strategy at the time was to secure SIGMA as their local in-country RSA Logistics Partner on the programme. This strategy, besides providing the GFC with insight and guidance on SA Navy maintenance approaches and thinking (i.e. a competitive advantage), further served the need to meet the significant Direct Industrial Participation (DIP) and Technology Transfer (TT) requirements of the programme. DIP is designed so that a percentage of required goods and services to be provided by overseas companies, is produced, and/or provided within South Africa by local companies (for the purposes of job creation/sustainment). The objective of the TT requirements is to empower local companies to be able to provide applicable goods and services during the acquisition of the new vessels, as well as during the vessels through-life operational support phase. In the case of SIGMA, the DIP and TT realised a local logistic support production and support capability in aspects outside of the core business and support capabilities of the SA Navy (and associated support organisations such as the Naval Dockyard, Simon's Town).

With the GFC winning the bid to supply the new vessels, SIGMA was tasked by Blohm+Voss (B+V) (being part of the GFC), to:

- ❖ Be a member of the overall programme ILS Management Team (ILSMT), responsible for managing the logistic acquisition and implementation processes of the programme;
- ❖ Participate in TT training, necessary to empower SIGMA to effectively do the required in-country work, as well as have a through-life support capability;
- ❖ Do certain logistic development and production work in-country; and
- ❖ Assist with initial implementation of the acquired logistic support system for the new vessels, including integration activities with SA Navy in-house logistic processes and procedures.

ILS Management Team (ILSMT): The ILSMT comprised a composite management team made up of key Customer and supplier personnel, tasked with managing the acquisition and implementation of the required logistic support system into the SA Navy operational support environment. The mandate was to plan, organise, direct, monitor and control the work required to define, develop/acquire and implement the necessary logistic support resources, capabilities and capacities for the new Vessel Class (done in accordance with the applicable operating and mission profiles and ILS requirements and standards). The life of the ILSMT spanned the duration of the project, from the Effective Date of Contract through to initial implementation of the acquired logistic support system and hand-over to the Acquiring Authority (i.e. SA Navy).

Technology Transfer (TT): TT formed a vital component of the Acquiring Authorities strategy on the programme to empower local companies (partners) to firstly, do allocated work within South Africa, thus increasing the local content and capability, and secondly, to provide local partners with the means to support the SA Navy with through-life support of the vessels, through the SA Navy's System Support Centre (SSC).

In the case of SIGMA, the primary focus of TT (done in Germany) was training on the conversion of Technical Manuals (system and equipment level) to electronic documentation, for use in the Documentation Module of the GFC developed Naval Logistic Management System (NLMS) (provided with the new vessels). The training on Standard Generalised Mark-up Language (SGML) enhanced SIGMA's electronic documentation capabilities at the time, enabling the provision of Class 3 Interactive Electronic Technical Manuals (IETM's) by SIGMA for the first time. The training also addressed the Business Rules specific to the development, management and viewing of the required Class 3 electronic publications/manuals. Besides SGML conversion training, at a later stage, further training was received in Germany on the NLMS itself. This training was introduced, once it was realised by B+V that SIGMA was capable of assisting with the required training of SA Navy personnel on the new NLMS system, and with its initial implementation. In this regard, training was received by SIGMA on NLMS operation, usage and maintenance. This enabled SIGMA to do training material development, as well as assist with initial NLMS training and implementation. This resulted in SIGMA being able to support the system in the operational environment, as intended.

The NLMS provided with the new vessels comprised primarily a Documentation Module (i.e. Document Handling System, Document Viewing System and Document Printing System); and a Maintenance Management Module (PMS); together comprising a state-of-the-art, first world electronic maintenance management system.

Logistic Development and Production: The work done by SIGMA in South Africa, as part of the acquisition, included:

- ❖ ILS Management, done in South Africa, France, and Germany (including the development of required logistic plans and associated documentation);
- ❖ Logistic Engineering (LE), including assistance with the development of the LE Plan for the programme, and the performance of vessel level Cost-of-Ownership modelling and calculations (done in South Africa and Germany). The work also included Combat Suite ILS logistic support analysis data integration;
- ❖ Participation in Original Equipment Manufacturer's (OEM) factory training for the 1st vessels crew (i.e. vessel mechanical systems) (done in Europe);
- ❖ SA Navy Dockyard Facilities assessments, leading to a comprehensive Facilities Assessment Report (still of use today);
- ❖ Development of a Ship Information Manual, addressing the entire vessel at the highest level (including an electronic version, linked to all associated lower level System Manuals, which in turn link to their associated Equipment Manuals);
- ❖ SGML conversion of Technical Manuals into Data Modules (DM's), for the Interactive Electronic Technical Manuals (IETM's), for inclusion in the NLMS. The IETM's were developed using a Common Source Database approach, where the IETM's themselves serve as the primary source of information for planned and corrective maintenance and material management (done in the Maintenance Management Module (PMS) of the NLMS);
- ❖ Enhancement of existing planned maintenance task procedures (for use in the SA Navy) and population of the Maintenance Management Module (PMS) of the NLMS; and
- ❖ Development of the Training Manual for the NLMS (for both end-users on vessels and ashore support personnel).

Initial Implementation of Logistic Support System: This work included assisting B+V with the initial installation and implementation of the acquired NLMS onboard the vessels, as well as at demarcated ashore support facilities. This effort included assistance to B+V with the NLMS training of the 1st vessels crew, using the SIGMA produced NLMS Training Manual. This was followed by training (provided by SIGMA only) of the crews of vessels 2, 3 and 4. A dedicated training facility was established at SIGMA's Westlake office in Cape Town, for the purpose of initial and continuation training of SA Navy personnel on the new NLMS. The work also included the integration of vessel / NLMS procedures with applicable SA Navy in-house logistic processes and procedures, to form a coherent documentation and maintenance management system for the new vessels.

All requirements of the contract were successfully met.

In line with the strategic DIP and TT objectives of the programme, on completion of the contract with the GFC (B+V), SIGMA was awarded an Interim Support Contract by the SA Navy. The main objectives of this contract were to:

- ❖ Provide ongoing assistance with the operation and maintenance of the acquired NLMS, including continuation training for vessel crews and applicable ashore support personnel;
- ❖ Integration of logistic support deliverables into the SA Navy's operational support environment, including certain refinements; and
- ❖ Provision of ILS Management services, including assistance with Support Qualification and Transfer (SQT) planning and implementation, and the development of a Deployment Integrated Support Plan (ISP) (as a management tool for the Corvette System Manager, for through-life support management purposes).

All objectives of the contract were successfully met.

Type 209 Submarines

To replace their old and then obsolete Daphné Class Submarines (acquired from France in the early 1970's), the SA Navy acquired new Type 209 Submarines from Germany in the mid 2000's. The Submarines were acquired, commissioned and introduced into service together with their acquired logistic support. As part of the projects acquisition strategy of tailoring logistic support deliverables to

meet specific SA Navy requirements and integration approaches, SIGMA was awarded a contract to assist. This work, done by SIGMA as part of a wider project team including Submarine specialists and end-users, covered the following:

- ❖ Tailoring Submarine Technical Manuals (TM's) to the look and feel of the SA Navy (i.e. covers, headers and footers);
- ❖ Conversion of the tailored TM's to a user friendly electronic PDF format, with suitable linking for use on PC's and laptops (typical Class 1 electronic manual);
- ❖ Tailoring of delivered maintenance cards to the look and feel of the SA Navy (format and layout);
- ❖ Assistance with the implementation of the tailored maintenance card information into the SA Navy in-house Operational Support Information System (OSIS);
- ❖ Development of a Maintenance Concept for the Type 209 Submarines; and
- ❖ Development of a System Technical Manual for the new Submarine Escape Training System (Facility) built in the Naval Dockyard, Simon's Town.

All objectives of the contract were successfully met.

CONCLUSION

Of great importance to all organisations is the quality and usefulness of operational and maintenance/support information. The lifeblood that flows through all organisations is information. For all functions of a business (or organisation) to operate optimally, relevant information that is fit for purpose, and accurate and up to date, must be available in a useful medium, wherever it might be required. This is true whether it be for the Captain or Engineering Officer on one of the SA Navy's Corvettes, or a factory manager who is responsible (yet reliant on plant and equipment), to meet production targets.

At SIGMA, we pride ourselves in providing cost-effective support information solutions that meet Customers operational and maintenance supports needs. Adding value in the process, solutions are tailor-made to fit in with the Customer's needs and operational environment, while improving system and equipment Availability and Reliability, and lowering support costs.

Assuring you our best at all times, Sigma Logistic Solutions invite you to contact us regarding your operational support information needs and challenges.

Corporate History Formed in 1985, Intertechnic Engineering (Pty) Ltd became part of Logistic Technologies (Pty) Ltd (Log-Tek) in 1998. This change merged common capabilities / resources to achieve the goal of being the most successful provider of support information (content) solutions. Due to the restructuring, Intertechnic became Log-Tek Engineering Solutions (LTES) in 2000, changing its name to Sigma Logistic Solutions in 2005. The business focus and strategy remain unchanged.

Jonathan Morse
Business Manager, Maritime Systems, Cape Town
Sigma Logistic Solutions (Pty) Ltd
Unit 8, Milton's Way, 11 Bell's Crescent, Westlake Business Park, Tokai 7945, South Africa
email: jonathan@sigmalog.co.za
website: www.sigmalog.co.za