



Charting New Waters

L-3 MAPPS Lands Two New Submarine Contracts

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MAPPS



The DSME selects **L-3 MAPPS IPMS** for the **Indonesian Navy Submarines**

In late 2011, Daewoo Shipbuilding & Marine Engineering (DSME) of South Korea was selected by the Indonesian Navy for the construction of 3 new submarines and a contract was subsequently signed by the concerned parties. This success follows the upgrade of the previous generation of the Indonesian Navy boats by DSME. Between 2004 and 2006, the Indonesian Navy's Type 209/1300 submarine KRI Cakra underwent a refurbishment by DSME in South Korea. Daewoo won another order to refurbish the KRI Nanggala, which was completed in early 2012.

Recognizing the importance of this opportunity, L-3 MAPPS engineers and the DSME design teams collaborated during the design phase in order to achieve practical, cost effective and reliable solutions for various integrated platform management system (IPMS) related software and hardware systems that would best overcome the DSME design team's constraints including space and weight. In late 2012, DSME selected L-3 MAPPS IPMS for their Indonesian submarine program.

L-3 MAPPS is fully committed to supporting the DSME engineering team and to ensuring the successful delivery of reliable and proven technology as per the agreed contract schedule in cooperation with our Korean partner companies.



Contract signing ceremony with the DSME in November 2012; Members of the DSME Procurement Team: Mr **Byong-Wook Ahn** (sitting), Mr **Jung-Soo Park** (standing on the right), Mr **Chung-Sik Bang** (standing on the left) and Dr **Reza Shafie-Pour** (L-3 MAPPS Director of Marketing)



VICTORIA CLASS

Autopilot System (VCAS) Replacement

L-3 MAPPS has been awarded a contract by the Government of Canada for the replacement of the legacy Autopilot System as fitted on-board the four Victoria class Submarines: HMCS Victoria, Windsor, Corner Brook, and Chicoutimi.

The VCAS consists of a "One Man Console", computers and three electronic enclosures distributed throughout the submarine. The VCAS replacement will be accomplished by customizing commercial off-the-shelf components through a comprehensive design, integration, system test, installation, set to work, and training effort as well as providing the required integrated logistics support and documentation. The scope also includes a new Onboard Trainer as well as upgrade work on the Shore Based Trainers (SBT's), Submarine Control Trainer and Maintenance Trainer. The SBT's are located at the Canadian Forces Base Halifax.

L-3 MAPPS is also upgrading the obsolete Fire Detection System on the Victoria class boats. This involves the replacement of the legacy system with a modern and fully supportable electronic suite that fits into the same space envelope. The FDS contract also included the replacement of all heat and smoke sensors located throughout the submarine and an update to the existing shore-based Machinery Control Trainer and the procurement of a new shore-based Maintenance Trainer.

The Royal Canadian Navy purchased the Victoria class Submarines from the UK Royal Navy in 1999 as replacements for the Oberon class boats. They have a speed of 12 knots on the surface and about 20 knots when submerged. Typical patrol endurance for the complement of 48 crew members and up to five trainees is approximately eight weeks.

The submarine's course, depth, and speed are controlled from the Steering and Depth Control position. The steering and depth control mechanism is an integrated One Man Control Unit manned by the helmsman. The Ship Control Officer of the Watch gives orders to the helmsman and engine room and coordinates various at-sea activities like surfacing and submerging.

The Autopilot System consists of an operator console, computers and electronic enclosures distributed throughout the submarine. The fully redundant autopilot system computers accept data from depth, course, speed, pitch, roll and heading transducers, to calculate and output ordered angle values to the submarine's rudder and hydroplanes control surfaces. L-3 MAPPS will organically design, develop and validate the 6 degree of freedom boat model as well as the autopilot course/depth keeping algorithm.



L-3 MAPPS now part of Controls & Integrated Systems Sector



Michael R. Reed,
President, Controls & Integrated
Systems Sector

In 2011, L-3 Marine & Power Systems (M&PS) Group was reorganised into functional areas or sectors. The Group president, Robert Leskow, announced the formation of the Controls & Integrated Systems sector which was later renamed the Power & Control Systems (P&CS) sector after further expansion. The P&CS sector within the L-3 M&PS Group comprises five divisions including L-3 Henschel (Ayer, MA), L-3 Maritime Systems (Leesburg, VA and New Orleans, LA), L-3 MAPPS (Canada, UK and India), L-3 SPD Electrical

Prior to joining L-3, Mike was with General Atomics serving as senior vice-president, Survivability Group. Prior positions included president & CEO of their Electronics Systems Company and senior vice president for the Advanced Technologies Group. Prior to joining General Atomics in 1997, he completed 22 years of naval service as an engineering duty officer having achieved the rank of Captain. His active duty assignments included sea duty on USS Saratoga, tours at the Naval Sea Systems Command, the Board of Inspection and Survey and Supervisor of Shipbuilding in Bath, ME and Pascagoula, MS. He was director of design for the Navy's DDG-51 Class Aegis Destroyer Program and Navy Program Manager for their Advanced Electric Technology Program Office. Significant programs under his development at General Atomics include Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG) for the CVN-78 FORD Class aircraft carrier.

Systems (Philadelphia, PA), L-3 Power Paragon (Anaheim, CA) and L-3 Westwood (Tulsa, OK). The P&CS Sector will align these business entities to leverage core competencies, maximize efficiencies and improve products and services to better support our customers and provide opportunities for revenue growth.

He holds both an Ocean Engineer advanced degree and a Master's degree in Naval Architecture and Marine Engineering from the Massachusetts Institute of Technology and a Bachelor's degree in Electrical Engineering from Iowa State University.

Michael R. Reed has been appointed to the role of President of the Power & Control Systems Sector, reporting directly to Robert Leskow. Mike's office is in L-3's Poway, CA facility.

Saunders Award Top Canadian Naval Marine Engineering Student

L-3 MAPPS is pleased to congratulate the following Royal Canadian Navy winners of the L-3 MAPPS Saunders Memorial award. The awards are presented every year at the Stadacona Officer's Mess, Canadian Forces Base Halifax.

2010 – Sub-Lieutenant L. Shields

2011 – Sub-Lieutenant D. Stewart

2012 – Sub-Lieutenant A. Giraldo-Mejia

Both The Canadian Forces Naval Engineering School and L-3 have honoured a deserving graduate from the Marine Systems Engineering Applications Course (Ashore) for the last 24 years. This award is a highly regarded recognition of Marine Engineering (MARE) Training Excellence, and precedes the students active shipboard engineering assignment. The award is named in memory of Lieutenant Chris Saunders, who tragically lost his life following a fire aboard the HMCS Chicoutimi in 2004.



2010 – Sub-Lieutenant **L. Shields**



2011 – Sub-Lieutenant **D. Stewart**



2012 – Sub-Lieutenant **A. Giraldo-Mejia**

L-3 MSUK

L-3 Marine Systems UK Ltd., an affiliate of L-3 MAPPS, is based and registered in the UK and holding full MoD accreditations and clearances. It was created in 2005 to bring together three project offices run by L-3 MAPPS in the UK. The company currently employs over 100 staff including Marine Engineers, Systems Engineers, Hardware and Software Designers, and Test and Service personnel. The company operates in four business areas including:

Naval Automation Systems

L-3 MSUK is part of the Power and Propulsion Sub-Alliance for the QEC Aircraft Carriers with responsibility for developing and delivering the IPMS, at over 40,000 points and seventy operating stations making it one of the largest ever produced. The company continues to support the IPMS of second and third submarines of the Royal Navy Astute class under construction at BAE Systems in Barrow-in-Furness as well as providing in-service support to the first-of-class HMS Astute and the two Royal Navy Amphibious Ships, HMS Albion and HMS Bulwark.

Training Solutions

L-3 MSUK is a partner with BAE Systems in the Astute Class Training Service with the responsibility for development and support of the platform and propulsion training elements of the service. This year, we will begin the production and delivery of a second Manoeuvring Room Trainer to be installed in the Astute Training Facility in Faslane.

Commercial Marine

In the commercial marine business, L-3 MSUK is the UK Partner for L-3 SAM, Lyngsø Marine and Valmarine in the supply of Automation and Navigation Systems to the cruise ship and ferry markets. Our recent projects have included priming a replacement navigation and bridge system for the P&O cruise ship Oceana and the supply of replacement Propulsion Controls for the Saga Sapphire. We are also working with A&P Group to update controls for RFA Argus. Our service organisation provides support for L-3 commercial marine systems across the UK. We are also in the training business, providing bridge and ECDIS system training from our office in Bristol.

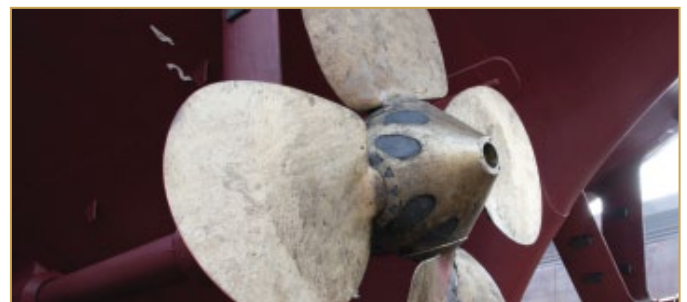
Electric Propulsion

L-3 MSUK is also priming the delivery of a complete Electric Propulsion and Distribution System for the RV Investigator research vessel, currently under construction at Sembawang Shipyard in Singapore for the Commonwealth Scientific and Industrial Research Organisation of Australia.

The General Manager of L-3 MSUK is Roger Baker, a 21-year veteran of L-3 MAPPS and its predecessor companies who ensures that MSUK maintains close links with our colleagues in Montreal and takes advantage of the latest technological developments and enhancements for the benefit of our UK customers.



Marine Systems UK



INTEGRATED CONDITION ASSESSMENT SYSTEMS

In Samuel Taylor Coleridge's classic poem "The Rime of the Ancient Mariner", the mariner relates the paradox of being stranded in an ocean of water, but none of it fit for use...

"Water, water, every where,
And all the boards did shrink;
Water, water, every where,
Nor any drop to drink."

The Trend in Platform Automation

In recent decades, the rapid increases in the overall computing capabilities as well as improved network speeds and network management systems have made platform management system real-time data more readily available, with the volume of this data growing every day.

An Integrated Platform Management System (IPMS) for a 6,000 tonne destroyer in the late 1990s had a then unprecedented 8,000 signals. A few years later, a programme for a much smaller 2,000 tonne corvette had 6,000 signals. L-3 MAPPS is now implementing programmes with signal counts of well over 40,000!

Managing the data

With such a large volume of platform data available on board, it is evident that improved systems to manage the data for analytical purposes are required. Without such systems, to draw a parallel from the Ancient Mariner, one can be floating in a sea of data but unable to use any of it. With this data's important implications on vessel maintenance, ignoring or mismanaging it can truly become the albatross around one's neck.

Traditional Maintenance Model

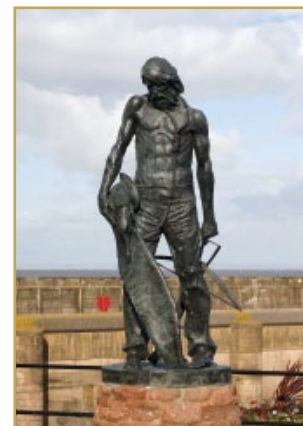
Before we look at using ship data for vessel maintenance improvements, let's understand the traditional model used for maintenance.

Traditional "preventive" maintenance is typically based on scheduled maintenance periods, and relies heavily on estimates of

equipment running hours. These maintenance periods are typically set at program inception by the OEM and are rarely updated based on actual usage profiles.

This model can initially seem attractive, due to the low infrastructure set-up costs that using a maintain / repair by replacement approach entails. Many navies quickly discover however that parts replacement costs can be very high, and are not always factored into the overall life-cycle costs. Navies never want to wait until a component fails to change it, nor do they want to perform preventive maintenance on items that still have a healthy service life.

Many systems and components on board ship do not lend themselves to easy, objective verification of the remaining service life. We have therefore observed an increase in the application of small-scale systems to try to detect early failures. One example is metal scanning systems placed in oil systems, which look for physical evidence of degradation of moving parts. These types of systems have definitely helped to flag failures in advance of their occurrence, but is there another way?



A Condition-Based Maintenance Model

In our everyday life, our consumer habits are increasingly being monitored so that companies can target their marketing specifically to our "needs". Things like our mobile phone use, Internet browsing and shopping habits all form data which can provide marketers actionable information regarding consumer trends, and market needs.

Why not take the same approach with ship data?

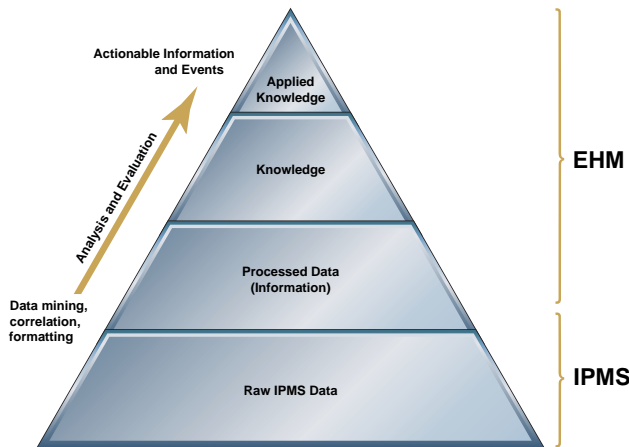
If we look at the information that is being processed by and available from the IPMS, it becomes clear that a great deal of the available information, if properly managed and analysed, is completely relevant to vessel maintenance.

Mining the wealth of data available from the IPMS can help to establish a condition-based maintenance model which helps maintenance managers to adapt the traditional preventive maintenance model by providing them actionable information regarding the health of the equipment on board. This can help to maintain the vessel in an operational state, reduce hours of down time through targeted maintenance, and reduce operational costs.

IS MANAGING YOUR PLATFORM DATA AN ALBATROSS AROUND YOUR NECK?

We can also see that there are benefits in managing this huge amount of information:

- Improved decision-making process
- Decisions taken based on facts, not 'feelings'
- Faster decisions and more efficient data mining
- Feedback to shipyard or ship designer to improve some aspect of a future vessel



EHM Information Hierarchy

Having the tools that allow operators to analyse the data from the IPMS provides additional knowledge which, in turn, equates to decisional power.

There are also cost benefits to using this data. Understanding how and when a failure occurs allows the optimisation of maintenance plans and schedules accordingly, producing a model targeting the user's needs, not that of the OEMs.

Goal of an ICAS

Integrated Condition Assessment Systems (ICAS), which are also known as Equipment Health Monitoring (EHM) systems, are applications which seek to turn measured plant data into reliable and actionable information for operations and maintenance managers. In practical terms, the ICAS should assist users in (a) identifying failures before they happen; and (b) analysing the data to determine whether regularly scheduled preventive maintenance can be delayed based on performance or needs to be advanced.

An ICAS makes correlations between various run-time data sources in order to detect and predict potential equipment failures.

While an ICAS is becoming a vital tool in vessel maintenance, it is important to caution users that it is not to be mistaken for a safety feature. Safety-related issues are the role of the IPMS.

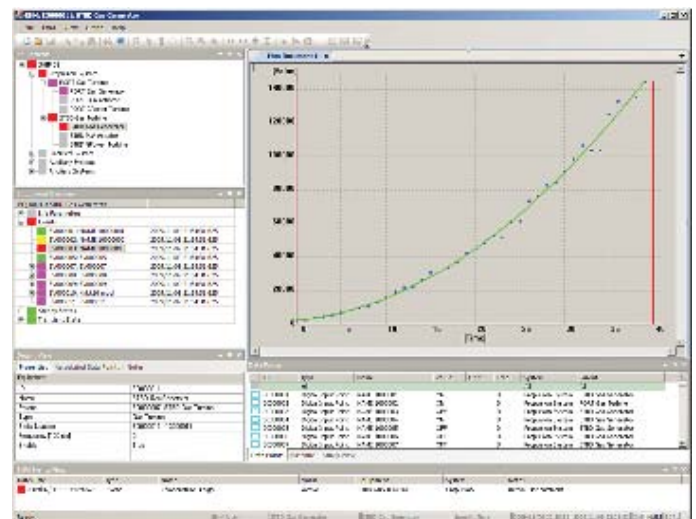
While an ICAS obtains most of its sensor data from the IPMS, a modern ICAS should not just be an extension of the IPMS. The ICAS should have the capability to acquire and integrate platform data not only from the IPMS, but also from external sources as well, without involving the IPMS supplier. It is therefore important that the ICAS be able to interface using standard communication protocols such as OPC or MODBUS/TCP-IP, to name a few. In this way, the package can be applied to many programmes and applications.

Practical Examples

So how does one use an ICAS in everyday operations?

The ICAS developed by L-3 MAPPS is virtually unlimited in its applications. When serving so many different navies with widely varying requirements, our systems have always been designed to be very versatile so as to adapt to a range of applications. In addition to the basic setup and operation of the ICAS, for example, special applications or analyses can be developed by the user at any time with varying subsets of data and sampling rates, as required, to narrow the root cause of a particular issue.

If we look at standard operations though, one of the first applications is to integrate the ICAS into the Preventive Maintenance Module (PMM) in use by the navy. Many navies already employ 3rd party software packages for tracking and scheduling preventive maintenance. The ICAS should, at a minimum, provide that system with basic operational information such as starts/stops and running hours.



Expected vs. actual performance

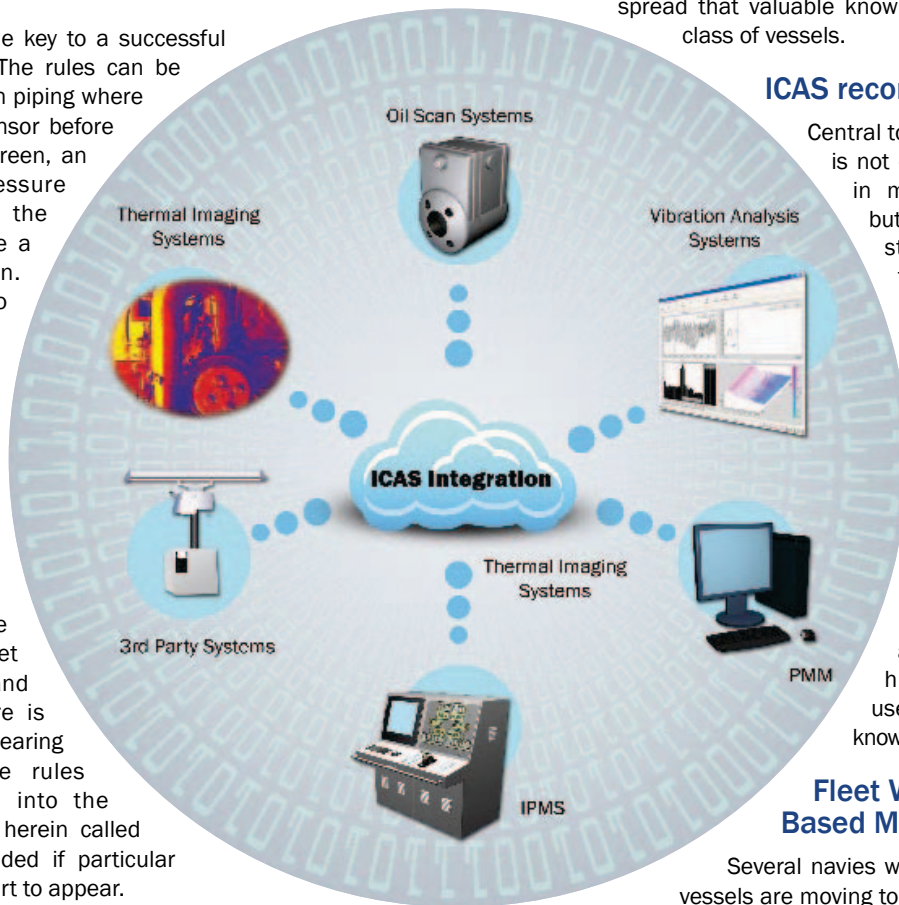
Another area where the ICAS should be of practical assistance is in comparing measured performance data to manufacturer baseline performance curves. If manufacturer baseline data is not available, it should be possible to import existing data and set it as the baseline performance. This will provide long-term information on how equipment is performing with respect to the manufacturer's expectations, and will help to provide feedback to the PMM as to whether scheduled maintenance must be advanced or if it can be delayed.

Establishing rules is the key to a successful ICAS implementation. The rules can be simple – for example, in piping where there is a pressure sensor before and after a filtering screen, an abnormally high pressure differential between the sensors could indicate a clogged filter screen. The rules can also be elaborate – a condition where the engine charge air temperature is high and the average of the cylinder bank temperature is high could indicate an intercooler air path blocked, or a condition where the gearbox lube oil inlet pressure is normal and a bearing temperature is high could indicate a bearing wear problem. These rules can be implemented into the ICAS whereby alarms, herein called ICAS events, are provided if particular conditions or trends start to appear.

The advantage of an ICAS is that it is not frozen in time. One thing we have embraced at L-3 MAPPS is that systems deployed on board need to be able to adapt over the service life of the ship in order to stay relevant. With the ICAS it is possible to analyse the historical data logged before the occurrence of a failure to determine if there were any signals pointing to the event. If so, on-shore experts will be able to develop a new set of rules and validate them by replaying historical data to verify if the malfunction gets

detected and an ICAS event created. The updated configuration is then provided to the class of vessels.

In this way, the ICAS becomes the “corporate memory” of the particular class of vessels. Every navy has the salty old CPO with a wealth of knowledge inside his head. Chances are if you were to tell him that the pressure on the main fuel inlet for Engine 2 was running low but only at cruising speed, he would be able to pinpoint the problem with his eyes closed. The ICAS provides a means to spread that valuable knowledge through the entire class of vessels.



ICAS recommendations

Central to the concept of the ICAS is not only to detect anomalies in machinery performance, but to provide the on-board staff with the means to verify and validate the issue. Any ICAS event (any failures or trends detected by the ICAS) can be categorised and a checklist (killcard) produced with suggested remedial actions, solutions, or additional verifications, investigations to be performed. This is another example of how the ICAS can be used to spread centralised knowledge throughout the fleet.

Fleet Wide Condition-Based Maintenance

Several navies with large fleets of similar vessels are moving to next level when it comes to ICAS. As mentioned earlier, ICAS has the capacity to become the “corporate memory” of your fleet. It is a tool which, when properly integrated with the ICAS and IPMS, can be used as an On-Board Condition-Based Maintenance (O-CBM) system to troubleshoot platform issues on-board, in real time.

The system becomes more powerful when integrated with a Land-Based Condition-Based Monitoring (L-CBM) system, where remote diagnostics software identifies corrective actions and improved

rules for use on-board a naval vessel. The L-CBM communicates with the O-CBM in near real-time through the desired shipboard secure communication channels. It also regularly receives data from onboard the ship in an off-line mode. The concept of an L-CBM can be extended to cover the whole fleet, whereby the performance of the desired equipment is monitored and compared with sister ships equipped with similar hardware across the fleet.

Conclusions

There is an increasing amount of data produced by a modern warship that is readily available for mining and further assessment of platform degrading (or salubrious) trends. In order to implement a successful and sustainable ICAS programme, a strong commitment from all parties, but especially the OEM and the end-user, is required.

There is a lot of data to wade through however, so it is important to approach the programme in steps, based on your needs and capability.

Times have changed since the seafaring days of which Coleridge wrote, and we should not be intimidated by but rather embrace new technologies. Maybe all the Ancient Mariner needed in order to placate the thirsty crew and get the albatross off from around his neck was a reverse osmosis machine. Maybe all you need in order to turn that sea of data into useful information is an ICAS...

The **Halifax Class** Frigates of the Royal Canadian Navy will be among the first classes of ship in the world to have a comprehensive fleet-wide Integrated Condition Assessment System.





PACIFIC 2012

The biennial Pacific International Maritime Exhibition took place from 31 January to 3 February 2012 at the Sydney Convention and Exhibition Centre on Darling Harbour in Sydney, Australia.

More than 1000 delegates representing 35 countries were in attendance at the show, where over 400 exhibitors displayed their products. The event was also well represented by RAN vessels, with five ships on display. L-3 MAPPS displayed its innovative Integrated Incident Board Management System or I²BMS.



CONFERENCE MARI-TECH EXHIBITION & CONFERENCE 2012



Co-hosted by The Eastern Branch of the Society of Marine Engineers and Architects and the Canadian Institute of Marine Engineers, Mari-Tech 2012 took place 10-11 April 2012 in Ottawa. The event was attended by over 500 people and featured 30 sessions, including keynote speeches, panel discussions and technical presentations, as well as the Expo hall with over 50 exhibitors. L-3 MAPPS participated as a Silver Sponsor and as an exhibitor, presented a paper on the HALIFAX Class Upgrade Project, and contributed to the overall Mari-Tech Team as the Sponsorship Coordinator.



CANSEC

CANSEC was held in the new Ottawa CE Centre near the Ottawa Airport from 31 May to 1 June 2012. The new exhibition venue proved to be world-class with more than 10,000 delegates attending the two-day conference to view 307 exhibitors at both indoor and outdoor displays. L-3's stand hosted 15 L-3 divisions from around the globe, including L-3 MAPPS exhibiting its Royal Canadian Navy HALIFAX Class platform management and damage control systems technologies, L-3 Power Paragon, L-3 Communications Systems East with its Integrated Communications Systems, L-3 Communications West, and L-3 MariPro. L-3 sponsored the luncheon on the second day with a contribution to the True Patriot Love Foundation.



DIMDEX 2012



Doha International Maritime
Defence Exhibition & Conference

معرض ومؤتمر الدوحة
الدولي للدفاع البحري

Held from 25 to 27 March 2012, DIMDEX is a unique event addressing the growing need for sophisticated naval equipment to control Middle East and North African offshore waters. It provides an opportunity for companies producing high-end maritime technology to promote their products and services to an international and regional audience of high-level government procurement personnel from navy and maritime security forces. L-3 MAPPs together with our colleagues from L-3 Valmarine demonstrated the latest in Integrated Platform Management and Navigation Systems.



The Canadian Defence Security and Aerospace Exhibition Atlantic (DEFSEC) featured more than 200 participating companies and organizations, 900 attendees, 110 exhibition booths, including L-3 MAPPs, L-3 MAS and L-3 WESCAM. DEFSEC has become the largest exhibition of its kind in eastern Canada, featuring an ever-increasing number of companies from across Canada and around the world. It is

a venue for industry, government and the Canadian military to meet, interact and exchange information, and it's a forum for exploration of critical issues in Canadian defence and security.

MARITIME SECURITY CHALLENGES 2012



Maritime Security Challenges (MSC) 2012, the 5th iteration in the successful MSC conference series, took place in Victoria, BC, Canada from 1 to 3 October 2012. MSC 2012 is presented by Royal Roads University in cooperation with Maritime Forces Pacific of the Royal Canadian Navy and the Asia-Pacific Center for Security Studies. MSC 2012 brought together many international navies and professionals for panel discussions on various topics such as: Developments in Aircraft Carriers, Security Issues, Maritime Applications of Unmanned and Autonomous Vehicles, and Shipbuilding and Future Naval requirements. L-3 MAPPs was a Conference Supporter and attended the three-day conference which included the participation of Vice-Admiral Paul Maddison and the Royal Navy's Admiral Sir Mark Stanhope, the First Sea Lord and Chief of the Naval Staff.



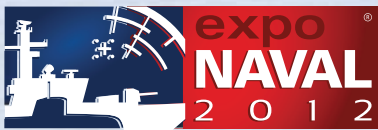
EURONAVAL 2012

Le Bourget was once again the venue for one of Europe's premiere naval exhibitions, Euronaval, now in its 23rd edition. Running from 22 to 26 October 2012, this year's exhibition attracted close to 400 exhibitors from 35 countries and trade visitors from over 100 countries. L-3 MAPPs attended this show exhibiting the latest in platform management and damage control systems, and was joined by colleagues from L-3 Calzone, L-3 Communications Systems - East, L-3 ELAC Nautik, and L-3 Valmarine.



Navy Appreciation Day 2012

On 30 October 2012, L-3 MAPPs participated alongside many of our Canadian industry colleagues in a one-day opportunity to meet with Canadian Parliamentarians from across Canada in their offices on Parliament Hill. The purpose of the 60-plus meetings organized by the Navy League of Canada was to express our industry's desire to have the National Shipbuilding Procurement Strategy (NSPS) progress more rapidly, as it has been promulgated as Canada's revitalization plan for the future of the Royal Canadian Navy and the Canadian Coast Guard. Fundamental to the NSPS are two key elements: the judicious use of government funding to ensure the best possible value for this investment, and the construction of highly capable vessels best suited to their missions and assignments in the defence and security of Canada. The National Shipbuilding Procurement Strategy is a key step for rebuilding both the RCN and CCG to meet Canada's future maritime needs. Action must now be taken to expedite the programs to be delivered under NSPS, which are the urgently needed minimum essential capabilities to allow Canada to exert national sovereignty in the future. Vice-Admiral Paul Maddison also participated for the majority of the day with his key Admirals and Senior staff in a presentation to six outstanding men and women who served in Afghanistan, a luncheon with industry, and a reception in the evening.



EXPONAVAL 2012, a gathering of Latin American navies, defence suppliers, and government officials, took place from 4 to 7 December 2012 in the Chilean port of Valparaiso.

The three-day event, now in its eighth year, was held at Muelle Barón, which is part of the Valparaiso passenger terminal on Chile's Pacific coast. It attracted representatives from more than 160 companies and naval delegations from 32 countries throughout the Americas and beyond.

L-3 MAPPs attended the show along with colleagues from several other L-3 divisions.



UPCOMING EVENTS

The following are upcoming conferences, exhibitions and seminars where you can expect to meet with L-3 MAPPS Marine Systems and Simulation.

17 - 21 Feb 2013



Location Abu Dhabi, UAE
Organiser Abu Dhabi National Exhibitions Company (ADNEC) in association and with the full support of the UAE Armed Forces
Participate <http://www.idexuae.ae/>

26 - 30 March 2013



Location Langkawi, Malaysia
Organiser HW LIMA Exhibitions
Participate <http://www.lima.com.my/>

10 - 12 April 2013



Location Rio de Janeiro, Brazil
Organiser Reed Exhibitions do Brasil Ltda
Participate <http://laadexpo.com.br/english/>

14 - 16 May 2013



Location Singapore
Organiser Experia Events Pte Ltd
Participate <http://www.imdexasia.com/>

29 - 30 May 2013



Location Ottawa, Canada
Organiser Canadian Association of Defence and Security Industries
Participate <https://www.defenceandsecurity.ca/index.php?action=cansec2012.exhibitors>

25 - 27 June 2013

Mari-Tech 2013

Location Halifax, Canada
Organiser The Canadian Institute of Marine Engineering
Participate <http://www.mari-tech.org/index.php/mari-tech-2013-halifax>

04 - 06 September 2013



Location Halifax, Canada
Organiser Nova Scotia International Air Show Association
Participate <http://www.defsecatlantic.ca/>

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WE LOOK AT THINGS FROM A DIFFERENT PERSPECTIVE



We've always been at the forefront of innovation.

From the first distributed architecture digital ship control system 30 years ago, to pioneering developments like the Battle Damage Control System, Integrated Condition Assessment Systems, On-Board Team Training Systems and Personnel Location Monitoring Systems, L-3 MAPPS stands out as a leader in Integrated Platform Management Systems for warships, Safety Management Systems for cruise vessels, and training solutions.

With modeling & simulation in our DNA, our innovation in ship controls is driven by our unique perspective honed over three decades of experience with over 60 warships in close to 20 different navies. It could be our drive to satisfy emerging customer requirements, or it could be our unrelenting dedication to excellence.

Is it time for you to benefit from a fresh perspective?

L-3 MAPPS

L-3com.com/MAPPS