

PACSEFC 2010



Northrop Grumman – Fire Scout UAS – offering unmatched situational awareness and precision targeting for maritime forces

AUTONOMOUS MARITIME SURVEILLANCE SYSTEMS SYMPOSIUM

DEVELOPMENTS, CAPABILITIES & MARITIME APPLICATIONS

28 – 29 January 2010
Parkside Meeting Room G01

0945 – 1600 Thursday 28 January 2010
0945 – 1400 Friday 29 January 2010

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An Official Event of the:
Pacific 2010 International Maritime Exposition
27-29 January 2010
Sydney Convention & Exhibition Centre, Darling Harbour

2010
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PROGRAM & SPEAKERS

Concerns about the higher level of potential illegal incursions of Australia's extensive and remote coastlines, as well as the security of valuable offshore oil and gas assets, ports, resources and diminishing fish stocks in Australia's vast territorial waters, has led to an increased level of awareness and interest by Australian Government and industry bodies in Autonomous Surveillance Systems capable of providing 24/7 and a level of intelligence that would allow for the protection and defence of offshore resources and assets, maritime borders, ports and crucial infrastructure.

Consequently, Australian Governments and industry are investing in the operational evaluation and trialling for potential acquisition, the latest Autonomous Maritime Surveillance Systems and Technologies – not only for defence purposes, but also for broad area surveillance and coastal security, with the prime objective of: reducing actual and potential illegal immigration; the trafficking of drugs; weapons and illicit substances; illegal fishing; threats to infrastructure security; as well as law enforcement, disaster recovery, oceanographical, geophysical, meteorological and environmental monitoring.

In response to this increased level of interest, Maritime Australia Limited has arranged for the Pacific 2010 International Maritime Exposition to host a dedicated **Autonomous Maritime Surveillance Systems Symposium**, which will be a focal point aimed at providing exhibitors and potential customers with the opportunity to discuss the latest technology developments, products and capabilities. The **Autonomous Maritime Surveillance Systems Symposium** will be held over 1½ days of Pacific 2008 (Thursday 28 and Friday 29 January 2010) and will include presentations by a diverse range of companies involved in the development, manufacture and use of the latest and various autonomous surveillance systems technologies and supporting capabilities.

THURSDAY 28 JANUARY 2010

0945 Introductory Remarks from Chair

Dr Arvind Sinha – Director of Engineering, Helicopter Systems Division, Defence Materiel Organisation

1000 Threats and Surveillance Solutions to Maritime, Littoral, Infrastructure & Asset Security

Tony Brescia – Chief Engineer, Acoustic Systems Division Naval Air Warfare Center, Aircraft Division
US Naval Air Systems Command (NAVAIR)

Unmanned platforms and sensors are very attractive for use as detection systems for reasons of cost, form factor, flexibility, and effectiveness. Furthermore, these systems, partnered up with onboard processing and conventional technologies provide a real time intelligence net. The manner in which we achieve this less direct however.

A successful methodology implementation will be presented starting from operational requirements generation through detection, classification and localization of potential threats or objects of interest within the sensor information provided by the data collection system. This talk will discuss operational requirements, their interpretation, systems engineering implications and review of technology results and successes of this approach.

1030 MQ-8B Fire Scout: A Program Overview, Status & Future Program Plans

John Paterson – International Program Manager
Unmanned Systems
Northrop Grumman Aerospace Systems

The presentation will provide an overview of the MQ-8B Fire Scout system, including a short history and system description. The presentation will also include information on current flight-testing and at-sea operations aboard USS McInerney (FFG-8). Operational Evaluation plans will also be described.

The principal points to be addressed include autonomous mission execution, shipboard successes, and future program direction. Fire Scout's proven success record with emphasis on completed flight operations as well as contributions to both the Navy and Army forces of the future will be stressed. Spiral development of the MQ-8B will be assessed to conclude the presentation.

1100 Shipboard Deployment of the Scan Eagle UAS, to Meet Real World Force Protection Scenarios

Peter Bale – Director of BD Strategy & Capture
Insitu Pacific Limited

Insitu Pacific provides ScanEagle UAS to deliver valuable intelligence, surveillance and reconnaissance data for day and night missions in both maritime and land domains.

In March of 2007, the lives of 15 Royal Navy personnel were at risk due to an adverse takeover of a vessel by Iranian forces. A contributing factor may have been that persistent surveillance was not available during this routine mission. The capability within UAS realms exists today.

The presentation will discuss maritime operational dynamics of small UAS, looking at the recent employment of the system to assist in the rescue of Captain Phillips of the Maersk Alabama, from pirates off the Somali coast, after being held captive aboard his ship's life raft. The Scan Eagle UAS system played an important role in providing a persistent stare capability and giving decision makers real time situational awareness.

1130 The RQ-4N Global Hawk and Broad Area Maritime Surveillance Unmanned Aircraft Systems (BAMS UAS)

Walt Kreidler – Director, BAMS UAS Business Development
Battle Management & Engagement Systems Division
Northrop Grumman Corporation

The US Navy and Joint forces have a critical need for a BAMS UAS capability to provide persistent intelligence, surveillance, and reconnaissance (ISR) in the maritime and littoral regions. Operating in conjunction with naval forces, the RQ-4N will have an exceptional combination of sensors and attributes (persistence, speed, and payload) necessary to conduct BAMS ISR and communications relay to support US Navy. With its state of the art maritime sensors the BAMS UAS will provide maritime ISR as an adjunct to



Insitu – ScanEagle UAS launch from US Navy Ship in counter-piracy operations in the Gulf of Aden

the USN's MMA aircraft, however it should be noted that the BAMS system is also ideally suited to civil and national security roles including bushfire support, border protection and humanitarian relief.

The US Navy BAMS development program has progressed significantly, and this presentation will provide an overview of the major program milestones, also covering high level technical details of the sensors. The wide range of naval war-fighting and civil/national security roles of the BAMS UAS will also be discussed.

1200 Broad Area OTH ISR in a Maritime environment

*Dr Paul Boxer – Managing Director
Sentient Vision Systems Pty Ltd*

Traditionally, large manned aircraft, or costly HALE UAV's, have dominated the maritime surveillance domain. Australia's significant coastline requires vigilance far beyond that of most other nations in the world. Public scrutiny from politicians and the community ensures that even small surveillance gaps become quickly pronounced.

New developments in the miniaturisation of airborne technologies and the ability to disseminate data in near real time have significantly altered this decision making process.

This presentation explores the ability to leverage these developments to conduct broad area maritime surveillance using multiple low payload multiple STUAS. It will also explore how advancements in onboard processing and data dissemination enable STUAS operating OTH to Detect, Classify, Identify and Track very small objects at sea, reporting back via an iridium network in under 20 seconds.

It will be shown that these developments provide a persistent and order of magnitude lower cost alternative to Australia's burgeoning offshore crisis.

1230-1400 Lunch & Exhibition Viewing

1400 Use of Multi-Intelligence Sensors in the Maritime Domain

*Steve Frith – Senior Program Manager
Lockheed Martin Defense Systems*

This presentation will detail the use of the Lockheed Martin Airborne Multi-Intelligence Laboratory (AML) to develop innovative techniques for sensor integration, multi-INT mission planning, intelligence gathering, processing, exploitation and dissemination within the maritime domain. A re-configured Gulfstream III business jet; the AML has an easily reconfigurable architecture that allows sensors and equipment to be rapidly integrated into the aircraft's mission systems.



Lockheed Martin – Airborne Multi-Intelligence Laboratory

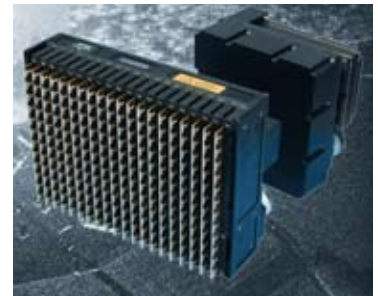
The test-bed includes a computing capability that supports most commercial operating systems, a radome on the belly with ample volume for a range of sensors, and four workstations.

The AML can process data both onboard and on the ground, is equipped with a robust suite of sensors as well as wideband and narrowband data links, with the intent to rotate sensors as required to support experimental configurations in the maritime domain.

1430 Exploitation & Dissemination of UAS Sensor Information

*Nick Meyrick – Campaign Manager, Air Systems
Selex Galileo (UK)*

The collection of data from Manned and Unmanned Systems is an essential element of the intelligence cycle. However, it is the exploitation of that data that provides commanders (both military and civil) with the knowledge required to resolve questions and to assist in decision-making. While there are significant numbers of UAV systems capable of producing single sensor data for exploitation, a UAS' capability can be greatly enhanced through the exploitation of information gathered from multiple sensors.



Selex Galileo – Lightweight & Compact ASEA PicoSAR

Selex Galileo has developed a Common Ground Control Station (CGCS) to exploit and disseminate such information, which will meet the declared intent of both US and UK defence procurement agencies for CGCS. Selex Galileo has also recently conducted work in the integration of multiple payloads and in mid 2009, carried out flights of its small FALCO TUAS in both Finland and the UK to demonstrate its dual payload capabilities utilising an EO sensor and a Synthetic Aperture Radar (SAR).

This presentation will complement the subsequent presentation on the FALCO UAS family solution in regard to persistent unmanned littoral and maritime surveillance by outlining the results of the 2009 FALCO campaign, before highlighting the benefits accrued from gathering data from multiple sources and how it can be exploited and disseminated in the C4I environment through a CGCS.

1500 Persistent Unmanned Littoral and Maritime Surveillance: the FALCO UAS Family Solution

Carlo Siardi – Selex Galileo (Italy)

Continuous and all-weather littoral and maritime surveillance implies a complex ISTAR network architecture with a variety of building blocks which also include a great deal of Autonomous (Unmanned) Surveillance Systems. The Australian case is typical of this trend and the UAS is perceived as a true and effective system solution, providing persistent and valuable stand-off images of the targeted area.

Within this context the FALCO UAS family represents a reference capability able to offer persistent real time and near real time intelligence (images and data) to the ground ISR network, thus effectively contributing to the general situational awareness picture. In this specific paper both littoral surveillance and maritime surveillance are discussed, with an emphasis on dual payload capability and making direct reference to an innovative radar-based mission payload suite, which coupled to one of the most modern UAV platforms, represents a state-of-the-art system capability in support of current priority requirements. Reference will also be made to shipboard fixed-wing UAS operations studies for organic MAE-type UAS.



Selex Galileo – FALCO Shipboard TO&L Multi-Sensor Tactical Maritime Surveillance UAS

1530 Multi-mission Maritime Predator B

*John Porter – Deputy Director, Business Development
General Atomics Aeronautical Systems, Inc.*

General Atomics Aeronautical Systems, Inc. (GA-ASI) remains a world leader in the design and production of highly sophisticated unmanned aircraft systems (UAS). Predator-series UAS have accumulated almost 1million flight hours providing persistent surveillance to federal, civilian, and military operators, as well as revolutionising the battlefield with precision-strike capabilities. Predator is the most combat-proven UAS in the world. First flown in 1994, it has accumulated well over 800,000 flight hours, with 85-percent of its time spent in combat operations. The world's first weaponised UAS, Predator features proven surveillance and precision weapons delivery capabilities.

GA-ASI produced the turboprop-powered Predator B to meet ever increasing mission requirements for military, civil, and governmental applications. Building on the proven success of Predator, the multi-mission Predator B is a major evolutionary leap in overall performance and reliability. With remarkable payload capacity, the aircraft meets a wide variety of missions above and beyond tremendous support for the war fighter. It patrols US borders; NASA has used it effectively to support fire fighters at state/national levels; and a maritime variant called Guardian has recently been delivered to the Department of Homeland Security. Joint operations with the US Coast Guard have commenced in Florida.

This presentation examines the expanding capabilities of Predator B UAS to meet diverse and emerging requirements worldwide.

1600 Exhibition Viewing & Happy Hour

FRIDAY 29 JANUARY 2010

0945 Introductory Remarks from Chair

*Dr Arvind Sinha – Director of Engineering, Helicopter Systems Division,
Defence Materiel Organisation*

1000 SeaDarQ – Autonomous Underwater Surveillance using Radar

*Graeme Dunk – Director Defence & Government Relations
L-3 Nautronix*

Radar clutter is often considered as a hindrance for maritime operations, hiding small contacts and confusing the surface picture. In reality however, the radar waves reflected from the sea surface contain valuable information on wind, waves, oil contamination, bottom topographic features and even submerged objects in the water column. SeaDarQ has developed a radar processing technology that extracts this information.

As the clutter is governed by the factors causing a surface disturbance, processing the clutter with an appropriate algorithm makes it possible to detect the disturbance and hence retrieve the originating pattern or structure. It is therefore possible to isolate the factor from which the disturbance originated and in effect to use radar to "see" beneath the surface of the water.

Extensive experiments over 18 years have successfully demonstrated the ability to extract information about currents, waves, ship tracks, oil slicks, water depth, bottom topography, small surface and sub-surface objects, and ice. This information is valuable for a range of maritime applications and operators, including for maritime safety, oceanography, hydrography, and environmental protection.

This presentation will provide an overview of the SeaDarQ technology, test results and the autonomous maritime surveillance and rapid environmental assessment applications.

1030 Underwater and Surface Surveillance with Unmanned Vessels: the French Experience

*Daniel Scourzic – Commercial Director, Robotics
ECA Group*

ECA has been producing underwater vehicles and systems over the past thirty years, including AUV's since the 1980's. Since the beginning of the 2000, ECA has focused specifically on Autonomous Underwater Vehicles (AUV's) and on Unmanned Surface Vehicles (USV's) with the development and delivery of several systems: A3000, a hovering AUV particularly adapted to perform inspection of underwater objects and structures down to 3000m depth, DAURADE AUV a survey AUV for Rapid Environment Assessment

that was delivered to the French Hydrographic Service (SHOM) in July 2008 and INSPECTOR USV, 8 units of which have been delivered to the French Ministry of Defence.

After a very short presentation of ECA Group, the first part of the presentation will give an overview of A3000 inspection AUV. The paper will then focus on DAURADE AUV with a detailed presentation of the system including its description, performance, suite of sensors etc. and results of trials at sea. The last part of the presentation will give an outline of INSPECTOR USV together with the expected use of USV technology for naval warfare.

1100 Situational Awareness in Deployed Small Craft

Peter Behrendt – Saab Systems

As counter-piracy, maritime interdiction, border protection and policing actions continue to occupy the world's maritime security forces across diverse theatres of operation, the need for situational awareness in deployed assets such as Rigid Hull Inflatable Boats (RHIBs) is becoming increasingly important and varied in nature. Challenges posed by the operating space include: harsh environmental conditions (fully exposed at sea, often in very hot and dusty areas), the possibility of operations over the horizon, and the complexity of human interaction with onboard systems whilst making way in a small platform.

The range of systems approaches available for providing situational awareness to maritime security forces within this small craft sub-domain might infer a review of established large platform thinking and an assessment of the efficacy of such approaches for small craft. Necessarily, this paper will consider what 'situational awareness' might mean to the coxswain of a RHIB and their likely passengers over a variety of missions. As an adjunct, this paper will then consider the implications upon the parent unit of deployed small craft (such as combatant or patrol platforms) and the methods that may be employed to create effective situational awareness synergies in both the parent and the deployed craft.

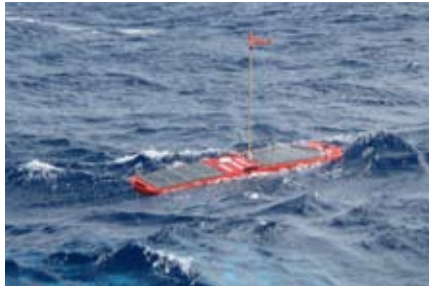
1130 The Wave Glider: A Wave-Propelled, Persistent Autonomous Surface Vehicle

*Scott Willcox – Principal Technologist & Director of Defense Business,
Liquid Robotics, Inc.*

Liquid Robotics Inc.'s Wave Glider autonomous surface vehicle is a new approach to persistent ocean presence. Through a purely mechanical

linkage, the Wave Glider converts the abundant energy contained in ocean waves into forward thrust, providing essentially limitless propulsion that is independent of wave direction. Two solar panels power the vehicle's control electronics, communications systems, and payloads.

This presentation provides an overview of the evolution of the design of this new platform and presents results from the extensive engineering sea trials that have been conducted, including the vehicle's propulsion performance in a variety of ocean conditions (varying sea state, wind speed, and surface currents). The vehicle's web-based interfaces for external control and monitoring are described and several payload packages for science, commercial and defense applications are discussed.



Liquid Robotics – Wave Glider Autonomous Surface Vehicle

1200 Are We Really Training As We Should Fight?

Spencer Fraser – President & General Manager
Meggitt Training Systems Canada

Since the attack on the USS Cole in 2000, countering the asymmetric small boat and Fast Inshore Attack Craft (FIAC) threats has been front and centre in the operational planning considerations of the majority of Western navies. Recent piracy events off the Horn of Africa have only reinforced these concerns.

While in the late 1990s some naval planners were discussing the demise of the naval gun, all modern navies are now planning to augment their ship self-defence systems with some form of small-calibre close-in guns or by adding new ammunition types to their existing mid-calibre guns; with several nations planning to add new generation low cost short range guided missiles to their arsenals.

While these navies have firm 'equipping' ideas on how to defend their ships and they believe in the maxim that one must 'train as you fight', their selection of training solutions has been highly varied with commensurately varied results. The key problem is how to effectively train sailors against these resurgent threats, both cost effectively and efficiently.

Meggitt Training Systems has been engaged in the design, development, and delivery of advanced virtual and live fire naval surface warfare training solutions for over 25 years and today offers anti-surface training products and services covering the whole continuum; from single operator virtual solutions to live fire 'war at sea' swarm attack scenarios conducted at night.

This presentation is made by a former Canadian naval officer with extensive Above Water Warfare experience, and who is the designer of the Hammerhead Anti-FIAC target system, and will provide some candid lessons learned from the recent experiences of having trained modern naval forces at sea.

1230 ConTracer – Container Security Device

Eun Kyu Lee – Senior Researcher
Dong-A University, South Korea

ConTracer is an active RFID based Container Security Device (CSD) for shipping containers, which has been recommended for use by the US Department of Homeland Security.

The ConTracer CSD is mounted inside a shipping container for sensing the opening and status of the container door, as well as monitoring and historically recording the internal environment and shock to the container through temperature/humidity/shock sensors. The ConTracer's RFID frequency bandwidth uses 433MHz and 2.4GHz making it compatible with frequencies used by different countries.

This paper introduces the development trend of CSD and compares the Dong-A University developed ConTracer with other companies' CSD. Finally, the ConTracer CSD System has been evaluated and verified through demonstrations with international container distribution services between Korea and China.

1300 Personnel Safety Monitoring

James Canterbury – Managing Director, Blue Glue Pty Ltd

Blue Glue is an Australian company that designs, develops and manufactures innovative safety, security, and tracking systems. Blue Glue has in-house expertise to engineer integrated solutions from fit for purpose circuit design through to web Browser workflow. Simply, Blue Glue creates strategic solutions delivering functionality not available with standard COTS and MOTS equipment.

To deliver end-to-end solutions, Blue Glue integrates many third party technologies such as ADS-B, AIS, Iridium satellite communications, smart cards, fingerprint, finger vein, signature pads, micro inertial units and RFID. Most solutions are operated via a standard web Browser requiring no middleware on client platforms and provide over the horizon visibility and management, thereby delivering increased return on investment for an existing standard operating environment.

The welfare of personnel and safety improvements are key Defence responsibilities. To that end Blue Glue is currently developing enhanced:

- Man overboard technologies
- Electronic pegboard with muster management
- Damage control team monitoring
- RADHAZ area management
- Diver safety systems, including monitoring of vital signs and through water communications.

1330 Closing Remarks from Chair

Dr Arvind Sinha – Director of Engineering, Helicopter Systems Division,
Defence Materiel Organisation

1345 Lunch & Exhibition Viewing

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