UNMANNED AIRBORNE VEHICLES AND INTEGRATED SYSTEMS SYMPOSIUM

10-12 MARCH 2009

10.45-14.00 TUESDAY 10 MARCH 2009 (HALL A AUDITORIUM)
09.30-14.00 WEDNESDAY 11 MARCH 2009 (HALL A AUDITORIUM)
09.30-10.45 THURSDAY 12 MARCH 2009 (HALL B CONFERENCE ROOM 3)

SPONSORED BY

Selex Galileo
UNMANNED AIRBORNE VEHICLES AND INTEGRATED SYSTEMS SYMPOSIUM
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With the support of the Australian Department of Defence, Aerospace Australia Limited is proud to present the Unmanned Airborne Vehicles and Integrated Systems Symposium at the AVALON2009 Australian International Airshow.

The Unmanned Airborne Vehicles and Integrated Systems Symposium has been organised to provide companies with the opportunity to present and showcase their advanced UAV, Airborne ISR technologies, products and capabilities to the Department of Defence, and other homeland security and civilian customers.

Due to its popularity, the Unmanned Airborne Vehicles & Integrated Systems Symposium will be held over three mornings of AVALON2009 (Tuesday 10, Wednesday 11 & Thursday 12 March 2009) and will include presentations by 18 diverse companies involved in the development, manufacture and use of various UAVs, payloads and integrated systems capabilities.

PROGRAM & SPEAKERS

**TUESDAY 10 MARCH 2009**

10.45 Welcome
Aerospace Australia Limited

**Introductory Remarks from Joint Chair**
Dr KC Wong – Senior Lecturer Aeronautical Engineering, University of Sydney
Dr Arvind Sinha – Director International Collaboration, Australian Aerospace & Defence Innovations

11.00 Unmanned Aerial Solutions, Systems Integration Innovation in Net-Centric Warfare
Tom Baker - International Program Manager, Tactical Intelligence Systems, Raytheon

Due to the need for sensing, control, and integration into networks, Unmanned Aerial Solutions are purchased as systems, not vehicles.

This presentation examines the market drivers of today’s Unmanned Aerial Solutions. It explores the need to standardise the UAS industry and the shift in systems integration to open systems architecture for net-centric UAS’, and discusses a selection of Raytheon fielded and developmental Unmanned Aerial Solutions that strive to address key challenges of modern net-centric UAS Operations.

11.30 RQ-4N Global Hawk and Broad Area Maritime Surveillance
Unmanned Aircraft Systems (BAMS UAS)
Thomas Twomey – Director, Aerospace Systems Sector, Northrop Grumman

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. The RQ-4N, the newest version of the Global Hawk unmanned aerial vehicle system (UAS) with state of the art maritime sensors for the BAMS UAS role, will provide the right capability for maritime ISR as an adjunct to the MMA aircraft for the Navy.

Operating in conjunction with naval forces, the RQ-4N has an exceptional combination of sensors and attributes (persistence, speed, and payload) necessary to conduct BAMS ISR and communications relay. This presentation will cover technical details involving these maritime sensors and naval war fighting capabilities. In addition, Global Hawk UAS has spearheaded advances in certification and safety qualification. Currently, it is the safest and most reliable unmanned systems in service today and one that will be capable of operating in all classes of airspace.

12.00 FALCO Tactical UAS - Integrated Operations
David Lazarus – Head Airborne Systems, Selex Galileo (UK)

UAS technologies continue to advance in response to user expectations and requirements. These include the ability to integrate UAS within a ground C3I environment rather than stand alone operation and flexibility in the numbers and types of unmanned platform that can be operated from a single node or ground station.

This presentation discusses an approach that enables UAS of any size, from mini through tactical and larger, to be operated from a single ground station. The ground station also has the capability to exploit imagery from multiple sources and payloads.

The Selex Galileo FALCO advanced Tactical UAS, is used as a case in point to provide an example of how a medium altitude, medium endurance unmanned aircraft is further enhanced in capability through its operation with this technology. The FALCO, which is already in service, has the ability to carry multiple payloads which can be changed out in a “plug and play” manner. This requires a ground system that can immediately accept differing imagery in standard and non standard formats and make the derived intelligence available locally or through a C4I network.

12.30 Multi-Mission Predator B
John Porter – Deputy Director Business Development, Aircraft Systems Group, GAAS

General Atomics Aeronautical Systems, Inc. (GA-ASI) remains a world leader in the design and production of highly sophisticated unmanned aircraft systems (UAS). This presentation examines the expanding capabilities of Predator B UAS to meet diverse and emerging requirements worldwide.

Predator-series UAS have accumulated over 600,000 flight hours providing persistent surveillance to federal, civilian, and military operators, as well as revolutionizing the battlefield with precision-strike capabilities.

Predator is the most combat-proven UAS in the world. First flown in 1994, it has accumulated over 500,000 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 U.S. borders; NASA has used it effectively to support fire fighters at state/national levels; and a maritime variant will soon support the Department of Homeland Security and US Coast Guard.

Northrop Grumman BAMS Global Hawk
13.00 Bridging the Gap between Tier II and Tier III UAS
Ben Marland – Business Development Manager, Insitu Pacific Limited

Tier II and Tier III UAS have been increasingly used in military operations since the late 1980’s and early 1990’s. This presentation discusses the classification, inherent capabilities and limitations of Tier II and Tier III UAS. Whilst there has been a fairly clear distinction between these types of UAV platforms in the past, increasingly Tier II Air Vehicles are growing in size, sophistication and associated reliability, whilst the size and weight of payloads such as SAR are decreasingly rapidly.

Further, the rapid growth of true autonomy in control algorithms and the ability to utilise multiple Tier II UAVs to achieve an operational effect previously the domain of Tier III or larger UAVs is fast becoming a reality. This blurring of the traditional lines between Tier II and Tier III will allow the application of increasingly sophisticated payloads while retaining the distinct advantages of a Tier II system, such as transportability, low support footprint, and low cost.

13.30 The Software Problem in Avionics
David Cook - Green Hills Software

Green Hills Software has a long pedigree in providing software and certification services for mission-critical and secure developments in the aviation and aerospace industries. Increasingly, software is the largest factor in the cost, schedule and especially risk of building and certifying a new airframe. This presentation discusses the imperatives of software being provably safe, and yet still having multiple features that make the airframe useful and competitive. These competing requirements make for a difficult software development process, especially if safety certification (DO-178B) or MILS security evaluation (EAL6+) is factored in. Traditional software design is monolithic, requiring the software suite to be tested and certified. But today’s processors allow true compartmentalisation of different tasks, maintaining isolation and independence, simplifying testing and certification: if only the software took advantage of these features!

10.00 MQ-8B Fire Scout
Michael Fuqua - Tactical Unmanned Systems, Northrop Grumman

The presentation will provide an overview of the MQ-8B Fire Scout system and will include a short history and system description. The presentation will also include information on current flight-testing and development growth potential as well as background on flight test activity that has taken place since the first MQ-8B flight.

10.30 Shadow 200 TUAS Program Update
Jim Christner - Director International Operations, AAI Corporation Defense Systems

The presentation will provide a history of Tactical UAV attempted fielding and deployments in the US. The focus will be on the most recent activities of the Shadow 200 US program for the US Army and US Marine Corps. The discussion will include a description of a typical Shadow system and Lessons Learned from recent operational deployments to Iraq and Afghanistan.

WEDNESDAY 11 MARCH 2009

09.30 What form does Australian UAS industry need to take to support to the ADF
Brad Yealland, General Manager Aerospace & Autonomous Systems Development, BAE Systems

Recent conflicts have forced the ADF to undertake an evolving range of military missions and this will be fundamental to the future acquisition and employment of UAS. The bespoke design of current systems means that it is costly and time consuming to modify and upgrade systems to meet new requirements. Australian industry must be in a position to support procurement plans that call for an increased emphasis on systems flexibility, overall cost of ownership, system safety and certification. They must be able to take advantage of technology that includes increased levels of autonomy that will drive a substantial reduction in operating costs and a modular flexible architecture that will provide the ability to adapt and modify systems through life as technology and mission requirements change. This is particularly applicable to sensor packages and their integration into the airframe, command and control, vehicle and system communications, and information processing and management in a closely coupled and highly integrated networked operating environment.

11.00 Cost Effective & Reliable UAV Target Systems
Chris Sievers – Managing Director, Air Affairs Australia

Air Affairs Australia is a provider to Defence and Industry aligned organisations that support target training worldwide and is the OEM for several products including the MTR-101 Reeling Machine, Underwing Stores Rack, Ground Support Equipment and Aerial Tow Targets, as well as the supplier and ILS provider of several UAVs & Targeting Systems.

Air Affairs’ new Phoenix Jet UAV has been developed specifically for the Defence Industry as a high performance training solution for a variety of gun and air defence missile systems. The Phoenix Jet provides a realistic threat simulation and enhancements such as MIIR, Smoke, IR and Luneburg lenses can be added to meet the requirements of a wide range of weapon systems.
This paper will discuss Australian industry’s ability to cost effectively provide and support advanced, reliable and readily upgradeable open architecture UAV systems capable of carrying multiple payloads that will meet the customer’s operational and networked ISR and targeting requirements. It will also discuss the importance of built-in redundancy and safety systems, as well as the training of qualified and CASA certified operators.

11.30 Mirach 100/5 Threat Simulation System
Carlo Siardi – Selex Galileo UAS & Simulators (Italy)
The expected introduction in the 2010–2020 timeframe, of innovative air-to-surface, air-to-air and surface-to-air weapon systems will lead to significantly expanded threat envelopes characterised by a highly differentiated family of offensive platforms. It follows that defensive systems are required to operate in complex and dynamic scenarios where multi-target engagement and adaptability to the incoming menace must become routine.

Notwithstanding the pressure of the drastically reduced budgets, there is a strong commitment by most MoDs to maintain present levels of operational training, while increasing mission requirements, but limiting overall costs through rationalisation, which translates into more efficient and realistic firing exercises where a reliable and cost-affordable threat simulator plays a key role. This calls for aerial target systems able to replicate a wide variety of future threats, and produce highly realistic tactical scenarios according to new operational doctrines (kinematics, signatures, countermeasures, formation flight, etc.).

This paper gives an overview of how Selex Galileo is addressing the need for realistic threat simulation by combining a highly capable and flexible platform, such as the Mirach 100/5, with a proper mix of mission payload.

12.00 Kestrel UAV Vision System: A New ISR Paradigm
Dr Paul Boxer – Managing Director, Sentient Vision Systems
Sentient Vision Systems specializes in Computer Vision software development for defence and security applications. UAVs tasked with ISR missions have major limitations. The “Soda Straw” effect, where UAVs capture only a narrow field of view, creates a need for a third party guidance and leads to a high cost/area covered. Bandwidth limits the quantity and value of ISR data and sustaining the diligent attention of the image analyst is an on-going challenge.

This presentation discusses a recent development that resolves these issues. The Kestrel UAV Vision system processes aerial surveillance imagery in real-time, either on-board or on a ground station. It detects and tracks multiple targets on the landscape below a UAV. It allows UAVs to fly higher and use a much wider field of view, covering an area over 20 times greater with the same sensor. It also facilitates autonomous flight beyond line-of-sight. This introduces a new paradigm for UAV ISR.

12.30 Latest Innovations in UAS Payloads
Steven Williams - Director of Business Development, FLIR Systems
This abstract gives an overview of a FLIR presented assessment of the future of Unmanned Aerial Systems and summarises the latest innovations in UAV payloads. It reviews legacy and multi-system heritage programs and examines three areas of UAV payloads:

The presentation discusses FLIR Systems’ imagers spanning Class 1 to 4 UAV’s, uncooled strap-down sensors, micro-gimbals, the Multi Mode Sensor Seeker program. It goes on to discuss wide area search strip mode, spot mode search, dual band and multi band optics assemblies, and compression challenges. Finally, it discusses that digital imaging sensors are key for network centric warfare and make everything a shooter.

13.00 Sabre Flight Explorer
David Hubner - Flight Explorer
Sabre Flight Explorer is an integrated asset tracking and management decision-support display system that provides the features required to improve tactical awareness and operational decision making.

The system provides real-time tracking of all assets and weather, and provides alerts on specific user defined mission critical events. In addition, the system allows for the integration of third party applications and easily updates the display on changes in airspace and operational boundaries.

13.30 UAS Training & International Test Range Directory
MAJ Robert Kendall - D Air CFG Canadian Department of National Defence
Major Kendall is the marketing manager for military training courses with International Training Programs of the Canadian Defence Forces.

This presentation will introduce the new International Test Range Directory website, and discuss elements of the website using the 5 Wing Goose Bay Range as an example.

THURSDAY 12 MARCH 2009

09.30 Airborne Asset Protection, Safe Landing and Recovery
Jo Chitty - Production Manager, Aerochrome International/Aero Safety Equipment
This presentation will discuss:

- How parachutes can be used for Asset protection, Equipment recovery and Public safety.
  - For UAV use
  - Test vehicles, flares and munitions - rockets, etc.
  - Cargo delivery, rescue supplies etc. using formal parachute equipment or manned and unmanned powered parachutes, with lifting capabilities up to 1200kg.

- Design and development of parachute systems for multiple applications. eg two man all terrain vehicle with parachute flying capabilities. UAV powered parachutes for surveillance, mapping, personnel or equipment delivery.

09.45 Application of Radial Fan Flight Technology to a VTOL UAV
Kim Schluke – Managing Director, Entecho
Entecho is a Perth based technology company specialising in aeronautical and mechanical engineering, flight control design and avionics, composites and computational fluid dynamics.

This paper presents a novel radial fan based VTOL technology, and its application to a back-packable sized Mupod MUAV prototype craft.

While radial fans have been used extensively in industry they have not seen widespread use in aerodynamic lifting platforms. With a radial fan, high lift efficiency can be achieved with quieter, low speed enclosed rotor blades. The hubless rotor also allows for a central payload area while providing gyroscopic stability allowing for operations within confined or populated environments.

10.15 Affordable and Sustainable ISR Systems
Michael Hall - National Marketing Manager, Airflite
Paul Jennison – VP Westcam
Remo De Feo - CEO Vulcanair

The aim of this presentation is to provide a concept of operations of how the use of combined systems capabilities, an affordable and easily sustainable ISR capability is able to provided to the customer.

The presentation will also provide an understanding of how the Wescam equipment mounted in Vulcanair aircraft can provide real time information whether it be detecting and tracking illegal activities or monitoring emergency situations such as fire fighting or search and rescue.