Welcome from our Chair

On behalf of The Williams Foundation, I am pleased to welcome you to our *Next Generation Autonomous Systems* conference.

Since 2013 the Sir Richard Williams Foundation conferences have focused on building an integrated fifth generation force. Recent conferences have evolved from the acquisition of new platforms to the process of shaping and better understanding the environment in which that integrated force will prepare and operate. Highlighted have been the challenges of making the strategic shift from counterinsurgency operations in Iraq and Afghanistan to higher tempo and higher intensity Joint operations involving peer competitors.

Within this context, the 2021 conferences further develop the ideas associated with an increasingly sophisticated approach to Joint warfighting and power projection as we face increasing pressure to maintain influence and a capability edge in the region. The Williams Foundation will continue to look at the evolution of the Australian Defence Force from the perspective of the sovereign lens and setting the conditions for future success.

This conference will explore the force multiplying capability and increasingly complex requirements associated with unmanned systems. From its origins at the platform level, the opportunities and potential of increased autonomy across the enterprise are now expected to fundamentally transform Joint and Coalition operations. Defence industry can and will play a major part in the transformation with opportunities extending beyond platforms to the payloads and enabling systems which underpin the necessary risk management and assurance frameworks demanded by Defence. The importance of industry is reflected in the design of the conference program and the speakers identified

We thank our gold sponsors Lockheed Martin, Northrop Grumman, Raytheon, Boeing, Thales, and AOS, our silver sponsor, Bell, and our bronze sponsors, L3Harris Technologies, General Atomics, and CAE for their generosity in supporting the program. We also thank the Royal Australian Air Force for their continued support.

Williams' is proud to host this event and trust that you find the day beneficial.

AIRMSHL Geoff Brown AO (Retd)
Chair

Program Outline

The concept of the Unmanned Air System (UAS), or Unmanned Aerial Vehicle (UAV), is nothing new nor is their use in missions which traditionally challenge human performance, fragility, and endurance. Ongoing operational experience confirms unmanned systems on their own are not the panacea and trusted autonomy in manned and unmanned teaming arrangements in each environmental domain is emerging as a key operational requirement.

The narrative has progressed the argument for greater numbers of unmanned systems in a far more mature and balanced way than hitherto. The manned-unmanned narrative is now sensibly shifting towards 'and', rather than 'or'. Manned and unmanned teaming leverages the strengths and mitigates the weakness of each platform and concentrates the mind on the important operational aspects, such as imaginative new roles, and the challenges of integration to generate the desired overwhelming firepower.

This capability will require a complex web of advanced data links and communication systems to make it operate as a combat system. Designing and building the 'kill web' so that it can enable the delivery of manned-unmanned firepower across domains will be a huge challenge not least due to the laws of physics. However, the ability to train, test, evaluate and validate tactics and procedures will add a whole new level of complexity to generate the 'trusted autonomy' required for warfighting.

The aim of the April 2021 conference is to promote discussion about the future implications of autonomous systems. It will investigate potential roles for autonomous systems set within the context of each environmental domain, providing Service Chiefs with an opportunity to present their personal perspective on the effect it will have on their Service.

The conference will also explore the operational aspects of autonomous systems, including command and control and the legal and social implications that affect their employment. And finally the conference will examine the current research agenda and allow industry an opportunity to provide their perspective on recent developments in unmanned air, land, surface and sub-surface combatants.

Program – Session 1

0800-0830	Registration, light breakfast and tea and coffee on arrival
0830-0835	Welcoming Remarks AIRMSHL Geoff Brown AO (Retd) Sir Richard Williams Foundation
0835	Introduction and MC WGCDR Keirin Joyce CSC Air Force Remotely Piloted Aircraft Systems
0835-0855	*Historical Perspectives* GPCAPT Jo Brick Australian Defence College
0855-0915	*Some Legal Aspects of Autonomous Systems* Professor Rob McLaughlin Australian National Centre for Oceans Resources and Security
0915-0935	*Trusted Autonomous Systems and Force Design* CDRE Michael Turner CSM and Bar, RAN Force Exploration
0935-0955	*Current Initiatives and Opportunities* Professor Jason Scholz Trusted Autonomous Systems Defence Cooperative Research Centre
0955-1015	*Navy Vision for Autonomous Systems* VADM Michael Noonan AO, RAN Chief of Navy

Program – Session 2

	Morning tea
1045-1105	*The RAAF Loyal Wingman and reviving Australian Aerospace Industry* Andrew Glynn Boeing Australia
1105-1125	*Countering Autonomous Systems* AVM Bill Henman AM (Retd) Raytheon Australia
1125-1145	*Building Enduring Sovereign Industry Capability'* Dr John Best Thales
1145-1205	*Autonomy and Logistics* COL David Beaumont Australian Army Research Centre
1205-1225	*Opportunities for Disruptive Innovation* Marcus Hellyer Australian Strategic Policy Institute
1225-1300	*Panel Discussion* Facilitated by WGCDR Keirin Joyce CSC

Program – Session 3

1300-1345	Lunch
1345-1400	*Investing in Autonomy for National Resilience – Not a Luxury but a Necessity* Dr Andrew Lucas Agent Oriented Software Group
1400-1420	*Autonomous Systems as an Enabler for Networked Operations* AVM Chris Deeble AM, CSC (Retd), Northrop Grumman Australia and Scott Winship via Zoom Northrop Grumman Corporation
1420-1440	*Developmental Requirements and Challenges* Dr Tony Lindsay Lockheed Martin
1440-1500	*Army Vision for Autonomous Systems* LTGEN Richard Burr AO, DSC, MVO Chief of Army
1500-1520	*Air Force Vision for Autonomous Systems* AIRMSHL Mel Hupfeld AO, DSC Chief of Air Force
1520-1530	Formal Close AIRMSHL Geoff Brown AO (Retd) Sir Richard Williams Foundation

Information

COVID-19 Guidelines	Please ensure you have signed in using the Canberra Checkin App as per ACT Health guidelines. Please see staff at the help desk or Gallery staff to check in. Hand sanitiser has been provided and we encourage all participants to practice safe social distancing guidelines.
Catering	Tea, coffee and a light breakfast on arrival, morning tea and lunch will be served in Gandel Hall. Tea and coffee will be available throughout the day. Please see the National Gallery catering staff for previously advised special dietary meals.
Security	Given the array of dignitaries attending this program, attendees are required to wear the provided name tag at all times. These name tags will be required to gain access to Gandal Hall.
On-the-record	Please note that selected invited media may be in attendance. The conference including question time will be on-the-record.
Parking	Any parking costs are the responsibility of the attendee. Paid parking is available in the underground National Gallery car park. If you have parked in the National Gallery underground car park, payments can be made in advance to avoid queues for parking payments at the conclusion of the conference. Please see staff at the help desk during the day to pre-pay your full day ticket.

THE CENTRAL BLUE

In the lead up to the conference, our forum, The Central Blue has been running a series to generate discussion and enable those that cannot attend the conference to gain a perspective on the topic. What does #NextGenUAS mean for Australia and its region? We want to hear from you!

The concept of the Unmanned Air System (UAS), or Unmanned Aerial Vehicles (UAV), is nothing new nor is their use in missions which traditionally challenge human performance, fragility, and endurance. Unmanned systems have now provided a far broader range of options for the application of force against even the most challenging target sets. However, ongoing operational experience confirms unmanned systems on their own are not the panacea and trusted autonomy in manned and unmanned teaming arrangements in each environmental domain is emerging as the preferred method.

To see the discussion visit The Central Blue.
https://www.williamsfoundation.org.au/thecentralblue

The Twitter, Facebook and LinkedIn hashtag is #NextGenUAS #futureautonomous. The editorial team will be live tweeting during the conference and we encourage you to do so also.

Contact the editorial team at thecentralblue@gmail.com

Our Sponsors

The Sir Richard Williams Foundation would like to thank the sponsors of this conference:

GOLD SPONSORS

LOCKHEED MARTIN Australia

Raytheon Australia

NORTHROP GRUMMAN

BOEING

THALES

AOS™ Autonomous Decision-Making Software

SILVER SPONSOR

BELL

BRONZE SPONSORS

L3HARRIS

CAE

GENERAL ATOMICS AERONAUTICAL

Colonel David Beaumont
Director, Australian Army Research Centre

David Beaumont is a military logistician by background, with experiences across Defence that have seen him lead Army training institutions and contribute to ADF modernisation and capability development. He has served in East Timor, Iraq and Afghanistan as part of Australian and multi-lateral military commitments, and has worked in inter-Departmental environments. David was selected as Director of the Australian Army Research Centre (AARC) in 2019, and since 2020 has been responsible to the Chief of Army for many of the Army's research partnerships with domestic and international academia, research-institutes and think-tanks. Key achievements in this role include the publishing of 'Strategic Assessment' advice to senior ADF leaders, as well as enhancing the public presence of the AARC. This has seen him develop communities of practice across within the Australian national security community.

David researches, writes and presents about strategic policy, logistics, military capability development, and the involvement of the 'whole-of-nation' in defence and security. He commenced doctoral research at the Strategic and Defence Studies Centre, Australian National University, in 2016; David's research is examining the vitally important national-security interaction between the 'national support base' and Defence in the 1980's and 1990's. He manages, edits and writes to an international audience at the blog 'Logistics in War' and other online venues. His last major paper was 2020's 'An uncertain and dangerous decade' which examines the coming decade as characterised by strategic competition, post-pandemic crisis responses and new roles and tasks for the ADF and Army.

Dr John Best
Vice President, Chief Technical Officer, Thales Australia

Dr John Best is Vice President, Chief Technical Officer at Thales Australia. His responsibilities include technical strategy, research and development, innovation and engineering. Partnerships and collaboration are significant components of the Thales innovation system and within his portfolio of responsibilities.

John's early career was spent at the Defence Science and Technology Organisation, where he contributed to, and led, programs of work ranging across underwater weapon effects modelling, mine warfare operations research, virtual environments and combat systems.

John is a director of DMTC Limited, a defence-oriented research consortium. He has previously been a director of Eurotorp Pty Limited and the Defence RPDE program.

He holds a Bachelor of Science degree with First Class Honours in Physics from the University of Queensland, a PhD in Mathematics from the University of Wollongong and an MBA from the University of Adelaide. He is a graduate of the Australian Institute of Company Directors.

Group Captain Jo Brick
Chief of Staff, Australian Defence College

Group Captain Brick studied law at the University of Technology, Sydney, and is admitted as a solicitor in the Supreme Court of New South Wales. She joined the Air Force through the undergraduate sponsorship scheme in 1997. As an Air Force Legal Officer, she provides legal advice to commanders and their executive staff on matters such as the enforcement of military discipline, personnel management, and the conduct of military operations. Previous postings include Staff Officer Legal to the Chief of Defence Force, and Legal Advisor to Chief of Air Force. She was also previously Directing Staff on the Australian Command & Staff Course at the Australian War College. She is now the Chief of Staff, Australian Defence College.

Group Captain Brick's operational deployments include Operation Catalyst (Iraq), Operation Slipper (Afghanistan) and Operation Amulet (domestic security). Her most recent deployment was on Operation Okra, in 2016, as the Legal Advisor to the Commander of the Australian Air Task Group.

Group Captain Brick has a keen interest in international relations, military strategy, and the laws of war. She holds a Master of Laws (Australian National University) and a Master of International Security Studies (Deakin University). She is a graduate of the Australian Command & Staff College and completed a Masters (Advanced) in Military and Defence Studies (Honours) through the Australian National University. As part of this Masters program, she completed a thesis on Australian civil-military relations and strategy.

Group Captain Brick is an editor for a number of blogs: *The Strategy Bridge,* and *The Central Blue*. She is also a published author who has contributed chapters to two books published in the United States: *Redefining the Modern Military* (US Naval Institute Press, 2018) and *On Strategy: A Primer* (US Army University Press, 2020). She recently contributed a chapter about the sci-fi series, *The Expanse*, and civil military relations to a forthcoming publication *To Boldly Go: Leadership, Strategy, and Conflict in the 21st Century and Beyond* (October 2021).

Air Marshal Geoff Brown AO (Retd)
Chair, Sir Richard Williams Foundation

Geoff Brown AO retired from the Royal Australian Air Force in July 2015 as Air Marshal in the position of Chief of Air Force. In a 35-year career, he commanded at all levels in the Air Force and flew Chinook helicopters, F-111s and F/A-18 as well as being a flying instructor and a member of the Roulette Aerobatic team. His operational service included Operation Iraqi Freedom where he was the operational commander for all RAAF assets.

Among his qualifications, he holds a BEng (Mech), a Master of Arts (Strategic Studies), Fellow of the Institute of Engineering Australia and is a Fellow of the Royal Aeronautical Society.

Since leaving the Air Force he has been appointed as a Director of Lockheed Martin (Australia), a Director of Electro Optic Systems, Chairman of the ACT Defence and industry Board, Chairman of the Sir Richard Williams Foundation, Chairman of the Advisory Board of CAE Asia Pacific and Middle East, Director on the Governing Council for the Temora Air Museum and a Director of GCB Stratos Consulting. He also mentors in Leadership and Strategic Studies at the Australian Defence College.

His honours and awards include his appointment as an Officer in the Order of Australia, the United States Legion of Merit and the Meritorious Service Medal from Singapore.

Lieutenant General Rick Burr, AO, DSC, MVO
Chief of Army

Lieutenant General Burr assumed command of the Australian Army on 2 July 2018.

He joined the Army in 1982, graduating from the Royal Military College at Duntroon in 1985 to the Royal Australian Infantry Corps. He has seen service in 8th/9th Battalion, Royal Australian Regiment, and the Special Air Service Regiment, which he commanded in 2003–04.

Lieutenant General Burr's senior leadership roles have been diverse: he was previously the Deputy Chief of Army and, prior to that, uniquely, served as the Deputy Commanding General to the US Army—Pacific, becoming the first foreign officer to hold the position. In 2011–12, he served as Commander of 1st Division and the Deployable Joint Force Headquarters.

His operational commands include Commander of Special Operations Forces to the International Security Assistance Force in Afghanistan in 2008, a theatre-level multinational command position, and, earlier, Commander of Australian Special Operations Task Groups in both Afghanistan (2002) and Iraq (2003).

In addition to his command roles, Lieutenant General Burr gained broad experience across Army, Defence and the Australian Government in a range of staff, training and representational appointments.

Committed to the development of our future leaders, he has served as an instructor at the Royal Military College at Duntroon, and Chief Instructor of the Australian Defence Force Warfare Centre, responsible for the education and training of ADF officers in planning joint operations.

Lieutenant General Rick Burr, AO, DSC, MVO

In key staff roles he was the senior operations and plans officer in Headquarters Special Operations Command in 2001–02, and Military Assistant to the Chief of the Army in 2005. As a colonel he served as Director of Force Structure and then Director General Preparedness and Plans in Army Headquarters. In 2007, he was seconded as a senior adviser to the Department of Prime Minister and Cabinet, and was Director General Military Strategic Commitments in 2009–10. In a key representational appointment, he was the Equerry to Her Majesty Queen Elizabeth II for the Royal Visit to Australia in 2000.

Lieutenant General Burr is a Distinguished Graduate of the United States Marine Corps Command and Staff College and graduate of the USMC School of Advanced Warfighting. He holds a Bachelor of Arts from the University of New South Wales, a Master of Military Studies from the Marine Corps University, and has completed the Harvard Business School Advanced Management Program. His personal awards include being appointed Officer of the Order of Australia, Distinguished Service Cross, Member of the Royal Victorian Order and a number of foreign awards for distinguished service. He is also Patron to the Defence Australian Rules Football.

Air Vice Marshal Chris Deeble AO, CSC (Retd)
Executive Director, Strategy, Northrop Grumman Australia

Chris Deeble is Executive Director, Strategy Northrop Grumman Australia. Deeble is responsible for supporting the company's longstanding programs in Australia, as well as exploring new business pursuits.

Prior to joining Northrop Grumman, Deeble worked for Airservices Australia as the program executive for OneSKY, responsible for delivering the Civil Military Air Traffic Management System for Australia. As the program executive, he led a joint Airservices and Defence team in managing the acquisition and delivering the infrastructure of the most complex, world-leading air traffic management system.

Previously, Deeble served for 37 years in the Australian Defence Force, most notably as an Air Vice-Marshal. As a senior program manager in the Capability Acquisition and Sustainment Group, he managed over $25 billion of complex acquisition and sustainment programs. These programs included the Joint Strike Fighter, Wedgetail Airborne Early Warning and Control, Multi Role Tanker Transport and Collins Class Submarine. His performance in leading these significant programs was recognised in 2016 when he was awarded the Officer of the Order of Australia (AO).

Prior to serving as Air Vice-Marshal, Deeble undertook senior roles in Air Force capability management and aerospace development. As the Director General Aerospace Development, Deeble was responsible for leading the development of submissions to the Australian government for all joint aerospace capability. As a result of his efforts, he was awarded the Conspicuous Service Cross (CSC) in 2007.

Deeble earned a bachelor's degree in mathematics from the University of Sydney, New South Wales

Andrew Glynn
Airpower Teaming System (ATS) Program Manager, Boeing

Andrew Glynn is the Boeing Airpower Teaming System (ATS) Program Manager. In this role, he is responsible for leading the design and development of the first military combat aircraft to be designed, engineered and manufactured in Australia in more than 50 years, including collaboration with the Royal Australia Air Force through the Loyal Wingman Advanced Development Program. The Airpower Teaming System is Boeing's newest unmanned platform designed for global defense customers and is the company's largest investment in a new unmanned aircraft program outside the United States.

Prior to this role, Glynn was the Boeing Research & Technology Everett Site Support Leader, responsible for leading technology implementation across the 747, 767 and 777 Airplane Programs. Before this, he was the Boeing Research & Technology Melbourne Site Leader, responsible for establishing the Boeing R&D portfolio for advanced manufacturing within Australia.

Since joining Boeing in 2002, Glynn has held a variety of technical and program leadership roles across research and development, product development, engineering and production support and has over 10 patents granted by the USPTO.

Glynn received his Bachelor of Engineering (Mech) & Bachelor of Science (Physics) from The University of Melbourne, Masters of Science from Ecole Nationale Superieure de l'Aeronautique et de l'Espace (SUPAERO) and Masters of Business Administration from Melbourne Business School.

Marcus Hellyer
Senior Analyst, Australian Strategic Policy Institute

Marcus is a Senior Analyst focusing on Defence economics and military capability.

Previously he was a senior public servant in the Department of Defence, responsible for ensuring that the government was provided with the best possible advice and recommendations on major capital investments such as the Joint Strike Fighter, Future Frigate and Future Submarine. He also developed and administered Defence's capital investment program.

Marcus has also worked in Australia's intelligence community as a terrorism analyst.

Before joining the public service, Marcus had a career as an academic historian in the United States.

Air Vice Marshal Bill Henman AM (Retd)
Strategic Advisor Air & Space, Raytheon Australia

Bill Henman is the Strategic Advisor Air & Space within Raytheon Australia's Strategy function. He has held this role since joining the company in July 2019.

Bill supports the Head of Strategy & Business Development in ongoing strategic dialogue with the Defence customer and providing strategic context and analysis to the company through a domain-focused approach to customer engagement.

Bill joined Raytheon Australia following a short period of retirement from the Royal Australian Air Force after serving for close to 40 years. Bill retired from the RAAF as an Air Vice-Marshal with significant experience in Air Operations and Command & Control in the Joint and Air domains. His last appointment in the RAAF was Commander of the Integrated Area Defence System, based in Malaysia. This role involved the planning and conduct of biannual multinational exercises, which involved engagement with Defence and government officials from Australia, the UK, NZ, Singapore, and Malaysia.

Prior to his last command, Bill held the appointment of Director General Strategic Capabilities Coordination within Defence, where he was responsible for Space, Cyber, Information Operations and Ballistic Missile Defence. Preceding this, from 2007-2009, he served as an embedded General Officer with the US Air Force. During his early career, Bill served as a fighter pilot, which involved training fellow fighter aircrew and led to Bill commanding Australia's fighter conversion school.

Bill is currently the President of the United Services Institute of the ACT, promoting understanding and awareness of Defence and national security issues. Bill is a Member of the Order of Australia and was awarded the Bronze Star medal from the US Military for service in 2003.

Bill holds a Bachelor of Science in physics from Melbourne University and two master's degrees in strategic studies.

Air Marshal Mel Hupfeld, AO, DSC
Chief of Air Force

Air Marshal Mel Hupfeld was born in Sydney in 1962. He joined the Royal Australian Air Force (RAAF) as an RAAF Academy Cadet in January 1980, winning the Flying Prize for his year and graduating with a Bachelor of Science degree in 1983.

Air Marshal Hupfeld's early career was spent in a variety of flying positions on Mirage and F/A-18 aircraft, primarily with No 3 Squadron (3SQN) and No 2 Operational Conversion Unit (2OCU), before qualifying as a Fighter Combat Instructor in 1989. Following a period of service as B Flight Commander, 3SQN, Air Marshal Hupfeld was appointed as the Executive Officer of 2OCU in 1995.

In 1997 Air Marshal Hupfeld was selected to attend the Royal Air Force Advanced Staff Course, graduating with a Master of Arts in Defence Studies from King's College in London, before taking up post as a Deputy Director in the Aerospace Development Branch.

In 2001 Air Marshal Hupfeld took command of No 75 Squadron (75SQN)

and led the Squadron in operations in Middle East on Operations BASTILLE and FALCONER. In 2003 Air Marshal Hupfeld was awarded a Distinguished Service Cross in recognition of his performance as Commanding Officer 75SQN on Operation FALCONER, and his Squadron was awarded a Meritorious Unit Citation.

On promotion to Group Captain in January 2004 he was appointed Director Aerospace Combat Development in the Australian Defence Headquarters, before accepting appointment as Officer Commanding No 81 Wing in January 2006.

Air Marshal Mel Hupfeld, AO, DSC cont.

Promoted to Air Commodore on November 2007, he became the Director of the Combined Air Operations Centre in the Middle East Area of Operations, before returning to Australia as the Director-General Air / Director General Air Command Operations in March 2008. In December 2009, he took command of Air Combat Group where he oversaw all of the RAAF's fast-jet combat aircraft to deliver Australia's capability to control the air and conduct precision strike.

Air Marshal Hupfeld was promoted and appointed as the Air Commander Australia on 3 February 2012. In this position he provided specialist air advice on raise, train and sustain issues to the joint environment.

In September 2014 he was appointed Head Capability Systems Division in the Capability Development Group. In 2015 Air Marshal Hupfeld received an appointment as Officer of the Order of Australia (AO) for distinguished service to the Australian Defence Force in senior command and staff appointments. In August 2015 he was appointed to the role of Acting Chief Capability Development Group. On the disbandment of Capability Development Group, Air Marshal Hupfeld took up the newly created position of Head Force Design in Vice Chief of Defence Force Group on 1 April 2016.

On promotion, Air Marshal Hupfeld was appointed as Chief Joint Operations in May 2018 and subsequently Chief of Air Force in July 2019.

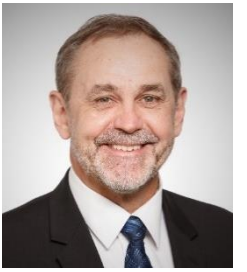
Air Marshal Hupfeld is married to Louise, and his interests include mountain biking, running, fishing, light aircraft, and sailing.

Our Speakers

Wing Commander Keirin Joyce, CSC
Chief Engineer, Air Force Remotely Piloted Aircraft Systems (RPAS): MQ-4C Triton and MQ-9B SkyGuardian

WGCDR Joyce is an Australian Defence Force Academy graduate with an Honours Bachelor of Aeronautical Engineering. WGCDR Joyce has spent the last 15 years in support of the ADF Unmanned Aerial Systems (UAS) capability including deployment to Iraq and Afghanistan. WGCDR Joyce is a Chartered Professional Engineer, holds a Masters in Aviation Management (specialising in Human Factors), a Masters of Aerospace Engineering, a Masters in Military and Defence Studies, a Graduate Diploma in Secondary Education (Mathematics) and has researched part time as a Doctorate of Philosophy student through ADFA. For the last four years, WGCDR Joyce was the Australian Army UAS Sub-Program Manager responsible for all Australian Army UAS activities, including Army Drone Racing, and then the Royal Australian Air Force Remotely Piloted Aircraft Systems (RPAS) Sub-Program Manager. He is currently the Chief Engineer for RAAF RPAS: MQ-4C Triton and MQ-9B SkyGuardian. Keirin is married to Rachael and they have four children.

Dr Tony Lindsay
Director STELaRLab, Lockheed Martin Australia



Tony is Director of the Science, Technology, Engineering Leadership and Research Laboratory (STELaRLab), Lockheed Martin's first international multidisciplinary R&D Laboratory. He is responsible for the executive leadership of STELaRLab, maintenance of key R&D customer relationships, and execution and delivery of results on internal and external R&D projects.

Prior to his role at Lockheed, Tony was Chief of the National Security and Intelligence, Surveillance and Reconnaissance Division of the Defence Science and Technology (DST) Group. In that role he was responsible for R&D programs supporting Australian Defence Organisation (ADO) ISR Projects including major surveillance acquisitions and intelligence programs. Corporately, he was responsible for managing the senior Defence relationships across all DST Group intelligence programs, and for strategic engagement and shaping of cross-cutting R&D initiatives supporting the civilian National Security Agencies.

Between 2005 and 2008 he held the diplomatic post of Counsellor, Defence Science, at the Australian Embassy in Washington DC, serving as Australia's senior R&D representative to both the United States and Canada. Tony's early career was in electronic warfare (EW), where he was eventually responsible for managing and coordinating all DST EW R&D and the provision of operational countermeasures development and reprogramming support to the Royal Australian Air Force.

Tony graduated from James Cook University of North Queensland with a BSc double major in Physics and Mathematics, followed by a BSc (Hons) in Physics and a PhD in atomic physics.

Dr Tony Lindsay cont.

In 2006 Tony received the ADO's highest award for R&D, the Defence Minister's Award for Defence Science. His extensive R&D collaborations with the US have been recognized with a Bronze De Fleury Medal from the US Army Corps of Engineers in 2007, a Defense Intelligence Agency National MASINT Office Award for Excellence in 2009. In 2016 he received both the Central Intelligence Agency's Agency Seal Medal and the National Reconnaissance Office Director of Advanced Systems and Technology's Spyglass Award (he is the only non-US person to have received this award). He is a Fellow of the Australian Academy of Technology and Engineering, and a Senior Member of the Institute of Electrical and Electronic Engineers.

Dr Andrew Lucas
Founder and Managing Director of Agent Oriented Software

Andrew Lucas is the founder and Managing Director of Agent Oriented Software (AOS), established in Melbourne in 1997 as an offshoot from the Australian Artificial Intelligence Institute (affiliated with the AI Center at SRI International, Menlo Park, CA). AOS specialises in AI, and autonomous and robotic systems – working on autonomous systems with UK Ministry of Defence, RAAF, Australian Army, RAN, CASG, and DST Group.

AOS has developed its own technology base of AI software, focused on intelligent software agents, combining this with other AI technologies, including machine learning, machine vision, and constraint programming.

Andrew leads AOS's development of off-road autonomous vehicle technology, including teams of autonomous vehicles, for the defence, agricultural, mining and construction industries.

Andrew holds a Ph.D. in Aeronautical Engineering from Cambridge University and a Bachelor of Engineering (1st Hons) from the University of Melbourne. He has over forty years of experience in various engineering roles in aircraft and aero engine design, AI software, management and technology consulting, robotic systems, and agricultural technology. Andrew is a member of the Royal Aeronautical Society's Unmanned Air Systems Specialist Group.

Our Speakers

Professor Rob McLaughlin
Australian National Centre for Oceans Resources and Security

Rob McLaughlin is Professor at the Australian National Centre for Oceans Resources and Security, Senior Fellow at the Stockton Centre for International Law at the US Naval War College, and honorary Professor at ANU. Prior to this, he was the inaugural Head of the UNODC Maritime Crime Program, and served in the Royal Australian Navy as a Seaman officer and a Legal officer.

Rear Admiral Peter Quinn, AM, CSC, RAN
Head of Navy Capability

Rear Admiral Pete Quinn joined the Royal Australian Navy in 1983 from Mackay, Queensland. As a Principal Warfare Officer specialising in Above Water Warfare he has served in a wide variety of Navy, Joint and exchange appointments, including operational deployments to the North West Pacific, the Middle East and East Timor

His seagoing service has primarily been in Australian and Canadian frigates and destroyers, including command appointments as Commanding Officer of the frigates HMAS Sydney (2003-2006) and HMAS Anzac (2009-2010). Early shore appointments include: Officer in Charge Maritime Warfare Training Group, Head of Combat Systems Training and Director Maritime Combat Development.

Star rank appointments have included: Director General Navy Capability Transition and Sustainment, Head Joint Capability Coordination, Head Joint Capability Management and Integration, Head Force Integration and his current position as Head Navy Capability.

As Head Navy Capability Rear Admiral Quinn reports directly to the Chief of Navy and is responsible for identifying the needs and requirements of Navy's future capabilities and for the development and delivery of these capabilities to the Fleet.

Our Speakers

Professor Jason Scholz
Chief Executive Officer, Trusted Autonomous Systems Defence Cooperative Research Centre

As CEO and former Chief Scientist and Engineer, Professor Jason Scholz leads the Trusted Autonomous Systems Defence Cooperative Research Centre, a not-for-profit company to advance industry-led, game-changing technologies for the Australian Department of Defence with over $50m in funding.

Jason has over 30 years experience in Defence Science and Technology in decision sciences, artificial intelligence, communications and control. He has led the successful research, development and transition of new telecommunications, control systems, and decision support technologies with embedded AI into Defence with significant operational impacts, and over $200m in savings.

Prof Scholz is the 2020 recipient of the McNeil Prize, which is presented annually to "an individual from Australian industry and academia who has made an outstanding contribution to the capabilities of the Royal Australian Navy".

Commodore Michael Turner CSM and Bar, RAN
Director General Force Exploration

Commodore Turner joined the Royal Australian Navy in 1989, graduating from the Australian Defence Force Academy in 1992 with an Electrical Engineering Degree. He conducted a number of sea postings in PERTH Class Destroyers and ANZAC Class Frigates, as a Seaman Officer and a Weapons Electrical Engineering Officer, including Command of the ANZAC Class Frigate HMAS Warramunga.

After command, Commodore Turner was the capability support manager for the ANZAC Class Frigate, before becoming the Surface Combatant Group Capability Manager's Representative responsible for the ADELAIDE and ANZAC Class Frigates and HOBART Class Destroyers.

Commodore Turner has extensive operational experience, serving onboard HMAS ANZAC during OPERATIONS DAMASK and SLIPPER, and then on staff at the Combined Maritime Forces in Bahrain as Plans Officer, CTF 150 staff and Director of Operations respectively supporting OPERATIONS CATALYST, SLIPPER and MANITOU. He also conducted an exchange posting with the USN Navy in Norfolk, Virginia at the Surface Warfare Development Group.

He is a graduate of the Australian Command and Staff Course and the UK Royal College of Defence Studies.

On 11 December 2020 Commodore Turner took up the role of Director General Force Exploration in Force Design Division of VCDF Group.

He is married to Alexandra, and has two sons, Nicholas and Christopher, where they all enjoy playing tennis and skiing and watching AFL, Football, Rugby and Cricket.

Scott Winship
Sector Vice President, Advanced Programs, Northrop Grumman Aeronautics Systems

Scott Winship is sector vice president of Advanced Programs at Northrop Grumman Aeronautics Systems, a premier provider of military aircraft, autonomous systems, aerospace structures and next-generation surveillance, strike and commercial solutions to assist our customers worldwide.

In this role, Winship oversees strategic business unit Scaled Composites; implementation and development of combat aviation strategy; and strategic programs and initiatives including the Unmanned Combat Air System, Next Generation UAS ISR/ Strike, and Advanced Mission Management utilizing our Distributed Autonomy/ Responsive Control technology.

Most recently, Winship was vice president of Strategy and New Business Growth, where he led the sector's strategic development initiatives. Prior to that, he was vice president of Advanced Air Warfare Development, responsible for enterprise-wide strategic integration and pursuit of new opportunities in the former Strategic Systems division portfolio.

Previous roles include: vice president and program lead executive for restricted advanced program pursuits, where he led Northrop Grumman's pursuit, capture and proposal strategy development for the Presidential Helicopter Replacement and the Combat Rescue Helicopter programs; primary focal point for domestic and international rotorcraft new business initiatives; vice president and program manager through concept definition, proposal, build and final design development for the X-47B Navy Unmanned Combat Air System Carrier Demonstration Program (Navy UCAS-D); and program director who led the Fire

Scott Winship cont.

Scout Vertical Take-off and Landing Unmanned Aerial Vehicle Program through first flight and into production.

Prior to joining Northrop Grumman in 2002, Winship served as deputy product manager for the Joint Strike Fighter X-35B STOVL program at Lockheed Martin Aeronautical Company's Skunk Works division. He held a variety of positions of increasing responsibility while at Lockheed Martin, including X-35 Flight Sciences integrated product team (IPT) leader, X-35 Air Vehicle IPT leader and X-35B Integrated Flight Propulsion Control IPT leader. Winship also served on the YF-22/F-22 program as Wind Tunnel Test IPT leader, during which time he helped develop the thrust vectoring control on the YF-22 program.

Winship earned a bachelor's degree in aerospace engineering from San Diego State University and was a naval aviator. His engineering honors include Employee of the Year for the F-22 program (1994); "Gold Skunk" Award for Leadership (1999); Lockheed Martin Aerostar Award for Leadership (2001); Teamwork (2002); and the American Institute of Aeronautics and Astronautics Engineer of the Year (2002).

Northrop Grumman solves the toughest problems in space, aeronautics, defense and cyberspace to meet the ever evolving needs of our customers worldwide. Our 90,000 employees define possible every day using science, technology and engineering to create and deliver advanced systems, products and services.

Our Gold Sponsor Profiles

Headquartered in Canberra, Lockheed Martin Australia is a wholly owned subsidiary of Lockheed Martin Corporation. The company employs more than 1,100 people in Australia working on a wide range of major programs spanning the aerospace, defence and civil sectors.

Our innovative technologies have been contributing to the security of Australia and realisation of Australia's national interests for over 70 years. We deliver exceptional program performance and leading innovation for Australia across a broad range of environments and domains. Lockheed Martin's diverse programs form a critical backbone of Australia's current and future defence capabilities including Next Generation Pilot Training, Combat Systems Integration, Rotary Wing Systems and Sustainment, 5th Generation Air Combat Capability, Surveillance across air, sea, land and space domains.

Headquartered in Bethesda, Maryland, Lockheed Martin is a global security and aerospace company that employs approximately 110,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

https://www.lockheedmartin.com/en-au/

Northrop Grumman Australia solves the toughest problems in space, aeronautics, defence and cyberspace to meet the ever-evolving challenges of an increasingly contested global security environment. Our 90,000 employees worldwide define possible every day using next generation technologies to create and deliver advanced systems, products and services.

For more than 20 years, Northrop Grumman Australia has been a proud strategic partner of the Australian Defence Force, delivering world-leading capabilities and support services to safeguard Australia's national interests, ensure mission success and respond to emerging strategic challenges. Our commitment to the ADF and Australian industry as a prime systems integrator and platform steward offers the ADF a broad portfolio of capabilities, technologies and professional services that enable the delivery of innovative capabilities across all warfighting domains.

Our national footprint of more than 800 locally-engaged employees across more than 10 sites in Australia, allows us to leverage our global reach-back to deliver superior Australian defence capability.

Experience how we're defining possible at
www.northropgrumman.com.au/australia

Our Gold Sponsor Profiles

For more than 90 years, Boeing and its heritage companies have been part of the fabric of Australia's aerospace industry. Today, Boeing Defence Australia is an integral part of the region's defence industry, bringing the 'Best of Boeing' products and services to support mission-ready defence capabilities. Our 2500-strong team delivers on more than 28 programs for defence customers including the Royal Australian Air Force, the Australian Army and Royal Australian Navy and partners with Defence and industry to support world-class defence capabilities in-country.

We design and deliver some of the world's most advanced communication infrastructure and systems to keep our customers connected to their people, platforms and products. Our programs include Project Currawong Battlespace Communications System, an agile, modular network that will improve the capacity and responsiveness of the Australian Defence Force's (ADF) during operations and the Defence High Frequency Communication System, a world-leading long-range high frequency communications system with critical redundancy in satellite denied or degraded environments.

Boeing Defence Australia designs, develops and sustains integrated tactical and strategic mission systems for the ADF including the Vigilare Battlespace Management System, an air defence command and control system that provides the ADF with unparalleled round and airborne situational awareness, and the E-7A Wedgetail Airborne Early Warning and Control System which is one of the most advanced air battle management capabilities in the world.

More Australian Defence Force aircraft are sustained by Boeing than any other contractor. Boeing Defence Australia is the prime contractor for the sustainment programs for all Boeing-built platforms currently in service including the F/A-18F Super Hornet, EA-18G Growler, F/A-18 Classic Hornet, P-8A Poseidon, E-7A Wedgetail, and C-17 Globemaster. Our 'best of Boeing' approach optimises fleet reliability, availability and capability.

https://www.boeing.com.au/

Raytheon Australia is a capability partner for Australia's Defence, delivering whole-of-life solutions to the Australian Defence Force.

Since its establishment in 1999, Raytheon Australia has committed to developing a truly sovereign workforce and comprehensive defence capability for Australia.

Our team of 1,500 employees, which includes over 700 engineers and technicians, successfully deliver on a range of diverse programs in Joint Battlespace Systems, Mission Systems, Above Water Systems, Under Water Systems and Weapons.

Our commitment to developing Australian Industry Capability is engrained across all of our programs, as is our investment in local SMEs to grow our existing supplier portfolio of 1,500 companies across Australia.

https://www.raytheon.com/au

THALES

Thales is a global leader in advanced technologies, investing in digital and “deep tech” innovations – connectivity, big data, artificial intelligence, cybersecurity and quantum computing to build a future we can all trust. The Group provides its customers in the defence, aeronautics, space, transport, and digital identity and security domains with solutions, services and products that help them fulfil their critical roles.

For over 100 years, Thales in Australia has been a trusted partner of the Australian Defence Force, leading the way in the research, development and manufacture of systems and solutions that help keep Australian Defence Force personnel safe.

Thales Australia has a history of patient investment to build advanced in-country capability across manufacturing, critical systems and services. Close collaborative relationships with local customers, Australian SME suppliers and research institutions combined with technology transfer from our global business enables Thales to tailor high quality solutions for Australian and export markets.

Thales Australia employs around 3,800 people directly and supports over 1,700 jobs along its Australian supply chain. In 2019, Thales Australia spent $522 million with 1,362 Australian suppliers of which 70% are SMEs.

https://www.thalesgroup.com/en/countries/asia-pacific/australia

Australia is at a cross-road; whether to take advantage of the local talent pool in a range of AI (Artificial Intelligence) technologies or to be a net 'importer' from companies off-shore. Australia has led the world in AI research in a number of areas but is at the risk of falling into the "invented here" trap that has driven a good deal of Australia's technology leaders off-shore for investment and further development.

My presentation is a perspective of where we have been, where we see the industry going, the unrealised potential of AI (with respect to intelligent software agents for example), and why it is important to Australia's future that we protect and foster our sovereign capability in AI platforms and research.

Established in 1997, Agent Oriented Software (AOS) is a software and robotics company specialising in autonomous and intelligent systems. Melbourne-based AOS's innovations are at the heart of a new paradigm in software engineering that sees the evolution of AI to Multi-Agent Systems, where systems are comprised of a group of autonomous decision-making entities called agents.

AOS has realised Artificial Intelligence concepts drawn from an historically popular model that considered the logic of rational agency, known as BDI, or Beliefs, Desires and Intentions. From this starting point we now produce intelligent agent software products, and applications, which can drive robots, autonomous vehicles and intelligent software assistants (Bots).

AOS' BDI intelligent software agent technology provides the foundation for machines and systems capable of rational reasoning, allowing humans to understand why the autonomous system did what it did. This generates trust and provides the means to achieve US Defense Department DARPA's goal of Explainable AI.

The company, with support from the Defence Innovation Hub, is producing a world-first capability for building teams of software agents that work with humans as a human/autonomous machines team, to be released in 2022.

This will realise AOS's transition from an R&D organisation into an AI platform provider – a key transformation that will ensure the company's success.

https://aosgrp.com/

Our Silver Sponsor Profile

Bell is more than an aviation company. Bell are pioneers with a long history of innovation. Thinking above and beyond is what we do.

From breaking the sound barrier with the Bell X-1 to certifying the first commercial helicopter, we've reimagined the experience of flight for over 85 years. We were part of NASA's first lunar mission. Today, we're redefining what flight is capable of, designing advanced tiltrotor systems and the world's first digital fly-by-wire helicopter (the Bell 525 Relentless); setting the bar for higher speeds and higher ranges with Future Vertical Lift through the V-280 Valor.

Bell's Innovation division has been spearheading with NASA development of the Autonomous Pod Transport (APT) family of scalable unmanned aircraft systems for commercial and military logistics missions.

Bell's V-247 Vigilant will deliver autonomous tiltrotor capabilities that are unmanned and unmatched. But Bell's innovation division is already looking to what is next, including the eVTOL range of electric ducted aircraft, starting with the Bell Nexus.

Headquartered in Fort Worth, Texas – as a wholly-owned subsidiary of Textron Inc., – Bell has strategic locations around the globe, ready to deliver exceptional aircraft experiences for military and commercial customers. Efficiently. Reliably. And, above all, safely.

https://www.bellflight.com/

L3HARRIS IN AUSTRALIA: L3Harris Technologies is an agile global aerospace and defence technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defence and commercial technologies across air, land, sea, space and cyber domains. L3Harris has approximately US$17 billion in annual revenue and 50,000 employees, with customers in 130 countries.

L3Harris has provided advanced technology solutions to government and commercial customers across Australia and New Zealand for more than 25 years. Today, the company has facilities in major cities including Brisbane, Melbourne, Canberra, Sydney, Perth and Adelaide – and employs approximately 550 professionals who understand the unique needs and challenges of customers in the region.

As a trusted partner to the Australian Department of Defence, L3Harris delivers advanced aerospace solutions, and has a long history of integrating and sustaining missionised platforms including ISR/SIGINT, maritime patrol and surveillance, tactical ISR, ground-based support and light attack. The company has provided in-country support and sustainment for key Australian air programs and platforms including the RAAF's F/A-18, AP-3C, C-17A, and C-27J aircraft. L3Harris' Tactical Common Data Links (TCDL) Systems are onboard the RAAF's P-8A and Army SOCOM platforms.

L3Harris has the specialist skills and facilities in Australia to design and manufacture high-reliability, aerospace-grade components and subsystems to customers' specifications, enabling global defence companies to fulfil government contracts with robust and reliable Australian Industry Capability (AIC) components. The company's specialist RF processing subassemblies are exported internationally and fitted to front-line military aircraft including the F-35 and E-7A, as well as integrated into the AN/ALR-67(v)3 and ALR-69A Radar Warning Receivers, installed on the F/A-18E/F, C-130H, KC-46A, and the F-16.

L3Harris combines speed, innovation and flawless execution to give people confidence and security in the world ahead. In a world of ever accelerating change, threat environments move fast. We move forward faster, delivering industry-leading value.

www.L3Harris.com

Our Bronze Sponsor Profiles

CAE uses advanced simulation technology to revolutionise training and operational support solutions in defence and security, civil aviation, and healthcare to make the world a safer place.

The broadest global presence in our industry has made us the partner of choice to customers worldwide who operate in complex, high-stakes and largely regulated environments, where successful outcomes are critical.

With over 75 years of experience, approximately 10,000 employees, 160 sites and training locations in over 35 countries, we make air travel safer, support defence forces to maintain readiness and enhance patient care.

For over 25 years, CAE Australia has created and nurtured Australian industry capabilities to sustain, integrate and upgrade the Defence Force's certified full mission simulators and training centres.

Our team of instructors, skilled engineers and project managers supports training across 20 sites throughout Australia and New Zealand, along with a number of strategic partnerships with Australian suppliers that support our global supply chain.

In March 2021 CAE announced the acquisition of the L3Harris Technologies' Military Training business. This acquisition will expand CAE's position as a platform-agnostic training systems integrator by diversifying our simulator portfolio and opening training and mission operations markets across naval, cyber and space domains.

Our regional capabilities support the following training portfolios:

- The Management and Through-Life Support of ADF Hawk Mk127, C-130J, KC-30A MRTT, MRH-90, CH47F, AP-3C, B350 and S-70-A Blackhawk training systems and centres;
- Delivery of training, in simulator and in aircraft (live), of ADF Hawk Mk127, C-130J, KC-30A MRTT
- Sustainment and training capabilities for the 'Romeo' MH60R Training Academy at NAS Nowra;
- Sustainment support to the Toll Aeromedical Centre of Excellence in Bankstown;
- CASA accredited training outcomes leveraging the King Air B350 Proline II training centre in Sale, Victoria;
- Critical trauma training programs for Ambulance Victoria; and
- Through Life-Support to the RNZAF NH90, SH-2 and T-6C training centres in New Zealand

https://www.cae.com/defence-security/regional-operations/cae-australia/

Our Bronze Sponsor Profiles

General Atomics Aeronautical Systems, Inc. (GA-ASI), an affiliate of General Atomics, is a leading designer and manufacturer of proven, reliable Remotely Piloted Aircraft (RPA) systems, radars, and electro-optic and related mission systems, including the Predator® RPA series and the Lynx® Multi-mode Radar. With more than six million flight hours, GA-ASI provides long-endurance, mission-capable aircraft with integrated sensor and data link systems required to deliver persistent flight that enables situational awareness and rapid strike. The company also produces a variety of ground control stations and sensor control/image analysis software, offers pilot training and support services, and develops meta-material antennas.

https://www.ga-asi.com/