

17th Australian International Aerospace Congress

INNOVATION INTO AEROSPACE FUTURE



AIAC17 PROGRAM

SUNDAY 26 FEBRUARY 2017

1700-1900	Registration opens – Percy Beames Bar
1800-1930	Welcome Reception – Percy Beames Bar

MONDAY 27 FEBRUARY 2017

0700-1730	Registration opens – Percy Beames Bar						
0800-1700	Speakers Preparation Room opens – Terrace Café						
0800-0945	Opening Plenary session "Defence Aerospace and Aviation" – Members Dining Room						
0800-0815	Congress Opening & Keynote Address Hon. Wade Noonan MP Minister for Industry and Employment Minister for Resources Lord Mayor Robert Doyle City of Melbourne						
0815-1015	Plenary Address 1: Regulations Air Commodore James Hood Director General, Defence Aviation Safety Authority, AUS Plenary Address 2: Academia Prof Phil Webb, Cranfield University UK Prof Nick Lieven, University of Bristol, UK Plenary Address 3: Unmanned Aircraft Doug Davis Director, Office of Independent Airworthiness, Engineering and Global Product Development Northrop Grumman Aerospace Systems, USA Plenary Address 4: Research Dr Alex Zelinsky Chief Defence Scientist, AUS						
1015-1040	Morning tea – Percy Beames Bar						
1040-1225	Concurrent session 1						
(25 min presentation inclusive of 5 minute Q&A)	Aerodynamics 1	Aircraft Systems (On Board & Off-Board) 1	Aircraft Design 1	AHS Mission Systems Conference	Structures & Materials 1	DSTG Health & Usage Monitoring Systems Conference HUMS2017 Chair Opening Address and 1st Keynote	AHS Composite Structures Conference
Chair:	Oleg Levinski Defence Science and Technology Group	Kent Rosser Defence Science and Technology Group	Matthew Marino RMIT University	Roberto Sabatini RMIT University	Sonja Jenkinson Defence Aviation Safety Authority	Wenyi Wang Defence Science and Technology Group	Madabhushi (Jana) Janardhana, Defence Aviation Safety Authority
Room	Hans Ebeling Room	Harrison Room A	Harrison Room B	Frank Grey Smith Room	Members Dining Room	AFL Dining Room	Tom Wills Room
Keynote session 1040-1110	New insights into laminar-turbulent transition mechanisms on aircraft Chris Atkin	A novel approach to the generation of aircraft collision avoidance advisories Grace Garden & Sarah Mecklem Boeing Research And Technology	Aircraft Design Method for Weight, Volume and Cost of Electric Motors Michael Gritsch Design, Analysis And Research Corporation	Multi-Mission Capability in Network Centric Operations Troy Bruggemann Queensland University of Technology	Additive metal solutions to corroded wing skins in operational aircraft Rhys Jones Monash University	HUMS2017 Keynote 1 So You Have a HUM System..... So What? Paul Harding & Jeff Day Ministry of Defence, UK	An Insight into High Performance Magnesium Alloy/Nano-Metastable-Synthetic Composites Manoj Gupta National University of Singapore
1110-1135	Development of a collaborative partnership between Defence, industry and academia for high-fidelity computational aeroelasticity Oleg Levinski, Defence Science and Technology Group & Robert Carrese, RMIT University	Embodied motion and perception couple for optical flow based state estimation Kent Rosser Defence Science and Technology Group	On the potential of lighter-than-air and hybrid aircraft for the Australian civil sector Graham Dorrington RMIT University	Analysing the reliability of multi UAV operations Troy Bruggemann Queensland University of Technology	On the validity of the Paris equation Eniel Amsterdam Netherlands Aerospace Centre	The Future of HUMS in the ADF Aviation Sector David Hood Defence Aviation Safety Authority	Addressing Defect Growth in Composite Structures Loris Molent Defence Science & Technology Group
1135-1200	The effect of icing on small unmanned aircraft low Reynolds number airfoils Geoff Brian Defence Science And Technology Group	A Case for Australian Missile Vibration Test Capability Development David Conser Defence Science and Technology Group	StopRotor: A new VTOL aircraft configuration Matthew Marino RMIT University	A Model-Predictive Approach to GNSC Integrity Augmentation for Flight Planning and Real-Time Optimisation Roberto Sabatini RMIT University	Understanding the mechanisms of fatigue behaviour using atomic simulations Paul White Defence Science and Technology Group	The Effect of Adhesively Bonded Doubler Repairs on Existing Fatigue Cracks in Typical Combat Aircraft Structures Simon Barter & Leigh Robertson Defence Science and Technology Group	
1200-1225	Skin friction reduction on an airframe fuselage using passive flow control Nicholas Findanis University of New South Wales	Rapid Development of the CH-47F Flight Test Instrumentation James Edge-Williams Department of Defence	Dragonfly Inspired MAVs – Adaptive and Evolutionary approaches Jia Ming Kok Defence Science and Technology Group	UAV Delivery System Design and Analysis Allen Chen RMIT University	Nonlinear aeroelastic response of the AGARD 445.6 wing with loosened root connection due to freerplay Robert Carrese RMIT University	Applying Machine Learning-Based Diagnostic Functions to Rotorcraft Safety Daniel Wade United States Army AMRDEC	
1225-1325	Lunch – Percy Beames Bar						
1325-1510	Concurrent session 2						
(25 min presentation inclusive of 5 minute Q&A)	Aerodynamics 2	Aircraft Systems (On Board & Off-Board) 2	Aircraft Design 2	AHS Mission Systems Conference	Structures & Materials 2	DSTG Health & Usage Monitoring Systems Conference Life & Usage / HUMS Applications	AHS Composite Structures Conference
Chair:	Robert Carrese RMIT University	Stan Jones Lockheed Martin Aeronautics	John Page SAVE Lab, Aerospace Engineering	Allen Chen RMIT University	Rhys Jones Monash University	Nick Lieven University of Bristol, UK	Ali Daliri RMIT University
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Keynote session 1325-1355	The interaction between flutter and buffet excitation mechanisms for the aeroelastic response of a typical airfoil section Robert Carrese RMIT University	Learning to fly on the fly: Embodying adaptive flight behaviours within autonomous systems Anselm Fataki Defence Science and Technology Group	A possible future short haul airliner John Page SAVE Lab, Aerospace Engineering	GNSC Integrity Augmentation System Synergies with SBAS and GBAS for a Space-Ground-Avionics Augmentation Network (SGAAN) Roberto Sabatini RMIT University	Materials for High Heat Flux Components in Aerospace Applications Dr K Balasubramanian, NPTDC	Sikorsky HUMS Data Analytics Jim Cycon Lockheed Martin / Sikorsky (non-keynote normal presentation)	Demonstration of pseudo-ductility in fibre reinforced composite joints using z-pins Anil Ravindran RMIT University
1355-1420	An Investigation of the Dynamics of Leading Edge Control Surfaces for Micro Air Vehicle Applications Ashim Panta RMIT University	Automatic integrated collision avoidance system Stan Jones Lockheed Martin Aeronautics	Energy harvesting in light aircraft using an organic Rankine bottoming cycle John Olsen University of New South Wales	Leveraging industry automation techniques for enhanced UAS system of systems Troy Bruggemann Queensland University of Technology	Finding an elusive crack: Problems related to identifying cracking in a brake assembly piston rod Judy Turnbull Bureau Veritas	HUMS for AGT1500 Gas Turbine Engine of the M1A1 Abrams Tank Greg Mason & Tim Conroy TAE Australia	Multi-criteria weighted order based maintenance decision making Viswanath Dhanisetty Deft University of Technology
1420-1445	Interaction effects of a plate on supersonic jet screech Bhavraj Thethy Monash University	Indoor Navigation using Distributed Ultrasonic Beacons Rohan Kapoor RMIT University	Future Platforms for Air Delivered Ordnance John Page SAVE Lab, Aerospace Engineering	Mission Systems – from Earth to the International Space Station Sebastian Chauvi Cuberider	Graphene: The lightest coatings for corrosion protection Muhammad Anisur Rahman Monash University	Development of a Flight Manoeuvre Recognition Software Application for Improved Usage Monitoring of Rotary Wing Aircraft Jack Lamshead QinetiQ Australia	Robust optimisation of time-varying aeroelastic composite structures using multi-particle swarm optimisation Aditya Vishwanathan University of Sydney
1445-1510	An anemometer for UAS-based atmospheric wind measurements Sam Prudden RMIT University		Improving Workflow Efficiency in a Concurrent Design Environment for large volume production Chee Beng (Richard) Ng RMIT University	Improving the field of regard of a Time-of-Flight Camera for UAV Mapping and Collision Avoidance in Cluttered Environments Thomas Newham RMIT University	Advances in using static load equations for dynamic load prediction David Conser Defence Science and Technology Group	Solving the Mystery of the Disappearing Symptom and Why it Benefits the Product Life-Cycle John Baker Copernicus Technology Ltd, Australia	Extending the USAF risk of failure approach to composite repairs Wenchen Hu Monash University
1510-1535	Afternoon tea – Percy Beames Bar						
1535-1715	Concurrent session 3						
(25 min presentation inclusive of 5 minute Q&A)	Aerodynamics 3	Astronautics 1	Aircraft Design 3	Avionics 2	Structures & Materials 3	DSTG Health & Usage Monitoring Systems Conference Corrosion / Land HUMS / Load Monitoring	AHS Composite Structures Conference
Chair:	Malcolm Jones Defence Science And Technology Group	SQLNDR Ulas Yildirim Defence Aviation Safety Authority	Matteo Giacobello Defence Science and Technology Group	Cees Bil RMIT University	Weiping Hu Defence Science And Technology Group	Robert Randall University of New South Wales	Sri Bandyopadhyay University of New South Wales
Room	Hans Ebeling Room	Harrison Room A	Harrison Room B	Frank Grey Smith Room	Members Dining Room	AFL Dining Room	Tom Wills Room
Keynote Session 1535-1605	Aerothermodynamic analysis of HIFIRE 8 hypersonic vehicle Malcolm Jones Defence Science And Technology Group	Infrared surface imaging using low earth orbit nanosats and/or high altitude micro-UAVs Graham Dorrington RMIT University	Rapid weight sizing methodology for small unmanned aerial systems (quadcopters) Michael Gritsch Design, Analysis And Research Corporation	Comparison and Characterization of the Visual Scan Patterns of Expert and Cadet Pilots in VFR landing Cees Bil RMIT University	Effect of Thermal Exposure on the Degradation of Mechanical Properties of Airframe Aluminium Alloy AA7085-T7452 Alexandra Shekhter Defence Science and Technology Group	Predicting Corrosion on F-35 Joint Strike Fighter Simon Jacob BAE Systems Australia (non-keynote normal presentation)	Generating Cost Effective Super Tough CFRP Laminates incorporating Short Milled Carbon Fibre Sri Bandyopadhyay University of New South Wales
1605-1630	Applications of radial basis functions to fluid-structure coupling Adam Murray School of AMME, University of Sydney	Simulation of a small satellite launch system with fly-home components Samuel Boland Heliq Advanced Engineering	Augmented lift with tip thruster on a rotating lifting surface Derrick Ho The University Of Sydney	A Virtual Pilot Assistant System for Single Pilot Operations of Commercial Transport Aircraft Yixiang Lim The University of Sydney	In situ thermoelastic stress analysis for airframe full scale fatigue testing: an overview of lessons learnt Yi Rye (Jireh) Choi Defence Science and Technology Group	On Monitoring the Health and Remaining Life of Vehicle Suspension Systems Guy Gallasch Defence Science and Technology Group	High strain rate tensile properties of basalt-fibre reinforced polymer composites Ali Daliri RMIT University
1630-1655	Reducing Aircraft Stall Speed of Firefighting Aircraft using Retrofitted Vortex Generators Justin Fox RMIT University		Biomimetic design for pest bird damage control Zhao Wang The University of Sydney	A GNSC Multipath model for aerial navigation Suraj Suresh Bijjiahalli RMIT University	The effect of service-induced dent damage on the out-of-plane strength and fatigue durability of metallic honeycomb sandwich structures Andrew Charles Defence Science And Technology Group	Advances in Airframe Load Monitoring Methodology for Military Fighter Aircraft Oleg Levinski Defence Science and Technology Group	Reduction of aircraft cabin noise using multifunctional composite laminates Akbar Khatibi RMIT University
1655-1715				A behaviour tree-based robust decision framework for enhanced UAV autonomy Troy Bruggemann Queensland University of Technology	Computer-Assisted Identification and Extraction of Geometric Features for Quantitative Fractography Weiping Hu Defence Science And Technology Group	A Corrosion Management System for Seahawk Simon Jacob BAE Systems Australia	
1915-2300	Congress Dinner – MCG, Members Dining Room						



TUESDAY 28 FEBRUARY 2017

0800-1730	Registration opens – Percy Beames Bar						
0800-1700	Speakers Preparation Room opens – Terrace Café						
0800-0930	<p>Plenary Address 5: Defence MAJGEN Andrew Mathewson, AM Head Helicopter Systems Division Capability Acquisition and Sustainment Group, Department of Defence, AUS</p> <p>Plenary Address 6: Defence AIRCDR Phil Tammen Director General, Airlift & Tanker Systems Capability Acquisition and Sustainment Group, Department of Defence, AUS</p> <p>Plenary Address 7: Space Programs Dr Jason Held CEO Saber Astronautics, AUS</p> <p>Plenary Address 8: Manned Aircraft Mal Benfer Vice President Capability Airbus Group Australia Pacific, AUS</p>						
0930-1000	Morning tea – Percy Beames Bar						
1000-1235	Concurrent session 4						
(25 min presentation inclusive of 5 minute Q&A)	Airworthiness & Regulations 1	Propulsion 1	Aircraft Design 4	Operations & Support 1	Structures & Materials 4	DSTG Health & Usage Monitoring Systems Conference Keynote 2 / Structural Health Monitoring / Machine Learning / CBM	
Chair:	WGCDR Ashley Howell, Defence Aviation Safety Authority	Rose Davies, School of Aviation, Massey University	John Page, SAVE Lab, Aerospace Engineering	Savern Reweti, Massey University	Madabhushi (Jana) Janardhana, Defence Aviation Safety Authority	David Hood, DASA Co-Chair: Yori Lavi, Applied-EA, USA	
Room	Hans Ebeling Room	Harrison Room A	Harrison Room B	Frank Grey Smith Room	Members Dining Room	AFL Dining Room	
Keynote Session 1000-1030	An update from the regulators Ben Challendard, Civil Aviation Safety Authority & WGCDR Ashley Howell, Defence Aviation Safety Authority	The A400M The Airlifter of the 21st Century Miguel Morell, Airbus Defence & Space	A new paradigm in the aerospace sector digital disruption is coming with the introduction of commercial Small Unmanned Aerial Systems: who are the winners and losers? Nathan Rickard, Defence Science & Technology Group	Development of motion and force feed-back for a low cost PC Based Aviation Based Training Device Savern Reweti, Massey University, NZ	Graphene Coating for Remarkable Corrosion Resistance: Current State and Challenges Raman Singh, Monash University	HUMS2017 Keynote 2 State-of-the-Art in Aerospace Structural Health Monitoring Chun-hui Wang, University of New South Wales	
1030-1055	A novel regulatory framework for airworthiness certification of small UAS Vamsi Krishna Madasu, Systra ScottLister	Characteristics analysis of biodiesel in a model jet engine with a driving cycle Rose Davies, School of Aviation, Massey University	Flight Experimentation Towards Enhanced UAV Capabilities: The Multi-rotor Air-Crane Matt Anderson, The University Of Sydney	Defence S&T Collaboration in the Virtual Fleet Model - Case Study: C-17 Drag Reduction Program Kylie Bedwell, Defence Science and Technology Group	Transverse Vibration Analysis of Tapered Rotating Beams with Rub-Induced Loading Desmond Adair, Nazarbayev University	From HUMS to PHM: Are We There Yet? Joanna Kappas, Defence Science and Technology Group	
1055-1120	Levels of autonomy for UAS detect and avoid Kelly Cox & Brendan Williams, Boeing Research & Technology - Australia	Trajectory-coupled solid rocket motor optimisation: enabling next-generation weapon system performance Matthew McKinna, Defence Science and Technology Group	Design and validation of a supersonic wind tunnel facility. Thomas Knast, Monash University	Designing an automatic beacon ejection system for aircraft Liam Peters, RMIT University	Numerical structural analysis in support of aircraft structural integrity management Xiaobo Yu, Defence Science and Technology Group	Engine Lubrication Oil Condition Monitoring: A Machine Learning Approach Leong Yen, Defence Science And Technology Group	
1120-1145	Review of Standard Passenger and Cabin Luggage Weight Procedures Michael Gritsch, RMIT University	Efficient Repair Accounting for Mistuning Strength Effects for an Integrated Braded Disk Guangxia Chen, Defence Science and Technology Group	A Concurrent Design Facility Architecture for Engineering Design Education and Research Chee Beng (Richard) Ng, RMIT University	The Australian Defence Force Unmanned Aerial Systems Roadmap, a decade along the unmanned journey Keirin Joyce, Australian Army	A comparative evaluation of deterministic and probabilistic approach for fatigue life assessment of airframe structures Ribeiro Torresoga, Defence Science and Technology Group	Machine Learning Techniques for Automatic Sensor Fault Detection in HUMS Systems Miroslav Dosen, ETMC Technologies Pty Ltd	
1145-1210	A Review of Instantaneous Climb Performance Michael Young, Defence Science and Technology Group	Systems Identification and Dynamic Modelling of Small Propellers Matthew Anderson, The University of Sydney			Microstructural Implications of Chromic Acid (Type IB) and Sulphuric Acid (Type IC) Anodising on the Fatigue Performance of AA7065-T7452 Aluminium Alloy Suzana Turk, Defence Science & Technology Group	Effecting Condition-Based Maintenance for UAVs Joshua Segal, Applied-EA, USA	
1210-1310	Lunch – Percy Beames Bar						
1310-1430	Concurrent session 5						
(25 min presentation inclusive of 5 minute Q&A)	Airworthiness & Regulations 2		Additive Manufacturing 1		Structures & Materials 5	DSTG Health & Usage Monitoring Systems Conference Diagnostics & Prognostics 1	DSTG Health & Usage Monitoring Systems Conference Sensor Technologies
Chair:	Vamsi Krishna Madasu, Systra ScottLister		Andrey Molotnikov, Monash University		Wyman Zhuang, Defence Science And Technology Group	Daniel Wade, United States Army AMRDEC	John Baker, Copernicus Technology Ltd, Australia
Room	Hans Ebeling Room		Harrison Room B		Members Dining Room	AFL Dining Room	Tom Wills Room
Keynote Session 1310-1340	Managing Uncertainty in the System Safety Assessment of Unmanned Aircraft Systems Achim Washington, RMIT University		Laser Ultrasonic Testing of Additive Manufactured Metallic Samples Geo Davis, Swinburne University of Technology		Improving fatigue life predictions of combat aircraft with a material model based on legacy data Madeleine Burchill, Defence Science and Technology Group	Vibration Signal Pre-processing For Spall Size Estimation in Rolling Element Bearings Using Autoregressive Inverse Filtration Nader Sawalhi, Prince Mohammad University, Saudi Arabia (non-keynote normal presentation)	High Cycle Fatigue Testing: Capability Development and Sensor Evaluation Ross Antoniou, Defence Science And Technology Group (non-keynote normal presentation)
1340-1405	Characterisation of the anthropometric features of airline passengers and their impact on fuel usage in the Australian domestic aviation sector Damien Melis, RMIT University		Surface roughness of Selective Laser Melted Ti-6Al-4V alloy components Zhuo Chen, Monash University		Use of Neutron Residual Stress Measurements for Fatigue Life Enhancement of Laser Clad Aircraft Aluminium Alloys Wyman Zhuang, Defence Science And Technology Group	Integrated Approach for Health Assessment of Engine Bearings through Numerical Simulation Zhongxiao Peng, University of New South Wales	Real Time Oil Condition Monitoring, Practical Examples of Trend Analysis & Failure Prevention Sam Botterill, System 7 Australia
1405-1430	Safety and security considerations in the certification of next generation avionics and air traffic management systems Eranga Batuwangala, RMIT University		Keynote session: 1405-1435 Additive Manufacturing: the challenge of qualification Chris Davies, Monash University		Scatter in the growth of small cracks in Al 7050-T7451 Pu Huang, Monash University	Use of Advanced Signal Processing Techniques to Diagnose Planet Bearing Faults in Variable Speed Conditions Robert Randall, University of New South Wales	
1430-1455	Afternoon tea – Percy Beames Bar						
1455-1705	Concurrent session 6						
(25 min presentation inclusive of 5 minute Q&A)			Additive Manufacturing 2		Structures & Materials 6	DSTG Health & Usage Monitoring Systems Conference PHM & HUMS	DSTG Health & Usage Monitoring Systems Conference Wear Debris Analysis / Diagnostics & Prognostics 2
Chair:			Suresh Palanisamy, Swinburne University of Technology		Chris Wallbrink, Defence Science And Technology Group	Chun-hui Wang, UNSW Co-Chair: Graham Forsyth, Ex-DSTG	Miroslav Dosen, ETMC Technologies Co-Chair: Joanna Kappas, DSTG
Room			Harrison Room B		Members Dining Room	AFL Dining Room	Tom Wills Room
Keynote Session 1455-1525			Value Chain for Metallic Additively Manufactured Parts – from powder to planes Leon Prentice, CSIRO Manufacturing		Uncertainty Quantification of Additively Manufactured Ti-6Al-4V Components Due to Process Variations via Thermo-mechanical Simulation and Surrogate Model Nagaraja Iyyer, Technical Data Analysis	Employing HUMS to Automate Dull Administration Tasks in Logistics and Fleet Management Guy Gallasch, Defence Science and Technology Group (non-keynote normal presentation)	A Nonlinear Dynamic Model of Defective Rolling Element Bearings with a Known Defect Topography on the Inner Raceway Francesco Larizza, University of Adelaide (non-keynote normal presentation)
1525-1550			Repair and Manufacturing of Military Aircraft Components by Additive Manufacturing Technology Qianchu Liu, Defence Science and Technology Group		Smart Load Spectrum Truncation through the Preservation of Damage Content Chris Wallbrink, Defence Science And Technology Group	Landing Gear Structural Health Prognostic / Diagnostic System Chad Forrest, ES3, Australia	Remote Location Wear Debris Analysis Andrew Becker, Defence Science and Technology Group
1550-1615			Effect of Building Strategy on Sample Dimensions and Properties in Direct Laser Deposition of Ti-6Al-4V Yi Pye (Jireh) Choi, Defence Science and Technology Group		The Effect of Viscosity on the Nonlinear Aeroelastic Aspects of a Three-Degree-of-Freedom Aerofoil System with Freeplay and Aerodynamic Nonlinearities Michael Candon, RMIT University	Application of the Teager Kaiser Energy Operator to Machine Diagnostics Robert Randall, University of New South Wales	A Video-based Wear Particle Imaging and Characterisation System for Real Time Wear Debris Monitoring Zhongxiao Peng, University of New South Wales
1615-1640			Microstructure evolution and strengthening mechanisms of aluminium alloy A357 manufactured by selective laser melting Heng Rao, Monash University		Validation of the NASGRO equation and USAF characteristic K approach for computing crack growth of AA7075-T7351 under spectrum loading Pu Huang, Monash University	E7-A AEW&C Wedgetail Boeing-Developed HUMS Data Analysis Tool (ASIGS Aircraft Structural Integrity Ground Station) Overview Brooke Griffin, Boeing Defence Australia	Acoustic Emission in Grease-lubricated Helicopter Drive-train Bearings Brian Dykas, US Army Research Laboratory
1640-1705			Keynote session: 1640-1710 Advances in Additive Manufacturing for Aerospace & Defence Stefan Gullizia, CSIRO Manufacturing			Planet Bearing Fault Detection Using Unified Change Detection Approach Wenji Wang, Defence Science and Technology Group	Tracking Bearing Degradation Using Gaussian Wavelets Tony Galati, Defence Science and Technology Group
1705-1735	Congress Closing Plenary						
1900-2330	HUMS Conference dinner – The Pavilion Fitzroy Gardens (1830-1900 Pre-dinner drinks)						