HUMS2025 Program (as of 14 March 2025, subject to adjustment)

DAY 1 – Monday 24 March 2025	
Time	**Congress Plenaries – Plenary Room 1 (Chair: Dr. Aaron Sudholz – BAE Systems)**
8:30	Congress Opening (Congress Chair: Prof. Pier Marzocca – RMIT)
9:00	Overcoming Adversity in Complex Defence Development Projects: Insights from Australia's Ghost Bat and Ghost Shark *Dr Shane Arnott and Dr Andrew Glynn (Anduril Australia)*
9:30	United in the Skies: The Power of US-Australia Aerospace Research Partnerships and International University Collaborations *Lt Col David Newell, Ph.D., and Dr Geoff Andersen (Asian Office of Aerospace Research and Development)*
10:00	Aerospace Innovation Out of the Box: from cardboard planes to harnessing data analytics and AI to drive rapid product development in a disrupted world *Ms Amanda Holt (SYPAQ)*
10:30	**Morning Tea**

Time	**M106 – HUMS Machine Condition Monitoring (Chair: Dr. Wenyi Wang – DSTG)**
11:00	**HUMS Keynote Presentation 1** – HUMS Enabling Predictive Maintenance: Transforming Commercial Helicopter Operations *Dr Eric Bechhoefer (Green Power Monitoring Systems – GPMS, International Inc., USA)*
11:30	Automating Vibration Analysis: Optimized Multi-Delay Filters for Improved Signal Separation *Dr Cédric Peeters (Vrije Universiteit Brussel)*
11:50	Planet gear crack fault detection and propagation tracking using FRESH filters *Mr Rik Vaernberg (KU Leuven)*
12:10	Automatic peak detection algorithm for gearbox monitoring *Mr Jean-Frederic Diebold* *(Safran Tech)*
12:30	Treatment of Erroneous Interference Effects from Post-processed Planet Gear Vibration Signals *Dr Nader Sawalhi (Defence Science & Technology Group)*
12:50	**Lunch**

Time	**M105 - HUMS: Data Challenge Session 1 (Chair: Dr. Nader Sawalhi – DSTG)**	**M106 - HUMS: Sensors, SHM & HUMS (Chair: Lcdr Dr. Gareth Forbes – RAN)**
14:10	The HUMS2025 Data Challenge Dataset *Wenyi Wang (Defence Science & Technology Group)*	An Improved wireless vibration sensor for real time, in-situ rotorcraft gearbox condition monitoring *Dr George Jung (Defence Science & Technology Group)*
14:30 14:50	HUMS: Data Challenge Result Presentation (10-min each team in the following order) 1. GPMS 2. LMCO 3. NavAus R&D 4. Team A	Improving the extreme temperature measurement capability of FBG sensors encapsulated in low thermal expansion materials *Mr Gerard Natividad (Defence Science & Technology Group)* A review of the improvements made to the F/A-18 fatigue tracking system: Individual Aircraft Tracking with a safe life philosophy *Mr Mathew Phillips (Defence Science & Technology Group)*

15:10	5. KU Leuven Condition Monitoring 6. UNSW TMCM Group 7. Priori	Architecture for a Low Cost, Light Weight HUMS for Commercial Helicopters *Dr Eric Bechhoefer (Green Power Monitoring Systems, International Inc. (GPMS))*
15:30		Formulation and Validation of an Aircraft Health Monitoring Tool for the MH-60R/S Fleet *Miss Katie Krohmaly (US NAVY)*
15:50	**Afternoon Tea**	

Time	**M105 - HUMS: Data Challenge Session 2 (Chair: Dr. David Blunt – DSTG)**	**M106 - HUMS: Diagnostics, Prognostics & ODA (Chair: Prof. Zhongxiao Peng – UNSW)**
16:10	HUMS: Data Challenge Result Presentation (10-min each team in the following order) 8. VUB 9. NRC AERO SMPL 10. MathWorks 11. Crack Detectives 12. SHARIF	Understanding the Influence of the Load Zone on the Vibrations Excited by Discrete Faults in Rolling Element Bearings *Dr Iain Epps (Mobolo Technology Ltd)*
16:30		Comparison of Bearing Spall and Fault Diagnostics using Inline Oil Debris Monitoring *Hassan Mahmoud (Gastops, Canada)*
16:50		Fluorescence Spectroscopy for inline oil contamination and condition monitoring to improve HUMS *Hassan Mahmoud (Gastops, Canada)*
17:10	Benchmark Analyses of the HUMS2025 Data Challenge Dataset *Dr Nader Sawalhi (Defence Science & Technology Group)*	Long Short-Term Memory algorithm for prediction of build condition in Laser Directed Energy Deposition of Ti-6A1-4V *Timothy Herzog (RMIT University)*
17:30 ~ 18:00	**Welcome Reception – Melbourne Convention and Exhibition Centre**	
18:30 ~ 22:30	**HUMS Dinner – The Bank on Collins, 394 Collins Street, Melbourne, VIC 3000**	

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DAY 2 – Tuesday 25 March 2025	
Time	**Congress Plenaries – Plenary Room 1 (Chair: Prof. Cees Bil – RMIT)**
9:00	Welcome to Day 2
9:05	The X-59 Low Boom Flight Demonstrator (LBFD): A Structures Perspective *Dr Walter A Silva (National Aeronautics and Space Administration (NASA))*
9:35	Regulating Defence aviation safety in the decade ahead *AIRCDRE James Badgery (Defence Aviation Safety Authority (DASA))*
10:05	Space-Based Air Traffic Management *Dr Craig Benson (SkyKraft)*
10:35	**Morning Tea**

Time	**M105 – HUMS: Predictive Maintenance Solutions (Chair: Dr. Nader Sawalhi – DSTG)**
11:00	**HUMS Keynote Presentation 2** – Methodologies for the Design of Health Indicators *Prof Jerome Antoni (Institut National des Sciences Appliquées de Lyon INSA-Lyon, France)*
11:30	Physics-informed Neural Network for Explainable Gear Condition Monitoring *Nico Herwig (University of New South Wales)*

11:50	A Spatiotemporal Data Fusion Technique for Aircraft Environmental and Operational Condition (EOC) Representation *Wei Yin Chia (RMIT University)*
12:10	Blind peak detection in vibration spectra using Region-based Convolutional Neural Networks for instantaneous angular speed estimation *Mr Georgios Protopapadakis (Vrije Universiteit Brussel)*
12:30	New applications of cepstrum analysis in machine diagnostics *Dr Wade Smith (UNSW Sydney)*
12:50	**Lunch**

Time	**M105 - HUMS: Data Science & LLM Applications (Chair: A Prof. Pietro Borghesani – UNSW)**
14:10	Systems of Agents *Mr Nathan Rigoni (LMC Aviation)*
14:30	Using Natural Language Processing (NLP), a Machine Learning (ML) technique, to classify maintenance dataset *Dr Wenyi Wang (Defence, Science & Technology Group)*
14:50	Digital Twins for Aircraft Structural Inspections: Enhancing Dent Detection *Ms Ann-Kathrin Koschlik (German Aerospace Centre (DLR))*
15:10	Wildfire detection information management using sensor fusion *Dr Rohan Kapoor (RMIT University)*
15:30	Mini-panel discussion on data science application in HUMS for academia and industry (*Kostis Gryllias of KU-Leuven & Nathan Rigoni of LMCO)*
15:50	**Afternoon Tea**

Time	**M105 - HUMS: Data Science/Analytics (Chair: Mr. Nathan Rigoni – LMCO)**	**M106 - HUMS: Industry Technology Demonstration Presentations (Chair: Dr Wenyi Wang – DSTG)**
16:10	Insights from using a rapidly deployable, wireless data acquisition system for non-intrusive flight test instrumentation. *Mr Sam Mancarella (MEMKO) and Pieter Penhall*	Industry Tech Demonstration Presentations (15-min each in the following order) 1. Warsash Scientific Pty Ltd (*Derek Huxley*) – GelSight surface precision inspection technology for aerospace applications and Polytec laser Doppler vibrometer technology for structural health monitoring 2. ONYX InSight Australia Pty Ltd (*Jiaxing Perry Chan*) – Development of lubricant and vibration integrated online condition monitoring platform 3. Gastops (*Branden West*) –Revolutionizing Vehicle Health Management: Gastops' Innovative Solutions for Optimizing Availability, Safety, and Maintenance of Complex Rotating Equipment 4. Braemac (*JK Han*) – Health Monitoring for Large-scale Aerospace Test Facilities 5. GPMS-VT (*Eric Bechhoefer*) – Demonstration of GPMS Foresight MX HUMS for rotorcraft applications
16:30	Mode Shape Identification Using Graph Neural Networks for Aircraft Structure Design *Mr Sitthichart Tohmuang (RMIT University)*	
16:50	Stabilizing Extended Dynamic Mode Decomposition using Parsimonious Mode Selection Criterion *Dr Arpan Das (RMIT University)*	
17:10	**HUMS Closing Ceremony**	
18:30 ~ 22:30	**AIAC21 Congress Dinner - *Aerial South Wharf,* 17 Dukes Walk, South Warf, Victoria 3006.**	