



***HORIZON SCANNING  
IMPROVING AEROMEDICAL RISK MANAGEMENT***



# **AMSNZ & ASAM 2017 CONFERENCE**

**31 AUGUST - 3 SEPTEMBER 2017, CROWNE PLAZA QUEENSTOWN**

**Proudly hosted by AMSNZ**

# **ABSTRACTS BOOK**

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## ABOUT AMSNZ

The Aviation Medical Society of New Zealand (Inc) is an association of and for doctors and others in New Zealand with an interest in Aviation Medicine and flying. AMSNZ is a non-profit Society in New Zealand. It exists to foster and support aviation medicine for doctors and others who are interested in the subject.

For more information, visit [www.amsnz.org.nz](http://www.amsnz.org.nz)



## ABOUT ASAM

Australasian Society of Aerospace Medicine (ASAM) is the authoritative professional body whose role is to cultivate and promote aerospace medicine and related disciplines in Australasia. Comprising more than 800 members from many fields of medical practice, the Society has been in existence for nearly 60 years and has provided professional development for its members by hosting successful scientific meetings each year.

For more information, visit [www.asam.org.au](http://www.asam.org.au)



# CONFERENCE PROGRAM

## THURSDAY 31 AUGUST 2017

1600 - 1900	<b>Registration</b> Ground Level, Crowne Plaza Queenstown	Dress: Smart casual
1700 - 1900	<b>Welcome Reception</b> Threesixty Restaurant, Ground Level, Crowne Plaza Queenstown Dress: Smart casual	

## FRIDAY 1 SEPTEMBER 2017

0800 - 1700	<b>Registration</b> Level 3, Crowne Plaza Queenstown	Dress: Smart casual
0900 - 0905	<b>Welcome</b>	
0905 - 1040	<b>Session 1: Safer skies - organisational approaches to safety</b>	<b>Chair: Dr Anton Wiles</b>
0905 - 1000	<b>Patterson Trust Lecture Dr Anthony Wagstaff</b> Just culture or trust culture? Aeromedical decision-making on the horizon and beyond	
1000 - 1020	<b>Dr Hardeep Hundal</b> Health promotion - a pilot health questionnaire at Air New Zealand 2016	
1020 - 1040	<b>Dr Neil Westphalen</b> ADF Aircrew and the Medical Employment Classification (MEC) System	
1040 - 1100	Morning tea	Atrium, Level 3
1100 - 1220	<b>Session 2: What's up doc? Case studies</b>	<b>Chair: Dr Craig Schramm</b>
1100 - 1120	<b>Dr Tim Sprott</b> It's just a cough doc. What's there to worry about?	
1120 - 1140	<b>Dr Adrian Zentner</b> Fit to fly? A330 Captain following TIA	
1140 - 1200	<b>Dr Gordon Cable</b> Subdural haemorrhage in a military aviator	
1200 - 1220	<b>Dr Imran Ansari</b> Vision threatening diabetic retinopathy in a commercial pilot	
1220 - 1320	Lunch	Threesixty Restaurant, Ground Level
1320 - 1515	<b>Session 3: Mental illness in aviation</b>	<b>Chair: Dr Greg van der Hulst</b>
1320 - 1415	<b>AsMA invited speaker Dr Quay Snyder</b> Deflating pilot egos – the impossible task? <i>Generously sponsored by AsMA</i>	
1415 - 1435	<b>A/Prof Gordon Davies</b> Psychiatric diagnosis and functionality in the aviation environment	
1435 - 1455	<b>A/Prof Pooshan Navathe</b> How can we prevent the next German Wings?	
1455 - 1515	<b>Dr Chris Kenedi</b> A new approach to assessing risk and mental health issues in pilots	
1515 - 1535	Afternoon tea	Atrium, Level 3
1535 - 1715	<b>Session 4: Substance use and abuse in aviation</b>	<b>Chair: Dr Ian Hosegood</b>
1535 - 1555	<b>Dr Joanna Lapish</b> Detecting post traumatic stress disorder after an aircraft accident - a case study	
1555 - 1615	<b>Dr Tim Sprott and Bryan Chong</b> 10 year review of the rehabilitation outcomes of an aviation industry workplace-based Alcohol and Other Drug (AOD) Programme	
1615 - 1635	<b>Dr Russell Brown</b> Unsafe use of alcohol and a return to safe flying	
1635 - 1655	<b>Dr Anton Wiles</b> An unusual cause for a raised CDT	
1655 - 1715	<b>Capt Laurie Shaw and Capt Simon Nicholson</b> The HIMS philosophy: reducing risk through a just culture approach	
1715 - 1815	<b>ACAsM Annual General Meeting</b>	Crowne II, Level 3
1900 - 2300	<b>ACAsM Annual Dinner</b> Pier 19, Steamer Wharf, Queenstown Dress: Suit / Jacket and tie	

## SATURDAY 2 SEPTEMBER 2017

0800 - 1700	<b>Registration</b> Level 3, Crowne Plaza Queenstown	Dress: Smart casual
0900 - 0905	<b>Welcome</b>	
0905 - 1040	<b>Session 5: Space - the final frontier</b>	<b>Chair: Dr Kate Manderson</b>
0905 - 1000	<b>John Lane Oration Dr Robert Thirsk</b> Surviving and thriving in space	
1000 - 1020	<b>Dr Tony Schiemer</b> Augmented reality and a mission to Mars - assessing effects on crew responses to emergency scenarios during analogue missions	
1020 - 1040	<b>Dr Jayashri Sharma</b> Postural physiological development and functional assessments during gravitational stress in adventure, aero-sports and aerospace environments	
1040 - 1100	Morning tea	Atrium, Level 3
1100 - 1220	<b>Session 6: Health issues of air travel</b>	<b>Chair: Dr Stuart Farmer</b>
1100 - 1120	<b>Whitney Hughes</b> Facilitating medical clearances for passengers – an airlines perspective	
1120 - 1140	<b>Dr Richard Heah</b> Is there a doctor on board?	
1140 - 1200	<b>Dr Anthony Hochberg</b> Aeromedical retrievals and complex medical case management in offshore locations	
1200 - 1220	<b>Dr Tony Schiemer</b> Australasia - prime property for international space ports	
1220 - 1325	Lunch	Threesixty Restaurant, Ground Level
1325 - 1445	<b>Session 7: Crystal ball gazing - to fly or not to fly</b>	<b>Chair: Dr Denis Lee</b>
1325 - 1345	<b>Dr Michael Thomas</b> 178 Seconds to live - the back story	
1345 - 1405	<b>Dr Ian Hosegood</b> One long hop – managing aircrew fatigue on the new Kangaroo Route	
1405 - 1425	<b>Dr Dave Baldwin</b> Surgical treatment for NIDDM pilots	
1425 - 1445	<b>Dr Kate Manderson</b> A pilot's future - atrial fibrillation	
1445 - 1505	Afternoon tea	Atrium, Level 3
1505 - 1545	<b>Session 8: "If you feel you are in a black hole, don't give up. There's a way out."</b> <i>-Stephen Hawking</i>	<b>Chair: Dr Collette Richards</b>
1505 - 1525	<b>Dr Kate Manderson</b> A pilot's future - cerebrovascular infarction	
1525 - 1545	<b>Dr Caron Jander and Joel Seaton</b> "Facing my last flight": when depression changes your career path, your dream, your identity	
1545 - 1645	<b>AMSNZ Annual General Meeting</b>	Crowne I, Level 3
1545 - 1645	<b>ASAM Annual General Meeting</b>	Crowne II, Level 3
1800 - 1830	Shuttle buses depart from Crowne Plaza Queenstown for the conference dinner	
1900 - 2300	<b>Conference Dinner</b> Wakatipu Room, Skyline Queenstown	Dress: Smart casual
2230 - 2330	Shuttle buses depart Skyline Gondola base for Crowne Plaza Queenstown	

## SUNDAY 3 SEPTEMBER 2017

0800 - 1215	<b>Registration</b> Level 3, Crowne Plaza Queenstown	Dress: Smart casual
0900 - 1020	<b>Session 9: Civil Aviation Safety Authority (CASA) update</b>	<b>Chair: Dr Michael Drane</b>
0900 - 0940	<b>Dr Michael Drane</b> The undiscovered country – assessing the maturer pilot	
0940 - 1020	<b>Dr Peter Clem</b> Cardiomyopathy	
1015 - 1040	Morning tea	Atrium, Level 3
1040 - 1210	<b>Session 9 continued: CASA update</b>	
1040 - 1120	<b>Dr Peter Clem</b> Alcohol and other issues	
1120 - 1140	<b>Dr Michael Drane</b> CASA topical	
1140 - 1210	<b>Dr Michael Drane</b> CASA Q&A	
1210 - 1215	<b>Closing remarks</b>	
1215 - 1300	Lunch	Threesixty Restaurant, Ground Level
1300	<b>Conference concludes</b>	

**FRIDAY 1 SEPTEMBER 2017**

**0905 - 1040 (SESSION 1)**

**SAFER SKIES - ORGANISATIONAL APPROACHES TO SAFETY**

**Patterson Trust Lecture - Dr Anthony Wagstaff**

**Just culture or trust culture? Aeromedical decision-making on the horizon and beyond**

Aerospace medicine is lagging behind other safety work in some respects. The complex, system-based aspects of psychophysical and medical flight safety are often left alone as we are happy to look for disease. The use of authority and regulation is largely prescriptive rather than performance-based. A modern safety management application of Aerospace Medicine means looking for high-risk areas which we can improve, and to a lesser extent use prescriptive control activities that have low value. Research shows that looking for disease in healthy populations is often ineffective. The lack of a good and honest history from the client decreases this effectiveness further. Aeromedical practitioners and systems therefore need to generate trust, in order for our clients to provide information about themselves and their work without unnecessary fear of outcomes. "Just Culture" facilitates reporting and sharing of safety-critical information without omitting accountability for gross negligence and destructive acts. Similarly, to Just Culture, a Trust Culture will yield knowledge on aircrew's health, life and pressures which we can use to improve flight safety. Evidence from research and practice will be provided to support this view.

Future developments in Aerospace Medicine should include such trust cultures, where practices, organisations and systems are designed to support pilot empowerment in the decision-making processes. This will generate a need for more resources on difficult cases. These resources might need to be drawn from a simplification of regular health checks. In the longer term these may be performed using computer algorithms.

**Health promotion - a pilot health questionnaire at Air New Zealand 2016 - Dr Hardeep Hundal**

**INTRODUCTION:** A study undertaken to understand Air New Zealand pilots' opinion and attitudes regarding health promotions during their regular aero-medical certification exam. This is a New Zealand arm of a multi-centre study.

**METHODS:** A 5 week prospective study undertaken at the Aviation Medical Unit in 2016. A paper based questionnaire was filled by pilots. The data was then captured on the SURVEY MONKEY. All data were anonymised.

**RESULTS:** 79 pilots participated in the study. 91% (72) of the participants were males and 9 % (7) were females. 98.73% (78) were class 1 and only 1. 27% (1) were class 2. 3.80 % were over the age of 65; 20.25% were between the ages of 60-65. 68.34% are in the 30-60 age.

Most pilots felt it was an opportunistic time to discuss health promotion strategies with their AMEs. Fatigue remained a key issue. Cardiovascular Diseases remained a key issue of probability negatively impacting their medical certificate. The second probability was depression.

75% of the pilots were not on any long-term medications and did not have any long term or family diseases.

**DISCUSSION:** Prevention is better than cure. Health prevention is often a "hot topic" by any family physician but not for AMEs. As part of ICAO Annex 19, health promotion is a central element of occupational health. Efforts must be made to enhance a pilot's physical, mental and social well-being. Attitudes towards health prevention and promotion can be context and culture- specific.

## **ADF Aircrew and the Medical Employment Classification (MEC) System - Dr Neil Westphalen**

The author has undertaken an initial descriptive epidemiological review of ADF personnel, with respect to the ADF Medical Employment Classification (MEC) System. The MEC System is used to inform commanders, supervisors and personnel managers of the health status of ADF members, while maintaining the privacy of their health information. It includes a four-point Specialist Employment Classification (SPEC) for aircrew, aircraft controllers, divers, parachutists and submariners.

This presentation describes the ADF MEC System, the MEC status of all ADF members, and the SPEC status of ADF aircrew. The latter includes a description of aircrew SPEC status by gender. Further review is required to ascertain the reasons for the differences identified so far, and their significance with respect to ADF operational capability.

## **1100 - 1220 (SESSION 2) WHAT'S UP DOC? CASE STUDIES**

### **"It's just a cough doc. What's there to worry about?" - Dr Tim Sprott**

Case presentation of an airline pilot presenting with severe complications of community acquired pneumonia and associated CNS complications. The case outlines challenges in assessing aeromedical risk during recertification, particularly in the presence of very limited/ absent published evidence.

### **Fit to fly? A330 Captain following TIA - Dr Adrian Zentner**

A 51 yo A330 captain developed weakness of his left arm with some paraesthesia, slurring of speech and expressive dysphasia on New Years day 2016. There was unsteadiness of gait with slight weakness of the left leg. Symptoms were reported to have lasted about 1 hour. All investigations for cause were negative and there has been no recurrence of symptoms. Application for re-certification after 12 months was supported by his neurologist who estimated a risk of recurrence to be < 1% p.a. The neurologist was asked by CASA to justify her risk assessment. The case is discussed with reference to ABCD2 criteria with an analysis of the pilot's ABCD2 score and its implications with reference to available literature and the requirements for peak performance in the modern airliner flight deck.

### **Subdural haemorrhage in a military aviator - Dr Gordon Cable**

**BACKGROUND:** The occurrence of any intracranial bleeding is highly significant from an aeromedical risk perspective, and potentially career-ending for a military aviator. Where it arises from head trauma, there is always concern regarding ongoing risk of post-traumatic epilepsy.

**CASE REPORT:** A 26 year old male military aviator with persistent headache is found to have small right frontal and parietal subacute subdural haematomas most likely precipitated by minor head trauma and possibly exacerbated by other concurrent physiological stressors. The haematomas resolved with conservative management and the aviator made a full recovery.

**DISCUSSION:** The association between traumatic subdural haematomas and the occurrence of post-traumatic epilepsy is well documented and this, together with the possibility of recurrent bleeding, must be considered as the significant aeromedical risks. However, this case presents an unusual situation of small subdural haematomas in isolation with no other features suggestive of significant traumatic brain injury. Relevant medical literature was found to be substantially lacking and no other similar case reports of aviators could be found. An aeromedical decision-making process is discussed in relation to returning the aviator to flying duties in a restricted capacity.

## **Vision threatening diabetic retinopathy in a commercial pilot - Dr Imran Ansari**

Diabetes Mellitus is a multi-system disease affecting close to 400 million people globally.

It has damaging effects on the cardiovascular and nervous system, as well as causing end organ damage in the kidneys and eyes.

Diabetic retinopathy can be a visually devastating complication of the disease and is thought to affect 100 million people worldwide, with 30 million having sight threatening retinopathy.

Pilots who live with diabetes and retinopathy are therefore also at risk of visual loss and need regular follow-up and early treatment to maintain passenger safety and prevent loss of livelihood.

Newer treatments in diabetic retinopathy, such as improvements in laser technology and intra-vitreous anti-VEGF injections, have dramatically improved the outcomes of patients with the disease.

This presentation provides a brief overview of how diabetic eye disease can affect pilots and provides a brief overview of recent advances in the management of diabetic retinopathy. Finally, it will highlight a case of a commercial pilot who lost his license due to diabetic retinopathy but was able to regain it and resume flying after successful treatment.

## **1320 - 1515 (SESSION 3) MENTAL ILLNESS IN AVIATION**

**AsMA Invited Speaker – Dr Quay Snyder**

### **Deflating pilot egos – the impossible task?**

Pilot personalities are characterised by strength, confidence, self-discipline, independence and self-sufficiency. While these traits are excellent attributes in many aviation operations, they can have an adverse effect when seeking help for situations beyond their control or outside of their understanding. Fear and denial are common emotions in these situations. Not recognising and admitting that problems and weaknesses exist, particularly psychological issues, make pilots loathe to seek assistance, particularly from an aviation medicine specialist who has the power to remove the pilot from flying. Doing so is a direct threat to the pilot's income, career and persona. Unfortunately, both physical and mental health conditions arise commonly in pilots' careers. The AME's responsibility is to remove barriers to seeking help, collaborate with the pilot in identifying these conditions early in their course and provide assistance in early resolution before the severity increases to compromise flying safety. In many cases, this can be done whilst keeping the pilot flying or with the expectation of an early return to the cockpit. Data from programs show that even with the failing aviator, medical and psychological conditions can be identified and treated to return most pilots to flying. Peer support programs with aerospace medicine oversight are effective tools in removing barriers and providing assistance in a non-threatening manner to optimise pilot health and aviation safety. The AMEs' collaboration with individual pilots, employers, pilot unions and the civil aviation regulator maintains safe standards, increases productivity and enhances safety synergistically with pilot personalities.

### **Psychiatric diagnosis and functionality in the aviation environment - A/Prof Gordon Davies**

When considering the assessment of the capability of individuals for duties as aircrew it is useful to have some understanding of the nature of the various illnesses and their consequent effect both on present competence and the risk of recurrence over the period of certification.

Modern psychiatric nomenclature essentially describes a set of syndromes rather than illnesses in the sense of satisfying Koch's postulates but their groupings may more practically be considered in terms of the way that they behave and are treated.

The initial group which comprises illnesses such as schizophrenia and bipolar disorder can be considered as primarily biological disturbances for which treatment centres around medications. The essential problem of this group of disorders is that they have a high rate of recurrence even many years after the original diagnosis and in general terms the legislature considers them as permanently disbaring.

The next group is that of personality disorders. These result from both genetic and environmental issues with their key characteristic being that they reflect sustained abnormalities of behaviour. Some of these may not matter in day to day life but issues such as excessive risk taking are clearly problematic in civil aviation and in an air force which mostly functions in a training role.

The next group of disorders reflect the interaction between personality and the environment. The more severe of these are the result of chronic stress situations which have resulted in coping strategies which become maladaptive in themselves. Treatment needs to address both the outside stressors and the underlying personality issues. They may result in longer term absence from duty but initially should be considered treatable.

Finally, there are those problems which essentially relate to reactions to high levels of external stress. These may particularly involve family conflicts or other occupational related issues. In this case the treatment is to help the person deal appropriately with issues and provide improved coping strategies. The prognosis is generally good for a return to flying.

#### **How can we prevent the next German Wings? - A/Prof Pooshan Navathe**

Following from some high-profile accidents, involving pilots deliberately impacting terrain and the attendant loss of life, there has been much discussion about how this could have been prevented and how it can be prevented in the future. Responses have ranged from (figurative) hand wringing to suggestions for a change of legislation to require all pilots' medical lives to be an open book. Suggestions have been made which may help to detect mental illness (there is an argument that not all suicides are in the context of mental illness and not all mentally ill folk will commit suicide). There have been discussions about whether there needs to be emphasis on personality, because these people engage in murder suicides rather than suicides, and a whole raft of other possible options. Without engaging in the debate about whether such events are suicides or murder-suicides, the author presents a pragmatic view about what can be done, whether those things which can be done are likely to get us to our objective, and whether the costs of the interventions proposed – financial, societal and political - are affordable or cost effective. The author also proposes a paradigm to use in deciding whether and what interventions are appropriate in any generic aeromedically significant clinical situation.

#### **A new approach to assessing risk and mental health issues in pilots - Dr Chris Kenedi**

The focus is on bringing a modern structured approach to AME and mental health experts in the aviation community who provide support to AME, airlines, regulators and pilots. The talk will illustrate approaches that increase transparency for pilots engaged in the process, establish required components of mental health assessments and avoid conflicts of dual agency when mental health professionals are engaged in both assessment and treatment of pilots. The goal of this approach is to produce assessments that evaluate risk, focus on mental health and wellness of the pilot, integrate cultural issues around aviation and are based on robust and evidence-based principles of mental health care.

## 1535 - 1715 (SESSION 4)

### SUBSTANCE USE AND ABUSE IN AVIATION

#### **Detecting post-traumatic stress disorder after an aircraft accident - a case study - Dr Joanna Lapish**

A recent fatal aircraft accident in a small provincial town has had effects on the pilot who witnessed the crash, the other pilots in the small organisation involved and the search and rescue pilots. Recently I did a day of medicals where several of the pilots I saw had been involved. One pilot, in particular, was very affected. This talk will discuss the case study (keeping details non-identifiable) including stressors to consider after an aircraft accident, how to detect and diagnose post-traumatic stress disorder, appropriate steps the AME can take if PTSD is possible, and the role of the medical examiner in keeping the pilot safe should symptoms of PTSD later emerge by fostering an open relationship where the pilot would feel able to contact their AME if they think their mental health is deteriorating.

A lot of AME/DAMEs present will have had experience with the air force and during question time I would hope that they may have their insights to offer.

#### **10 year review of the rehabilitation outcomes of an aviation industry workplace-based Alcohol and Other Drug (AOD) Programme - Dr Tim Sprott and Bryan Chong**

There is limited published research on the outcomes or effectiveness of workplace based AOD Programmes, especially in the aviation industry. This study's aim was to investigate the efficacy of rehabilitation outcomes in employees with diagnosed substance use disorders working for a New Zealand airline. A retrospective case series study of 201 participants in the AOD Programme between 2006 and 2016 was undertaken. Of these 119 employees had a diagnosis of substance use disorders and met the inclusion criteria for this study. The primary outcomes recorded were the participant's last known recovery status and the rates of documented relapses. The overall recovery rate for all employment categories was 80.7% (n=96) at time of last follow up. Of the 96 employees in recovery 76% (n=73) and 63% (n=61) had been in recovery for more than 12 and 24 months respectively. There was a strong association between follow up time and recovery rates but no statistical association with treatment type (inpatient or outpatient), role in the Company, rehabilitation agreements or rehabilitation testing. There was a 20% documented rate of relapse from participants during the study period. Employees with rehabilitation agreements had higher rates of relapse (p=0.005). Despite the study limitations, implementation of an effective workplace-based AOD programme in the aviation industry is achievable.

#### **Unsafe use of alcohol and a return to safe flying - Dr Russell Brown**

Mental illness and substance misuse are common problems seen in pilots and it can be challenging for doctors and regulators to be satisfied around fitness to fly. Three cases of alcohol misuse are presented, including the addicted pilot, alcohol abuse events without clear diagnosis, and combined mental illness and alcohol misuse. This presentation outlines an approach where the pilot peer network and monitoring are pivotal components of management and may be our greatest drivers of cultural change and stigma breakdown throughout the pilot community. HIMS Australia provides a transparent pathway for pilots with an addiction and this program has commenced within Australia with early signs of success. This presentation provides an update of an Australian airline approach to HIMS. The Qantas Peer Assistance Network is a similar pilot driven program that helps those with psychosocial and mental health problems. The clinical cases cover challenges in diagnosis, alcohol markers in pathology testing, and surveillance and monitoring options. Most importantly, the cases demonstrate the value of pilot driven support programs and the recommended procedures for peer reporting back to doctors and managers. HIMS

Australia advisory group invite all aviation doctors with an interest in substance misuse to become part of the contact register for pilots in need.

#### **An unusual cause for a raised CDT - Dr Anton Wiles**

A Class 1 pilot with an historic incident of a drink-driving conviction was required by CAA NZ to undertake a CDT test - the result was elevated, and he had abnormal LFTs (plus a fatty liver). Despite protestations that he was not drinking and an Alcohol counsellor being supportive, restrictions and then disqualification were placed on his certificate.

Recently this was tested further and he was found to have an early form of myeloma - one of the elevated proteins in this caused the elevation in CDT. When an alternative test, not affected by that protein, was done his result was within normal range.

Given that some Civil Aviation Authorities have an increasing reliance on CDT as a measure of alcohol usage, more care needs to be given to the other reasons for an elevated result. This particular cause was unknown to NZ CAA and has caused some considerable discussion - without a favourable result to date.

#### **The HIMS philosophy: reducing risk through a just culture approach - Capt Laurie Shaw and Capt Simon Nicholson**

Substance use disorders affect a percentage of airline pilots as they do any group in the general population. Early identification is hampered by social stigma, fear of repercussion, lack of understanding and education of these conditions within both the general pilot and management groups. A program for managing substance use disorders in aviation known as the Human Intervention Motivation Study (HIMS) has been active in the United States since the mid 1970's and has been evolving in New Zealand since 2009, and more recently in Australia.

While Australia and New Zealand have very distinct national and cultural identities; we share a common heritage which entwines our cultures in many ways. HIMS Advisory Groups, composed of Pilots, Doctors, Addiction Medicine Specialists and observers from the regulator have been set up on both sides of the Tasman and working closely together to assist our colleagues afflicted with substance use disorders with appropriate treatment and eventually with a return to work in a safe manner.

HIMS began as a "relapse prevention strategy" but has the essential components of a Safety Management System (SMS): establishing policy, identifying hazards, assessing risk, managing risk, monitoring success, and education/training. It adopts a Just Culture, rather than a punitive approach, and depends on a strong relationship with the medical profession. This presentation outlines the origin and progress of HIMS so far in Australasia and describes how the HIMS approach can enhance our capacity to manage the conditions of concern.

**SATURDAY 2 SEPTEMBER 2017**  
**0905 - 1040 (SESSION 5)**  
**SPACE - THE FINAL FRONTIER**

**John Lane Oration - Dr Robert Thirsk**

**Surviving and thriving in space**

A career in the space program is gratifying and full of interesting challenges. Using images and video, Dr Robert Thirsk will describe the professional and personal aspects of training for and flying on a long duration expedition aboard the International Space Station.

Dr Thirsk's presentation will include a description of his crew's launch aboard a Russian Soyuz rocket from the Baikonur Cosmodrome in Kazakhstan and their rendezvous two days later with the Station. He will talk about astronaut onboard activities such as multidisciplinary research, robotic operations, and maintenance and repair work. He will describe some of the anticipated clinical issues associated with astronaut health and well-being as well as crew productivity during future interplanetary missions.

**Augmented reality and a mission to Mars - assessing effects on crew responses to emergency scenarios during analogue missions - Dr Tony Schiemer**

INTRODUCTION: Augmented reality (AR) refers to technology that incorporates computer-generated enhancements with existing reality. For long duration space missions, such as those planned to Mars, AR-related studies can potentially contribute to astronaut selection and training. Initially, for the assessment of human performance with the altered perception provided by AR, short-term studies need to be conducted during analogue simulations in confined and extreme environments. We propose to embed AR technology in the pre-mission training and extra-vehicular activity (EVA) of an upcoming Mars analogue mission. The purpose is to assess the impact AR has on crew responses to emergency scenarios. This follows a pilot study already conducted at the Mars Desert Research Station.

AIM: Assess the effect of augmented reality technology in Mars analogue astronauts responding to emergency situations

METHODS: Using AR overlays in EVA components of Mars analogue missions, assess the responsiveness of those astronauts involved in emergency scenarios compared to controls without the AR technology component. The following factors preceding medical emergencies will be considered: fatigue, hyperventilation, hyperthermia and (sand) storms.

DISCUSSION: The selection of astronauts for long-duration space travel is a fundamental component of mission planning. Given the complexity of physiological and psychological issues involved in a Mars mission, protocols and procedures to manage emergencies must be addressed during analogue missions in conjunction with the technology the crew will be using during the actual mission, ideally with modified responses due to the inclusion of computer-mediated technology.

**Postural physiological development and functional assessments during gravitational stress in adventure, aero-sports and in aerospace environments - Dr Jayashri Sharma**

Physiology of posture: The Evolutionary development of Postural change from fetal, to slither, roll, crawl, crouch, squat, semi squat, sit, stand, walk, run, haul, climb; to bipedalism by humans, serve Comparative animal gravitational needs, as adapted in Geographical locations and anomalies in Space-time. Mammalian uterine microgravity like in a water-immersed state keeps Fetal positions of optimal whole-body vascularization, not compounded by altering Atmospheric pressures with concomitant metabolic and energy requirements. Postural Sensory-Vascular adaptations with neuronal templates are

constantly patterned, choosing appropriate Physiological, typological, and ethnographical choices of posture, with varying human cultures. Human Patterns of self-motion, as a whole or in part, and, moment by moment well-practiced limb movements, in the presence of Coriolis forces, with stable long torso positions are molded/cast, as good bipedal posture-development in Earth's gravity (Gx). Being Air-borne in 3D+, over-rides confines of phonemes, linguistics, cultural expressions and scientific logic leading to Postural Deficiency Syndromes, common in Gymnastics, Adventure and Aero-Sports, and Space Flight. Functional Assessments and Training-Human Performance with better controlled postures in the newer Remote and Automated vehicles attempts at creating Artificial Gravity for Training. Head tilt predominantly influences Visual egocentric and allocentric positions even in (Gy and Gz) positions. Optimal Postural Sensory-Motor-Cognitive-perceptions, can allay errors in decision making, during appropriate moving trajectory projections. Multi-axial Gyro-Simulators for training in Adventure Sports, Aero-Sports and Space Tourism can help in assessing tolerances and understand physiological processes, in various pliant bodily positions; akin to fetal positions of early growth and development, to recording subsequent postural adaptations in extreme environments.

## 1100 - 1220 (SESSION 6) HEALTH ISSUES OF AIR TRAVEL

### **Facilitating medical clearances for passengers – an airlines perspective - Whitney Hughes**

Airlines are receiving an increasing number of medical clearance applications for customers travelling each year. The estimated number of travellers globally is set to double in the next 20 years to over 7.2 billion travellers worldwide.

To ensure customers are assessed appropriately for the aeromedical environment, airlines have defined processes designed to reduce risk to the customer and the airline.

Despite this there are barriers to reporting a customer's medical condition such as current practices via paper based forms, insufficient knowledge of the processes by most medical providers, potential disruption to a customer's journey, and being denied travel when presenting at the airport.

Improvements and streamlining of processes to enable successful and uneventful travel with robust consideration by the treating doctor of the aeromedical environment is essential.

Development of enhanced communication and education to the medical and hospital teams along with customers will ensure a better understanding of the requirements to achieve overall safety for aviation and its customers.

### **Is there a doctor on board? - Dr Richard Heah**

With increasing prosperity, cheaper cost of flying and an aging population, the number of air flight travellers has increased and is expected to increase in the foreseeable future. From this, the incidence of Inflight Medical Emergency has increased and the need for medical support from medical professional (doctors, nurses or first responders) has also escalated. This presentation gives an insight of the types and incidence of medical emergencies, what role and benefit a medical person could provide, their expectations and concerns especially medicolegal and rewards if any.

### **Aeromedical retrievals and complex medical case management in offshore locations - Dr Anthony Hochberg**

What is best practice in managing serious medical health issues in staff travelling or residing in offshore locations? How are the risks managed to an acceptable level and what is the duty of care on senior executive management? How do aeromedical retrieval companies influence your risk management and

costs? Can an insurer reasonably act to decline a claim when there is risk to life or limb because an exclusion potentially exists? What are the cross-cultural issues that may affect outcomes in different medical jurisdictions and how can medical consent be obtained when an employee is unconscious? Where does the Chief Medical Adviser or Company Doctor fit in and how can they proactively influence outcomes? Case examples will be discussed.

### **Australasia - prime property for international space ports - Dr Tony Schiemer**

**INTRODUCTION:** With the advent of commercial space flight, companies are searching for prime sites for launching space vehicles. Recommended guidelines have been presented by authoritative bodies within both the USA and the UK for space port sites, with various considerations for selection including: terrain, meteorological environment, runway characteristics, proximity to medical services and distance from heavily populated areas. Australasia has multiple potential sites which can be explored.

**AIM:** To review the locations of possible space port sites within Australasia.

**METHODS:** A review of geographical sites within Australia and New Zealand was undertaken based on currently available airports with runways greater than 3000m. Distances were calculated to nearby towns with populations greater than 50,000 people, as well as to tertiary hospitals, including emergency retrieval times via road and air. Meteorological data from the area was reviewed. Sites were ranked from operationally positive to negative.

**RESULTS AND CONCLUSIONS:** Several sites within Australasia were identified as possible space ports. However, each required further input to fulfil currently available criteria. Further discussion between the civil aviation authorities and governments in Australasia needs to be undertaken to begin facilitation of laws and possible developments to undertake the construction of space port sites. Australasia is a prime site for space ports based on environmental factors, available skilled personnel and as an already established worldwide tourist destination.

## **1325 - 1445 (SESSION 7)**

### **CRYSTAL BALL GAZING - TO FLY OR NOT TO FLY**

#### **178 Seconds to live - the back story - Dr Michael Thomas**

A visual pilot is said to have 178 seconds to live if they stray into instrument meteorological conditions, however where did this phrase come from and what is the evidence behind it?

The phrase is a modern interpretation of one small component of an important 1954 aviation study entitled the "180 Degree Turn Experiment." In an initial flight test performed at the beginning of the 180 Degree Turn Experiment, the average time before pilots developed an "incipient dangerous flight condition and/or altitude", was 178 seconds. However, the pilots were seriously constrained in their capacity to fly the aeroplane, most critically by the researchers covering-up some important flight instruments.

We present the interesting story of the "180 Degree Turn Experiment", some modern VFR-into-IFR outcome statistics, and discuss our forthcoming research project to test modern visual pilots in a modern aircraft simulator to see if 178 seconds is a genuine statistic under more representative modern conditions.

## **One long hop - managing aircrew fatigue on the new Kangaroo Route - Dr Ian Hosegood**

From March 2018, Qantas will operate the first direct flights between Australia and Europe when it flies the 787-9 Dreamliner directly between Perth and London. When Qantas created the Kangaroo Route in 1947, the 14,498 kilometre journey took four days and nine stops. With the advent of the new direct flight, that time will now be reduced to a single 17 hr sector. This paper briefly discusses the history of the Kangaroo Route and the advent of ultra-long haul flying and addresses the approach that the airline is taking to managing aircrew fatigue and maximising passenger comfort. The paper discusses the evidence around in-flight rest in ultra-long range operations and some of the measures being taken to maximise aircrew alertness. The design of current in-flight crew rest facilities is discussed as is the use of bio-mathematical modelling, rest planning, crew complement and personal fatigue countermeasures.

## **Surgical treatment for NIDDM pilots - Dr Dave Baldwin**

Type 2 Diabetes is a very common diagnosis in pilots and up to now treatment involves a combination of dietary measures, promoting a healthy lifestyle and using hypoglycaemic medication. Some of the hypoglycaemic medications used to treat Type 2 Diabetes, such as Sulfonylureas, carry a significant risk of hypoglycaemia which is a risk to flight safety. This is a case presentation of a Type 2 Diabetic Pilot who participated in a hepatic artery denervation study to improve glycaemic control in type 2 diabetes using a surgical technique. This is the first time a surgical approach has been developed to treat Type 2 Diabetes and it typifies cutting edge research and development. The denervation procedure involves catheterizing the hepatic artery and then using ultrasound to ablate the hepatic sympathetic nerves. This unique approach is based on animal studies that show considerable improvement in glucose metabolism following the ablation of the hepatic sympathetic nerves. The pilot concerned has experienced an improvement in his blood glucose levels since the procedure has been carried out.

## **A pilot's future - atrial fibrillation - Dr Kate Manderson**

This is a case presentation that explores the clinical features, workup, results, diagnosis and disposition of a Class 1 applicant with a new diagnosis of asymptomatic atrial fibrillation. The presentation will discuss the current issues and controversies around investigation, anticoagulation and stroke risk stratification for pilots.

## **1505 - 1545 (SESSION 8)**

## **IF YOU FEEL YOU ARE IN A BLACK HOLE, DON'T GIVE UP. THERE'S A WAY OUT. - STEPHEN HAWKING**

## **A pilot's future - cerebrovascular infarction - Dr Kate Manderson**

This is a case presentation of a Class 1 license holder with a visual field defect identified during his routine medical assessment. The presentation covers the approach to visual assessment by DAMEs, investigation, diagnosis and aeromedical disposition for a complex neuro-ophthalmological presentation.

## **"Facing my last flight": when depression changes your career path, your dream, your identity - Dr Caron Jander and Joel Seaton**

Depression changes lives, for some in a minor way but for pilots the consequence of the diagnosis can be career ending.

This presentation will be a personal encounter of a pilot facing his depression (before German Wings), how he realised he may have depression, the choices he made, the support systems available to him,

the crossroads and life choices he encountered and what he has done subsequently. Hearing firsthand about this experience will enlighten DAMEs as to the path of a pilot with depression to see it from the other side of the desk.

This is depression, a pilot's perspective.