

From the editor

Hello All,

We thoroughly encourage people who are not members of the RAeS to join the society – the benefits are enormous! Membership of the Society gives you worldwide professional recognition and the right to use post-nominal designations at the appropriate grades. Aerospace International is the Society's monthly magazine packed with in-depth news, topical articles, conference reports, and is delivered to all members *free of charge*. Valuable Professional Development is derived from the Society's international Conference and Lecture Program. The Society attracts high profile delegates and speakers from a wide range of backgrounds – industry, government and academia, in both civil and military arenas. The Society provides numerous opportunities for networking and exchange of views with other like-minded professionals. **NOTE** that if you join the society *now*, the membership rate is 50% of the annual rate! Visit <http://raes.org.au/become-a-member/> to download an application form today.

Don't forget to register early for the 2009 Lawrence Hargrave lecture and dinner to be held in November using the form attached. The CEO of Qantas, Alan Joyce, is our distinguished lecturer for this event which is not to be missed! The Hargrave lecture will attract a wide variety of people from the aviation industry making this a great networking opportunity! Hope to see you all there ☺.

Best Regards,

Karen Trezise
Newsletter Editor

14th September 1989



On September 14th 1989, the Bell/Boeing V-22 Osprey tilt-rotor aircraft completed its first transition from rotor to wing-borne flight.

The V-22 operates as a helicopter when taking off and landing vertically. The nacelles rotate 90 degrees forward once airborne, converting the Osprey into a turboprop aircraft. It can provide Vertical and/or Short Take-off and Landing (V/STOL) with a payload of 24 troops, or 2,722kg of cargo, at 796km combat range, or V/STOL with a payload of 3,765kg of cargo for a range of 407km.



September Event 2009 Hargrave Recipient Applications and Advances in Crack Patching Technologies

Presenter: Alan Baker, 2009 Hargrave Award Recipient
When: Monday 14th September 2009
Time: 6.00pm for a 6.30pm start
Where: Auditorium, Engineers Australia, 21 Bedford St, North Melbourne
Free - everyone welcome! No registration required.

Crack patching (CP), the use of adhesively bonded fibre-composite reinforcements to repair defective metallic aircraft components, has become accepted as a cost-effective and highly structurally efficient repair technology. CP technology, developed in DSTO from the early 70's, has been widely exploited by Australian Defence Force (ADF) for repairing fatigue cracks in C130, Mirage, F111 and F/A-18 aircraft.

Dr. Baker will provide background on the basis, scope and advantages of CP when compared with conventional repair approaches, based on mechanically-fastened metallic patches, and then outline some of key underpinning materials engineering and design technologies. He will then briefly describe several repair applications, including some undertaken commercially for the U.S. Air Force and US Army.

More challenging repairs to primary structure in the wings of Australian F111 and USAF C141 aircraft will be described in greater detail.

The scope of CP is much broader than the repair of cracks; for example, it can be used to reduce stress or repair corrosion damage. Non-aerospace examples for the ADF include the reinforcement of welds in the Royal Australian Navy's FFG ships.

The reasons for the current limitations of CP to repair critical fatigue cracks in highly-loaded primary aircraft structures will be described followed by a discussion of approaches, based on structural health monitoring (SHM), that have the potential to overcome these limitations.

Next Month - October Event

Connecting the World: Boeing's Long-Range Commercial Jetliners

Presenter: John Roundhill,
Former Vice President of Product Development and Strategy, Boeing Commercial
When: Tuesday 20th October 2009
Time: 6.00pm for a 6.30pm start
Where: Rooms A & B, Engineers Australia, 21 Bedford St, North Melbourne
Free - everyone welcome! No registration required.

Since retiring in 2002, John Roundhill has continued to support Boeing by providing product development consulting for various Boeing programs including the 747-8, 787 and other new airplane programs. From 1997 until 2002, Mr. Roundhill served as Vice-President of Product Strategy and Development, including product development, enabling technologies, the Airplane Creation Process Strategy Team and research coordination. Out of this work, came the Sonic Cruiser concept and the 787 Dreamliner. Prior to this assignment, he was director of Engineering for the 737/757 programs.

Since the entry into service of the 707 by QANTAS in 1959, Boeing long-range commercial jetliners have been literally connecting the world. Mr. Roundhill will speak about the technological progress in weight, airplane drag and engine efficiencies that are the underpinnings of the remarkable improvements in range capability, environmental performance and economic efficiency over the past 50 years. A relatively detailed look at the enduring 747 (including the derivative 747-8), the popular 777 family and the all-new 787 Dreamliner will be included, with some consideration of future trends in commercial jet aviation.

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September Event – 2009 Hargrave Recipient, Alan Baker

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2009 Lawrence Hargrave Lecture & Dinner – Reservation form

Spy in the sky

Upcoming Events / Websites of interest

Safeskies Conference 2009

Managing Aviation Safety in a Changing Environment

Safety is at the forefront of the Aviation Calendar with the Biennial Safeskies Conference. The Flight Safety Foundation is a strong supporter of Safeskies and the 2009 Program looks to be both comprehensive and topical in this current challenging environment.

Safeskies Australia is an independent, not for profit organisation that promotes continuing improvement in aviation safety by fostering innovation and exchange of information and views between civil and military aviation operators, regulators, governments and academia.

Safeskies' internationally recognised biennial conferences facilitate sharing information and views among hundreds of Australian and international attendees and speakers from multiple disciplines from Australia and around the world.

Between conferences, Safeskies cultivates informal and formal dialog between all relevant commercial and government sectors on many issues and developments bearing on aviation safety.

The Sir Reginald Ansett Memorial Lecture and Safeskies Conference Dinner Tuesday 6th October, Parliament House Canberra, ACT

Safeskies International Aviation Safety Conference Wednesday October 7th and Thursday October 8th, Hyatt Hotel, Canberra, ACT

***STOP PRESS** - The Safeskies Board has kindly agreed that RAeS Members can attend the Ansett Lecture and Conference for the corporate rate of \$770, a saving of \$110 on the full rate. If you wish to attend, please specify that you are a member of the RAeS when registering to obtain this reduced rate.*

Refer to the website www.safeskiesaustralia.org for more details.

First Person View

Remote Control flying

First person view is a relatively new aspect of model flying activity. It is a system whereby a radio control model aircraft is piloted, not through direct line of sight, but by using a live video downlink from an onboard camera allowing the pilot to experience a 'cockpit view' and to control the aircraft from the visual perspective of an on-board camera. The latest generation of lightweight camera equipment, combined with developments in data transmission, have enabled this type of flying to be carried out cost effectively and with small lightweight airframes. This technology has been typically used for Military operations since the 1940's.

Equipment is now becoming commercially available which allows the on-board camera to be gimbal-mounted and driven by servo motors which are in turn linked to a gyro-controlled headset worn by the operator. This allows the pilot to point the camera mounted on the aircraft in almost any direction by moving his head.

The equipment described potentially presents the pilot with opportunity to fly the aircraft out of normal unaided visual range by utilising the 'cockpit view'. Where an aircraft is being flown either using a headset or a monitor screen there is cause for concern in any emergency situation, either due to pilot error (disorientation, or unsure of position) or systems failure (loss of data link), as the pilot may not be able to re-acquire the aircraft visually with sufficient speed to prevent a crash. This problem may be compounded due to lack of spatial and positional awareness as well as lack of information on other external factors (such as the location of other model aircraft and persons).

Inflight Refuelling

Inflight Refuelling is vital to the world's major air forces. In June 1923, the U.S. Army Air Service used two DH4 Biplanes to prove a workable, yet risky, system consisting of 500 litres of fuel, large funnels and a 15.25m hose with an on/off nozzle on the end. Despite the dangers, by 1935 the record for sustained flight courtesy of inflight refuelling was pushed to 653 hours and 33 minutes – a record that stands to this day.

Although the US led it early, it was Britain's Sir Alan Cobham, the founder of Flight Refuelling Ltd, who developed a system consisting of weighted cable let out from the tanker and a grapnel fired from the receiving aircraft to grab the cable. The hose was then drawn into the receiver aircraft – it was known as the looped-hose system. However, just as WWII was coming to an end, Flight Refuelling perfected a technique still in use today – the probe and drogue method.



The tanker aircraft trails a hose with a stabilising conical drogue at its end. Receiving aircraft are fitted with fixed probes which accept fuel flow when connected to the drogue. Valves are automatically opened on the probe and drogue when locked together and closed once contact is broken. This method was perfected in the late 1940s.

Meanwhile in the USA, Boeing set about developing their own system to improve on the British technique. They wanted to pass fuel at a faster rate down a shorter hose which ultimately evolved into a rigid pipe. So was born the method used today. The rigid pipe is actually telescopic and joined to the tanker by a universally pivoted coupling. The boom is pressurised by the fuel itself and had aerodynamic control near the "business" end, controlled by a boom operator who fires the telescopic boom to make a fuel-tight seal.



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* Opinions expressed in this newsletter do not necessarily represent those of RAeS, the Melbourne Branch or the Editor.

Websites of interest

Branson's Galactic Mothership:

<http://www.theage.com.au/travel/travel-news/public-gets-first-look-at-bransons-galactic-mothership-20090728-dzvj.html>

Writings about military and civil aircraft, including rotorcraft and lighter-than-air machine:

<http://www.vectorsite.net/indexav.html>

History of Qantas:

<http://www.qantas.com.au/travel/airlines/history/global/en>

Air crash Investigations:

<http://natgeotv.com.au/programmes/air-crash-investigation>

Spy in the sky

The years following the Second World War were known as the Cold War. During this time the two global superpowers, the United States and the Soviet Union, were involved in an arms race as each country tried to develop the most powerful weapons, however they never really attacked one another. In the early 1950s, the American government was afraid the Soviet Union might be planning to drop a nuclear bomb on the United States, so the Lockheed Corporation was asked to produce an aeroplane that could be used to spy on the Russians. The ultra-light U-2 was designed to fly at very high altitudes so it couldn't be shot down. With newly-developed spy cameras on board, the plane flew its first mission over the Soviet Union in 1956.

The U-2 flew back and forth over the Soviet Union for four years, taking photos of highly secret military installations. It was beyond the reach of their anti-aircraft missiles and fighters, but finally, in 1960, they managed to shoot one down. The pilot survived and was taken prisoner. He was later exchanged for a Russian spy who had been captured by the Americans.

Because the aircraft operates at such a high altitude, the pilot has to wear a type of spacesuit with its own oxygen supply.

U-2s are still in use by the U.S. Air Force for reconnaissance and high altitude research.

The U-2 is considered to be one of the most difficult aircraft in the world to fly because of its large wingspan and light body which mean that it is easily affected by crosswinds. It is also hard to land because it tends to float over the runway.

Wingspan:	32 m
Length:	19.2 m
Maximum Take-off weight:	18,000 kg
Maximum Speed:	660 km/hr
Maximum Altitude:	21,212 m
Range:	11,265 km
Crew:	1
Engine:	General Electric F-118-101



Forthcoming Events

Planned future events to make a note of include:

Gippsland Aeronautics

The development of the GA-200 agricultural, GA8 utility and the ex-GAF Nomad aircraft

Details of the program for 2009 will be provided once events are finalised. Visit our website for up to the minute details at <http://www.raes.org.au/~raesorga/melbourne-branch/> The branch welcomes any suggestions or ideas for future events/lectures.

Melbourne Branch of the Royal Aeronautical Society

September 2009

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MELBOURNE BRANCH

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The Melbourne Branch of the Royal Aeronautical Society presents

2009 Hargrave Lecture and Dinner

Presented by

Mr Alan Joyce

Chief Executive Officer — Qantas Airways Ltd



Wednesday 4 November 2009

6pm for a 6.30pm start

RACV Club, 501 Bourke Street, Melbourne

About Mr Alan Joyce



Alan Joyce was appointed Chief Executive Officer and Managing Director of Qantas on 28 November 2008. He is a former Director of Orangestar Investment Holdings Pte Limited (holding company of Singapore-based Jetstar Asia and Valuair) and Jetstar Pacific Airlines Aviation Joint Stock Company (in Vietnam). Mr Joyce previously served as Chief Executive Officer of Jetstar for five years from October 2003, a period that included the commencement of the airline's domestic and international operations. Prior to his appointment at Jetstar, Mr Joyce spent over 15 years in leadership positions for full service carriers Qantas, Ansett and Aer Lingus. At both Qantas and Ansett, he led the Network Planning, Schedules Planning and Network Strategy functions. Mr Joyce holds a Bachelor of Science in Applied Science (Physics and Mathematics) (Honours) and a Master of Science in Management Science. He is also a Fellow of the Royal Aeronautical Society.

Dinner Reservation and Payment Slip

**Hargrave Lecture and Dinner
4 November 2009**

\$ 75 RAeS members
\$ 120 non members
\$ 50 full-time students
(incl. GST)

Name: _____

Email: _____ Ph. _____

Amount: \$ _____ RAeS membership number: _____

Cheque (to "Royal Aeronautical Society, Melbourne Branch") or

Card Type: Visa/MasterCard/American Express

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