



Edition 77 - January 2024

Fly By

Mum's The Word!
"Mum" Davis Tells His Story!

Darken The Sky
A New Breed of Airship is Coming

QHIs In The RAN
A History of Helicopter Instructors in the RAN





Editorial

By M.C. Peake

Anyone who worked with or flew in ADF aircraft was, from the moment they started their training, immersed in a culture of Flight Safety. Quite rightly, it dominated everything we did.

From manuals that dictated exactly how things should be done, to configuration control that kept everything in sync; training that emphasised the risk of *not* doing things properly, and the culture that taught you to keep your eyes and ears open and report anything awry - it was all part of it. And an absolutely fundamental principle was 'openness' - the need be honest about omissions or errors, so that others learned from our mistakes.

So it came as a surprise to read earlier in this month that Defence has allegedly refused to release a report assessing the potential risks of the MRH90 "Taipan" helicopters before they were grounded.

Of specific concern is the reason for refusal. *"the confidential aspects of aviation safety is vital"*, the rejection allegedly read, and *"any erosion of that process could be expected to diminish the quality and level of information available for...investigators to determine the cause of any aviation incident."*

What a load of cobblers! The report's focus was a general assessment of risk of continued operation of the Taipans. It was not an accident investigation and, noting the ADF no longer operates the MRH90, it is difficult to envisage how releasing that assessment could fetter fu-

ture incident investigations of other types of helicopters.

Defence's use of aviation safety investigation as its excuse for secrecy grossly abuses the tenet of openness so vital to preventing accidents. In doing so, it risks undermining the hard-learned and baked-in principles and culture of Flight Safety. It is also contemptuous of the intelligence of interested parties outside of the ADF, who aren't fooled by the weasel-wording for a second.

But then we know that Defence has a habit of suppressing things it doesn't want people to read about. For example, a report - even a redacted one - has yet to be released on the ditching of a Navy MH-60R over two years ago.

And it would seem, certainly from this latest refusal, that any excuse is seen as a good one. Even if it is not.

On a different subject, the majority of our readers are now officially out of date for their membership, as subscription payments became due on 01 January. Last year our hard-pressed volunteers literally spent hours and hours chasing up late payments, so please can you save them some work and pay your sub now. All of the details are on the last page of this edition, or you can simply ask the database manager [here](#) how much you owe, and how to pay.

And on that note, welcome to 2024! May it bring you good health and happiness in whichever corner of this wide brown land you live.

mp.

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QHIs in the RAN

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THIS MONTH'S COVER PHOTO



HMAS Canberra personnel conduct a yoga and meditation exercise on the Flight Deck under the stars. (Defence image).

REST IN PEACE

Since the last edition of *FlyBy* we have been advised that the following people have Crossed the Bar:

Bill Ritchie, Brian Dutch, Jack Suriano, Theo Burdorf, Mike Lovell

You can find further details by clicking on the image of the candle. →



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Dear Editor,

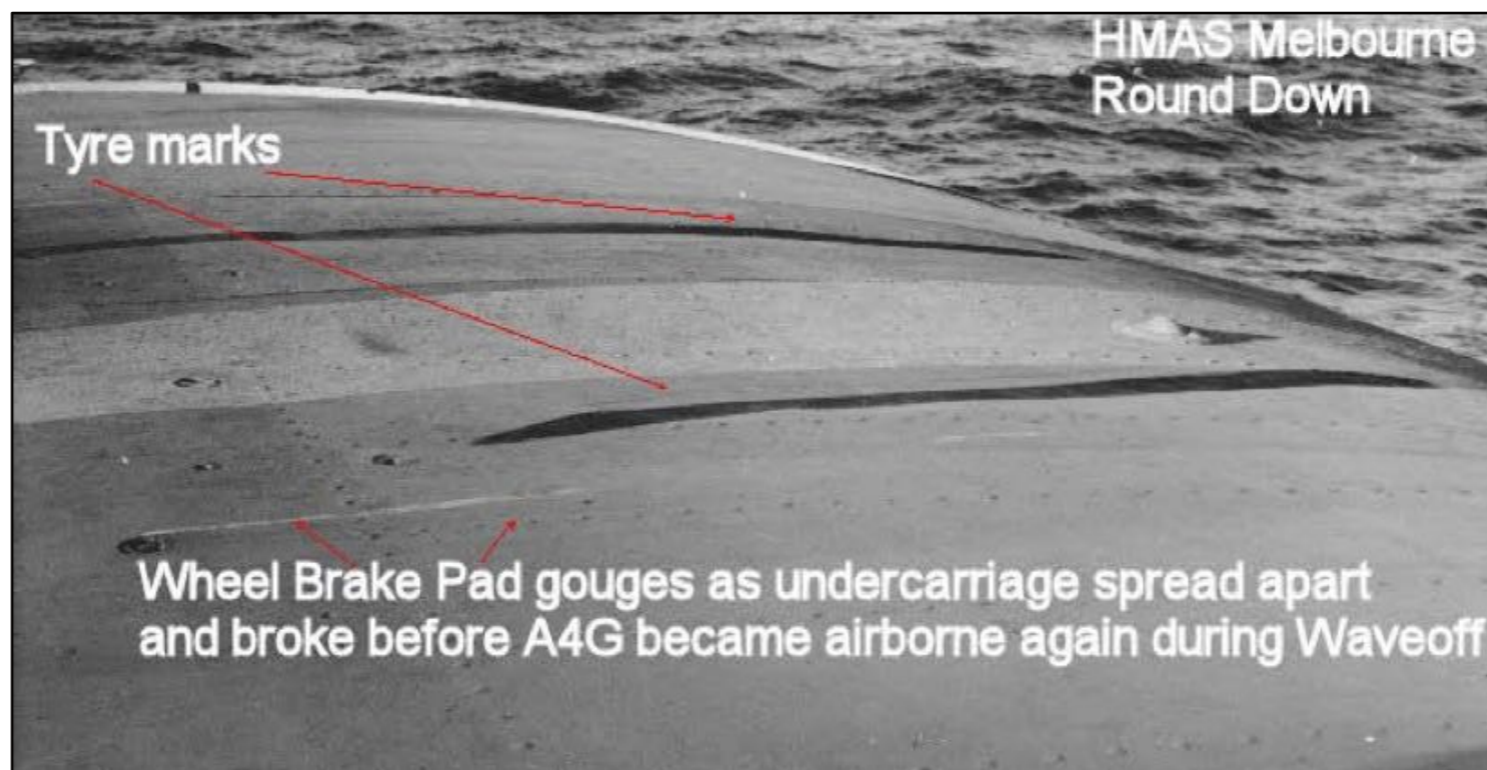
Please see below my response to the Landing Signals Officer (LSO) night ramp strike letter on page 15 of last month's Flyby (Dec 2023 [\[here\]](#)).

Thanks for the LSO debrief GT. :-) I don't quibble with the words of the LSO, much the same as one did not argue the 'small stuff' (detail) in an LSO debrief of a carrier approach. He was there - he saw what he saw - but after fifty years as he acknowledges, his memory may be "somewhat unreliable".

We can both say neither of us was in each other's suede flight boots that night. My recollection was from not only retelling the story from my perspective for most of those last fifty years to anyone interested (and the reason for starting work on the Mega PDF [here](#), but also I wrote my story some twenty odd years ago. That was the untouched story published in 'Slipstream Magazine of March 2020 [\[here\]](#) & subsequently in the recently published book 'The Skyhawk Years' that you reference. [More or less that same story].

'Grime' (**Graham QUICK**) also has 4 pages about LSOs in this edition. Also the FAAAA website features a story of 18 pages [here](#), with embedded videos removed. There's also a Aug 2004 16 page version with an error [here](#).

My point is that the night ramp strike story has



been published online in various forums for many years, with additions of some photos, often with embedded videos that unfortunately will not play now.

Returning to the night of the incident, the LSOs involved remained aboard *Melbourne* so it was not possible to have an LSO debrief that night, although I did see GT onboard subsequently as I recall; but we did not speak about the event.

A week or so later, after day DLs, I did a night DL session but did not have time to night qualify due to *Melbourne's* requirement to steam to the city of Melbourne, thus the requirement for a divert field for night DLs was not met during the transit.

The first part of my cruise with VF805 was done only with day DLs. Before the second part - beginning 1972 after Xmas leave - I was quickly worked up by day then night qualified onboard. It was much easier due to my accumulation of day DLs earlier.

My sincere apologies for claiming the LSOs went into the 'scoot chute'. This is where my first person account falls down when told things by a third party. Sorry 'O'Don' (**Lyll O'Donoghue**) for getting you moving.

Now I understand why 'Gazza' (**Gary Northern**) the second VF805 LSO did not speak to me subsequently about that night either. It was 'Grime'. He may have been talking to me on his radio after the rampstrike unaware I had switched to the ship controller frequency (who told me to head east [but he had just returned from our WA] I was going WEST anyway - back to NAS Nowra). It was not

possible for 'Grime' to know anything about the state of A4G 885 at night. Yes 'waving off at Optimum Angle of Attack at full power' does induce a steep climb.

As an irrelevant aside I once made a touch and go climb then short circuit at NAS Nowra at Opt AoA all the way around but then ATC told me to land. VC724 SP 'Dusty' King was not concerned saying I should not do any again because it did look different - especially the steeper than usual climb - and ATC was concerned. It was difficult to keep at Opt AoA by the way especially turning downwind. To drive home the point about the powerful A4G engine (9,300 lbs of thrust) I once carried out a short take off at FAIRBAIRN with only about half internal fuel on my way back to NAS Nowra. Trevor Peck in the S2 watching said he had never seen such an astonishing climb.

Back to the approach. As mentioned: starting high again the power was low but I thought I was increasing it incrementally - obviously not enough. I defer to the LSO on these points - all my fault.

I never wanted to eject. I did not say I wanted to do so. Except in exceptional controlled circumstances I did not need any permission to eject otherwise. As mentioned all the caution lights lit, except the fire warning. The aircraft remained flyable so it was flown back to Nowra - more or less at approach speed, with fuel dwindling rapidly, below undercarriage speed limit because I realised there were problems. VF805 Senior Pilot **Barrie Daly** inspected the underside of 885 from his airborne A4G, yes the undercarriage was U/S.

John Park did not make it to the portable mirror

on RW 26 at NAS Nowra but spoke to me via the radio in the VC724 SP's office in 'J' Hangar. I knew from the getgo I needed to carry out a short field arrest. Trying to convey that necessity to ATC had me babbling a bit (fuelled by adrenalin) early on to Nowra ATC, to get them to acknowledge it. Speaking to them afterwards I realised I needed to speak slowly in emergencies because of one's tendency to speak quickly otherwise.

Then GT writes: "...Phil's ramp strike was a direct result of him not following the LSO's directions. I have not seen Phil since that night."

I agree about 'not following' but would say "not following ENOUGH". As mentioned in my story the power was coming on - but not enough obviously. An LSO 'POWER' call required more power than I was applying. On my first approach I had managed to finesse the high start to carry out a deck landing; but with hook up as required. Subsequently the LSO debrief downwind at 1,000 feet at night was only half heard because I was struggling with the aftermath of that first night approach and the instrument flying. I had never been over black water/no horizon conditions at 1,000 feet before, my attention was mostly focussed on what had happened and instrument flying. I don't recall an LSO debriefing me downwind in flight otherwise - ever. My comprehension of what was said then was limited sadly. My bad.

It was surprising to not have an inquiry into the accident - at least none that involved me. People spoke behind closed doors so I don't know those conversations. Business as usual but no night DLs for me for the first half of the cruise late 1971.

Weeks after the rampstrike when VF805 embarked I did see GT in *Melbourne's* wardroom but we did not speak. I don't recall seeing him after that, but he would know if he was on the cruise late 1971 to Hawaii for the first RIMPAC.

Yours aye, **Phil Thompson**.

Dear Editor,

David Prest in 1966 watched as the chefs at Nirimba, the Navy Apprentice base, performed the miracle of turning water into milk.

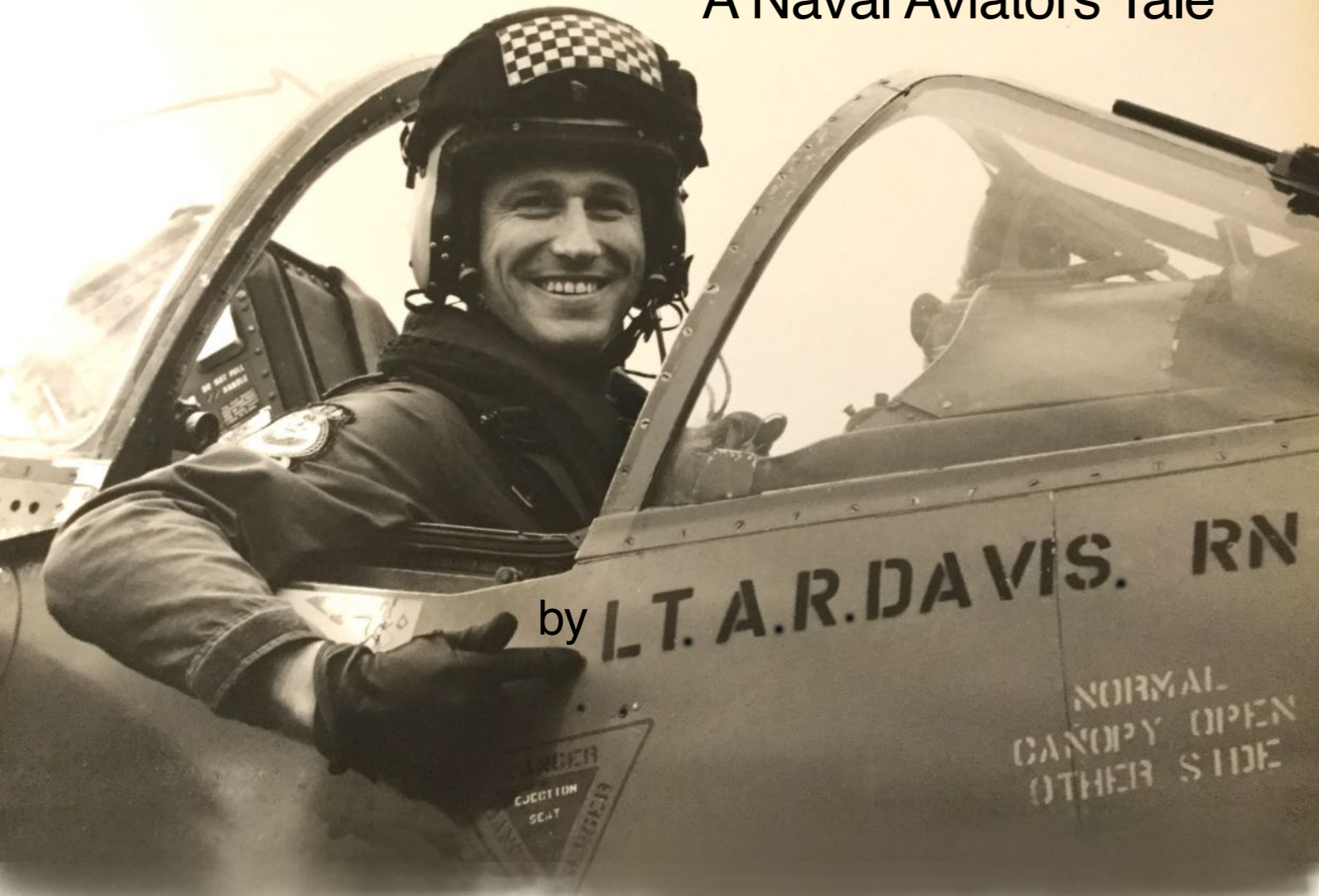


Taking a milk churn that was almost full of water, the chefs then added 2 pints of milk, gave it a stir and said "The apprentices will never know the difference."

Yours aye, **David Prest**.

MUM'S THE WORD!

A Naval Aviators Tale



There are and have been many like me, but I'll contest that few aviators will have had quite the same breadth of experiences and privileges. Lucky Mum!

So, my tale begins in 1976, waiting in a long queue at Garden Island Dockyard to get aboard HMAS *Melbourne* for a Ship Open to Visitors Day. Looking up from the dockside I saw the tails of A4 Skyhawk jets and realised that the Navy flew exciting fixed wing too. As a newly promoted corporal in the Air Training Corps, the gloss of the Air Force was diminished - the scales had fallen from my eyes!

In the end, they closed the gangway and I never got aboard that day. I had to wait 4 years before finally getting aboard HM's steamer - this time flying myself on.

Recruitment was interesting. Straight out of school, I applied for an SL commission with Observer, then ATC and finally pilot in that order. Under confident, with no real flying experience and not yet shaving, I thought I'd never make a pilot's backside, but I

was guided by the boards senior officer to reapply my priorities. Thank you, sir.

In Feb 1978, after joining for all of 7 weeks of Basic Air Training Course (SL officers' short course) at HMAS *Creswell* (RANC), number 105 pilots course formed at RAAF Point Cook to start a long period of ground school. Scraping every exam, and, after my first shaving bollocking by the WO Disciplinary, now also scraping my chin, we started flight training on the 'plastic parrot' CT4A. Looking back, some of the instructional practices such as 'towing' an erroneous student back from the runway for forgetting his checks, and the ritual humiliation of 'remain standing' after a wayward answer to a technical question, are quite archaic and wouldn't stand up to HR scrutiny today!

Flying training continued Macchi jets at RAAF Pearce. Testing times but a strong course group helped us through, and wings were awarded in 1979. The 'disposal' drinking exercise saw me wasted and posted to S2 Tracker OFT which

started almost immediately at RANAS Nowra on VC851.

Still desperately under-confident, I staggered through training on this magnificent and large (but quite blunt) machine, including Field Carrier landing Practice and ultimately the crowning glory of my first actual deck landing in March of 1980. Abiding memories include being alarmed that the ship didn't seem to get any bigger as we approached, and being entirely convinced the wingspan wouldn't fit (indeed it only just did - we only had 8' wingtip clearance from the island IF on centreline!).

So having got over closing my eyes in horror late on finals and being saved by 'Farmer' Talbot by taking my own, way too late, waveoff (nose down and hook raised to avoid an airborne arrest), I carrier night qualified and, in 1981, embarked for a major 'up top' deployment with VS816 Fighting Tigers. The Squadron aviators consisted of 3 LCDRs, 4 LEUTs and 15 SBLTs or A/SBLTs. What an experience with such an inexperienced crew. I developed an enduring taste for Hong Kong!

Another shorter exercise deployment and all of a sudden, our ship was taken from us and we were shore based doing oil rig patrols *ad nau-*

seam. I was so lucky to have enjoyed the time flying CATOBAR ops (Including a hangfire catapult shot on my 21st birthday) and saw the very last of it, bagging the second-last fixed wing DL in the RAN (Snapper McKean gets the last honour by 30 seconds!). We awaited the arrival of HMAS *Australia*, the carrier that never came. As it turned out I embarked in the very same carrier (HMS *Invincible*) only 3 years later as an RN exchange Sea King helicopter pilot.

Below. Andrew Davis was flying No.3 ship in this well known formation photograph. **Main picture.** A Tracker on short finals to HMAS *Melbourne*. The government's decision not to replace her spelled the end of fixed wing flying in the FAA.➔





Eight Tracker crew (pilots and Observers) were loaned to the RN on the cessation of RAN fixed wing operations, and another 10 pilots transferred to the RN after that sorry event. Three years of Helo flying whizzed by and, liking the flavour of real-world cold war ops, I transferred to the RN in 1987. I suppose I can be accused of choosing Queen and Navy over country, but the job options in the RAN were very limited at that time.

Above Main: A photograph of 801 Squadron embarked in HMS Ark Royal anchored off Akrotiri in Cyprus during Operation Granby (1st Gulf War). LEUT Davis is back left. The Squadron was tasked with air defence of the Eastern Mediterranean, ostensibly to monitor any possible intervention of the Libyans, Syrians or Egyptians in the war. 801 managed to provide a continuous CAP during the height of the war, with the greatest activity coming from the Israelis who were nervous when radar images suddenly popped up off their coast. **Left:** An image of a valid Sidewinder solution on a

friendly Dutch F16. Taken from an old wet film gun camera from an FRS1 SHAR. Speed, heading, angle of attack and height are all represented, along with horizon bars. The diamond just behind the target is a locked sidewinder symbol - and would produce the growl you hear in top gun movies. It was rare to get a clean shot on an F16 flown by good operators like the Dutch. You can see the long pitot probe projecting from the bottom of the picture. →

Jet training followed and my third frontline tour was with 801NAS flying Sea Harrier FRS1 from HMS Ark Royal. A flirtation with the first Gulf war in the Eastern Mediterranean included intercepting a 'friendly' U2 at 48000' (well above our service ceiling, but live missiles on the wing increased my wing area making it possible) and watching cruise missile launches from a US cruiser during a very long and lonely night CAP sortie as we maintained 24 hour defensive counter air ops.

At its peak, ex Australian Sea Harrier pilots made a up a third of the total pilot manpower for the RN. I suppose we always hoped the RAN would acquire a similar capability and we could come home, but that wasn't to be and after a QFI course and some basic instructing, set about trying to teach VSTOL flight from the backseat of a Harrier at 899 NAS. No mean feat, and quite the challenging role especially resisting interfering in the students' attempts to decelerate and land.

Now married to the charming Amanda (herself an RAF Air traffic Controller), another frontline tour beckoned, this time involving Operation Deny Flight over Bosnia. Only just surviving a very

alarming locked in engine surge over the country, I went back to the training Squadron for another QFI tour. A short but engrossing attachment to NATO headquarters in Italy to help run the Operation *Deliberate Force* saw me play my little part in bringing the Bosnia conflict to some kind of settlement.

Yet another front line tour with 801NAS (can't get enough of them) and then appointed as CO Naval Flying Standards Flight where I was privileged to 'own' and operate 2 hawks in the pilot training /assessment and maritime training roles, while still instructing on Sea Harrier, Hawk, Grob, and Jetstream.

Realising my promotion to Admiral had been unaccountably delayed, and with young mouths demanding feed, I chose the civvy route and enjoyed 20 years of long-haul airline flying with Virgin Atlantic. A hiccup in that plan came about in 2001 with 9/11, and the company let me rejoin the jolly

Below. A Hawk T1 of Naval Flying Standards Flight based at Yeovilton, UK, of which Andrew Davis was the CO. →





Visit the Navy Wings site for lots of news and information, and goodies for sale at reasonable prices!

NAVY WINGS

old Andrew for a swansong career, again going frontline in the mighty Sea Harrier on 800 NAS.

Demobbed again in 2004 and back to the airline, I was privileged to be retained in the RN Reserves, where I had the best of both worlds flying Hawk in the pilot and maritime training roles part-time, while jetting about the world in my day job. Such is the lot of the career pilot. Now just to balance jet lag against hand flying 500knots at 50 feet!

Postscript - Covid cut short the airline career and I was just settling into a comfortable and dull retirement when that urge all aviators of a certain age and type overcame common sense and I got involved in aircraft older than myself (again!).

Navy Wings, the RN civilianised Heritage operator offered me a position I couldn't refuse, and I am today one of only three current Swordfish pilots in the world. Display flying old machines is a new challenge which we meet on a daily basis and is perhaps the riskiest of all flying to date – evidenced by a small incident about ½ mile short of runway 04 at Yeovilton in a 2 seat Sea Fury. Me, a passenger with 6 minutes flying time, found myself crawling out from one of the 3 large pieces of our once mighty machine. We found that engine seizure at 800' on finals has a dramatic effect on your glide path.

Finally booted out of the RN Reserves by His Majesty in 2022, I completed 44.5 years of service in 3 Navies (reserves being one) and enjoyed every minute. Operating such varied types from seagoing platforms is the greatest challenge in aviation (well, night ops are- if you've done it, you'll know) and the best choice for a young, unimpressive but aspiring not-yet-shaving 17 year old can make.

Andrew Davis.

As one of only three pilots in the world qualified to fly the Fairey Swordfish, Andrew gets to enjoy days like this: over Anglesea earlier this year. Inset right: Ready to taxi for the Battle of the Atlantic 80th anniversary display. ➔





Last month's Mystery Photo featured a modern-looking aircraft with an astonishing feature, and we asked if anyone knew what it was. The answer is the Convair NB-36H - the first nuclear aircraft in the world.

In 1942 Enrico Fermi, the creator of the world's first nuclear reactor, proposed using nuclear power to propel aeroplanes.

From the point of view of aeronautical theory it was a logical idea, and the US Air Force took it up in 1946 when it formed the Aircraft Nuclear Propulsion (ANP) program. With initial funding of US\$10m, the program was tasked to develop and test a nuclear powered bomber.

With Cold War tensions increasing, the Air Force was attracted to the idea of an ultra long range bomber which could infiltrate the vastness of the Soviet Union from unexpected, under defended angles. To do so it needed a heavy lifter with unlimited range.

Starting Conventional

The USAF already had an airframe which could carry the payload required: the Convair B-36. Developed at a time when it looked like the Nazis would overrun the whole of Europe, including Britain, the Convair B36 "Peacemaker" was conceived for one purpose only: to carry a significant payload from the eastern tip of North America, across the Atlantic and back again.

The War was long over by the time the first Peacemaker flew, but the start of the cold war saw it remain in service.

It was nothing if not impressive, offering a huge leap in size and performance over its predecessors. With a wingspan of 230 feet, it dwarfed the B-29 Superfortress bombers which had been one of the largest aircraft of WW2.

Originally powered by six 71 litre 28 cylinder radial engines, it remains the largest propeller driven aircraft of all time. The piston engines were primarily used for cruise flight, and were soon augmented by four jet engines to give a total of 44,000 horse power. The jets were typically used on take-off and for additional speed over the target. When not in use the jet intakes were blanked by special louvres to reduce airframe drag.

The Peacemaker's carrying capacity was impressive, too. It could carry the entire bomb load of a B17, plus the weight of

that entire aircraft and its crew and the weight of a P51 Mustang escort fighter.

Going Nuclear

When it came to actually building an aircraft capable of nuclear power, a conventional B36 was requisitioned, which was one of 61 B36s that had been destroyed or damaged by a tornado that struck Carswell Air Force Base in 1952.

The original crew and avionics cabin was replaced

A slogan often attached to the mighty B-39, reflecting its six propeller and four jet configuration, was "Six turning, four burning".

As engine fires were relatively common however, some crews humorously changed this to "two turning, two burning, two smoking, two choking and two more unaccounted for."

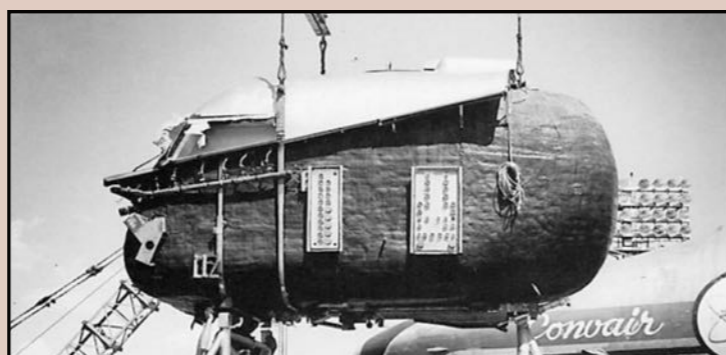
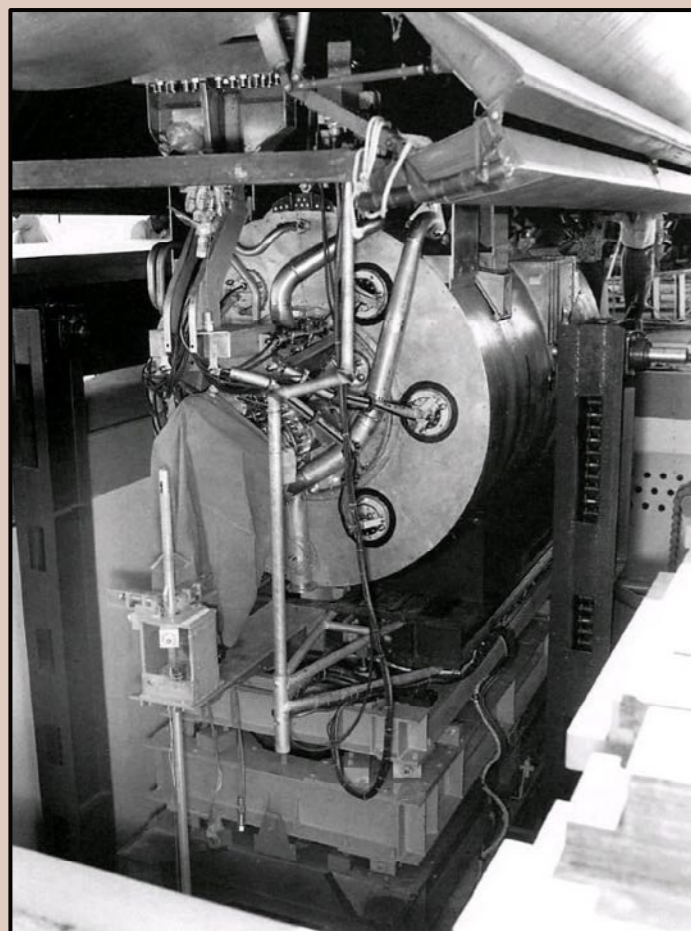


by a massive lead and rubber lined 11-ton crew section for a pilot, copilot, flight engineer and two nuclear engineers. Even the small windows had to be 22-30cm thick lead glass.

The aircraft was then fitted with a 16,000 kg air cooled reactor capable of generating one megawatt of power. This was detachable, being suspended in the aircraft from a hook in the middle bomb bay, and lowered to the ground between flights for safe storage in a bunker. A monitoring system nicknamed "Project Halitosis" measured radioactive gases from the reactor.

The aircraft, now designated NB-36H ("N" for 'Nuclear') completed 47 test flights between 1955 and 1957, accumulating 215 hours of flight time.

The reactor was never actually used to power any of its engines - the flights were really just to test shielding for crew protection, but it was taken to 'critical stage' for 89 hours of the flight test schedule, so it did prove the concept. What was never tested was the actual process of transferring the power from the in-hull reactor to wing-mounted engines. Separate research into this very subject was conducted by General Electric and Pratt & Whitney, and, although designs were produced the



Clockwise from top: [1] The 11-ton crew module, lined in lead and rubber, was designed to protect the five man crew from radiation leakage. [2] A photo from the nose of the aircraft, showing the top of the crew module set into the fuselage. [3] The nuclear reactor was hoisted into the aircraft through a bomb bay, and hung suspended from a hook. When the aircraft was on the ground the reactor was removed and stored in a bunker to further limit radiation leakage. The reactor was never used to power the aircraft during the test-flight regime. ✈

program never came anywhere near producing flight-ready hardware.

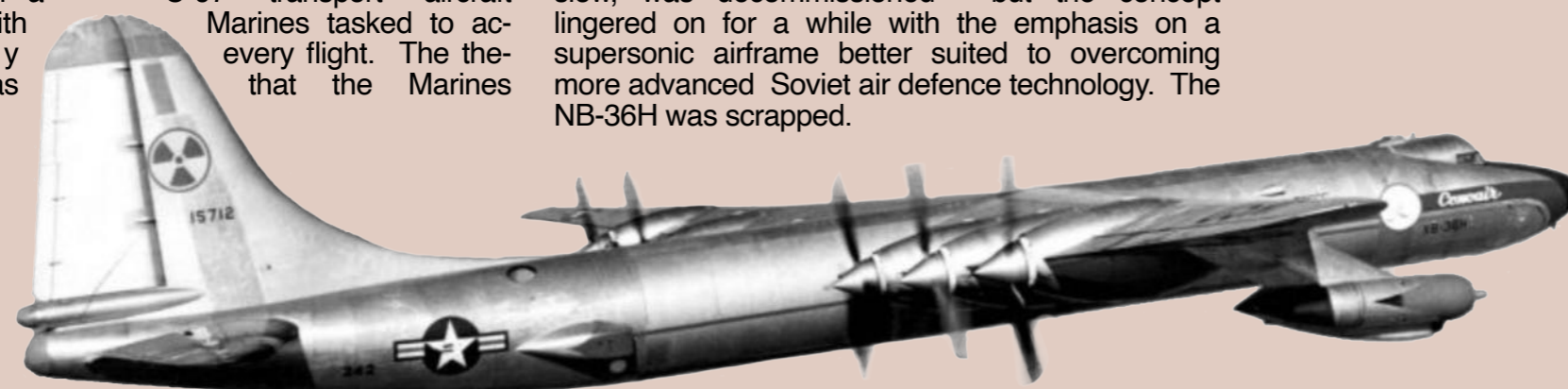
Although the NB-36H test flights demonstrated that the crew was safe from radiation, it revealed limitations in the technology of the day: in short, the ability to produce a small reactor capable of generating enough power for a fast aircraft.

The tests also revealed a risk of contamination in the event of an accident: hardly a surprising outcome! This had been a concern from the beginning, with a C-97 transport aircraft loaded with Marines tasked to accompany every flight. The theory was that the Marines

would parachute to the crash site to secure it, should an accident occur.

Meanwhile, the Soviets were also experimenting with nuclear reactors in aircraft, modifying a Tu-95 turboprop aircraft. Some 34 test flights were undertaken in 1961 but, like the Americans, the tests revealed that the concept was impractical with the technology of the time.

In 1957 the USAF's flight testing of the NB-36H was complete and the bomber, now considered to be too slow, was decommissioned - but the concept lingered on for a while with the emphasis on a supersonic airframe better suited to overcoming more advanced Soviet air defence technology. The NB-36H was scrapped.



In March 1961 the newly elected President Kennedy cancelled the program, stating that the concept of nuclear powered aircraft was still remote, despite 15 years of development and expenditure of nearly one billion dollars.

Although no trace of the nuclear airframed B36 survived, four B36s were preserved, one of which was snapped (below) in an American museum by Rob Hackett, one of our readers. ✈

Click on the image to the right to watch an excerpt from "Strategic Air Command", starring Jimmy Stewart, featuring a wonderful clip of a B36 start up and take off, and cockpit shots. ✈



NEXT MONTH'S MYSTERY PHOTO



Only one Navy would issue shorts like that - the Poms. But what about the aircraft? Can you tell us what it is? Send your answer [here](#).

Don't Run For The Hills!

Subscriptions for FAAA membership fell due on 01 January so, for those folk who have not yet renewed, please can you do so?

Last year we spent hours and hours chasing up late payments. This included having to phone about one hundred people individually. That's a lot of work!

If you have not paid yet your membership has expired.

Most Divisions' fees have not gone up, and, if you are not fussed which Division you want to belong to, you can always shop around. Payment details are on the last page of this edition or you can ask the database manager [here](#) how much you owe and how to pay.



Three ADF guys are at the club having some drinks together. After a few hours, the Army WO2 blurts out: "God has told me I'm the bravest and most loyal soldier ever!"



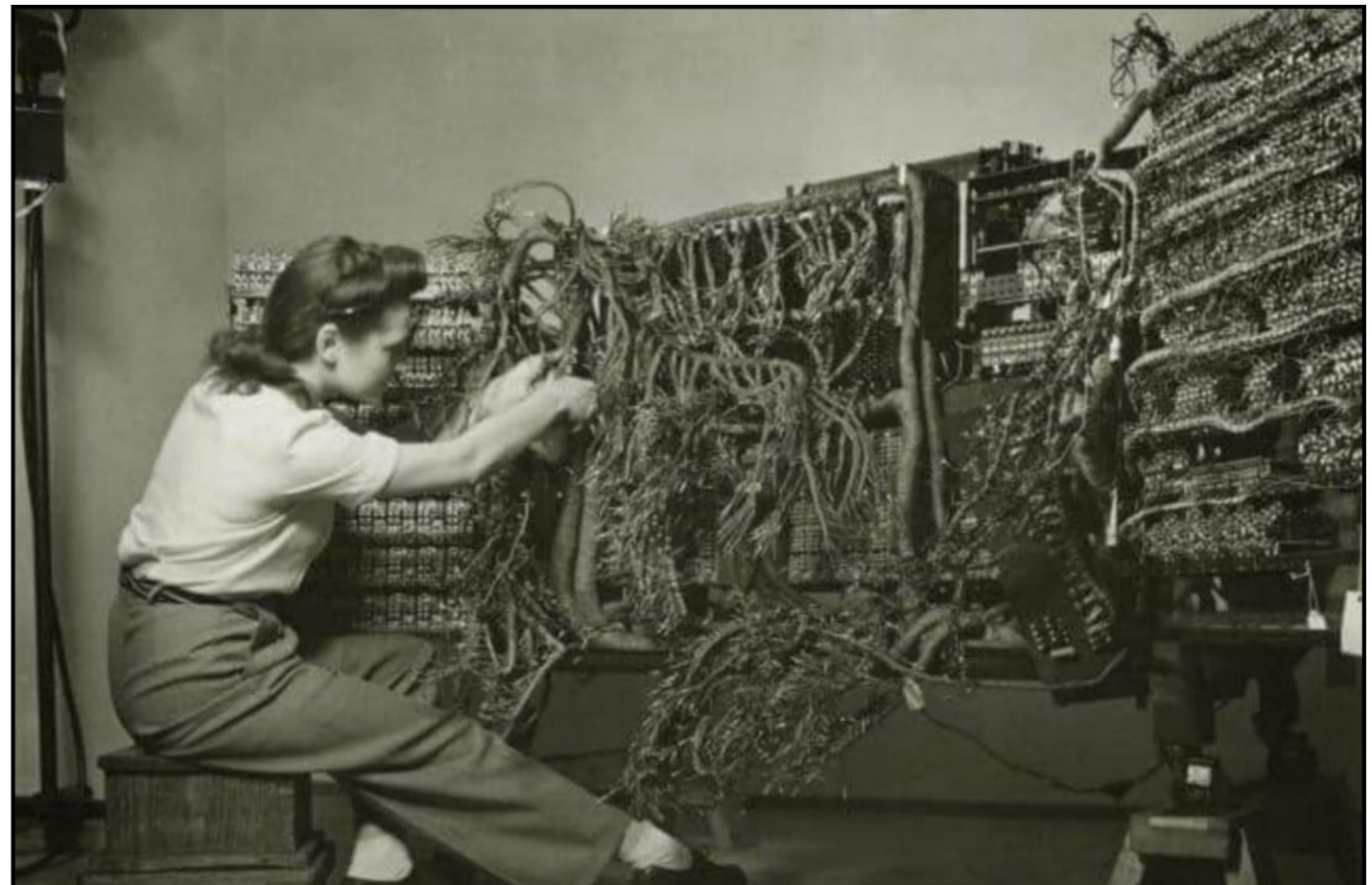
The Air Force Flight Sergeant looks up and says: "And God told me I'm the best looking and most popular Flight ever."



The Chief knocks back his drink, levels a steely gaze at the other two and says: "That's bullshit! I didn't say any of that!" ✪

CHICKEN WINGS

Pilot Dec 2023 BY MICHAEL AND STEFAN STRASSER



Having easily reproduced a model of a male brain, Masie never really succeeded in replicating that of a female. ✪



Reigning in the defence bureaucracy

Unprecedented and rapidly evolving threats to our National Security have brought challenges which Defence is ill-equipped to meet. Rowan Moffitt and John Stanford look at the reasons why this is so.

After 40 years of reform experimentation that has seriously weakened the Australian Defence Force, it's time for the government to bring the defence bureaucracy back on to the rails.

Australians are becoming increasingly anxious about Australia's strategic circumstances as they're told we won't have much warning of an armed conflict in our region. To address this, Defence says it wants to be able to hold an adversary's forces at risk further away from our shores. This strategy necessarily emphasises sea and air capabilities, as recently acknowledged by former Australian Army chief Peter Leahy. If there was ever a need for bold, decisive government action, it is now.

The public version of the 2023 defence strategic review didn't sufficiently acknowledge the maritime emphasis of its approach. It should have addressed the changes that would be required in the integrated investment program across the services to build a maritime-focused force. The acquisitions announced around the time the review was released, none of them actually new, didn't address the urgent need for new maritime combat hardware. There has been only more delay since.

There are two major impediments to equipping the Australian Defence Force to execute the new strategy. The first is a lack of urgency. The change required must come at a pace that Defence seems incapable of generating. The second is the scale of the enterprise. Enormous investment will be required to quickly replace our worn-out naval combat capabilities and significantly expand our maritime airpower. This will require people as well as new money and it must happen well before our nuclear submarines arrive. Yet not only is the investment not forthcoming, quite the opposite is happening. Sustainment budgets have been cut severely this year, which will impact ADF preparedness.

Changing the combat force structure has been an

alien concept in Defence since it was brought into a single department in 1973. Under an initiative of the powerful mandarin Arthur Tange, the individual ministries for each of the three services, in place since 1939, were unified under one minister with a few deputies and parliamentary secretaries. This followed similar moves in the US and UK designed to reduce inter-service rivalry and promote efficiency. Australia achieved neither outcome.

Problems with Tange's model were accurately foretold. Defence analysts warned that the abolition of 'the direct Minister to Service Chief (and vice versa)' and the 'strategic, financial and moral accountability (and mutual knowledge) this entailed' would result in a 'giant step' along the road to public service—as opposed to parliamentary—control of the armed forces. That's exactly what happened. One reason for this was that it became almost impossible for a single minister to master the complexities of such a large and challenging portfolio, even with the help of a junior minister or two.

In trying to eliminate rivalry, Tange's changes also reduced the possibility for a real contest of ideas about how to address any strategic objective. In a system where the chief of the defence force was required to represent all three services impartially and the minister was unlikely to be in a position to challenge military leaders on details, in practical terms any substantial change in the force structure became impossible.

This contention is supported by a letter from Paul Dibb to Defence Minister Kim Beazley covering Dibb's 1986 review of defence capabilities: 'The Review could obtain no material centrally endorsed by the higher Defence structure which explained, for example, the strategic rationale for a 12-destroyer Navy, three fighter squadrons, six Regular Army battalions ... Most [documents] focus on justifying the present force structure rather than estimating what our strategic circumstances require.' While Australia and the region have changed enor-



mously since then, our combat force remains essentially the same.

Even if major changes were agreed, Defence too often opted for ill-advised, unnecessarily complex and risky hardware that was beyond its competence to manage. Poor performance in managing the timely and cost-effective acquisition of new capability has required Defence to keep obsolescent equipment in service far beyond the end of its practical life, weakening the ADF overall.

Australia's sclerotic performance in acquiring major military hardware this century has produced some dismal outcomes and wasted vast amounts of money. Among the likely causes are the burdens of bureaucracy and process for its own sake, and the emergence of an empire of ill-equipped and poorly advised senior decision-makers. This has been accompanied by the minimisation of the service chiefs' authority, outsourcing of technical services, centralisation of scientific support and abolition of in-house academic research capabilities.

Late last century, Defence's commercial support and strategic reform programs, followed in 2014 by the first principles review, continued to worsen the impact of the Tange-era changes. Many specialised, dedicated domain-specific functions on which the services depended for their effectiveness were either outsourced or centralised in a complex

shared-services matrix organisation. In common with other departments, some elements of the Defence matrix became heavily reliant on contracted labour and consultants. The ADF's effectiveness has been seriously damaged as a result.

ADF technical staff were stripped of functions that were then largely contracted to the private sector, which has been unable to sustain delivery reliably, effectively or efficiently. So, too, with the scientists, laboratories and academic researchers. Without these vital, specialised resources in-house, service acquisitions have been persistently characterised by costly and avoidable problems.

“Appointing an individual Minister for each service and restoring the authority of the service chiefs would help address these systemic problems.”

The 2014 review marginalised the service chiefs further by removing their right of access to the minister. This was based on, at best, contestable logic. Most recently, the 2023 DSR centralised away from the service chiefs true authority over their people, one of the few remaining vestiges of formal control they had. The service chiefs are

now little more than staff officers to the chief of the defence force and are removed from being, in any sense, commanders of the specialised institutions of state over which they preside.

Where once they outranked all military officers except the chief and vice chief of the defence force, with whom they were equal, today the service chiefs must compete for resources—including their own people—with seven military officers and nine

public servants of equivalent rank. Holding anyone accountable is impossible, while advice to ministers is filtered, struggled over, tightly controlled and frequently avoids the whole story.

Much of the extensive organisational change since the late 1980s has pursued 'efficiency' (read: cost-cutting), which is a non sequitur. The DSR uses the same language. The evidence shows, however, that very few efficiency gains have been achieved. Defence is costly, and while financial efficiency is rightly demanded, no evidence has been presented to show that much inefficiency ever existed at all. Labyrinthine bureaucratic processes are hardly efficient, yet they proliferate unchecked. Today's ineffectiveness is a far worse outcome than effectiveness with a bit of inefficiency—that bit of fat that provides the resilience so very valuable in a small force like the ADF.

Resolving profound differences of view about strategy and acquisitions within the bureaucracy, rather than around the cabinet table, has been a failure. While coordination and harmonisation are certainly required across ADF endeavours, as professional heads of their services the service chiefs should be authorised, responsible and accountable for all matters concerning them, from military strategy to the full range of operational and tactical elements of equipping, employing and sustaining it.

The top end of the ADF has both ballooned in numbers and been professionally dumbed down as a result. The government certainly seems to think so. Why else would it have asked a retired US Navy admiral to tell Australia what surface combatants our own navy should operate?


That the defence minister position has become a revolving door hasn't helped. Ministers have averaged fewer than two years in the role in the past 30 years, and the chances of a government gripping Defence properly have become remote. Even as governments have flailed around looking for independent advice, too often from overseas, effective control has been held in the hands of Defence officials rather than ministers, as should be the case under Australia's Westminster system of government.

Appointing an individual minister for each service and restoring the authority of the service chiefs would help address these systemic problems. The explosion of senior ADF positions must also be critically examined. The services don't have the capacity to supply the suitably experienced and competent decision-makers required to meet current demand. Crucial in-service technical and scientific resources must be restored to help the individual services function better.


The Albanese government got off to a good start. It described eloquently the threat to our national security and designed an appropriate strategy to address it. But it must now move decisively to provide the military with the teeth it needs to implement the strategy. It's time the rubber hit the road. Urgently.

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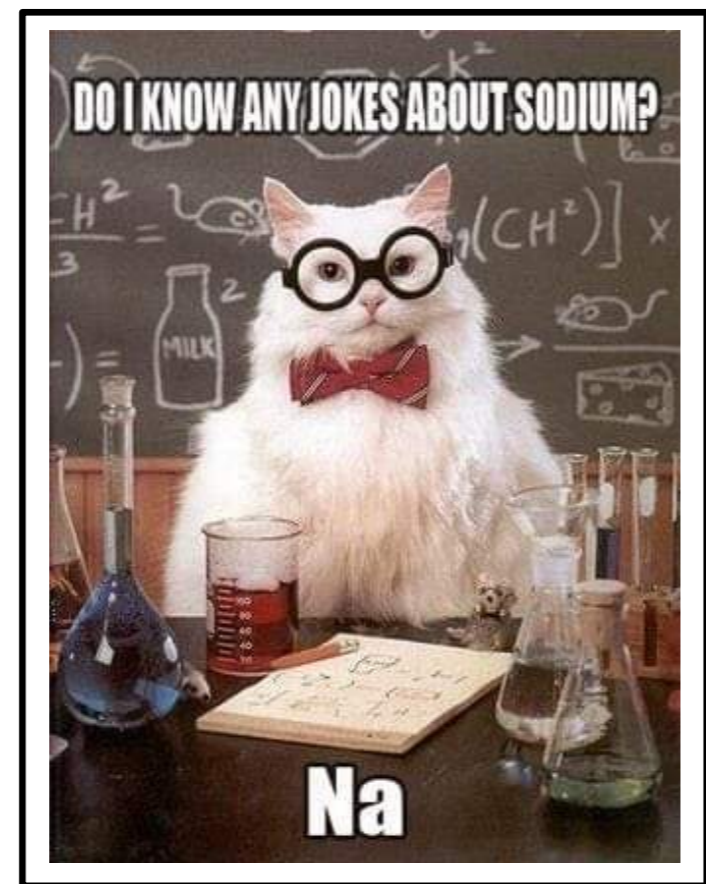
AUTHORS



Rowan Moffitt is a retired rear admiral with 40 years' service in the Royal Australian Navy, the last 14 years in the Department of Defence's senior leadership in both operational and capability acquisition roles.



John Stanford worked in the Australian public service for 25 years, his last appointment being as a division head in the Department of the Prime Minister and Cabinet. He is now a consultant.



Picture in a Million

This Seahawk FB3 was lost at Farnborough in 1953 after it suffered an engine fire during a display routine.

Lt. **Roger Dimmock** of 800 Naval Air Squadron was serving on board HMAS *Ark Royal* when the Squadron was directed to form a display team to perform at the world famous event.

On 01 September Roger was engaged in a display practice at RNAS Brawdy when the engine fire warning light illuminated. He detached from the formation but was unable to make the runway.

He ejected just before the image was taken. His wife of eight weeks, who was watching the display, was taken to the crash site to find him sitting on the grass with a broken ankle.

He went on to have an illustrious career, serving as CO of an RN Buccaneer Squadron, Captain of RNAS Culdrose and Flag Officer Naval Air Command. ✈

There are over 1000 names on the Wall to date and, as far as we know, it is a unique facility unmatched anywhere else in the world. It is a really great way to have your service to Australia recorded.

It is easy to apply for a plaque and the cost is reasonable, and far less than the retail price of a similar plaque elsewhere. And, although it is not a Memorial Wall, you can also do it for a loved one to remember both them and their time in the Navy.

Simply click [here](#) for all details, and for the application form. ✈



Have you thought about getting your name put on the FAA Wall of Service?

It's a unique way to preserve the record of your Fleet Air Arm service in perpetuity, by means of a bronze plaque mounted on a custom-built wall just outside the FAA museum. The plaque has your name and brief details on it (see background of photo above right).

- Current applications in Order No.53 are as follows:
- R.J. Cluley LS ATA S113325 Jul 72 - Jul 81.
 - D.R. Hooper WO ATA S133260 Apr 82 - Apr 06.
 - M.A. Sandberg ABATWL S125208 May78-May88.
 - E.D. Sandberg LCDR(O) O1024 Apr50-Sep90.
 - A. Clark CAF(A) R35828 Mar48-Mar63.
 - A. Gillam CPO ATWO/ETW S118699 Jan76-Jan96
 - B. Thompson LS ATC S128255 Mar80 - Jan93
- We have to wait for a minimum order size before we can submit to the Foundry, so there will be a delay.

Around The Traps

USAF Becomes Laser Sharp!

In 2022 there were over 9,500 reported incidents in the US of laser illumination of aircraft. The incidence of military threats was also on the rise, with the Philippines accusing a Chinese coast guard ship of using a military grade device to temporarily blind its crew, and an Australian P-8 receiving a laser strike from a foreign vessel. US Air Force pilots have also reported similar incidents.

The US Air Force is taking the threat seriously, and is making big steps to give its aviators added protection against Laser illumination.

The US Office of Special Investigations (OSI) points out that laser illumination of any kind is not a harmless prank, with the potential to distract and disrupt crew function and, in the worst case, to cause permanent eye damage.

Your average sunglasses won't help much, so the USAF is promoting both day and night protection to assist. Day glasses contain higher levels of dye to block the laser's photons. Night glasses, which let in more light whilst still providing protection, are still in development. Both day and night spectacles will also provide enhanced ballistic protection. ✈



Facial Recognition (FR)

Our FR software has had its use-by date, so we wondered if anyone can help out with names for the folk in this Tracker. Maybe Beachball on the left? Send your answers [here](#).




Heavy Brass

Recent research reveals that the number of senior officers in the ADF has almost doubled in the last 20 years, despite a steady decline in overall numbers of other ranks.

The total number of Star Ranks is now 219, up from 119 in 2003. For every senior Defence officer there are now just 260 lower ranked officers and ORs. This compares very unfavourably with the US, which has a ratio of 1:1526, or the UK with its ratio of 1:1252.

Having a bloated Senior Rank structure not only costs money, but it creates a 'top heavy' culture where decisions are required to be pushed upwards, slowing process and stifling on-the-ground innovation. Its also indicative of a culture which is risk adverse ('the big boss has to approve it'), and one which is disinclined to allow mistakes. That's not a reflection on individual competency, but it is a reflection on the organisation and the way it thinks.

Navy reportedly has 3 Vice Admirals, 15 Rear Admirals and no less than 50 Commodores. ✈



Royal Commission into Defence and Veteran Suicide

Royal Commission Extended

The Royal Commission into Defence and Veteran Suicides has been granted a three month extension. This is to allow finalisation of the report, which is now due to be with the Governor-General by Monday, 8th September 2024.

The Commission has previously expressed frustration with the slow response of Commonwealth agencies to requests for information, as well as stone-walling with claims of confidentiality, parliamentary privilege and public interest immunity. The Commission says that the extension will ensure the report is robust, evidence-based and fit-for-purpose.

The extension also means an extension to the final public hearing block, which will now commence on 4 March and will run over four weeks. Daily hearing schedules and witness lists, including senior ADF officers, will be available closer to the event. ✈

Want a cheap helicopter?

Hill Helicopters is a British rotary wing manufacturer with a difference. It's a start up, so they have no models ready for sale just yet. They have very slick marketing, so their orders now exceed 1,000 units, and they have a philosophy that manufacturers' profit margins are ridiculously high, and are going to do something about it. They also plan to make all components in-house, including the 500 SHP Hill gas turbine engine.

With two models on the books: the HX50, aimed at private users, and the HC50 for commercial operators. These are available to order at US\$673K and US\$747K.

This could be a breakthrough in aviation. Click on the button below to see the concept.





The exact replica of Charles Kingsford Smith's "Southern Cross", the record breaking Fokker F.VIIB/3m trimotor, took to the skies in early December at Albion Park airfield.

This is its first flight after being restored to airworthiness following a crash in 2002. This occurred after the aircraft lost a main wheel on take-off, requiring an emergency landing. The pilot was able to keep the damaged hub off the ground for as long as possible, but eventually the starboard wing contacted the ground and snapped about 3 metres from the tip. You can see a short video of the event [here](#).

Reportedly, the South Australian Government was unable to find anyone prepared to repair the aircraft, due to its unique structure and unknown risk.

After considerable negotiation the Historic Aircraft Restoration Society (HARS) was able to acquire the aircraft in 2010, and it has slowly been under repair since then. This involved rebuilding the wing, refurbishing engines back to zero time, redesigning and rebuilding the landing gear, and upgrading the electrical system from the existing 12v to a proper aviation 28v system.

Under the watchful eye of project manager Jim Thurston, a small team of craftsmen have now restored the aircraft to as-new condition.

It is based permanently and on display at the HARS Aviation Museum in Shellharbour, just south of Sydney.

You can help keep the Southern Cross airborne by donating [here](#).

You can read the story of Charles Kingsford Smith in an earlier FlyBy magazine [here](#). ✈

Top. VH-USU takes to the air for the first time in 21 years, after it suffered an accident in 2002. The aircraft remained in SA for years afterwards, but was eventually repaired by HARS under a Deed of Gift arrangement. It was transported to Albion Park. **Middle.** The wing repair in progress. It was the largest single span wing ever built in Australia and its refurbishment required the small team to learn some of the old skills in woodworking. **Below.** The original 'Southern Cross' landing at Brisbane Eagle Farm in 1928 after Smithy's record breaking flight across the Pacific. ✈



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PATENT NOS. 2,480,164; 2,487,070; 2,487,071



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Snap-on ANAL-O-SCOPE
with exclusive, easy-to-read trace pattern

Now you can parade engine troubles right before your eyes — and understand them just as easily — with the new Snap-on ANAL-O-SCOPE. This electronic engine analyzer or oscilloscope has an extremely easy-to-understand trace pattern —

one any mechanic can understand and use with brief instruction. The ANAL-O-SCOPE has more experience dating back to World War II equipment. It provides instantaneous, complete analysis of:

1. Dwell or cam angle
2. Breaker point operation
3. Distributor wear
4. Condenser action

5. Primary circuit leakage
6. Primary circuit resistance
7. Spark plug action
8. Secondary circuit resistance

9. Secondary circuit insulation
10. Ignition reserve
11. Valve action

Ahoy Engineers!

Sent in by one of our eagle-eyed readers, the gadget advertised on the left was apparently a great seller in the good old US of A. Indeed, Snap On Tools are still trading, apparently, although thankfully they think about the names of their tools a bit more than in the past. ✈

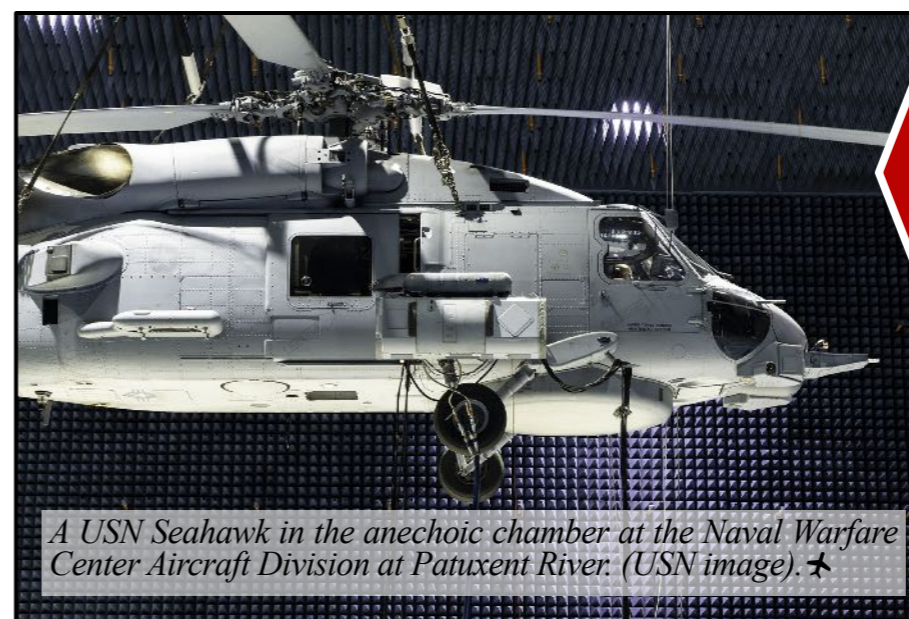


Marshmallows Don't Fly!

The RAF, in a ground-breaking scientific discovery, found that chocolate-coated marshmallow teacakes expanded at high altitudes due to pressure change. Eventually, they became too big to eat in one bite.

But a captain and student pilot forgot they had placed unwrapped teacakes above their instrument panels. When the captain initiated an emergency depressurisation during a training mission, the treats erupted.

Shards of chocolate and marshmallow hit the windshield, flight controls, and the mens' uniforms. Shortly thereafter, the RAF put marshmallows on their no-fly list. ✈



A USN Seahawk in the anechoic chamber at the Naval Warfare Center Aircraft Division at Patuxent River. (USN image). ✈

New Pods for US

Certification for new Advanced Off-shore Electronic Warfare (AOEW) pods for US Navy and Army Seahawk helicopters are being progressed through the Flight Certification process

The pods work either independently, or in concert with a ship's sensors. They are designed to detect and defeat incoming high-speed missiles using techniques such as jamming or spoofing. It is described as one of the most advanced and complex EW systems ever devised.

Image: NavalNews. ✈

Wanted. Photos/Plans of HMAS Albatross

David Rey served at Albatross in the 70's, during which time he was involved in a fire rescue in one of the JR accommodation blocks there. This accommodation was, if you recall, not far from what was then the JR mess hall.

All of our photos are in the wrong timeframe: We've got reasonable shots from early on (late 40s and early 50s), and again from 2015 ish, but nothing in between.

Can anyone help? We are after a photo that shows the general barracks area, or of the accommodation blocks, or a plan view of Albatross showing the layout of the buildings in the 70s and early 80s. The red circle on the photo below shows where the specific building we are interested in used to be, so any image with that detail is the right one.

We would also be keen to know if anyone else remembers the incident, which happened in '78 or '79. The fire broke out in a top floor cabin when the occupant left an electric bar heater on, too close to bedding.

You can send the images [here](#), please, at as high a resolution as you can manage. ✨



Graduation Parade

The last pilots' course for 2023 graduated last month from RAAF Pearce. No. 272 Course comprised 14 RAAF and 5 Navy pilots, with the latter now moving to Nowra to start EC135 helicopter training at 723 Squadron.

Below L-R: Jim Bush (FAAAA-WA), Mike Keogh (FAAAA-WA), LEUT Alison Smith*, LEUT Nathan Threlfall*, LEUT Brodie Henderson*, CDRE Matt Royals (COMFAA), LEUT Jackson Smith*, SBLT Aleksandr Maclean*, LCDR Brad Eaton (SNO Pearce), CDRE Brett Dowsing (Ret'd). *Graduates. ✨



A Character to the End

This is one of the last photos we have of Jack Suriano, and I know that he would not mind sharing it with you, or the story behind it.

Having learned that he only had a few days left to live, Jack asked his wife Shirley to check him into the best palliative care facility in Perth, and then promptly invited a bunch of his colleagues over for drinks. The image captures a moment during that event, which encapsulates both Jack's enduring sense of mischief, and the high regard with which he was held. Good on you, mate!

You can read more of the story in his obituary [here](#). (Photo via Brett Dowsing). ✨

Fate of MRH-90 Helicopters Shaping Up

As the Defence Disposal system grinds its way to a conclusion, hints are appearing about the fate of the ADF's 42 MRH-90 helicopters which were decommissioned earlier this year, years ahead of their original life expectancy. Much controversy and misinformation has surrounded the reason for their demise, and, now, what is to be done with them.

An article in the Asia Pacific Defence Reporter on 21Dec stated authoritatively that 'Technicians are currently – and in secret – disassembling all 45 Army Taipan Multi Role Helicopters and will bury the components on a Defence site. Worth around \$20 million each on the second-hand market, the decision has been taken to instead destroy them on the quiet in the hope that no one notices.'

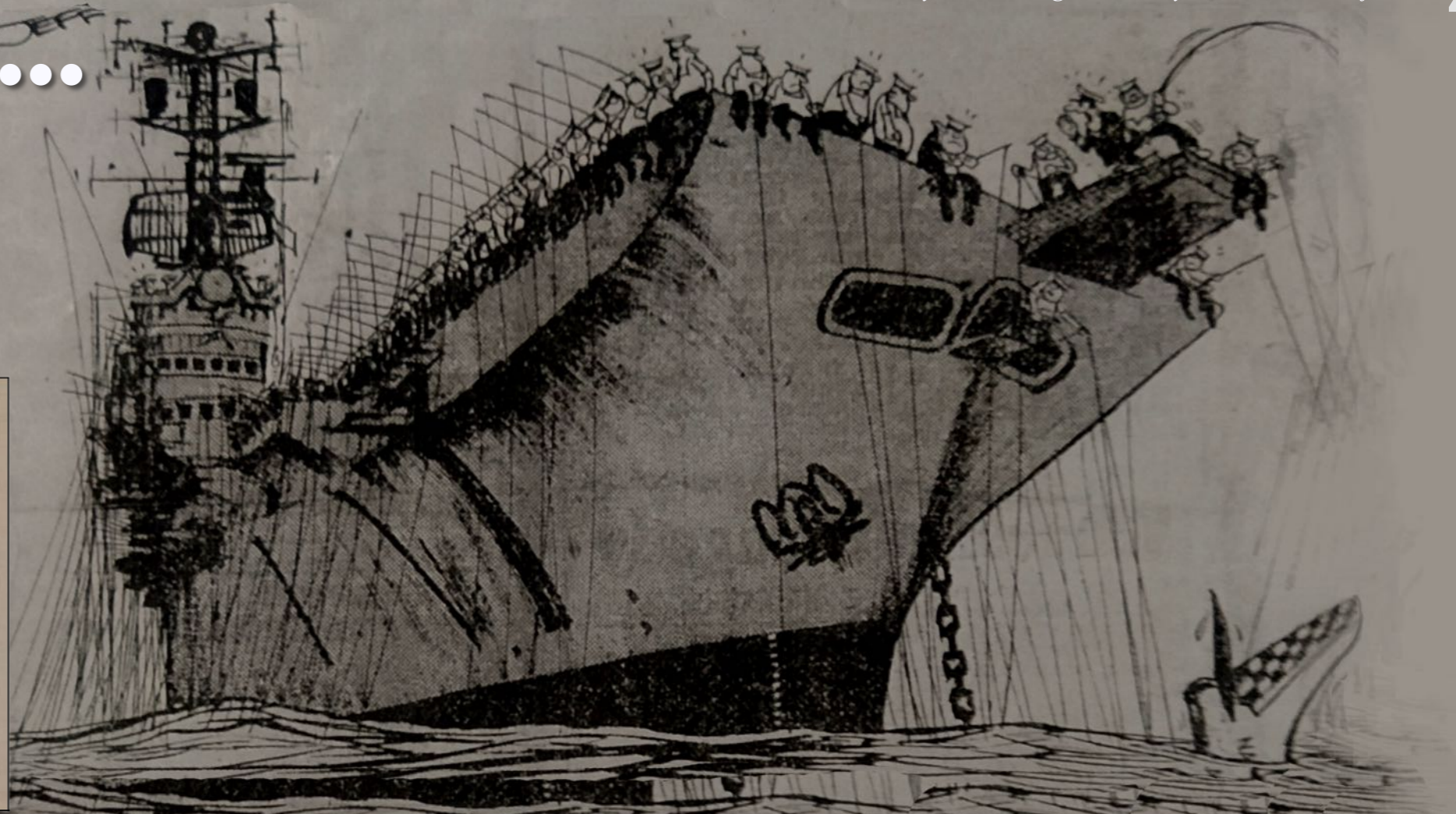
The article presented as thinly-researched and did not engender confidence in its factual accuracy, however. This has been borne out by what appears to be more substantial reports in Flight Global (06Oct23) and Aviation Week (04 Dec23) which both report that Defence is in negotiation with NI Industries, which is interested in harvesting the parts of the ex-ADF Taipans to supplement critical shortages in its supply chain - one of the factors that contributed to Australia's decision to scrap the type. We will see what the final outcome is. ✨



Back in 1980...

...the Press got hold of aircraft loss statistics, and, following a spate of Skyhawk accidents, went to print to take the rinse out of Navy. Here's a couple of examples of their humour.

(Thanks to Ian Campbell who found them in his ready use locker).



DAILY TELEGRAPH, Tuesday, April 29, 1980 1

Eighth Skyhawk lost in crash

The navy lost its eighth Skyhawk jet yesterday when it crashed and exploded while making a landing approach at HMAS Albatross, near Nowra.

By ALEC FIELD

The aircraft, flown by Lt Andrew Sinclair of Nowra, crashed several hundred metres from where a farmer, Mr Bob Monteith, was mustering cattle.

Lt Sinclair ejected safely after the plane's engine "flamed out."

Erupted

A navy spokesman said Lt Sinclair was 5 km from the runway when the TA 4G Skyhawk lost power.

A witness, Mr Eric Townsend, said the jet disintegrated in a tremendous explosion.

"The aircraft erupted in a ball of flame," he said.

"The flames subsided after several seconds but grassland around the wreckage continued to burn until navy fire crews arrived.

"The pilot's parachute opened moments after he ejected and he parachuted into a nearby gully about 300 metres from the crashed plane.

"I drove across paddocks to the crash site to help the pilot but by the time I arrived a navy helicopter had whisked him away."

A navy spokesman said Lt Sinclair had tried to refire the jet engine but when his attempt failed he ejected while the aircraft was several hundred metres from the ground.

Lt Sinclair was unhurt.

Sank

Yesterday's crash was the eighth involving Skyhawks of the navy's Fleet Air Arm. They were bought from the United States 13 years ago.

Last year two Skyhawks were lost off the aircraft carrier HMAS Melbourne.

In August one of the \$1.5 million planes rolled over the side of HMAS Melbourne and sank.

In May another Skyhawk was lost when an arrester wire on the deck of the ship snapped as the plane was landing.



Defence losses

THE Federal Opposition has called for a "high level inquiry" into the frequency of accidents involving the armed forces. The Opposition's defence spokesman, Mr Scholes, said the loss of a Navy Skyhawk jet off the carrier Melbourne yesterday was the third this year.

A Skyhawk comes in to land on the Melbourne: and then there were 13.

Another Skyhawk lost

CANBERRA. — A \$1 million Skyhawk fighter-bomber toppled overboard from the aircraft carrier HMAS Melbourne today, the navy's second such loss in four months.

An RAN spokesman said the accident happened as the Melbourne steamed through rough seas about 150 miles off Newcastle.

The fleet flagship listed suddenly 20 degrees to starboard, and the Skyhawks tumbled off.

It sank in 5000 fathoms. A sailor was working on the aircraft and fell over the side with it.

But he was picked up by a diver from the escorting destroyer HMAS Hobart.

The navy has now lost seven of the 20 Skyhawks it bought from the US 1967.

RARE POWER

NICE to see that the Navy featured the Skyhawks in an exhibition at HMAS Albatross, Nowra, yesterday.

But it might have been a case of "Come and see them before it's too late."

Why? The way the 'hawks are dropping out of the skies these days they might soon be classified as an endangered species.

Darken the Sky

Bringing
back big
airships



Sergy Brin's Pathfinder 1 under construction in California. Photo with the kind permission of Balazs Gardi.

A question that none of us will ever have to ask ourselves is “what do I do with the rest of my life and my billions of dollars, now that I’ve retired?”

Sergey Brin, one of the co-founders of Google, has answered it, at least in part, by setting up a company called Lighter Than Air Research (LTA) in 2016. It is specifically to develop and build the next generation of airships.

Brin, whose net worth is estimated at \$105bn, is convinced of the future of airships. Dismissing the tragedies of the past (see next page), he believes they can deliver heavy payloads at a fraction of the price of conventional air transport, and with hardly any carbon footprint. He also thinks airships are cool and can’t wait to be the first one to ride in his airship when it is completed.

He shouldn’t have long to wait, as his prototype, Pathfinder 1, is almost ready for its first flight. Its lift capacity is provided by 13 bladders filled with Helium, an inert non-flammable gas, and the frame is made with carbon-fibre to give structure and strength. It is this rigidity which distinguishes airships from ‘blimps’.

The basic structure of airships hasn’t changed much over the years, but the technology has. Pathfinder 1’s frame is achieved by nearly 300

Right: One of the Titanium hubs supporting the polymer carbon-fibre reinforced tubes which make up the body of the frame. Below: The naked frame dwarfs those working on it. (Photos: LTA Research and Exploration. ✈)

carbon-fibre reinforced polymer tubes connected to 96 welded titanium hubs: all lighter and stronger than materials used in previous craft. The outer skin is made from laminated, non-flammable Tedlar material enclosing 13 nylon bags filled with helium.

Propulsion is by 12 motors on ‘pods’ which can be rotated in any direction to give stability. They are managed by simple joystick controls through a fly-by-wire flight control system.

Initially, propulsion will be by diesel engines, but these will be replaced by electric units in subsequent production designs. The top speed is a leisurely 65 knots, and the passenger capacity is just 14 people. Remember, this is a scaled down version of what could be much bigger production models.

Last September Pathfinder 1 was issued a 12 month airworthiness certificate for the purposes of outdoor testing. It imposes a maximum altitude of 1,500 feet agl within specific boundaries, but it’s



enough to do the job. Brin expects tests to be completed well within that timeframe.

The initial trials will be indoors, given that Pathfinder has never been filled with helium and its theoretical stability envelope must be tested in benign conditions. Following that it will be tethered to a mobile mast for outdoor ground trials before conducting 25 planned low-level flights for a total of about 50 hours of airborne time.

Should the test flights be successful, and if Sergey Brin feel disposed, later models of Pathfinder could be built - indeed, the company has already acquired facilities in Ohio big enough to build a 300m airship. If it comes about, it will be larger even than the Hindenburg class of airships of the ‘30s, which remain to this day the largest aircraft ever built.

But Pathfinder is not the only airship now in development. Green power and modern technology is driving a whole new renaissance in lighter than air craft, as the following pages will show. Each of them is aimed at a niche market of some kind, and all of them are in various stages of development, with Pathfinder, well, finding the path. ✈

Below: Pathfinder’s Gondola. It is small, with a maximum capacity of just 14 people. The second image shows the view from the pilots’ seats. ✈



Who is Sergey Brin?



Sergey Brin, a Russian by birth, emigrated to the United States at the age of six.

His father was a Professor of Mathematics and his mother worked as a researcher at NASA’s Goddard Space Flight Centre, so it was no surprise that young Sergey would seek a career in the sciences - specifically, computer science. He graduated with honours in 1993, aged just 19.

Whilst on post graduate studies he met Larry Page, a man with whom he seemed at first to have little in common. But somehow, a friendship developed and the two became intellectual soul-mates and close friends. Brin’s focus was on developing data-mining systems whilst Larry was interested in the concept of inferring the importance of a research paper from its citations in other papers. Both required an extensive search capability far outside what was available at the time, so they developed the PageRank algorithm, which relied on a new kind of technology that analysed the relevance of links that connected one web page to another. It allowed the number of links and their rank to determine the rank of the page.

Like many early computer entrepreneurs, Brin and Page worked in a poky premises with makeshift equipment - in this case Page’s dormitory room, and with scrounged computer parts from inexpensive computers to give them the necessary computing power.

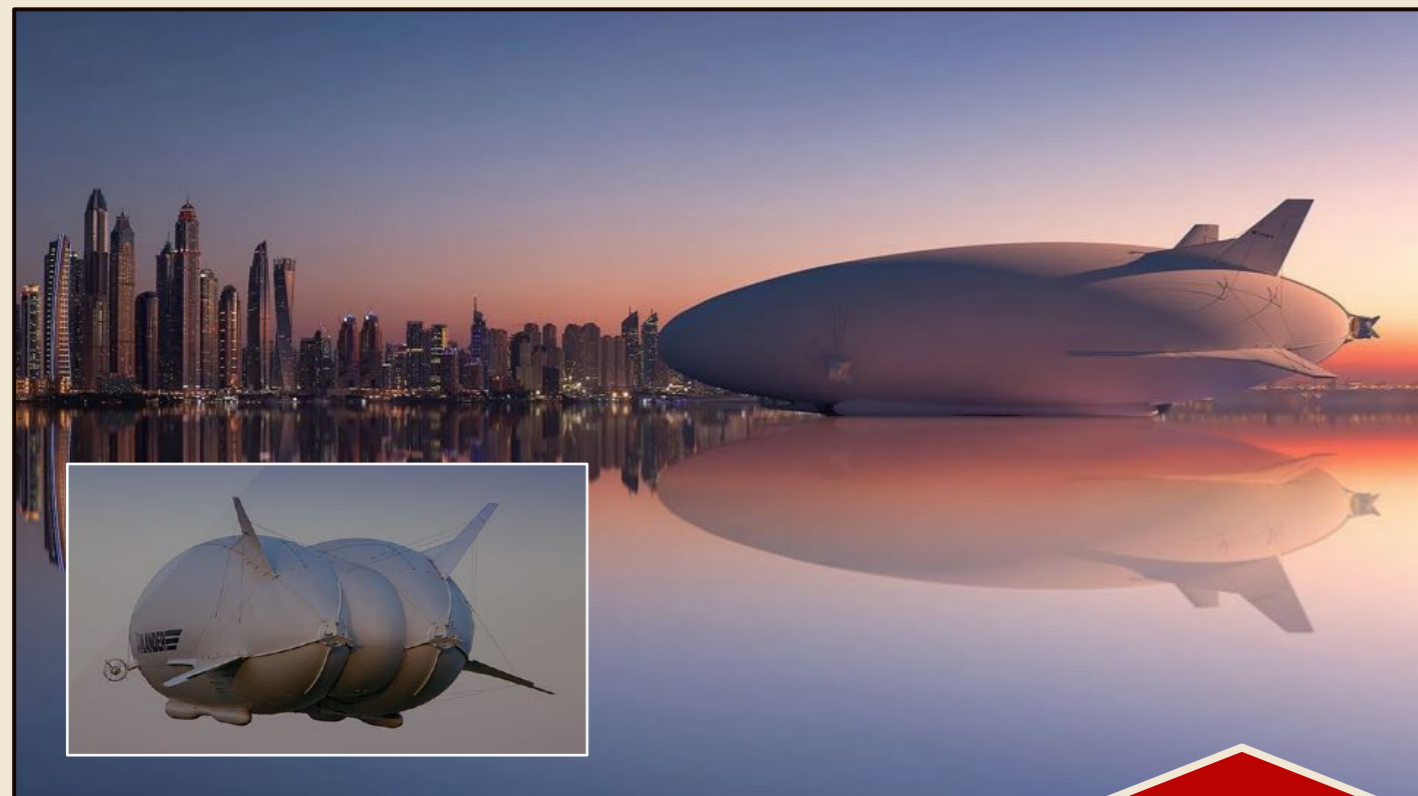
Later, Page recalled: “We realised with had a querying tool which gave a good overall ranking of pages and ordering of follow-up pages.” But it wasn’t until mid 1998 that the pair realised the potential of their project. “By then we were getting 10,000 searches a day, and we figured, maybe this is real.” ✈



Euro Airship. 20 day non stop flight around the world without fossil fuels. 2026. "Solar Airship 1" 151 metres, 50,000 cu metres of helium. 4,800 sq m of solar film, and at night hydrogen to power a fuel cell. Crew of three. Bertrand Piccard who has already completed two record breaking circumnavigations of the world in a hot air balloon and an experimental electric aircraft. Dorine Bourneton, the first disabled woman to become an aerobatic pilot (severely injured at 16 in an aircraft accident, and Michel Tognini, astronaut. ✈



California based company H2 Clipper is also building an airship, but has a different approach as it plans to use Hydrogen rather than Helium. The former is more buoyant, costs over 60 times less than helium, and is easy to manufacture. The company argues that the highly inflammable gas, which caused some of the great airship accidents of the past is much safer to use with modern technology such as double-skin bags and 'hydrogen sniffers' to detect leaks. ✈



The Airlander 1 is in concept stage and has been dubbed "The Flying Bum" because of its large, multi-bulbous hull. A creation of Hybrid Air Vehicles (HAV), the production centre is on the outskirts of Bedford in the UK. Like most other modern airship designs, the Airlander uses Helium. It also features a unique 'airbag' undercarriage that allows it to settle onto the ground rather than rely on mast mooring, as other designs do.

The specification sheet boasts of a 5 day endurance, 10 tonne payload, 4,000 mile range and 20,000 ft ceiling. Initially it will use combustion engines but has a planned path through hybrid-electric to a full electric solution. ✈

A RENAISSANCE OF AIRSHIPS

The need to go Green in today's world has spawned a rash of airship design and manufacture, using 21st century technology to (hopefully) overcome history. Here are some of the more notable projects.



"Flying Whales" is a French-Canadian company also committed to the concept of modern airships. Its conceptual 200m LCA60T is a helium lift dirigible designed to carry up to 60 tonnes of cargo in remote regions such as north Canada. It will be powered by a hybrid-electric system comprising a 1mW generator mated to a gearbox and gas turbine. The assembly line is near Bordeaux and it expects to be operational by 2026. ✈

A QUESTION OF EQUILIBRIUM

Airships have one advantage - free lift. They don't need to rush through the air or thrash rotors around to generate it. The gas in their hulls does it for them.

But how do they maintain vertical equilibrium? If an airship discharges a two tonne load, for example, what's to stop it from suddenly ascending?

There are three ways to do this:

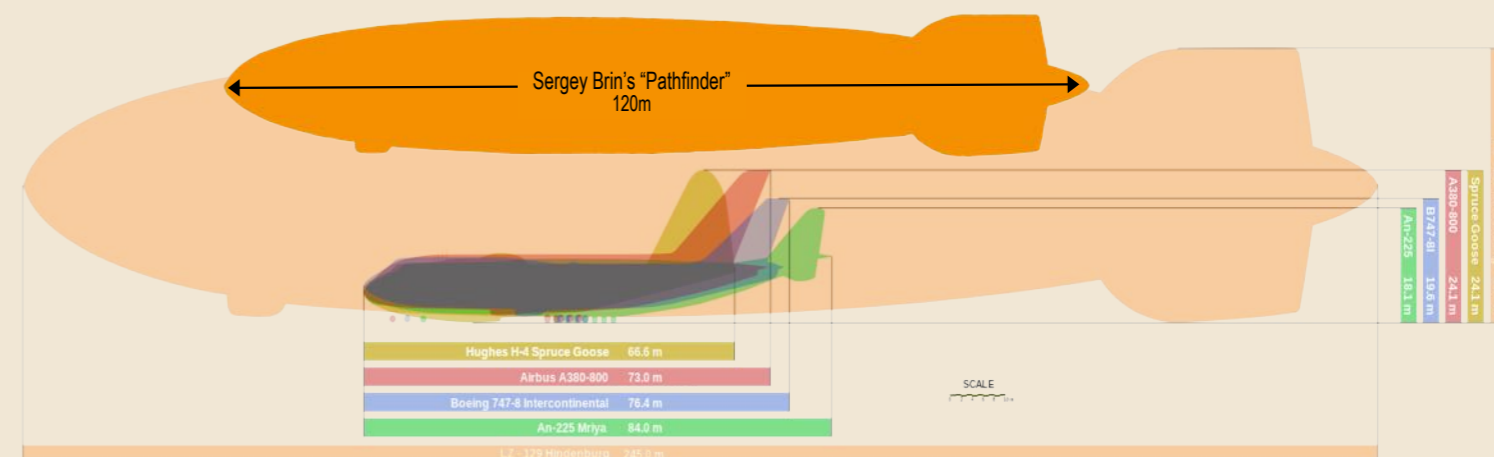
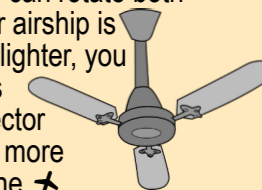
Release Gas. At sea level on a 0°C day, a cubic metre of helium can lift a load of 1.1145 kg, so releasing nearly 1800 cubic metres of helium would restore vertical equilibrium when your two tonne load is dropped. But helium is expensive, and, when you take on more payload you'll need to replace it to fly again: not an option in the field.



Compress Gas. When you turn helium into liquid form it stops lifting and becomes ballast. That's great because when you next need it you can simply expand it again. But the necessary compressors and tanks are large and very heavy. Industry is working on this option as a practical solution, but reckons it is still five to ten years away.



Use aerodynamic forces to balance lift/weight. The engine pods on a modern airship can rotate both vertically and horizontally. If your airship is tending to rise because it is now lighter, you simply rotate the necessary pods to generate a downward force vector to compensate, until you take on more payload. Tricky, but it can be done. ✈



A History of Disasters

The History of Airships is a history of accidents and disasters. The first recorded mishap was in 1897, when Friedrich Wolfert's man-powered machine rose to a height of 200 feet, caught fire and crashed, killing him and one crewmember.

Successive years filled the pages of accident journals. Airships crashed in storms, caught fire in the air, blew out to sea, suffered structural failure or collided with one another. Most were fatal.

Surprisingly, they continued to be built, getting bigger and bigger.

The R.38 Disaster

The first of the great airship disasters was the R.38, a British built craft of American design. It was intended to patrol the seas around that island for six days at ranges up to 300 miles at high altitudes (up to 22,000 feet), but the project was cancelled at the end of



WW1, and the hull was sold to the United States for £300,000. The USN changed the design, particularly to the nose section, and also found significant weaknesses in transverse girders in the framework, concluding that "the transverses of the R.38 are only just strong enough and have no factor of safety". Importantly, the USN intended to use the airship for low-level patrol operations, a task for which it was not designed.

The airship was completed in 1921 and undertook an abbreviated test flight schedule for expediency, but during flights several girders failed and the craft experienced significant stability problems. The girders were replaced but no structural changes made.



A further test flight was made on 24th August, during which significant control reversal tests were made at low level, which involved driving the rudders from side to side. At 17:37, close inshore and being watched by thousands of spectators, the structure failed amidships. Creases appeared diagonally across the hull and both ends dropped. The R38 then cracked open with men and objects dropping from the rupture. The two sections separated and a large fire engulfed the forward part, followed by two massive explosions. The forward section fell rapidly to earth, but the tail descended more slowly, allowing 5 of the 49 crew to survive.

Astonishingly, subsequent investigations found that no allowance for aerodynamic forces had been made in the design, and the authority for signing off the airworthiness certificate was the same body as had designed it in the first place. This resulted in significant regulatory changes for subsequent British airships, the R-100 and R-101.

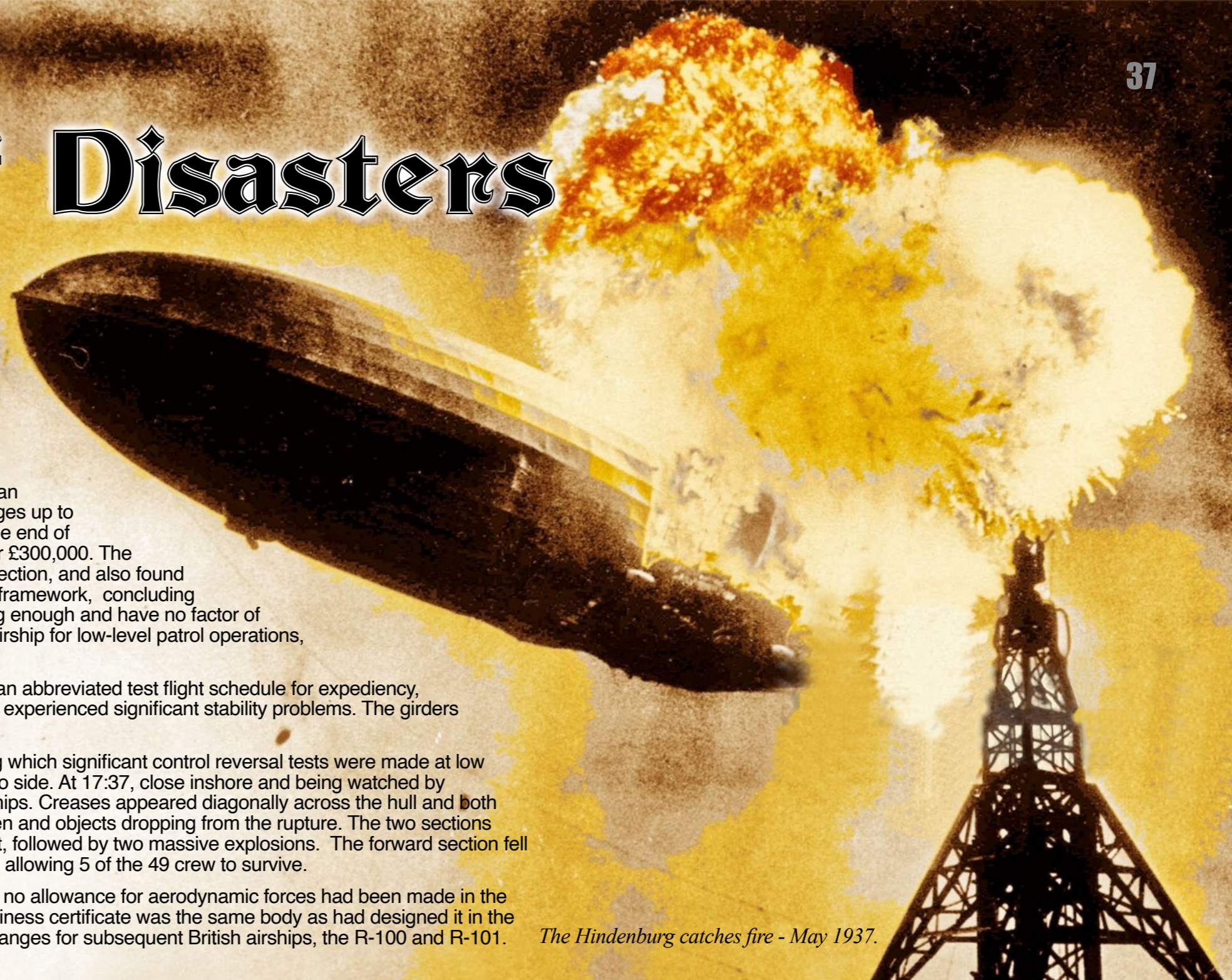
The R-101 Disaster

The R101 was one of a pair of British rigid airships completed in 1929. It was built by an Air Ministry appointed team, whilst the R-100 was constructed and designed privately with Barnes Wallis as the team leader.

After a troubled build and early testing, the R101 was lengthened by 46 metres to increase its lifting capacity. Further test flights were conducted but leaks in the gas bags continued to plague the design, leading to lifting problems. The solution was to wrap some of the girders with padding to reduce chafing.



The airship set off on its maiden voyage in early October 1930 for its intended destination of Karachi. It suffered a problem with one of its engines which required it to be shut down, but this did not deter the crew, who were under significant pressure to 'fly the flag'. During the night it drifted from its intended track due to inaccurate wind forecasting, and it began to suffer trim problems, requiring dynamic lift (generated by forward speed) to maintain altitude. At about 0200 the airship went into a dive from which it slowly recovered. Emergency ballast was released but shortly afterwards a second dive occurred which caused the nose to strike the ground. It immediately caught fire and 48 of the 54 souls on board perished.



The Hindenburg catches fire - May 1937.

What is wrong with airships anyway? They have borne mankind aloft for over a hundred relatively accident-free years and I see no reason to impugn their popularity..."

Jasper Fforde, *The Eyre Affair*

The Sad Tale of the USS Akron

Despite high-profile fatal crashes of previous airships, the United States persisted in building them, with the USS *Akron* being an example. She was designed as an airborne aircraft carrier, equipped with four F9C Sparrowhawk fighters that could be launched and recovered in flight.

With an overall length of 785 feet, the *Akron* and her sister ship, the *Macron* were amongst the largest ships ever built. She used helium, which was reckoned to be much safer than hydrogen, allowing her eight engines to be mounted inside the hull.

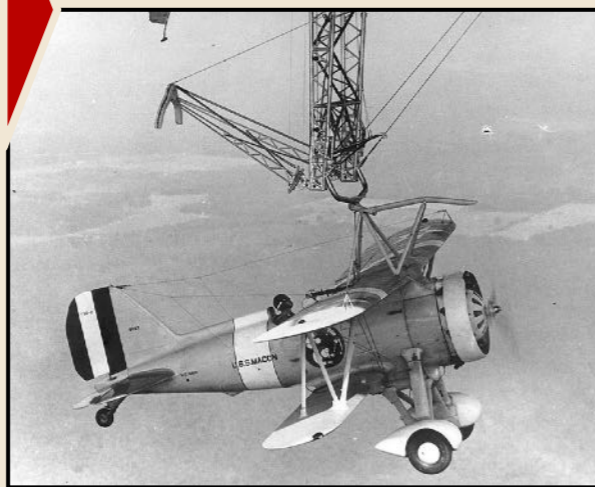
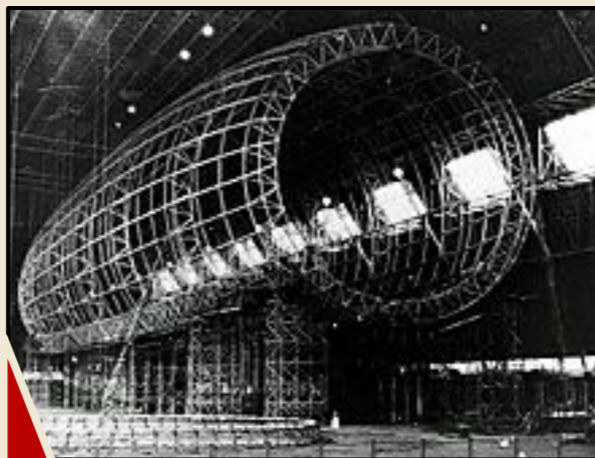
Akron's early flights suggested impressive performance: indeed on her maiden flight she carried no less than 209 people to prove the utility of airships for high speed transportation of troops. Over the weeks that followed over 300 flight hours were logged including a 46 hour marathon over central America.

In May of 1932 the *Akron* was fitted with four Sparrowhawk 'parasite' fighters. These were released from clamps to fall free of the hull, and then recovered through an ingenious 'skyhook' trapeze mechanism.

The same month the *Akron* suffered her first fatalities. Arriving in San Diego she was attempting to moor, but her helium gas had been warmed by sunlight and she was uncontrollably light. The mooring cable was cut to avoid a catastrophic nose-stand, and she rose rapidly from the ground. Most of the mooring crew released their lines but four did not. One let go at about 15 feet and suffered a broken arm, while the others were carried further aloft. Two fell to their deaths shortly afterwards, but Apprentice Seaman Cowart managed to secure himself to his line and was hoisted aboard about an hour later.

The *Akron* was lost on the night of 3 April 1933, when the ship encountered fog, increasing lightning and heavy rain off the coast of Philadelphia. Unknown to the men aboard they were flying into one of the most violent storms to sweep the north Atlantic coast in ten years. Caught in violent downdraughts, the *Akron* descended at about 800 feet per minute and, despite dumping emergency ballast, struck the sea tail first. She broke up rapidly and sank, with the loss of 73 souls, many of whom drowned as they had no lifejackets. A Navy blimp sent out to search for her also crashed with the loss of two men.

The loss of the *Akron* spelled the beginning of the end of the rigid airship in the US.



The Hindenburg Disaster

Perhaps the most well-known of the big airship disasters was the loss of the German passenger vessel, the *Hindenburg*.

Having made ten trips to between Europe and the US in 1936, the *Hindenburg* was regarded as a safe and comfortable way to travel.

Its first crossing of the Atlantic in May of 1937 was uneventful, although bad weather delayed her arrival. At around 19:00 she finally made her approach to the mooring mast at Lakehurst (New Jersey). Ground winds necessitated last minute manoeuvring, gas venting and ballast releasing, but at 19:21 her first bow line were made secure, ready to winch the ship down.

Four minutes later, witnesses say the fabric forward of the upper fin flutter, as if gas was leaking. Others reported seeing a dim blue flame - possibly static electricity or St Elmo's Fire. In any event, a muffled explosion followed almost immediately and the airship was quickly engulfed in flames. The fire spread forward and the rear end of the structure imploded. Two tanks - either containing water or fuel - burst out of the hull as a result of the shock of the blast. Buoyancy was lost on the stern of the ship, the bow lurched upwards and the airship's back broke. The whole event lasted less than 40 seconds.

Four newsreel cameras were filming the landing and, although they did not capture the source of the fire the film provided evidence for the subsequent investigation. There were also numerous eyewitnesses. Thirty-four people aboard the *Hindenburg* lost their lives (from a total of 97), and one was killed on the ground.

Many theories have been given for the cause of the disaster, including sabotage, static electricity or a lightning strike. No specific cause has ever been universally accepted.

The disaster shattered public confidence in giant passenger airships and brought their era to an abrupt end. You can see footage of the crash [here](#).

HELIUM vs HYDROGEN

Hydrogen is the most plentiful element in the universe. It can be harvested from fossil fuels, or by passing electricity through water to separate its two elements (oxygen and hydrogen). It is relatively cheap to produce.

Helium is a valuable and finite resource for which there is an ever-growing demand in many industries such as Health Care and Electronics.

It cannot be readily extracted from the atmosphere and the only ready source is from natural gas products such as methane, propane or ethane. It requires a complex process to distil and purify, so is relatively expensive.

At sea level on a 0°C day, one cubic metre of hydrogen can lift 1.2032 kg. The same volume of helium can only lift 1.1145 kg, so it provides about 8% less gross lift than hydrogen does.

Noting the above, filling an airship with hydrogen is a much cheaper and more efficient option - but the gas is highly flammable and risk usually outweighs the benefits.



A History of Helicopter Instructors in the RAN

by Trevor Rieck

The evolution of helicopter instructor training in the RAN has taken place over the 53 years from 1960 to the present day. It has progressed from antiquated helicopters (by present day standards) to the most technologically advanced flying machines now in service.

In those 53 years, helicopter instructor training has moved from the United Kingdom (Royal Air Force's Central Flying School (Helicopters) – CFS(H)), to indigenous training at the Instructor Training Wing (ITW) at Canberra, then to ITW Oakey and now at ITW Nowra.

UK training started in 1960 and the majority of the RAN's involvement there finished in 1996. The RAN periodically still sends students to the UK QHI Course (now at RAF Shrewsbury) but without the accompanying exchange posting that

traditionally followed the course. The last RAN member to attend undertook the course in 2018 (as at 2023).

Since 1960 several Australian Defence policy changes have necessitated changes of direction in helicopter instructor training, the transfer of helicopters and helicopter flying from the RAAF to the Army being probably the most significant.

United Kingdom Training

The first RAN pilot to undergo CFS(H) training was Lieutenant David Orr RAN, so one could say he is the grandfather of all QHIs in the RAN. He trained at RAF South Cerney at Cirencester on Sycamores. Strangely, he had many hours in the Sycamore, but had to undergo a left-hand-seat conversion for his QHI course. On completing the course, he returned to Australia to a training billet.

CFS(H) moved to RAF Rissington and then to RAF

Tern Hill, where it remained until 1996 when the Defence Helicopter Flying School was established at RAF Shawbury, where it remains today.

Helicopters flown at CFS(H) over the years included the Bristol Sycamore, the Agusta-Bell Sioux, Westland Whirlwind Mk10 (turbine), Aerospatiale Gazelle, the Eurocopter Squirrel HT1 and the Airbus H135 Juno HT1.

To build the RAN's instructing expertise, an exchange program was initiated with the Royal Navy in 1964, whereby experienced RN QHIs were exchanged with newly qualified Australian QHIs. The RN exchange QHIs (known locally as RNers) were a great asset at HMAS Albatross over the years.

The newly qualified Australian B2 QHIs were to spend two years on exchange at the RN Helicopter School at 705 Squadron, at HMS Seahawk, RNAS

Culdrose in Cornwall. Over the course of 33 years, from 1963 until 1996, 22 RAN helicopter instructor pilots took part in this mutually beneficial exchange. At least 25 RN QHIs took part in the exchange at Nowra during that time, in an arrangement that still continues today. Some of the RN pilots who served on exchange in Australia after returning to the home country, did migrate to Australia and continued flying in the RAN. Could Nowra really have been that attractive?

In November 1962 the RAN posted the first pilot for the double-barrelled helicopter instructor training and exchange posting at 705 Squadron. RAF Tern Hill, in the Midlands, housed CFS(H) and following the 4 months QHI course the lucky Australians took up residence in sunny Cornwall (sunny some of the time) for two years - the first pilots included



Previous page. RN Gazelles in the sky over Cornwall. They were the backbone of *ab initio* training for RAN instructors lucky enough to be posted to 705 Squadron. **Above. [1]** The very first RAN instructor undertook his QHI training on a Bristol Sycamore. **[2&3]** Two early types which served concurrently on 705 Squadron for many years: the Westland Whirlwind Mk 7 and the Hiller 12E. ✦

Pat Vickers MID, (later killed in combat in Vietnam) and Rolly Waddell-Wood, DFC.

The RAF CFS (H) Standards system defined four instructor categories which were adopted and maintained by the Royal Navy in compliance with Joint Services Publication (JSP) 318.

Those who undertook the QHI course in the UK passed out as a B2(H) category and advanced to B1(H) after six to nine months at B2 and a minimum of 120 hours instructional time. A2 (H) was achieved by extensive theory and flying instruction examinations conducted by senior staff from CFS after a minimum of twelve months as B1 and 250 hours instructional time.

To obtain the pinnacle of instructional helicopter flying training, A1(H) was by the highest recommendation/nomination to RAF CFS, whose acceptance for test and recategorisation involved examination by senior standards staff during which candidates were tested for a minimum of two days to exhibit extensive aviation knowledge and exceptional flying and instructing skills. A couple attained A1 in Australia when CFS sent their standards crew to visit Australia.

Most of the 22 Australian QHIs departed 705 with an A2 qualification. There was one exceptional Australian pilot, LCDR Max Speedy DSC, who skipped A2 (H) and qualified as an A1 instructor before departing for home.

The highest RAN rank achieved from 705-exchange group was a Rear Admiral (**Tony Dalton**) and a Commodore (**Vince Di Pietro**). One notable RN exchange QHI in 725 Squadron flying Wessex Mark 31A was **Ben Bathurst** who rose to the rank of Admiral, RN and First Sea Lord.

Most enjoyed their posting. There was only one "crash" (a fenestron stall in a Gazelle at very low level) and as in most learning and training environments and over many decades of flying, a few censures of varying gravity for incidents and misdemeanours. Exciting events included regular engine failures in the 25-year-old Whirlwind Mk7s and Hillers in service at that time.

As well, during 1963 to 1993 some 25 RAN pilots came to RAF Tern Hill for their QHI training and returned directly to Australia for instructional duties without having the opportunity for an exchange posting in the UK.

The RAN ceased sending pilots on the QHI Course and 705 SQN Exchange Program in 1996, when the British Armed Forces established a joint helicopter training school at

RAF Shawbury, which subsumed 705 Squadron. The last RAN exchange instructor, as by that time only one pilot was involved in the process, was Lieutenant **Jeremy 'Harry' Butler**.

During this period the Navy set up a RAF CFS(H) agent in Australia, who was responsible for the standards of all practicing CFS(H) trained pilot instructors whether returning Australians from exchange or QHI Course, or RN exchange pilots serving with the RAN. Generally speaking, the agent supervised the qualified to instruct on type and was able to upgrade qualifications from B2 to B1 to A2. Upgrade from A2 to A1 could only be conducted by visiting RAF/RN staff of the CFS(H).

Separately from the instructor program, the RAN negotiated another exchange program with the Royal Navy in the Lynx Squadron at RNAS Yeovilton in 1993 with the first pilot being **Matt Shands** and the current one being **Samuel Taylor-Burton**. Most undertook the QHI course at CFS(H) at some time in their Lynx exchange before returning to Australia.

Indigenous QHI Training

In 1989 and amidst some controversy, the RAAF transferred all its helicopters to the Army. This led to the Australian Defence Force Helicopter School (ADFHS) being set up in 1990, in the existing facilities at RAAF 5 Squadron in Canberra, for Army and Navy *ab initio* helicopter conversion training.

The Army commanded ADFHS and its instructors were mainly Army, supported by a few Navy instructors. The need for QHI training also resulted in an Instructor Training Wing (ITW) being established in ADFHS in 1993. Both Army and Navy instructors manned it.

Two instructor courses were conducted per year, limited mainly by staffing numbers at ITW. Generally there was only one pilot per course. Staff numbers at ITW varied from a maximum of four to, at times, only instructor.

In 2001 the ITW was moved to Oakey, within the Army Aviation Training Centre.

Musical Uniforms

In August 2003 LCDR **Chris Tutin** was headhunted by the Army. Having served for 26 years in the Navy, he held out for promotion to LTCOL for a 5 years short service commission. At ITW Oakey, he taught QHIs on the Kiowa and the UH-1H Iroquois.

At about the time the Army started a new civil helicopter training contract at Oakey with Boeing Defence Australia, Chris was recruited by Boeing

and he remained at Oakey as a civilian instructor flying the Kiowa at ITW until he was made redundant in December 2017 after nearly 11 years with Boeing and 21 years with ITW in two military uniforms (Navy and Army) and one civilian contractor's uniform.

John (Fast Eddy) Edwards is worth a mention here. He was a Navy helicopter pilot, was posted to RAAF East Sale for QFI course, then joined the Air Force, instructing on helicopters at 5 and 35 Squadron. Later he re-joined the Navy, became CO 817 Squadron, and again left the Navy. After studying at university, John came back as a civilian instructor at the ADF Helicopter School, Canberra, then transferred to the Army and instructed in 162 Reconnaissance Squadron at Townsville and finally left the services in 2004.

Ian Sangston also swapped services to take account of the different flying training requirements in each of the services. When the Air Force gave up their helicopters, the Army had to scramble for personnel to operate a huge increase in airframes. Ian saw greater opportunities and transferred in 2001 as a Major, fully expecting to fly multi-engine types. But it was not to be – back to instructing. He re-educated and had several desk jobs before retiring as a Lieutenant Colonel.

AIR 9000 Phase 7 HATS 2014 Beginning

In 2014, the AIR 9000 Phase 7 Helicopter Aircrew Training Systems (HATS) acquisition program began, incorporating both live and synthetic training elements to consolidate Navy and Army helicopter training into a single joint helicopter aircrew training system.

The standing-up of the Joint Helicopter School (JHS) came as ADF fixed-wing pilot training had undergone a generational change in re-equipping and consolidation. It was hard fought to establish the Joint Helicopter School at a suitable and scalable site for future growth and infrastructure development. Nowra was chosen as the most suitable site over Oakey, which was being reduced considerably in size and airspace access.

The Joint Helicopter School now resides within 723 Squadron at RANAS Nowra, is manned by Army, Navy and contractor (Boeing) instructors and enjoys rotational Command by Navy and Army (Commander/Lieutenant Colonel) QHIs.

The Army's Bell 206 Kiowa and Navy's AS350 Squirrels have been replaced by the twin-engine EC135T+, equipped with glass cockpit filling a significant gap in technology between initial (basic) fixed-wing training in PC9/PC21, which the Squirrel was unable to achieve.

"Tomorrow I'll teach
you how to land."



QHI Female Pilots

At about this time female Navy pilots were qualifying as QHIs. The first was Natalee McDougall who qualified at CFS(H) RAF Shawbury in 2005. Natalee was also the first female pilot in the RAN. More female helicopter instructors have since been trained, some in UK and some at the ITW at HMAS *Albatross*.

Natalee changed her last name to Johnstone after meeting Gavin Johnstone who was on Course 326 at CFS(H) at RAF Shawbury. A romance blossomed and later Gavin volunteered for Exercise LONGLOOK exchange to 723 SQN at Nowra, where Natalee was then working. They even went flying together once.

Natalee then accompanied Gavin back to the UK where they married in 2008. Gavin did some flying for the RN and then migrated to Australia in 2009 and began the first of many postings to 723 SQN to teach on Squirrel, Bell 429 and finally EC135. He is now in FAA headquarters, responsible for overseeing flying Instructor standards. A unique part of this story is that Gavin and Natalee have produced not one but two future QHIs. Natalee has retired and does consulting work while attending to the young budding QHIs

Consolidation

For some time naval aviators had gone to the Army Instructor Training Wing (ITW) at Oakey (flying the Kiowa (B206)) for their QHI training and basic MRH-90 conversion.

In 2019 QHI training transferred to the Navy under the ADF Helicopter Aircrew Training System (HATS) in 723 SQN at HMAS *Albatross*. This new capability consists of the ADF Helicopter Training School and the Instructor Training Wing, all flying EC135T2+ (not H135).

From this point on, all RAN rotary QFI training would go through ITW at HMAS *Albatross*. **Tammielee Hunter** and **Ryan Cross** were the first to do the QHI course at 723SQN on EC135, taught by **David "Bill" Oddy** who was then an Army Major before transferring to the Navy as a Lieutenant Commander.

The New Overall Aircrew Training Compliance Assurance and Standards

HATS adopted a seriously professional organisation for compliance assurance and standards, although under the umbrella of the Central Flying School RAAF.

Headquarters Fleet Air Arm's (HQFAA) aircrew quality control structure is headed up by the Staff Officer1 (SO1) – Compliance Assurance and Standards (SO1 CAS). Working for the SO1 CAS is the SO2 Pilot Standards, SO2 AvWO Standards and SO4 Aircrewman Standards. These are the respective Chief Examiners.

The RAN gradually wound down its ties to the RAF CFS agent about this time and instructor standards are now maintained through the RAAF CFS and the standards section at *Albatross*.

RAAF CFS is the gatekeeper for instructor assessment. At HMAS *Albatross* there is a position that until recently was called Chief Pilot Examiner, now called SO2 Pilot Standards. He/she is the CFS agent and typically is the person who will conduct category upgrades and Authority to Instruct assessment.

The SO2 Pilot Standards is assessed by and operates under a delegation from RAAF CFS as a 'Flying Instructor Category Assessor' (FICA). He/she is responsible for instructional standards across all Fleet Air Arm flying instructors (QHIs, Aviation Warfare Instructors, and Qualified Aircrewman Instructors). The FICA qualification may be held by more than one member within the FAA.

The JHS grades of qualifications for helicopter instructors start at D Category (D Cat) on completion of instructor training. Next is a C Cat, an upgrade and comes with experience. It is awarded to a regular instructor who is able to deliver the full range of normal instruction and is recommended for upgrade by the Unit CO in consultation with the staff within CAS.

The next level is B Cat, which involves more testing and remediation training. This instructor is then qualified to deliver the full range of normal instruction, deliver remediation training to a student who is having difficulties, and perform summative assessments.



The EC135T2+ brings the most advanced technology to the QHI, with its two engines and glass cockpit. The Instructor Training Wing is within the ADF Helicopter Training School at NAS Nowra, where both Army and Navy train their young helicopter pilots (ADF image). ✦

The Cat A instructor is able to deliver Cat C and B instruction, and also is qualified to 'train-the-trainer'. Thus, a Cat A instructor will normally deliver 'Competent to Instruct' (or C2I) training (when an instructor joins a new unit/aircraft type he or she receives around 10 sorties of C2I to ensure they can apply their instruction in the unit and type that is new to them).

An Authority to Instruct (A to I) is granted at the various categorisations. The Competent to Instruct (C to I) is done per aircraft type.

The Instructor Training Wing (ITW) has a Senior Instructor (A Cat QFI), 2 additional A Cat QFIs (1 x Army and 1 x Navy). ✦

This is an abridged version of a longer historical piece submitted by Trevor. You can see the whole article [here](#). You can also read a more detailed account of the 22 RAN instructors who did an Exchange posting with 705 Squadron [here](#). ✦



About the Author.

A Queenslander by birth, Trevor Rieck was set for a career as an industrial chemist, but caught the flying bug and in 1966 opted for the Navy instead.

He was one of the cohort sent to the US for his training (see the story in his co-authored book "Wings of Gold"), before returning to Australia to fly Wessex 31s.

Following a distinguished career, Trevor paid off in 1986 and entered the construction industry with a large company on the Gold Coast.

He retired to the UK in 2006 and enjoyed travelling in Europe and writing. He now lives in London. ✦

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