NOTES on the chapters of CLOUD SURFING.
(Also some extra bits)

A bit more information, explanation, photos and web locations of videos relevant to the stuff in the chapters. I've even put graphs and formulas in just to bore you to tears, feel free to ignore.

1 CLOUD SURFING

I talk of a jet engine producing horsepower. They actually produce 'thrust', which is just another way of saying power. One pound of thrust equals one horsepower if the jet engine is moving at 325 knots. Strange, but jet engines came after the horse-drawn era and deserve their own definitions.

Jumbo on approach all 'dirtied up' with flaps and landing gear. This is actually a photo of Qantas' last 747 doing one of its last landings into Sydney.

2 WHY BECOME A PILOT?

Two retired airline pilots under an Auster. Peter (left) flew us to Darwin.

Inside the Auster – the Wright brothers wouldn't have been impressed.

3 SECURITY ISSUES.

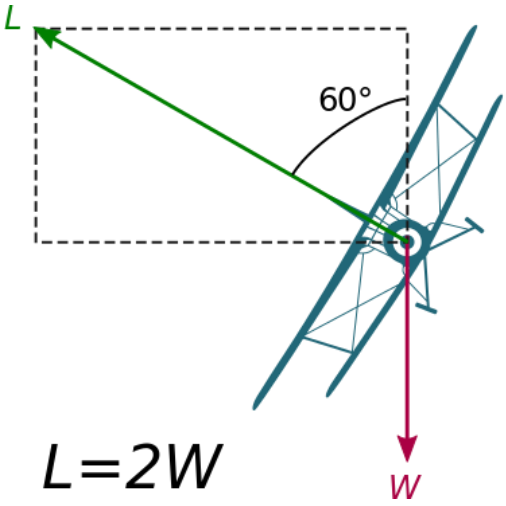
Video of hijacked aircraft being blown up in the desert. Qantas and I were lucky that day.

(https://www.youtube.com/watch?v=5de6fYWKDWU)

British, American and Swiss jets being blown up on Dawson's Field. The Qantas jet made it to London with no problems.

4 CADET TRAINING.

Turning circles and angles of bank and apparent weight (G forces).

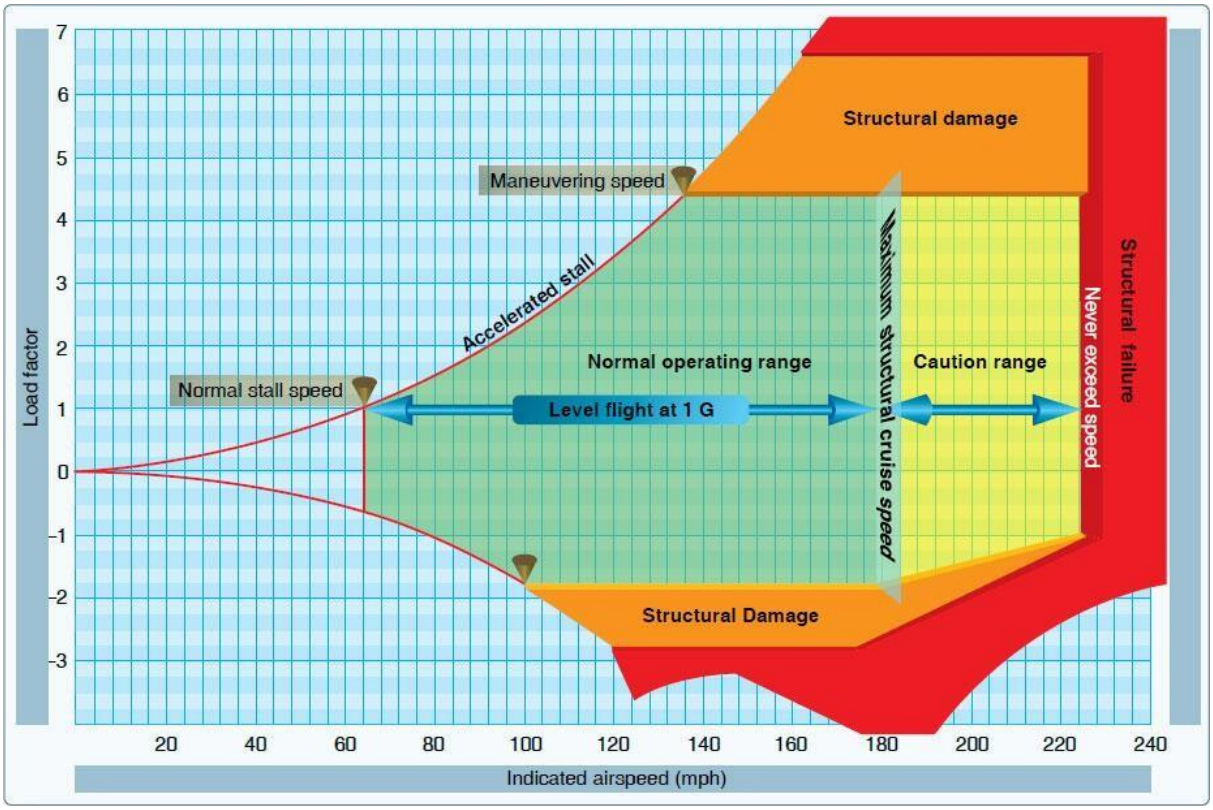


I've actually flown something that looks like this diagram aircraft. The maths are the same for a Tiger Moth and a Boeing 747.

It's all to do with the cosine and the tangent of the angle of bank. Roll the aircraft to its normal 15 to 20 degrees to go around a corner and passengers will notice a little increase

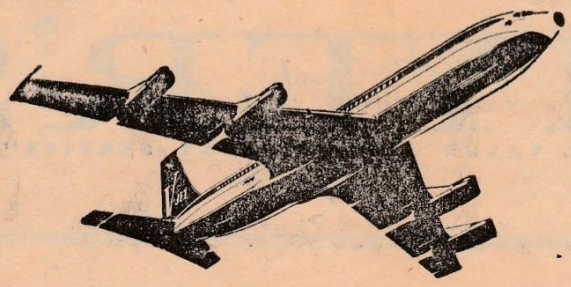
in weight but not enough to be annoying. Increase the angle of bank to 60 degrees, what pilots call a steep turn, then the apparent gravity is suddenly doubled. It's a cosine thing.

The steeper the angle of bank, the smaller the turning circle. The tangent of the angle comes into play here; speed is the other factor. So, keeping the angle of bank at a passenger-friendly 15 degrees but maintaining your Concorde like two times the speed of sound speed makes the radius of turn ridiculous. Tipping your aircraft over enough to have a small turning circle would be even more ridiculous, your passengers would all black out as the blood left their brains with the extra G forces. It's like when Boeing loses engineers to Airbus – it's an aviation brain drain. (Sorry.)



I have no idea what the above graph does or means but it looks fantastic.

I think it might have to with not stressing your aircraft to breaking point by applying too much G-force. Sounds like a thing that should be avoided.



Take off to your career as a Qantas Cadet Pilot

The Qantas Cadet Pilot Training Scheme provides selected young men with an opportunity to enter a challenging and rewarding career in international civil aviation.

Scholarships will be offered to young men to commence a twenty-month training programme in Sydney in February, 1966. Successful students will graduate with a Commercial Pilot's Licence and passes in the theoretical subjects at the examination for a Flight Navigator's Licence.

Cadet Pilots will then be taken on to the Company's staff and, after advanced training, will be ready to take their place as crew members on Qantas operational aircraft.

The cost to the Cadet of this training will be approximately £250 to cover the first 30 hours of flying training and the necessary text books and instruments. An allowance of £7.7.0 per week will be paid to students during the training period and interstate and country students will receive a living-away-from-home allowance of £5.5.0 per week. Successful applicants will be required to enter into a bonding agreement.

QUALIFICATIONS: 17 to 20 years of age • A matriculation pass, including the subjects of English, Mathematics I, Mathematics II and Physics • Students sitting for matriculation examinations in 1965 in the above subjects are also eligible to apply • High standard of medical health and eyesight.

Written applications, giving full details of age, education, results in each subject of last examination, details of sporting and other interests should be addressed to: **Cadet Pilot Selection Committee, Qantas Empire Airways Limited, Box 489, G.P.O., SYDNEY, N.S.W.**

Applications close on 30th July, 1965, and initial interviews will be held in August in capital cities. Aptitude tests and final interviews for selected applicants will be held in September.

You'll be proud to say you work with

QANTAS

Q75.83.65

Qantas *EMPIRE* Airways will offer scholarships to young *MEN* and pay them in *POUNDS, SHILLINGS and PENCE*. Times had to change – and they did.

By the way, I didn't want a career as a Cadet Pilot; I wanted to progress further than that.

Ah, so young and innocent. Graduation of 4th course. Going up the back row
I'm the 7th young 'space cadet'. That's what other Qantas people called us anyway.

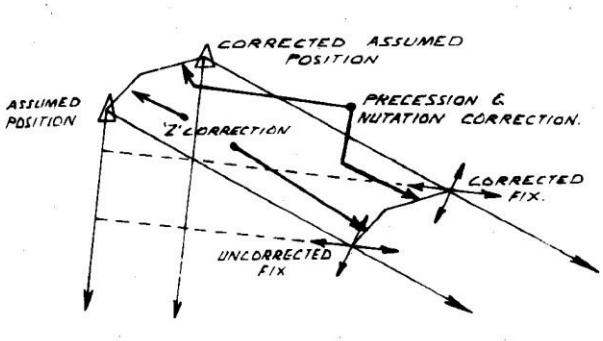


FIGURE 2 - CORRECTION OF THE ASSUMED POSITION

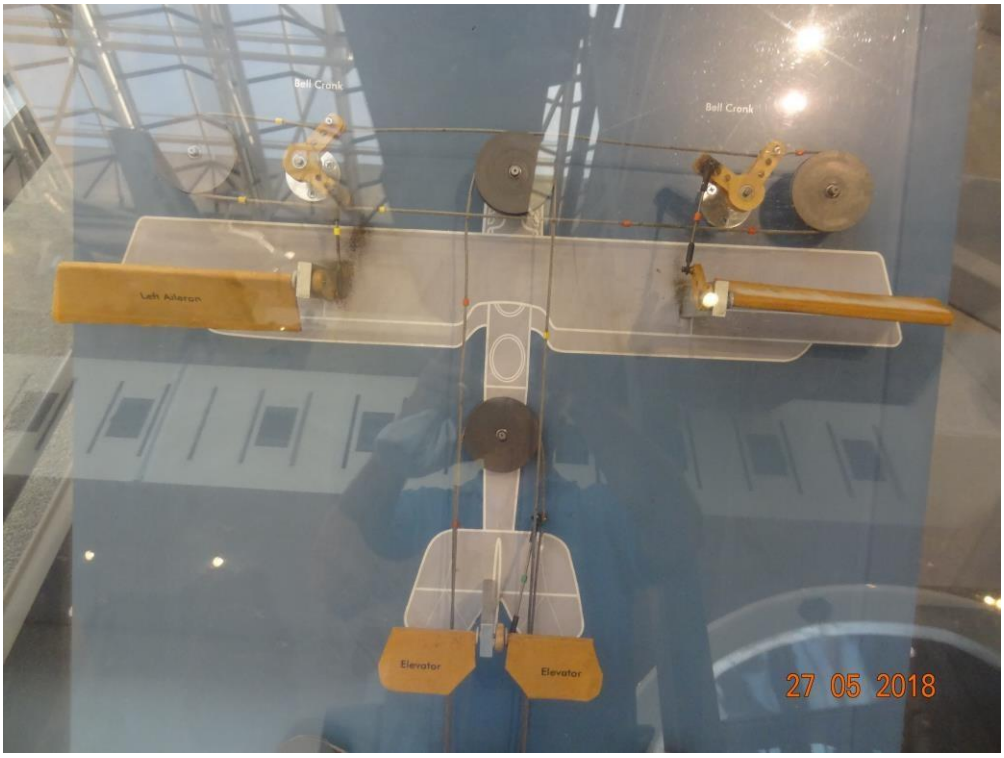
From some old 'Astro Nav' notes- no wonder I had no idea where I was most of the time.

Now I'm just not sure what I'm doing most of the time.

5 AILERONS.

With my aileron control problem back in the 90s in mind, I went looking in the Smithsonian Aerospace Museum recently. I found two little models depicting the two different flight control systems used in modern aircraft. There was the mechanical one with cables running through pulleys to the control surfaces like the ailerons and elevators. It was pretty flimsy and over the years the millions, and I do mean millions, of kids just hammering the joystick in all directions had taken its toll. The controls hardly moved and the control surfaces just flopped around a bit.

I moved on to the electronic fly-by-wire model – beautiful looking thing. The wires led from control handle through electronic circuit boards to little actuators on the ailerons and elevators. Now we were talking. This was how it should be; I took the control handle in my hand and moved it around. Nothing happened – nothing. Says it all, really. Somewhere the Swiss cheese had a hole in it and the electrons all fell out.



Two photos through glass of the models in the Smithsonian. I had to push little kids out of the way to get even these.

Wheel well shown with the doors open. Usually they close up again after the wheel go up or down. Lots of stuff inside it, cables and pulleys for a start.

Animation of Undercarriage and the doors. (This one is an A380)

https://www.youtube.com/watch?v=P1Xarq1Yr1Y

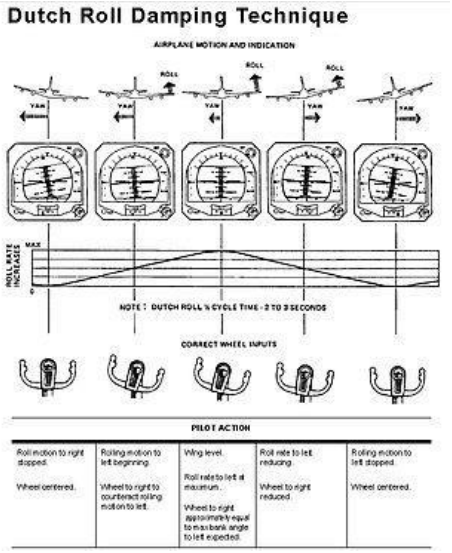
On Takeoff-----Doors open—Wheels up—Doors close.

On Landing----Doors open—Wheels down—Doors close.

Me doing the walk around inspection at the Avalon air show.

This picture is in here not only to remind me of the rip in my uniform trouser leg but also to show what the wheel-well door looks like in comparison with the photo above it. The door closes back up after the gear comes down. The ground engineer had to open the door to see the great lump of ice covering the control line pulley. I've never seen the photos; I have enough nightmares without them thanks.

Dutch Roll video (https://www.youtube.com/watch?v=Zmjam1evDD4)



It says use the ailerons; too bad if they don't work.

6 UNUSUAL FLIGHTS.

Young flying instructor wearing warm flying jacket; it gets cold up there, down there in Melbourne.

The debate over how wings work goes on.

Increase the angle of attack of the wing and more air is forced down away from its initial relative path and in agreement with Newton's laws there is an equal upward push on the wing.

Increase the angle of attack of the wing and the curvature on the top of the wing forces the air that is travelling over the top to travel further in a given time and, because of this increase in speed, that air loses some of its pressure. (Bernoulli's principle.) The air underneath the wing has now gained relatively in pressure and therefore there is an upward push on the wing.

Both these statements are true. Flat-winged balsa wood gliders work without the classic curvature you see on an air foil shape. Curved upper surfaces really do reduce pressure on the upper surfaces of aircraft wings. I was called out of the flight deck to check out what was on the wing of a 767 one day over the Tasman Sea. Some type of rubber, non-skid surface had been laid on part of the wing before departure and unfortunately the glue hadn't dried properly. What I saw was this rubber being sucked up into a semi-sphere the size of half a basketball. I alleviated the passengers' fears by pointing out the most graphic example of reduced upper wing pressure anybody had ever seen. My exuberance and

childlike glee at seeing this wasn't totally contrived, even though I was deliberately making light of the whole thing.

Here's another photo from the Smithsonian. I had to snap over the kids' heads. It was getting embarrassing elbowing them out of the way.

Here's a poem by another very young pilot killed in a mid-air collision. The author and Holly Smith were almost the same age when they died.

'High Flight'

Oh! I have slipped the surly bonds of Earth And danced the skies on laughter-silvered wings;
Sunward I've climbed, and joined the tumbling mirth
of sun-split clouds – and done a hundred things
You have not dreamed of – wheeled and soared and swung
High in the sunlit silence. Hov'ring there,
I've chased the shouting wind along, and flung My eager craft through footless halls of air
…

Up, up the long, delirious burning blue,

I've topped the wind-swept heights with easy grace Where never lark, or even eagle flew –

And, while with silent, lifting mind I've trod

The high untrespassed sanctity of space, Put out my hand, and touched the face of God.

John Gillespie Magee Jnr. RCAF.

7 FLYING NEAR FIRES.

Aussie fires 2020

I mentioned 30,000 fire fighters on duty on one day. The Victorian CFA operates more than 4,000 vehicles, including 1,970 4WD tankers, 264 pumpers, 11 hydraulic platform (aerial) trucks, 28 rescue tenders, 16 hazmat vehicles plus numerous other vehicles including communications vans, lighting trucks, command and transport vehicles. This fleet is supplemented by more than 1,400 brigade-owned vehicles. There are 1,200 base radios, 5,800 vehicle radios, 3,000 handheld radios, 35,000 EAS pagers, 58 satellite terminals and 10,700 pre-conference telephone interceptors (whatever they are).

The CFA also leases a large fleet of firefighting aircraft to assist brigades throughout the busy Summer fire season. The fleet comprises rotary and fixed wing aircraft, from small single-engine planes up to Very Large Aerial Tankers, based on commercial passenger jets.

Those impressive numbers are for the small state of Victoria where I did my bushfire flying. The state where I live and where the Blue Mountains are, New South Wales, has the world's largest volunteer fire service. There are currently 75,000 volunteer bushfire firefighters. This does not include the 7,000 full-time firefighters and their 7,000 special volunteer helpers. This is for a state with the same population as Washington State USA or London. There are 6,000 firefighters in London. If you are an Englishman this means that a London firefighter is worth 15 New South Wales firefighters – either that, or fire is 15 times worse in NSW.

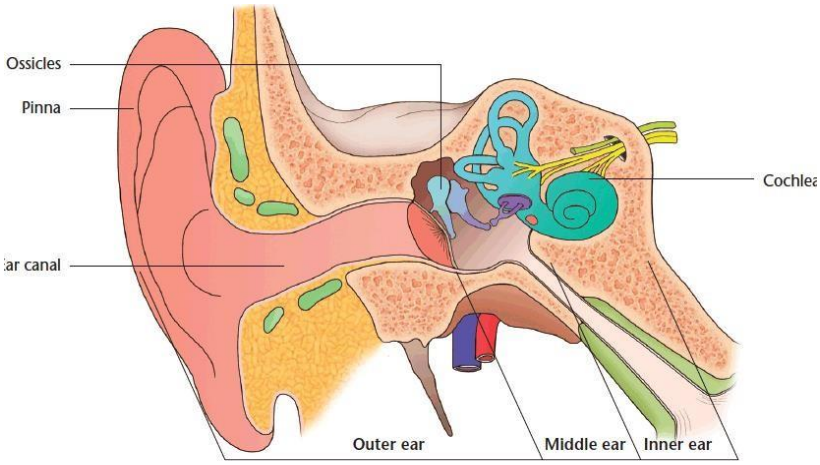
I heard a great Blue Mountains fire 'battle' story from an ex-Air Force Qantas mate. Well, what is it if not a battle when artillery is used and directed by forward observers? The battle was against a vicious little fire demon forcing its way up the side of a hill, determined to destroy a row of houses built on the downhill side of a road. The firefighters had managed to borrow a great water cannon from the nearby Air Force base and had it positioned on the road but, significantly, on the other side of the houses to the fire.

With the observers on the balconies of the threatened houses directing the water spurts from the big cannon with their radios, the pump operators put their shots over the houses to exactly where they were needed. No houses were lost on that street. The pump operators were totally dependent on directions over the radio and the landing shells had that great Kurt Vonnegut (*Slaughterhouse Five*) reverse war thing going and, instead of starting fires, these shells put them out.

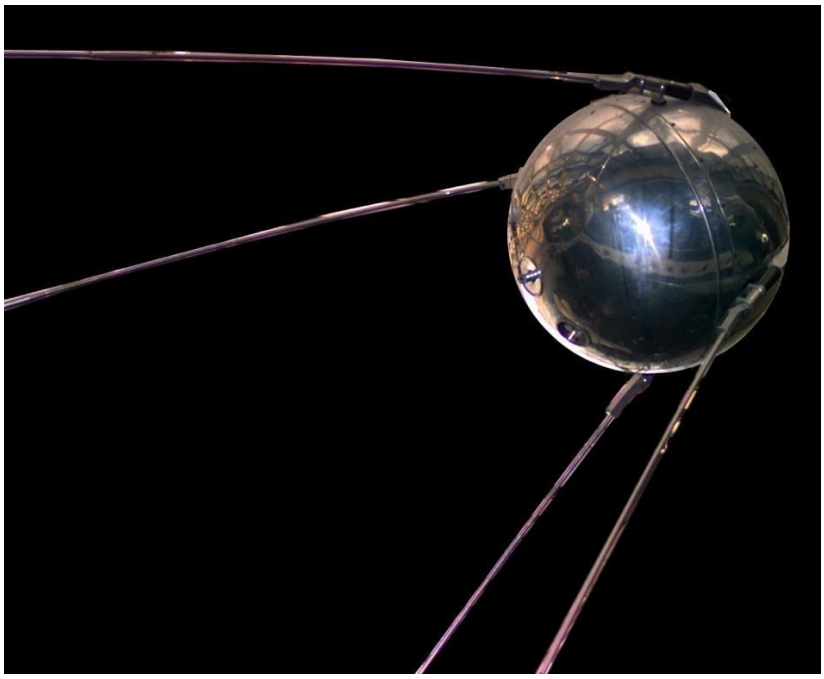
For those in gentler climates, here are a couple of videos that may explain why Australians like me are wary of bushfires. They kill way more than all our spiders, snakes, crocodiles, jelly fish and sharks combined.

(https://youtu.be/lDTrqQM9NqM)
(https://www.youtube.com/watch?v=XMhUU1BBRdY)

8 VERTIGO.



9 EARTH SHADOW.



Sputnik started it all. Now there are nearly 5000 satellites.

Using formulas for volume of spheres, air density, hydrogen density (air is 15.5 times heavier than hydrogen) and the lead density of 11.4gm/cc you can, like I did, make a spreadsheet to find out how big your lead balloon needs to be to carry a small white mouse. So, 48 years after Frank and I started it on a tablecloth, I used a couple of modern-day tools to finish the calculation. The advantage of a spreadsheet is that you can fool around with the various parameters to your heart's content and you can try all the 'what ifs' you want.
My actuary coffee mate tells me to just use a formula. Where's the fun in that when you have the chance to play with a spreadsheet.

If you can get your lead down to a thickness of 2 mm you only need a balloon diameter of 1.2 m or 4 feet – theoretically, anyway. The impracticalities of thin lead and making a sphere out of it confines this project to paper only. Some academics used lead foil to build a balloon in the late 70s and the *MythBusters* did it again recently. Cheats, one and all – WTF is lead foil?

Captain Frank Brown or, as we young S/Os used to call him, Blank Frown, (pilots are just so witty) would have used spreadsheets all the time if he had access to them. When he was doing his stuff, unfortunately for him but good for the rest of us, they were just being

invented by a couple of hippies who refused to take out a patent on them and instead gifted them to humankind – a great tool to be used forever more.

Sir Arthur C Clark, the famous science-fiction writer, like Frank Brown, worked in the RAF during the war as a boffin (scientist). I often wonder whether they met. Sir Arthur did all sorts of fancy stuff with radar but, right at the end of the war, he came up with the idea of putting communication satellites into geostationary orbits. Again, he didn't patent the idea, calling it an idea for humanity and not his or anybody else's to profit by. He had hippy ethics as well.

10 EARLY DAYS.

The Mighty Boeing 707.

This one has Flight Management Computers and a modern radar; a bit like putting cruise control onto a 1968 Volkswagen Beetle.

Early days all right!

Check out the sideboards – you needed those if you wanted to talk to young women in mini-skirts. It was the 70s. The white-top caps disappeared from Qantas for 45 years and then made a comeback in 2017.

How to impress people who are seeing a white guy haggle for the first time in their lives … One day in China, way off the beaten track, there was an interested audience to a street market purchase. About a half dozen blokes were watching how a creature from another universe would stand the hot blowtorch of street haggling. I had 8 yuan in my hand and I had spotted a small ceramic turtle, an ideal gift for the nine-year-old boy at home who was way into turtles.

A plan was hatched – 8 yuan in the hand, so that must be the price. I had no idea if that was a fair price but it was not a lot – so why not? The goods were displayed on a blanket on the ground and I asked the blanket holder, 'How much?' I was using hand language as these blokes only spoke Mandarin. The merchant pulled out a basic calculator and put a price of 12 for the turtle on the screen. Ridiculous – he was dreaming. I would only pay 4, significantly, the same amount below the fortune I held in my hand as the asking price was above. So, when his price came down by one, my offer would go up one, and eventually we would meet in the middle. Of course, the middle was 8. We met and I handed over my money.

Much satisfaction was gained by all the spectators. The white guy had haggled hard and a fair price was, by definition, achieved. But wait, one sharp-eyed spectator had noticed how easily I handed over the money, no counting out from a pile but instead I had just opened my hand. Well, he realised and told everybody very loudly of his discovery. The alien had known before the haggling started what the final price would be. There was stunned silence as these guys took this in. No, I didn't know the future but I can do quick mental arithmetic and I did know how much I had to play with.

11 GUNS, DIAMONDS AND CASH.

Big diamond, downtown Jo-Burg.

Dehydrated animal carcasses, ready for the discerning buyer.

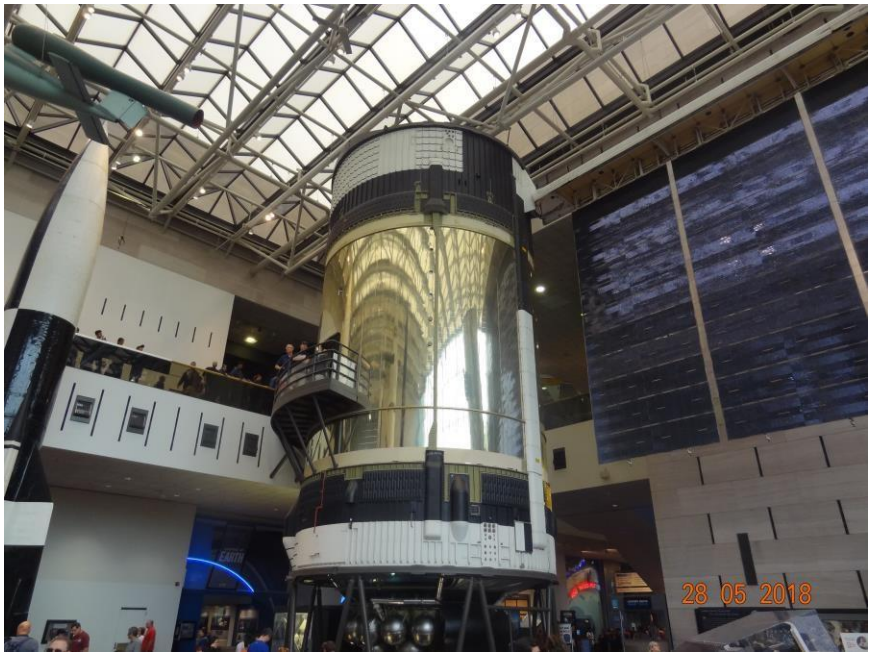
12 ON THE CHANGING TIMES.

Captain Deborah Lawrie, first Aussie woman pilot in a major airline.

First Qantas women pilots. Sharelle Quinn and Ann Bennett.
Note the one stripe of the Pilot Under Initial Training (PUIT.)

13 ON SPACE AND STUFF.

On my recent pilot pilgrimage to the Smithsonian Air and Space Museum in Washington DC, I saw it all – sputniks hanging from the ceilings, Saturn V rocket engines, the insides of all the big Jumbo engines – you name it, it was there. I walked through the Skylab mock-up and I could see its fuel tank origins. I could also look up into the more empty spaces and see the running track. Lucky bastards, what I wouldn't give for just one vertical lap, or should that be one upside down lap, it's all relative to something.



Mock up of Skylab in the Smithsonian.

Lucky bastard

Video of astronauts having too much fun exercising. (https://youtu.be/S_p7LiyOUx0)

Alan Shepard doing his thing.

Videos of Moon golf:

https://www.youtube.com/watch?v=BUwGe9zzxoE

https://www.youtube.com/watch?v=NTnoyaffOkQ

Apollo 14 landing video. I'm calling bullshit on this one, the last few minutes anyway, the real Alan Shepard didn't describe it like this.

(https://www.youtube.com/watch?v=W6rZvxhgxZg)

Space orbital formula

Vo (Orbital Velocity) Ve (Escape Velocity)

$$Vo = \sqrt{gR}$$

$$Ve = \sqrt{2gR}$$

Energy equates to the square of the velocity. ($\frac{1}{2} MV^2$) so energising above:

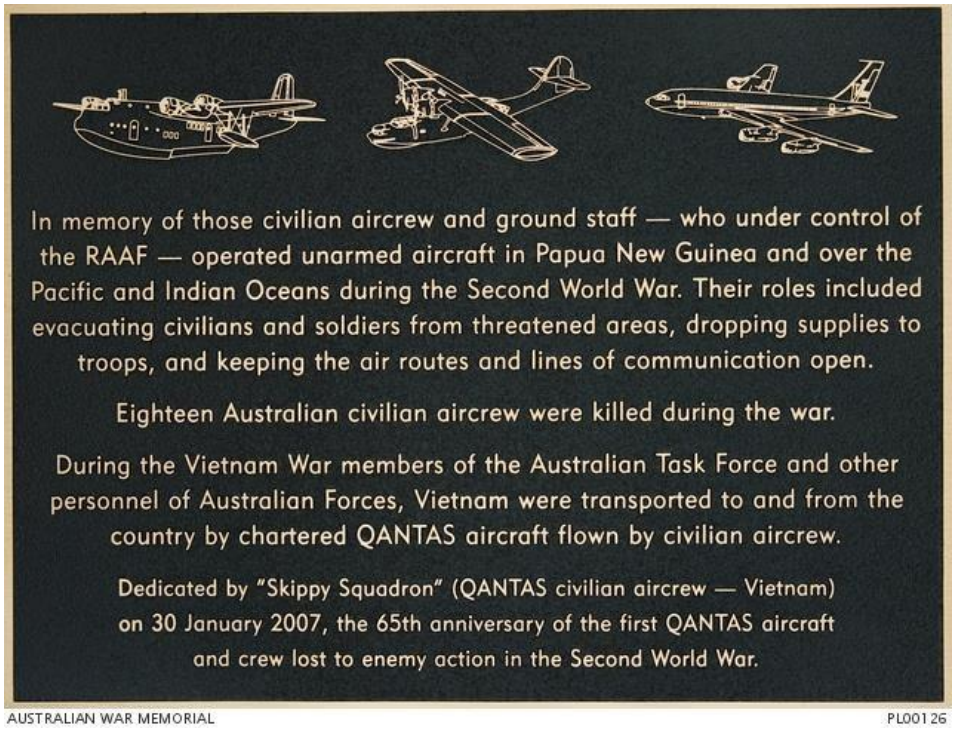
Energy (o) $= \frac{1}{2}$ gRM and Energy (e) = gRM

Energy to escape = 2 times Energy to orbit. (As I said – magic!)

15 VIETNAM FLYING.

I just read some wartime history about the horrific casualties Royal Air Force light bomber crews suffered in the early months of WW2. The bombers, when and if they did return to base, would often drag their trailing radio aerials over houses near the airstrips and do quite a bit of damage.

B 52 bomber. Just what they looked like coming home from their missions.



Qantas 707 loading up with diggers

Squadron logo. The ribbons are for the medals awarded.

16 REFUGEES.


with the
compliments of
QANTAS
The kangaroo, one of Australia's unique marsupials, is considered to be the country's national animal. Along with the emu it has a place of honour on the Australian coat of arms and a winged version is the emblem of Australia's Round-World Airline, QANTAS.
All over the world, this 'flying kangaroo' symbolises a standard of superb service and overall efficiency ranking amongst the finest in international air transportation.

17 LOS ANGELES RIOTS.

The video of Rodney King being beaten by the LAPD. Not for the squeamish. My daughter tells me she had to study this video in depth and the case that it sparked in law school.

https://www.youtube.com/watch?v=sb1WywIpUtY

Lots of fires like this all over LA.

18 MELBOURNE BALLOON.

Melbourne balloon just recently.

Gas, sparks and wicker don't go well together. Luckily, on this day, passengers and pilot weren't in the mix.

One of two balloons that crashed on the same day down there in Melbourne.

Just what are they doing down there? I love that the Chinese tourists 'were whisked away' to a champagne breakfast.

Wheels spin up and the rubber gets deposited.

Here's a video.

https://youtu.be/fSodzuCwRYI

And no, you can't put little electric motors on the wheels to spin them up before landing. Lots of problems if you do that. Mismatch of wheel and landing speed, failed motor on one wheel, landing with the wheels not pointing straight down the runway are just the start. See this video for more and this bloke doesn't even go into gyroscopic forces messing with the aircraft.

https://youtu.be/AJRf1jDiaXw

19 I ONLY FIGHT WOMEN PASSENGERS.

I found this post below on an aviation forum (not my spelling) By beerdrinker - Tue Dec 31, 2013 5:12 pm

1. The middle of Australia is know as the Great Australian F**k All. Years ago a whit in the Oz CAA named a waypoint in the middle of this airspace GAFFA. Sadly no longer there.

And you wonder why the woman in Hong Kong wanted off the aircraft.

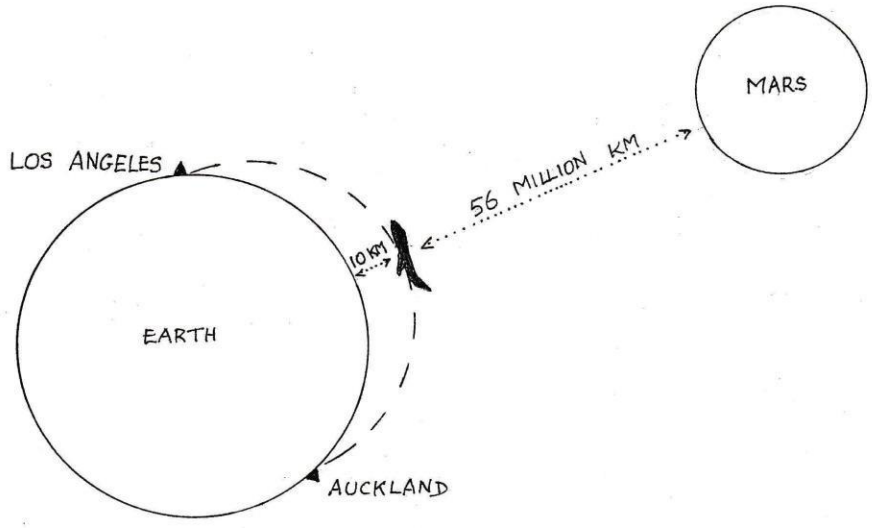
20 MARS.

CONGRATULATIONS

You are now one in a million (or probably a lot more)

At 09:51 UTC (Universal Coordinated Time) 27/8/2003 when you were approximately 10 kilometres above the Earths surface, you were also directly under the planet Mars. At this precise moment Mars happened to be at its closest point to Earth in some 60,000 years. This combination of events brought you closer to our heavenly neighbour than almost all modern humans, making you "one in a million" or better.

This comes as a direct result of you being astute enough to arrange your travel itinerary so that you were aboard this Qantas flight 25 bound for Los Angeles out of Auckland New Zealand on the night of the red planet's closest point. Well done, especially as this was a close encounter at no extra expense.



Feel free to tell your grandchildren about this achievement and be sure to point out that they will have to become deep space astronauts/cosmonauts to equal it.

Thank you, Captain W.V.Austen

There is one certificate holder for every 20 million people on Earth

Video of clever people doing clever things on Mars. As the closest human ever to Mars, I give them permission to keep doing so. (I'm pretty sure they couldn't care less what I say.)

https://www.youtube.com/watch?v=zeApJ2nuYmY

21 TYPE WARS AND AIRSHOWS.

Wellington approaches video – 36 seconds in, is a Qantas 767. I could easily be the bloke fighting the controls.

https://www.youtube.com/watch?v=IA7qkUeltNI

First glass cockpit aircraft (B767) I flew –the times were a-changin'.

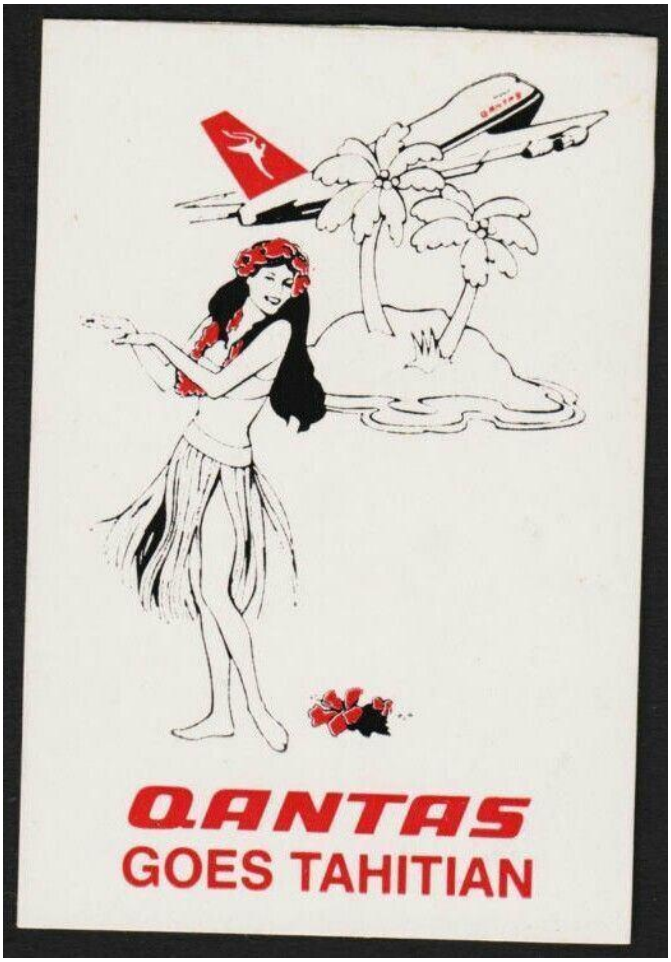
As a Captain, I saw my first female technical crew on this aircraft. A junior S/O was the first and she presented a problem. All the rest of these junior pilots were generically nicknamed 'Baldrick' after the smelly little Blackadder underling. This didn't fit this female S/O but, because she could easily have been the daughter of a couple of hippies, she was awarded the title 'Moonbeam' and it stuck for years. Checking the instruments in the photo above, you can see the climbing ability of a twin jet; 13,000 feet and climbing at an easy 3,500 feet a minute. 40 mph or 65 klicks vertical component; no wonder I went a quarter of the way to the moon.

Dad at the Avalon Air Show in a Dragon Rapide.

I'm behind Dad making sure he doesn't try to fly with this one pissed and broke; it doesn't look like it would fly with two healthy motors, let alone one. You just have to call those engines motors, don't you? By the way check out the motor that took me to Darwin in the Auster (photo above in the Chapter 2 notes.) Dad told a great story of carrying a dead body one day in one of these aircraft; got it in okay but then rigor mortis set in. It was a bugger to get out he said – we won't go into the details.

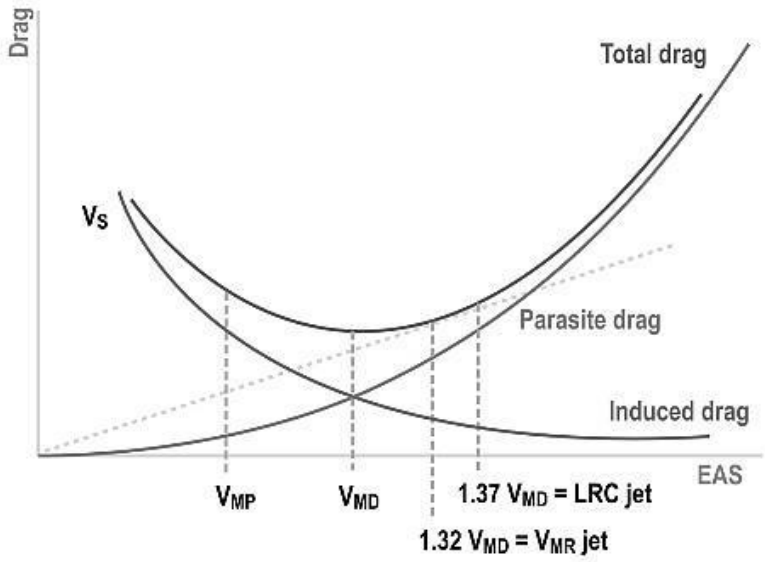
22 SEX (X RATED)

Qantas "Hosties" uniforms through the years, I well remember the orange mini-skirts.



Ah Tahiti!

23 DIFFERENCES.



Vary the speed (EAS) and the drag varies; I used to understand graphs like this. EAS is short for Equivalent Air Speed; close enough to Indicated Air Speed.

EAS as a function of impact pressure and static pressure (valid for subsonic flow):

$$EAS = a_0 \sqrt{\frac{5P}{P_0}\left[\left(\frac{q_c}{P}+1\right)^{\frac{2}{7}}-1\right]}$$

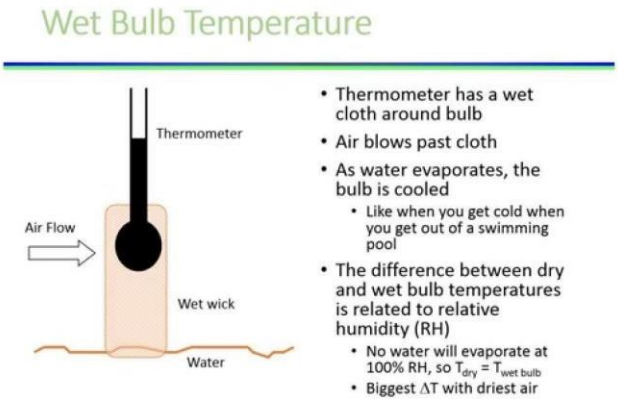
And you wonder why I have kept the book as simple as I could.

Airport entrance

Jumbo landing on a snow covered runway

Note how hard it is to see the runway lights in these conditions. You can pick out one just in front of No 3 engine but, even with a dark background, it's still hard to see; maybe black lights would have indeed been better. This is a later model Jumbo than the one I helped land in Frankfurt; you can tell by the winglets. I was once told by a Melbourne airport ground controller to, 'Follow the Virgin with the big tips.' His next comment was, 'I've always wanted to say that.'

Not as bad as the other ground controller up in Darwin who, when asked by the captain of a taxiing aircraft whether its rotating beacon was working replied, 'Yes it is, no it's not, yes it is, no it's not.' It gets hot up there in Darwin.



A wet bulb drawing.

The only wet bulb thermometer I'm interested in now is the one in my swimming pool.

I talk about losing nearly 99% of the aircraft's energy from cruise to touchdown.

Here's the proof but feel free to skip.

So a 1 kg aircraft at 500 knots cruising at 41000 feet has energy from its speed and altitude.

M= 1 kg V=500 kts = 257 mtrs/sec H=41000 ft= 12497 mtrs G= 9.8 mtrs/sec^2

Energy from velocity (kinetic) =1/2 MV^2 = 33024 joules

Energy from Height (potential) = MGH = 122470 joules

Total Energy = 155495 joules

Energy of the 1 kg aircraft touching down at 125 knots.

M = 1 kg. V = 125 kts = 61 m/s. H = 0 ft or mtrs. G= 9.8 mtrs/sec^2

Energy from velocity (kinetic) =1/2 MV^2 = 1860 joules

Energy from Height (potential) = MGH = 0 joules

Total Energy = 1860 joules

Percentage of energy remaining on touchdown = 1860/155495 = 1.2%

THE AIRCRAFT HAS LOST 98.8% OF ITS ENERGY BEFORE IT TOUCHES DOWN. THE REMAINING 1.2% IS ENOUGH TO SET FIRE TO THE BRAKES IF YOUR'E NOT CAREFUL.

24 FLIGHTS WITH STRETCHERS.

'Classic' Boeing 747.

Note the Engineer's panel to the right. I became a First Officer on these.

The huge crew from the charity flight for the kids with disabilities.

You can see the big bloke in the white shirt in the top centre; he's the very proud Captain who will always thank Captain Toby (seated bottom left) for getting him to do the flight.

747-400 'Electric Jumbo'

You can see the lamb's wool seat covers; the little blind girl got that right.

I really hope this photo was taken inside a simulator.

The Sri Lankan tsunami damage was a catalyst for my surgeon mate. He and one other hero started to organise finance for a trauma centre on the east coast of Sri Lanka. It was opened in June 2018, one great effort by some dedicated people, one giant leap for humankind. I hereby officially forgive my mate for fixing up Sri Lanka's cricketers.

Video of the tsunami

(https://www.youtube.com/watch?v=eR0sYLRx8Pk)

25 LIGHTNING.

Morse Code

dit..dit..dit -----S
dit..dit..dit..dit-H
dit..dit ----------I
dar ----------T

St. Elmo's Fire

St Elmo's Fire

https://www.youtube.com/watch?v=B51GcGIqLlY

https://www.youtube.com/watch?v=P1luqXNqC1c

Lightning video

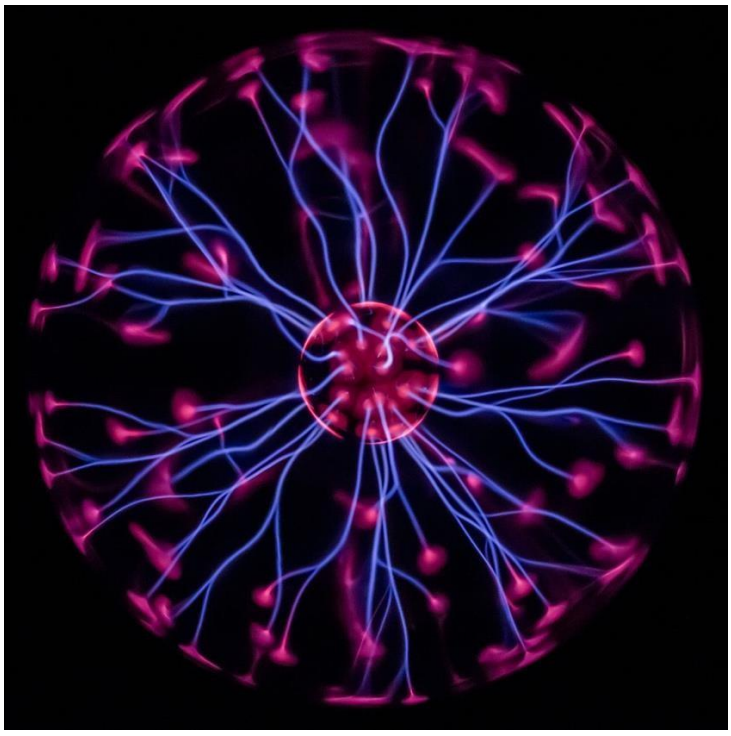
https://www.youtube.com/watch?v=m37z5R2rJ5E

Microburst videos (If you have a fear of flying don't watch!)

https://www.youtube.com/watch?v=HDfodeURad0

https://www.youtube.com/watch?v=xIHFP4oHvds

Self-explanatory. Note the earthing through the tyres.



Plasma Ball

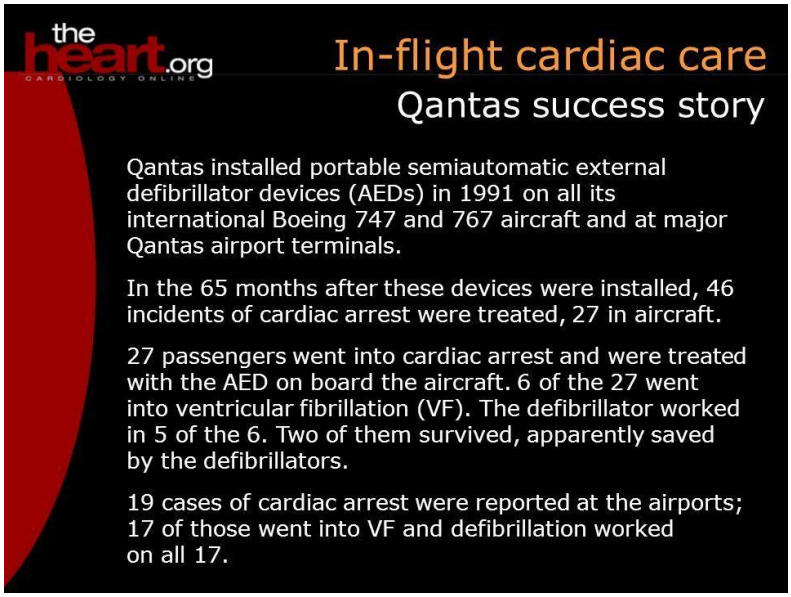
As for the undulating arms of electrical energy emanating from the nose of the 767 that sparkly night, check out a light ball like this above to get a little of what it looked like. I've had one of these great toys for a long time; I probably bought it straight after my lightning experience as some weird subconscious effort to understand the universe I live in. Not really, it's just a fabulous moving light show.

26 NOT ALL THE FUN WAS IN THE AIR.

One way to operate an aircraft, not the best Cockpit Resource Management.

Videos of ground and water training. The first one has a flight attendant stripping her pantyhose off, presumably to prevent static on the slide. I refuse to comment further. https://www.youtube.com/watch?v=fQoxIuio4Mc

This second one is actually shot inside the Qantas facility, just not with Qantas crew. If any Qantas crew were this reticent and slow, the firehose would have been used to blast a few into the pool. The music is great. https://www.youtube.com/watch?v=NMDFOiLNUpk



Zappers!

Smoke and oxygen masks.

When you get acrid smoke inside an aircraft, you can't stick you head out the window, so masks and goggles have to be used. When smoke does occur, like when a chiller fan short-circuits and catches fire, you better have practised donning the smoke protection beforehand; see photo of me and a S/O practising at 31,000 feet.

The electrical smoke incident between Brisbane and LAX was well prepared for. Familiarity with emergency equipment and knowledge of the electrical equipment and systems is a necessity. We were taught how to fight all sorts of fires and how to use the appropriate type of extinguisher – this was just a given. Your airline crews should all be well trained and tested in all these things. If you suspect they aren't, change your airline.

27 FLYING SKILLS.

Best flying video ever filmed. I say this because shortly into the video the vision turns into what the pilot actually sees, namely the runway out in front and the minimum controls and instruments around him. Exactly what it feels like to the pilot.
https://youtu.be/VjS849ssgrw?t=634

Hot brakes "Old School Training" This video shows deflated tyres but the voiceover is great. Specially at the end where he realises that he has told people to not use the brakes and then tries to rectify that.
https://youtu.be/lFbQCZQqQ

28 LONG-DISTANCE FLYING.

Website calculating great circle tracks. To do this from first principles with a slide rule is what we did. A simple calculation could take up to twenty minutes.
https://www.greatcirclemapper.net

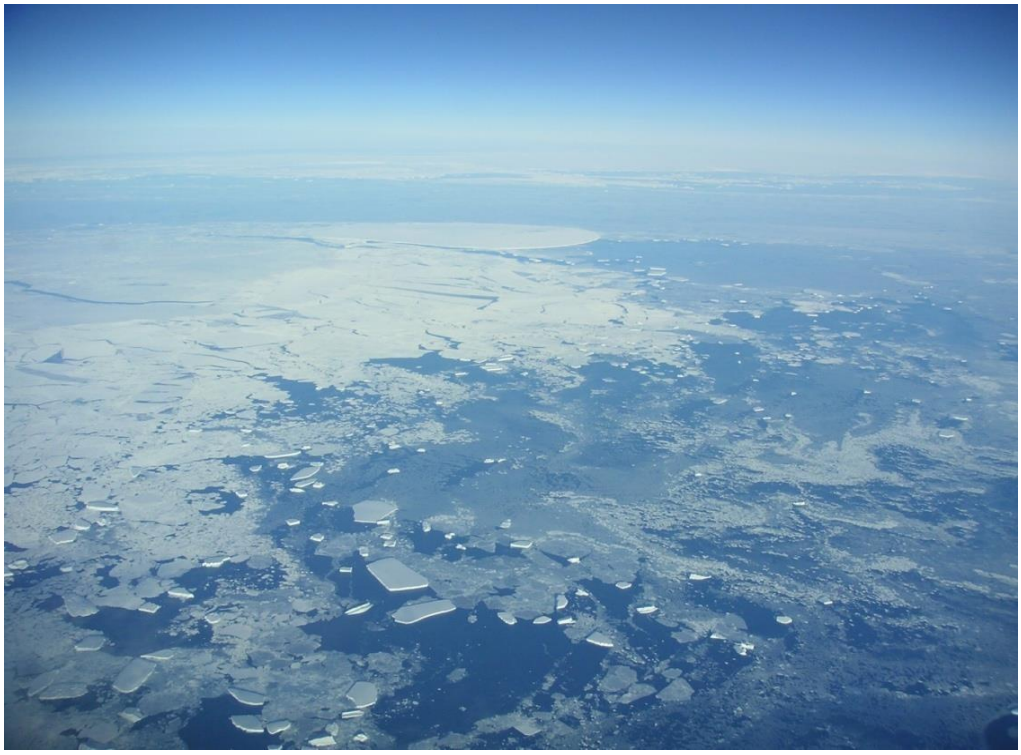
A video of a big engine undergoing a catastrophic failure
https://youtu.be/9m7zRLJEIvw

A video of a Qantas 747-400 departing Sydney. I flew this aircraft a lot. This take-off is trouble free, as were the vast majority. The night departure from Buenos Aires was the one we pilots train for. Please note the noise the mike is picking up; explains why most pilots end up with significant hearing loss.
https://www.youtube.com/watch?v=2hbQH9J7LWE

29 THE THREE-CARD TRICK.

Either this video is a trick or the card sharps do know what they're doing.
https://www.youtube.com/watch?v=LrQSTiCOOu0

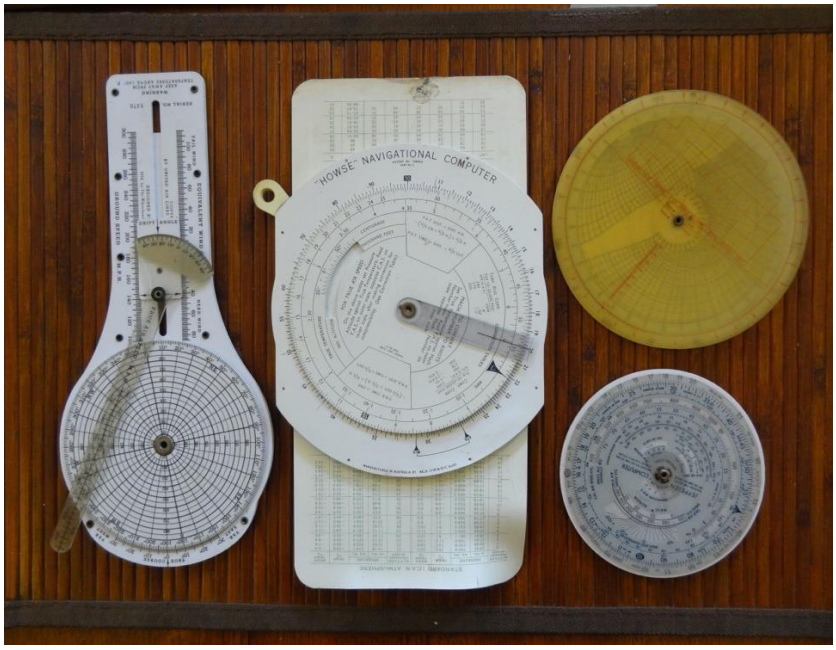
30 ANTARCTIC FLYOVERS.



Down over Antarctica, the clouds just parted for us.

An Alaskan glacier from the front seat of a light aircraft.

The pilot didn't want his photo taken; I think a lot of characters on the run from something or someone end up in Alaska.



Pre-digital flight computers.

They are just clever slide rules really. The one in the middle was designed by a Qantas pilot or navigator. This bloke knew his maths like Frank Brown did.
The bumpy bit you can see on the bottom right hand corner of the slide of that central computer is a result of an encounter with a light aircraft's fuel-driven heater. It meant I couldn't fully slide the insert in and out and, as a result, couldn't use it if the tailwind component got above a certain value. I spent the last few navigation check flights of the cadet course dreading any strong tail winds; the slide would only move so far.

31 SAN FRANCISCO

Parallel approach into San Francisco, 436 cubits apart.

It looks way closer than that, doesn't it? Imagine what a Jumbo looks like at night on one of these approaches.

Video of an approach to the same runways.
https://www.youtube.com/watch?v=qfuwMBBfs0o

No fog, no clouds, no wind – no excuses.

Three pilots, late at night on the streets of San Fran and the new young one asks what's wrong with a particular bar and why don't they go in. The other two let him go in to check it out. He soon comes out and complains that they let him walk into the gayest bar he had ever seen. The older wiser blokes just point to the rainbow flag that all gay bars in San Fran proudly fly.

32 TRAVELLING THE WORLD.

In the southern Philippines, there are lakes within islands. Google Earth it: Vulcan Point Island in Crater Lakes in Taal Volcano Island in Lawa Ng Taal in Luzon in the South China Sea. Zoom in and out on this Google Map (I note that after the eruption the map has already changed.) https://www.google.com.au/maps/@14.0001336,121.0404788,10.73z

Taal volcano eruption from a Qantas flight deck a few days after it went up.

I mentioned an *inversion*. As you gain altitude the temperature usually goes down by 2 degrees Celsius per thousand feet. In an inversion the air temperature near the ground is colder than that above it until the inversion layer is reached. This usually happens on cold nights when the ground cools rapidly which, in turn, cools the lower air layers more than the higher layers. Smog gets trapped underneath the inversion level. In the good old days of coal-burning fires, places like Melbourne or London in the 60s would have a lovely layer of brown smog just sitting on all the people on a cold morning– ah, the good old days. A few thousand feet up the temperature gradient would become normal and a clearly defined surface of this smog could be seen like the surface of a sewage pond, above it the visibility was unlimited. In a light aircraft it was actually possible on a smooth day to feel a gentle bump in the control wheel when you went through the temperature change.

And you didn't believe me when I said the Japanese bombed mainland USA with balloons?
https://www.youtube.com/watch?v=0m9EqDlBBeg

Volcanoes smell – it's either H_2S or SO_2. H for Hydrogen, O for Oxygen and the S is for Smelly in both cases. Okay, the S may actually be Sulphur.

British Airways in a fight with an Indonesian Volcano, animation but fairly accurate.
https://www.youtube.com/watch?v=hFQjZoyYA8o

Circular rainbow with its double. Fantastic!

Circular rainbow videos. With glimpses of the elusive double rainbow.

https://www.youtube.com/watch?v=M-JSXKz6NSI

https://youtu.be/6GGzvikbJOA This one is filmed from a drone.

'The Glory'

The sunlight turns the aircraft's shadow into a rainbow. Usually it's just a bright halo around the dark shadow. Great video of it. https://www.youtube.com/watch?v=fDh7vHphmd4

Racetrack holding pattern video – and you thought it was simple. By the way, the Morse code soundtrack is all about the beacon the aircraft is holding over; the three-letter call sign is what the dits and dars are all about. Once identified the beacon's transmission would be silenced – pilots get annoyed like anybody else.

https://www.youtube.com/watch?v=sp4j-AYQZI4

My holding pattern was way better than this.

It had the full moon right in the centre. This photographer had a camera though.

View out of a pilot's office window.

This is at dawn. Imagine, after a couple more minutes of flying, the view would have changed into another equally magnificent vision. It was very easy to get all Tolkien about it. I wish I'd taken photos like JPC van Heijst; check out his website. https://jpcvanheijst.com/

Wingtip vortices and condensation trails.

Going into London it looked like this, except we were behind the aircraft and flew into the invisible swirls. It was turbulent enough to have to take over from the autopilot. Note the condensation forming on top of the wings and at the edge of the flaps. No fuel dumping or chemtrails, just water.

As I said it was easy to get all Tolkien about it all. I do miss the skies.

33 EPILOUGE – HISTORICAL HILARITY.

My dad, late 90s (age that is) and still raring to go.
He flew this aircraft through the desert in the 40s (decade that is.)

American veteran having a fly, this bloke passed away within a day of my father doing so.
https://youtu.be/5thY5l4G2kg?t=247

Jumbo underfloor galley.
You can see the one person lift with the two vertical windows that are there to stop you thinking you're in a coffin.

EXTRAS

Qantas 747-400 ferrying an engine.

Qantas was one of very few airlines that would do this. I had to carry an engine from Singapore to Sydney once; the aircraft flew like a *blevitt*. A *blevitt* is a 10-kilogram capacity bag filled with 20 kilograms of shit. This was just an old expression pilots used to describe less than ideal flying characteristics. Don't ask me why. The imagery is good though.

Australian aboriginal art meets the 20th century.

I flew this aircraft quite often. When you are on the flight deck you can't see the colour scheme. I wondered why on arrival into LAX people on the airport apron were staring, until I remembered which aircraft I was in.

Two older blokes trying to get into a Cessna (stop laughing.)

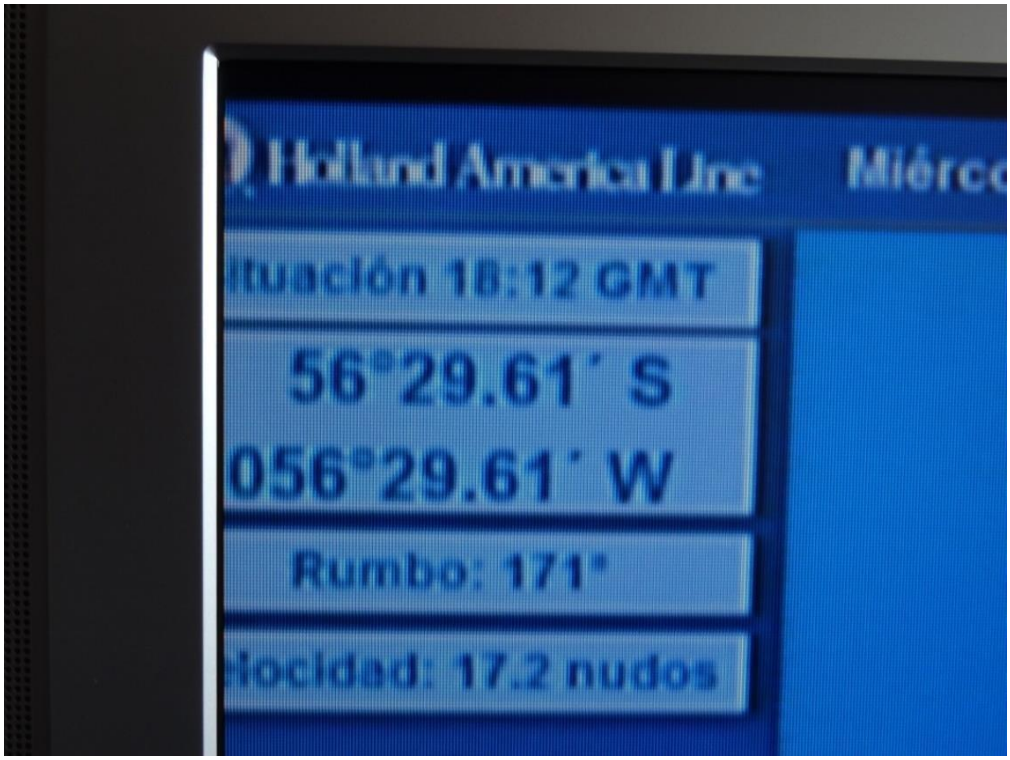
My younger brother in the red shirt is a six-and-a-half-foot ex-pro-footballer. He does actually have a pilot's license and did manage to get in, eventually. You can see why pilots sometimes refer to some light aircraft as *flying singlets*. You don't get into them, you put them on.

Sydney harbour bridge and the Opera house.

One son learning to fly and falling in love with it all while over Sydney Harbour. Why wouldn't he love flying? Look at the view from his new office.

Passing the baton on to the next generation on a 747-400 cruising over the Pacific.

On this trip, for the first time in my son's life, he had to do what I told him.



Snapshot of the navigation screen on a cruise to Antarctica.

This is such a nerdy navigator thing to get into they have actually removed any references to it from the internet. Join the dots of all points of equal latitude and longitude and you get a figure 8 centred on the equator. Told you it was nerdy. (Nudos equals knots by the way. Rumbo means the 'course.' Indeed if you're not flying a great circle you actually fly a 'rumb line' on a map, a course of constant heading.)

Best website ever

At least for anybody interested in the planet he or she lives on it is. We have come a long way to get this worldwide information displayed and all you have to do is click your mouse a bit.

So, bring up the graphic Earth (I find that if you refresh the screen it comes up bigger) and move it around by the left click, hold and drag method. Zoom in and out with the little wheel. (iPads are different of course.) Right click on a point on the planet and you get the wind velocity (speed and direction) as well as the temperature for that position. It shows up on the left-hand side of the screen along with the Latitude and Longitude of the

spot. You can change the units to suit yourself by clicking on the units; unfortunately, there is no ‘cubit per egg timer’ selection though.

By then right clicking on the word Earth on the left there you can bring up tables you can select from. I only play with the wind and temperature of the air but you can get info about the ocean currents as well.

From the Overlay line click on wind and temp to get the readout for the selected spot. Go onto the Height line and select ‘sfc’ for the surface wind and temp. The 250 hPa selection is close to where aircraft cruise. In checking it out as I write this guide, the jet streams are showing up as classically normal. It would take a balloon bomb less than two days to get from Northern Japan to Seattle. It’s minus 56 degrees Celsius down in the middle of Antarctica by the way. Best website ever. Well, you can see why a pilot would think so anyway.

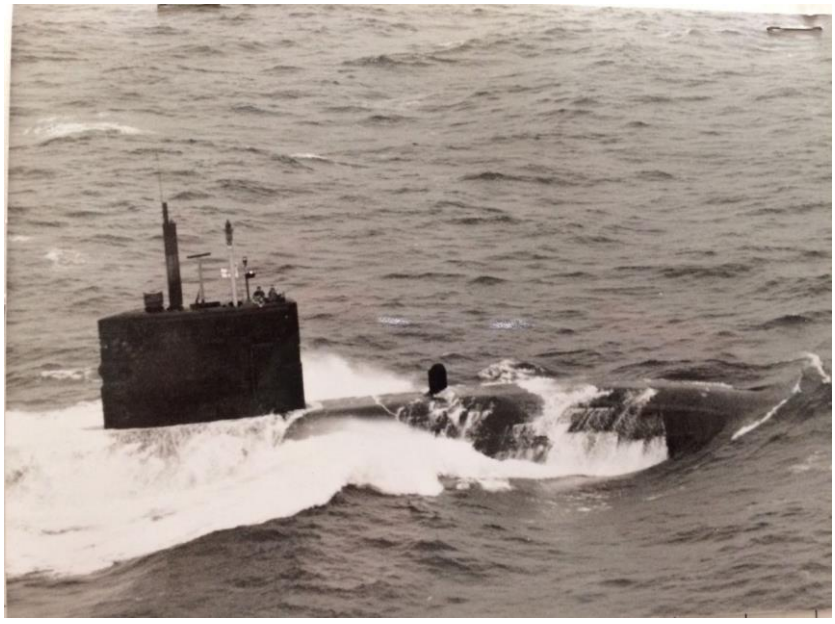
https://earth.nullschool.net/#current/wind/isobaric/250hPa/orthographic=-82.64,77.84,344/loc=74.668,-40.068

PILOT STORIES

I said in the book that all pilots have their stories. I loved hearing them while debriefing in the bar. Royal Air Force pilots’ stories about flying through the rising columns of nuclear test bomb clouds through to wartime survival stories. One pilot was nicknamed ‘Hotfoot Harry’. He’d been shot down three times after D Day and had made it back safely to allied lines three times on foot. He used to carry around the “missing in action” telegrams sent to his mother to prove his story.

The guys that had been in the forces had story after story. One F/O told me about the most embarrassing flight he had while in the Australian air force. He was the skipper of an anti-submarine patrol aircraft, a P3 Orion. He told me they found the Russian sub in the Indian ocean that they were looking for and just to confirm things they dropped a line of listening buoys near it. Sure enough number three buoy picked up a huge amount of noise. The sub was next to it. The only problem was the sub had surfaced right next to the top secret listening device and was indeed in the process of heaving it on board to take back to Russia. The F/O told me that as he flew really low and close to the sub the Russian sailor

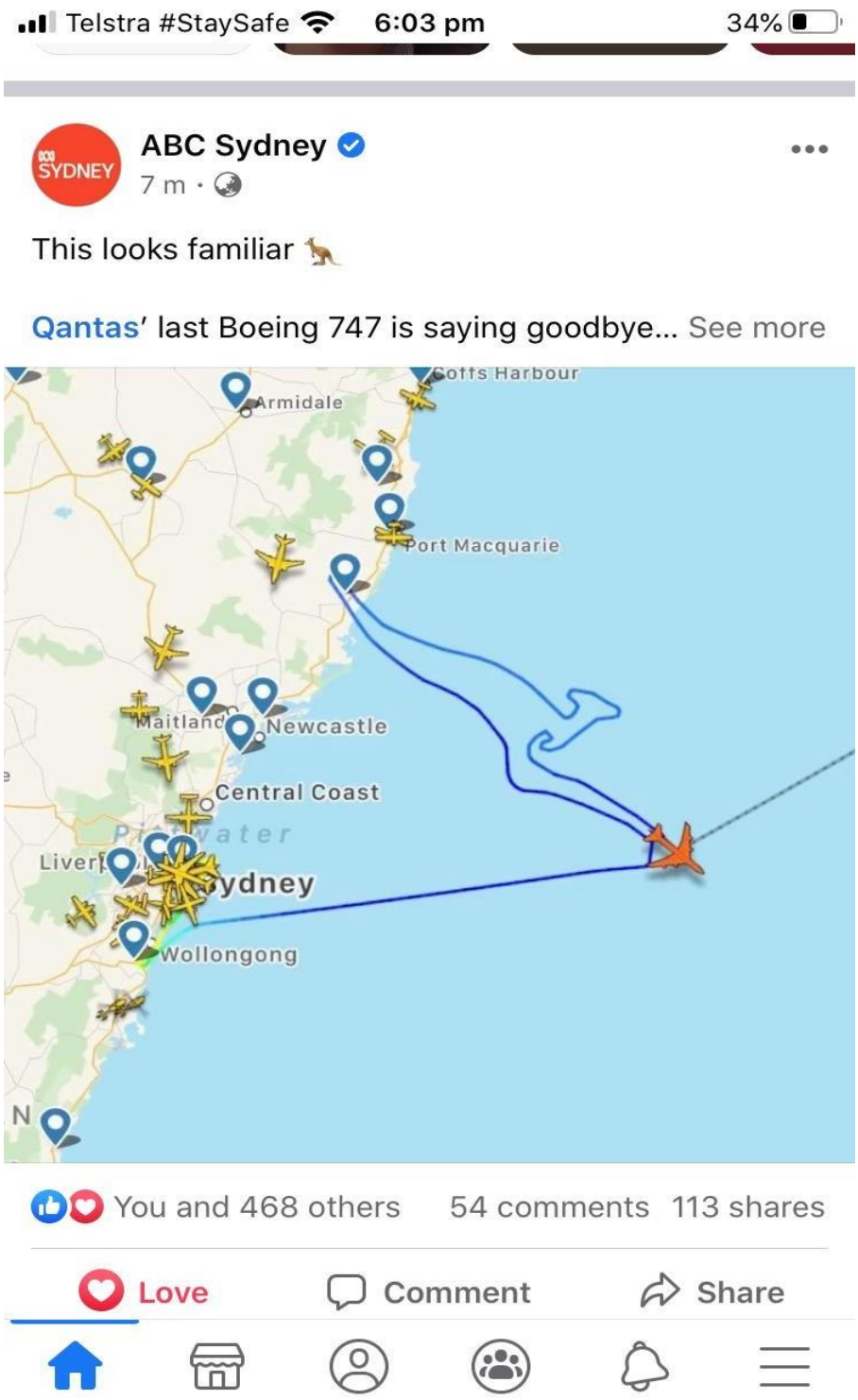
with the buoy in his arms put the sensitive microphone on the buoy up to his mouth and said in a heavy Russian accent to the low flying Aussie aircraft, “Fuck yoo Kangaroo!”



A Qantas pilot chat site provided this photo of what the Australian Airforce P3 sub hunters used to see. The ex-RAAF blokes were getting all nostalgic on the RAAF’s 100th birthday.

There was one pilot who was a fountain of information, you could ask him about any of the Goon Show scripts, he knew them off by heart. The episode where the Germans came over to the south of England to bomb the cardboard decoy tanks with cardboard bombs was his favourite. As far as I was concerned this bloke was radioactive and he had been since the nuclear test blasts in the Australian outback. Back then they had given him a shoebox of dust after one of the tests to take down to Adelaide for analysis. He had placed the box next to himself in the cramped cockpit and in his light summer flying shorts had carried out his task. He only grew concerned when standing outside of his aircraft with the shoebox in his hands he was approached by the scientists who were to do the analysis. He said the fact that they were in full silver hazmat suits with full facemasks and breathing tanks was bad enough but when they held out huge long tongs to take the box off him he really started to wonder.

The blokes who flew through the rising column of the mushroom cloud said they weren’t too worried. They had special suits on and thought things should be fine. Two things changed their mind, they looked back after leaving the aircraft to see it being buried by a couple of bull dozers and the second disconcerting thing was all the skin sloughed off their hands the next day. Their gloves were a bit transparent to radiation it would seem. I thanked the bloke who told me this story and then asked if he minded if I moved away from him in the bar a bit.



I and a few hundred other ex-Qantas aircrew and engineers assembled in front of the Sydney Opera House to farewell the last 747 on its departure down Sydney Harbour.

After leaving the coast the aircraft followed a set of co-ordinates to complete the track shown above. The Qantas Flying Kangaroo.

So the ‘Kangaroo’ was drawn on the radar screens when the aircraft followed a pre-calculated track fed into the navigation computer. Here are the Latitudes and Longitudes of the track. One of the pilots of that last flight told me they were spending a lot of time getting it right, this was weeks before the flight.

As an old pilot I was interested as to what altitude/speed/weight/flap setting and G-loading this was all done at. These are all important details.

https://youtu.be/tu-SUZJSk-8?t=398

Benediction for a Queen

Aircraft are just metal constructs, assembled on a factory floor But to the lucky few who fly you, you are always so much more When you joined us, newly gleaming, latest in a noble line

Your majesty and grace impressed us, now had come your time to shine Quickly logging mileage, countless wishes granted on the way Thrilling, everyone who flew you. Hoping you would always stay Icecaps, oceans, deserts, forests. You have overflown them all

Borne your subjects safely onwards, your reputation standing tall They were times some pilots cursed you, purge to say it, but it's true If you humbled them, the reason was because they disrespected you You have met our every challenge, explorer of the highest skies

Surpassing all who came before you, unrivalled in your pilots' eyes Soon, your engines will fall silent, your time has come to finally rest

As you prepare to go and leave us, we say, thank you. You've been the best.

Qantas F/O Jeff Kale