The Aermacchi MB-326H

Fleet Air Arm Association of Australia
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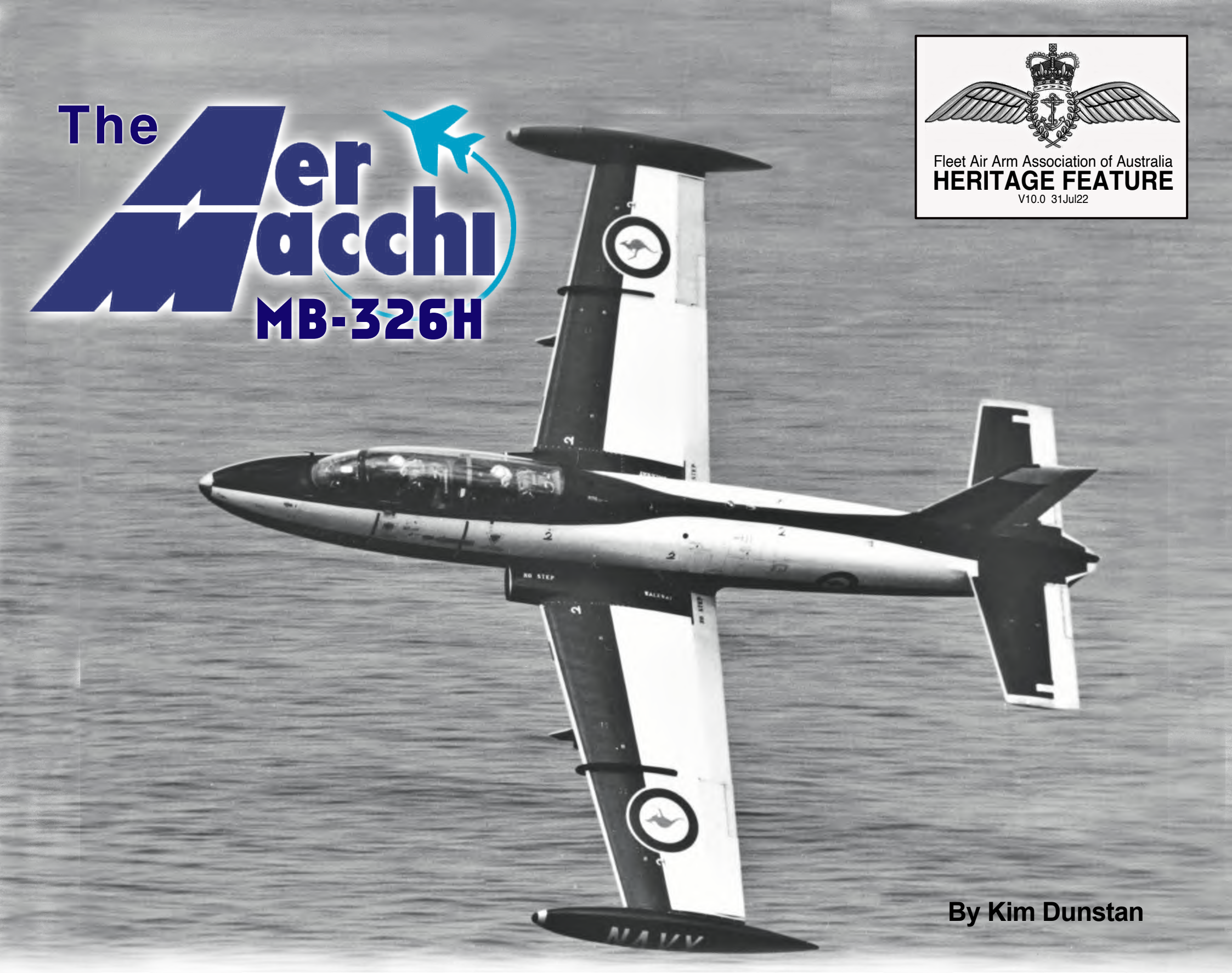


By Kim Dunstan

In the 1960s, with 'Cold War' tensions and instability in South East Asia, the federal government bolstered the RAN's Fleet Air Arm (FAA) by extending the life of the Sea Venoms and Fairey Gannets, ordering the Douglas Skyhawk and Grumman Tracker aircraft; and replacing the ageing DH Vampire trainers with CAC-30 Aermacchi MB-326H (Macchi) advanced trainers.

After the Royal Australian Air Force (RAAF) took delivery of their new Macchis, the RAN placed an order for 10 identical aircraft in 1969. The first of the Macchis began arriving at Naval Air Station Nowra (NAS Nowra) in September 1970, with deliveries continuing into 1971. Their primary role was for tactical training of RAN pilots converting to A4G Skyhawk fighter/bombers.

RAN CAC-30 Macchi MB-326H Performance
(subject to conditions)

Type: Land-based advanced jet trainer

Manufacturer: Commonwealth Aircraft Corporation (Licenced by Aermacchi, Italy)

Number: RAN purchased ten MB-326H

Crew: Two - pilot and instructor

Wingspan: 10.74 m (35 ft 3 in.) with 70 Imp gal tip tanks

Length: 10.67 m (35 ft 0 in.)

Height: 3.71 m (12 ft 2 in.)

Engine: Rolls-Royce Viper Mk 22-11 turbojet, 2,500 lb thrust

Max speed: 439 kt (506 mph) (814 km/h)

Cruising speed: 300 kt (345 mph) (555 km/h)

Range: 816 nm (940 miles) (1512 km)

Ceiling: 12,196 m (40,000 ft)

Armament: 7.62 mm Miniguns and practice bombs

The RAN Macchis were shore-based aircraft operating from NAS Nowra as part of VC724 Squadron and were not carrier capable. They played an important part in training and in fleet support work until the end of July 1983 when the RAN phased-out fixed-wing flying. The surviving airframes were then transferred to the RAAF.

Aermacchi MB-326 Origins

During the 1950s a global increase in the number of jet fighters created a rapid demand for jet trainers. The Italian-built Aermacchi MB-326 was specifically designed as a dual-purpose jet trainer suitable for ab initio and advanced training, quickly acquiring a name as an outstanding 'lead-in' aircraft for pilots converting to high-performance jet fighters

At Aermacchi the MB-326 project team was led by Ermanno Bazzocchi, who had initially designed it for the Italian Air Force. The first prototype flew in December 1957 and after further tests and modifications, series production began in 1960 with deliveries commencing in 1962. The MB-326 proved to be a success with some 800 Macchis built. Many were sold to foreign air forces, with others produced under licence in Australia, Brazil and South Africa.

Aermacchi MB-326 Basics

The Macchi MB-326's all-metal construction was straight forward and robust. Its low wings had flaps, ailerons, tip tanks, and mid-wing fences to aid airflow, with jet intakes at the wing roots. The tandem two-seat cockpit was pressurised and fitted with Martin Baker Mk4a ejection seats. The bubble canopy and windscreen anti-icing provided good visibility. The Rolls-Royce Viper turbojet was centred in the fuselage aft of the wings with the jet pipe exiting at the empennage. A speed brake was located on the underside of the fuselage.

The Macchi was popular, easy to fly and fully aerobatic. The Viper engine was responsive, coping well with trainee pilots and those new to jet engines. Airframe buffeting gave early warning of a stall. Recovery from stalls and spins was prompt using the approved method. The tricycle undercarriage was well-suited to its training role - including a small rear wheel to avert tail-strike.

The CAC-30 Macchi MB-326H

The Australian Macchi MB-326H was a licence-built variant produced by the Commonwealth Aircraft Corporation (CAC), at Fishermans Bend, Port Melbourne. A number of the early MB-326Hs were imported from Italy, but the majority were produced by CAC who was the prime contractor, with Hawker de Havilland and others providing a high level of local content. By 1972 a total of 97 CAC-30 Macchi MB-326Hs were built, including the ten purchased by the RAN.

Important modifications to the CAC-30 Macchis included internal anti-corrosion protection; wing leading edge protection; improved cockpit air-conditioning; a nose wheel splash-guard to prevent wet runway fame-outs; improved cockpit lighting and oxygen quick release; waterproofing of radio equipment; and rerouting of fuel and oil drains to prevent fires.

The RAN Macchis

Ten CAC Macchi MB-326H jets were order by the RAN in July 1969. The first six (serial N14-073 to N14-078) were rolled-out from July to November 1970 - with the first delivered to the Naval Air Station at Nowra (NAS Nowra) on 10 September 1970. The second batch of four (serial N14-084 to N14-087) were received in 1971. They were identical to the RAAF Macchis arriving at VC724 Squadron at Nowra in the orange and white colour scheme, but with the word NAVY on the tip-tanks and tailfin - later a blue and white paint scheme was adopted.

VC724 Squadron, the RAN FAA's operational training unit for fixed-wing flying, began using the Macchis as a 'lead-in' trainer for pilots converting to the A4 Skyhawk fighter/bomber. It was a step-up from the ageing Vampire T22s, T34s and Sea Venoms with their confusing non-standard cockpit layouts.

Apart from pilot training the Macchis were used by VC724 Squadron's Fleet Requirements Unit (FRU) helping to keep navy ships at peak effi-

JULY 10, 1969

Navy to have 10 new jets: $7.6m order

By FRANK CRANSTON

Ten Macchi MB-326H jet trainers have been ordered for the RAN's Fleet Air Arm in a move seen primarily as intended to help keep the flagging Australian aircraft industry afloat.

The purchase of the Macchis was announced yesterday by the Minister for Supply, Senator Anderson, and the Minister for the Navy, Mr Kelly. The order will cost about $7.6 million, including spares.

The Macchis will be used to train crews for the RAN's 10 Douglas Skyhawk fighter-bombers. This will give the navy the status of having one trainer for each strike aircraft, an enviable position by world standards.

The Commonwealth Aircraft Corporation, Melbourne, which has the prime contract for the new Macchis, and Hawker de Havilland Australia Pty Ltd, the major sub-contractor, had only recently recovered from the shock of the Government's action in slashing 21 Macchis from the 108 originally announced for production in 1965.

The Macchis have no naval role, not being adaptable for aircraft carrier use although they can be used as ground-level attack and counter-insurgency machines by fitting various weapons systems.

The Navy will use its new aircraft to continue jet training of RAN pilots who are currently trained by the RAAF.

ciency. Tasks included radar calibration flights, fighter direction training, target towing, mock attacks and naval gunfire support. Previously the Vampires and Sea Venoms were used for this, but as they neared the end of their service lives the Macchis took over the FRU role.

Pilot training

From 1968 onwards, RAN pilots who did ab-initio training with the RAAF flew Macchis as part of their course.

Prior to the arrival of the Macchis at NAS Nowra RAN trainees then converted onto the old Vampires and Sea Venoms , but limited aircraft availability created a backlog. So the arrival of the Macchis at VC724 Squadron in 1970 was a great boost to the training regime.

The Macchi MB-326H trainer was sturdy and reliable with a well-designed cockpit and instruments and this, together with its tandem cockpit and aerobatic capabilities, made it an excellent aircraft for pilots to gain experience before converting to the front-line A4G Skyhawk.

Apart from general flying the Macchis were used for instrument and night flying, formation flying, low-level navigation exercises, combat manoeuvres, weapons training, special tactics and more.

Macchi exercises included weapons training at the Beecroft Weapons Range near Jervis Bay. The Macchis could be fitted with light-series bomb carriers carrying 4 kg practice bombs. For target shooting gun-pods, with M134 mini-guns firing 7.62 mm ammunition, were attached to wing pylons. Aiming was assisted by a Ferranti F-26 gyro gunsight. In 1974/5 the Macchis conducted trials with 2.75-inch rocket pods, and Mk 106 high-drag practice bombs during weapons training.

Macchi Matters

Maintainers had ready access to the Macchis' servicing points. Panels over and under the fuselage provided entry to the engine bay, and the turbo intake ducts had doors enabling inspection of the first-stage compressor blades.

The Macchi spares and major overhaul programs remained under RAAF auspices. All parts including engines were pooled - but the RAN airframes retaining their navy N14 serials and side numbers - this arrangement worked well.

Macchis delivered to NAS Nowra arrived in the RAAF orange and white colour scheme - with NAVY stencilled on the tip-tanks and tailfin. In 1973, VC724 Squadron adopted the Oxford Blue and white paint scheme, with NAVY on the wing tanks and a yellow chevron on the tailfin. The kangaroo roundel on the fuselage included a thin white border to separate it from the Oxford Blue background.

Macchi serial N14-086 (862) had the chevron replaced with a large yellow albatross stencilled on the tailfin identifying it as the VC724 Squadron Senior Pilot's aircraft - sometimes called 'the admiral's barge'. This is because Captain 'Nobby' Clarke, the CO of NAS Nowra (circa 1972/3), who was instrumental in adopting the blue and white colour scheme, took flying lessons in this aircraft occupying the front seat [he was not a pilot and never went solo] while being tutored by Lt Cdr Hickling in the rear seat.

The Macchis formed an important part of VC724 Squadron's fixed-wing training unit. Apart from training courses, pilots not attached to a squadron or those doing 'desk jobs' were able to use the Macchis for refresher courses - or maintain their flying hours to keep their flying skills current. Observers could also fill vacant rear seats in the Macchis while brushing-up on navigation and other observer skills.

Macchi Mishaps

Two RAN Macchi jets were lost owing to mishaps. Fortunately, in both cases, there were no serious injuries, but the aircraft were destroyed.

On 28 April 1971 during an instructional flight over Jervis Bay, in Macchi N14-078, Lt Kavanagh and student pilot Lt Clarke were forced to eject when control of the Macchi was lost after entering an inverted spin. Both pilots were rescued by local fisherman Syd Williamson using his four-metre boat. The aircraft was destroyed when it struck the ground near Sussex Inlet.

On 07 December 1972, Macchi N14-073 suffered a flameout as the aircraft was about to land on runway 26 at NAS Nowra. The pilot Lt Smythe ejected at 60 metres (200 ft) at 105 knots, escaping with a minor injury to his ankle - however the Macchi was demolished in the crash.

Goodbye Fixed-Wing Flying

In March 1983 the Labor Government announced it would not replace the aircraft-carrier HMAS Melbourne, this effectively put an end to fixed-wing flying in the RAN. The process of closing down fixed-wing operations began immediately, followed by the phasing-out of the Skyhawks, Trackers and Macchis.

The loss of the Macchis led to the closure of VC724 Squadron's Fleet Requirements Unit. Initially the RAAF took over the fleet support work; then for a time (leased) RNZAF A4 Skyhawks based at NAS Nowra did the job. Later tasking then reverted to RAAF Macchis, covering Fleet Base East ships from RAAF Williamtown; and RAAF Pearce for Fleet Base West ships.

With many large and medium sized RAN ships being fitted with helicopter landing decks - the focus of naval aviation moved to boost rotary-wing operations and aircrew training to maximise the benefits of ship-borne helicopters.

Exit the Macchis

After serving with VC724 Squadron at NAS Nowra for some 13 years the end of the Macchi era came on 30 June 1983 when the remaining eight RAN Macchis were transferred to the RAAF. The Macchis proved to be an effective 'lead-in' trainer, preparing pilots for conversion to the front-line A4G Skyhawks. In another role, they played a vital part in fleet support exercises. The Macchis were well suited to their task and a pleasure to fly.

Macchis On View

An ex-RAN Macchi MB-326H is on display at the Fleet Air Arm Museum, at Nowra, south of Sydney. Macchis may also be seen at various RAAF museums around Australia as well as independent aviation museums (such as HARS at Albion Park NSW) and other air museums and collections. Ex-RAN Macchi N14-087 is mounted on a pole outside Cranbourne RSL Vic. ♣

Flying the Macchi

By Brett Dowsing

I enjoyed flying all the aircraft and helicopters I flew, but flying the Macchi was always a thrill. My first flight in the Macchi[1] took place at RAAF Pearce[2] on 26 May 1977. It was GF1 of RAAF/RAN 101 Pilots Course, Flight Lieutenant Phil Noordink [3] was my instructor and it was a familiarisation flight of the Pearce Training areas. Some 10 flying hours later, on 13 June 1977, I flew my first solo flight in the Macchi. I loved it.

The Aircraft

The Macchi MB326H was selected as the RAAF's jet training aircraft in August 1965 to replace the de Havilland Vampire. An initial order for 75 aircraft was placed for the Air Force but this was shortly increased to 87 aircraft for advanced pilot training and lead-in fighter training. In July 1969, ten aircraft were ordered for the Fleet Air Arm, taking the total to 97 aircraft for the Australian Defence Force.

Designed by Aermacchi, Italy, the Australian Macchis were built under licence by the Commonwealth Aircraft Corporation (CAC) as prime contractor and supported by Hawker de Havilland and other organisations. The initial aircraft were assembled at the CAC facility at Fisherman's Bend, Victoria and test flown at Avalon before handover to the RAAF/RAN over the period October 1967 to September 1972. The Macchis were powered by a 2500 lb thrust Bristol Siddeley Viper 11 turbojet engine. The aircraft was capable of achieving about 450 KIAS and had a range of just over 900 nm at cruising speeds. It was fully aerobatic and a very good-looking aircraft.

No. 2 Flying Training School

Having commenced 101 Pilots Course on 1 November 1976 at No. 1 Flying Training School, RAAF Base Point Cook[4] we concluded our basic training on the Victa Airtourer CT-4A on 29 April 1977 with just shy of 70 hours flying under our belts. Crossing the Nullarbor with Midshipman Keith Champion in my relatively new Holden Monaro GTS, we commenced at No. 2 Flying Training School[5] at RAAF Base Pearce on 9 May 1977. The other survivor of the original seven Navy students, Midshipman Vince Di Pietro, joined after local leave in Melbourne.

The course on Macchis at 2FTS was structured to transition from basic to advanced flying skills in preparation for operational conversion onto an ADF aircraft or for helicopter training. After about three weeks of ground training, which covered aircraft specific and advanced aviation subjects, we commenced flying the Macchi.

The initial general flying phase was a little over two months long and quite intense as the flying was interposed with continuation of ground–school subjects and tests. While the main emphasis was on flying handling skills, there was also introduction to night circuits, navigation and instrument flying. All flying other than instrument training, was done in the front seat by the student, with the instructor occupying the rear seat. Any failure might allow for one re-test but any further failure usually meant withdrawal from the course or being 'scrubbed'. It was 100 percent heads-down studying through this phase. The Basic Handling Test conducted at the end of this phase occurred on a 1.2-hour flight 29 July 1977 with Squadron Leader Richard Strudwick.[6]

The next phase of the two months continued the pressure but, as the ground training eased off, the complexity of the flying evolutions increased. This was especially so with instrument flying training the focus but formation flying, navigation exercises and night flying were also conducted. Most students were doing two sorties per day with weekends the only respite.

A much greater emphasis on being prepared for emergencies and alternatives, essentially "remaining ahead of the aircraft," was expected during this phase - professionalism and airmanship were being instigated and tested. Our decision-making was being honed. I flew my Intermediate Handling Test (IHT) on the morning of 27 September with Squadron Leader "Herb" Elliott - it was 1.3 hours long and included some actual instrument flying conditions.[7]

The final phase of the course commenced an hour or so after landing from my IHT when I took off on a low-level navigation exercise. By now the course revolved almost entirely around flying sorties. At least two flights a day were normal and, if any days were lost due to weather or aircraft unavailability (rare), then students could expect a long day with three flights, one of which would usually be a solo flight. There was a heavy onus on complex instrument flying and navigation exercises, and some aerobatics with final tests of these segments. I flew the Formation Test on 17 October and Navigation Test on 16 November before the all-important Final Instrument Handling Test (FIHT) on 25 November.[8]

The FIHT was generally considered the "make or break point" of the course as those that didn't pass generally had little chance of building confidence to pass a retest. This was where most failures occurred, and it was particularly sad as it was only a few weeks before completing the course. For those who passed, it was a significant morale boost into home-strait, and it built camaraderie amongst those heading towards their Wings.

The final few weeks of the course were all about honing skills and preparing for the Wings Test. Flight Lieutenant Alf Allen[9] was my instructor for these final few flights and I was learning right up to the Test. Instructors had a pretty good idea of students' particular weaknesses and concentrated on these in preparation for the final examination. I don't think I had any particular weaknesses and had average confidence in all areas.

On the morning of 30 November 1977, Squadron Leader Ron McGrath,[10] the 2FTS Chief Flying Instructor, briefed me on his require-

***Left**. The author in an RAAF Macchi trainer at Pearce Air Force Base. **Right**. The "Hole in the Wall" feature in the Tianjara low flying area not far from Nowa. There was a 'one way' system so flights though it were only permitted from south to north.*

ments and we took off for my Wings Test. His first requirement was to enter the Avon Valley at the maximum speed I was comfortable flying towards Pearce. About a third of the way along he pulled the throttle, initiating a practice engine failure. I immediately entered a speed-to-height climb and commenced ejection procedures.

Having done this, I was advised that we might just be able to glide to Pearce but if I decided en-route that we wouldn't make it, I was to them recommend ejecting. Having negotiated air traffic priority, I achieved a perfect gliding landing on the cross-runway and after relaunching was told that I had my Wings, so we'd just go to the aerobatic area and have some fun. I was totally relaxed for the rest of the test of the 1.2-hour flight and thoroughly enjoyed a final lesson in aerobatics from the CFI.

In my debriefing, Ron McGrath said that he didn't think I would achieve the 'dead-stick' recovery to Pearce and was impressed with my choosing the non-duty runway and milking the appropriate gliding performance under the conditions of the day. He advised that he was confident that I would continue to build my skills and live up to the ethos of a military pilot. I left his office elated but vowing never to let him down.

101 Pilots Course graduation parade took place on 15 December 1977. Three Navy and 21 Air Force graduates received their Wings from Air Chief Marshall Sir James Rowland KBE, DFC, AFC[11] in front of a couple of hundred dignitaries, staff, families and friends. It was one of the proudest days of my life and certainly a career milestone achievement.

Flying the RAAF Macchi

It was a jet - it went fast, it went high, it was aerobatic, you sat at the front of the aircraft with rest of it behind you; it had a bubble canopy and you could see everything in Visual Meteorological Conditions (VMC). It was responsive and relatively easy to fly accurately; it had no major impediments. Compared to the CT-4A Airtourer or the Cessna 150s I'd flown before, flying the Macchi was a quantum step above in all aspects of flying experience.

But with such performance, things happened a lot faster and, as a consequence, to safely fly the Macchi, you had to have an intimate knowledge of the aircraft, emergency procedures and airmanship. Your situational awareness had to be immaculate particularly when flying at night or in instrument Meteorological Conditions (IMC).

It was single jet engine powered and was therefore always at risk of engine failure although rare. Similarly, it was conventionally analogue-instrumented with limited navigational capabilities. Compared to today's aircraft there were knobs and dials everywhere and no radar or GPS to assist with the all-important situational awareness. You had to be "in front of the aircraft" at all times.

During my pilots course at Pearce, there were a couple of flights that particularly stood out. The first, which was an area familiarisation - no pressure, pure enjoyment of the new flying experience and anticipation of learning to fly a jet. My first solo flight in a Macchi - just a couple of touch and goes with the instructor in the radio shack next to the runway, and the pressure of remembering all the checks but especially lowering the undercarriage. No time to really enjoy and over far too quickly.

Then there was the solo lo-hi-lo navigation exercise outside the controlled airspace from Pearce, over my hometown, a land-away and refuel in Geraldton and time-on-target return to Pearce. Pure adrenaline, flying around my hometown, low level across my relations' and family-friends' farms and landing at a new airfield first-time. It just made the hard work, sacrifice and studies worth it.

Passing the FHT, as said earlier, was the real hurdle of the course. For some unknown and probably perverse reason, I really enjoyed instrument flying. I revelled in the challenges and believed I was lucky in that my earlier seamanship training in “Blind” navigation and night formation steaming had given me a reasonable ability in spacial awareness - a mental, three-dimensional map-keeping capability and vector determination.

Finally, of course, and as described earlier, the Wings Test was amongst the most memorable. I don’t think it was a foregone conclusion that if you get to the Wings Test you would automatically pass - a member of the Course in front of us failed his, but managed to pass his re-test. The instructors were not out to fail students and most went to extraordinary levels to give all students the best chance to survive and become military aviators. Notwithstanding this, nearly 50 percent of all students that started out on Pilots Course failed, though rarely after the FIHT.

As such, the Wings Test for me was one of my most memorable not because I passed but because of the humility of my testing officer, Ron McGrath. He taught me as much in the debriefing as during our flight - I came away with both piloting lessons but just as importantly, with an authentic leadership example. In the last sortie at Pearce, he taught me to enjoy flying and to enjoy the professional responsibilities of an officer.

Navy Macchi Flying

Immediately after graduation from 101 Pilots Course, all newly qualified naval and military pilots proceeded on leave before reporting to their next posting. For the Navy graduates all three of us were selected for helicopter conversion[12] but only after re-joining Navy at Naval Air Station at Nowra, HMAS Albatross.[13]

We joined VC 724 Squadron variously in late January 1978. VC 724 was the operational conversion squadron for pilots and maintainers destined for the front-line fighter unit, VF 805 Squadron. As such, VC 724 was equipped with Douglas A4G and TA-4G, and MB326H Macchi aircraft.

The Macchi was largely used for lead-in fighter training preparing fast-jet students for conversion to Skyhawk. It was also used to verify our aviation capability assessment from Pearce. This seemed rather disingenuous since we had Navy Qualified Flying Instructors (QFIs) on staff at 2FTS who would have had total exposure to all student performance during the course at Pearce.[14]

Nevertheless, the experience at VC 724, though short for us transitioning to helicopters, was wonderful. While we were still being checked out on Macchi, which was exactly the same as those operating at Pearce (except with a much nicer blue and white colour scheme), it was subtle. We were spliced into the flying program and flew missions with all members of the Squadron hierarchy and really only knew that we had passed when the flying program indicated a solo or captaincy flight.

We were treated as graduates but the expectations were higher and the flight scenarios more operational. We did ship strikes and missile simulations as well as longer and more complex over-land and over-water navigation flights. We were encouraged to enjoy our flying time and the Squadron camaraderie. It was a fun time and our introduction to the operational side of the Fleet Air Arm was embracing.

The first of two flights that really stuck in my mind from my time at VC 724 was my first with the Squadron Commanding Officer, Lieutenant Commander Errol “Klump” Kavanagh. It was a multi-level navigation exercise that entailed low-level, high-level, over-land, overwater visual and instrument flying with time-on-target turning points and an interception point about 20 nautical miles seawards off Eden in southern NSW.

I occupied the front seat and was working furiously all the way to the at-sea interception point, which was two minesweepers passaging to Sydney. Lieutenant Commander Kavanagh then took the controls and “beat-up” the ships for 10 minutes before handing back the controls and telling me to take him straight home to NAS Nowra in the fastest possible time. This I did with my back-seat passenger chuckling away and regaling me with stories of his recent time commanding one of the sweepers we’d just harassed.

The second flight was a general flying exercise where I was captain of the aircraft and the rear seat was occupied by my 101 Course-mate Keith Champion. We literally had freedom to pretty much do whatever we wanted and it was the last Macchi flight I captained. We took off, flew low level around Tianjara area to the west of Nowra, down Kangaroo Valley, then did a series of aerobatics across the top of Ulladulla, some low flying over the sea, an on-top HMAS Creswell (my alma-Marta) and returned to NAS Nowra, landing with minimum fuel. What a hoot before finishing my last jet flying in command. The following week, on 6 March 1978, we joined No. 37 Helicopter Conversion Course at RAAF Fairbairn, Canberra and the remainder of my career as a helicopter pilot began.

Summary of Hours Flown on the Macchi

Although I only flew the Macchi over the period from 26 May 1977 to 2 March 1978 (less than a year) and achieved a little over 175 hours on type, I consider this is to be amongst the most enjoyable flying of my roughly 3500 hours military and civilian flying. I was fortunate to have qualified on and flown two fixed-wing types and five helicopter types over my naval career and, whilst I enjoyed each and every moment of this experience, flying the Macchi was always a very special thrill.

End Notes

1 In the Australian vernacular, pronounced “Mak-key”.

2 RAAF Base Pearce is located 35 km north of Perth, WA.

3 Flight Lieutenant Phil Noordink graduated from No. 70 Pilots Course in October 1969.

4 Commanding officer of 1FTS was Wing Commander M. McDonald No. 50 Pilots Course (Aug 64).

5 Commanding Officer of 2 FTS was Wing Commander K. Pyke No. 32 Pilots Course (Mar 59).

6 Squadron Leader Richard Strudwick No. 60 Pilots Course (Feb 67).

7 Squadron Leader “Herb” Elliott No. 55 Pilots Course (Oct 65).

8 Formation Test was with Flight Lieutenant “Nobby” Clark No. 72 Pilots Course (May 70); Navigation Test was with Lieutenant Alf Allen No. 67 Pilots Course (Dec 68) FIHT was with Squadron Leader “Herb” Elliott No. 55 Pilots Course (Oct 65)

9 Flight Lieutenant Alf Allen No 67 Pilots Course (Dec 68).

10 Squadron Leader Ron McGrath No. 50 Pilots Course (Aug 64).

11 Air Chief Marshall Rowland was Chief of Air force and served as a Pathfinder pilot during WW2.

12 Selection for operational aircraft or helicopter type occurred around the time most students were undergoing FIHT. Primarily, it was a match between Air force or Navy requirements and students’ ability and then, where possible, alignment with individual students’ preferences.

13 Nowra is about 160 km south of Sydney, NSW.

14 During passage of 101 Course through 2FTS, the Senior Naval Officer was Lieutenant Commander Gary Northern No. 63 Pilots Course (Dec 67) and the Navy Staff QFIs were Lieutenants John McCauley No.77 Pilots Course (Dec 70) and Murray Smythe of No.68 Pilots Course (Feb 69). I flew with all instructors for a couple of my sorties. They were A4G pilots and totally professional instructors who enjoyed great respect of the other staff and students alike. ♣

Macchi MB36H And Spinning

By Jerry O'Day

I believe that by late 1968 as many as five RAN pilots were flying the Macchi, either at CFS or at No 2 FTS Pearce. They were Ian McIntyre, Rob Partington, Peter McNair, Graham ("Beetles") Bailey and Colin ("Farmer") Talbot. The RAN was not to receive its own Macchis until July 1970.

It was prior to the arrival of our own Macchis during a visit to ARDU as part of my AMAFTU duties on October 17th, 1968, that I was offered a flight in ship No. 005 as it had been announced that the RAN was to receive 10 of the aircraft. This offer was readily accepted!

I had one of the ARDU test pilots, SLDR Geoff Talbot in the back seat and although this was my first exposure to the type Geoff allowed me to handle the aircraft throughout the flight. We did the whole routine including spins and I found it a pleasant little aircraft to fly. We did not, as far as I can recall, do an inverted spin which may have been a bit much on my first flight and in someone else's aircraft! But more on that later.

At that time erect spinning was a standard part of the curriculum for RAAF Macchi flight training but the Commanding Officer of No 2 FTS at Pearce believed that all students should at least experience an inverted spin should he or she accidentally create the conditions leading to an inverted rather than erect spin. This is because most of the visual cues are quite misleading and the recovery actions required are not the same as in the erect case.

The Macchi Flight Manual itself stated quite clearly that there were no prohibited manoeuvres, and I understand that quite a few instructors were given tuition on how to enter the inverted spin, what things look like in the established inverted spin and the correct recovery actions. This was, in my view, a very sound policy because no matter what is said, eventually someone will end up spinning even a supposedly unspinnable aircraft by doing something we hadn't thought of!

In 1968 I had just returned from ETPS (then at Farnborough) and a period instructing at USNTPS, Patuxent River in the USA. At Pax I was one of the three instructors at the school rostered to carry out the spin demonstration sequence with students in the T-1A Seastar, the navalised version of the ubiquitous USAF Lockheed T33 jet trainer. This was an ideal spin demonstrator with completely different recovery techniques required depending upon whether the tip tanks were full or empty.

My nomination as a spin instructor was largely because my ETPS course had included an intense spinning programme in the Hawker Hunter F 6, an aircraft with a reputation as a dangerous aircraft to spin. In fact, the RN and RAF had forbidden in-service spinning of the Hunter and had also imposed a minimum altitude of 25,000 feet for stalling the aircraft! In the UK I did over 60 spins in my Hunter programme as well as 20 or 30 in other types so was well prepared for the task in the US and really enjoyed demonstrating the various aspects of spin entry, correct identification and recovery.

Those who have flown the Macchi will recall that the "vanilla" 1 g level stall was a non-event as the elevator control power was so limited at low speed that the aircraft barely stalled at all. The T-1A demonstrated this same characteristic and according to a Lockheed test pilot (Tony LeVier) this was a design feature incorporated in an endeavour to avoid deeper stalls, post stall gyrations and spinning. I suspect the elevator control power limit in the Macchi could have had a similar origin.

Be that as it may, because of this limitation, there is not enough forward stick available to fully stall either type when inverted in order to get into an inverted spin. This can be overcome by inertia coupling from a slow barrel roll and applying full opposite rudder at the appropriate time in the roll while also applying full forward stick. The inverted aircraft will stall completely as the nose rises further due to the coupling and the initial results can be spectacular. Waiting for the gyrations to stop is the secret here but the resultant spin will usually be inverted. The inverted spin can also be entered from a vertical stall where elevator control power is limited but we found the rolling entry to be the most productive.

The RAN eventually started to take delivery of its 10 Macchis on 10 September 1970. Once the Macchis were at NAS Nowra, FRU work and pilot conversions were the order of the day and upon my return to AMAFTU in mid-1970 after some sea time I arranged to be formally converted to type. This training was carried out by LCDR Rob Partington who had been an instructor as well as SNO at Pearce. On flight one we covered all sequences including spinning and I asked him about inverted spins and he said go for it. We did a few and I found recovery straight forward as it should be when you know how to do it and what to look for to recover. I went on to accept the last three aircraft from Avalon.

I did not know at that time that the RAAF had lost an aircraft to an inverted spin at Pearce on 31 January 1969. This led to ARDU (SLDR Max Loves) carrying out an extensive test programme in the type to fully explore its spin behaviour. He found that post stall gyrations and the inverted spin itself were so disorienting that inverted spinning should not be carried out as a matter of course. His report was submitted in mid-1970 but a general admonition regarding the inverted spin was already in place vide' Air Board Orders (ABO) which prohibited outside loops, inverted spins et al in any RAAF aircraft.

Then on 28 April 1971 Errol Kavanagh, who I understand had experienced the inverted spin as an instructor at Pearce, was

demonstrating one during the endorsement training of Peter Clarke and was unable to recover. They both ejected successfully at about 8,000 feet and there were reports that the aircraft was no longer spinning when it hit the ground.

Although the Macchi was supported by the RAAF under a Single Service Management Programme (SSMP) which included the provision of all manuals including the Flight Manual, RAN pilots were not aware of, nor were they obliged to comply with, the relevant ABO regarding outside loops and inverted spinning. And, for its part as already mentioned, the Flight Manual stated quite clearly that there were no prohibited manoeuvres.

Imagine my surprise when a file on Errol's ejection came across my desk in DNAP containing a letter from the Department of Treasury refusing to write the aircraft off because the pilot had, quote, "been carrying out a prohibited manoeuvre". It seems Treasury had approached the RAAF for advice regarding the aircraft loss and had been assured that the RAAF did not carry out inverted spinning in any aircraft because Air Board Orders did not permit it.

Approaches to those in the "know" in the RAAF could not induce anyone to admit to Treasury that such training had been carried out at Pearce so we had a problem. We couldn't get the bean counters to write the aircraft off notwithstanding that it had been destroyed. Clearly, they wanted someone to take the blame!

In response we pointed out that the Flight Manual provided under the SSMP and supplied to the RAN stated that there were no manoeuvres that were prohibited in the Macchi and that ABOs did not apply to the Fleet Air Arm. Further, we highlighted the fact that the Single Service Management Programme had not in any way notified the RAN that the total absence of restrictions in the Flight Manual was qualified. I don't think we let them know that the RAAF had been teaching inverted spinning contrary to Air Board Orders - best not to stir up a hornet's nest!

The aircraft was eventually, and I would guess somewhat reluctantly, taken off charge and we heard no more of the matter. However, this inter-departmental difficulty did indicate that we needed to be more careful with things like SSMP to make sure from the outset that each service is provided with the complete suite of information regarding any equipment limitations and restrictions. ♣

LEUT Errol Kavanagh with the ejection seat that saved his life.

The Macchi Paint Scheme

By Ian McIntyre

The RAN Macchi paint scheme, blue and white with a gold albatross or flash on the fin, drew lots of praise in most circles whilst the aircraft was operated by Navy. However, there was somewhat of a rocky road in getting the scheme into service.

In the late 1960s, it was decided by Defence that the RAN Macchi fleet would be introduced under the concept of Single Service Management (SSM). This meant that the fleet would be logistically supported by the RAAF as a follow-on production run for the Air Force Macchis, albeit operated and maintained by the Fleet Air Arm. A major development in this respect was that the aircraft would be maintained under Air Force maintenance principles, schedules and documentation – after a settling in period, this worked very well.

Tied in with this was the agreed obligation that Navy would follow the Air Force modification control system, to the extent that our Macchis could not be modified without express approval and control within RAAF HQ Support Command. The paint scheme for our Macchis was to be identical to that of the RAAF Macchis, other than the addition of "NAVY" to parts of the aircraft. This was under the control of an allocated Macchi Mod. No. In the late 60s, as the RAN Macchi Project Officer working in RAAF HQ Support Command, I had queried our intended paint scheme, and was told by Navy Office that it would be as just described above.

I delivered the first Macchi (N14-075) to NAS Nowra on 10 September 1970. There were immediate (probably justifiable) outcries from everyone that the RAAF "Fanta can" (orange and white) paint scheme was totally unsuitable for Navy aircraft. Having regard to the SSM agreements, I made it clear that "what you see is what you get", and the issue then settled down.

Several years later, the-then Commanding Officer at Nowra, Captain D.A.H. (Nobby) Clark, made it quite clear to me, in his inimitable fashion, that he was highly distressed that we did not have a proper Navy paint scheme for the aircraft. I briefed him on the history of the issue as described above, and the SSM and aircraft modification control obligations. This, of course, was to no avail, as all who knew Nobby would understand. So it was agreed (and here I forget how the RAAF was informed) that we would have a blue and white paint scheme, corresponding to that of an Admiral's Barge. Everyone said that was very fitting!♣

Paint Scheme Explained

In 1973 the colour scheme was changed from the RAAF's "Fanta Can" (Orange and white) to Oxford Blue/White.

VC724 Squadron 'Chevron' in yellow for most aircraft. Some retained "NAVY". One exception was 862, 'the barge' of Albatross Captain, which had a yellow Albatross (see inset)

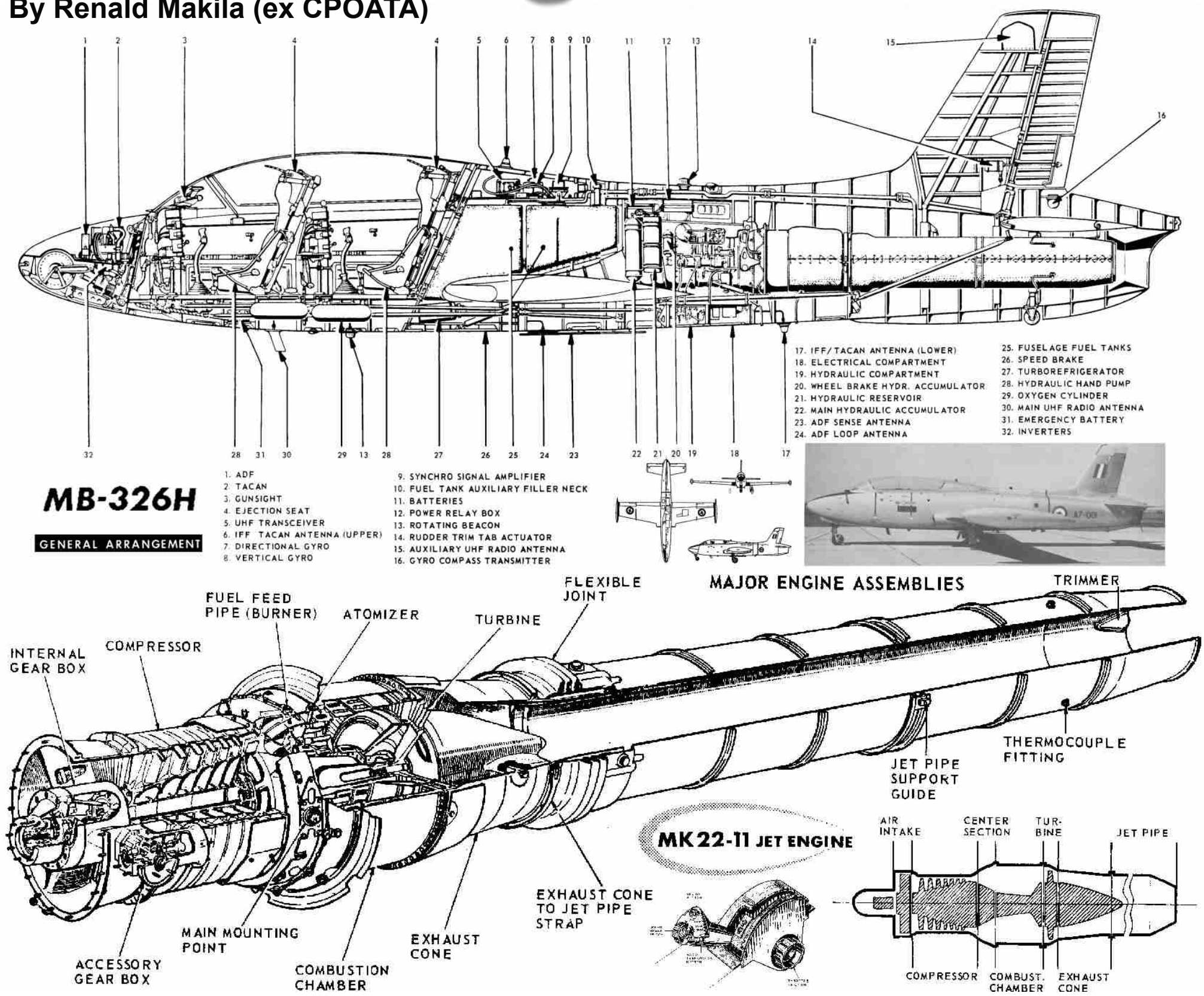
Most aircraft had the last digit of the side number replicated on the rudder.

Some aircraft had "NAVY" in bold white lettering on wing tip tanks.

Serial	Side No	Serial	Side No
N14-084	860	N14-074	865
N14-085	861	N14-075	866
N14-086	862	N14-076	867
N14-087	863	N14-077	868
N14-073	864	N14-078	869

Maintaining the Macchi

By Renald Makila (ex CPOATA)



It is over 50-years since I first worked on the Macchi and memories fade but hope this provides a snapshot. I was a newly promoted AA1 when we received the first Macchi 866. It was flown in by our first AEO who was a pilot as well. It was LCDR McIntyre who delivered it in September 1970, by the end of 1971 all ten had arrived.

An RAAF Sergeant (Peter Tunks from memory) on temporary loan to the Squadron to help us through maintenance issues for the first few months, a thoroughly professional tradesman.

The Macchi by and large was quite easy to maintain. The rear fuselage could be removed in less than an hour, and the engine shortly after, for example.

Access to the major servicing components (oil tank, hydraulic reservoir, BFCU (barometric fuel control unit), AFRCU (air/fuel ratio control unit) and fuel pump (where adjustment could be made for Max RPM) were readily accessed through easy to open panels.

The engine was a Rolls Royce Viper Mk22-11 with some 2400 lbs of thrust. It had a starter/generator fitted to the front section. It was possible to be started by battery power, or preferably ground power.

An early modification was to the nosewheel mudguard. In certain heavy rain conditions, the twin contact tyre could spray water into the intakes causing a possible flameout. Small nylon skirts were fitted to the sides to direct the water away.

Initially, the Macchis were supplied with 30-gallon tip tanks, which were replaced with 70 Gallon tanks. Although the air conditioning was upgraded it only just managed to handle the Australian conditions.

The Macchis were initially painted orange and white - affectionately known as the “flying Fanta can”. They were all eventually painted blue and white with one 862 emblazoned on the tail with a yellow albatross designed by the late Ron Smith.

Servicing:

“A” service every 7 days; “C” service 30 days or 50 hours; “D” service every 200 hours. The 4 “D” services were carried out at squadron level and the fifth was an “E” service that was carried out at the ASU. The “E” service was a complete strip down including wings off, tail removal and extensive non-destructive inspection of the centre section and wing attachment points.

RAAF paperwork was used for Macchi servicing. The logbook was the EE500, and all servicing/s were placed in an AAP, which was issued by AMCO in a loose sheet form and included a cover sheet for signatures covering the type of servicing and details of all paperwork issued. Sheets were also issued for unserviceable items detailing serial number changes, modifications, etc.

It was almost a failsafe system - with each operation requiring an initial, and at certain points a supervisory signature and independent signature if applicable. The tradesperson was not to proceed until all three signatures were entered. For example, if the rear fuselage was being removed, when the last signature was in place the fuselage could be removed safely. After the final signature was in place the servicing was done. Once accustomed to the system, I found it easy to use.

Spares:

We had an RAAF stores person posted permanently at NAS Nowra (Len Roebuck was the first) initially, spares were mostly readily available, and Len was most helpful to us.

Flights

I had several flights in the Macchi, the most notable as part of a fly over in company with Skyhawks and Trackers for the Melbourne Moomba Festival. We flew from Nowra via East Sale where we refuelled. ♣

The Macchi in Navy Service

By John McCauley

Photo: John Bartels

Following an Air Force order of 87 Aermacchi MB326Hs in 1965, the Navy ordered 10 aircraft - primarily to replace the Vampire. They entered service in 1970/71 with VC 724 Squadron. Most Macchis were built in Australia by the Commonwealth Aircraft Corporation and Hawker de Havilland near Melbourne. Navy Macchis were transferred to the Air Force in 1982/3 following the loss of our fixed wing carrier HMAS Melbourne. They were finally retired from Australian service in 2001. The relatively long service life under frequently stressful flight profiles was only achieved with a life of type extension and wing replacement programs in the 1980/90s. Throughout its service there were also several reductions in its performance envelope - speed and load factor. As I recall some of the initial limitations were 450 knots (IAS) and +7.5/-2.5G, reducing to 375KIAS and +6/-2 (figures from memory).

The aircraft was a good trainer by virtue of its simplicity, serviceability, forgiving handling characteristics and ergonomics. Although some might feel night flapless circuits were a little testing from the back seat, particularly on short finals where runway light reflections in the canopy could mislead! Several safety features were improved during Australian production and the air conditioning system was enhanced; Oz summers won this battle however. We lost two aircraft – one in an inverted spin and another with an engine failure in the circuit. All crew safely ejected albeit with some injuries. Navy Macchis took on a more 'senior service' appearance when the orange and white (RAAF) colour scheme gave way to blue and white.

At VC 724 the Macchi was used primarily for continuation training after pilot's course, and more particularly for fleet support flying and 'fighter lead-in training' prior to Skyhawk Operational Flying Training. Armament included 7.62mm mini guns and 5kg practice bombs. rag and weight of either affecting performance noticeably. I believe our late colleague Ralph McMillan may have coined the phrase 'constant thrust variable noise machine' referring to Macchi performance in relation to that of the Skyhawk. Nevertheless, I think the Macchi served us well.

In air combat manoeuvring the Macchi provided a good learning experience working with Skyhawks in teaching the benefits of turn performance (Macchi advantage at low to medium speed) versus high energy/speed (Skyhawk advantage).

In addition to pilot's course and VC 724 experience I was fortunate to fly the aircraft at number 2 Flying Training School (2FTS) at RAAF Pearce in WA, and at Central Flying School at RAAF East Sale in Gippsland. I finished with about 2000 Macchi hours and like anyone spending a long period in aviation, I encountered a few 'unintended events'. Two of the more memorable occurred when I was conducting the maintenance test flying at 2FTS; and both during test flights after major ('E') servicing.

I thought I had seen everything a Macchi could do but was surprised by quite a violent 'flick' when conducting a spin entry. Not having seen it before or since I believe I had entered an inverted spin. The normally reliable spin recovery technique had no effect, so I centralised controls and waited some number of 'bananas' "one banana, two bananas" (you get the picture) – still no effect. Finally I just released the controls. The control column thrashed about somewhat and after more 'bananas' the aircraft 'popped' out into a steep dive. Recovery was then simple. Later in service the aircraft developed far more irregular post stall characteristics, and Greg Rulfs (ex FAA and Test Pilot) was at the forefront of designing and testing a remedy, which involved the addition of vortex generators on wing leading edges. They transitioned laminar flow to turbulent flow earlier to prevent any leading-edge stall development which was sudden and asymmetric.

The second incident occurred when water in the static system froze at altitude and caused a blockage. This led to erroneous flight instrument indications which became apparent during descent, when vertical speed and altimeter indicated more or less no change as the earth definitely grew larger. No other aircraft were flying to enable a formation landing so I used that old QFI mantra 'Power + Attitude = Performance' to return and land. As I recall the indicated airspeed was near 300 knots at landing (gear speed limit was 150). Rigging was checked post flight!

The Macchi was a good instrument trainer with a decent instrument fit and layout. Having no autopilot meant good trimming technique was important to sustain accurate performance over time. This was tested by close friend Ian Shepherd and me one day when we were flying together out of Nowra. The weather was closing in at a rate relating closely to that of our fuel depletion! The precision ground-controlled approach (GCA) was inoperative, so we had to fly a TACAN approach, involving much higher weather minimums.

As I remember, we had one approach attempt and didn't see the runway and had no option but to declare a PAN and divert to RAAF Richmond - with 'only just' enough fuel. We were junior officers and inexperienced pilots, and I imagine there was some gnashing of teeth in the Boss's office. Enroute we received the joyful news that the weather was closing in at Richmond as well. We had enough fuel for one GCA approach, and in fact did ask ATC which direction we should head if we had to eject! Fortunately, we got in, and I recall that we shut down with about 250 lbs of fuel.

My biggest surprise however happened after a navigation training exercise when I chanced to overfly my hometown in Queensland. A few days later I was called into the Boss's office to 'explain' a letter that he'd received - my Mother had written to the Commanding Officer thanking him for allowing her son to provide a flying display (layperson's exaggeration) at home. That letter (and thus story) has found its way into the VC724 Line Book. Somehow, I think I would not remain unscathed in today's work environment?

After 47 years in the game, my flying days are well over but having had some time on Winjeel, Skyhawk, F-111 and brief opportunities in the Hunter, Hawk, Harrier and Meteor along with commercial airliners; if I were offered half an hour in any of those aircraft for pure fun - I would definitely choose the Macchi. I found it a complete joy to manoeuvre in the 180 to 300 knot range. though sluggish at lower speed and heavy on controls faster. It also required virtually no support equipment which enabled some memorable overnights at unexpected fields. but that's another story.

I would add - if these stories seem relatively tame, I can assure you the forgiving nature of Macchi operations - at least in my experience - is the reason. My numerous flying 'escapes' in other aircraft types left me breathless often enough! ♣

RAN Macchi Engine Reliability

By Ian McIntyre

The original Armstrong Siddeley Viper turbojet engine was designed as a short life engine for target drones. However, it was found to be basically quite reliable, and engine design upgrades then made it suitable for military and civilian fixed wing aircraft used. The later variant used for the Australian Macchi MB326H aircraft was the Rolls-Royce Viper 11 engine rated at 2500lbs static thrust, and the later run of engines were produced by Commonwealth Aircraft Corporation at Fishermans Bend.

Overall engine reliability was excellent. The engine could stand the sort of rough handling that basic students could inflict, and the engine fuel system air/fuel ratio control unit (AFRCU) prevented engine overheats, stalls or surges, no matter how hard the throttle was slammed open or shut at any speed or altitude.

Having said that, there were two major engine malfunctions that I am aware of whilst the aircraft was in RAN service, both related to the engine fuel system.

In early 1975, I was carrying out a post-E Service full maintenance test flight on one of our Macchis, with AMAFTU's CPO Aircrewman Squizzy Taylor recording the figures in the rear cockpit. We were at 35,000ft about 25nm out to sea east of JB, carrying out the engine handling abuse tests that were required at that stage. At the end of this sequence, the engine hung up at idle, and no amount of throttle opening would accelerate the engine – it was as good as a flameout. A shutdown and relight brought us back to the same stuck idle situation.

I called a Pan to NAS Nowra approach control and started gliding to the base. There was plenty of altitude in hand, and the forced landing pattern through high key and low key went well. The landing itself was uneventful. However at the end of the landing run I tried opening the throttle again, and lo and behold, the engine accelerated and behaved normally, and I could then taxi in, in a state of embarrassment given the number of emergency vehicles out on the runway.

Post-flight maintenance revealed that one of the BFCU half-ball valves was sticking in an intermittent fashion.The other major engine malfunction was a flameout suffered by Murray Smythe in aircraft N14-073 in late 1972 whilst he was turning base for landing on Runway 26. There was obviously no time to go through engine relight procedures, and Murray ejected safely at about 200 feet. I don't think the cause of the flameout was ever determined.♣

Very Low Flying in the Macchi

By Ian McIntyre

The Turana remotely piloted target aircraft was developed by Government Aircraft Factory to provide a sophisticated high-speed target for RAN ship defensive gunnery exercises. Certain trials were carried out between early 1973 and late 1974 at sea off Jervis Bay. This sub-programme required extensive involvement by one of the 724 Squadron Macchi aircraft.

The aircraft selected was side number 865, and it was extensively modified to simulate an airborne Turana. The work was carried out by Aircraft Maintenance and Flight Trials Unit (AMAFTU). The Turana fin, containing its control electronics, was adapted to the rear cockpit ejection seat rail after the seat was removed – other aspects of the modification included external aerials on the Macchi fuselage, and a sensitive radar altimeter (radalt) being fitted in lieu of the front cockpit gunsight.

The calibration runs involved flying 865 to and from the trials ship, HMAS Swan (111), along particular radials. The upper and mid-level work was a non-event, but at one stage the calibrations required my flying the Macchi towards the ship at low level. This was old hat, because like many 724 Squadron pilots carrying out Fleet Requirements Unit (FRU) sorties, I was used to these particular exercises.

However, after a number of runs at 50 ft above the surface, the ship required me (via CO, CMDR Adrian Cummins, an extremely well-known gunnery officer, on the R/T) to now make runs at 30 ft above the surface, at 300kts. There was a swell running, with about 10 ft peak to trough. Much concentration required on the radalt, together with wide-eyed peripheral vision, and of course looking ahead for sea-skimming albatrosses.

That done, Adrian required a run at 20 feet. This was exciting, as the radalt was showing fluctuations that agreed with a cyclic thumping, which of course was ground effect between the swell peaks and the aircraft wings.

But then – wait for it – he wanted two final runs at 15 feet. I tactfully explained that this would result in an impact situation, given the ground effect messages just received.

I received a somewhat grumpy acknowledgement, and that completed that phase of the trials. ♣

Macchi Flameout!

By Stephen Cooper

Today's mission was to be a four aircraft simulated attack on HMAS Perth (ll) sailing 140 Nautical miles from the N.S.W. coast.

The Commanding Officer (CO) of my Squadron, VC 724, instructed me to plan the flight. He conducted the pre-flight briefing one hour before the scheduled take off time, during which he instructed us that we would be flying the strike at not above 50 feet from the water to evade radar detection by the ship, to make it a realistic wartime attack for them.

I was to fly solo in my Macchi as number two in the formation, whereas the other three aircraft would be two up. We would be flying in close formation until we reached a predetermined position on the coast. Then we would take up our individual headings calculated by me, to reach points on an arc around the Destroyer. From there we would turn inbound to arrive over the top of the ship simultaneously, making it more difficult for HMAS *Perth* to engage all of us at the same time.

Briefing finished, I walked to the safety equipment room and donned my flight suit, 'g suit' and boots, Mae West, collected my gloves, helmet and oxygen mask and made my way to the aircraft. I conducted a thorough pre-flight inspection of the airframe, signed the authorisation book and climbed aboard. I progressed rapidly through my pre-start cockpit checks and gave the signal to the ground crew that I was ready to start the engine.

I pressed the start button and the Bristol Siddeley Viper engine began spooling up. The igniters fired and with a woosh, the engine sprang into life and quickly ran up to 60% power. I then tuned in the automatic terminal information service and took note of the weather conditions. "Terminal information Bravo, Runway 26, Wind 240º at 15 knots, barometric pressure 1016, temperature 22º" was broadcast. I set the pressure reading of 1016 on my altimeter and looked across at the other aircraft.

The CO in the lead aeroplane then transmitted, "Ground control, Delta Reds request taxi clearance, received Bravo". Ground control responded, "Delta Reds, cleared taxi, Runway 26". I gave the signal for chocks away to the ground crew and followed Red one from the apron. Taxying out, I ran through my pre take off checks and the formation came to a halt at the Runway holding point. The CO then transmitted, "Delta Reds, button two go". Now on Tower frequency, he further transmitted, "Tower, Delta Reds ready". The tower responded, "Delta Reds cleared for take-off, contact Departures on button three airborne". The CO read back, "Delta Reds, cleared for take-off".

We then lined up on the Runway and I positioned my Macchi a few meters away from the CO, tucked in on a 45º angle. Red one then gave the wind-up signal to increase to 100% power, made a visual check of the other aircraft and then released his brakes. We accelerated rapidly along the runway as I made small adjustments to the controls to stay in echelon left position. The lead aircraft lifted off and I stayed in close formation position, the remaining two aircraft rolling behind us. I saw the CO's wheels shudder as he applied his brakes to stop the wheels rotating and retracted my landing gear in unison.

The lead aircraft then called, "Delta Reds button three go". Then transmitted "Departures, Delta Reds climbing through 1,400 feet tracking 095º". Departures replied, "Delta Reds identified". Delta Red aircraft three and four then formed up in echelon left on me and we climbed quickly to 4,000 feet. Leaving the coast the CO called the ship, "Perth, Delta Reds inbound". HMAS *Perth* replied, "Delta Reds, change of requirements, would you attack in line astern from the west, followed by a second attack from different points of the compass". The CO responded, "Perth, Roger". Then "Delta Reds tac formation, line astern go". I reduced power as did Delta Red Three and Four and we adopted positions 150 metres behind each other.

The lead aircraft then began descending and we levelled out just below 50 feet above the waves. The horizon was obscured by low cloud and mist and the visibility was reduced, so I concentrated hard on maintaining my formation position and height. Our speed was some 300 knots as we tore along and the sensation was exhilarating. 20 minutes later the formation streamed over the ship and the CO, called, "Delta Reds echelon left go". I advanced the throttle to full power and closed up on the lead aircraft. Neatly in formation the CO began navigating the group into position for the subsequent attack.

Despite the low altitude and the concentration required to maintain a close formation position, my thoughts began to wander back to the previous night, which I had spent in company with a most beautiful lady.

Consequently, I failed to keep track of our headings while transiting into position for the next attack. I became somewhat disorientated and when the CO transmitted, "Red two anchor, 092". I was confused. I thought the ship was in the opposite direction. I queried the CO "Red two say again". The CO replied somewhat tersely, as he didn't want to prolong the transmissions, enabling HMAS *Perth* to fix our position. "Red two 092!" I checked my TACAN navigation needle, which was tuned into the ship and that was swinging lazily but seemed to indicate that the ship was to the east. I therefore assumed that my inbound heading was 092 degrees.

Unbeknown to me the CO had given me a radial bearing from the ship. The other aircraft were dropped off to anchor by the CO in different positions awaiting the call to turn inbound by the lead aircraft. A few minutes later the CO called, "Delta Reds, turn inbound". I adopted a heading of 092º and increased my speed back up to 300 knots. At

FORCED LANDING

A navy pilot glided 50 nautical miles to a safe landing at the HMAS Creswell airstrip after a flameout on Wednesday afternoon.

The pilot, Midshipman Cooper of 726 squadron based at HMAS Albatross, was taking part in an exercise with the guided missile destroyer HMAS Perth, 140 nautical miles east of Jervis Bay.

At 1.28 p.m. he realised he was dangerously low on fuel and radioed through a distress signal.

Midshipman Cooper then climbed to 35,000 ft in his Macchi trainer jet to conserve fuel and provide himself with leeway for a gliding descent and landing.

At just after 2 p.m. the pilot sent out a mayday signal as his engine flamed out.

He then glided for 50 miles to Creswell where he made a perfect landing.

As soon as they received the Mayday signal, HMAS Albatross and Creswell brought emergency operations into force.

Two Wessex helicopters and a Tracker aircraft were dispatched to the general area of Midshipman Cooper's approach in case he had to ditch.

Ambulances and fire tenders at Creswell lined the tarmac, but were not needed as the plane touched down and drew to a halt without difficulty.

such a low height and with reduced visibility, I didn't expect to sight the grey painted ship until within a few miles of it. I wasn't worried therefore when I was approaching Bingo fuel state and had still not seen the ship. The time I had calculated for the 40 nautical mile inbound run came and went and I started to become concerned. A few minutes later I heard a faint radio transmission, "Red two come in". The broadcast sounded like it was coming from a long distance away.

My fears confirmed, I advanced the power to 100%, began a turn to the coast and commenced climbing. I then called, "Perth, Red two". The CO replied before HMAS *Perth* responded and asked for my inbound run heading. I responded, "Red two, 092º". The CO then called, "You were heading for New Zealand!" He further transmitted, "We have a MAYDAY situation on our hands". I continued climbing rapidly as the ship RADAR identified me and gave me a heading at my request for the airstrip at Jervis Bay, the nearest aerodrome.

The rest of the formation were returning to our departure point at HMAS *Albatross*, while I experienced a transient sinking feeling in my stomach, when I realised that I didn't have enough fuel to make it back to land. My first thought was that I would have to fly back over the top of HMAS *Perth* and eject. I reviewed my ejection procedures and opened the pockets on my Mae West to re-familiarise myself with the position of the signal flares and other equipment. After due consideration however, I determined that if I climbed as high as possible, I may be able to glide to Jervis Bay, without power. I then adopted this as my course of action.

My Macchi jet climbed quickly under full power, as the aircraft was very light, due to its low fuel load. Passing 20,000 feet, the CO called me up and asked me what my height was. I replied that I was passing 20,000 feet and he instructed me to keep climbing. He called me again a little while later and asked me to state my height. I responded that I was at 35,000 feet. "Start it down! Start it down!" he exclaimed. I eased the nose over, reduced my power to idle and adopted a speed of 200 knots. The Macchi carried a fuel load of 2,400 pounds and I was rapidly approaching this figure, according to the fuel used meter. At 2,400 pounds consumed the engine was still running. 2,405, 2,406, 2,407, still turning, 2,408 pounds and the engine flamed out and began to wind down.

I took up the recommended gliding speed of 140 knots and continued down. I was still some 50 Nautical miles from the coast, where the airfield at Jervis Bay was located. As I was passing 15,000 feet a Wessex helicopter dispatched from HMAS *Albatross* to the general area of my approach called up and asked the position of the downed Pilot. I transmitted to the helicopter and assured them that I was still very much airborne. Approaching the coast at 5,000 feet I was still unable to see my destination airfield as it was obscured by 7/8 cumulus cloud, with a base of 2,000 feet.

At about this time my mate "Bungy" Williams who had been in Red three during our flight and had returned to base, refuelled and was now over the airfield at Jervis Bay transmitted. "Red two this is 862 over Jervis Bay, can you see me?" I replied in the negative, he further transmitted, "I am flashing my wings". The Senior Pilot, who had made his way to the tower at HMAS *Albatross* to offer support, called up and said, "Red two don't worry about him".

With the airfield still not visible, I decided that I would dive through the cloud cover and if I could glide to the airfield, I would land at Jervis Bay, otherwise I would pull up and eject over the land. I determined that I was almost over the field and was about to nose over when through a small hole in the clouds I saw the white letters 15. I then transmitted, "Red two I have the airfield in sight, I have the airfield in sight!" excitedly.

The Senior Pilot asked me to say again and I responded with the same message, somewhat more calmly. The Senior Pilot then transmitted, "Just like in training, Coops, and don't worry about gear or flap speeds". As I emerged through the gap in the clouds, I found myself located at "High Key" at 1,500 feet and 220 knots. The profile for a forced landing at this position was 2,500 feet and 140 knots. I held my height and circled around to "Low Key", with my speed reducing to the profile speed of 140 knots at the correct height of 1,500 feet.

From this position I selected gear down and half flap. It was then a simple matter to glide around onto final approach, select full flap and touch down smoothly on Runway 15. As I drew gently to a stop, Bungy transmitted, "beautiful Coops".

The flight was over - total glide time 22 minutes.

Glossary:

Bingo fuel: The fuel state calculated that is required to return to base from the ships position with the required fuel reserve of 300 pounds remaining.

High Key: A position abeam the touchdown point on the upwind leg at 2,500 feet and 140 knots in the forced landing pattern.

Low Key: A position abeam the touch down point on the downwind leg at 1,500 feet and 140 knots

TACAN: a navigation system with bearing and range so an aircraft can locate a ship or airfield.

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The end of the fixed-wing era for the RAN Fleet Air Arm in mid 1983 also included the Navy's Macchi Trainers, with the surviving eight airframes transferred to the RAAF.