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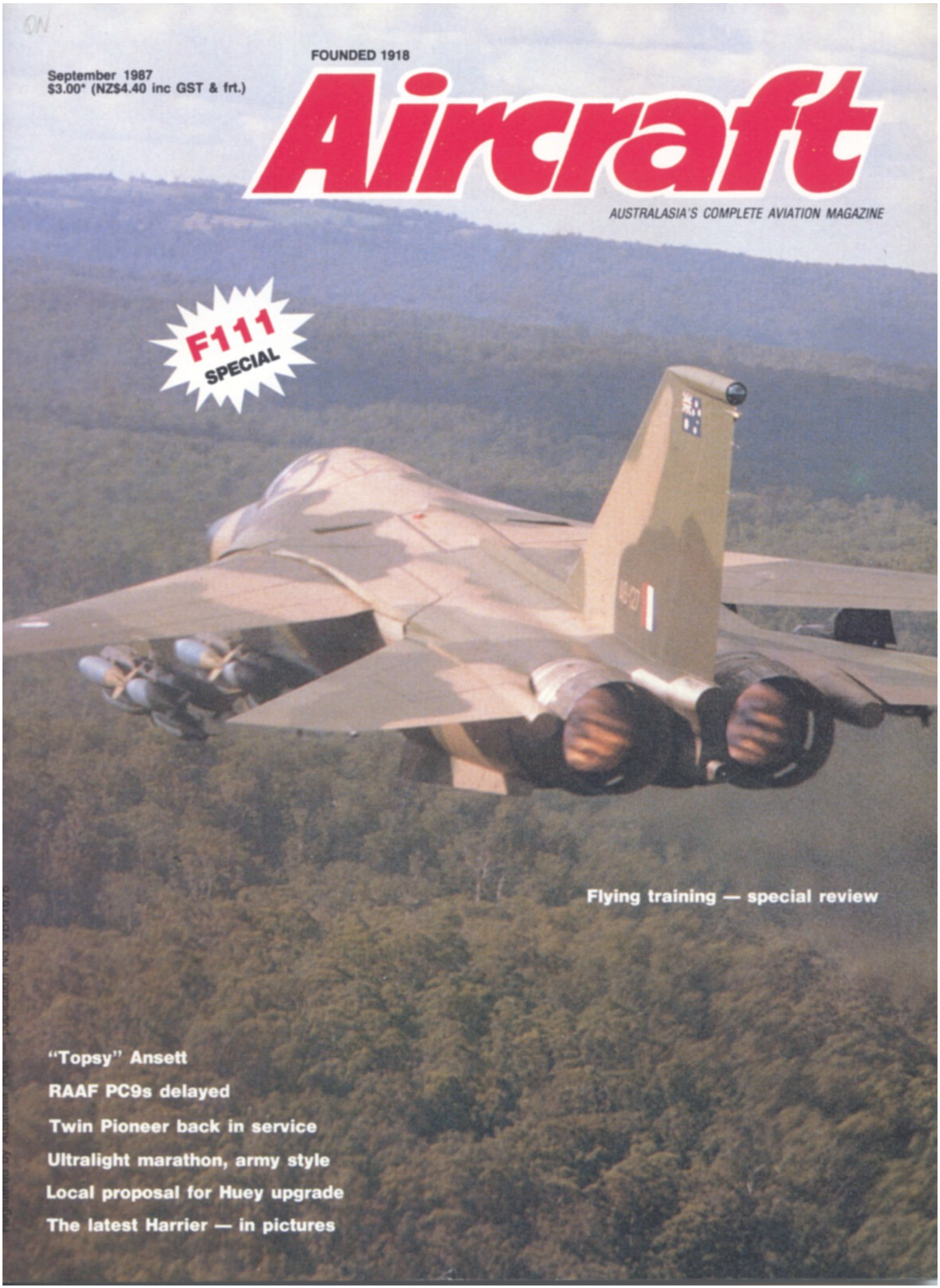

F111 SPECIAL

Flying training — special review

"Topsy" Ansett

RAAF PC9s delayed

Twin Pioneer back in service

Ultralight marathon, army style

Local proposal for Huey upgrade

The latest Harrier — in pictures

The F111 in service —

War is nothing more than the continuation of politics by other means — Karl von Clausewitz.

USING the cover of a telephone book as a guide, a RAAF F111 crew photographed a building in the substantial Department of Defence complex in Russell, Canberra, from about 25,000 ft with a very-high resolution reconnaissance camera.

They focused on the window of the *dreaded* "Force Development and Analysis" group comprising the core of the "anti-F111" forces.

Soon, tapes of the group being "taken out", complete with the cross-hairs that could have delivered a guided bomb or missile with pin-point accuracy through the window from up to 11 km away, were dutifully delivered by more conventional means to the aforesaid gentlemen.

The lack of subtlety in the cameo performance not long ago was a master stroke. In one sweep, the message conveyed in part the reconnaissance and strike capabilities of the awesome F111. The FDA group was clearly not amused!

The bitterness between the RAAF and the group of bureaucratic number-crunchers is symptomatic of our times: One of the great battles waged by Australia's DoD amounts to internecine warfare over the future of the F111 strike force.

The problem typifies something that is endemic in many Western societies: Some politicians and bureaucrats live in a strategic vacuum. Wrapped in a cocoon of ignorance, unable to project beyond the easy option solution, they wage number-crunching guerilla warfare with unmitigated gall and often disastrous consequences. Sadly, they have invariably departed before reaping *their* whirlwind. The critical debate over the future of the F111 with the RAAF has raged for some years with the negative options ranging from mothballing the fleet immediately, to eventually replacing them with a new F/A18 with longer range than those now entering service with the RAAF, plus terrain following radar.

Nothing much has been heard lately from McDonnell Douglas on this proposed update but if the men who operate the F111's are any guide, the old "Pig", as it is affectionately known, **should** be in service at least until 2010!

Not bad for an aircraft that has its genesis in the late 1950s and flew for the first time on December 24, 1964, 10 days ahead of schedule!

The F111's are undeniably a very expensive weapsons syetem to maintain. Their direct operating costs are about $12,000 an hour but that is only part of the equation. The rest is rolled into a jig-saw that would need a team of acturies to unravel ... and then they would be constrained by security-type restraints.

The RAAF F111's are currently undergoing a very costly modification program to enable them to use the infra-red/laser-guided weapons delivery system called Pave Tack (more on it later) but more changes are needed to keep them at the forefront of technology in the future.

This need — a digital avionics refit costed at $240 million in the Dibb Report — is providing the sceptics with fresh ammunition to fire at the aircraft.

But the avionics refit, swapping the old, analog system for the latest digital system, is considered vital on three counts: It will save weight and space, which can be translated into fuel savings or more stores; it is inherently more capable and flexible, giving the crews a greater chance of success against increasingly modern opposition; and it will save hundreds of manhours and tens of millions of dollars in mainteance per year.

The savings in maintenance also trans-

Australia's greatest deterrent

Story by Gerry Carman

Pictures: Rob Fox

lates into having more aircraft available for operations at any one time. During *Aircraft's* visit, only about half of the F111s on strength were ready for action. The rest were undergoing maintenance and Pave tack modifications.

The commander of the Strike Reconnaissance Group, based at Amberley, Air Commodore Bob Walsh and the officer commanding the 82nd Wing, which includes the two F111 squadrons, Group Captain Errol McCormack and their officer cadre believe that the avionics refit is vital.

"It should be considered like a mid-term refit for a ship . . . we are eating up man hours keeping those (analog) systems going," G/Capt McCormack said.

The switch would bring a five-fold improvement in the mean time between failures. This means that if an existing unit fails every 10 hours, the avionics refit would stretch the MTBF to 50 hours.

A regional deterrent

"We are the resident 'Rent-a-Threat' . . . everybody wants us as the bad guys," G/Capt McCormack, said with a grin.

G/Capt McCormack, the operational commander of No 1 and No 6 Squadrons, the two F111 units based at Amberley, is talking about training exercises. But his message is clear.

Whether it is other RAAF squadrons, the Army, RAN or Australia's training partners ranging from US forces to New Zealand and Singapore, the F111 is the ultimate yardstick. It is a message not lost in the region and beyond.

Ordered for political reasons by the Menzies Government during Indonesia's confrontation with Malaysia, the F111's delivery was held up for a couple of years (F4 Phantoms were leased on an interim basis) but their *raison d'etre* has not changed. They are Australia's most visable deterrent, with the ability to project Australia's foreign policy whether it be based on a "Fortress Australia" or "Forward" concept, or anything in-between.

In a reconnaissance role, the F111s are irreplacable components in the intelligence-gathering fabric of national policy; in a strike role, their ability to deliver with precision a devastating variety and load of stores ensures that the more fanciful delusions of grandeur in the region remain harnessed.

Above: An RAAF F111 strike aircraft, its wings partially swept back, on its way to the bombing range.

A No 6 Squadron F111 being prepared for a night strike. The F111 squadrons do half their flying at night.

Left: The No 1 Squadron (r) and No 6 Squadron "car ports"; unlikely as a surprise attack may seem, they would be a tempting target.

Below left: Air Commodore Bob Walsh — a strong proponent of the F111.

Below middle: A bomb with pop-out fins to allow a low-flying F111 to clear the blast area. The Gatling gun on a trolley (nearest F111).

Below right: USAF Capt. Rick Dunham and Flt. Lt. Pete Lloyd briefing before a night mission.

Air Cdre Walsh, (he often doubles as the "Red Baron" at air shows, flying the Fokker Tri-Motor from Point Cook) told *Aircraft*: "The F111 is an excellent aircraft. Without it we would have no real deterrent."

Not surprisingly, it is a sentiment that was put forcefully during *Aircraft's* stay at the big RAAF base which took root near Ipswich, Queensland, in 1938 and became operational in June 1940.

"Menzies made the right decision ... we'll never known what might have developed if he hadn't ordered the F111," Air Cdre Walsh said . "It gave us an advantage in our sphere of interest.

"We are a small service. We have to optimise our formation capability and this particular aircraft is very flexible; it is capable of performing roles that other aircraft are incapable of.

"Some people say the F111 is *too* capable. That's horse manure," he said.

Air Cdre Walsh stressed that he was not pointing to any particular country but "the reality is only one area can threaten this country and that area is (to) our north ... the F111 can bridge any scenario that we are likely to face.

"I am a very strong proponent of the F111 ... it is a philosophical decision, whether we need a strike force or not. Of course, you know the answer that you will get around here," he said.

Air Cdre Walsh said that unless Australia had the capability to extract a crushing price from a potential enemy, "you may as well fight with your hands tied behind your back".

The number of RAAF crews current on F111s is classified but it is generally considered to be just sufficient to meet peace-time needs.

Air Cdre Walsh said: "Our guys are highly motivated. We get the most out of them." Pressed, he acknowledged that the numbers would be insufficient if the 82nd Wing went to "surge" operations.

The equation is finely balanced. Crews are allocated only 20 hours flying a month, the same as the transport and maritime (Orion) crews.

Air Cdre Walsh put it into perspective: "We (F111s) don't have a real peace-time task, as the trash haulers (C130, Caribou and Boeing 707 transports) do. We practice for something that we hope we don't have to do. In peace time we are marking time. Our business is very specialised."

However, the senior officers warned that the crew training and retention levels were at a critical point.

"Everything boils down to dollars and cents. We have got to fly a minimum number of hours to remain proficient. If we go lower we'd have to trade off capability," Air Cdre Walsh said.

"... capability, say night/land strike can't be rebuilt quickly. It could just be the difference between winning and losing a war.

"I don't want to sound emotional but if we have more crews, there would be more stability," Air Cdre Walsh said. He added that the current situation was "a little bit hand-to-mouth".

The loss of highly trained pilots and navigators to the maurading commercial airlines is a perennial problem for the RAAF but the situation has become alarming and the F111 squadrons are prime targets. Service pilots earning $25,000 to $30,000 are being offered up to $90,000. (*Aircraft* met at least one F111 pilot who acknowledged that he had been approached by Cathay Pacific; he is in the process of getting his civilian licence and expects to resign from the RAAF soon.)

Air Cdre Walsh and G/Capt McCormack stressed that "nothing else" could replace the F111 in terms of the job it did for Australia. They said they did not want to sound has if they were knocking the F/A18 but it carried "half the load, half the distance".

"The F/A18 may supplement the F111 but it will never replace it. Unfortunately, this is not recognised in some quarters," Air Cdre Walsh said.

The F111 could traverse the Australian continent, day or night, in any weather. This made it *the* ideal aircraft to act, without any great fuss, against the sort of low-key, harrassment raids by "Calathumpian" forces now featuring in strategic scenarios.

Losses

The RAAF's initial batch of 24 F111's were ferried to Australia in flights of six, the first arriving in June 1973. All 24 were operational in No 1 and No 6 Squadrons by the end of that year.

Since then, six of the swing-wing machines have been lost in accidents — four from No 6 Squadron and two from No 1 Squadron — the first (bird strike) occured on September 29, 1977.

Three crews have been lost, the latest only a couple of months ago near Tenterfield, NSW and three crews "punched

out" (a 18,140 kg thrust rocket motor blasts the crew capsule free and it descends by a large parachute, the landing impact cushioned by air bags or flotation gear in the water). In fact, one of the crew capsules is now used as a familiarisation trainer at the squadron rooms. (Refer story page 21.)

Australia subsequently bought four well-used F111A models from the US (one had seen service in Vietnam) and converted them for all intents and purposes, to "C" models.

Four of the six losses have been attributed to: Bird strike on the weapons range; engine manfunction (crew survived); water injection in the fuel on take-off in New Zealand (crew survived); suspected fire in the wheel well area, also in New Zealand (crew survived). The causes of the other two accidents, one into the sea off Nowra and the other at Tenterfield, are officially listed as unknown. The inquiry report into the last crash had not been completed at the time of writing but it is believed that one possibility is crew disorientation.

Operations

"We fly our aircraft a lot harder than anyone else because we have to be Jacks-of-all-trades," G/Capt McCormack said. "It is important to realise that completely disparate reasons caused the six losses."

The losses, over more than 13 years, are small by any military standards.

"The majority of the problems were not aircraft-related. Basically, the aircraft has been very, very good. It's the old thing about giving a dog a bad name; the US may have had problems in the early days in Vietnam but we haven't looked back since we got them," he said.

No 1 Squadron has 11 F111C strike aircraft and 150 personnel. No 6 squadron has six F111Cs plus four configured for reconnaissance work. It considers the single F111 operated by the Australian Research and Development Unit to be "on loan". It, too, has 150 personnel.

In turn, both squadrons are supported by various support/depot level maintenance squadrons on the base. For instances, the 482 Support Squadron performs intermediate level maintenance/avionics work on the aircraft; No 3 Aircraft Depot does a wide range of engineering and period overhaul work on the F111 and its TF30-P3 engines.

Training

Unlike most other air forces, the RAAF cross-fertilizes crews on aircraft types; pilots and navigators do not spend their careers flying the same general types, i.e. fighters, transports etc.

This is reflected in the F111 crews who might include former fighter "jocks" (Mirage and F/A18s), "trash hauler" (Hercules) or Plastic Parrot (CT4 trainer) pilots and HS748 navigators.

No 6 Squadron is the primary training and reconnaissance unit for the F111 force. It trains flight commanders; its ranks include three instructor pilots and two instructor navigators.

The commanding officer, Wing Commander Al Blyth, told *Aircraft* that the squadron ran two courses a year (the first started in August 1973 and number 27 is now underway), each lasting 18 weeks. There are three crews per course.

On completion of their training, the pilots and navigators transfer to the strike unit, No 1 Squadron, or to the reconnaissance section of No 6 Squadron.

The training is structured as an introduction to a fighter course, so it does not matter if the trainees come from a transport or trainer squadron.

This phase, lasting 12 weeks, is conducted on Macchis, at Williamtown. It involves 49 sorties for pilots and 20 for navigators. Then follows a transition phase on F111s, at Amberley, involving six sorties. Crews get their instrument rating before progressing to bombing and terrain following radar capability, day and night.

"The failure rate is low. We may lose one per course; we'd be upset if we lost two," W/Cdr Blyth said.

The squadron also runs an operational refresher course for crews returning to F111 operations after a break. This course lasts five weeks — pilots fly nine sorties (24 hours) and navigators seven sorties (19 hours) to regain Category D/night operations capability.

W/Cdr Blyth, who was on the second and third ferry flights that brought the F111s to Australia from the US in 1973, had experience in Canberra bombers in Vietnam and in-between tours on the F111, he was an instructor on Winjeels, at Point Cook, in Victoria.

"It is very difficult to put into words the difference between the F111 and other aircraft . . . the F111 is an absolutely magnificent machine," he said.

"The fact that it was designed about 25 years ago and will probably keep going for another 25 years — it needs an avionics update but that's in the hands of the politicians — speaks for itself.

"Good young pilots can handle the F111 because they undergo a graduated course . . . you can be young and mature. They must have good orientation and good leadership qualities.

"A lot is expected of them. In short, they must have 'Skills X'. You've either got it, or you haven't," W/Cdr Blyth said. "We can develop 'Skills X' here, we can't instill it.

"The course involves a lot of hard work, even for gifted guys. They get the fire-hose treatment — a lot of information is poured on them," he said.

The RAAF's conversion course for F111s has changed from the original USAF model over the years. It is tailored to meet the needs of No 1 Squadron.

For instance, RAAF F111 pilots are taught aerobatic skills in the aircraft; the USAF stops short at wing-overs and the like, which invariably causes the eyes of their exchange pilots to "pop" (metaphoricaly) when they see the manoeuvres flown by their RAAF counterparts!

Exchange crews

The RAAF has for many years been actively involved in exchanging pilots and navigators with the USAF and the RAF. They are usually two-year exchange postings.

In the case of the F111 squadrons, its pilots and navigators fly USAF F111s and RAF Buccaneers.

USAF Captain Rick Dunham, of Florida, an exchange pilot from the 27th Tactical Fighter Wing, at Cannon AFB, was briefing his navigator, Flt. Lt. Pete Lloyd, a former HS748 instructor navigator, for a night mission during *Aircraft's* visit.

Capt. Dunham, who flies F111Ds at home (they have digital avionics) described the difference in systems as "tremendous . . . it allows the right-seater to concentrate more on bombing rather than putting (navigation) points in; it also allows very close accuracy."

Their mission (Capt Dunham subsequently lost a bet with G/Capt McCormack over bombing accuracy — G/Capt McCormack and Air Cdre Walsh flew separate missions that night) entailed a maritime strike at 400 AGL and bombing land targets.

"We'll look for a boat to do a Harpoon profile," Capt Dunham told Lloyd. Part of the route is carefully structured so that they climb to 1000 ft above a "noise sensitive" area before settling down at 450 ft. The inland component involves a simulated strike on a rail siding and a fire station, using Pave Tack.

The flying time is 140 minutes,

Continued page 39.

Contd. from page 22.

covering 1000 nm. It includes 20 minutes over the bombing range doing 'race track patterns', plus a couple of approaches back at Amberley.

How often do crews have to contend with emergencies, like an engine failure?

"Pete and I had one (one engine failing) eight months ago," Capt Dunham said. "You deal with it like creatures of habit. The more you practice in the simulator to react in an appropriate manner the better prepared you are. But nothing is ever black and white."

How often do you go supersonic?

"You burn fuel at the rate of about 80,000 lb an hour by going supersonic. When your jet is carrying about 30,000 lb of fuel, it's little use tactically to go supersonic ... only if you are running away and then in short dashes," he said.

Pave Tack

Squadron Leader Robert "Herbie" Thoroughgood, shows *Aircraft* over the No 1 squadron "Strike Shop", singing the praise of Pave Tack (AN/AVQ26), a system that combines a forward looking infra-red (FLIR) sensor and laser "eyes", one a transmitter and the other a receiver, which then enable the F111 crew to acquire and guide their weapons on to targets from a safer "stand off" position.

In fact, the Pave Tack modification, which began about 20 months ago, includes making the RAAF F111s capable of delivering the wave-skimming, anti-shipping Harpoon missile.

The Pave Tack mod involves a massive rewiring of the wings. At the time of *Aircraft's* visit, 10 of the 22 RAAF F111's had been modified. It also involves the removal of the Gatling gun which fires 20 mm bullets at the rate of 4000 or 6000 rounds per minute.)

"We are really happy with the system. It has performed better that we expected ... the interface with our analog system has been very good," Sqd. Ldr. Thoroughgood said.

Radarscope interpretations had been a real challenge; navigators had required a lot of training to raise their skills.

The system has a range of about 11 km, depending on atmospheric conditions.

It enables weapons like the Harpoon anti-ship missile and bombs to be used with greater accuracy. One such "big mother" is the 907 kg GBU15 television-controlled glide bomb designed to knock the hinges off hangar doors. "It's a 'Rolls-Royce' weapon for us," Sqd. Ldr. Thoroughgood said.

Engineering

No 6 Squadron's senior engineering officer, Sqd. Ldr. Phillip Campbell, operates his four officers and 107 mainteance personnel, covering six main trades (engine, airframe, electrical, instruments, radio and armaments) in two shifts to ensure 24-hour availability of aircraft.

No 6 Squadron technicians work on a troublesome avionics computer in an F111.

Sqd. Ldr. Phillip Campbell and Warrant Officer Bill Kitson check a TF30-P3 turbofan.

W/O Dave Bannister, the No 6 Sqd. maintenance co-ordinator, keeps track of his little "Pigs" with models on a status board.

"The F111 is structurally quite sound, with good engines but there are a lot of faults with the avionics," Sqd. Ldr. Campbell said. "Hopefully, we will get the digital (avionics update) system up."

He said that because No 6 was a training squadron, his men had to ensure that the trainee flying crews had as many back-ups available to them as possible.

Ground crews occassionally rushed to other ports when an F111 "Lone Ranger" (deploying away from Amberley with only its flight crew) flight develops mechanical problems.

The F111s are checked by specialists before and after every flight. The aircraft also have an "R1" check every 100 days, which takes us about half a day; the "R2" occurs every 250 flying hours and covers the functional tests of its systems.

Then its over to 482 Squadron for "R3" tests every 500 flying hours and the "R4", every 1000 hours. This involves a wing-bay service and resealing of the swing-wing components, plus the replacement of fuel tank sealant.

The "R5" occurs every 2000 hours and includes a strip-down but after an analysis last year, it has been extended to every 4000 hours.

"We have a lot of respect for the aircraft," Sqd. Ldr. Campbell said.

"Some people think that because it was designed to meet a 1962 requirement it is just a bag of nuts and bolts but it is not. It is a very sophisticated aircraft," he said.

One of the modifications to the troublesome analog avionics suite in the RAAF F111s involves the terrain following radar. When the RAAF first got the aircraft, the TFR allowed only 10° of bank; this has been stretched to about 40°.

Another major problem confronting the F111 force is the flight simulator. It was installed in 1978 and is now outdated. "It really needs to be changed ... right now, it is virtually only a procedural trainer," one officer said.

Left: A8-131 with "Aircraft's" editor on board wheels out of the "car port" before a terrain following radar mission.

Below: Living a boyhood fantasy — Carman straps into the navigators seat in the awkward-to-get-into but roomy cockpit/crew escape capsule in A8-131.

Bottom: Sqd. Ldr. Furber smiles as his ring-in "navigator" (axed from this picture) struggles into a G-suit.

Hot trotting in a lovable Pig

"OK. Hot to trot," Squadron Leader Noel Furber says as he swings the long, drooping nose of A8-131 on to the 10,000 ft runway. Shafts of sunlight bounce like lasers off his helmet visor.

Eight-Nine-Oh, one of 10 Pavetack-equipped F111 strike aircraft of the RAAF's formidable Strike Reconnaissance Wing has just been cleared for take-off by Amberley control.

The twin Pratt & Whitney TF30s growl in powerful unison, anticipating massive stimulation in the form of full military power (after-burner boost).

Strapped into the right-hand seat, I, too, am in a state of excited anticipation. This is my first ride in one of the wonders of military aviation — certainly Australia's greatest deterrent to would-be ambitious regional powers.

I glance at the engine rev indicators and they appear to be plugged in to my pulse rate; the adrenalin is pumping as fast as the kerosene that will shortly light the two most scorching fires that I am ever likely to have under my tail.

The communications microphone on my oxygen mask is on and the sound of deep breathing fills my headset. It is probably annoying Sqd Ldr Furber but I choose to leave it on rather than risk fumbling later on. The chin strap of my helmet is annoying, too, but what the hell. I remember to push my lower back well into the comfortable seat, tentatively re-check the shoulder and lap harness and generally feel elated.

Sqd Ldr Furber, the commander of the F111 reconnaissance unit within No 6 Squadron, began a litany of pre-flight checks more than 30 minutes earlier, starting with a meticulous walk-around the massive, swing-wing aircraft. (Not many people realise that its all-up weight is almost the same as the DC9!)

The final checks continue as we taxi at 12 knots with the large bat-wing canopies still open, cool air filling the two-place cockpit which doubles as a unique crew escape capasule in case of an emergency. An Ansett 727 peels away into the cloudless sky after another training touch-and-go. My lips are parched; they feel like sandpaper.

Sqd Ldr Furber switches on the all-important terrain following radar to ensure that it is working; two yellow squiggly lines and a dot, or pulse, which indicates that the system is continuously checking itself, light up on the E-scope in front of him. (The TFR is a magic eye, first introduced on the F111, based on six computers which enables the F111 to automatically hug the contours of the earth, as low as 200 ft or 400 ft, to avoid detection by hostile radar. The F111 can be flown manually below 200 ft.)

"Altitude test two ... radar on," he calls. I slowly focus on the radar knob and confirm that it is "on".

My seat is usually occupied by the navigator/weapons officer. The most prominent features of the station are the protruding "scope" of the radar display and the Pavetack controls suspended like a gun handle above the radar and radio panel, near my right knee.

My pre-flight briefing by Sqd Ldr Furber, including a precise check-out for a comfortable G-suit and helmet, was

backed-up with a familiarisation session in a part-simulator, by Flying Officer Russ Lucas, a navigator. The part-simulator is a cockpit/crew capsule in which one RAAF crew ejected successfully.

I have some basic tasks to perform, like switching on/off the UHF radio, radar and closing/opening the bay doors but I dither at the first test when Sqd Ldr Furber calls "bay doors". I find myself mesmerised. I focus on the right switch but it doesn't register. My mind is racing ahead down the runway. Geez, I think, I don't have that special "Skills X" that the commanding officer of No 6 Squadron, Wing Commander Al Blyth, spoke of earlier. (See p.19)

"It's there on your right," Sqd Ldr Furber remindes me. I refocus, lift and pull the switch with my gloved hand and sheepishly call "Roger". I feel like a poor imitation of a Hollywood flyer. I console myself: At least I didn't switch the radar on too soon. I was warned that to do so would leave the ground crew sterile: A heavy load!

Sqd Ldr Furber tests the flaps, then grabs the black handle on the bat-wing canopy and I copy him, pulling it down hard before pushing the large button, ensuring that it is sealed. We are, indeed, hot to trot. "Check oxygen normal," Sqd Ldr Furber continues (I do), "anti-icing . . . reset altitude test two back to normal . . . visors down." Again I fumble with the release mechanisms on my helmet, pulling down first the clear visor, then the glare shield. Sqd Ldr Furber's words at the briefing ring in my ears: "We use both visors for take-off, in case of bird strike." I also recall that a bird strike caused one of the RAAF's six F111 crashes.

That's merely memory recall. There is no fear, only tremendous excitement. The G forces that this Mach 2.5 beast, affectionately known as "Pig", can haul seem insignificant. Were it not for the harness, I would float out of the seat.

• • • •

The revs on the engine dial spin excitedly and the tone of the "subdued" roar changes as Sqd Ldr Furber punches in the after-burner and calls, "rolling now". The nose dips and 36,742 kg of mean machine laden with 14,000 kg of fuel is trundling.

The runway markers begin to zoom past as Sqd Ldr Furber calls the play: "100 kt, 120 kt, 140 kt . . ." and the big "Pig" rotates after rolling about 3500 ft. "The One-Eleven goes well in cold conditions," Sqd Ldr Furber says as he retracts the flaps.

We bank left and the G-suit starts to work around the thighs and calfs; the feeling is much like having your blood pressure taken. We pull a comfortable 3G, hauling 340 kt. The after-burner is cut out at 350 kt, about 5 nm from base.

Levelling out at 4000 ft, with a true air speed (TAS) of 400 kt, we track across Brisbane Airport before banking sharply over the Expo site. Then on to Stradbroke Island's Point Lookout, aptly named because from here I can see forever, well, the high rise buildings of the Gold Coast!

Sqd Ldr Furber hauls us around a right hand corner as we are cleared to track the 45 nm along the most famous coastline in Australia and then it's the moment I have been waiting for.

"This is what a TFR descent is like," he says gleefully. Instantly, I am on the most fantastic roller coaster ride imaginable.

The big snout of this very lovable "Pig" doesn't just dip, it dives sharply. My hands, gripping notepad and pen, rise minus the force of gravity; my head, ensconced in a substantial "bone-dome", valiantly tries to skewer off on a tangent from a G-suited body straining at the harness to make its own upward trajectory through the canopy. An invisible puppeteer controls my body; my mind races in a million different directions. This must be how a junkie feels! We level out at 200 ft above the deep blue sea, the TFR in complete command. We are being flown by computer at 400 kt, a blink away from obliteration. I rest in the knowledge that should the TFR malfunction, a command computer automatically flicks the nose up. (I am soothed with a demonstration later.)

Set for a "hard ride", the TFR shows how ultra-smart it is. Its radar, projecting forward and down, records every contour, in this case, series of waves. (Over water, this is represented by two perpendicular lines intersected by a squiggly line and the pulse.) The result is a porpoise-like ride.

Luckily, I have a strong constitution!

With the panoramic vista of Surfers Paradise looming off to starboard (by now, another piece of the F111's pioneering gadgetry has been employed and the aircraft has changed its configuration with the wings swept back 44°), Sqd Ldr Furber spots an ultralight flying in the opposite direction along the beach. "They are the sort of thing we don't like to see," he says.

As Surfers flashes past like a newsreel on fast wind, a controller's voice cuts in: "Eight-Ninety, what's your position?" The staccato reply: "The casino".

Sqd Ldr Furber uses his eyes in radar-like sweeps looking for other traffic from Coolangatta Airport as we race our sleek shadow on the wavetops, seemingly at arm's length. "Seagulls", he calls and a blurr of white zooms past.

Control is informed that we are "going local" and then I get a demonstration of the F111's acceleration, without going supersonic. With the TFR off, the big aircraft is hauled back from 480 kt to 300 kt; the vibration increases when the speed brakes pop out. The feeling is one of pushing hard into your stirrups as a bucking bronco digs its hoofs in. Power is stabilised in the twin turbofans before Sqd Ldr Furber calls: "Power on, burner on."

Brute power surges through the Pig as the after-burners light rapidly in five stages; my back is pushed firmly into the seat. We hit 450 kt in the time that it takes to scrawl Furber's call. In a few blinks the needle passes 550 kt and as we crash through 600 kt, Sqd Ldr Furber eases off the power. Phew . . . 300 kt to 600 kt in a shade over 12 seconds. (I later learn that the afterburner in the right engine hadn't worked properly!)

There is some buffeting as we slide back through 450 kt. Soon, we turn inland at Evans Head, with the TFR back on, for a run over the bombing range. The TFR's horizontal lines are now on an angle and slightly squiggly, with the right hand line pulsating towards its mate indicating our closing on each rise. Peering into the radar scope, I find shaded areas — valleys about

HISTORY OF THE F111

THE F111, built by General Dynamics, with Grumman the major sub-contractor, had a stormy development, including cost over-runs, the plague of military procurement.

Its first foray into Vietnam, involving six aircraft, was less than auspicious (three were lost in six weeks) and the recovery of one wreckage indicated failure of the horizontal stabiliser. When another F111 lost a wing (failure of the wing pivot box) at Nellis AFB, in Nevada, the fleet was grounded. However, when the F111 returned to Vietnam with new tactics employed, it was arguably the most successful aircraft there.

Along the way, the United States Navy abandoned it to concentrate on developing the F14 Tomcat (the then US Secretary of Defence, Mr Robert McNamara, was a strong proponent of aircraft commonality as a cost-saving measure) and the British, who were expected to take 50 F111K's, also dropped off.

Australia was the only other buyer, ordering 24 F111A's modified to a "C" version. The USAF and the RAAF remain the only users of this long range strike aircraft. The only difference is that while the USAF F111s can carry nuclear weapons, the RAAF expressly does not include the subsystems for a nuclear capability.

It is often forgotten that while the F111 did encounter early problems, essentially with its revolutionary wing, it was breaking the technology barrier in many fields.

Critics who harp on those early days conveniently forget that the F111 was the first aircraft into production with a variable-sweep wing. The Germans — Messerschmitt — built a model in WW2 but it never flew. Much of its technology was subsequently used by Bell in its X5. Grumman also built an early swing-wing, called the Jaguar and both these US aircraft flew successfully; neither entered production.

The F111 was also first with the remarkable terrain following radar; the first military jet into service with a turbofan **and** full after-burner for take-off and accelleration; the first and still the only aircraft with a cockpit that doubles as a crew escape capsule (the capsule in the much later Rockwell B1 prototype has been replaced with ejection seats); the first with high flotation, variable terrain landing gear for rough strips; and the first with solid state electronics.

Add to this an 80,000 ft ceiling, Mach 2.5 dash capability and a range of 2500 nm (stretching to the limits of crew endurance with aerial refuelling, *a la* the USAF raid on Libya when 18 strike F111s and three F111 Ravens [electronic jammers] operating from the UK were refuelled twice over the Atlantic and twice over the Mediterranean before attacking at 200 ft) and you have *the* enduring marvel of modern combat aircraft.

5 nm ahead. This is pinpointed by the closing squiggle on the E-scope.

It is fascinating approaching the first ridge at 440 kt. Someone unfamiliar with the system would no doubt want to grab the stick and yank it back.

The TFR displays another bit of cleverness when confronted by a hill with another higher one immediately behind. In typical fashion, we rise as if by remote control on a cushion of air, to clear the first hill. Then, instead of rising further to clear the second obstacle, the F111 gently banks right and skirts around the side of the hill, into a valley. This is the system's forte, ensuring we stay below radar detection by slipping from one valley into the next.

The most marvellously eerie test (of my fortitude, anyway) comes after we pass a river junction waypoint. In the distance, an imposing, massive rise begins to fill the windscreen. It towers almost 1000 ft above us as we close at more than 400 kt.

Now I really appreciate the nerves of steel needed to do this at night, when the two RAAF F111 squadrons do about half of their flying. The urge to "do something" as the wooded slopes loom large is strong but it is reassuring to realise that the angle of the slope is falling; we are rising. The TFR truly is a little beauty!

As Sqd Ldr Furber explains: "The pilot must be careful to read his maps well beforehand to ensure 'peak height capability'." It means that the pilot must make sure that his aircraft has sufficient air speed to get over the highest mountain along his intended flight track.

We re-cross the NSW-Queensland border and as Cunningham's Gap comes up on the right, we have 9843 kg of fuel left. I continue to soak up the glorious roller coaster ride as our Tacan locks on to Amberley. Soon, we are over another ridge and a wide plain unfolds, with Amberley 25 nm away on the right.

We climb to 2500 ft to avoid light aircraft in the Gatton area and then do a "wing" (drop the right wing to the perpendicular) for 30 seconds, 5 nm out, to look out for other aircraft. Almost simultaneously, the tower confirms: "No other traffic".

We fly overhead the runway at Amberley at 1000 ft and then abruptly bank left, pulling about 3Gs. Smoke indicates a cross-wind as Sqd Ldr Furber calls "wheels down ... flaps". At full flaps he adds: "Gear green, looks great".

There is a surge of power at 10 Alpha as the runway is lined-up. The most amazing thing about the short finals is the flat, almost nose-down attitude of the aircraft. There is belated, negligible flare. (The F111 has a smaller wing ratio than even the stubby razors on the F104 Starfighter.)

Sqd Ldr Furber's touchdown is one for the books. Delicate. He calls the ground roll speed, "130 kt, 120 kt, 6000 ft to run ... there's no point hitting the brakes and burning them up." The taxi back to the No 6 Squadron "car port" involves the litany of pre-flight checks in reverse, the most poignant being the reinsertion of the ejection pins! As the engines spool down and I struggle to disconnect my oxygen line, my mind is already on fast-rewind. I descend the ladder but my heart is in the cockpit and my soul ... well, it's porpoising its way o'er seas and dales.

The Squadrons

The No 6 Squadron CO, W/Cmdr Al Blyth, in familiar surroundings.

The RAAF operates its F111 force in two squadrons, No 1 and No 6, from its biggest base, Amberley, near Ipswich, in Queensland. The squadron rooms — No 1 has yellow doors, No 6 blue doors — are repositories of air force history with their photographs, clippings and plaques. In more recent times, the F111 strike force has produced two Chiefs of Air Staff, AM Jake Newham (who led the first F111 ferry flight from the US) and AM Ray Funnell. The squadron rooms are relaxed places, considering the gravity of their business. Pop music from an FM station wafts through the rooms as crews brief, de-brief, swap tactics, write reports or relax with mugs of coffee or tea. The demands on the hot water urn are steady all day and into the night. About half of all the squadron flying is done at night.

No 1 Squadron

No 1 Squadron is a torch-bearer. Australia's oldest squadron, it was formed as part of the Australian Flying Corps in January 1916. Its motto: "We see, let us act".

The squadron crest features a diving Kookaburra superimposed on the Cross of Jerusalem, which relates to its service in Palestine in WW1.

Its commanding officer is Wing Commander Dave Dunlop, believed by insiders to be destined for the top in the RAAF.

The pictures on the wall trace the history of the unit: A Bristol Boxkite (CFS3), the first military aircraft to fly in Australia, operating at the Central Flying School, Point Cook); Lt. Col. E.H. Reynolds, its first CO, on January 1, 1916; Lt. R. Williams, DSO, with the squadron's BE2Cs at Mejdel, in Palestine etc. etc.

The squadron, of course, is famous for producing the first Victoria Cross for an Australian flying unit — awarded to Lt Frank Hubert McNamara, for landing his aircraft amidst enemy action to save another pilot, Capt. Douglas Rutherford.

In WW2, it fought the Japanese in Malaya and then in the SW Pacific.

No 6 Squadron

No 6 Squadron was formed in 1939. Its MacArthur-like motto: "We shall return".

The CO is Wing Commander Al Blyth. He was on the second/third F111 ferry flights from the US in 1973.

The crew rooms feature a very large print of an F111 along one wall and various trophies, like a plaque from the US Air National Guard, proclaiming No 6 Squadron as the "best night unit" during exercise "Photo Finish", in 1985. An AK47 rifle captured in Vietnam and presented by the Australian Army graces another wall.

Initially equipped with Ansons and then Hudsons, No 6 covered the approaches to Sydney and later, it was engaged at Milne Bay, in the defence of Port Moresby.

Operating Australian-built Beauforts, it bombed Japanese targets in Rabaul, New Britain and Wewak. After WW2, it re-equipped with Lincolns at Amberley.

In 1952, its aircraft tracked the radioactive cloud following the atomic tests on Monte Bello Island, off the coast of WA.

The Lincolns gave way to Canberra bombers, which in turn were replaced with Phantoms until the F111 arrived.