The F-111C Aircraft for Australia

Article by Lance Halvorson

In February 1971, the most vexed question in defence re-equipment consideration was whether Australia would eventually accept delivery of the 24 F-111C strike aircraft ordered for the RAAF.

A decision on the acceptance was not made until after the F-111 had satisfactorily completed the USAF “Inspection and Repair As Necessary” program, which began in late 1972. The Government decided to leave the aircraft in the United States until all the technical and scientific problems had been overcome and until the RAAF knew that the aircraft would reach the full performance requirements.

Testing of the Aircraft Structure

The USAF had developed a rigorous inspection and testing program for all versions of the F-111s and they, together with General Dynamics Fort Worth (GDFW), fully expected that all proving targets would be met. Cold Proof Load Tests (CPLT) and development of non-destructive inspection methods for in-service use were carried out. RAAF engineers were closely involved in these tests and closely monitored the testing of F-111Cs for the RAAF.

Defence Minister Fraser stated at the time, “Although a great deal of progress had been made with the proving of the Wing Carry-Through Box (WCTB), there remain some continuing uncertainties associated with the proving of the fatigue life of new WCTB designs. Difficulties were experienced in the use of D6AC steel, especially in the detection by non-destructive testing techniques of small cracks, which might become critical in service. Until these problems are solved, the aircraft will be unacceptable to Australia and to the Royal Australian Air Force as a result of shortfalls in performance and doubts about structural reliability. Assuming the F-111C meets our minimum operational and technical criteria, it will give the RAAF an outstanding strike capability superior to any other existing aircraft”

The successful completion of static, fatigue and flight tests was scheduled for the middle of 1971. The latest advice in mid 1970 was that fatigue testing program would not be completed before the end of 1971 and possibly later than that before it was established whether the aircraft would perform as required.

Australia was negotiating with US Defense Department, USAF and GDFW from a position of strength due to better knowledge of the program, the engineering expertise provided by RAAF engineers, the choices open to Australia in the acceptance, or not, of the F-111 and a sober detachment from past attitudes.

A degree of acrimony had arisen over the F-111 purchase, in both USA and Australia, in a number of areas of Government, Opposition, USAF, RAAF and bureaucracies. Australian Progress payments in USD were continuing and the Government was seeking options for deferring the purchase or not accepting the aircraft, ie, ‘ways out’ of the purchase, as USD were in short supply. The final decision on acceptance of the F-111 would hinge on RAAF engineering assessments of the structural integrity of the aircraft and the life expected with the new re-designed wing-carry-through-box, following the tests to be carried out on the aircraft.

The status of the F-111 static test program, fatigue test program and the recovery program, including the cold proof test and non-destructive inspection (NDI) was covered in complete detail in the August 31 1970 report of Air Force Secretary Robert C. Seaman and USAF Chief of Staff, General John D. Ryan. At that stage the fatigue test program was about 75% complete, and the results indicated both “a sound basis for confidence in the structural adequacy of the system” and a “reasonable expectation” of a 15 year “life” for the wing-carry-through-box (24,000 test hours, equaling 6000 flight hours), in testing to be completed by June 1972.

The F-111 underwent many tests, from the WCTB, NDI test on components, engine tests (with frozen chicken ingestion in the engine intakes) to high speed sled tests, again with chickens, to test the strength of the module transparencies (the front windshields). The NDI inspections required significant dismantling of the aircraft; following the inspections, the aircraft were reassembled and given thorough ground checkouts and five flight tests before the USAF acceptance flight. The F-111 was the most tested aircraft in USAF and RAAF history.

The complete details on the testing of the F-111 are outside the scope of this article. However, the RAAF engineering assessments that followed were obviously correct as the aircraft was accepted in 1972 and has flown in the RAAF for 37 years without any loss due to failure of the WCTB or structural components.

USAF Experience at the Time

Although criticised later as a risk that should not have been taken at the stage in the aircraft’s development, six F-111As deployed from Nellis AFB in the US to the RTAF Base Takhli, 85 miles north of Bangkok, Thailand, early in March 1968. The aircraft flew their first combat sorties against targets in North Vietnam on 25 March. They completed 55 missions in the test of combat effectiveness before the loss of three stopped the operations. However, the testing proved to the USAF the benefits of the new interdiction concept, made possible by the F-111, night or bad weather low-level single aircraft penetration in a high threat environment.

Two F-111As disappeared with their crews, from causes unknown, but with no suggestion of enemy action. A third was lost (second of the three), attributed, at the time, to the jamming of the controls by some loose object. Officially, that remains the cause, but on 8 May 1968, another F-111 crash on a training flight near Las Vegas, was caused by fatigue failure of a weld on the actuator valve controlling the horizontal tail surface. Inspections of other F-111s showed development of a similar fault. A similar defect was thought to have caused the three that crashed in Vietnam - a defect that was, after the May 1968 accident, eliminated by a simple modification.

Following the Combat Lancer losses, a number of other crashes occurred, due to a variety of causes. While two of
these were not structural failures of the WCTB, their failures were in the same area and the association was there. USAF General James Ferguson, in evidence before the US House of Representatives’ Committee on Armed Services, when discussing the in-flight wing failure of a F-111 in December 1969, put the program in focus:

“This problem, like the others I have discussed, is not unique or mysterious in aircraft development programs. Demands for higher and higher aircraft performance have forced both the commercial and military aircraft designers to develop and employ higher strength materials. Each new material or new alloy of an existing material invariably has a few unique characteristics which must be ferreted out and understood. The exhaustive inspection techniques previously used in the manufacture of the part that failed did not disclose the presence of this particular flaw. The newly developed inspection techniques will positively detect them,” said General Ferguson.

On October 8, 1970, there was a move in the United States House of Representatives to strike out $US548,000,000 from the fiscal 1971 program for the F-111. It was defeated by 89 votes to 28. The chairman of the House Armed Services Committee, Mr Mendel Rivers, reporting on the conference with Senate representatives which restored the original House vote, added that “the House conferees in no way agree with the statement contained in the initial report of the Senate committee to the effect that this year’s procurement will be the final buy for the F-111”. He added: “We believe the Department of Defence should be prepared to ask for further aircraft if they are called for by military requirements. This is a truly unique aircraft. Even the Senate committee report says: ‘No other aircraft in the Air Force inventory can compete with the F-111’. Pilots who fly this aircraft say they would rather fly the F-111 than any other aircraft in the world. If it is the best plane we can give them, then I think we should not permit substitution of a lesser aircraft.”

The 20th Tactical Fighter Wing of the USAF was equipped with F-111E aircraft, operating at Upper Heyford, Oxfordshire in the United Kingdom as part of NATO defence in late 1969. The aircraft had flown 3000 miles across the Atlantic, from Pease AFB, New Hampshire, USA, to, England, un-refueled, in 6 hr 53 min.

Following North Vietnamese intransigence at the Paris Peace Talks and their decision to ‘break-off’ talks on 13 December 1972, Linebacker II bombing operations started on 18 December. The 11 day bombing campaign launched against targets that had not previously been attacked: rail yards, command and control facilities, power plants, bridges, POL supplies, MIG bases and SAM sites in and around Hanoi and Haiphong. Linebacker II used all-weather force of B-52s, F105, F4-E and F-111 attack aircraft to bomb these targets. The F-111s were employed at night on low level attacks against pin point targets, eg, POL supplies, power plants C2 facilities and SAM sites.

The F-111s excelled in the campaign and their effectiveness was proven beyond doubt.

**Ferry to Australia – June 1973**

In December 1971, the Defence Minister Mr Fairbairn announced the Cabinet decision to accept aircraft out of storage at General Dynamics, Fort Worth. Australian aircrew and maintenance personnel were once again ready for training in the United States. Instructor aircrew were posted to the 474TFW in January 1972 for another F-111 conversion course; the two navigators were on the original 1968 F-111 courses and one, Alan Lockett, was also on the F-4E training and ferry in 1970.

By January 1973, ferry aircrew were once again at Nellis AFB for training. Four were trained in 1968, but the rest were new crews. The first six F-111Cs arrived at Amberley on 1 June 1973 from McClellan AFB, Ca via Honolulu and Pago Pago.

During the welcoming speech, Mr Barnard stated, “I’m sure this aircraft will be flying well into the 80s, and beyond”. No-one present would have guessed that ‘beyond’ would be 2010, 37 years later. The aircraft were ordered in 1963, were due to be flown to Australia in 1968, but arrived five years late in 1973. A long period to wait for the best strike aircraft in the western world.

**In-service**

Once the aircraft were bedded down at Amberley, both squadrons started a comprehensive continuation training schedule and some flag flying around Australia. The first opportunity to wave the flag came four months after arrival
with a nine aircraft flypast, the total number of aircraft in Australia at the time. After being called the 'Flying Opera House' by some in the Australian media, the F-111 force ironically overflew the real Opera House during the Royal Salute to Her Majesty, Queen Elizabeth II, when she opened the 'House' on 20 October 1973.1

No 6 Squadron carried out its first conversion course in Jan 1974, closely followed by No 2 Conversion Course in August 1974, on which the author completed his 2nd F-111 conversion. Both squadrons engaged in Kangaroo 1 Exercise in the latter part of 1973 and a number of smaller exercises. No 6 Squadron deployed to New Zealand in November 1975 for Exercise Tasmanex, a maritime exercise with the RAN and RNZN.

Squadrons trained in maritime strike exercises and their primary role, low level strike, largely 'single ship', but working up to three and four aircraft strikes on land (coordinated at 30 sec intervals) and maritime 'targets'. On occasions, crews practised air-to-air intercepts, to maintain some of the skills they gained in the Phantom F-4E and on conversion course with the F-111. However, while the capability was maintained, it was accepted as a minor role. The same occurred with the 20mm M61A1 gun; it was fitted but not used, due mainly to the aircraft role, but also by the opposition of one or two senior members of the air staff, who considered firing the gun was the role of the fighter force. However, all of the guns were fired and proven in the F-111s before they were removed for fitment of the Pave Tack pod.

Most of the training involved bombing at the Evans Head Weapons Range where crews could practice radar and visual releases of 25lb practice bombs. To gain experience in operating the F-111 with 20 x 500lb (227Kg) high explosive (HE) bombs, ie, 'heavyweight', both squadrons deployed separately to RAAF Base East Sale and flew TFR sorties in Tasmania, mostly at night, before releasing the HE bombs at Dutson Range and recovering to East Sale.

Aircrew very quickly determined the limitations of the F-111 navigation and bombing system (NBS). As the system was integrated, navigation and bombing accuracy was dependent on an accurate inertial navigation platform and analogue nav/weapons computer, so that crews could find the pinpoint target/s in all-weather conditions. The navigation system drift error was about 2 n miles per hour and while crews, more often than not, found their target/s, 'bomb damage' was dependent on the CEP of the bombing system. The F-111's CEP, for similar attack conditions, was about 55 metres; inadequate to damage likely heavy structured pinpoint targets. While the accuracy was adequate for wide area targets where unguided bombs were suitable, eg, dispersed aircraft and 'soft skinned' targets in general, precision guided munitions were the obvious answer. Possibly as important as the navigation and bombing accuracy, was the failure rate of the nav/bomb system. After a few years in-service navigation computer units started to fail after 3 to 5 hours of operation, sometimes in flight. Availability of technical support and spare parts from the manufacturer were becoming problems also, as most US aircraft were fitted, or being fitted, with digital computer systems.

As procured, the F-111C had a PGM capability, albeit with Vietnam era weapons, eg, AGM45 Shrike anti-radiation missile (ARM), AGM65 Maverick and AGM62 Walleye missiles. Maybe Air Staff were involved in procuring the aircraft, against much bad publicity, and to pursue weapons as well may have pushed the procurement of both into the 'unobtainable' basket.

Whatever the reasons, the operational offensive capability of the F-111C, and the whole RAAF, was in a 'parlous state'. Following a paper on this unsatisfactory state by the new ARWPN, Peter Ekins, strategies were put in place to provide a graded operational capability for RAAF offensive aircraft. In addition, the activities of separate weapon acquisition, based on aircraft replacement, were changed to a weapons system philosophy. All air staff titles were changed to Operational Requirements to reflect this philosophy.

Attrition Aircraft

Provision for attrition aircraft was made in the original purchase agreement in 1964 and confirmed again in the Fraser/Laird Agreement in 1970. Chief of Air Force Operations, AVM David Evans, raised the subject of attrition aircraft with the USAF in 1977. Following Government approval, four F-111As were acquired from USAF operational squadrons in 1981. To maintain configuration control with the F-111Cs in the RAAF, the aircraft were selected from the same or near to, 'build block' as the 'C' models: 67109, 67112, 67113 and 67114, the last ‘A’ models built. In a departure from normal processes, Operational Requirements staff at the time, Alan Lockett and Lance Halvorson, recalled that they wrote the Air Staff Requirement (ASR) after the decision was made to acquire the aircraft, when the usual process was to write the ASR to justify the acquisition.

1 'F-111C Formation', RAAF News, November 1973, p 3

2 CEP, (circular error probable) is a statistical figure of the radius in which 50% of the bombs will hit, under similar conditions. It also means that crews have a 0.5 probability of a bomb impacting within that radius. This figure is the basis for weapons effort planning, even with precision guided munitions (PGMs) which have a much lower CEP, and therefore a higher Pk, ie, probability of kill.
The aircraft were stock standard F-111As which were modified to 'C' standard after procurement. An interesting fillip was that the original 'A' model WCTB's were retained. The fatigue life of these aircraft may have received closer monitoring than their 'C' model brothers. However, no problems were encountered when in-service.

**RF-111C Modification**

As early as December 1974, Defence Minister Barnard approved a Project Definition Study on the acquisition of a reconnaissance capability for the F-111C, the first project for the new aircraft. Air Staff Requirement 14, later Project 5014, was developed to modify four F-111C to provide a strategic and tactical reconnaissance capability. The team that visited GDFW and the sensor manufacturers agreed, predictably, that a reconnaissance pallet installed in the weapons bay was the best and only option.

The modification provided a comprehensive reconnaissance capability unmatched by other 'recce' aircraft at the time. An infra-red linescan system and various camera configurations were fitted and the prototype was completed in April 1979. A four month flight test program by SQNLDR Jack Lynch and FLTTLT Marty Chalk verified the design and performance criteria. The remaining aircraft were converted at No 3 AD, Amberley. The avionics of the RF-111C were also upgraded as part of the AUP, later in 1996.

In addition, two Photographic Processing and Interpretation Facilities (PPIF) were established at Amberley to process the film and interpret the results, one for permanent installation and the other for deployment. Such facilities were essential to complete the intelligence sequence: acquire, process, interpret and disseminate.

**Early Navigation System Upgrade**

In 1978, USAF embarked on the Weapons Systems Improvement Program (WSIP) to upgrade their 'A' and 'E' models with a digital navigation and bombing system and to re-equip the aircraft with the Pave Tack system. USAF offered to include the F-111C aircraft in the program at about 10% of the total cost. However, when the costs escalated considerably, USAF cancelled the program. The RAAF was left with nowhere to go on the digital upgrade, the Pave Tack or Harpoon integration. It looked in danger of 'back to square one'.

**Pave Tack & Guided Weapons**

Following the cancellation of WSIP, there was little support in the certain areas of Air Office and DSTO to continue with the Pave Tack integration. Harpoon looked like a possible casualty too. However, Operational Requirements staff at the time, Alan Lockett, Peter Ekins and Lance Halvorson, knew that integration of Pave Tack and Harpoon in the F-111 would greatly enhance the capabilities of the strike force, even with retention of the analogue nav/bomb system. Without this integration, the F-111 would not progress into the world of precision guided munitions, essential for its future credibility as an offensive weapons system.

With considerable staff work by the officers above, and their technical services counterparts, the integration of Pave Tack on the F-111C was approved and the project became Air 65 Pave Tack and Guided Weapons. The guided weapons to be integrated were the AGM 84 Harpoon anti-shipping missile and the GBU-15, a 2000lb Mk84 glide bomb guided by data link. Initially, the project included the dreaded 'fitted for but not with' concept that derived from the civilians in Defence who had little appreciation of modern weapons systems or strike operations. A weapon considered essential in any strike force was the AGM-88 high speed anti-radiation (HARM) missile; however, its inclusion in the project was not approved because of a 'trade-off', due to its cost, for other service projects.

Pave Tack was undoubtedly the start of the modern PGM capabilities in the F-111 aircraft in the RAAF. The Pave Tack system gave the F-111Cs a much needed capability boost in weapons delivery precision. The system consisted of a forward looking infrared sensor (FLIR), a laser transmitter/receiver and target designator and the associated electronics, enclosed in a self-contained pod which could retract into the weapons bay when not in use. The turret could swivel to give a 180° arc forward, rear and to each side. A stabilised image in the navigator’s display allowed the operator to switch between the radar and infra-red display and designate the desired bomb impact point on the FLIR, to which the laser was ‘bore sighted’. 

*An F-111 fitted with Pave Tack and laser guided bombs, near Amberley Photo: RAAF*
Tack before heading to the Isle of Man for a quick bombing run, then back to Lakenheath. Pre-flight check-out on the ‘F’ was minimal and digital system and Pave Tack knowledge were from the checkout in the crew room; while not scoring a direct hit, the bomb was close to the target. The author was very impressed with the F-111F and its systems and Pave Tack; the sortie confirmed, in his view, that the RAAF decision on the project was correct. However, maybe the RAAF should have looked closer at the F-111F when the ‘C’ was having problems in 1968-1969 and all options were under consideration.

At the time, the LANTIRN (Low altitude navigation targeting infrared by night) pod developed for the F-15E Strike Eagle, or the Advanced Fire Control Pod developed for the F-18, deserved a closer look. The pods were much smaller than the Pave Tack, although the LANTIRN consisted of two pods. However, we were too far down the path on Pave Tack.

**AGM-84 Harpoon**

The RAAF became interested in Harpoon for the P-3C aircraft in 1977, and later, for the F-111C and F/A-18 Hornets. Harpoon was the only missile available to meet the maritime strike requirements; Exocet was not yet on the scene. The incorporation of Pave Tack in the F-111C gave the opportunity to also incorporate the AGM-84A Harpoon anti-ship missile control and launch system (HACLS) and essential interface with the navigation/bombing system.

Operational Requirements staff (Peter Ekins and Lance Halvorson) developed the operational design requirements before Halvorson attended a Harpoon Design Interface meeting at GDFW to develop the weapons control and interface design. As the F-111 Harpoon configuration was fully integrated with the nav/bomb system, target coordinates were continuously updated; immediately before launch, the navigator could program search patterns, way points and attack modes. The integration made the Australian F-111C the most lethal maritime strike platform in the world.

Harpoon is a 12.6 ft (3.8 m) long turbojet powered anti-ship 1145 lb (520 kg) missile with a high explosive blast warhead capable of inflicting significant damage to a vessel. Once fired, the missile flies autonomously to the target, turning on the active radar seeker head in the attack phase. The missile has a range in excess of 60 nautical miles (80kms), outside the target’s missile engagement zone, thus providing a safe launch for the attacking F-111C.

**AGM-88 HARM**

After a failure in the late 1960s to acquire the AGM-45 Shrike or Standard anti-radiation missiles for the RAAF under Air Staff Target (Guided Weapons), the Operational Requirements Staff turned to the newer AGM-88 HARM or High Speed Anti-Radiation Missile. Anti-radiation missiles are designed to lock onto enemy radio or radar transmissions and then fly ‘down the beam’ to hit the target, or if the enemy becomes aware of the F-111C in the area with ARMs, force them to turn their radar off, denying them any tracking data of the F-111. Either way, the ARM is very useful, even indispensable, to the attacker in the defence suppression role. On two occasions, procurement of anti-radiation missiles was denied for the F-111C. One wonders the rationale behind non-procurement of the anti-radiation missile; maybe it was viewed by the bureaucrats as too offensive and aggressive.

Well, they are and no apologies were offered for such a view. With wiring now being fitted to 12 F/A-18F Super Hornets, it may be third time lucky and ARMs will be fitted to upgrade the Super Hornet to the EA-18G Growler.

**Modifications Along the Way**

The F-111 has had a number of modifications in its service life, from engines and flight controls to avionics/weapons systems and electronic warfare (EW) equipment. However, details of the modifications are too detailed for this article; the major updates will be discussed briefly. Details can be found in Mark Lax’s book on the history of the F-111, From Controversy to Cutting Edge, released on 3 December 2010. Books can be ordered from the Air Power Development Centre, www.raaf.gov.au/airpower

**Engines**

The F-111C/RF-111C aircraft were fitted with upgraded engines in the mid 1990s, procured from ex-USAF stocks of F-111D and F models that had been retired. These P109 engines were more reliable and had greater thrust than the P103 they replaced. The improved performance was welcome, achieved with little affect on fuel consumption or range and payload. The F-111G aircraft were fitted with a RAAF modified P107/109 (called the P108), to allow for the difference in engine and airframe structure.

**Avionics Update Project (AUP)**

Following a successful avionics modernization program carried out by the USAF on FB-111A and F-111A/E aircraft, the RAAF re-established the 1978 Air Staff Requirement to upgrade the avionics system of the F-111C. In addition, Operational Requirements staff, John Kennedy and Mark Lax, developed a ‘position paper’ on the options for the F-111 aircraft, which were considered by the Force Structure Committee. After Committee agreement, the Government approved the update of the avionics and a contract was signed with Rockwell International in August 1990, at a cost of $480M. The choice was largely due to the company’s experience with the USAF F-111F and F-111D Pacer Strike program which updated the USAF avionics system, 10 years after the original USAF WSIP program was cancelled.

Originally intended as a reliability and maintainability upgrade, the AUP continued the development of the F-111 to a modern and ‘lethal’ weapons system, a trend started with the Pave Tack and guided weapons provisions in the 1980’s. Air Staff and Technical Services Division of the RAAF were aware of the tremendous capabilities that would be available with the upgrade to a digital system, so it was no great surprise when the operational advantages ‘opened up’ and a new era of PGMs became available to the F-111 fleet. As the capabilities and roles of the aircraft increased, so did the complexity and the level of training required for aircrew and groundcrew.

The digital update involved many major components: laser ring gyro inertial navigation system with GPS, digital stores management system, dual mission computers, digital flight controls, updated Terrain Following Radar (TFR) and new attack radar system. In addition to two multi-function displays in the cockpit for the navigator/weapons systems officer, secure HF and UHF radios were added. Greatly improved electronic warfare equipment was also installed.
Block Upgrade Program

In combination with the AUP, the RAAF incorporated a ‘block upgrade’ (BUP) of the F-111C/G fleet. The upgrades were to include new electronic warfare (EW) equipment and a number of other smaller upgrades to bring the aircraft to a common standard. Also included was the incorporation of a new stand-off weapon, the AGM-142.

In the event, the BUP for the F-111G did not proceed and the ‘C’ upgrade was curtailed. However, the EW equipment was upgraded on the F-111C, a much needed modification.

Precision Guided Munitions

Paveway Series Laser Guided Bombs

Paveway I and II series of bombs, standard Mk 82 (500lb, 227kg) and Mk 84 (2000lb, 900lb) bombs, fitted with laser guidance kits, have been employed as GBUs 10, 12, 22/24 for some years. These bombs are guided by laser energy reflected from the target/s by laser designators, usually Pave Tack equipped F-111C aircraft. The GBU series were developed with great success in Vietnam and refinements have resulted in increased accuracies, to less than 2 metres.

F-111C aircraft released these GBUs in a 10 degree climb, (toss bombing profile) from low level (200-400ft) at high speed and the GBU would reach an apogee of about 3500-4000 feet before heading for the target. The aircraft laser would fire automatically at 10-15 seconds before weapons impact to provide terminal guidance. High level releases were also employed.

AGM-142

The AGM-142 is a rocket propelled air to surface standoff missile, with inertial midcourse guidance and a passive electro-optical (TV or IIR) terminal seeker which relays an image to the launch aircraft via a datalink. The WSO tracks the target aimpoint and command corrections are sent to the missile via a datalink carried in a weapon specific pod. The missile weighs about 3,000 lb and has an 800lb warhead, twice the size of the Harpoon. The AGM142 is used for both land and anti-shipping targets, has similar range as Harpoon when launched at altitude, is supersonic and as it has a passive seeker head, provides no warning of its approach to the target.

As the principal intent of acquiring a standoff weapon was to improve F-111 survivability against high threat targets, the RAAF procured the longer ranging AGM-142/Popeye weapon as it provided significantly better aircraft survivability than the AGM-130 weapon, which had a shorter range, while still capable of inflicting acceptable damage levels on the intended target types.

Procurement of the F-111G

After the USAF Strategic Air Command (SAC) received the B-1B Lancer in 1985, they transferred the FB-111A to the Tactical Air Command (TAC) in 1989, after the nuclear delivery equipment was removed and the nav/bomb system was upgraded. Operating in TAC as the F-111G, they were declared surplus in 1991. Procurement of additional F-111s by Australia offered the opportunity to extend the life of the F-111Cs and the ‘G’ models seemed ideal as they had the same heavy landing gear and extended wingtips of the F-111C, but more powerful engines. Defence Minister Robert Ray announced the Government decision to acquire up to 18 F-111Gs in October 1992, to the surprise of many, including the RAAF.

The RAAF eventually acquired 15 ‘G’ models, 14 from the 27 TFW at Cannon AFB, NM and one from the Aircraft Maintenance and Regeneration Center (AMARC), the ‘boneyard’, at Davis Montthan AFB, Arizona. The first two arrived in Australia in September 1993 and the rest arrived in 1994.

Operated by No 6 Squadron in the new grey paint scheme, eight of the aircraft were used in conversion training, training exercises and show-the-flag missions, preserving the fatigue life of the F-111C. They were retired on 3 September 2007.

Involvement in Exercises

The upgrades to the F-111C/RF-111C aircraft resulted in an outstanding offensive strike platform. The aircraft participated in many exercises in USA (Red Flag, Green Flag), IADS in SE Asia, Pitch Black in Australia and numerous others. In all, it proved its capabilities as one of the best strike aircraft in the world.

Lead-up To Retirement

The then CAF, AIRMSHL Angus Houston, and other senior Air Force members presented a paper on F-111 capability and the Joint Strike Fighter to the Joint Standing Committee on Foreign Affairs, Defence and Trade on 6 June 2004. AIRMSHL Houston said the F-111 capability was “going great guns at the moment. We currently have a very good
strike capability built around the F-111. We have had a lot of problems in recent times, but I am very pleased to say that, with the assistance of the DSTO, industry partners and obviously the elements within the Air Force that are part of the F-111 community, we have remediated the capability fully after three major challenges … the fuel leaks, the fuel tank implosion and the wing breakage.” He praised the “wonderful work” done to fix the problems.

DSTO scientist, Dr Graham Clark, said current testing of an F-model wing and other developments in DSTO could “push out” (the life of) the wings, with good results, to 2010. But the “overriding picture” was one of repeated problems which would present “very serious logistical and availability issues” for the Air Force. Already, flying hours has reduced from an average 5680 hours a year in the period 1974-1979 to an average 3060 for 1999-2003.

AIRMSHL Houston said the problems encountered had changed the ADF’s view of the cost of operating the F-111s and therefore the timetables for their retirement. “When I look at the amount of money that I have to plan with, through to 10 years, keeping the F-111 going really distorts the force structure of Air Force, given that we must transition to a networked Air Force for the future. Making the F-111 compatible with the networked system can be done, but it will be an expensive investment,” he said. The Government planned to spend about $50 billion on capital investment across the ADF and about $15 billion on air combat capability over 10 years.

AIRMSHL Houston said the upgrades of the Hornets would provide an enhanced strike capability. “We will have more lethality and a better survivability … it is a strike capability that is better than the one the F-111 gives us now - and indeed it is one that will give us the capability we need through that period until the Joint Strike Fighter arrives”

Subsequent to the paper to the Standing Committee, the RAAF acquired F-18/F Super Hornets. See ‘The Super Hornet…A New Era” in the Autumn 2010 issue of Wings.

Reflections

The evolution from a great modern weapons system in 1968, albeit with its limitations, to an even greater and very effective weapons system in the 2000’s, is evidence of the strength of the modern RAAF. The decisions of the RAAF air staff and their engineering and logistics advisers to acquire the F-111C, under such adversity, demonstrates the professionalism of the RAAF. The engineering expertise to overcome the earlier setbacks, to introduce the aircraft into service and to maintain the fleet to 2010, is very high. The F-111C’s employment for 37 years as an effective weapons platform is an outstanding achievement for the aircrew, the engineering/maintenance personnel, the logistics organisation and the administrative and support members in the RAAF, and to Boeing who maintained the F-111C to its retirement.

The F-111 Retires

At the time of writing, the F-111C Final Flight is scheduled to land at 1300, 3 December 2010. Wings will feature the retirement ceremonies and last flight in the Autumn 2011 issue of Wings.

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