

ACES HIGH!

LEFT: Wing Commander Peter Chriss, leader of the RAAF's highly successful 1 Squadron at the Red Flag simulated combat exercise

RIGHT: Three young fliers from RAAF Amberley set out in the Nevada desert to pit their wits and risk their lives in a supersonic duel against opposition fighters and surface to air missiles

1989



IN the desert of Nevada, the state famous for gambling, young Australian pilots walk out to dice with death.

The crisp desert air is on their faces and their nerves are tingling.

Here, just north of the blazing neon signs and gambling palaces of Las Vegas, the game is deadly serious.

It's called Red Flag, and it's an exercise to develop battle readiness.

As they walk to their aircraft the Aussie fliers see the Sunrise Mountains rising from the desert, but the sun has set on the lives of 33 other young fliers since this biennial event began in 1975.

Thirty-four aircraft have been destroyed in Red Flag's realistic simulated combat missions out of Nellis Air Force Base.

The Aussies from Amberley are members of the elite F111 Strike Reconnaissance Force, described by the RAAF as Australia's major defence deterrent.

Some pilots returned from the 1988 Red Flag Mission knowing they had come close to death.

"It was a sensory overload," an RAAF navigator said of the supersonic struggle to avoid the surface to air missiles hurtling at them.

High tech fighters ripped through the Nevada skies trying to shoot them down as they concentrated on delivering their laser-guided bombs on target.

"It was as close as you could get to hell," one pilot said.

But these jet age gladiators are accustomed to pushing themselves to the limit and beyond.

They do it to defend the moat, says Wing Commander Peter Chriss.

The moat is the water around Australia that an aggressor must cross.

This year the RAAF's F111 contingent — 127 members from No. 1 Squadron, Amberley — went to Red Flag armed with Pave Tack, a brilliant weapons system which delivers laser-guided bombs with pinpoint accuracy.

With more than 120 Red Flag aircraft using runways and at least as many more also operating from Nellis, one of the US Air Force's biggest bases, the pressure was intense.

Most of the Red Flag accidents happened in the early days. Since then the programs have

“The awesome firepower of the F111s was dramatically demonstrated”

matured and the number of accidents has declined.

Nevertheless, the dangers are extreme.

The F111 normally attacks at night, using terrain-following radar to fly fast and low under enemy radar.

The US attack on Libya in 1986 showed the power of the plane in its nocturnal role.

At Red Flag, however, all the action was in the daytime.

The RAAF's fliers, backed by a dedicated ground crew, proved indomitable.

Wing Commander Criss said: "In the two-week exercise the reliability and awesome firepower of the Pave Tack-equipped F111s has been dramatically demonstrated."

Late last year another element of the RAAF's Strike Reconnaissance force, from No. 6 Squadron, returned triumphant after beating top US fliers in their own patch of sky.

The Amberley aces outclassed US teams flying flashy F14 Tomcats — Top Gun aircraft — and others of the US flying elite in a major international photo reconnaissance competition called RAM 88.

Last year an F111 from No.1 Squadron scored with the most damaging operational blast ever by the RAAF, a \$1 million hit with a Harpoon missile on a ship target in the Pacific during the major maritime exercise RIMPAC 88.

Then F111s from 1 Squadron showed the media what they were capable of by using Pave Tack to destroy four widely dispersed targets in sequence, as planned, each with one specifically nominated weapon.

That success was at Townshend Island off the central Queensland coast. Now the RAAF has repeated the triumph over the Nevada desert.



Amberley F-111s next on hit list, warns MP

RAAF Amberley's F-111 fighter-bombers could be next on the mothball heap after the scrapping of the Ipswich base's fleet of Chinook helicopters, the Opposition said today.

Gold Coast Liberal MP and former Opposition defence spokesman Peter White said a "hit list" of defence spending cuts had been drawn up for this year's Federal Budget.

Under the radical cuts, Australia's FA-18 Hornet fighters could even be grounded or sold and a 3000-member army unit disbanded.

The Federal Government will withdraw the

From

GREG MAYFIELD

RAAF's 11 remaining Chinook helicopters from service at RAAF Amberley.

Dozens of staff are expected to be transferred from the base as a result of the decision, and as many as 121 workers may eventually be affected at the base if F-111 cuts are made.

Defence Minister Kim Beazley said the department could neither afford nor justify keeping the Chinooks, considering the capabilities of the army's new battlefield helicopter, the Black Hawk.

The decision will save about \$110 million in operating costs in five years, the money to be redirected to priority areas of the defence force.

Mr White said the Chinook fleet was being mothballed because of a huge miscalculation in the balance between operations, employment and personnel.

He said the army, navy and air force would have been told to submit areas for spending cuts.

Option

He said one of the options open to Mr Beazley was to ground one of Australia's three FA-18 squadrons, comprising about 18 to 20 of the multi-million-dollar fighters.

He said as many as a third of Amberley's 22 F-111s could be sold and the reconnaissance-training and strike sections amalgamated.

A third option was to disband a brigade at the army's Holsworthy base

in Sydney, relocating the men.

Mr White said: "I think all three options are being considered by the government."

"I would not be surprised to see all three happen."

"It is a bloody disaster, (the Chinooks) are essential for the proper deployment of the Australian defence force."

The Black Hawk costs only \$2390 hourly to operate, compared with about \$7080 hourly for the Chinook, and it has a much higher serviceability rate.

Of 39 Black Hawks being bought, 10 are already in service.

Mr Beazley paid tribute to those who had served in the Chinook squadron.

A new army unit, the 5th Aviation Regiment, has been formed in Townsville where training of Black Hawk a. crew and technical personnel is proceeding.

Four hundred more service personnel, many with families, will be posted to Townsville.

BRISBANE

Amberley to keep its F-111s, says Beazley

THE future of Amberley Air Force base and its two F-111 squadrons was assured, the Federal Defence Minister, Mr Beazley, said yesterday.

Mr Beazley said suggestions that Australia's 22 F-111 fighters would be mothballed were "nonsense".

Speculation about Amberley's future arose this week when the Federal Government decided to withdraw from service the base's 11 Chinook helicopters.

Mr Beazley told Parliament yesterday the development of the F-111 would continue to be a high priority for the Government.

He said said the Govern-

By PAUL WHITTAKER

ment had shown its commitment to the future of the F-111's by its decision to spend \$200 million to upgrade the aircraft's outdated avionics system.

Less than a decade ago there were five operational F-111 squadrons at Amberley. Only, the two remain.

Mr Beazley faced further questions last night when the Opposition defence spokesman, Mr Carlton, said Mr Beazley was yet to adequately answer questions about the effectiveness of the new Black Hawk helicopters.

The Federal Government announced this week the

scrapping of the Chinooks in favor of the Black Hawks would save \$110 million in operating costs during a five-year period.

Mr Carlton said unlike the Chinook the Black Hawk could not carry the large artillery and equipment needed in the field.

Gold Coast Liberal MP and former Opposition defence spokesman, Mr Peter White, last night said the Federal Government had its priorities wrong at Amberley.

"The Chinooks are an essential part of any modern defence force and getting rid of them is a tragedy and a further loss of our defence capabilities," he said.

RAAF PLANNING FOR 21st CENTURY OPERATIONS VIA UPDATED F-111 FORCE

by Jim Thorn

A planned \$200m avionics update of the RAAF F-111C force will see this unique strike aircraft remain in service through till the year 2010.

A Request For Tender was issued at presstime for the long awaited upgrade which will essentially convert the aircraft's 1960s designed avionics systems from analog to digital. All USAF F-111 aircraft are being upgraded under a similar programme aimed at greatly increasing the capability of the basic aircraft in addition to enhancing its reliability as a functioning weapons system. At present, the complex and labour intensive analog systems require an above average quota of maintenance man-hours per flight hour to maintain but will also be insupportable by the mid nineties due to the unique and outdated nature of their design. The upgrade is expected to greatly reduce the overall maintenance requirement of the F-111 force while ensuring a greater number of aircraft are available on a week to week basis on the flight line.

Two consortiums are bidding to win the upgrade contract. Hawker de Havilland has teamed with Rockwell while Aerospace Technologies of Australia have teamed with General Dynamics. Both consortiums have excellent track records for the updating and integration of complex systems within aircraft. Rockwell already supply the IFF and tactical navigation equipment for the RAAF's F-18s in addition to the ATC system at the Richmond air force base. HdH integrated (as then CAC) the complex AQS-901 avionics suite in the P-3 update programme and are also responsible for converting four of the RAAF's Boeing 707s to tankers in conjunction with Israel Aircraft Industries. ASTA of course have been busy integrating surveillance systems in Nomad airframes for the best part of a decade and more recently have increased their capabilities in this area through their association with the US Customs Service and Brookland Aerospace in the UK via the Scoutmaster. General Dynamics, their project team-mates, were of course the original builders of the F-111 (as Convair) and in recent years have been involved in the wide ranging USAF F-111 update programme which will closely parallel our own requirement.

With the RFT being issued prior to Christmas, it was hoped a winning contender would be announced before the end of 1989 which would then allow the first aircraft to be in service around 1992/93. It is planned that between 3 and 4 aircraft would be upgraded annually while the first aircraft to be converted would be the colourfully painted test aircraft presently in use with Edinburgh's Aircraft Research & Development Unit (ARDU).

This of course is not the first significant update that 82 Strike Wing's F-111 force have had. Dating back nearly a decade the RAAF decided to equip our aircraft with the very potent Pave Tack precision strike targeting system, a \$167m decision that led to the first of type entering RAAF service in the mid eighties.

Australia acquired 24 F-111C aircraft during the early sixties as a Canberra bomber replacement during the heady days of Confrontation with Sukarno's Indonesia. Problems initially led to the aircraft being technically mothballed in the US from 1968 through till 1973 when they finally entered RAAF service. The primary problem at that time was with the complex wing folding mechanism, a situation that was fully rectified prior to entry to RAAF service. Australia later acquired 4 additional ex-USAF F-111A aircraft which were then converted to C standards.

Ironically the RAAF had all along required a long-range, all weather, reconnaissance capability and was looking to use the F-111 in this role. The most cost effective solution would have been to have acquired 4 F-111A aircraft from US reserves of the

time and convert them without bringing them up to C standards. However, funds were constantly denied this logical acquisition and so the RAAF was eventually forced to modify 4 existing C aircraft to RF-111C standards. With attrition came a requirement to obtain more aircraft and so finally DoD was forced to purchase, at a much higher unit price, the 4 F-111As that it rejected several years earlier.

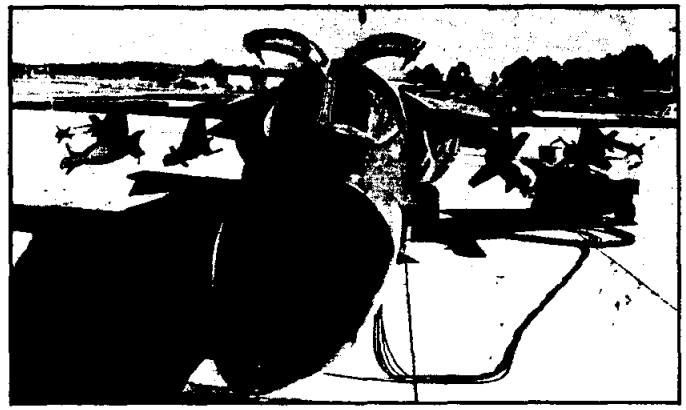
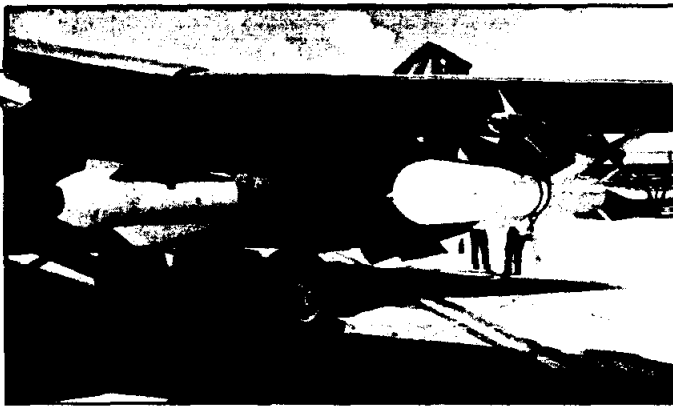
Today the RAAF operates 18 F-111Cs in the strike role and 4 RF-111C in the recce role. While A series aircraft are presently scarce, the RAAF still hopes that some additional A models might be procurable during the early nineties to bring both squadrons back up to their full complement. No82 Wing comprises No1 and No6 squadrons, 1 being the primary strike squadron while 6 is used as the hybrid strike and training/conversion squadron and also is home to the recce birds.

Pave Tack has given the RAAF an entirely new strike capability far superior to that of any other resident air arm in South East Asia. The F-111C is indeed a difficult aircraft to replace. Fully loaded it has a conservative tactical radius, without tanking, of over 1,000nm. Nothing can come near that and still approach the target at minimum height using its Terrain Following Radar at 500kts plus. The use of minimal weight Precision Guided Munitions (PGM), tanker support and an advanced nav/attack system allows the aircraft to operate over ranges restricted only by crew fatigue, as was ably demonstrated by the 1986 USAF F-111 raid on Libya.

The Pave Tack system is housed in the aircraft's bomb bay and is lowered on approach to the target area. Target acquisition can be accomplished using any one of several manual or computer search modes. The field of view and scene magnification can be selected to enhance target recognition. The target, once located by the Weapon Systems Operator (still quaintly referred to as a Navigator in RAAF parlance), can be locked up and designated even if the aircraft is performing severe evasive manoeuvres. Once target tracking is established, the laser can be fired continuously to determine exact target range until weapons release. If laser guided weapons are being deployed, the laser is again continuously fired after weapons release, while maintaining target tracking, until weapon impact. During target egress the target area is still tracked for damage assessment. Thus the entire mission can be performed at high speeds at minimum altitudes during adverse weather conditions at any time day or night.

With the GBU-15 the swivelling seeker head slaves on to the image of the target while the navigator locks up the target visually in preparation for launch of the TV guided 2,000lb GBU-15 glide bomb. A 4G pull up is then initiated and the bomb is tossed into a trajectory that will maximise its range profile thereby keeping the launch aircraft well away from the potent area defence systems likely to be encountered around any priority one target. Once stabilised in flight the operator can then guide the bomb directly onto its target with unerring accuracy. By the time the bomb has impacted its target the 111 is well away, in the weeds and heading for home at high speed. The radar image the aircraft displays on its initial pull up would be, in most cases, the first evidence of an attack.

And the results of such an attack is indeed impressive. According to the RAAF, the Circular Error Probable (CEP, a measure of the bombing accuracy of different air to ground weapons) of using standard unguided bombs is 131ft. Using Pave Tack and with GBU-15 the CEP comes down to a devastatingly accurate 3ft, with the laser guided Paveway series 2,000lb GBU-10 and



Loaded for bear – shown on the starboard wing stations is a 2,000lb GBU-15 glide bomb (left pic) with an AGM-84 Harpoon antiship missile and an AIM-9L Sidewinder Air to Air Missile on the outer pylon. (right) Weapons, right to left are a Sidewinder AAM and a 2,000lb GBU-10, a single 500lb GBU-12 laser guided bomb, a 2,000lb GBU-15 TV glide bomb, a Harpoon ASM and another Sidewinder AAM. In the maritime strike role, the 111 would typically carry 2 Harpoons and 2 HARMS with 2 Sidewinders, while in the high priority land strike role the strike inventory would include the various GBU series PGMs in conjunction with HARM and Sidewinder. (Jim Thorn)

500lb GBU-12 some 19ft and with standard unguided bombs still an impressive 60ft. Another example of this force multiplication factor is evidenced in that it would typically take 25 sorties dropping a total of 200 2,000lb bombs to take out one reinforced bunker. That decreases to 1 sortie using 4 GBU-12 500lb laser guided bombs or 2 sorties using 8 2,000lb GBU-10 laser guided bombs (proving ironically that the larger bomb is not necessarily always the most efficient).

The bottom line, of course, is that a single Pave Tack equipped F-111 can take out a highly defended priority one target in a single mission with a minimum of danger to itself, in the immediate precincts of the target. Formerly this type of target (as evidenced by the thousands of bridge attacks on North Vietnam which literally become killing grounds for the NVA air defence gunners) would have required a large number of sorties with a consequently high attrition rate. Pave Tack changes all that. Australian Aviation was fortunate to witness a series of such attacks against simulated targets on the RAAF's bombing range at Townsend Island, off Rockhampton. The unnerving accuracy of the various weapons was indeed impressive.

Also impressive is the fact that DoD in recent times has at last begun to appreciate that the F-111 force is not only here to stay but is a vital component of our long-range maritime and land strike force. Working as a triad with the Harpoon equipped F-18s and P-3C Orions (and utilising Jindalee and the tankers) and combined with the resources of the RAN Australia, it would indeed demand a high price from any potential aggressor wishing to land a sizeable force on our mainland.

To further add to the F-111's potency, the acquisition of HARM (Homing Anti Radiation Missile) is being sought and it is hoped that this missile will be in inventory by the time the first updated aircraft becomes operational. HARM is essentially a radar def-

ence missile. When the F-111 enters hostile airspace and detects a radar emission from a ground based emitter, such as a SAM (Surface to Air Missile) or an anti aircraft gun unit, then it can fire the HARM which then homes in on the radar emission, destroying the unit in the process.

This of course does two things, it either physically eliminates the threat or more conveniently forces the enemy to shut down his many radars for fear of the obvious. Either way the ingressing strike force can be assured of a greater chance of survival. Other defensive systems employed by the F-111 are chaff, infra-red decoy flares and ECM.

The aircraft is already equipped with the all aspect AIM-9L Sidewinder IR Air to Air Missile though this primarily would be necessary only in a day mission environment. Most wartime attacks would be conducted under the cover of darkness using the Pave Tack's excellent infra-red capabilities which literally turn night into day for the attacker. Addition of Sidewinder though presents the defender with a more complex range of options in attacking the 111 once he is aware that it has itself a considerable self defence capability. Making the defender's job more difficult and complex is, after all, a crucial component of the mission in that it makes him concentrate more resources to your attack profile than would normally be the case.

Our F-111s are also equipped with the latest Block 1C air to surface anti ship Harpoon missiles. This mark of the very accurate Harpoon is capable of numerous spoofing mid course deviations and is more advanced than the Harpoons presently equipping the P-3 and various RAN units. Harpoon has an effective range of around 60nm and both longer range and land strike versions are under development for possible future RAAF use.

Continued on page 79

(left) a 2,000lb GBU-10 shares the outer underwing pylon with an AIM-9L Sidewinder AAM. (right) The Pave Tack 'canoe' in the deployed mode beneath the belly of the F-111, the swivelling seeker head unit is at the rear of the structure and in this case is looking away from the camera. Addition of Pave Tack provides our F-111 force with a deterrent capability unequalled by any nation in the region. (Jim Thorn)



The RAAF is also equipping four of its six Boeing 707s for tanker operations using the probe and drogue system for the F-18 Hornets. However, the F-111 requires a USAF boom system and while this is not included in the initial 707 tanker refurbishment programme, it is hoped that at least two of the 707s will be so modified by the mid nineties. At present the USAF work closely with 82 wing and all 1 Squadron crews are fully tanker proficient.

The latest decision to invest a further \$200m in our F-111 force puts to bed for good any indecision as to the type's long-term future in the defence of Australia and can only greatly enhance our overall deterrent posture in the decades ahead. □

An in-depth analysis of all aspects of the RAAF F-111C update will be addressed via our Technology Explained series in a later edition of Australian Aviation.

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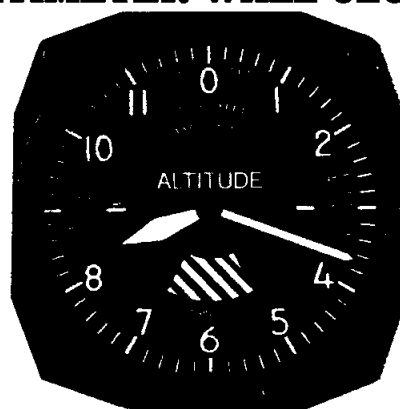
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modes. Two additional wing pylons and 12,000lb J52-P-409 engines will allow a full complement of jammer pods plus two HARM rounds. A new pod mounted ITT ALQ-149 Communications Jammer will also be carried.

The Grumman/General Dynamics EF-111A Raven

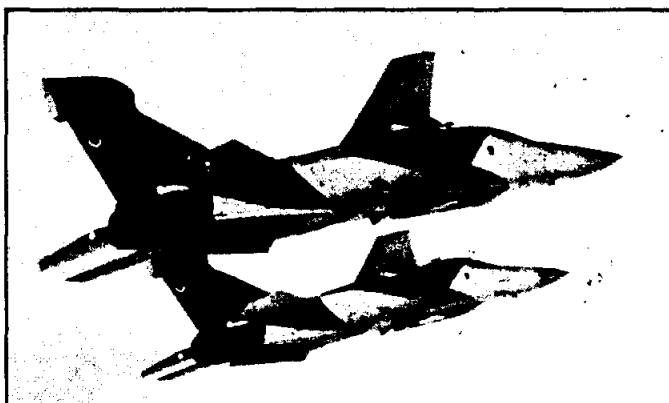
The EF-111A is the USAF's first true tacjammer. The need for such an aircraft became most apparent in South East Asia where the USAF EB-66B/E was constrained to the SOJ role lacking the performance to survive in a MiG and SAM saturated environment. While the USAF recognised the effectiveness of the Navy EA-6B, the EA-6B lacked the performance and endurance required by the USAF to support its fast F-111 and F-4 tactical fighters. The high density European theatre would require an upgraded ALQ-99 and a high performance airframe to carry it. The analogue F-111A was the natural choice with some airframes surplus to the A-model wing. Both prototypes of the EF-111A flew in early 1977 and were rebuilt from existing low time airframes, with 42 production rebuilds being delivered from 1981 onward.

The airframe of the EF-111A differs little from the basic F-111A the only major structural changes being the fitting of a large fairing to the top of the vertical stabiliser and the installation of a jammer pallet in the internal fuselage weapon bay. Internal changes were substantial with a resculptured cockpit, numerous antenna and wiring installations and presumably a major increase in electrical power generation capability to support the thirty jammer electronics. The aircraft retained the geriatric AJQ-20A nav-attack and APQ-110 Terrain Following Radar (TFR) but acquired a newer APQ-160 attack radar.

The EF-111A carries the ALQ-99F which had 70% commonality with the Navy ALQ-99. The ALQ-99E offered much faster threat acquisition and identification while being substantially automated with only one Electronic Warfare Officer required to operate it. Each jammer in the 99E could cover a larger number of threats than the Navy version (spot noise jamming where the jammer dwells on the frequency of each threat radar for a programmed fraction of a second after which it retunes to the next and so on ...) and used multi-mode antennas which allowed omnidirectional and directional transmission. Ten jammers each with a steerable antenna are carried in the weapon bay, the antennas protruding below the fuselage concealed under a distinctive canoe radome. The USAF are understandably secretive about the 99E therefore little has been published on the system level tie-in with the remaining aircraft systems.

The aircraft also carries the upgraded ALR-62(V)4 Terminal Threat Warning System (TTWS) which is designed to 'look through' the powerful jamming transmissions of the ALQ-99E. Defensive jamming is provided by the capable ALQ-137 track-breaker ECM which is common to SAC's FB-111As (refer TE Sept 88) and provides fore and aft coverage. Antenna placement on the EF-111A differs from the F-111 with receiving elements of the ALR-62, ALQ-137 and ALQ-99E situated in the tail fairing with some ALQ-137 transmit antennas and ALR-62 forward antennas on the wing gloves and nose.

Given the architecture of the EA-6B/ALQ-99 and the known major modifications to the ALR-62(V)4, it is very likely that the ALR-62 TTWS performs a similar function to the ALR-42 SIR in the EA-6B, detecting, classifying and prioritising threats for the automatic set-on receivers of the ALQ-99E and defensive ALQ-137. Under the control of the ALQ-99E's internal processor jammers would then be directed against selected threats. Cockpit interior layouts released by the USAF indicate a large rectangular CRT display on the right hand side of the FWO's panel beneath which is a control keyboard and above which is a combined TTW/DECM indicator panel. A bar telltale status indicator is provided for the ten jammers which have individual mode controls and automatic and manual steering controls on a right hand side console panel. Available information suggests coverage in six bands in early aircraft, it is likely that subsequent upgrades provide full C to J band coverage as in the Navy Icap Prowler.



USAF/Grumman/General Dynamics EF-111A Raven. USAF EF-111As play a major role in the European theatre, concealing AWACS airborne command posts and other high value assets from Warpac long range SAMs and fighters. Other missions include standoff jamming support for close air support missions and escort jamming support for deep penetration strikes. The effectiveness of the EF-111A in the latter role was amply demonstrated by the stunning TAC raid on Tripoli in 1986, supported by three Ravens from the 42nd Electronic Combat Squadron at Upper Heyford in the UK. (Grumman)

At the time of writing the US\$81.5m Eaton/AIL/General Dynamics upgrade programme, running since 1984, was cancelled by USAF Systems Command who regarded cost overruns and schedule slippages in the contract as unacceptable. This upgrade involved new high band exciters for the ALQ-99E jammers many of which were originally designed by AIL; of the 49 Line Replaceable Units in the ALQ-99E, a third were designed and built by AIL. The USAF was to decide whether completion of the programme is to be awarded to Grumman who lost out in the 1984 bidding. It is however certain that the cost overruns and delays will postpone the USAF's plan to fit the upgraded Litton receiver set developed for the EA-6B Advcap thus leaving the EF-111A's capabilities well behind those of its Navy counterpart.

It is unclear what impact this will have on longer term plans which apparently include phased array antennas (much like the B-1B/ALQ-161) for the jammer transmitters; these will allow time sharing an antenna between several threats without a penalty in power delivered to the threat. Phased arrays allow nearly instantaneous pointing of very tight beams which concentrate more jamming power on the threat. It is almost certain that the EF-111A will undergo the full USAF F-111A/E offensive avionics/flight controls upgrade currently under way and proposed for RAAF F-111s.

The longer term outlook is most likely that of the EA-6B and EF-111A being replaced by a derivative of the A-12 Advanced Tactical Aircraft (ATA) early in the next century. The ATA is currently being designed as a stealthy multi-role replacement for the A-6E and later F/FB-111 aircraft.

Mission Profile

The EA-6B and EF-111A have been optimised for the naval strike and high density air/land battles respectively, therefore a broad spectrum of missions is flown.

The EA-6B will spend most of its time in two roles – electronic support of the fleet and support jamming during air strikes. The former role involves a considerable amount of electronic recce (ELINT) in conjunction with dedicated EA-3B, EKA-3B, ES-3A and ASW/ASUW S-3A/B aircraft, sniffing for and investigating the electromagnetic emissions of hostile naval forces and shore based installations.

The other aspect of this role is the jamming of radars on hostile surface vessels, recce and strike aircraft in support of anti-shiping strikes by friendly aircraft or maritime air superiority/defence missions directed at hostile maritime strike aircraft. In this uniquely naval mission the EA-6B is a potent offensive and



USN/Douglas EKA-3B Skywarrior. The elderly EKA-3Bs and EA-3Bs provided support jamming and electronic recce during the Vietnam conflict. In the latter role the aircraft is still used although it is to be replaced by ES-3A Vikings rebuilt from ASW airframes. (Jim Thorn)

defensive tool. The other major aspect of the Prowler's mission is support jamming and defence suppression during strikes on coastal targets. These missions may involve penetration with escort jamming or simply stand-off jamming.

The EF-111A has been by design targeted at the high density central European air/land battle and three classes of mission are envisaged.

In Stand-Off Jamming missions, the EF-111As would operate at altitude 200 to 400nm from the battle front from where they would 'snow' Warpac long-range surveillance radars probing for Allied AWACS, JSTARS, TR-1 surveillance/recce aircraft, EC-130H Compass Call communications jammers and tankers. These valuable but slow moving aircraft are vulnerable to long-range SAMs such as the SA-5 (range cca 160nm) recently deployed in central Europe, while it also appears that the Flanker and new AS-11 ARM firing defence suppression Foxbat F would be employed to dash through the NATO fighter/SAM screen on dedicated AWACS killing sorties.

Operating in pairs the EF-111As would blind surveillance radars and attempt to confuse ground based direction finding systems thus preventing the Warpac from locating and destroying some very important assets.

In Close-in Jam missions the EF-111A would approach the forward battle area and blind the Long Track, Flat Face, Clam Shell and Land Roll mobile surveillance/acquisition radars to approaching NATO A-10, Jaguar and Harrier Close Air Support (CAS) aircraft. This leaves the CAS aircraft only up against the Warpac's terminal defences and allows ingress well above 500ft while over friendly airspace thus saving a considerable amount of precious fuel.

On Primary Jamming missions, the EF-111As fly as escort jammers with deep penetration strike aircraft such as the F-111E/F. Typically the aircraft all penetrate using TFR at very low level and hopefully undetected. As the strike aircraft approach the radar horizon of the target's area defences, the EF-111A would pop up to several thousand feet and jam any radars which would be considered a threat, while the strike aircraft pound the target from tree top altitude. These tactics were employed against the Libyans in 1986 quite successfully with no SAM hits reported.

High performance tactical jamming aircraft are a necessary part of any major air power and represent the most effective means of disrupting the control of the enemy's defensive system. Once that has occurred the individual SAM and AAA systems have no means of coordinating and concentrating their fire on

specific targets. This renders them essentially ineffective when confronted by the onboard defensive jammers of the attacking strike aircraft.

While the acquisition of specialised aircraft such as the EA-6B and EF-111A is out of the reach of smaller air forces, multi-role tactical jamming/defence suppression aircraft such as the Tornado ECR are an affordable and reasonable means of performing these roles. It will be interesting to see whether the RAAF responds to this emerging trend. The payoff is considerable. □

FIREPOWER!

Firepower. That's what you need when you embark upon a marketing plan for your aviation product or service. Firepower in advertising spells high audited circulation, a large and productive readership base, solid demographics of age and occupation backed up by a reliable, high quality medium that will more than adequately enhance your company's image.

Australian Aviation can offer the advertiser this and more. With a CAB audited circulation of **18,059**, (Australia's **largest** by a wide margin and 91% of which is paid) and a readership of over **52,000*** we can deliver your message to Australia's largest and most effective aviation audience. Additionally the **average reader age is a mature 33 years** while some three quarters of our total readership is in the **high response 25 to 54 years of age category***. On top of that **55%*** of our 52,000+ readers actually work within the aviation industry.

And if that wasn't enough then Australian Aviation is also the official organ of no less than five of Australia's most prestigious and influential trade associations: the **Australian Business Aircraft Assn**, the **Association of Australian Aerospace Industries**, the **General Aviation Assn**, the **Aviation Law Assn** and the **Helicopter Association of Australia**. Top that for reader credibility!

So, if you are seeking to gain a wider market awareness for your aviation product or service, there is no better promotional medium than the magazine you are reading now. But, don't take our word for it, **phone** the advertisers in this edition and ask them where their greatest advertising response comes from. If we weren't confident enough to suggest you do that, then we wouldn't be number one, right.

For more information contact Jim or Margaret Thom,
Australian Aviation, PO Box 105, Weston Creek ACT 2611
Phone: (062) 88 1677 or Fax: (062) 88 2021

* Derived from our 1986 reader survey estimating 2.9 readers per issue with accompanying demographic data.

The F-111 has become a mechanic's nightmare, but Lakenheath kept its mission-capable rate above command standard anyway.

Team Jaeger

BY JAMES W. CANAN, SENIOR EDITOR

AFTER a rocky start in the 1960s, the F-111 has served the Air Force well in strategic and tactical roles for more than twenty years. F-111s performed handsomely in Vietnam and carried out Operation Eldorado Canyon, the demanding long-distance raid on Libya from England in April 1986.

But the F-111 has become a mechanic's nightmare. It is "an old airplane with too many moving parts—the whole wing moves, of course, and it has lots of flaps, slats, false spoilers, and what have you. The airplane is very maintenance-intensive."

That description comes from Col. Richard L. Jaeger. He knows from experience how hard it is to keep F-111s in shape for flying and fighting, and his extraordinary success at that task is all the more impressive in view of the difficulties involved.

Colonel Jaeger won the Air Force Association's 1989 Thomas P. Gerity Memorial Award for Logistics Management for having "led a maintenance team that achieved unprecedented levels of readiness" with its wing of F-111s at RAF

Lakenheath, United Kingdom. The award was presented at AFA's forty-third national convention last September in Washington, D. C. Colonel Jaeger received AFA's highest honor in the logistics field "for his unparalleled professionalism in leadership of the largest F-111 maintenance complex in the Air Force. His mission accomplishment and logistics management have set standards for years to come."

In nominating Colonel Jaeger for the award, Gen. William L. Kirk, then Commander in Chief of US Air Forces in Europe, commended him for "achieving superior results with the hardest-to-maintain, most complex aircraft in the inventory at an overseas location where logistical support is a constant challenge."

Colonel Jaeger, now stationed at Tinker AFB, Okla., earned the Gerity award while serving as Deputy Commander for Maintenance of the 48th Tactical Fighter Wing. The "Statue of Liberty Wing" is made up of eighty-two F-111s, including those used on the Libyan mission in 1986. Colonel Jaeger was responsible for the operations, training, and

well-being of the wing's 2,300 maintenance personnel.

Never Below Seventy

He got results that were, by all accounts, hard to believe. For example, the wing's fully mission-capable (FMC) rate—the number of F-111s with all systems functioning as they should—averaged seventy-four percent for the year. This was an eye-popping twelve percent higher than the USAFE standard and a dramatic 10.6 percent improvement on the wing's previous all-time high.

The FMC rate for the 48th's F-111s was a model of consistency, too. Not once during 1988 did it drop below seventy percent. Twice, during June and July, it topped eighty percent.

In recommending Colonel Jaeger for the AFA award, USAFE noted that "it was his ability to clearly define goals, put the right people in key leadership positions, enforce strict compliance with technical-order and tool-control procedures, and insist on supply discipline that made this superb achievement possible with aircraft over twenty years old."

Colonel Jaeger augmented his leadership and managerial abilities with an inventive turn of mind. He was cited by USAFE for his "personal work with Air Force Logistics Command to solve a flux-valve problem" that had plagued his wing's F-111s. Working closely with AFLC's Sacramento Air Logistics Center, the colonel and members of

Jaeger' created a new yardstick for others to measure themselves by."

The wing's extremely high readiness rates made Colonel Jaeger proud but also somewhat skeptical. He questioned their validity.

Work, Practice, and Luck

"The numbers were so good," he recalls, "that I began personally in-

[wing's] deputy commanders for operations and for resource management," the colonel says. He also notes that he received "absolutely superior support from Third Air Force, USAFE, Sacramento ALC, and British Aerospace," which runs the maintenance overhaul depot that serves RAF Lakenheath.

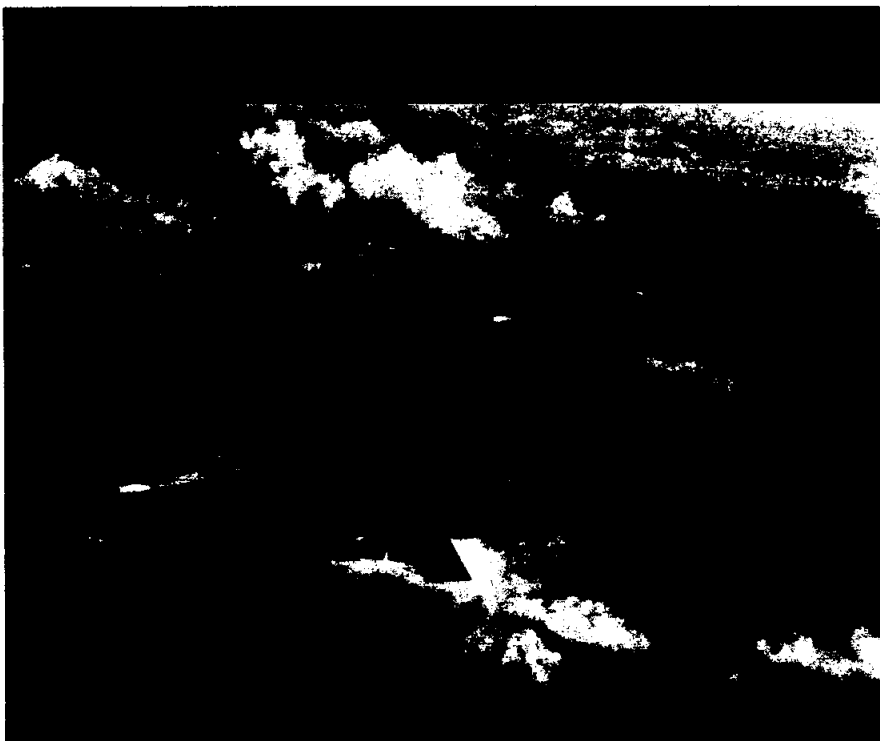
It seems that Colonel Jaeger gave as much support as he received. As the USAFE recommendation notes, "in the face of constant mission demands, Colonel Jaeger expertly maintained a balanced, people-oriented leadership style. He was constantly aware of and responsive to his people. . . . He created an atmosphere in which they felt free to think creatively, and his encouragement of innovation resulted in extraordinary ideas for saving time and money, many of which were adopted at the command and Air Force levels."

Demands on the maintenance team were heavy at Lakenheath. According to USAFE, the team was taxed in 1988 by such difficulties as "extremely poor weather [and] a depot call-back of twenty-two engines . . . with suspected turbine side-plate cracks." In addition, it had to cope with the effects of Air Force budget cuts and take care of large numbers of transient aircraft.

But the maintenance team's toughest challenges lay in seeing its F-111s successfully through the annual USAFE bombing competition and twenty-seven operational exercises, an average of more than two a month. It met those challenges and more, breaking USAFE records in the generation and regeneration of aircraft.

In one exercise, enough F-111s were generated to meet the wing's twelve-hour goal in less than half that time, or five hours, eighteen minutes.

"Our generation rates were astounding," Colonel Jaeger recalls, "but we worked for them. We also practiced covert generation of aircraft, because we never knew when we might have to go do the real thing. Not everyone would know about those exercises. I'd use just enough people to get the job done. I'd say to them, 'I need you to do this, but I can't tell you why.' And they always went out and did what they had to do." ■



More than twenty years old, the F-111 has become a mechanic's nightmare. Nevertheless, Col. Richard L. Jaeger, Deputy Commander for Maintenance of the 48th Tactical Fighter Wing at RAF Lakenheath, United Kingdom, kept the wing's F-111s' fully mission-capable rate twelve percent higher than the USAFE standard.

his maintenance force developed "a new machine to swing flux valves more quickly and precisely."

The flux-valve problem was the main reason why the partially mission-capable (PMC) rate of the wing's F-111s had been far too high. Once the problem was solved, the PMC rate came down dramatically to a level much lower, and thus much better, than the USAFE norm.

As a result, the 48th TFW's mission-capable (MC) rate, which takes into consideration both the FMC and PMC rates, climbed to "a superb 78.9 percent, far surpassing the USAFE standard of seventy-one percent," said the USAFE citation. "So high did the numbers climb that in 1989, USAFE leaders were obliged to raise standards—and not just by a little bit. 'Team

specting the airplanes and keeping track of things to make sure they were accurate. And they were.

"We worked for those numbers. We had good people, and we practiced a lot and we practiced hard. That's a big part of my management philosophy. It comes down to telling people what you want, giving them the resources to do it, and giving them plenty of opportunity to practice."

Colonel Jaeger, who piloted RF-4C tactical reconnaissance aircraft on 196 combat missions in Southeast Asia, says he owes his success as a maintenance commander to "a little bit of luck" as well.

"I was fortunate in having a wing commander whose style was not to micromanage, and I enjoyed very close working relationships with the

RAAF strike jets ready for Gulf

AUSTRALIA'S two squadrons of F-111 fighter-bombers based at Amberley in Queensland are ready to go to the Middle East.

Defence experts said if the United Nations sanctioned military liberation of Kuwait, Australian F-111s could be fighting over the Gulf within a week.

The strike aircraft would be "first cab off the rank", and Australia was the only country outside the US with an F-111 force.

Modifications that made the RAAF craft more versatile would render them especially valuable in a Gulf war.

The defence experts said the F-111s, with their awesome strike power — one has a greater destructive force than an entire squadron of World War 2 bombers — would be by far Australia's most important contribution in a Gulf war.

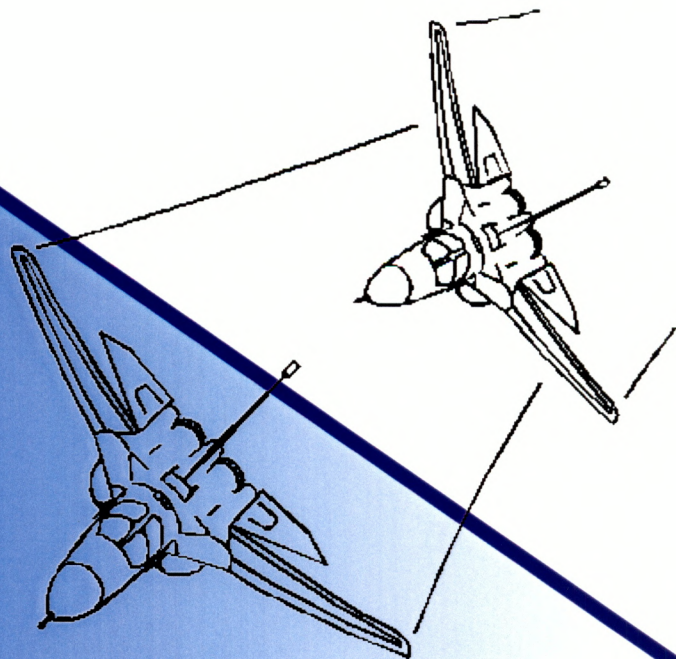
Although old by US standards, recent multi-million-dollar refits have crammed the planes with the latest weapon technology.

The RAAF has 22 F-111s, 18 of them recently modified to carry the 21st century style Pave Tack system which uses a laser beam to guide bombs. They also have the Harpoon anti-ship missile, more accurate and lethal than the Exocet missile.

The Australian F-111s would probably operate from Turkey, where the necessary support has already been set up by the US F-111 force.

With swing wings and terrain-following radar, they can fly at twice the speed of sound, hugging the ground or sea by day or night, in any weather, to strike with "surgical precision".

Courier Mail (QLD)

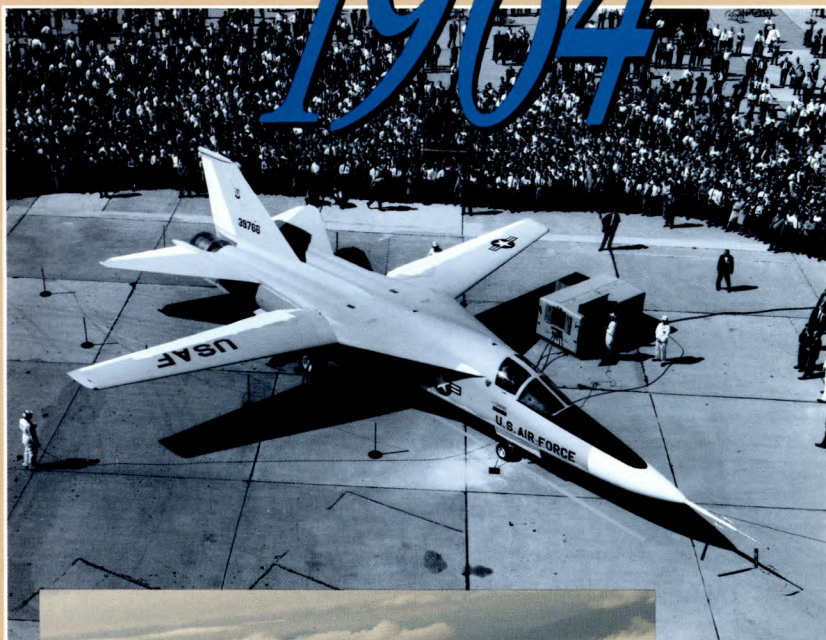


1990

NEWS PAPER CUTTINGS AND
ARTICLES OF INTEREST for
the year 1990

AN SRLMSQN PERSPECTIVE

OCTOBER 15 1964



Remember 1964? Lyndon Baines Johnson was elected president. Leonid Brezhnev replaced Khrushchev as the Communist Party Secretary in the U.S.S.R. Elizabeth Taylor divorced Eddie Fisher and wed Richard Burton. Cassius Clay defeated Sonny Liston to win the world heavy-weight boxing championship. Richard Hofstadter won the Pulitzer Prize for *Anti-Intellectualism in American Life*. The year also marked the first flight of the F-111.

The plane established a place in aviation history as the first aircraft with a variable-sweep wing and the first with a terrain-following radar for high-speed flight at low altitude. The first F-111 eventually led to the delivery or creation by modification of eight different models of the aircraft. The Aardvark has set numerous speed records, including the longest low-level supersonic flight (172 miles below 1000 feet) and the first tactical aircraft flight from the United States to Europe without refueling. In 1986, an FB-111A crew made national news by transporting a donor heart cross-country at 700 mph for delivery to a transplant patient.

The last new-production F-111 was delivered from General Dynamics in 1976, taking off simultaneously with the first F-16.

Today, a quarter century after the first flight, F-111s continue to play an important role in the inventories of U.S. and Australian air forces.

Some things change. Some don't.

RAAF F111C avionics update

THE DEFENCE Department has opened contract negotiations with Rockwell to make a contract for the modernization of the RAAF's 22 F111C fighter/bombers over the next five years. Rockwell is expected to work with Hawker de Havilland providing the Australian input.

However, the other competitor (led by General Dynamics, with Aerospace Technologies of Australia Pty Ltd providing Australian input) have been told that, if a satisfactory contract cannot be concluded with Rockwell, the work may well revert to the GD group.

Defence does not have the necessary qualified personnel (who need both specialized technical expertise and commercial contracting ability) to negotiate contracts on both bids right forward to the final decision time. It was this approach which proved so successful in the AN-ZAC frigate negotiations.

The project is to fit the F111C force for operational service with the RAAF until after 2010. There is not enough space in the aircraft to achieve the required improvements. To find the space, a physically much smaller digital flight control system must be installed to replace the existing analogue systems.

General Dynamics is the sole owner of the digital flight control system. Industry observers say it is very unlikely to sell this to a competitor, as it is a crucial competitive factor in one or more USAF/USN other major equipment projects now under consideration.

APDR understands that the Rockwell proposal included modernizing the first two F111Cs in the USA and the rest in Australia. The GD group plan to modernize all aircraft in Australia. This would have resulted in a significant difference in Australian industry participation levels. The higher AIP premium would have made the GD bid more expensive than Rockwell's.

The higher councils of the ADF and the Defence Department have had to balance short term cost (in a critically tight defence budgetary situation) against the better through-life support achieved by paying the higher AIP premium.

The RAAF's F111Cs differ from those in USAF service. Therefore, much of the proposed modernization involves development work specifically for the Australian aircraft. This emphasizes the importance of through life support. It also raises the risk level of the project, a factor that is re-emphasized in the ADF by the software problem with Navy's S70B2 Seahawk helicopters (which could not "talk" to one another). These were developed specifically for Australia. ■

\$210m deal to update 'old' F-111s

AUSTRALIA'S F-111 front-line strike aircraft will be given a new lease of life with a major modification program.

The Defence Minister, Senator Ray, said the main avionics systems on the RAAF's 22 F-111s would be updated under a \$210 million contract awarded to Rockwell Electronics Australasia.

Senator Ray said the analogue systems in the aircraft would be replaced by digital components, improving reliability and reducing maintenance and support costs.

He said the operational flexibility of the aircraft would also be enhanced, providing Australia with an effective air strike capability well into the next century.

Without the avionics update, the aircraft would be difficult to maintain by the mid-1990s, he said.

The update package includes the attack radar, Terrain Following Radar, flight control and the communications/navigation systems which enable the F-111 to operate at night and in adverse weather.

The Terrain Following Radar also allows low-level flying.

The first aircraft will be modified in the USA by Rockwell International and the remainder by



Senator Ray . . . air strike capability enhanced.

Hawker de Havilland in Australia.

Senator Ray said Australian engineers and other specialists would be involved in the project through the Australian companies, AWA Defence Industries, C3 Pty Ltd, Honeywell and IBM.

The Australian-New Zealand content of the project is worth about \$42 million in 1989 prices, or 20 per cent of the contract price.

In addition, \$47 million in offset work will also go to Australian industry.


Senator Ray said the project, to be completed in 1996, was consistent with the Government's self-reliant defence strategy.

The RAAF has two F-111 squadrons — No. 1 and No. 6 — both based at Amberley near Brisbane.

— AAP

Melbourne Sun, Thursday, August 23, 1990

MESSAGE FORM

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PRECEDENCE - ACTION	PREC/INFO	DATE - TIME GROUP	MESSAGE INSTRUCTIONS
ROUTINE	ROUTINE	040100ZDEC90	

FROM	HQLCENG	SIG/ORIG NO
TO	DIR MAT MGT MCCLELLAN AFB CA/LA-RAAF	SIC HEA
		246/AIRENG1
		GR

F111-ACQUISITION DETAILS

A. TELECON SM-ALC ALO/AIRENG1D OF 30 NOV 90.

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SECURITY CLASSIFICATION
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MESSAGE FORM

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5. THE AIRCRAFT ATTRITED DURING RAAF SERVICE ARE AS FOLLOWS:

- A. AIRCRAFT A8-136 CRASHED 28APR77 AT GUYRA NSW WITH 830.4 AFHRS CAUSED BY BLEED AIR DUCT FAILURE.
- B. AIRCRAFT A8-133 CRASHED 29SEP77 AT EVANS HEAD NSW WITH 876.6 AFHRS CAUSED BY BIRD STRIKE.
- C. AIRCRAFT A8-141 CRASHED 25OCT78 AT WAITEMATA HARBOUR AUCKLAND NZ AT 1373.9 AFHRS CAUSED BY BLEED AIR DUCT FAILURE.
- D. AIRCRAFT A8-137 CRASHED 24AUG79 AT OHAKEA NZ AT 1215.2 AFHRS CAUSED BY WATER INGESTION/FLAMED OUT AND AQUAPLANED OFF THE RUNWAY.
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3	SQNLDR G.D.MCDOUGALL AIRENG1D		04DEC90
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Department of Defence
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PRECEDENCE - ACTION | PREC/INFO | DATE - TIME GROUP | MESSAGE INSTRUCTIONS

ROUTINE

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040100ZDEC90

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NSW
A/C A8-127 CRASHED @ GUYRA ON 14 SEP 93

OF 15
FIRST FILMS ARRIVED

FIRST FILM FLEW 3 AUG 94

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CRITERIA FOR ADDITIONAL F-111 PURCHASE - ex-AIRENG1D CONSIDERATIONS

General Considerations

Nacelle former at FS496 (12B2910): no (or minimum) cracking work (almost impossible to replace this frame). Problem areas forward lower horizontal flange, and nacelle tie link lug attachment holes.

F-111A-style ECS Water Tank Bulkheads (12B2685, 12B2694): no corrosion or minimum rework (very difficult to replace).

Wing Carry Through Box upper cap (12B12311): no cracking from paint injection holes (very difficult to change WCTB).

Horizontal stabiliser pivot fitting at FS770 (12B10521): select blind tooling hole for cracking (very difficult to replace frame).

Wing Pivot Fitting Fuel Flow/Vent Holes (especially No. 13): cracking/minimum rework.

Wing Pivot Fitting Stiffener Runouts (especially No. 2): no cracking/minimum rework.

Fuselage Flow Assy - lower diverter (12P11401): no cracking (very difficult to replace - repair is not elegant).

8. FS449.53 Longerons (12B1895): no corrosion in splice holes, no cracking.

9. 16th Stage Bleed Air Ducts: prefer Inconel (we have lost 2 acft from earlier ducts failing; if can't get Inconel ducts installed, buy such as spares).

10. D6AC corrosion/grindouts: prefer minimum. Check Wing Pivot Fitting (12W475, etc) especially.

11. Bonded panels (especially horizontal stabilizers (12T9201) and mid-engine access doors (12B10012)): not too much grievous corrosion/disbonding. Buy spares for any poor condition panels - especially drilled-to-fit components such as Saddle Tank Cover (12B10403), "Pork Chop" panels, Weapons Bay doors. (A recent NDI, preferably with neutron radiographic inspection, is desirable.)

12. Aluminium (especially 7075, 7079) corrosion/cracking (especially stress corrosion cracking): prefer minimum. Check Upper Routing Tunnel trusses (12B2893, etc) and floor (12B4710), Crew Module floor trusses (12K2145, 12K2144, 12K2143) especially.

13. Good state of sealant (especially fuselage). Check date of last deseal-reseal, look for reverted sealant, and check results of leak checks (preferably pressurised).

14. Spoilers: prefer LTV-manufactured.

NOV FLIGHT

ised bids for
New Zealand
on update

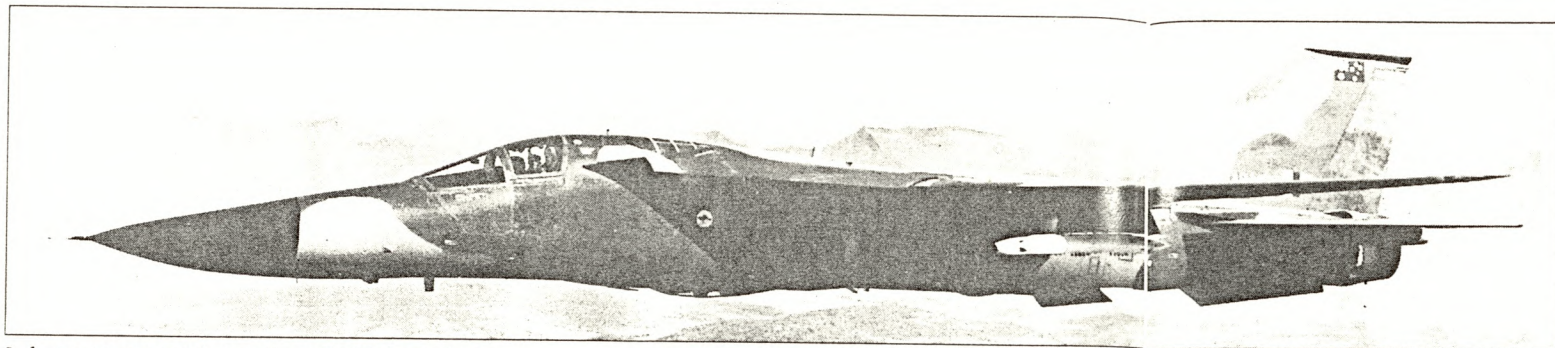
ms competing for the
ionics update of the Royal
Zealand Air Force's
AF) fleet of six Lockheed
Orions have been asked to
date their bids. The move
s a lengthy re-estimation of
proposed programme by the
Zealand Ministry of Defence
wants to update the
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ing is bidding its full
e IV avionics for the P-3Ks,
were the first to use most
ns of the original Boeing
s package. Facing it is a
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villand and consisting of
Defence Industries, C3,
e Australian Government's
Science and Technology
isation.

RNZAF did not issue a
d specification but instead
a functional requirement.
bidders then responded
packages that include a
ff to give New Zealand
y 10 per cent of the work
ed. □

**Donnell Douglas to develop
ot's Associate for DARPA**

RAAF considers refuelling options for F-111s



Industry presents options to keep F-111 flying further

BY GUY NORRIS
IN AUSTRALIA

A series of design proposals for air-to-air refuelling F-111Cs has been submitted to the Royal Australian Air Force (RAAF) by the joint Israeli Aircraft Industries (IAI) and Hawker de Havilland (HdH) team currently converting four RAAF Boeing 707-320s into tankers. The proposals cover options for additional conversion work to the 707s and provision of a refuelling probe on the F-111Cs.

The RAAF's 22 F-111Cs are not able to refuel from the tank-

ers, which are all due to be in service by September 1991 as the combat aircraft use the standard US boom/receptacle tanking system. The four tankers are being equipped with wingtip-mounted Flight Refuelling Mk 32B pods and will therefore use the hose-and-drogue system to work principally with the RAAF's McDonnell Douglas F-18 force.

HdH says that the proposal to equip the F-111C with a probe is based around using the forward equipment bay to house a retractable probe. The conversion work to install the probe and piping could be done during the aircraft's extensive down time for its forthcoming avionics update, according to HdH.

Engineering work to install a tail-boom in the 707s would be considerably more complex, requiring an additional hydraulic

system for the telescopic boom unit and installation of a larger supply fuelpipe. Timing of any work would depend largely on the RAAF's sanctioning of tentative IAI/HdH proposals to convert a further two RAAF 707s to tanker configuration. Aircraft five and six could receive the extra modification at once and the first four would be retrofitted.

The first of the present batch is due for handover in April 1990 with subsequent deliveries over the next 18 months. The 707s will retain their current combi-freighter capability and fuel for tanking will be supplied from the aircraft's standard 24,000gal capacity tanks. IAI has proposed two optional positions for extra tanks—option one being an underfloor tank in the cargo area and option two a portable tank in the cabin itself.

Most of the modification work is concerned with duplicating the standard 707 hydraulic system and beefing up piping with additional pumps being added to the fuel system on engines one and four. The outboard wing stringer and skin sections are being strengthened to take the Mk32B pods which will dispense fuel at 400gal/min.

HdH is updating the navigation/communications system. It involves new VHF radios, TACAN, and Litton 92 inertial navigation. An eventual GPS requirement is also foreseen. Integration work for guidance lights around the fin and stabiliser, a swivelling, visible/infrared surveillance television camera mounted in the aft keel, new internal intercom, and identification friend or foe being undertaken by HdH. □

RAAF jet flame show backfires

30 MAR 1990

By BRUCE TOBIN,
ANDREW MEVISSEN
and BRIAN WALSH

A HAIR-RAISING Air Force Week display last night backfired on the RAAF.

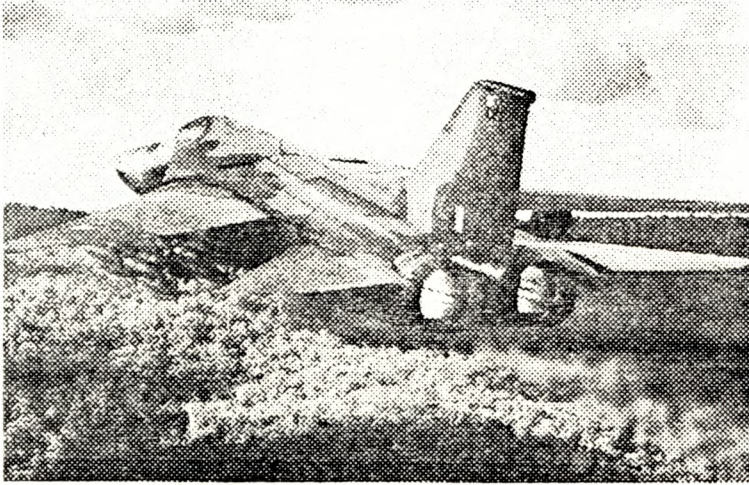
The screaming, low-level flyover by an F-111 fighter bomber at 7pm shook buildings and frightened thousands of unsuspecting Melbourne residents.

Hundreds of callers to The Sun and police D24 reported sighting what some thought was a crashing airliner and others claimed was a UFO.

The 20-second stunt, performed at more than 350 knots, was what the flyboys call an afterburner "torch" manoeuvre, involving the dumping and igniting of excess fuel through the jet's huge exhaust ports.

It was authorised, perfectly safe and all in good fun.

It also was very loud and spectacular and there were



● An F-111 with its afterburners on ... low-level RAAF display caused a stir with Melbourne residents last night.

many who didn't see the joke.

One man said he had nearly broken his ankle after losing his balance and falling from a balcony as he "ducked for cover".

"It was straight out of the movies," said Mr Tom Mitchell, of Prahran. "It looked like a meteor crashing to earth.

"I was leaning against a wooden railing on the back porch and it gave way.

"I was swearing a lot afterwards. I'd love to sue the RAAF."

James Cooper, of Beaconsfield Pde, St Kilda, said he saw the plane and believed it was on fire.

"It was just a ball of fire. I've seen nothing like it. It was a massive size.

"It was flying at a million miles an hour. I've never seen anything so dramatic in my life."

An elderly woman who heard the jet in her East St Kilda flat said: "It sounded like something crashing through the sound barrier.

"The noise was shocking. It was like an earth tremor.

"I was expecting the plane to come through the ceiling."

A man sitting in his car at traffic lights in Punt Rd said it was like the Challenger space shuttle disaster.



"It looked incredible, it looked like Challenger with all the flames out the back," Mr Marc Gonsalves, a public relations officer at St Vincent's Hospital, said.

Another St Kilda caller said he thought a plane had blown up in mid-air.

"It was just a massive explosion and I thought it was some sort of plane that had blown up," he said.

A RAAF spokesman said last night the aircraft flew at 2000 feet over Swanston St towards the Shrine and then performed the controlled stunt between 4500 and 7500 feet.

The pilot, Air Commodore Bruce Searle, flew through broken cloud when the manoeuvre was performed and it lit up the sky.

An air traffic controller said the F-111 took off from Melbourne Airport for the flyover and continued on to the Amberley RAAF base in Queensland.

USAFE may 'cascade' F-111s to soften cuts

NATO-EUROPE

BY JORIS JANSSEN LOK
RAMSTEIN, WEST GERMANY

United States Air Forces Europe is considering the transfer of some of its European-based aircraft, including F-111 strike aircraft, to other NATO air forces under the so-called 'cascading' process in an attempt to reduce the impact of a Conventional Forces in Europe (CFE) agreement.

USAFE Vice Commander-in-Chief Lt Gen Clifford Rees says that all major combat types in the command's inventory would be suitable for 'cascading'.

"'Cascading' conceptually is the right thing to do. I think countries such as Portugal, Italy, Turkey or Greece would be very interested in F-15s or F-16s, or even F-111s or A-10s. From a military viewpoint, they are very capable aircraft that could be used for replacing aircraft such as Alpha Jets, F-104s or G.91s," Gen Rees told *JDW* at USAFE HQ in Ramstein.

Politically, however, transferring nuclear-capable F-111 aircraft would be a burden, Rees said, referring to their offensive nature and increased cost of operation.

"I'm not saying this is a simple idea — it is really complex. For the F-111, only one or two countries would be suitable. You have the economic burden of a big pipeline that goes back to the USA for spares.

"To 'cascade' F-111s would be the most difficult, because they have an offensive, rather than a defensive, connotation.

"The alternative, however, is to cut them up. To keep a G.91 and cut up an F/A-18 (for

example) doesn't make any sense at all. And it doesn't make sense to the Soviets either.

"They are going to keep enough old forces around to cut up sufficient numbers to meet agreed CFE levels; those that are to be maintained in the frontline not being MiG-15s, I guarantee."

Rees said that the Warsaw Pact threat is lower than any time since 1945. "The probability of a bolt-out-of-the-blue Pact attack has gone down dramatically in the last few months.

"The amount of warning time NATO will have has already increased; I foresee that is going to be even longer... I'm not so sure the USSR would ever get reinforcements through Poland, Czechoslovakia and East Germany.

"On the other hand, the possibility of a smaller war... is significantly greater. What worries me is people who jump to the conclusion that the Pact is withdrawing all its forces and is restructuring to a purely defensive orientation, ignoring the fact that there is significant

modernisation going on.

"(The Pact is) forming a smaller force, easier to manage, with better command and control and improved air defence capabilities.

"Old surface-to-air missiles are being replaced by new SAMs. The Pact's combat power is probably decreasing, but not proportionately to the numbers of systems they are withdrawing."

Rees also expects the number of USAFE aircraft to be reduced. "On the table are totals of 5700 on both sides (ie NATO's CFE proposal on combat aircraft), and I don't think the European nations or Congress would like it if only the Europeans were to reduce and USAFE were to maintain its strength. So I see us taking a significant reduction."

Rees denied reports that USAFE wings have already received Martin-Marietta's low altitude navigation and targeting infra-red for night (LANTIRN) night attack system.

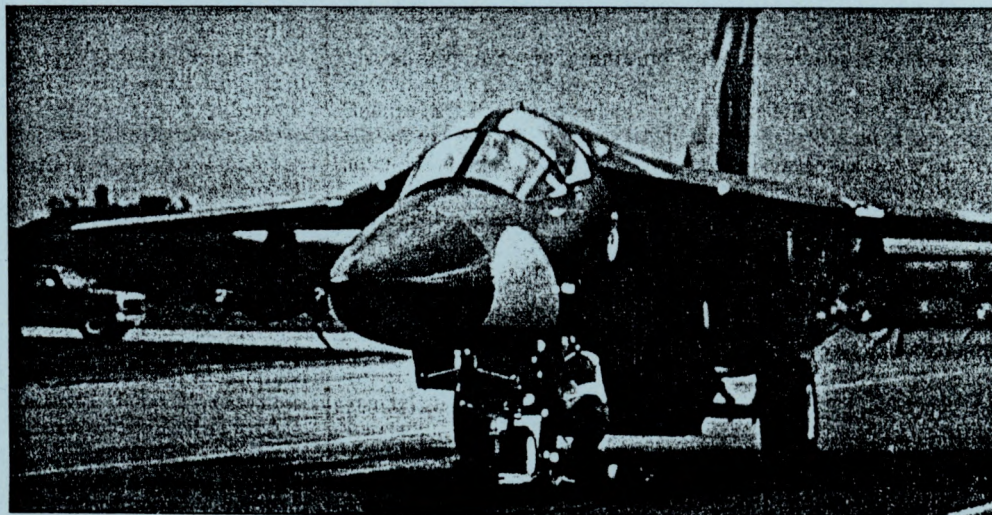
He indicated LANTIRN would not be deployed in USAFE

before late this year, the plan being to equip one West Germany-based F-16 wing (probably 50th TFW at Hahn air base) with the system, providing all-weather, day/night low-level penetration and target acquisition capability.

"Eventually, F-16 software will be modified so that all F-16s will be LANTIRN capable, but I'm talking six or eight years downstream," Rees said, adding that he believes a round-the-clock attack capability is essential given today's force levels in Europe.

On the much-rumoured introduction of F-15E Strike Eagles, Rees said present plans see "less than a wing" of those aircraft coming to Europe. He denied that F-15Es would be based at Bitburg, and suggested that "in peacetime they could be based in the UK; in wartime I hope they would be based in several places, in the UK as well as the Central and even the

'Cascading' the F-111 — the alternative is scrapping



Southern Region."

In the absence of a CFE agreement, no changes are foreseen in USAFE F-111 basing, Rees said, denying earlier reports that F-111Gs (modified FB-111s) could be brought in to augment the UK-based F-111 fleet.

"We have worked the F-111 problem over the last 18 months. There have been a number of exercises that would have changed types and even the number of F-111s, but all those turned out not make as much sense as we thought. However, I expect CFE will result in reductions in the F-111 presence in Europe," Rees said.

"Because of CFE, this is a time of great uncertainty for us. We have brainstormed through hundreds of questions that could be asked us in 1990. I think we will be expected to respond very quickly.

"And I would like to respond from a position of some knowledge. My view is that as soon as the negotiations burn down to some equality in numbers, the nature of that equality becomes very important. If one side had all F-15s and the other side all MiG-15s, equality wouldn't be equality."

Rees is concerned about the increased difficulty of conducting low-level flying training in Europe, especially in the Central Region. Will the introduction of LANTIRN bring an increased need for night low flying?

"There will be no increase in the total night low-level flying required. We are looking at the possibility of establishing a training complex that would simulate the European ground environment in Canada, Alaska or in the northern USA. Here, a number of LANTIRN-equipped aircraft would be permanently assigned and we would deploy aircrews there on temporary duty.

"Fortunately, LANTIRN is introduced on the F-16, an aircraft common to a large part of our pilot population," Rees pointed out, saying this will make training easier.



'What's happening now in Europe is going to result in a different composition of our air force. I don't know what that is, I just know it's going to be different' — Lt Gen Rees, Vice C-in-C, USAFE

"Much LANTIRN basic training will be done in less demanding areas in the USA and on simulators," he added.

"The good news, for once, is that the weather is bad in Europe. For LANTIRN training, bad weather actually works to our advantage.

"We will do a lot of that training in Europe during daytime, flying in adverse weather conditions," Rees said, stating that this comes close to equating the stress on the pilot flying at night.

According to Rees, the future of the new LANTIRN training detachment depends on what happens to the planned NATO Tactical Fighter Weapons Training Centre and to the USAF presence in Alaska.

"Alaska has many advantages because of the wide, uninhabited spaces. But in the next few years, driven by budget reductions, we are going to see a restructuring

of US Pacific Air Forces. I can see some of those coming back to Alaska. If that's too much then we may not be able to put the LANTIRN detachment there," Rees predicted.

Budget reductions — up to \$180 billion in the next four years — will not result in unilateral reductions to USAFE's commitment to NATO outside the CFE framework, Rees stressed.

Under the Defence Management Review (DMR) programme, USAFE is trying to streamline its organisation. "We have eliminated 37 per cent of the HQ regulations that go out to the wings. Hopefully this will lead to less bureaucracy. There will be some savings from DMR, not millions of dollars, but still significant."

Another recent measure, induced by the uncertain future, is to put all shipments of war readiness materials to pre-

positioning depots in Europe on hold, Gen Rees said. It makes no sense to have it shipped over here and then having to send it back home or relocating it."

According to Gen Rees, the next 'REFORGER' exercise will be a "compromise between the training you have to do and recognising that the situation in West Germany is different today. Rather than having a whole company coming out in the field, there will now be one vehicle representing that company. The German people should feel 'REFORGER' a lot less."

This however presents USAFE, which is supporting 'REFORGER's' army exercise as part of the concurrent Allied Air Forces Central Europe exercise 'Cold Fire', with problems.

"In previous 'REFORGER's', we would be tasked to go out and find and attack that company. Now what we're looking for is a jeep, and it's a lot easier to find a company and the vehicles and the comms that come with it, than to find a jeep. Maybe this is too good a test for our target acquisition systems.

"We're in process of trying to re-evaluate our participation in this 'REFORGER'. We want to prevent sending our crews to fly over empty areas; that would be wasting fuel and 'demotivating' to the pilots."

USAFE is providing in-theatre forces for 'Cold Fire', only one Tactical Air Control unit being deployed from the USA and no dual-based flying squadrons.

"What's happening now in Europe is going to result in a different composition of our air force. I don't know what that is, I just know it's going to be different."

"There will be some forces, I think, removed from the Central Region, and some forces removed from the UK, to be returned to the US. In time of war they would come back.

"I think we will have a increased warning time, and CFE will give a better balance. The same thing is going on in the Pacific. It's a period of change and great uncertainty."

Great changes are expected in NATO operations and procurement in the next decade because of the rapidly declining threat from the Soviet Union and its former military allies, Alliance commanders told delegates attending a symposium on the new Europe held in London last week.

Three major reasons behind the decline are the political changes altering the face of Eastern Europe, the anticipated unification of Germany, and the force reductions which, in the short term, are set to culminate in the Conventional Forces Europe (CFE) talks in Vienna, Austria.

With the rejection of the Communist system in Eastern Europe, the Warsaw Pact is moving towards being an alliance which is political rather than military in nature, and its future existence is increasingly in doubt.

At the recent meeting of the Warsaw Treaty Organisation Political Consultative Committee, Soviet deputy foreign minister Yuli Kvitsinsky said, while discussing ways to transform the Warsaw Treaty, that greater emphasis would be laid on the political and consultative aspects, and that some obsolescent structures will be altered.

PACT COLLAPSING

Speaking of the "significant upheaval in the eastern part of Europe—air-defence systems, NATO HQ in Brussels, told delegates at last week's Advanced Technology International symposium "New European Aerospace and Defence Forecast and Market Opportunities Outlook" that a post-CFE environment could see the "collapse of the Warsaw Pact as a military entity".

Gen Manfred Eisele, chief of combat requirements, Supreme Headquarters Allied Powers in Europe, added that the Warsaw Pact "...can no longer be seen as an extension of the Soviet General Staff".

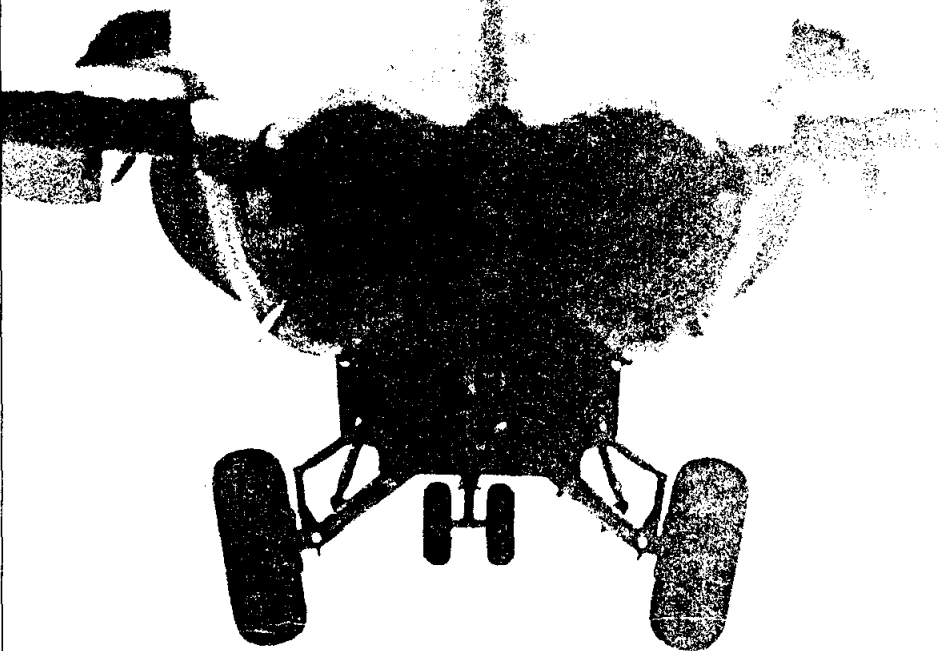
To clarify the picture further, the US Department of Defense's annual evaluation of the Soviet threat, *Soviet Military Power*, stated in its 1989 edition: "At present, the Soviets do not seem to anticipate war in Europe in the near future".

One effect of the increasing freedom of choice open to Eastern European nations will be the possibility of purchasing arms from the West. Poland's first vice-defence minister has provided what could be a taste of things to come by saying that the Polish Air Force "...will not necessarily in future spend \$30 million on a MiG-29 when we can buy, for instance, a much better Western aircraft such as an F-16 or F-18 for much less money."

The most significant manifestation of the dramatic changes in Eastern Europe is the prospect of a united Germany. According to Eisele this, along with the emergence from Soviet dominance of Czechoslovakia, "will recreate a central Europe not seen since before World War II."

Facey added that a united Germany will

VICTORY IN THE WEST...



...but at what cost, reports Simon Elliott from a conference addressed by senior NATO commanders.

remove the existing East-West threat axis, saying: "I would suggest the threat to the central region is going down significantly ... in the north there is little change ... but the threat to the south gets higher". This is thought to be a reference to the non-Soviet threat on NATO's southern flank, from Libya for instance. According to Facey, it is possible to see a time when "...the threat is more dominant to the south than in the centre or the north". Libya in particular is singled out by Rear Adm Thomas Brooks, US director of naval intelligence, in his report to Congress this year (*Flight*, 30 May-5 June, P 20), in which he noted that "...shipments to Libya rose sharply in 1989 and included Tripoli's first Su-24 Fencer fighter-bomber". The all-weather Fencer considerably enhances the Libyan Air Force's capabilities.

In addition, with the expected future withdrawal of the remaining Soviet troops from Eastern Europe, the only routes through which the Soviet Union could directly attack NATO in Europe would be on the northern flank in Norway or the Southern flank in Turkey.

As a byproduct of unification, a combined

German Air Force is set to gain Soviet-built MiG-29 Fulcrums from East Germany in addition to Tornados and F-4F Phantoms (and later the European Fighter Aircraft) from its Western counterpart. The Soviet Union has told the West German Government that it must take delivery of 32 Fulcrums ordered by East Germany if the two Germanies unite (*Flight*, 9-15 May, P 10). The East German Air Force operates up to 30 MiG-29s.

REDUCING THREAT

Successful CFE talks could see the biggest and most dramatic changes to the balance of power in Europe. In pre-CFE Europe Facey sees a stable threat to NATO from the East, the Warsaw Pact as a single entity, and increasing defence budgets. In a post-CFE world Facey envisages a reducing threat, a weaker Warsaw Pact, and declining defence budgets. NATO and Warsaw Pact parity would be expected from the Atlantic to the Urals. "We hope to approach force parity through treaties," says Eisele. A surprise attack from the East would become increasingly unlikely and improbable as a result.

These three factors will cause major operational and procurement changes within NATO, and this in turn will have a dramatic effect on an arms industry reliant on large-scale Western arms procurements to deter the Soviet threat.

At an operational level, in a post-CFE Europe, Eisele told delegates: "For the Soviet Union and her former allies the vast variety of military options will disappear". He added: "The major option used to be to attack NATO, but if CFE is successful, this will not be the case in the future".

NATO forces are deployed in central Europe to engage a Warsaw Pact which is, or was, seen as able to launch an offensive along the entire length of the East-West boundary. In a conflict, NATO would defend European territory on the East-West boundary and use long-range strike aircraft such as Tornados and F-111s to engage Soviet second- and third-echelon forces, in a follow-on-forces attack role.

Post CFE, the Soviet capability will be altered dramatically. Eisele says: "In future the Soviet Union will only be able to attack NATO in one area at once". Instead of having to contend with a front-wide attack, therefore, NATO forces will have to engage a much more limited attack along one axis.

The result is a public expectation in the West of significant reductions in defence budgets, a re-examination and assessment of defence requirements and thus current and future weapons programmes, and the increasing need within NATO for flexibility.

PREDOMINANT TASK

These factors will mean that NATO will develop in the 1990s with three tasks becoming increasingly predominant. The first is crisis management to control a situation before it can get out of hand.

The second is to increase the capabilities of alert systems such as reconnaissance forces and verification equipment and personnel, the latter to ensure treaties are observed. With the likelihood of a lessened state of readiness in both East and West after CFE, the ability to detect the military build-up before an offensive will be even more important than it is today.

Because of the reduced level of forces deployed by NATO, early warning would be essential to detect the direction of any one-axis Soviet attack. According to Eisele, one example of a development NATO would have to detect would be the mobilisation of Soviet arms stockpiles east of the Urals.

In addition, both sides must develop the command structures to allow the de-escalation of force readiness and not just exist with the ability to mobilise forces.

Thirdly, to counter the one-axis attack, NATO will come increasingly to rely on standing mobile forces backed up by reinforcements — the latter being part-time forces which can be mobilised in a crisis.

The mobile forces are expected to be increasingly multinational in nature. Eisele said that Spain could be expected to make a contribution to the multinational Allied Command Europe Mobile Force in the not too distant future and, instead of having individual national Corps covering individual areas of the front, post-CFE Europe could well see one multinational Corps covering the same area.

The mobile forces will also rely heavily on long-range precision weapons, such as the US Air Force F-111 force, to engage the reserves of the attacking forces before they can deploy on to NATO territory.

STORING EQUIPMENT

Eisele pointed out that, because of the reliance on part-time reinforcements for major conflicts, "...a lot of equipment should be able to be stored for lengthy periods". A defence based on a standing multinational mobile force and part-time reinforcements will mean an increased emphasis on high-mobility equipment, an increase in the importance of multinational interoperability, an improved NATO logistics structure, a focus on high-quality/high-technology equipment, and a renewed search for force multipliers, according to Facey.

For the Western defence industry, post-CFE NATO will require smaller programmes, reduced production runs, an increase in the proportional cost of research and development, and an increasing reliance on dual (military and civil) technologies. Facey told delegates: "We are beginning to see a struggle for survival as far as some industries are concerned".

Facey does see post-CFE potential for the defence industry in a number of areas, however; for example, in the destruction and transfer of equipment. According to Facey the destruction of systems is "not cheap, but extremely expensive". Facey also says that industry could benefit by a shift towards upgrading old systems rather than procuring

new equipment, of which there would be reduced production lots. He sees nations "making do with what they have".

Facey also sees growth areas in the field of verification technology which he sees requiring "new thinking and technology", assuming a successful resolution of CFE talks.

Finally Facey sees a continuation, and probably an increase, in research and development for systems although many may not go into production, the technology being kept *in situ* in case of a future requirement. The research and development is expected to become increasingly multi-national. Areas where procurement could increase include electronic warfare and command, control, communications and intelligence.

On a sombre note (for Western industry, at least) Eisele said: "For the armaments industry [the changes taking place in the Soviet Union and eastern Europe] will mean the entry [on to the Western market] of a new arms producer, the Soviet Union", adding, however: "but on a shrinking Western market, of course".

NATO's future planning is being based on a number of assumptions which include NATO's continued existence, the acceptance of the idea of stability through parity, a continued US and Canadian presence in Europe, the continued adoption of a responsive strategy (which must back up conventional forces with nuclear weapons according to Eisele) and the likelihood of defence budget cuts.

In concluding, Gen Eisler sees NATO forces in Europe "...having to ensure that ... smaller forces will be kept up with higher performance and efficiency levels". He also said: "NATO will continue to be the structured element of structural stability for all of Europe", adding: "We will continue to be a political alliance but the military will have to take an even smaller profile".

Facey said that, in planning for the future, much clearer guidelines on defence expenditure are required.

Strike aircraft such as the F-111 will spearhead new mobile forces

