THE MCDONNELL DOUGLAS F-4 Phantom II

Part 2: US Navy & Marine Corps Variants

by Andy Evans





SAM Limited



THE MCDONNELL DOUGLAS **F-4 Phantom II** A COMPREHENSIVE GUIDE

Part 2: US Navy & Marine Corps Variants

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Cover: A US Marine Corps F-4J Phantom from VMFA-212 shows the shape and style that made the 'Spook' famous

MDF 13 The McDonnell Douglas F-4 Phantom II, Part 2: US Navy & Marine Corps Variants by Andy Evans

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Andy Evans

December 2007



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Introduction



he McDonnell Douglas F-4 Phantom was one of the most successful post-war jet fighters and was the second most prolific American jet fighter to be built, outnumbered only by the North American Sabre. Total US production was 5057, with another 138 being built under license in Japan, and the Phantom remained in continuous production for 20 years from 1959 until 1979, and during the Vietnam War, 72 Phantoms were coming off the production line every month. It was on the 25th of July, 1955 that the Navy and McDonnell agreed to a detailed list of specifications for the YF4H-1, the forerunner of the Phantom. The aircraft was to be capable of staying on patrol for up to two hours at a time at a distance of up to 250 nautical miles from its carriers and was to be able to remain in the air for at least three hours without midair refuelling and carry a crew of two. Initially the aircraft was to be named 'Mithras' or 'Satan', however under government pressure the aircraft was given the less controversial name of 'Phantom II'. During its service it gained a number of nicknames such as 'Double Ugly', 'Rhino' and 'The Louisville Slugger' to name but three, as well as its acknowledgement for being the 'World's Leading Distributor of MiG Parts'!

Almost as famous as the aircraft itself is its emblem, a

whimsical cartoon ghost called 'The Spook' created by McDonnell artist Anthony Wong, which soon became universally associated with the F-4. The aircraft would be the first to carry an all-missile armament and was destined to become one of the most famous aircraft of all time, the McDonnell Douglas F-4 Phantom II; the rest, as they say, is history F-4N 153101 with its impressive black tail hails from VF-51 'Screaming Eagles' (© Author's Collection)

Andy Evans December, 2007



An RF-4B in 'clean' configuration (© US Navy)

Glossary



'Top Flight' (© McDonnell Douglas)

| AAAAnti-Aircraft Artillery |
|------------------------------------------|
| AAMAir-to-Air Missile |
| ABAir Base (Non-US) |
| ADCAir Defence Command |
| AFBAir Force Base |
| AFRESAir Force Reserve |
| AGMAir-to-Ground Missile |
| AGMAirborne Guided Missile |
| AIMAir Intercept Missile |
| ANGAir National Guard |
| ARMAnti-Radar Missile |
| BARCAPBarrier Combat Air Patrol |
| CAPCombat Air Patrol |
| COCommanding Officer |
| DECMDeceptive Electronic Countermeausers |
| ECMElectronic Countermeasuers |
| FFARFolding Fin Aerial Rockets |
| FISFighter Interceptor Squadron |
| FLIRForward Looking Infra-Red |
| HARMHigh Speed Anti-Radar Missile |
| IFRIn Flight Refuelling |
| Lt CmdrLieutenant Commander |
| Lt ColLieutenant Colonel |
| Lt JGLieutenant Junior Grade |
| LORANLong Range Navigation |
| MCASMarine Corps Air Station |
| NADCNaval Air Development Center |
| NASNaval Air Station |
| NOLONo Onboard Live Operator |
| NULLONot Utilising Local Live Operator |

NVANorth Vietnamese Army RAGReplacement Air Wing RHAWRadar Homing And Warning system RIORadar Intercept Officer RSOReconnaissance Systems Operator RTAFBRoyal Thai Air Force Base SAMSurface-to-Air Missile SEASouth East Asia SLARSideways Looking Airborne Radar SURESensor Update Refurbishment Effort TACTactical Air Command TACAN Tactical Air Navigation TPSTactical Paint Scheme USAFUnited States Air Force USAFE United Satates Air Forces Europe USMC United States Marine Corps USNUnited States Navy VTASVisual Target Acquisition System

F4H-1/F-4A – Genesis of the Breed

Chapter

The origins of the F-4 Phantom can be traced to a request by the US Navy for an upgrade of the McDonnell F3H Demon carrier-borne fighter. Although the Vought Crusader won the contract, the Super Demon (as McDonnell's entrant was dubbed) was developed as a ground attack aircraft under the designation AH, which by 1955 had evolved into an all-weather air superiority fighter designated F4H. The F4H-1 was designed to carry four semi-recessed Sparrow radar-guided missiles and be powered by two J79-GE-8 engines with a crew of two and an AN/APQ-50 radar. To accommodate carrier operations, the landing gear was designed for landings with a sink rate of 23 feet per second and the nose strut could extend by some 20 inches (50 cm) to increase angle of attack at takeoff.

The F4H-1 was the initial production version of the Phantom for the United States Navy and since the J79-GE-8s originally intended for the aircraft were still not available, the first 45 F4H-1s ordered were powered by a pair of 16,150 lb. afterburning J79-GE-2 or -2A engines. In order to distinguish these planes from later models powered by -8 engines, on May 1, 1961 they were redesignated F4H-1F, the 'F' indicating the use of a special powerplant. Amongst the external changes introduced on the F4H-1 differentiating them from the earlier prototypes was the introduction of





a pair of plain pitot inlets for the air-conditioning system, which replaced the flush-mounted recessed ram intakes, and these were mounted on the forward nose just behind the radome, and as they stood away from the fuselage skin, they produced more drag than the flushmounted units, but, the increased pressure recovery was deemed to be worth the extra drag. Early carrier qualification trials (© McDonnell Douglas)

F4H-1 Phantom 143391 is readied for a carrier launch during qualification trials (© McDonnell Douglas)







Initial carrier trials were carried out by A/C 143391, which was first launched and recovered aboard the USS Independence on February 15, 1960 and during test and evaluation, numerous changes were progressively incorporated into the aircraft; amongst the most significant was a change in the geometry of the air intakes. Also from A/C 145307 onward, the highpressure blowing system along the wing leading edges and flaps was made fully operative, and was retrofitted to the two earlier aircraft. The radar chosen for the early F4H-1F was the I/J-band APQ-72, and attachments for five and later nine pylons were activated, with the



Spook Caricature

As early as 1960, the US Navy had begun to form VF-101 at NAS Oceana, destined to be the first Phantom equipped Replacement Air Group (RAG), a squadron designed to train future

pilots and backseat radar interception operators. On September 18, 1962, the J79-GE-2/2A powered F4H-1F was redesignated F-4A in accordance with the new Tri-Service designation system and the J79-GE-8 powered F4H-1 was redesignated F-4B. Only 45 F-4As were built before production switched over to the F-4B. Most of the 45 F-4As built served in research and training roles, and very few ever reached squadron service as

they were not considered fully operational. The aircraft would be the first to carry an all-missile armament and was destined to become one of the most famous aircraft of all time, the McDonnell Douglas F-4 Phantom II. Weapons carriage trials (© McDonnell Douglas)

Testing the Phantom VFX-1 (© McDonnell Douglas)

The 3000th Phantom in Navy colours (© McDonnell Douglas)



inboard wing pylons each carrying either an extra Sparrow or a pair of Sidewinder missiles. An AAA-4 infra-red search and tracking sensor was added in a prominent bulge underneath the radome and a retractable in-flight refuelling probe was added to the right side of the cockpit. Production block 3 also introduced a new cockpit with a new and larger nose. McDonnell had also redesigned the cockpit and raised the seats 23 inches and fitted new and more capacious cockpits after input from pilots who complained about the poor view and restricted space. The revised and larger radome provided space for the new 32-inch dish that was fitted to the Westinghouse AN/APQ-72 radar in place of the AN/APQ-50 Mod and its 24-inch dish.

left: The first Phantom F4H-1 142259 (© McDonnell Douglas)



F-4B – First of the Phantoms

he first Phantom to be considered 'fully-operational' was the block 6 version of the F4H-1, although the Model 98AM F4H-1 was the first 'definitive' production version as the earlier F4H-1F models were acknowledged as purely developmental aircraft. In September 1962, the F4H-1F was redesignated F-4A, with the F4H-1 becoming F-4B. The first block 6 production Phantom fitted with the J79-GE-8A or -8B engine, BuNo 148363 flew on March 25, 1961, with test pilot Thomas Harris at the controls, and overall there was very little difference between this aircraft and the late Block 5 F4H-1F. The engines were J79-GE-8As, rated at 10,000 lbst dry and 17,000 lbst with afterburner, and this and subsequent machines were fitted with revised air intakes with a fixed forward ramp set at 10 degrees from the flight axis as opposed to 5 degrees for the modified ramps of the earlier Phantoms. In addition, the variable ramp had a maximum setting of 14 degrees, again as opposed to the earlier ten degrees. Otherwise they were similar to late production F4H-1Fs with raised canopies and the larger radome containing APQ-72 radars.

The F-4B had the Lear AJB-3 nuclear bombing system, the General Electric AN/ASA-32 analogue autopilot and flight control system, folding wings and tailhook and the full set of nine hardpoints, and also had smaller tyres than subsequent Phantoms. All F-4Bs were outfitted with the Aero-27A ejector



An F-4B of the 'Silver Eagles' (© E Uhl)

An F-4B from Marines unit VMFA-321 shows its extended internally mounted In Flight Refuelling probe (© US Navy)





rack on the fuselage centreline which could carry a 600 US gallon drop tank. The aircraft also carried a LAU-17A inboard pylon under each wing which was able to carry one Sparrow or two Sidewinder missiles, although the former was more readily mounted in purpose built underfuselage recesses. Two MAU-12 outboard underwing pylons were also fitted, and these could each carry the 370 US-gallon fuel tanks. As already noted four underfuselage slots were provided, each of which could accommodate a semi-recessed Sparrow missile and in the air-to-ground role, the F-4B could carry a load of up to 16,000 lb of ordnance compromising of up to eight 1,000 lb bombs, four AGM-12C Bullpup air to



An F-4B from VF-96 firing a salvo of Folding Fin Aerial Rockets (FFAR) (\circledast $^{US\,Navy)}$





A mix of Phantoms, one from VF-32 and another from VF-14. Note the differing radome colours (\otimes US Navy)



Cat crew ready an F-4B for launch (© US Navy)

Vf-101 F-4B during carrier training sorties (© Via Mark Smith)

Triple 'B' cat shot! One aircraft has gone, one is ready to go and a third waits its turn on the bow cats (© US Naw)



One of the 'Jolly Rogers' from VF-84 gets airborne from the USS independence $(\circledcirc \textit{US Navy})$



Some of the most colourful and best loved modelling subjects are the Phantoms from the 'Sundowners' of VF-111 (@ Mark Smith)





This F-4B from the 'Jolly Rogers' strains under the catapult power as launch is imminent (© US Navy)

surface missiles, or fifteen packs of 2.75-inch FFAR rockets. The F-4B was also configured to carry four AIM-9 Sidewinder missiles, and additionally was fitted with a retractable IFR probe located on the port side above the engine intake. The APR-30 radar homing and warning system with fin-cap antennae facing to front and rear was fitted to all F-4Bs, and was retrofitted to the first eighteen aircraft.

Record Breakers

Although as previously noted this Datafile does not deal in great detail with the development and genesis of the Phantom, however in order to understand the quantum leap in power and capability the aircraft imbued the services with it is important to include the records set by the developmental aircraft. In a series of flights under Project High Jump, production F4H-1s set several time-to-climb records. On February 21, 1962, two timeto-height records were set at NAS Brunswick, Maine. Lt.Cdr. John W. Young reached an altitude of 3,000 meters (9843 feet) in



A trio of VF-84 F-4B Phantoms in formation (© US Navy)

The brutish power of the Phantom is evident here as a bird from VF-14, armed with Sparrow and Sidewinder AA's, is readied for action (© US Navy)





The F-4B had the Lear AJB-3 nuclear bombing system, the General Electric AN/ASA-32 analogue autopilot and flight control system, folding wings and tailhook and the full set of nine hardpoints and also had smaller tyres than subsequent Phantoms (© US Navy)

34.523 seconds, and Cdr D. M. Longton reached 6,000 meters (19,685 feet) in 48.787 seconds. Three more time-to-climb records were set at NAS Brunswick on March 1, 1962 when Lt Col W. C. McGraw reached altitudes of 9,000 meters (29,528 feet) and 12,000 meters (39,370 feet) in 61.629 seconds and 77.156 seconds respectively, and Lt Cdr D. W. Nordberg reached an altitude of 15,000 meters (49,213 feet) in 114.548 seconds. On March 31, 1962, flying from NAS Point Mugu in California, Lt Cdr F. T. Brown reached 20,000 meters (65,617 feet) in 178.500 seconds and on April 3, 1962 Lt Cdr John Young reached an altitude of 25,000 meters (82,021 feet) in 230.440 seconds. The last Phantom record was set by Lt Cdr D. Nordberg on April 12, 1962, reaching an altitude of 30,000 meters (98,425 feet) in 371.430 seconds and in setting this record, Lt Cdr Nordberg zoomed over the 100,000 foot mark, surpassing the record set earlier by Cdr Flint in the second YF4H-1 back in 1959. However, this was not officially recognised by the FAI.

The first production Phantoms for the US Navy initially went to operational training units VF-121, NAS Miramar, which received its first aircraft in early 1961 and VF-101, based at NAS Oceana in Virginia. The first fully-operational Phantom squadrons were VF-74 at NAS Oceana for the Atlantic Fleet and VF-114 at NAS Miramar, Pacific Fleet, which were equipped with F4H-1s in mid-1961. Three F-4Bs 151473, 151497, and 151497 were modified as YF-4Js, to serve as the prototype for the next and final fighter version of the Phantom to be placed in service with the Navy and the Marine Corps



The VX-4 shows its stripes (© Mark Smith)







In October of 1961, VF-74 became the first Phantom squadron to complete carrier qualifications and the 'Spooks' first operational cruise was made in August-October of 1962 by VF-102 aboard the USS Enterprise during her first shakedown cruise. The first full-scale deployment of Phantoms was also made by VF-74 when they travelled into the Mediterranean aboard the USS Forrestal from August 1962 until March of 1963. In October of 1962, at the time that Soviet missiles were discovered in Cuba, the F-4Bs of VF-41 were transferred from NAS Oceana to NAS Key West in Florida and at the same time, Phantoms operating from the USS Enterprise and the USS Independence took part in the Cuban Blockade.

One of the best known and most popular schemes was the one applied to the Bi-Centennial F-4B of VX-4 'The Evaluators' (© Via Mark Smith)

Twelve F-4Bs were modified as F-4Gs, a Navy designation not to be confused with the USAF F-4G, which was a Wild Weasel aircraft (© McDonnel Douglas)

An F-4B takes the wire aboard USS Coral Sea (© US Navy)

One of the naval F-4G aircraft (© McDonnell Douglas)





Five VF-51 F-4B's in tight formation (© US Navy)

A pair of F-4B's head out on a training mission (© US Navy)

One of the 'Grey Ghosts' from

VMFA-531 (© VIa Mark Smith)

By the time of the Gulf of Tonkin Incident in the August of 1964, and the subsequent onset of the Vietnam War, thirteen Navy fighter squadrons were equipped with F-4Bs. The first Phantom combat sorties were flown during Operation Pierce Arrow on August 5, 1964 from the USS Constellation. These were flown by F-4Bs from VF-142 and VF-143, which flew top cover to warplanes striking North Vietnamese torpedo boat bases in retaliation for the Gulf of Tonkin incident. The first Phantom airto-air kill of the Vietnam War did not actually involve a North Vietnamese fighter. It took place in a battle between F-4Bs from the USS Ranger and Chinese MiG-17s near Hainan Island on April 9, 1965. F-4B 151403, piloted by Lt JG Terence M. Murphy of VF-69 shot down a Chinese MiG-17. However, he himself was shot down immediately thereafter, probably by a Sparrow fired by one of his wingmen! This incident was not generally reported, in order not to complicate Chinese-American relations. The first American crew to shoot down a North Vietnamese fighter were Cdr Thomas C. Page and Lt Jon C. Smith Jr of VF-21 flying F-4B 151488 from USS Midway, who destroyed a MiG-17 near Haiphong on June 17, 1965. In air-toair combat the F-4 had to rely on its Sparrow and Sidewinder



The catapult crew prepare a VF-51 bird for launch (© US Navy)



A great view of the underside of this F-4B (© US Navy)

missiles, there being no internal cannon fitted. As a result of combat experience in Vietnam, chaff dispensers were added above the rear fuselage sides. ECM capabilities were steadily improved, with the addition of Radar Homing and Warning Systems and Deception Systems such as the ALQ-51 and AN/ALQ-100.



An F-4B 'escorts' a Russian raider (© US Navy)



The US Marine Corps received its first F4H-1s in June of 1962 when VMF(AW)-314 traded in its F4D Skyrays for the Phantom, and the first Marine to fly a Phantom was Lt Col Robert Barbour. Beginning in April of 1965, Marine Corps F-4Bs were based at airfields in Vietnam and Thailand as well as aboard the USS America. They took an active part in the Vietnam War, primarily in the ground support role, and consequently some seventy-two Marine F-4Bs were lost in combat and three others were destroyed in operational accidents.

A total of 649 F-4Bs were built and delivered to the Navy and the Marine Corps between June 1961 and March of 1967, and the Navy F-4Bs were flown by operational squadrons until the late 1960s. During the early 1970s, 228 F-4Bs were upgraded to F-4Ns under 'Project Bee Line'. The first F-4N flew on June 4, 1972. Other F-4Bs were replaced in service by the F-4J, which was a later production variant of the Phantom, and latterly by

THE F-4B NAVY FIGHTER SQUADRONS

Atlantic Fleet:

VF-11, VF-14, VF-31, VF-32, VF-33, VF-41, VF-74, VF-84, VF-101, VF-102, VF-103, VF-171.

Pacific Fleet:

VF-21, VF-51, VF-92, VF-96, VF-111, VF-114, VF-121, VF-142, VF-143, VF-151, VF-154, VF-161, VF-191, VF-194, and VF-213. Naval Reserve:

VF-11L1, VF-301, VF-301.

The F-4B Marine Corps Squadrons:

VMFA-115, VMFA-151, VMFA-122, VMFA-312, VMFA-314, VMFA-321, VMFA-323, VMFA-513, VMFA-531, VMFA-542, and VMFAT-201.

29 F-4Bs were loaned to the US Air Force in support of their plan to acquire the Phantom as its primary fighter aircraft under the designation F-110. These included BuNos: 149405, 149406, 150480, 150486, 150493, 150630, 150634, 150643, 150649, 150650, 150652, 150653, 150994, 150995, 150997, 150999, 151000, 151002/151004, 151006, 151007, 151009, 151011, 151014, 151016, 151017, 151020, and 151021. These were temporarily assigned the USAF serials 62-12168/12196. Although they were marked as F-110, they retained their F-4B designations.

The Naval F-4G

Twelve F-4Bs were modified as F-4Gs, a Navy designation not to be confused with the USAF F-4G, which was a Wild Weasel aircraft. The Navy F-4G was a version modified with the AN/ASW-21 data-link for the evaluation of the feasibility of automatic carrier landing operations. These twelve aircraft were flown by the 'Black Lions' from the USS Kitty Hawk and operated in the Gulf of Tonkin from November 1965 until June of 1966. One was lost to North Vietnamese AAA, but the others were later brought back to F-4B standards. Interestingly they also wore an experimental dark green upper fuselage colour scheme with white radome which the Navy chose not to adopt. DF-4B Drone Director Aircraft

In December 1976, the Navy approved the use of the EF-4B designation for F-4Bs that were serving with VAQ-33 in support of the Navy's electronic warfare support effort. Long after most F-4Bs had been retired to storage, five F-4Bs remained serving with VAQ-33 as high-speed targets and as threat simulators to train radar operators. They were provided with electronic countermeasures pods and jammers carried underneath their wings. By the time the designation change was approved, the only F-4B remaining with VAQ-33 was 153070 and this aircraft was finally retired in 1981. Two F-4Bs were modified as research and development aircraft under the designation NF-4B. They served in test work at the Naval Air Development Centre at Warminster, Pennsylvania.



the F-4S. The last two active duty Navy squadrons to operate the F-4B, VF-51 and VF-111, finally traded in their planes in 1974. Full details of the F-4N and F-4S can be found in Chapters 5 and 6.

Some F-4Bs leaving active service were transferred to the reserves and first reached the Naval Air Reserve in 1969 when F-4Bs were assigned to VF-221 at NAS Los Alamitos, California where they operated for a short while after which they were consigned to storage at the Davis-Monthan facility in Arizona. The last Marine Corps unit to use the F-4B, VMFA-323, finally traded in its planes for F-4N conversions in 1979, bringing the service life of the F-4B to a close.



In close on the superb diamond tail markings of this VMFAT-101 'Spook' (© US Navy)

Going vertical – a Sundowners Phantom from the USS Coral Sea (© US Navy)

With everything down a Marines F-4B from VMFA-112 on finals (© US Navy)









F-4/B/N Technical Diagrams

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



Rear Cockpit



Rear Cockpit



ECM antennae details on the engine intakes (© Via Mark Smith)

Phantom Dimensions



Figure 1-1. Principal Dimensions

Emergency Approach Procedures



F-4/B/N Technical Diagrams

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



A Sparrow missile in its underfuselage recess (© Author's Collection)



Twin Sidewinder launch rails (© Author's Collection)



Rear fuselage detail (© Author's Collection)



One of the forward semi-recessed Sparrow missiles (© Author's Collection)



| | | _ | Photos © Author's Collection & USAF, Diagrams © McDonn |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXTERNAL STORES | JETTISON | CHART | |
| Weight must be off geer. | | | CARRIER LANDING PATTERN |
| Missiles mounted on fuselage stations 4 and 6 somed if a 600-gallon tank, MER, or buddy tank on centerline station 5. F-48 after AFC 346 except for airplanes 151473, 151496 1514878, and IF-AN, the ALL postion nereword. How | cannot be jetti- is installed sand ever, F-45 | 0 -0 | GROSS WEIGHT-38,000 POUNDS |
| after AFC 366 and all F-4N either the former ALL position RAFT poptions can be used to jettion the right aft insule. Armament safety override button bypasses the switch and allows release with gear handle dow | e or the ear-hondle m, | 0 0 ++ 0 | Note ON F-48 THU ISSAM-REFORE AFC 218 HHT DUT DROOPED ALLEDORG: THE OWNERD ASTR AND FINAL AMPROACH INDERED S FOR A TYPICAL AND FINAL AMPROACH INDERED S FOR A TYPICAL |
| | GEAR HDLE. | 0 | DU-SPEED ATTERN MILL BE APPROXIMATELY S LANDING GEAR DOWN WIG CTLDS: FULL DOWN 250 KGAS PSEED BRAKES AS REQUIRED |
| 1, 5 & 9 | POSITION | METHOD OF RELEASE | WAYLOFF LEVEL BREAK |
| (F-48 1483631 HRU 149474k PRIOK TO ASC 78, 87 & 97) 1 thru 9 (F-48 1504061 & UP OF AFTER ASC 78 | | External stores emerg release button - DEPRESS | LADRING CHEER LIST |
| 87 & 97 AND ALL F-4N) | | External tanks jettion ov IETT | POR HT ILD VINGS LEVEL DOWNING LEG |
| 2 & 8 | UP or DOWN | Missile jettison selector sw APROPRIATE STATION (L. WING, R. WING) | APPROVIDE IN A CASE OF PAAL TIDOU OF PAAL TIDOU FALLED AND A CASE THE PART AND A CASE TH |
| 3,4†,6†OR7 | UP or DOWN | Missile jettison selector sw APROPRIATE STATION (L. FWD, R. FWD, L. AFT, R. AFT) Missile jettison selector sw PUSH | MPEREN MERCANDO HAPPOR IN ISACAS 18-48: PPAI APPOR 32 C OP BANK |
| 2, 3, 4 † , 6 † , 7 & 8 | UP or DOWN | Missile jettison selector sw ALL ^{††} Missile jettison selector sw PUSH | 30-35 SECONDS ON GLIDE SLOPE |
| 5 (F-4B 148363f THRU 149474k) | UP | Bomb control sw DIRECT Bomb / & store release button - DEPRESS | UPDETER NOTATION |
| 5 (F-48 148363f THRU 149474k AFTER ASC 87) | UPTTT | Canterline station sofe sw READY Bomb control sw DIRECT Bomb / C store release button - DEPRESS | - the state of the |
| 5 (F-4B 150406L & UP AND ALL OTHERS AFTER ASC 78 PART 1) | UP††† | Centerline station safe sw READY Bomb centrol sw DIRECT Multiple weapons master arm sw SAFE Bomb / C. store release button - DEPRESS | |
| 5 (F-48 152278w & UP OR AFTER AFC ?41 AND ALL F-4N) | UP††† | Centerline station safe sw READY Bomb central sw DIRECT Weapons sw CONV OFF - NUCL ON Somb / E store release button - DEPRESS | Note SUBTRACT 2 KNOTS AIRSPEED FOR EACH 100 POUNDS SUNCE NORAL LANDING CROSS WEICHT (18, 000 LBS) |
| annal Olanaa Jawiaan Ola | | F08-1-(71) A | Carrier andino Pattern #1 |
| ternal Stores Jettison Cha | art | | |
| | | | |
| | | | |
| | | | MINIMUM TURNING RADIUS AND GROUND CLEARANCE |
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| OCE REPORTS | FORM | MARSHAL POINT | |
| AT, 10 MILES, REPORT — SIDE NUMBER, 10 MIL AT, 6 MILES, REPORT — SIDE NUMBER, FUEL AT NORMAL WEATBALL AQUISITION, REPORT — SIDE NUMBER, F-4, MIL (NON MEATBALL) | LE GATE STATE, 6 MILE GATE HEATBALL OR CLARA EL STATE | | |
| Non-precision (ASR) approach only. For precision 1200 feet after passing 6 mile gate unfil meatball ar directed to commence descent. | s (PAR) approach, maintain cquisition of until " | MATTOEM (PASSING 5000 HET | |
| | 10 MILE GATE CHANGE TO L | ILEVEL AT 1000 FEET MSL MIDING CONFIGURATION | ECAUTION] |
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| | 4 MILES-600 FEET | CENT | |

Note

Figure 3-3.

CATA

Phantom Turning Radius

-

Figure 3-9

Carrier Landing Pattern #2

20 Chapter 2

F-4/B/N Technical Diagrams









Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



F-4/B/N Technical Diagrams

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas

External Drains and Vents #2



Figure 1-9. External Drains and Vents (Sheet 1 of 2)



Handling and Servicing Markings



RF-4B – Marines Photo-Phantom

hen the initial 'Model 98' package was submitted to the Navy, McDonnell had included a 'Model 98P', which was a photographic reconnaissance version of the basic design. The Navy initially expressed no interest in this proposal, since they were perfectly happy with the RF-8 reconnaissance version of the Crusader and their RA-5C Vigilante. However, both lacked a night reconnaissance capability that was being planned in early 1962 for the Air Force's RF-4C land-based reconnaissance version of the Phantom. This caused the Navy to take a second look at the 'Model 98P', and in February 1963 they, via the Marine Corps, agreed to acquire the first nine of an eventual forty-six RF-4Bs converted from RF-4Cs on the McDonnell production lines. In the original proposals and pre-contract negotiations, this aircraft had been referred to as the F4H-1P, however this was changed to RF-4B in September 1962 when the new unified military designation scheme came into effect.

The RF-4B was similar to the USAF's more numerous RF-4C, and like the RF-4C, the RF-4B was unarmed. The fighter's radarequipped nose was replaced with a special nose specifically designed for reconnaissance applications, and this elongated section was 4 feet 8 7/8 inches longer than the nose of the armed F-4B. The AN/APQ-72 radar of the F-4B was replaced by the much smaller Texas Instruments AN/APQ-99 forward-looking J-band monopulse radar which was optimised for terrain avoidance and terrain-following modes, and could also be used











for ground mapping. There were three separate camera bays in the nose, designated Stations 1, 2, and 3. Station 1 could carry a single forward oblique or vertical KS-87 camera, Station 2 could carry a single KA-87 low-altitude camera, and Station 3 normally carried a single KA-55A or KA-91 highaltitude panoramic camera. The much larger KS-91 or KS-127A camera could also be carried.



RF-4B

Patch



Carrying the USS Midway signage a pair of low-vis RF-4's formate for the camera $(\! \varpi \textit{ US Navy})$





A pair of RF-4B's look pristine in their grey over white scheme (© US Navy)

Full reheat on the J79s as this RF-4 prepares to ride the 'cat' aboard the USS Midway (© US Navy)



A Bi-Centennial marked RF-4B amidst the steam waits for launch (© US Navy)

Unlike the cameras of the Air Force's RF-4Cs, the RF-4B's cameras were fitted on rotating mounts so that the pilot could aim them at targets off the aircraft's flight path.

The rear cockpit was configured for a Reconnaissance Systems Operator (RSO), with no flight controls being provided. For night time photography, a set of photoflash cartridges could be ejected upward from each side of the aircraft and for this a pair of ALE-29A/B chaff/flare dispensers were installed, one on each side of the aircraft above the rear fuselage similar to the RF-4C's configuration. The aircraft's reconnaissance imagery could be developed in flight and film cassettes could be ejected at low altitude so that ground commanders were able to obtain aerial intelligence as rapidly as possible.

An AN/APQ-10 reconnaissance SLAR (Sideways Looking Airborne Radar) was fitted, with its associated antenna faired into the lower fuselage sides, just ahead of the intakes. This SLAR was capable of tracking both fixed and moving targets and an AN/AAD-5 infra-red reconnaissance system was also fitted in the fuselage belly just behind the SLAR. An APR-25/27 radar homing and warning system was used, as was an ASW-25B one-way data-link, together with a



Having just dropped the catapult strop an RF-4B heads out (© US Navy)



A pair of grey-clad birds in flight (© US Navy)

Litton ASN-48 inertial navigation system. An ARC-105 communication transceiver was also fitted, which required that large shunt antennae be faired into both sides of the vertical fin. Like the RF-4C, the RF-4B had no Sparrow missile bays under the fuselage and also, although inner wing pylons were originally fitted, they were only occasionally carried.

The first 34 RF-4Bs (BuNos 151975/151982 and 152089/153113) retained the power plants and the basic airframe of the F-4B, however, the last twelve (153114, 153115, and 157342/157351) were built with the wide wheels and the 'thick' wing of the F-4J, and the last three RF-4B's – 157349 to

157351 were unique in that they were completed with the smoothly-rounded undernose camera bays similar to that seen on many USAF RF-4Cs rather than the angular section of its predecessors. This adaptation improved the aerodynamics and increased the internal volume. However this modification meant that the pilot could no longer control the angle of a KS-87 camera on station 2, which was now fixed.

During its lifetime the RF-4B would receive many of the updates and improvements fitted to the F-4B and F-4N. Beginning in 1975, surviving

Max Power! (© US Navy)



VMFP-3 Patch





Waiting for the next call to duty (© Via Mark Snith)

Marine Corps RF-4Bs were upgraded as part of Project SURE -Sensor Update and Refurbishment Effort. This included strengthening the airframe at strategic locations and a complete rewire along with the slotted stabilitors of the F-4N. The RF-4Bs were also fitted with the AN/ASN-92 Carrier Aircraft Inertial Navigation System 'CAINS' which replaced the ASN-48. They were also given the AN/ASW-25B data link, the AN/APD-10B SLAR which replaced the APQ-102A, and the AN/AAD-5 infrared reconnaissance set which supplanted the AN/AAD-4. Various externally-mounted electronic countermeasures pods were replaced by the internally-mounted ALQ-126 or ALQ-126B electronic countermeasures suite with its characteristic antennae and cable ducts mounted on the sides of the intakes. The J79-GE-8 engines were also replaced by J79-GE-10 engines.

The first RF-4B flew on March 12, 1965, and deliveries took place between May 1965 and December 1970, all aircraft being slated for the Marine Corps. The first RF-4B was delivered to VMCJ-3 based at MCAS El Toro in May of 1965, and soon after to VMCJ-2 at MCAS Cherry Point and to VMCJ-1 at Iwakuni in



Carrying a store on the often unused inner wing pylon this RF-4 catches the wire $({\scriptstyle {\rm CV}}~{\it US}~{\it Navy})$



Japan. VMCJ-1 took its RF-4Bs to Da Nang in October of 1966 to take part in the Vietnam War, and during the Southeast Asia conflict, three RF-4Bs were lost to ground fire and one was destroyed in an operational accident. In 1975, two years after combat in Southeast Asia had ended, the surviving RF-4Bs were regrouped into a new squadron, VMFP-3, based at MCAS El Toro. VMFP-3 itself stood down in on 14th August of 1990, when RF-4B 157351 made the last touchdown at Cherry Point bringing Marine Corps operations of the RF-4B to an end.

Colours and Markings

Despite their relatively short life, the RF-4Bs enjoyed some of the most flamboyant colour schemes ever applied to Marine Corps Aircraft, including a spectacular all-over black scheme applied to 157190. The basic operational scheme was the standard overwater Gull Grey over White, however during the 1980's the tactical greys took over and the aircraft began to sport tactical low-visibility colours.

The superb all-black retirement scheme applied to 157190

Looking very smart in the colours of VMCJ-3

Coming in hot! (© US Navy)



RF-4B Walkaround



Nose showing camera bays and air conditioning scoops



Rear underfuselage



Of note here are the external antennae of the ALQ-126 or ALQ-126B electronic countermeasures suite $% \left({{{\rm{ALQ}}} \right) = {{\rm{ALQ}}} \right)$



Catapult strop hook



Forward camera bay door open



Looking forward note the strike camera and lack of Sparrow missile wells



Note the contours of the more slender nose of the RF-4

RF-4B Walkaround



Forward ECM blister



Nose gear in detail



The more slender nose housed a Texas Instruments AN/APQ-99 forward-looking J-band monopulse radar



Tailfin, and note the position of the photo-flash bay doors



One of the few preserved RF-4Bs



Main gear bay detail



Main gear doors

RF-4B Walkaround



The all important arrestor hook mounting





Main wheel assembly



Looking along the undernose at the landing gear



Slotted stabilator, an upgrade courtesy of the F-4N



The brake cute housing and fuel dump pipe



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RF-4B Cockpit

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas









A good view of the matt tactical grey colours. Note the warning triangle on the photoflash ejector (© Author's Collection)

F-4J – The Navy & Marines Workhorse

The F-4J was the last 'production' version of the Phantom for the US Navy and US Marine Corps, as any future aircraft would be upgrades of existing airframes. The F-4J was designed as the natural follow-on to the F-4B, correcting some of the deficiencies which had become apparent in service and adding new items of kit. In prototype terms there were three YF-4Js, all of them converted from existing F-4B airframes - BuNos 151473, 151496, and 151497 - with the first YF-4J getting airborne on June 4 1965 followed by the first full production F-4J which flew on May 27, 1966 and in all a total of some 522 F-4Js were built for the US Navy and Marine Corps between December of 1966 and January of 1972.

The F-4J was powered by a pair of J79-GE-10 engines, rated at 17,900 pounds of thrust with afterburner, and these were distinguishable from the earlier models by virtue of their longer 'turkey feather' afterburner cans. Because of the increased weight and the more demanding sink rate



One of the 'Aardvarks' of VF-104 about to take the cat (© US Navy)



A fresh coat of paint can do wonders for a weary Phantom as this picture shows (© Mark Smith)







With 'everything down' a VF-31 Phantom attacks the deck (\circledast ${\it US Navy})$



A VF-31 bird from the USS Saratoga



Taking on gas, a Marines F-4J extends its range (© Glenn Sands)

A good note for a diorama setting here with this VMFA-235 Phantom


153861 from VMFA-122 'The Crusaders' (© Credit: Don Gilham)



155830 of VMFA-115 'Silver Eagles' (© Credit: Don Gilham)



The unmistakable markings of Marine unit VMFA-333 'Fighting Shamrocks' (© Don Gilham)



Another famous Marines unit VMFA-312 'The Checkerboards' (© Credit: Don Gilham)



157292 in the livery of the 'Starfighters' formerly the 'Tarsiers' of VF-33



155773 from VF-31, a favourite with the early Airfix kit! (© Thomas McManus)



A superbly presented all-over light grey Phantom from VF-102 'Diamondbacks'. Note the reduced size insignia and markings (\otimes Don Gilham)



A variation of the 'Startighters' scheme is this all-over grey Phantom 155761 (\circledast Credit: Don Gilham)





requirement of this version of the Phantom, the F-4J was fitted with a beefed-up landing gear with larger main wheels, and in order to accommodate these changes the upper and lower surfaces of the inner wing panels were bulged outward like those on the USAF F-4Cs. An additional fuel cell was also fitted in the rear fuselage bringing the aircraft's internal fuel capacity to 1998 gallons, however, the number 1 fuel cell was slightly reduced in size to accommodate a larger computer and other electronics.

The Navy wanted a better take-off and landing performance for the Phantom, and it was felt that speed, climb, and range requirements ruled out the use of the highdrag slatted wing as was being used by the Air Force on their F-4E. So in the pursuit of this greater envelope of performance McDonnell Douglas decided instead to add a slot to the stabilator leading edge, effectively turning it into a 'miniature' inverted slatted wing. This slotted stabilator provided a tremendous downward force at low speeds, which allowed the wing leading-edge slats to be heavily deflected



"Head Devil' The Boss-Bird from VMFA-232 'The Red Devils' Thomas McManus)



A VF-102 'Diamondbacks' F-4J is positioned on the deck of the USS America (© US Navy)

Looking rather 'shaded' this VF-151 Phantom still impresses (© Mark Smith)

With full tail markings this is a shot of a VMFA-212 'Spook'

An F-4J from VF-102 prepares to hit the deck (© US Navy)





An Aardvark of VF-104 just about to catch the wire (© US Navy)



On Station, an F-4J from VMFA-235 'Death Angels' (© US Navy)





without stalling. The effectiveness of the slotted stabilator was also markedly improved by locking the inboard leadingedge flap in the up position. The F-4J also introduced 16.5degree drooped ailerons, which when roughly translated meant that with main gear and flaps down, a downward deflection of 16.5 degrees became the 'neutral' aileron deflection, and as a result of all these aerodynamic innovations, the approach speed was reduced from 157 mph to 144mph.

The F-4J was equipped with the AN/AJB-7 bombing system which provided substantially better ground attack capability over that of the F-4B. This system had the capability for all-altitude release of nuclear weapons at various angles on a timed basis from the target or offset, and in addition it had the capability of working with the Bullpup air-to-surface missile. The F-4J was also equipped with the AN/AWG-10 fire control system housed in an enlarged radome and used an AN/APG-59 pulse-Doppler radar in place of the earlier APQ-72 with the AWF-10 pulse Doppler fire control system; this new radar was designed to detect and track low-lying aircraft and to distinguish them from sea/ground returns. Furthermore, the infrared search and tracking pod found underneath the nose of the F-4B was



finally removed and the F-4J was also fitted with the AN/ASW-25 one-way data link, first flown on the Navy's F-4G, which made automatic carrier landings possible.

Other improvements were added during the course of production such as the Sidewinder Expanded Acquisition Mode (SEAM), fitted in 1969 and this involved new wiring and the fitting of other items designed to make full use of upgraded Sidewinder missiles. The Visual Target Acquisition System (VTAS) helmet sight was fitted to Blocks 45 and 46 A striking Starfighter from VF-33 (© Via Mark Smith)

VMFA-314 'Black Knights (© Via Mark Smith)

The CAG Bird of VF-21 aboard the USS Ranger (© Via Mark Smith)





Taking on gas from an A-4 'Buddy' Tanker is this Phantom from VMFA-235 (© US Navy)



153842 of VF-194 the 'Golden Dragons' (© Via Mark Smith)



A superb shot of the F-4 with everything down coming in to land (© Via Glenn Sands)

F-4J UNITS US NAVY ATLANTIC FLEET

VF-11, VF-31, VF-32, VF-33, VF-41, VF-74, VF-84, VF-101, VF-102, VF-103.

F-4J UNITS US NAVY PACIFIC FLEET

VF-21, VF-92, VF-96, VF-114, VF-121, VF-142, VF-143, VF-151, VF-154, VF-161, VF-191, VF-194, VF-213. The F-4Js began to leave Navy service in the mid-1970s, when the Grumman F-14 Tomcat became available. Many F-4Js were replaced by F-4Ns, which were upgraded F-4Bs. Most surviving F-4Js were placed in storage at Davis-Monthan AFB as they were retired from service. However, some 250 surviving F-4Js were upgraded into F-4S configuration and then returned to service. By the early 1980s, most Navy F-4Js had either been upgraded to F-4S status or else had been placed in storage. The last unit to operate the un-upgraded F-4J, VF-74, finally exchanged its F-4Js for F-4Ss in 1982.

F-4J UNITS US MARINES

VMFA-112, VMFA-115, VMFA-122, VMFA-212, VMFA-232, VMFA-235, VMFA-312, VMFA-333, VMFA-334, VMFA-451, VMMAT-201, and VMFAT-101.

The first Marine Corps unit to receive the F-4J was VMFA-334, which began to receive the type in June of 1967, and these aircraft were used extensively in Vietnam during the later stages of Operation Rolling Thunder, which lasted from March 2nd 1965 until October 31st 1968, and they returned to Vietnam to participate in Operation Linebacker in 1972. On September 11, 1972, Major Thomas Lasseter and Captain John D. Commings flying F-4J 155526 of VFMA-333 from the USS America shot down a MiG-21 over North Vietnam, scoring the only Marine air-to-air kill in the Southeast Asia conflict. The F-4J was the last US aircraft in operation in Southeast Asia, with Marine F-4Js of VMFA-232 finally leaving the base at Nam Phong in Thailand in August of 1973. For more details of the Phantom in Vietnam see Chapter 8.

The F-4J began to leave Marine Corps service in the late 1970s and early 1980s and again many of the surviving F-4Js were upgraded to F-4S status and returned to service, where they soldiered on into the late 1980s and even the early 1990s before being replaced by the F/A-18 Hornet.



F-4Js, and was later retrofitted to many earlier aircraft. Also retrofitted was the Sanders AN/ALQ-126 electronic countermeasures set with prominent slender 'canoe-shaped' fairing antennae mounted on the portion of the engine upper intakes, with a hemispheric dielectric antenna fitted at the leading edge of the 'canoe' and a further two antennae added below the engine intakes. Also an AN/AYK-14 dogfight computer was fitted as well as an AN/APX-76 or -89 IFF interrogator. For better self-protection an AN/APR-32 radar warning set was fitted, with antennae mounted in the fin-cap



Marines Machines. A sight sadly missed – Phantoms from VMFA-333 (© US Navy)

You can see the rugged presence of the Phantom in this shot of an F-4J from VF-84 (© US Navy)

Another favourite scheme for kit manufacturers, this one featured on one of Hasegawa's early 1:72 releases (© Via Glenn Sands)





155736 from VMFA-333 (© Via Mark Smith)

trailing edge and in a box underneath the nose. Many pilots were also grateful that the smokeless J79-GE-10B engines were also retrofitted, once more ending the 'follow the smoke – find the Phantom' adage!'

The first F-4J deliveries began on October 1, 1966 and VF-101 began re-equipping with the type in December of that year. The F-4Js then rapidly began to replace the earlier F-4B in most operational Navy squadrons.



A superbly colourful tail aboard this VF-154 aircraft (@ Frank Duarte)



A superbly colourful F-4J from VF-142 (© Via Glenn Sands)

157259 from VF-121 'The Pacemakers' (© Via Glenn Sands)



Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



Semi-recessed Sparrow missiles on the underside



A VF-103 TPS camouflaged F-4J. Note the extended IFR probe



The outer wing section which folds for carrier operations



Forward fuselage and cockpit detail showing the air conditioning intake and variable intake ramps % $\frac{1}{2} \int_{-\infty}^{\infty} \frac{1}{2} \int_{-\infty}^{\infty} \frac{1}{$



A forward-looking view of the two cockpits

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



Looking down on the windscreen and HUD glass



Underwing airbrake from the rear



Detail of the front cockpit and ejector seat



Looking up into the nosewheel strut



Flap to fuselage detail



Looking up into the mainwheel well



Side view of one of the underwing air brakes



Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



Nosewheel detail



Nosewheel detail

Photos © Author's Collection & USAF, Diagrams © McDonnell Douglas



Looking from the front at the unique Phantom profile. Note the wing slats and extended IFR probe



Forward fuselage detail showing the integral crew access steps



Up close on the tail



Good overall view of the F-4J in its low visibility, and well worn Tactical Paint Scheme



RMU-8/A Reel Target Launcher



Block Numbers



F-4N – The Reworked F-4B

t the beginning of the 1970's the US Navy was beginning to be concerned about the condition of its fleet of F-4Bs, many of which were over ten years old and showing signs of old age, fatigue and wearing the ravages of salt water operations. In that year, a program named project *Bee Line* was instigated, by which some 228 F-4Bs were to be refurbish and modernised, with the revamped aircraft carrying the redesignation of F-4N.

The aircraft selected for conversion were sent to NAS North Island, California, where they were stripped and inspected, then were completely rebuilt using new parts. Changes included a structural strengthening to extend the fatigue life, plus a complete rewiring. The electrical generating system was upgraded with 30-kVA constant speed



The superb '00' CAG Bird from VF-51 'Screaming Eagles' (© Author's Collection)

A 'Sundowners' Phantom catches the wire aboard the USS Coral Sea (© US Navy)

An F-4N from VF-21 prepares to take a cat-shot (© US Navy)





NAVY SQUADRONS THAT FLEW THE F-4N

Atlantic Fleet: VF-41, VF-84, VF-171 Pacific Fleet: VF-21, VF-51, VF-51, VF-111, VF-151, VF-154, VF-161 Navy Reserve: VF-201, VF-202, VF-301, VF-302 The F-4N also served with several Marine Corps squadrons: VFMA-112, VFMA-134, VFMA-314, VFMA-321, VFMA-323, VFMA-351, VFMA-531, VFMAT-101.



Phantom Power; the J79s at full reheat as this Marines bird prepares for launch $(\! \otimes \textit{US Navy})$



alternators. The F-4N retained the thin wings and tires, the main radar, and the undernose infrared search and track detector of the F-4B, however the F-4N was fitted with an F-4J-style slotted stabilator which helped solve 'Mach tuck' problems when decelerating from supersonic speeds during manoeuvres and which also reduced approach speeds during landings, and ultimately all of these reworked aircraft had their inboard leading-edge flaps locked shut.

The F-4N was fitted with the Sanders AN/ALQ-126 or ALQ-126B Deceptive Electronic Counter Measures equipment. This included long antenna fairings mounted on the sides of the upper air intakes and this distinctive feature Waiting at the Davis-Monthan 'Boneyard' this F-4N was eventually converted to QF-4N Drone status (© Michael Baldock)



An all-over grey F-4N from VF-202 'Superheats' with a triple ejector rack fitted with practice 'Snakeye' retarded bombs (\circledast ${\it Don \ Gilham})$



A good view of the low-visibility scheme options here and the way the aircraft have been patched up with shades of grey (${\tt (D \ on \ Gilham)}$



F-4N 152262 carrying the flamboyant markings of VMFA-321 'Hells Angels'. Note the ALQ-126 DECM antenna on the leading edge of the tailfin (\otimes Don Gilham)



F-4N 150426 at the end of its service life awaits its fate (© Don Gilham)



F-4N 152977 in the markings of VMFA-314 'Black Knights' (© Don Gilham)



Note the open Ram Air Turbine bay on this retired F-4N (© Michael Freer)



F-4N 153053 in the markings of VF-84 'Jolly Rogers'



A superbly presented F-4N from VF-202 'Superheats' (© Via Glenn Sands)



enabled F-4Ns to be externally distinguished from F-4Bs. The DECM antennae fairings on the F-4Ns were in longer than those used on the F-4J (with the same equipment) due to the difficulty in routing the cables. The radar homing and warning antennae for the ALQ-126 DECM were fitted to the undersides of the intakes and wings just aft of the undercarriage bays, and these were also tied into the antennae on the trailing edge and to a new antenna on the leading edge of the vertical fin, thus adding another external identifying marker for the F-4N. Internal changes included the fitment of a helmet sight Visual Target Acquisition System (VTAS) and a Sidewinder Exanded Acquisition Mode (SEAM). A new dogfight mission computer was provided, together with auto-altitude reporting equipment. APX-76 or APX-80 air-to-air IFF equipment was also fitted, plus AN/ASW-25 one-way data-link. The J79-GE-8 engines of the F-4B were retained, although smoke abatement equipment was fitted to them.

The first F-4N flew on June 4, 1972. The first renovated F-4Ns joined the fleet in February of 1973.

The F-4N had a relative short life as an active-duty fighter with Navy carrier-based units, and began to be replaced by the all-conquering Grumman F-14A Tomcat during the midto late-1970s. However, VF-154 flew F-4Ns off the USS Coral Sea until the end of 1983, when they finally traded in their Phantoms for Tomcats. The F-4N soldiered on for a few years longer with Naval and Marine Corps reserve units until being replaced by either the F-4S or by the F/A-18 Hornet during the early 1980s. The last Navy F-4N was retired from VF-201 based at NAS Dallas, Texas in February of 1984 and the last Marine Corps unit to fly the F-4N was VFMA-134, which relinquished the type in 1985.

As they left service, many F-4Ns were modified as remotely-controlled drones under the designation QF-4N. The first QF-4N conversion was performed in 1983. As compared to the original Phantom drone, the QF-4B, the QF-4N was much more manoeuvrable and was intended to



simulate the most agile targets. This increased agility was obtained by removing everything from the aircraft that was not absolutely essential to the target mission. The rear cockpit was stripped to make space for the AN/ASA-32 analogue autopilot and flight control system. However, the front cockpit remained, so the QF-4N could be flown in the manned mode if needed. One of the most famous US Marine Corps Phantom units was VMFA-531 'Gray Ghosts' who carried this impressive tail marking on their aircraft (@Author's Collection)

Carrying Napalm canisters this 'Silver eagles' spook from VMFA-115 taxies out (© US Navy)

Seen in low-vis plumage is this F-4N of VF-201 'The Hunters' (© Author's Collection)



F-4S – The Final Seaborne Phantom

-4S was the designation applied to some 265, although some references quote only 248, F-4J Phantoms which were upgraded during the mid-1970s. This program followed the same route as the aforementioned Bee Line project in which Navy F-4Bs were upgraded to F-4N standard. The major goal of this upgrade was to extend the life of the USN and USMC F-4Js so that they could remain in service until eventually being replaced by the F/A-18 Hornet in Marine Corps service and by the F-14 Tomcat in Navy service.

The major changes included airframe and undercarriage strengthening, whereby the aircraft were stripped down and carefully inspected, and where necessary they received any necessary landing gear, wing and fuselage structural improvements. One of the most prominent external cues was the addition of external straps to the wing spar to improve the structural integrity. The electrical system was completely rewired, and the hydraulic system was replumbed using stainless steel tubing. In order to improve the manoeuvrability, two-position wing leading-edge slats were fitted which gave a 50 percent improvement in combat turning capability in comparison with an unslatted F-4J.



An F-4S crew get ready to roll





These slats operated automatically as a function of the aircraft's angle of attack sensors, but they could also be overridden from the cockpit. The slats came in two sections, one on the outboard portion of the fixed inner wing and the other on the folding outer wing panel. Because of production delays, the slats were not fitted to the first 43 F-4Ss, but were later added as a retro fit.

The F-4S was fitted with the digital AWG-10B weapons

control system with new AN/ARC-159 dual UHF radios and most, but not all, received an ARN-118 TACAN. The ALQ-126 or 126A deceptive electronic countermeasures set of the F-4J was retained, with the same short intake antennae fairings, which was another identification marker between the F-4S and F-4N. One of the persistent problems with the Phantom was that it tended to leave a rather prominent trail of sooty black smoke behind it, making it more readily visible to an The stormy skies almost match the paint finish on this VMFA-321 'Spook'

A pair of VF-301 F-4Ss in flight showing this unusual variation on the TPS scheme





The F-4S flew mainly from the small aircraft carriers such as the USS Midway, as seen here with an aircraft from VF-151



A well worn F-4S on the flight line as an A-7 comes in to land in the distance

The darker blue-grey of the VMFA-321 Phantoms made a stark contrast to the normal tactical paint colours







The later, more colourful and 'angular' TPS scheme as applied to the aircraft of VF-301 'Devils Disciples

enemy – 'follow the trail, find the Phantom' was a popular remark. In order to correct this problem, the F-4S was fitted with smokeless J79-GE-10B engines with low-smoke combustors and low-energy ignition, and this same engine was also fitted to some late model F-4Js. Low-voltage formation lights were also added to the sides of the nose, mid-fuselage, and tailfin, and staggered cooling ports were fitted near the nosewheel well.

The first F-4S modification (F-4J BuNo 158360) took its maiden flight on July 22, 1977 with the first F-4S with 'factory fitted' leading edge slats 155899 being delivered in the

November of 1979. First to unit to get their hands on the upgraded aircraft was the US Marines VMFA-451, which began to receive un-slatted aircraft in June of 1978.

By the end of American involvement in the Vietnam War, the Phantom was already beginning to be supplemented by the Grumman F-14 Tomcat aboard the larger carriers, and throughout the remainder of the 1970s and into the early 1980s, the Navy progressively replaced its F-4Ss with the The low-vis greys of the TPS soon faded and showed up the tell tale patchwork of repair and maintenance





VMFA-321's supremely colourful anniversary jet celebrating the Phabulous Phantom

A good view of the fuselage walkway markings in light grey here



VF-161's colourful tail art breaks up an otherwise dull colour scheme

Wearing the darker grey TPS (Tactical paint Scheme) applied to some of its aircraft, this VMFA-321 'Hells Angels' Phantom looks very impressive. Note the use of the 'slime lights' on the tail adding to the logo







Looking far more weary and tired, a VMFA-321 Phantom in the standard Tactical Paint Scheme

Looking almost factory fresh, a pair of VMFA-112 'Cowboys' shows the demarcation lines of the TPS to good effect





F-4S front cockpit

Grumman design aboard most deployable carrier-based squadrons. The exceptions were six squadrons which were assigned to the older and smaller carriers such as the USS Midway and the Franklin D Roosevelt which were re-equipped with both F-4Ns and F-4Ss and soldiered on with these Phantoms for a few more years. However, by 1986, all of the Phantoms serving with the Atlantic and Pacific Fleets were gone, the last carrier launch of an F-4S having taken place on March 24, 1986 when F-4Ss from VF-151 and VF-161 were launched from the USS Midway. After 1986, F-4Ss now served exclusively with shore-based Naval reserve units, however, this service was rather brief. The last F-4S, 155560 was retired by VF-202 from NAS Dallas on May 14, 1987, thereby bringing to an end the 'Spook Service' of the Navy's

The darker greys of the VMFA-321 aircraft added a certain style to the Phantom's last years of service

An F-4S rolls into position to take on fuel





A VF-210 aircraft is prepared for flight. Note the manoeuvring slats on the folded wing leading edge

Still looking menacing even in the twilight of its career

Ready for action is this pristine looking F-4S from VMFA-112

An F-4S wearing one of the experimental 'Heater-Ferris' camouflage schemes designed to break up the aircraft's shape in combat







A good view of the nose area of the F-4S including access ladder placement



MARINE CORPS OPERATORS OF THE F-4S

VFMA-112, VFMA-115, VFMA-111, VFMA-134, VFMA-212, VFMA-232, VFMA-235, VFMA-251, VFMA-312, VFMA-321, VFMA-333, VFMA-451, and VFMAT-101.

NAVY OPERATORS OF THE F-4S

The first Navy squadron to receive the F-4S was VF-21, based at NAS Miramar in California, which began to receive its first aircraft in December 1979. Atlantic Fleet: VF-74, VF-171 Pacific Fleet: VF-21, VF-121, VF-151, VF-154, VF-161 Naval Reserve: VF-201, VF-202, VF-301, VF-302 Air Development: VX-4 last tactical Phantom. VF-202 later re-equipped with F-14A Tomcats. By mid-1992, the only Phantoms remaining in Navy service were those assigned to the Naval Air Weapons Centre at NAS China Lake and NAS Point Mugu in California.

In the late 1980s, Marine Corps units also began to phase out its F-4Ss in favour of the F/A-18A Hornet and in the January of 1992, VMFA-112 retired the last F-4S from the US Sea Service inventory and they completed their transition to the F/A-18A shortly thereafter. This was the last Marine Corps unit to operate the Phantom, and was, incidentally, also the last naval aviation Phantom to serve on active duty, apart from drones. At least one F-4S -158358 was converted into a drone configuration under the designation QF-4S.

A VMFA-312 F-4S from the 'Checkerboards'



QF-4

– Drone Phantoms

Chapter

An overall view of a VX-30 QF-4S (© Glenn Sands)

FSAT - Full Scale Aerial Targets

The designations QF-4B, QF-4N and QF-4S were applied to retired F-4B/Ns that were converted to a remotecontrolled drone configuration, and these aircraft were intended as supersonic fast manoeuvring targets to assist in new missile development. The first QF-4B conversion took place in mid-1970 when the third F-4B 148365 was modified by the Naval Air Development Centre (NADC) at Warminster, Pennsylvania. The weapons systems of the F-4B were removed and replaced by radio and telemetry equipment and ballast was added to the nose in order to preserve the centre of gravity in place of the removed military equipment. From late 1971, the





first conversion was tested in basic remote control mode, using a Vought DF-8L Crusader as the director aircraft. Tests included switching back and forth between piloted and unpiloted mode, combat manoeuvring, weapons trials, and penetrations of hostile airspace. A high-visibility Dayglo paint scheme was applied and the aircraft was delivered to Point Mugu in California in April of 1972 for further testing. At least 44 F-4Bs were modified to the QF-4B drone configuration and each had differing command, data link, and scoring systems. Most QF-4B sorties were flown manned, with hits or misses being scored electronically, since the cost of even a surplus F-4B was at the time considerable! However, several QF-4Bs went out to White Sands and other facilities for tests of the Army's Patriot surface-to-air missile system, and were subsequently destroyed.

Some forty QF-4N drones were created, the first two being 150630 and 151004, with the former being unveiled at the Naval

Dayglo orange panel dominate the rather faded appearance of the QF-4S (© Glenn Sands)



QF-4 Cockpit (© Mark Smith)



A pair of QF-4N's from the NAWC (© Glenn Sands)



The fearsome nose of the QF-4S. Note the small amplifier aerial on the undernose 'bump' (${\ensuremath{\textcircled{}}}$ Glenn Sands)

QF-4 Cockpit

QF-4B/N 152250 (© Glenn Sands)





A QF-4N in 'manned' flight (© US Navy)



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The fearsome tail markings of VX-30 shown on a QF-4S (© Glenn Sands)

Tail markings aboard QF-4N 153030 (© Glenn Sands)

153030



Close-up of the nose of a QF-4 drone. Note the intake cover (© Glenn Sands)

QF-4S Sharkmouth (© Glenn Sands)



Missile Centre at Point Mugu in 1984. The QF-4N had the full manoeuvring capability needed by the test units which was lacking in the earlier QF-4B models and was therefore a more effective threat. A number of QF-4S airframes were also converted to the drone role and were also operated by the VX-30 'Bloodhounds' at Point Mugu. The QF-4S, unlike the early QF-4s, was capable high 'g' turns when operating in the NOLO – No Onboard Live Operator – configuration. Their smokeless engines also made them much harder to spot. The QF-4S also incorporated a new electronic warfare suite and a Trimble GPS. The last F-4S (155847) was delivered to from Cherry Point to Point Mugu on March 3, 2003 and the QF-4s ended their time with the Navy supporting the F-22 program at Edwards AFB.

> Up close and personal, QF-4B (© Glenn Sands)

















Colour Art © David Howley



Colour Art © David Howley

Paint References

| NAME | FS REFERENCE | TAMIYA | REVELL | GUNZE HOBBY | TESTOR / MM | HUMBROL | |
|-----------------|--------------|--------|--------|--------------------|-------------|---------|--|
| Gull Grey | 36440 | | | 325 | 1729, 1730 | 129 | |
| White | 37875 | xf2 | 5 | 11 | 1768 | 34 | |
| Blue Grey | 35237 | | | | | | |
| Dark Ghost Grey | 36320 | | | 307 | | | |
| Ghost Grey | 36375 | | | 308 | 1428, 1728 | 127 | |

Colours

Unless otherwise stated Navy and Marine F-4s were camouflaged with: Uppersurfaces FS36440 Light Gull Gray

Undersurfaces FS 17875 Insignia White

Walkways in FS 36231 Dark Gull Gray, sometimes black



Colour Art © David Howley
Phantoms in Vietnam

o give full details of the role of the Navy and Marine Corps Phantom in the Vietnam war would require more pages than are available within this Datafile. However, the work of the aircraft in the South East Asia conflict is so important as to warrant brief look at its performance. The US military had just become comfortable with the Phantom when the time came to send it to war. US activities in the sputtering conflict in Vietnam had been growing steadily in the early 1960s, and finally went past the threshold to full involvement in the summer of 1964. The Navy began a campaign of limited bombing attacks against North Vietnam codenamed 'Barrel Roll' in December 1964 that continued into January 1965. Following attacks on US facilities in South Vietnam by Viet Cong guerrillas in early 1965, the US began to ramp up a bigger air campaign against the North, codenamed 'Rolling Thunder' that would continue off and on for several years. In the meantime, the Phantom had drawn first blood, but it was not an inspiring introduction to combat, as on the 9th of April 1965, US Navy Phantoms mixed it with Chinese MiG-17s over the Gulf of Tonkin. A Phantom apparently shot down a MiG down with a Sparrow AAM, but the victorious Phantom was lost with both crewmen, apparently the victim of a 'friendly fire' accident involving a Sparrow launched by their flight.

As Rolling Thunder gathered pace, both Navy and USAF Phantoms became involved, initially operating in the air superiority role to protect strike elements from MiGs. On 17 June 1965, Navy F-4Bs were flying 'Barrier Combat Air Patrol – BARCAP', protecting a strike package which was attacked by four North Vietnamese MiG-17s. Once the Phantom pilots visually identified the MiGs, they took them on, firing Sparrows at them. Two Phantoms, one piloted by Commander Louis Page and the other by Lieutenant Jack Batson, each



scored a kill and these were the first 'People's Army of Vietnam North Air Force' (PAVNAF) aircraft to be shot down in the war. These successes were encouraging and the Phantom would score more kills in the coming months. Since Marine aviation is mostly dedicated to support of the 'grunts' on the ground, USMC Phantoms were generally dedicated to the battlefield strike, or 'mud-moving', role from the early days, attacking Communist forces in South Vietnam therefore they had little opportunity to chase MiGs. Phantoms assigned to the strike role were armed with general-purpose 'slick' bombs, napalm tanks, unguided rocket pods, and cluster dispensers or canisters. Although the Phantom could carry the Bullpup ASM, this weapon proved unreliable and ineffective, and was not widely used. As the recce RF-4Cs and RF-4B arrived in the battle theatre, they too found themselves



Sidewinder armed Phantoms from VF-142 and VF-143 prepare for launch on Combat Air Patrol (© US Navy)



immersed in the war. Reconnaissance missions were often very hazardous. USAF RF-4Cs over North Vietnam not only faced heavy air defences, but often had to conduct post-strike intelligence missions, photographing target areas after a strike, when the North Vietnamese were fully alert and expecting them. Marine RF-4Bs didn't face such an array of heavy weapons, but they had to get down low to get good intelligence, and the Viet Cong shot at them with everything they had. The fact that the recce Phantoms were always unarmed didn't reassure their pilots, either.

During this quiet time, improved weapons were acquired. The Air Force got their F-4Es, with built-in cannon, and the Navy got their new F-4Js, which could carry the Hughes Mark 4 cannon pod. New and much more effective jammer pods were introduced. The Phantom also helped pioneer the operational use of 'smart' munitions. The US Navy had introduced the Walleye Electro-Optical Glide Bomb (EOGB) into combat in 1967. It was originally carried by Navy A-4 Skyhawks fitted with radio-link gear to control the weapon, and eventually was carried by Phantoms as well.

The quiet spell began to end in early 1971. On 19 January of that year, a Navy RA-5C was performing a reconnaissance mission over North Vietnam, with a flight of Navy F-4Js assigned to perform air-defence suppression. The flight was





led by Lieutenant Randall Cunningham, better known as 'Randy' or Duke', with RIO Lieutenant William Patrick 'Willie' Driscoll, both were Top Gun graduates. The Phantoms dodged a number of SAMs and then ran into MiG-21s. Cunningham saw two MiG-21s moving fast below him and dived on them. Driscoll got a Sparrow lock, but Cunningham decided to close in and use a Sidewinder. He fired; the PAVNAF pilot broke right and shook off the missile. Cunningham's Top Gun training told him not to get into a turning contest with a MiG, so he went down low and fast to get out of that game and seek a better opportunity. He got it; though the second MiG-21 flew out of the fight, the first came out of his turn, the pilot failing to see the Phantom below him. The MiG banked left and Cunningham popped up, firing a Sidewinder on a nice clear target outlined against the sky. The missile scored a direct hit on the MiG, blowing off its tail. It was the first Navy air combat victory in almost two years.

On 8 May, as Navy A-6 Intruders were mining Haiphong Harbour, Duke Cunningham and Willie Driscoll were flying escort, when they were attacked by a MiG-17 that fired a heat-seeking AAM at them and their wingman. The Phantoms banked and shook off the missile. Cunningham turned on the MiG and took a shot at him with a Sidewinder.

An F-4B from VMFA-122 (© US Navy)

A pair of F-4J's carrying the same unit insignia as those of Cunningham and Driscoll during their MiG kill, and also popular in the early Hasegawa 1/72 Phantom releases (© US Naw)

A brace of fully loaded Marines Machines (© US Navy) A pair of 'Sundowners' from VF-111 assigned to the USS Coral Sea drop 'iron bombs' against North Vietnamese targets (© US Navy via Glenn Sands)



VMFA-531 the first Marines unit to arrive in the South East Asia theatre (© US Navy)





A crowded deck scene aboard the USS Independence (© McDonnell Douglas via Glenn Sands)



A VMFA-115 F-4B (© US Navy)

The firing position was far from optimum, but the missile struck home. Cunningham and Driscoll didn't have much time to enjoy this victory, since another MiG-17 immediately jumped them. Cunningham turned wildly to escape, damaging his aircraft in the process, only to look up and see the MiG-17 just above him. There was no out-turning a MiG-17, but he could out-run it. He ducked into a cloud and engaged afterburner to give the MiG the slip. Cunningham and Driscoll counted themselves lucky to have got away.

On 10 May 1972, Cunningham and Driscoll were part of a strike package hitting a rail yard alongside Haiphong Harbour. As they were pulling out of their bomb run, one of the other Phantoms blew up in a fireball, a victim of ground fire, just as Driscoll reported a MiG-17 coming up on their own tail. Four more MiG-17s joined the first, and Cunningham found himself in a wild mix-up. He managed to use the Phantom's superior speed and power to get on the tail of one of the MiGs, so close in fact that he was too near to fire a Sidewinder, wishing he had a cannon pod. However, the MiG pilot panicked, and instead of trying to out-turn the Phantom – which he could have done easily – he engaged afterburner and tried to run away. Cunningham put a



Attack aircraft aboard the USS Midway (© US Navy via Glenn Sands)



A Marines F-4B carrying a heavy warload of 24 Mk.82 'slick' bombs on MER racks (© US Navy via Glenn Sands)

A Phantom is positioned onto one of the USS Midway's catapults (© US Navy)

A scene from the horrendous deck fire aboard the USS Forrestal when a stray Zuni rocket was accidentally launched into the parked aircraft (© US Navy)

Sidewinder up the MiG's tailpipe, blasting it out of the sky. Cunningham applied power and got altitude to look down on a scene full of MiG's and Phantoms. One of the Phantoms broke out of the fight with several MiG's in pursuit. Cunningham dived down on the four aircraft and got a Sidewinder lock, but he couldn't safely launch since the other Phantom was in the line of fire. Cunningham called out: 'Showtime, break right, break right!' The pilot of the second Phantom, distracted, didn't respond. Cunningham tried again: 'Showtime, reverse starboard!' Nothing happened. Cunningham finally shouted: 'If you don't you're dead!' The second Phantom then rolled out of the line of fire, and Cunningham launched, scoring a hit that tore apart the MiG. The North Vietnamese pilot somehow managed to bail out or was thrown clear. Cunningham circled back around out of the fight. Driscoll observed a MiG-17 on their tail, but Cunningham easily shook him. They didn't see anything but MiGs in the sky and decided to head back for their home, the carrier USS Constellation. On the way back out, they encountered a MiG-17 approaching from ahead. Cunningham turned into the attack, abruptly jinking out of the way and going vertical when the MiG pilot started firing. Cunningham thought that would be the end of it, given the usual 'hit and run' tactics of the enemy, but the PAVNAF pilot was there to fight, pulling up vertically so the two aircraft were canopy-tocanopy. The MiG-17 didn't have the power to keep up in this game, but that wasn't good news for the Navy men; it meant that the Phantom would soon climb into the line of fire of the





MiG's hard-hitting cannon. Cunningham dropped out of the climb and dove just as the MiG opened fire again. The two fighters separated and came back at each other again, performing two up-and-down manoeuvres, trying to get on each other's tail. The MiG stayed with the Phantom every step of the way. Then Cunningham cut power and extended his airbrakes, forcing the MiG to overshoot. The MiG pilot went into a steep dive to escape and Cunningham followed. The range was long and Sidewinders could be easily confounded by ground heat sources on a downward shot, but Cunningham launched anyway. Somewhat to his surprise, the missile went home and the MiG exploded. Cunningham and Driscoll were not quite through with the excitement for the day. Near the coast, an SA-2 SAM popped up near them and exploded, spattering shrapnel into their Phantom and badly damaging it. They made it well out to sea, called ahead to the carrier for a rescue helicopter, and then ejected. They were picked up about 20 minutes later and brought back to a wild celebration. Not only had they shot down three MiGs in a single sortie, but Cunningham and Driscoll were given equal



Fighter and attack aircraft from USS America form up before heading for a strike over North Vietnam, including A-7 Corsairs from VA-82 and Phantoms from VF-33 and VF-102 (© US Navy via Glenn Sands)

An F-4B from VF-114 'Aardvarks' aboard USS Kitty Hawk flies a Combat Air Patrol mission over North Vietnam in March of 1968 (© US Navy via Glenn Sands)



Ensign James Lainge ejects from his stricken F-4B on return from an attack against Kep airfield. His pilot Lt. Commander Charles E Southwick ejected moments later (© US Navy via Glenn Sands)



With its bomb and missile racks empty an F-4J from VF-21 aboard the USS Ranger prepares to 'come aboard' its home carrier in the Gulf of Tonkin (© US Navy via Glenn Sands)





A colourful Marines bird from VMFA-235 awaits the call to action $(\!\circledast$ US $\textit{Navy}\!)$



Navy Aces Cunningham and Driscoll in conversation with the Secretary of the Navy and Admiral Zumwalt (\circledast US Navy)



Aircraft aboard the USS Constellation wait on the flight deck for their turn to be launched on strike missions to the Haiphong area of North Vietnam (© US Navy via Glenn Sands)

credit for kills, and were now the Navy's first aces of the Vietnam War. Even the Marines, who didn't have the opportunity to do much dogfighting during the war, got into the act during 'Linebacker' as on the 11th September 1972, USMC Major Thomas 'Bear" Lasseter and RIO Captain John D. Cummings shot down a MiG-21, the only Marine air-to-air kill of the conflict. During the course of the war, Navy Phantom squadrons participated in 84 combat tours with F-4Bs, F-4Js, and F-4Ns. The Navy claimed 40 air-to-air victories at the cost of 71 Phantoms lost in combat, 5 to enemy aircraft, 13 to SAMs, 53 to AAA, and an additional 54 Phantoms were lost in accidents. Of the 40 aircraft shot down by Navy and Marine Phantom crews, 22 were MiG-17s, 14 MiG-21s, two Antonov An-2s, and two MiG-19s. Of these, eight aircraft were downed by AIM-7 Sparrow missiles and 31 by AIM-9 Sidewinders. Marine F-4 pilots claimed three enemy MiGs, 2 while on exchange duty with the USAF at the cost of 75 aircraft lost in combat, mostly to ground fire, and four in accidents.

On 29 December 1972, the North Vietnamese delegation returned to the negotiating table. The raids were cut back, but continued until 15 January 1973, when the North Vietnamese finally agreed to terms. A cease-fire was signed on 23 January 1973, and the Air Force began airlifting POWs out of Hanoi on 18 March 1973.



USAF and Navy Phantoms (with an A-7 Corsair in attendance) rain bombs on North Vietnamese positions (© US Navy)

Flying the Phantom at Sea



'Ride the Cat' and 'Take the Wire'

Former Phantom pilot Commander John Roberts describes flying the Phantom at sea.

he Phantom aircrew will take a good 10 to 15 minutes just to run up the machine, strap in and get the systems checked out. As soon as the air boss orders, 'start engines,' over the ear-splitting bull horn, the crew begins the intricate ritual of pre-launch activity. The plane captain in his brown helmet runs forward of the parked aircraft and gives a series of arm and hand signals to start the engines, unplug the starters, spread the wings, lower the flaps, check the operation of the ailerons, horizontal stabiliser, rudder, tailhook, speed brakes, emergency drop-out generator and the in-flight refuelling probe. Every signal has a specific meaning: swinging both extended arms over his head from a crossed position to a horizontal one means to spread the wings, holding one arm up, elbow bent 90°, and touching the underside of that elbow with the palm of the other hand means to drive home the wing locking pins. Flaps are extended by splitting two arms forward of the body, half flaps by following this quickly with crossed index fingers, tail hook by giving an exaggerated thumbs down or thumbs up, swinging the arm from the shoulder. Refuelling probe is extended by one arm slowly swung way out to a side. Emergency generator drops out by a sweeping gesture with both hands and a split of the hands.

With checks completed, the plane captain turns the Phantom over to a yellow-shirted Flight Deck Director, who has another assortment of hand and arm signals: chocks out, taxi forward, turn left, turn right, speed up, slow down, all are signalled in rapid succession as the Phantom rolls out of its parking place, onto the travel section of the flight deck, and moves forward toward the catapult. Here now, the Flight Deck Ballet really gets going. While bracing themselves against the pitching deck, screaming exhausts and strong winds, they have to use both hands over their heads to effect the signals for the pilot to follow. A 'come ahead' is just that, both hands high, motioning come along. Turns are signalled by making a fist with one hand and jabbing it downward, while still keeping the 'come ahead' signal active with the other. Flight Directors are yellow-clad, from helmet to waist and a certain

The pilot keeps his left arm thrust full forward, holding the throttles with the heel of his hand and grasping the retaining handle with his fingers (© US Navy)







The aircraft seems to scream in agony as each bolt, plate, screw, pin, washer and rivet is put under maximum strain (© US Navy)

The tyres flatten to the rims even with 450 pounds of inflation, and the Phantom is flung into the air! ($\mbox{\tiny GUS}\ \mbox{\it Navy})$



For coming aboard, the Phantom is a hard but forgiving aircraft. It's heavy and doesn't get bounced much by turbulent air, it has nice control harmony and gives a solidly reassuring feeling to the pilot, especially over the fan tail (© US Navy)

number have earphones in their bulky cloth helmets through which they receive radio orders from Pri-Fly, the Flight Deck Boson or the Flight Deck Officer. Clinging to each strut, chock in hand, are the blue-shirted plane handlers, who also follow each signal from the Director. As the Director dances

backward, moving the plane forward, he nears the edge of his area of responsibility, and passes the control along to another yellow-shirt further up the deck. Ultimately, it is the Catapult Plane Director who does the fine signalling required to bring the huge Phantom directly over the catapult shuttle for hook up. As the beast moves into position, other crewmen



Flight Directors are yellowclad from helmet to waist, and a certain number have earphones in their bulky cloth helmets through which they receive radio orders (© US Navy)

feverishly scramble around beneath the Phantom, fixing the heavy steel bridle to the plane, and the dumbbell shaped 'hold-back' to a fitting in the stern keel of the aircraft.

With the Phantom in place, a slight tension is placed on the catapult bridle, straining to pull the plane forward hard against the hold-back dumbbell. The pilot extends the nose gear on signal, which whooshes the nose of the airplane six feet or more into the air. Flaps are set as required, and the catapult officer extends two fingers and rapidly rotates his hand over his head. From here on until airborne, the Phantom crew is in the hands of the cat crew. The pilot's feet come off the brakes, the engines are turned up to full power and the hook-up men scramble to the catwalk as the plane shudders and shakes as 34,000 lb. of thrust strains against the hold-back. When the pilot gets an O.K. check from his flight officer, and is satisfied that his engines are cranked up, he salutes smartly with his right hand, returns it to the stick, jams his elbow back, all the while keeping his left arm thrust full forward, holding the throttles with the heel of his hand and grasping the retaining handle with his fingers. He puts his head firmly against the headrest and waits. The catapult officer swings his arm in a high arc, touches the deck and the cat operator in the catwalk throws the firing lever. Within a split second the cat fires! The aircraft seems to scream in agony as each bolt, plate, screw, pin, washer and rivet is put under maximum strain and the tyres flatten to the rims even with 450 pounds of inflation, and the Phantom is flung into the air!

For coming aboard, the Phantom is a hard but forgiving aircraft. It's heavy and doesn't get bounced much by turbulent air, it has nice control harmony and gives a solidly reassuring feeling to the pilot, especially over the fan tail. Getting aboard is always a heart stopper. A high vertical descent rate is started, and the plane seems to actually fall to the deck with a thud. The pilot selects max power as he aims for the three wires in case of a bolter, and the Phantom hits the deck. If the aircraft cannot land with the hook extended for any reason a large nylon and wire arresting barricade has to be thrown up across the landing area. The plane is then brought around and literally flown into a spider web of nylon. The strands grab at wings and landing gear, stopping the plane safely, but not without some amount of damage. A good carrier pilot gets his plane off the wire quickly and safely; this means that the tail hook frees easily and rapidly after arrestment, as the plane rolls gently aft, and then out of the landing area to clear the decks for the following landing. The moment the wire drops clear, a yellow-shirted taxi director



signals a rapid 'come ahead' to the pilot, power is added smartly, wings start to fold upward, flaps are raised, the nosewheel turns to provide exact directional control, and the Phantom scoots clear at almost the same instant that the tension is reset on the wires, thereby opening the deck for the following aircraft. The catapult officer swings his arm in a high arc, touches the deck and the cat operator in the catwalk throws the firing lever (© US Navy)



Phantoms and Angels

The US Navy's crack aerial demonstration team the 'Blue Angels' took delivery of their first twin-engine aircraft the F-4 Phantom in 1969, and it remained a popular steed until the fuel crisis forced them to choose a smaller, less thirsty mount in the shape of the A-4 Skyhawk.



Flying a 'mirror image' (© US Navy)



The Angels aircraft are always immaculate





One of the 'Angels' signature manoeuvres is the 'mirror image' (© US Navy)



Formation take-off (© US Navy)





Close formation is one of the Blue Angels trademarks (© US Navy)



Blue Angels F-4J 153082

Six Angels in a diamond (© US Navy)

The Phantom was a thirsty steed for the Blue Angels, but was nevertheless a crowd pleaser



It was not always plain sailing for the 'Angels! (© US Navy)



Black Bunny Phantoms

o look at the Navy F-4 would be complete without a photograph or two of one of the most famous and most modelled Phantoms, VX-4's 'Vandy 1' collection of F-4Js, perfect in their all-black colour scheme complete with a 'Playboy Bunny' symbol on the tail.



'Vandy 1' taxies in after another mission (© Mark Smith)





The immaculate 'Playboy Bunny' Phantom that was VX-4's trademark (@ Mark Smith)



A veritable gaggle of test Phantoms in all shades of the spectrum! (${}^{\tiny(\! \mbox{\scriptsize US}\)}$ ${}^{\tiny(\! \mbox{\scriptsize US}\)}$



It even looks good in the rain! (© Author's Collection)





VX-4's F-4J Black Bunny caught at Ofutt AFB, in 1984

VX-4 'White Bunny' F-4J

Phantom Operators

Chapter **12**

t was the 30th December 1960 that VF-121 'Pacemakers' became the first Phantom operator with its F4H-1Fs, the F-4A. VF-74 'Bedevilers' became the first deployable Phantom squadron when it received its F4H-1s - F-4Bs on the 8th July 1961, and the squadron completed carrier qualifications in October 1961, and Phantom's first full carrier deployment between August 1962 and March 1963 aboard USS Forrestal. The second deployable Atlantic Fleet squadron to receive F-4Bs was the F-102 Diamondbacks and the first deployable Pacific Fleet squadron to receive the F-4B was the VF-114 'Aardvarks', which participated in the September 1962 cruise aboard USS Kitty Hawk.



VF-10



VF-14



VF-21



VF-41



VF-74

| ATLANT | IC FLEET SQUADRONS |
|--------|------------------------------|
| VF-11 | 'Red Rippers' |
| VF-31 | 'Tomcatters' |
| VF-14 | 'Tophatters' |
| VF-32 | 'Swordsmen' |
| VF-33 | 'Tarsiers' ('Starfighters') |
| VF-102 | 'Diamondbacks' |
| VF-41 | 'Black Aces' |
| VF-84 | 'Jolly Rogers' ('Vagabonds') |
| VF-74 | 'Bedevilers' |
| VF-103 | 'Sluggers' |
| | |





VF-102



VF-114



VMFA-212



COWBOF

VMFA-122

VMFA-251





VF-301

VF-202



VMFA-333



VMFA-531



VMFA-232



VMFA-314



VMFA-334



VX-4

| US NAV | Y RESERVE | US MAR |
|--------|-----------------------------------------------------|----------|
| VF-201 | 'Hunters' (Atlantic Fleet) | VMFA-11 |
| VF-202 | 'Superheats' (Atlantic Fleet) | VMFA-11 |
| VF-301 | 'Devil's Disciples' (Pacific Fleet) | VMFA-12 |
| VF-302 | 'Stallions' (Pacific Fleet) | VMFA-21 |
| | | VMFA-23 |
| | | VMFA-25 |
| NAVAL | CREW TRAINING | VMFA-31 |
| VF-101 | 'Grim Reapers' (Atlantic Fleet) | VMFA-31 |
| VF-121 | 'Pacemakers' (Pacific Fleet) | VMFA-32 |
| F-171 | 'Aces' (Atlantic Fleet. NB: The DACT detachment of | VMFA-45 |
| | this squadron was located at NAS Key West, Florida, | VMFA-51 |
| | and flew the A-4 Skyhawk) | VMFA-53 |
| | | VMFA-54 |
| | | VMFP-3 (|
| NAVAL | FLEET SUPPORT | MFAT-10 |
| VC-7 | 'Tallyhoers' | |
| VAQ-33 | 'Firebirds' | |

| FLIGHT | DEVELOPMENT, TEST AND EVALUATION | |
|--------|----------------------------------|--|
| VX-4 | 'Evaluators' | |
| VX-5 | 'Vampires' | |
| VX-30 | 'Bloodhounds' | |

| US MARINE CORPS OPERATORS | |
|------------------------------------|--|
| VMFA-115 (VE) | |
| VMFA-112 (DC) | |
| VMFA-122 (MA) | |
| VMFA-212 (WD) | |
| VMFA-235 (DB) | |
| VMFA-251 (DW) | |
| VMFA-312 (DM) | |
| VMFA-314 (VW) | |
| VMFA-323 (WS) | |
| VMFA-451 (VM) | |
| VMFA-513 (WF) | |
| VMFA-531 (EC) | |
| VMFA-542 (CR) | |
| VMFP-3 (RF or NF as part of CVW-5) | |
| MFAT-101 (SH) | |
| | |

Modelling the Phantom

Chapter 13

Big Scale Jolly Rogers

Phantom F-4J Hasegawa 1/32 Garry Prettyman

hen this kit was released back in 1995/6 it was superb, and is still as good today. This kit comes as a US Marines or Navy version with all the differences that come with the F-4J. In all there are nine grey and two clear sprues, with a one-piece upper and one-piece lower fuselage. You also get a 600 gallon tank, wing tanks, AIM-9E sidewinders, AIM-7E Sparrows, white metal undercarriage legs, rubber tyres, a small set of screws and, as you would expect from a top class company like Tamiya - a complimentary screwdriver. There is also a 20 page instruction booklet which shows each section in detail and displays the colours for the various parts are to be painted. The large decal sheet provides three schemes: two Marines schemes and one Navy. There is also a decal sheet containing a full set of stencils. The markings are for:

• F-4J Marine Phantom from VMF-333 Shamrocks, aircraft number 201 flying from the U.S.S. America. (CV-66)

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- F-4J Marine Phantom VMF-232 Red Devils, aircraft number 1 flying from Kadena Air Base in July 1977.
- F-4J Navy Phantom VF-84 Jolly Rogers, aircraft number 200 flying from the U.S.S. Theodore Roosevelt (CVN-71) in June 1971.

For this MDF build I will detail the construction sequence in stages however, these may not necessarily run in the same sequence as the instruction sheet, but as a seasoned modeller, I have developed my own technique over the years and this I have found to be the most straightforward.

VF-84





Stages 1, 2 and 3

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Tamiya suggests constructing the engine air intakes first, so that's where I began. I painted the insides of the intakes Gloss White and when dry joined them together. The engine fronts were painted Alclad steel and then fixed to the backs of the intakes. With this done I then fixed them inside the fuselage by a small screw and then ran a small amount of glue around the edges just to make sure everything was fixed securely. Whilst I had the Alclad out I painted the insides of the afterburners and the afterburner fan blades. When these were dry I fixed them together. At this time I also sprayed Alclad Aluminium to the horizontal stabilizers. The afterburners were then fixed inside the fuselage and again these were fixed by a small screw and some glue. Next, I fixed the engine intakes and the splinter plates. At this stage I hit a snag. Unfortunately the fronts of the air intake trunking did not line up with the engine intakes. It

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took an incredible amount of skill and effort just to fit them at all, and in the end I fitted them as accurately as I could and then, when the model was finished, used a set of the F-4 Re-Heat Models EO.D. intake covers to complete them. Part J-25, which is the housing for the refuelling probe, was fitted, and the refuelling

VF-84

USS ROOSEVELT

probe itself was added at the end of construction. I then encountered a problem which I have discovered before. The Phantoms from Tamiya tend to show repair patches on the fuselage, but technically speaking, they were not on the original airframe and therefore I prefer to erase them. I achieve this by finely sanding them off. But be warned! This is a very time consuming job! With this particular model, Tamiya had used a battle repaired Phantom at Kadena Air Base which had the metal patches placed over the holes in the airframe. Needless to say, I spent a considerable time in trying to recreate a mint condition Phantom.





Stage 4

At this stage I fitted the bottom half of the rear fuselage and the stabilizers. Fixing was pretty straightforward as all that was needed were two small screws and a small amount of glue.

Stage 5

Whilst the glue was drying, I started on the cockpit. Firstly, I sprayed the cockpit tub in Dark Gull Grey, (F.S. 16231). This was an ideal time to also start work on the instrument panels, but before I could commence, I had to file away the unwanted plastic from the panels because I chose to use the Eduard detail brass set, number 32-530, instead of the moulded detail. When the paint was dry the appropriate brass parts were fixed into place on the instrument panels using white glue. I gave the cockpit tub a wash of Raw Umber oil paint and when this was dry a little silver was dry brushed around the cockpit to show wear and tear. The back seater's radar screen was first painted silver and then I applied Tamiya clear green to the screen. The complete

cockpit tub was then fitted inside the fuselage with two small screws and a little glue around the edge.

Stage 6

It is important that at this stage you have familiarised yourself with any holes that need drilling out that are relevant to your model. Thankfully Tamiya indicate the holes to be drilled and that certainly makes life a little easier!

Stage 7

The bottom half of the fuselage is now fitted into place. This is a big section so care needs to be taken in its fitting. The first job was to get everything lined up, then fit the two screws that hold the upper and lower halves of the fuselage together, then it was a simple matter of screwing the two parts together. The rest of the fitting was done using glue. Once everything was fixed and in its proper place I fitted small lengths of masking tape at strategic



points and the whole assembly was left overnight to dry. The benefit of using the masking tape for this purpose is that any joins will be bonded together and it eliminates the possibility of the join coming apart.

Stage 8

I deviated from the instructions at this point and constructed a number of sub-assemblies such as the front and main undercarriage legs, wing tanks, tail unit and missiles. I cleaned up the joins on these and on the 600 gallon belly tank and then fitted the fins. This is a relatively easy job and only took a few minutes.

Stage 9

Once the missiles with fitted fins were complete, I sprayed them with Halfords White Primer and then Halfords Gloss White. These were then set aside ready for the decals to be applied.

Stage 10

As the front and main undercarriage legs were now built I sprayed them with Halfords White primer followed by Halfords Gloss White. Tamiya provide you with two sets of wing pylons with this model, one set for the Air Force version and the other for the Navy. As this is the Navy model it is important that you make sure that you use the correct set of wing pylons (the shape is quite distinct). When the paint was dry on the missiles I applied the decals and set them aside for fitment later. At this stage I also constructed the wing drop tanks. If you are making the Marines version you would use some of the MK.82 500lb bombs (there are 12 of them). However, as this is the Navy version I did use the wing tanks. I now constructed the outer wings and flaps and attached them to the airframe and also fitted the tail assembly, but unfortunately I had a little gap at the bottom of the tail where the tail meets the airframe. This was easily remedied by using some Vallejo filler, which was applied and then the excess wiped away with a damp cotton bud.

Stage 11

I was ready to paint the ejector seats. I did use the Tamiya seats and these are quite well detailed but I also used the Eduard brass set number 32-511 just to add a little more detail.

Stage 12

This stage deals with the head up display (HUD) and the forward cockpit coaming. A little more detail can be added to the back of the HUD in the form of cables which represent the wires for the instruments.

Stage 13

The canopies are crystal clear but be very careful when you remove them from the sprue as you have to cut the canopy from the sprue on the clear part. Once you have successfully removed the canopy from the sprue, clean off the excess plastic and dip the canopies in Johnson's Clear. This will protect them from any damage and also give them a terrific shine. Once dry I masked them with Tamiya tape and set them aside for painting and fitment later on in construction.

Stage 14

This is the in flight refuelling probe section and I painted the probe silver and the front part matt white. The tip was painted Gunmetal.

Painting and decaling

With all of the construction now complete and the end was in sight. To complete the model I first sprayed the complete model in Halfords White primer and any parts that had not been painted or primed were also given the same treatment. Priming can highlight any

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imperfections in the model such as scratches, glue marks or parts that need a bit more attention on the sanding front! I checked the model and parts thoroughly and I am glad to say that I found nothing untoward! I then applied thinned Tamiya black paint to all the panel lines in an exercise called preshading. It might look a mess when you first start to do this but just have patience and all will be revealed. The bottom of the aircraft was sprayed in White Ensign's Non - Specular Gloss White and I started to do this with the paint quite thin and built it up until the right look was obtained, i.e. just enough to let the black lines show through. I then sprayed the rear end in various Alclad Metallic shades and set it aside for about 30 minutes to dry. Next, I masked the bottom of the aircraft, the top of the flaps and all of the previously sprayed rear end. I painted the undercarriage doors in white and then, when dry, I applied a thin line of red paint around the edges of the doors. The top surface was sprayed in White Ensign's Light Gull Grey (E.S. 16440) which was sprayed thinly and built up slowly, as you want the black panel lines underneath to just show through the grey paint. The nose cone was painted Matt Black as well as the tail unit and then overpainted with Gloss Black. Once I was satisfied with the effect, I let the paint dry thoroughly overnight. I then sprayed on two coats of Tamiya clear in preparation for the decals. For this build I used a combination of Tamiya decals and a further set from Yellowhammer - Sheet number 32-2002. There was only one scheme for me and that was the 'Jolly Rogers 'with their classic skull and cross bones emblazoned on the tail. Although this scheme comes with the kit I have found that sometimes Tamiya decals can be a little on the thick side and can be slightly difficult to apply. The majority of the decals went on flawlessly, but unfortunately some of them did crack. The fuselage walkway decal presented the biggest problem for me but I eventually managed to achieve a satisfactory finish. The Yellowhammer decals settled without any problems at all - just what you'd expect just using the normal setting solutions Micro Set and Sol. I now left the model overnight to let the solutions do their work, and sadly I did find that a couple of Tamiya's stencils/decals had silvered. I then sprayed the whole of the top of the model with Polly-Scale matt varnish. With this done and the varnish now dry I mixed up a small amount of Raw Umber oil paint with thinners and applied this mixture to some of

USS RODSEVELT

VF-B

the panel lines where a little more wear would build up. I then applied the same mixture to all of the other sub-assemblies.

Final Assembly

Now with everything dry it was time to fit all the parts that had been painted and put to one side such as the wing tanks, the centre line tank, the missiles and bombs. All of the parts then fitted neatly in their respective places and the Phantom was complete.



Conclusion

This was an enjoyable build with a few set-backs, particularly the intakes, the decals and the sanding of the repair plates. It can be quite challenging at times when things don't go quite to plan, but it is also very satisfying when the problems have been resolved. Now this model is finished it looks absolutely splendid in the markings of VF-84. This Phantom is just Phantastic!

Snakes on a Plane

Phantom F-4J 'Diamondback' Hasegawa 1/48 Angelo Picardo

ne of the first models I ever built was Revell's 1/72nd F-4B and I remember seeing the box with the stunning artwork of two F-4s in VF-102 Diamond Back markings which really impressed me! The kit used for this build was the Hasegawa F-4J which, unlike the earlier release of the F-4, featured engraved panel lines. I also used the Aires resin and photo-etched set to upgrade the cockpit. Although the Hasegawa kit is a lovely model, it does have a few shortcomings. A major one is with the intakes so again I utilised an add-on in the shape of the Cutting Edge resin set of seamless intakes and compressor faces. At the other end, the exhausts were too shallow, and once more Aires came to the rescue with some gorgeous exhaust pipes and nozzles.

First of all, the kit features lowintensity formation lights which are not featured on this version and they were removed with some gentle scraping of a scalpel blade and some light sanding and polishing. To fit the Aires cockpit, the sills, front panel shroud and moulded-on sidewall detail all has to go. The plastic is fairly soft so with a new blade this is fairly easy to do. Once all done, I painted and assemble the resin cockpit. Aires provide the whole interior, a new tub, seats, canopy rails, mirrors. The seats are without any harness but the photo etch fret carries a beautiful set. Once complete, it was all set aside for later and the next project, the intakes, could be tackled. Again the kit will need to be cut up to fit the new parts and this time, Cutting Edge's instructions show clearly the extent of the surgery required. The soft plastic cuts so easily under a new blade that the work was done in no time. The resin intake ducts are cast integrally with the intake shrouds so that there is no need to use the kit ones, however, this set was

designed for Hasegawa's older F-4s, the ones with raised panel lines, so the shrouds have raised panel lines and do not match the rest of the kit. There was no way I could engrave the resin as it was too brittle and I could not match the fineness of Hasegawa's mould makers. So I cut away the resin shrouds and with a lot of Squadron Green putty, I faired in the kit parts so they were still seamless.

> These were glued into place along with the new cockpit and nose gear well which requires the thinning of the top of the wheel well and the bottom of the cockpit to get it all to fit; this, also, is not mentioned in Aire's instructions.

> > VF-IDE

Being rather suspicious of Aires Instructions by now, I decided to check the fit of their exhausts before I closed up the fuselage and l discovered that surgery was required to get these to fit. About 5mm of the rear edge of the fuselage's lower web has to be removed to ensure a good fit. Once this was done, the fuselage halves were brought together and carefully cemented to ensure a good fit along the spine so that little, if any, sanding would be required so as not to lose the panel lines along the top. The exhausts were sprayed in Humbrol's polished steel, buffed up and weathered with Tamiya's smoke then set aside until final assembly.

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DANGER

The rest of the kit went together with little, if any problem. The wings feature the entire belly of the plane integral with the lower wing surface and all control surfaces are fixed, though the air brakes are positionable.

Two canopies are provided, a one-piece moulding for a closed canopy option, and four parts to enable an open canopy option. For underwing stores you are provided with three drop



tanks, with moulded-on pylons, four Sparrows and four Sidewinders. The tanks, missiles with their launch rails and pylons come from the earlier kit so feature raised panel lines. These are quite refined so I left them as they were. The detail on the Sidewinders is pretty basic compared to other Hasegawa AIM-9s but I could not find any replacements and used them anyway and drilled out the exhausts on all the missiles as this does improve their look.

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F-4J 155100 As this was going to be a United States Navy plane, it would be a light grey over white scheme. Humbrol would provide the grey but the white would be a problem. I usually find most white paint either yellows with age, or goes a shade of yellow when varnished. I heard that Halford's Appliance White stays white, but it only comes in a spray can. I decanted some into a jar and once all the propellant gasses had bubbled off I was able to spray it using my airbrush. The CAM decals I wanted to use were for an F-4B on the USS Enterprise, and my model was of an F-4J. A trawl through my references yielded VF-102's the CAG's bird based on the USS Independence. A quick look through my spare decals and I had enough to be able to model this plane, which also features a white nose which I always thought looked good on a Phantom!

The decals were applied over a cote of Klear floor polish and settled down perfectly. The CAM sheet provided not just the

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squadron markings but the national markings too plus stencil data. A weathering wash was limited to a light coat of raw umber oil paint to accentuate the panel lines and I then sprayed the model in Humbrol's Matt Cote, except for the radome which was left in the Halford's Appliance White finish. Once dry I masked off and painted the bare-metal tail section using Humbrol's Metal Cote polished steel and flat aluminium. This was weathered with Tamiya's smoke and a light dry brushing with the aluminium. Once this was completed the tailplanes were attached along with the canopies, undercarriage and ordnance. My only frustration with the project was in the lack of information in the Aires instructions regarding the modifications needed to the kit to fit their parts, which is a real shame as their stuff is exquisite and enhances the model no end.





Marines Mean Machine

Phantom F-4J VMFA-235 Hasegawa 1/48 David Aungst

This is Hasegawa's second release of the 1:48 F-4J kit which came out with VF-96 markings and fully engraved panel lines. In my opinion, this kit is perhaps the best of the Hasegawa Phantoms. Not that any of the Hasegawa Phantom kits are bad, but I feel this (and the F-4S) stands above the others. Although the kit builds superbly from the box, I wanted to take this to the next level and add extra detailing, therefore I scratch-built the wiring details between and behind the cockpits and the



various instrumentation on the top of the front instrument

hood. I replaced the kit ejection seats with Verlinden products, although close inspection of the Verlinden seats showed they are not complete and represent seats that are in maintenance, as the upper harnesses that should connect to the top of the seat are just dangled over the parachute pack and not attached to anything. I also added the pitot tubes inside the engine intakes and replaced the tail ones with brass. I also wanted this Phantom to be armed to the teeth, so I incorporated lots of weapons from the various Hasegawa Weapons Sets, and I included the following: four AIM-7E Sparrow Missiles, four AIM-9D Sidewinder Missiles, six Mk 82 500lb High Drag Snakeye bombs mounted on a centreline MER, four LAU-10 Zuni rocket pods























mounted on two Triple Ejector Racks (TERs) and two wing tanks as provided in the basic kit

I used all Testors Model Master enamel paints for the camouflage of standard Light Gull Gray. For the aircraft's markings, VMFA-235 'Death Angels' was one option of about a dozen different F-4Js that I wanted to build. I started to think of other options and almost built a different unit, so to lock in the decision, I quickly painted the nose red. The decals came from Meteor Productions in their YH48-017 Yellow Hammer decal line and armed with this sheet the model soon came together. I like detailed weapons, as many modellers treat weapons as 'window dressing' and skimp on detailing them to match the rest of the model. In total, I spent about 15 hours painting, decaling, and weathering just the weapons so that they would match the rest of the aircraft. The rocket pod and bomb decals came from the Hasegawa Weapons Set decal sheets. The Sparrow and Sidewinder missile decals came from the recent ProModeler release of the F-4E. For weathering, I used thinned down enamel paint washes and air brush shading. I finished the weathering with some dry brushing to pop out the surface details.







A Devil's Disciple

Phantom F-4S VF-301 Hasegawa 1/48 David Aungst

The subject of this build is a former MiG-killing F-4J which was later converted to F-4S standard. The kit used was the Hasegawa 1:48 'high-grade' which has all of the same basic plastic components of the 'normal' F-4S kit, the difference being the extra goodies included only with the 'high-grade' release. All things, as they say, are subject to change and this Phantom was no exception. In 1972 when this aircraft was victorious over its MiG opponent, it was an F-4J Phantom painted in the bright unit colours of VF-96 and camouflaged in Light Gull Gray with White undersides. By 1983, the aircraft had undergone an upgrade to F-4S standard and was now assigned to VF-301 with much more subdued unit markings. Furthermore, the camouflage was changed to a low-visibility evaluation, one known as the 'Heater-Ferris' scheme. Through all these changes, though, the markings identifying this aircraft as a MiG-killer were preserved – in one form or another as in 1983; the markings took the form of a black MiG-17 silhouette painted on the rear fuselage at the base of the vertical tail. This is also the exact same aircraft that came to a very public, flaming end at the 2002 NAS Point Mugu Air Show. The Phantom seemed to develop a mechanical problem following the routine break for landing that caused it to crash, killing both crew members.

Inside the Hasegawa box the first 'extra' is a photo-etched set for the cockpit and canopy. It breaks down the cockpit sills into segments that can be more easily fitted to the cockpit, regardless of minor construction irregularities. The second 'extra' is a set of







The large bumps in the centres of the upper wing are reinforcing plates applied to Navy aircraft to strengthen the landing gear so the legs would not get driven up through the wing on a hard landing. They are not correctly shaped, though, and needed to be refined

The pre-painted cockpit sections



The intricate painting sequence as described in the text







white-metal landing gear to replace the kit plastic pieces. Vinyl tires are provided with these landing gear pieces, but I would recommend ditching them and using some resin wheels from either 'Cutting Edge' or 'True Details'. The last 'extra' is a combination of white metal and vinyl wire that are used to build up the 'spaghetti factory' that lives between the two cockpits. There is also a second photo-etching set that comes in all the F-4S kits which provides the reinforcing strap to attach to the belly of the aircraft. Hasegawa only provides this in the F-4S kits, but this strap is actually found on all slatted-wing F-4 Phantoms such as the F-4E/F/G/S!'



I started the project by painting the cockpit then I was able to assemble the fuselage leaving out the ejection seats and assorted etching pieces as these would be added near the end of the project. The wings assembled easily and those provided in the kit are of the slatted variety which is correct for an F-4S but they do contain a miscellany of Air Force and Navy characteristics, though. The assorted antenna blisters on the lower side at the wing roots and behind the landing gear wells are Navy ECM gear and the F-4E/F/G kit instructions say to cut them off, however for the F-4S they are correct so I left them alone.

The large bumps in the centres of the upper wings are reinforcing plates applied to Navy aircraft to strengthen the landing gear so the legs would not get driven up through the wing on a hard landing. They are not correctly shaped, though, and needed to be refined. I gently 'Dremeled' them down to a more correct outline, then sanded them smooth with sandpaper. The images below show the bulges before and after modification. For Air Force aircraft (F-4E/F/G), I would have completely removed the bumps

The camouflage colours of the 'Heater-Ferris' scheme are Intermediate Blue FS 35164), Grey/Blue FS 35237, Light Sea Grey FS 36307, and Light Ghost Grey FS 36375. The pattern begins with the darkest colour on the nose, extending out the left wing leading edge, and then progressively lighter shades are applied in a diagonal pattern, ending with the lightest shade on the tail area and right wing outer panels. Of note is that the underside pattern is not mirror-imaged, which complicates the nose camouflage area. Where the top pattern has the left wing having a dark leading edge, the bottom pattern has the right wing getting the dark leading edge and this makes for a strange interaction in the patterns around the nose. The 'Heater-Ferris' scheme also has several standardised variations. By mirror imaging the camouflage pattern from left diagonal stripes to right diagonal stripes, a second version of the scheme is created. Two more versions are created by reversing the order of the colours in each of these first two versions, placing the lighter shades on the nose and the darker shades on the tail.

The one used here was the final version applied to all the VF-301 aircraft. VF-301 did briefly have two aircraft painted in a version with light coloured noses and dark tails, but these were changed rather quickly to the scheme displayed here. VF-301's sister unit, VF-302, also painted their aircraft in 'Heater-Ferris', but they were not uniform and apparently had aircraft painted in all four versions of the scheme. VF-302 also used low-visibility grey markings on their aircraft, rather than the black markings used by VF-301.

Decals to build Heater-Ferris camouflaged VF-301 aircraft were available on three decal sheets:

- Super Scale 48-218: This old sheet was the first sheet available for building VF-301 aircraft in the 'Heater-Ferris' camouflage. It provides for a VF-301 aircraft ND-101 when they were testing the camouflage with the light coloured nose and dark tail.
- Detail & Scale 0648: This was the second sheet for 'Heater-Ferris' VF-301 and provides the exact markings for the MiGkiller Phantom built here. These are the best matching decals



to the markings seen in pictures of the real aircraft. Notably, however, the sheet is wrong on two points. First, they have the two light colours of the camouflage (Light Sea Gray and Light Ghost Gray) reversed in the painting diagrams, and secondly they state the nosewheel well doors are simply painted black. This is incorrect. There is actually a false canopy on the underside of the nose, which causes some areas (not all) of the nosewheel well doors to be black.

• CAM 48-011: This is the third sheet for Heater-Ferris VF-301 aircraft and the only one still readily available and provides for the same aircraft as found on the Detail & Scale sheet, and in fact is really just a copy of this with all the same inaccuracies in the instructions..

The completed cockpit section














One of VF-301 F-4S Phantoms



In researching the aircraft, I found a person that was actually a member of VF-301 who had pictures of the real aircraft. This enabled me to determine several things that had bothered me about this aircraft as there are inconsistencies between pictures of the aircraft that were hard to figure out. The facts that I gleaned therefore are as follows:

- The aircraft was painted in the Heater-Ferris scheme in late 1982 or early 1983 and based on the markings locations drawn on the instructions for the Detail & Scale decals, they are for the aircraft as it appeared at this time.
- Between May of 1983 and April of 1984, the aircraft was repainted into the same camouflage and the markings were reapplied in subtly (and not so subtly) different locations. The repainted camouflage faded badly and by 1984 had numerous paint touch-ups applied in fresh paint that no longer matched the faded colours.
- The aircraft had a full 'false canopy' painted under the nose in 1983.

With the major camouflage and markings complete, I turned my attentions back to all the details needed to complete the model. First on the list was the landing gear. I cleaned up any mould marks on the white-metal parts, then masked off the wheel wells on the airframe and a coat of gloss white turned everything the right shade. I added some minor wiring details using pre-coloured 1:24 scale car ignition wiring and weathered the pieces with some washes. The landing gear attached with no difficulty, followed by the wheel well doors (painted while I was doing the airframe camouflage). The weapons were next. I assembled the centreline fuel tank and inboard wing pylons, painting these in the appropriate camouflage colours, and then I painted up two of the kit-provided AIM-9D Sidewinders as practise rounds and placed them onto missile rails. The last item I worked on was the cockpit: the sills and canopies get a lot of photo-etchings attached to them and I pre-painted these with Interior Black. I also attached some small strip styrene to the canopy trim pieces so they would have something more substantial to which to be attached. I completed the project by attaching the canopies, using window cleaner on a cotton swab to clean them before attachment. The front canopy fits nice and positively, however the rear is notoriously fragile so I reinforced the canopy attachment with fine brass wire mounted into holes I drilled had in the upper rear cockpit moulding. With the canopies attached, I declared the project complete.

The Great Pumpkin

Phantom QF-4N Drone Hasegawa 1/48 F-4B/N David Aungst

ADC was the conversion facility for all the early QF-4B Phantoms and the origin of one of the best known of the drone Phantoms, the so-called 'Great Pumpkin' a name conferred due to its



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correct early style. Separate pieces are provided for the ECM fit

on the intake shoulders of the F-4N and two sets of mainwheels are provided in the kit. The 'common sprue' provides the standard fat wheels of most F-4 variants and a special F-4B/N 'insert sprue' provides the needed thin wheels unique to these versions.

The kit's biggest downfall is the cockpit, which is mostly for an Air Force F-4C. The tell-tale signs of

this are all over the rear cockpit which includes the lack of a control stick (Naval Phantoms have rear-seat flight controls), a right side instrument panel (instead of a padded wall that covers the in-flight refuelling probe), and no boxes to clutter the left sidewall. With both Aires and Black Box now providing wellmoulded resin replacements for the F-4B/N cockpit, this problem can be negated with these alternative parts, however, as this was an old kit I had to scratch build the interior:

superb colour scheme. This kit is the original release of the Hasegawa F-4B Phantom and is an accurate representation of an F-4B/N Phantom, and at the time being the only 1/48th scale kit to provide the correct unbulged wings of the F-4B/N, and as it was one of the earliest Hasegawa Phantom releases, it has raised panel lines. The stabilitors are slotted, which is correct for many F-4B and all F-4N aircraft and the engine exhausts are the

GREAT PUMPKIN













The Great Pumpkin QF-4B seen at NAS Pt, Mugu in 1977



- Sidewall details were sanded off and new scratch-built sidewall details added.
- Instrument console details in the front cockpit scratch-built with new side consoles.
- The side instrument consoles were cut away in the rear cockpit and new scratch-built wall on the right side added with avionics boxes on the left.
- Side sub-panels from the front main instrument panel rebuilt.
- New rear main instrument panel created.
- Wiring details between and behind the cockpits inserted.
- True Details ejector seats added.
- Hasegawa's etched metal Phantom cockpit and canopy etchings set added from a high-grade release

Further work included:

• Scratch-built detailing inside the kit engine exhausts using strip styrene. There are 108 tiny pieces of strip styrene cut into the appropriate shapes and attached inside each engine exhaust cone.



- The pitot tubes inside the engine intakes and tail were replaced with brass wire and styrene stock.
- The plastic kit landing gear legs were replaced with Hasegawa's white metal landing gear, adding plumbing and electrical lines.
- I replaced the wheels with True Details products, but I sanded down the moulded tire bulges.
- The unslotted horizontal tails from a Hasegawa F-4C/D kit were substituted.
- The blade antennas were replaced with etched metal antennas from the Hasegawa Phantom cockpit and canopy etchings set.
- Nose antennas were scratch-built for the nose that are, themselves one of the distinguishing features to the QF-4B.

The 'Great Pumpkin' was finished in overall International Orange FS 12197 which is without question, one of the 'loudest' paint schemes ever completed, and for this I used Testor's Model Master paints. At the time the model was built no manufacture had released markings for this aircraft in decal form so markings were created with decal scraps and masks to create the tail markings. I masked and painted the NADC badge on the tail and the 'Great Pumpkin' logo on the nose was done with 'N' scale railroad decals and applied one letter at a time. For weathering, I used thinned-down enamel paint washes and air brush shading. As the model had raised scribing, I could really only do the washes around the flight control surfaces. I finished the weathering with some dry brushing to bring out the surface details.



A Splintered Spook

Phantom F-4J VF-194 Hasegawa 1/48 with Yellowhammer Decals Rick Bellinger

n the early 1980s, the US Navy experimented with several low-visibility camouflage schemes for their combat aircraft. Among them was the grey 'Heater-Ferris' schemes applied to F-4J/S Phantoms assigned to Naval Reserve squadrons VF-194, VF-301 and VF-302 stationed at Miramar NAS, California. The scheme was developed by F-14 pilot Commander C.J. 'Heater' Heatley, who was inspired by the deceptive camouflage created by aviation artist Keith Ferris. In addition to making the aircraft hard to see in air-to-air combat, the pattern also made it difficult for an adversary to determine which way the aircraft was headed and how far away it was. Some Heater-Ferris Phantoms had black false canopies with white pilot's 'helmets' applied on the underside of the forward fuselage to further confuse enemy pilots. Here Rick Bellinger uses the Hasegawa 1/48 kit and Yellowhammer decals to recreate such a scheme.











MiG Killer

Phantom F-4J 'Showtime 100' Hasegawa 1/48 David Aungst

The date was 10 May 1972. In Vietnam, the first 'Linebacker' aerial bombardment campaign had just started, and a bad day for the Vietnamese Peoples Air Force with nearly a dozen aircraft being shot down in aerial engagements. Lt Randy 'Duke' Cunningham and his RIO, Lt JG Willie Driscoll, were participating in an alpha strike against the Haiphong Railyards. Three of the day's aerial victories were scored by 'Duke' flying in 'ShowTime 100, the F-4J that is the subject of this model. Exactly whom 'Duke' shot down on his final kill of the day, the one that made him an ace, has been the subject of conjecture. Early on,

sources claimed the pilot was the top Vietnamese ace known as Colonel Tomb, however, time has shed more light on the subject that Tomb was not the victim in Cunningham's historic dogfight; instead, it was most likely an un-named pilot, a flight leader, squadron commander, or possibly the regimental commander of the 923rd Regiment. Whoever the Vietnamese pilot was, the dogfight was historic, and the victory made Cunningham the first US ace of the Vietnam conflict.

The model is the retooled Hasegawa F-4J built out-of-the-box together with the decals and weaponry. I did make a minor revision to the tops of the wings in that I ground down the large bumps that Hasegawa moulds in the middle of the wing. These are reinforcing plates to strengthen the upper landing gear





attachment points for carrier landings. They should be slightly raised with smooth humps in the surface, not the huge defined bumps as moulded by Hasegawa. Five minutes with a Dremel flexible shaft tool reduced the size of these bumps to a more acceptable stature. The rest was done with sandpaper to smooth off the remaining humps. Whilst not the exact weapons loading Cunningham describes in his memories of the fateful mission, I chose to just use the kit-provided weapons. The kit provides a full air-to-air load with four Sparrow missiles and four AIM-9D Sidewinder missiles. For the record, 'Duke' describes his weapons loading as two Sparrows in the rear wells, four Sidewinders, two TERs with Mk.20 'Rockeyes on the inboard weapons pylons, and a centreline fuel tank. The forward Sparrow wells were empty as were the outboard wing pylons.

The camouflage on the model is the old standard of Light Gull Gray over White. Using Testors colours I painted the White first and masked off the flight controls, and then I painted the Light Gull Gray. I freehand painted the line between the gray and white along the fuselage sides. The engine exhaust area is painted in two shades of metalizers. I started with a base coating of Steel, and then applied Magnesium to the panels immediately behind the engine exhausts and to the centre













panels on the horizontal tails. The engine exhausts themselves are painted in Burnt Metal with flat black interiors. The markings on the model are for VF-96 'Fighting Falcons', off the USS Constellation, and are as correct as I could get them for the mission of 10 May 1972.

Recent research shows some revisions from earlier markings in that the MiG silhouette on the forward vertical tail was removed and two kill flags were painted. This set of markings only existed for a few hours before the 10 May mission. As the aircraft was lost on the mission, this information is based mostly on the recollections of 'Duke' on how the aircraft looked.

I amended the Hasegawa kit decals to make these changes on the model. The kit decals include markings for Cunningham's assigned aircraft NG#107, 155792 following the 10 May mission, the aircraft that actually had his name on the canopy rails. From this alternate set of kit markings, I obtained the solid black triangle for the forward vertical tail and the two kill flags for the intake splitter plate.







Eyes of the Corps

Phantom RF-4B Tamiya 1/32 F-4J with Combat Models Conversion set Rick Bellinger

his was an amazing project to undertake, and despite the size of the model the conversion was reasonably straightforward. To make the basic model really stand out I used the Cutting Edge Modelworks' 1/32 scale F-4B conversion sets CEC32180 and CEC32187, followed by their CEC 32183 seamless intakes. All were very nicely cast and easy to work with – if you don't mind cutting up a fairly expensive kit. The cockpit is the Black Box'J' interior, modified to a 'B' version. The Combat Models RF-4 conversion set was used to add the long recce nose and again both sets required a lot of cutting and fitting to convert the model. The decal sheet came from CAM, which also provided the painting instructions. This was an expensive but fun project, and provided much inspiration for future builds.













Kits

Appendix **1**

US Navy & Marines Corps Phantom Kits

Ithough there have been plenty of Phantom kits produced over the years there are surprisingly few available today, many having been deleted or just faded away. Some resurface with new packaging, and the only way to be sure of what is in a particular box is to read the reviews in the modelling press, particularly Scale Aviation Modeller International. For this Datafile we include this listing of kits, which at the time of writing are still part of their individual manufacturer's catalogues, and whilst it is acknowledged that many older kits may still be very good and highly sought after by both the modeller and collector, it is the intention to look at only what is current at the date of publication and therefore available for modelling projects.

| KIT NO | SCALE | ТҮРЕ |
|---------|-------|------------------------------------------------|
| | | |
| ESCI | | |
| | 1/48 | F-4B/J Phantom |
| 1 | | |
| ITALERI | | |
| IT2642 | 1/48 | F-4J Phantom II |
| IT0170 | 1/72 | F-4S Phantom II. Decals for VF-301 USN Reserve |
| | | |
| HASEGAW | A | |
| HAPT006 | 1/48 | F-4J Phantom 'Show Time 100' |
| HA09652 | 1/48 | RF-4B Phantom II USMC |
| HAPT031 | 1/48 | RF-4B Phantom II USMC VMFP-3 |
| HA09762 | 1/48 | QF-4S Phantom II VX-30 Bloodhounds |
| HA09778 | 1/48 | F-4J Phantom VF-33 & VF-213 CAG Birds |
| HA09787 | 1/48 | F-4B/N Phantom CVW-19 CAG |
| HA00855 | 1/72 | F-4J Phantom II 'CAG Bird' |
| HA00879 | 1/72 | F-4J Phantom II VF-102 Diamondbacks |
| | | |
| REVELL | | |

1/48 F-4J Phantom MiG Ace

TAMIYA

TA60308

1/32

F-4J Phantom II Marines



Hasegawa 1/48 RF-4B USMC



Tamiya 1/32 F-4J Marines



Italeri 1/72 F-4S



Hasegawa 1/48 F-4J



Hasegawa F-4N Sundowners



Hasegawa 1/72 F-4J 'CAG Birds'



Hasegawa 1/72 F-4J VF-102



Italeri 1/48 F-4J



A colourful VX-4 bird was this F-4J

Accessories & Conversions

| AEROCL | UB | |
|--------|-------|--------------------------------------------------------|
| ABV184 | 1/72 | F-4 Phantom undercarriage set |
| AIRES | | |
| 4155 | 1/48 | F-4B/N Phantom II cockpit for Hasegawa kit |
| 4160 | 1/48 | F-4J/S Phantom II cockpit set for Hasegawa Kit |
| 4330 | 1/48 | RF-4B Phantom details for hasegawa Kit |
| 4220 | 1/48 | RF-4B Phantom II cockpit set designed for Hasegawa Kit |
| 4231 | 1/48 | RF-4B/C Phantom II photo bay designed for Hasegawa Kit |
| BLACK | BOX | |
| 3201 | 1/32 | F-4J Phantom Cockpit |
| CUTTIN | G EDG | E |
| 32025 | 1/32 | F-4S Phantom Slats conversion for Tamiya Kit |
| 48455 | 1/48 | F-4B/C/D/N/RF-4B/C Seamless Intakes for Hasegawa Kit |
| | | |
| BRASS | ETCHE | ED ACCESSORIES |
| AIRWAV | ES | |
| 48099 | 1/48 | F-4 Phantom Wingfold for Hasegawa Kits |
| 72213 | 1/72 | F-4 Phantom Wingfold for Hasegawa Kits |
| 72022 | 1/72 | F-4J Phantom Cockpit Set For Hasegawa Kits |

EJECTOR SEATS

TRUE DETAILS

72415 1/72 Martin Baker Mk.7 Ejection Seat

| REPLACEMENT WHEELS | | | | | |
|--------------------|--------|--------|-------------------|--|--|
| | TRUE D | ETAILS | 5 | | |
| | 48053 | 1/48 | F-4B/N Phantom II | | |
| | 72007 | 1/72 | F-4B/N Phantom II | | |
| | 72009 | 1/72 | F-4J/S Phantom II | | |

48051 1/48 F-4J/S Phantom II











EDUARD

32530 1/32 F-4J Phantom Pre-Painted 73207 1/72 F-4B/N Phantom Pre-Painted FE319 1/48 F-4J/S Phantom Pre-Painted 73209 1/72 F-4J Phantom Pre-Painted 48118 1/48 F-4J/S Phantom for Hasegawa Kits 32041 1/32 F-4J Phantom for Hasegawa Kits

48123 1/48 F-4B/N Phantom for Hasegawa kits

BIG7208 1/72 F-4B/N Phantom Super Detail Set BIG7206 1/72 F-4J Phantom Super Detail Set 49260 1/48 RF-4B Phantom II Pre-Painted FE260 1/48 RF-4B Phantom Pre-Painted SS209 1/72 F-4J Phantom Pre-Painted

49319 1/48 F-4J/S Phantom Pre-Painted BIG4820 1/48 RF-4B Phantom Super Detail Set

| 一部 おおしん ちょうちょう |
|----------------|
| |



Decals

Few US Navy & Marine Corps Units have been missed by decal manufacturers over the years, and new sheets continue to be added to the genre. Once again for the purposes of this Datafile we have included only those sheets in production at the time of publication.

| AEROMAST | FR |
|-----------|-------------------------------------------------------------------------------------------------------|
| 48500 1/4 | Phancy Phantoms Pt 1 (2) F-4B/S VMFA-115, VMFA-321 Farewell Double Sheet |
| 48503 1/4 | 48 Phancy Phantoms Pt 3 (3) F-4J/N VMFA-312, VF-74, VF-154 |
| 48516 1/4 | 48 Phancy Phantoms Pt 4 (3) F-4B/J VF-11, VF-103, VF-302 Bi-Centennial |
| 48547 1/4 | 48 Phancy Phantoms Pt 5 Marine F-4J (3) VMFA-251, VMFA-122, VMFA-155 |
| 48704 1/- | 48 Phancy Phantoms Pt 8 (2) F-4B, QF-4N |
| 48705 1/4 | 48 Phancy Phantoms Pt 9 (2) F-4J VMFA-232, QF-4N Sharksmouth |
| 72178 1/ | 72 Phancy Phantoms Pt 1 (3) F-4B VF-11, VF-103, VF-302 Bi-Centennial |
| 72179 1/ | 72 Phancy Phantoms Pt 2 (3) F-4J/N VMFA-312, VF-74, VF-154 |
| 72186 1/ | 72 Phancy Phantoms Pt 5 (3) VMFA-251, VMFA-122, VMFA-115 |
| 72214 1/ | 72 Phancy Phantoms Pt 9 (2) F-4B QF-4N VMFA-321 MARTD, NWTS |
| 72215 1/ | 72 Phancy Phantoms Pt 10 (2) F-4J, QF-4N VMFA-232, NWTS |

CAM

- 32046 1/32 F-4S Phantom (1) VF-151 32054 1/32 F-4S Phantoms (1) VF-302
- 32055 1/32 F-4S Phantoms (1) VF-161
- 48124 1/48 F-4S Phantoms (2) VF-302 , VF-161

-0-

72014 1/72 F-4J Phantom (2) VF-103 V-103, VF-11



| - | | | |
|---|-------|--------|--------------------------------------------------------------|
| | EAGLE | STRIKE | |
| | 48008 | 1/48 | F-4J/N Phantoms Phorever Pt 3 (3) VF-51, VF-74, VF191 |
| | 48009 | 1/48 | F-4J/N Phantoms Phorever Pt 4 (3) VF-41, VF-142, VF-171 |
| | 48022 | 1/48 | Phantoms Pt 5 F-4B/J (2) VF-51, VF-121 |
| | 48180 | 1/48 | Marine F-4S Phantoms Pt 1 (2) VMFA-235, VMFA-451 |
| | 48181 | 1/48 | Marine F-4S Phantoms Pt 2 (2) VMFA-333, VMFA-321 |
| | 72017 | 1/72 | Phantoms Phorever Pt 1 (3) F-4B/J VF-301, VF-121, VF-202 CAG |
| | 72032 | 1/72 | Phantoms Phorever Pt 3 (3) VF-51, VF-74, VF191 |
| | 72061 | 1/72 | Phantoms Phorever Pt 6 (3) F -4J VF-111, VF-41, VF-154 |

FOX ONE

48010 1/48 F-4J/S Phantom Walkways

MAW

48006 1/48 F-4S Phantoms (2) VMFA-232 MiG Killer, VMFA-333

MICROSCALE

48012 1/48 USN and USMC F-4 Phantom Walkways

SUPERSCALE

| 480846 | 1/48 | F-4J USMC Phantoms (2) VMFA-115, VMFA-333 | |
|--------|------|---------------------------------------------------|--|
| 480939 | 1/48 | F-4N Phantom (1) VF-101 | |
| 480984 | 1/48 | F-4J/S Phantoms (2) VF-121, VX-30 | |
| 480985 | 1/48 | F-4J Phantom (1) VF-31 | |
| 481109 | 1/48 | F-4N/S Phantoms (2) VMFA-212, VF-154 | |
| 481142 | 1/48 | F-4S Phantom (3) VF-103, VF-302, VMFA-333 Low Vis | |
| 481143 | 1/48 | F-4J/N Phantoms (2) VMFA-212, VF-171 | |
| 72845 | 1/72 | F-4J/S Phantoms (2) VF-121, VX-30 | |
| 72309 | 1/72 | F-4N Phantom (2) VF-151, VF-161 | |
| | | | |



Phantom Bibliography

Appendix

Books

A small portion of the available books on the sea-going Phantom

F-4 Phantom Robert F Dorr Osprey ISBN 850455871

Air War Over Vietnam Dana Bell Warbirds Illustrated 14 ISBN 853685738

Rhino The Immortal Phantom Joe Cupido Windrow & Greene ISBN 872004180

The Phantom Story Anthony Thornborough & Peter E Davies Arms & Armour Press ISBN 1854094165

Spirit In The Skies Various Aerospace ISBN 1880588315

McDonnell Douglas Phantom *Bill Gunston* Ian Allan

Recon Phantoms Colours & Markings Bert Kinzey Detail & Scale ISBN 890242216

Wings of Fame 15 Various Aerospace ISBN 1861840330

Combat Legends F-4 Phantom *Martin Bowman* Airlife

Phantom Tony Holmes Chancellor Press ISBN 9781851529

Phantoms Forever Robert Dorr Motorbooks ISBN 9780850474 USAF MiG Killers 1965-68 Peter Davies Osprey ISBN 1841766569

F-4 Phantom Robbie Shaw Airlife ISBN 97815310096

F-4 Phantom Production & Operational Data William R Peake Midland Publishing ISBN 857801903

F-4 Phantom Notebook Wilson & Franzi Norebook Publications ISBN 1876722005

Phantom Pilot Over Vietnam John Trotti

US Navy Phantom MiG Killers 1972-73 Brad Elward Osprey

US Navy Phantom MiG Killers 1965-70 Brad Elward Osprey

Grey Ghosts *Peter Davies* Schiffer

USNavy F-4 Phantoms Pt.1 Bert Kinzey Detail & Scale

US Navy F-4 Phantoms Pt.2 Bert Kinzey Detail & Scale ISBN 890242216

USMC Phantoms in Combat Lou Drendel Squadron/Signal ISBN 897472357















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'Triple Nuts' - the Boss-Bird of VMFA-321, a spectacular sight!

Phantom F-4N







1/72 SCALE 1/m 2m 2007 David Howley

3m





A quartet of RF-4's (© Author's Collection)







Phantom F-4B





Phantom F-4J





Phantom F-4S





Phantom RF-4B Early

