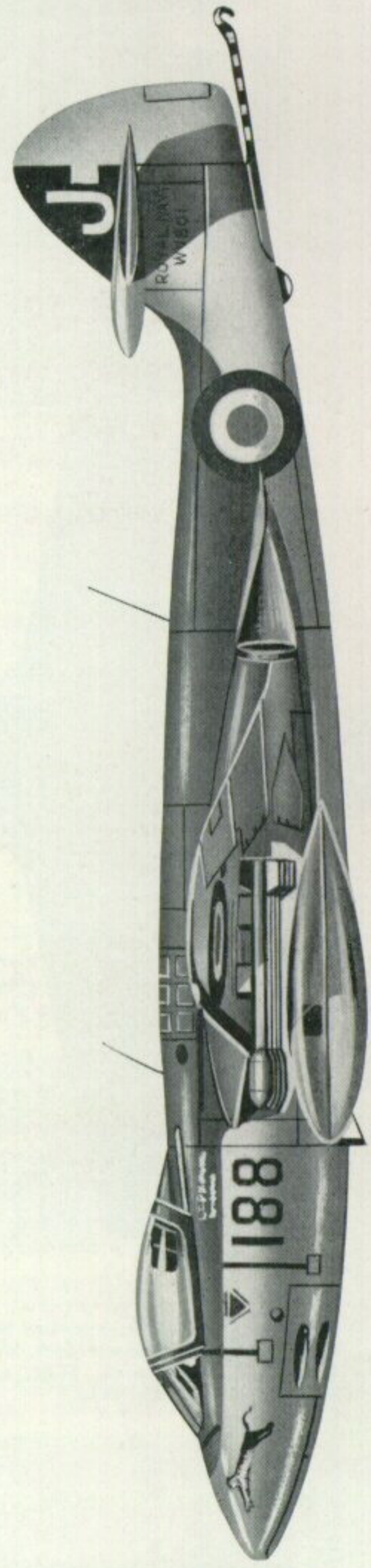
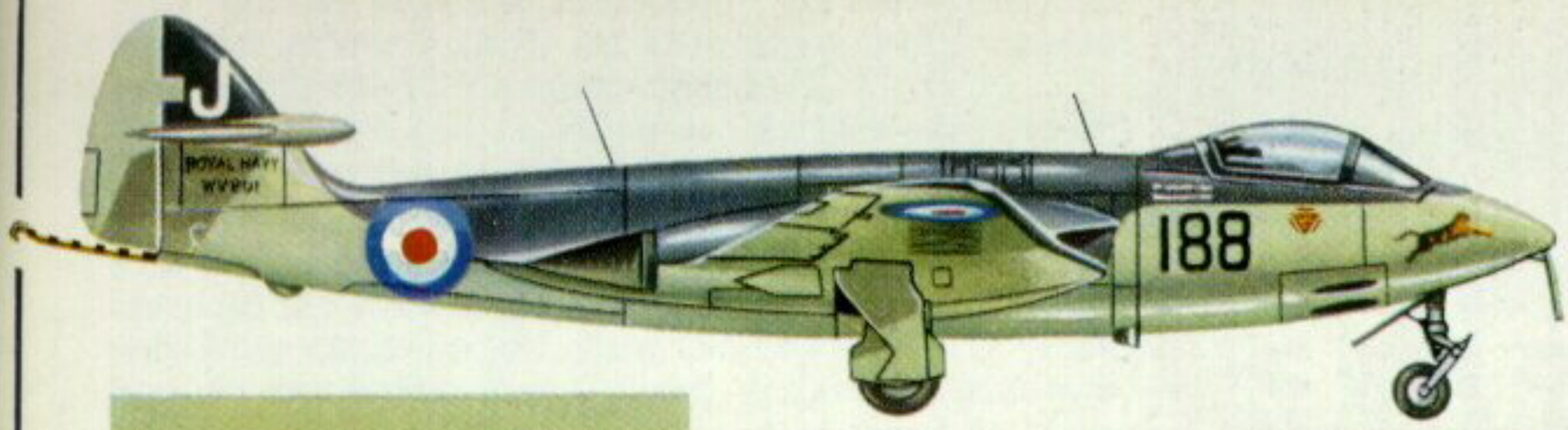
PROFILE PUBLICATIONS

The Hawker Sea Hawk

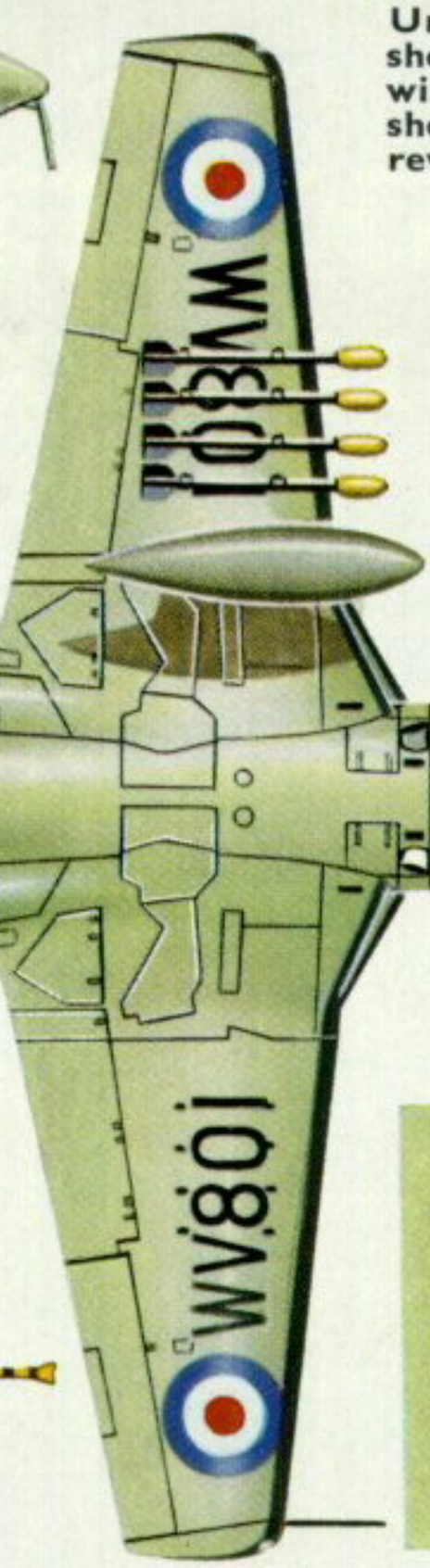
NUMBER 71

TWO SHILLINGS

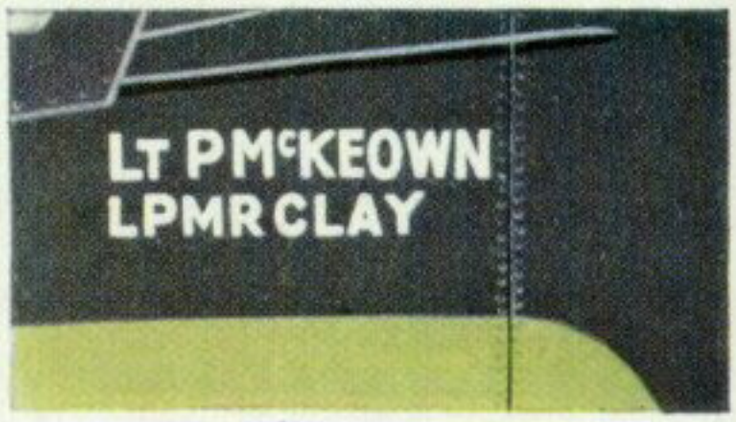


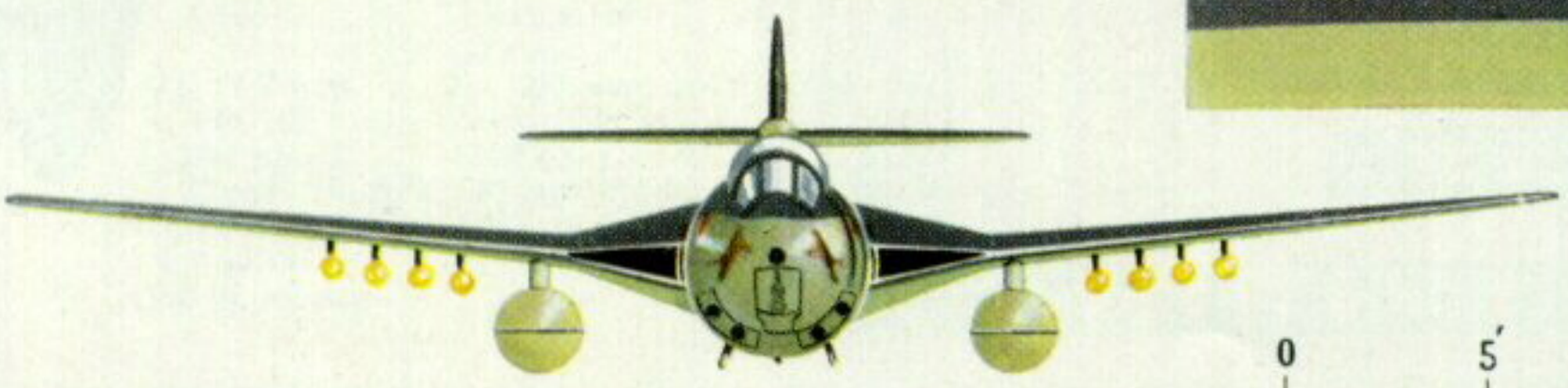


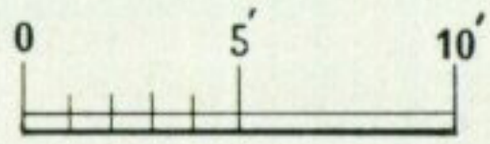
Underwing stores shown on starboard wing. Port wing shown "clean" to reveal markings.



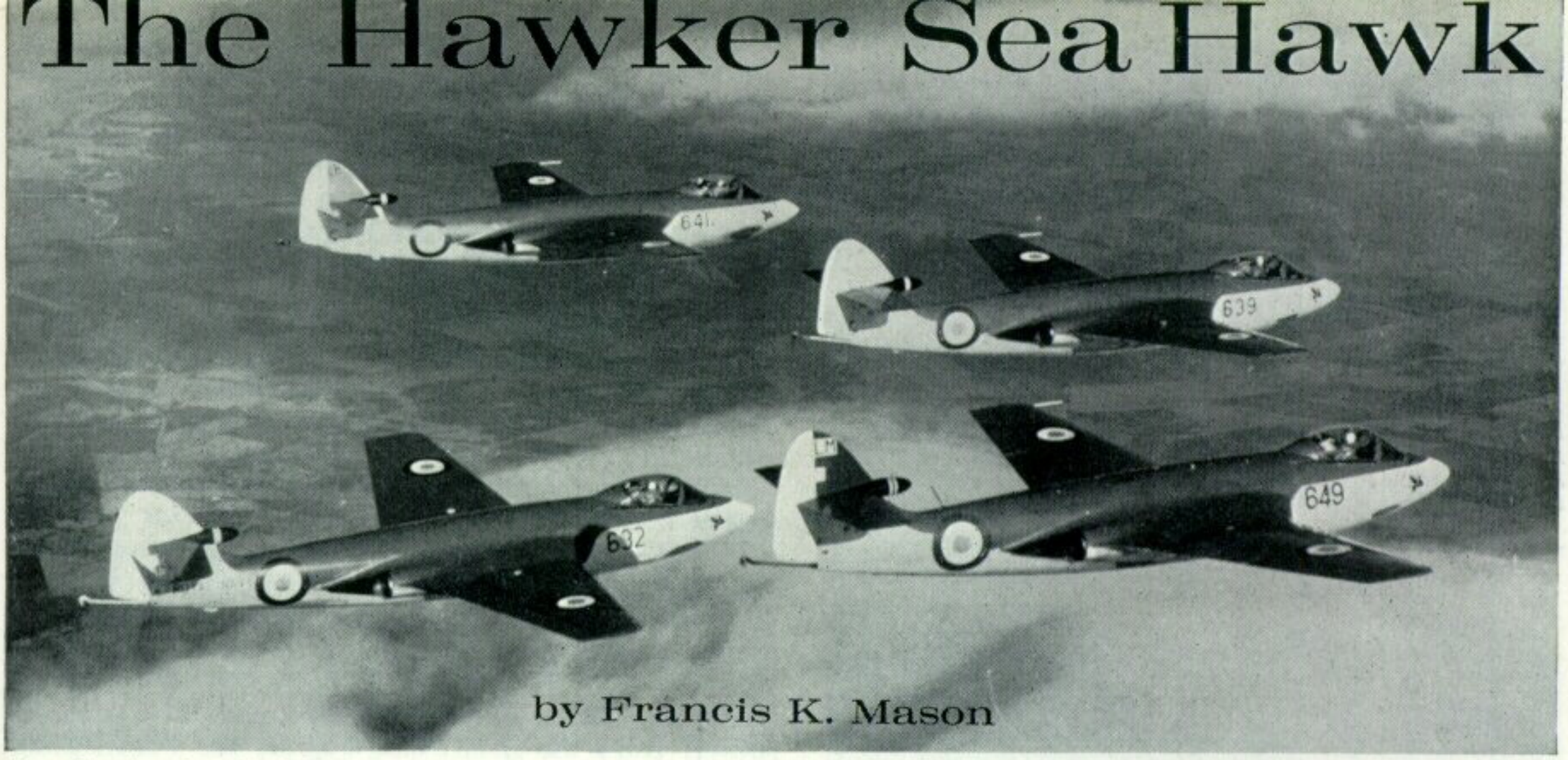
HAWKER SEA HAWK F.G.A. Mk. 4 of No. 804 Squadron, Fleet Air Arm. This aircraft, WV801, was flown by Lt. P. McKeown, R.N. aboard H.M.S. Eagle, Mediterranean, 1956.







The Hawker Sea Hawk



by Francis K. Mason

Four Hawker Sea Hawk F.G.A. Mk. 6s of the Lossiemouth Naval Fighter School. Note blast stains round gun ports.
(Photo: Flight International, Neg. No. 34700)

The Sea Hawk design was remarkable on two principal counts: it represented Hawker's first excursion into the jet field and, with unswept wings, it remained in front-line service with the world's second most powerful naval air arm long after swept wing naval fighters had become accepted as conventional equipment elsewhere. Seventeen years elapsed between project design stage and declaration of obsolescence—by any standards a long period and one that seems to have been typical of a high proportion of Sir Sydney Camm's designs.

Hawker Aircraft Limited, being so heavily committed to the massive wartime production of piston-engined fighters, the Hurricane, Tempest and—to a lesser extent—the Typhoon, occupied little of its design effort in the development of jet designs until late in 1944. It was on 1st September that year that the first Hawker F.2/43 Fury* prototype flew, an aircraft designed for R.A.F. operations in the Far East and combining the demands for long range with the experience gained in previous powerful Hawker fighters.

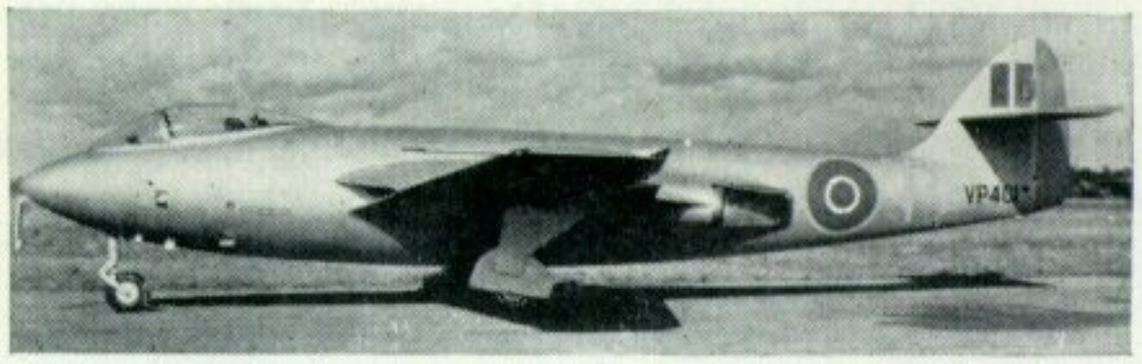
It was natural therefore that while the Fury and Sea Fury prototypes were undergoing their early development their fundamental design should form the basis for project application of the jet engine, and after early rejection of the Derwent as a suitable engine (whose 3,500-lb. thrust was clearly inadequate for an aircraft the size of the Fury), the new Rolls-Royce B.41 Derwent-development was chosen. Of the various Fury design projects under consideration, the P.1026 (covering the Griffon-powered Fury prototype, *LA610*) was selected. The piston engine was omitted and the nose re-contoured to accommodate the cockpit as far forward as possible, and the B.41 engine inside its plenum chamber was positioned amidships with lateral intakes and tailpipe exhausting under the rudder. This design, the P.1035, was submitted for Air Staff observations in November 1944 and a month later was followed by more detailed proposals covered by P.1040.

The P.1040 now included the familiar split lateral jet pipes exhausting aft of each wing root trailing edge—a scheme which required the thickening of the wing root and in turn permitted the use of root air intakes (as used in the Vampire, see *Profile* No. 48). Elimination of the long tailpipe now allowed considerably increased fuel tankage aft of the engine thus enabling the necessary thin wing to be adopted without severe range penalties. For ease of production the Fury's eliptical wingform was abandoned in favour of straight taper, and the tailplane was raised so as to clear the jet efflux on either side of the fuselage. A nosewheel undercarriage (Hawker's first such application) was also adopted, and an armament of four 20-mm. Hispano Mk. 5 guns was allowed for.

*Not to be confused with the Hawker Fury biplane fighter of the nineteen-thirties (*q.v.* Profile *No. 18*).

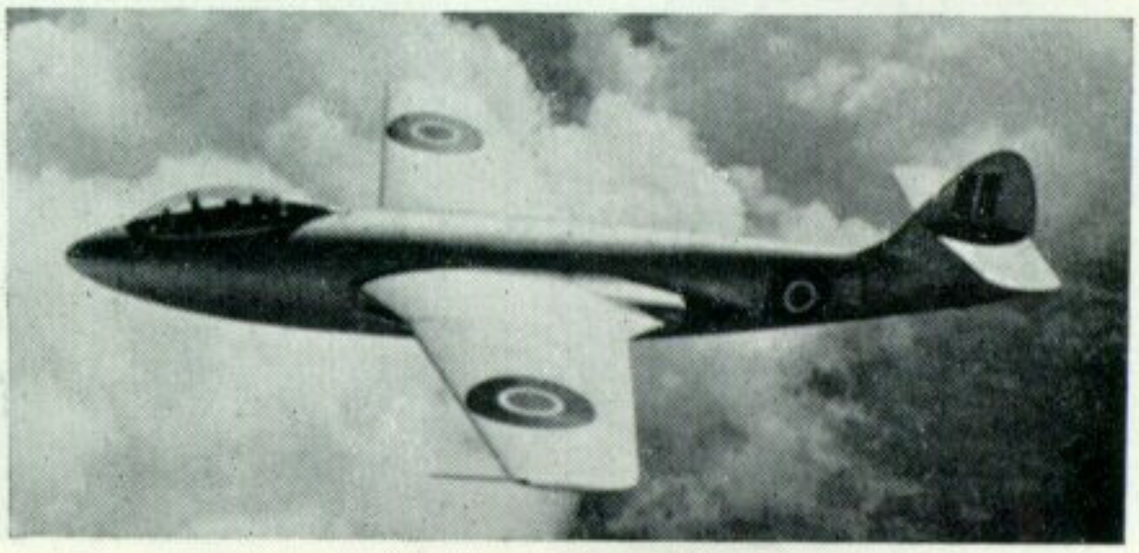
"THANK HEAVEN FOR THE NAVY"

It should be emphasised here that the P.1040 was originally prepared for R.A.F. service, as had been the F.2/43 Fury before. Both Air Ministry and Admiralty viewed Hawker's efforts with little more than academic

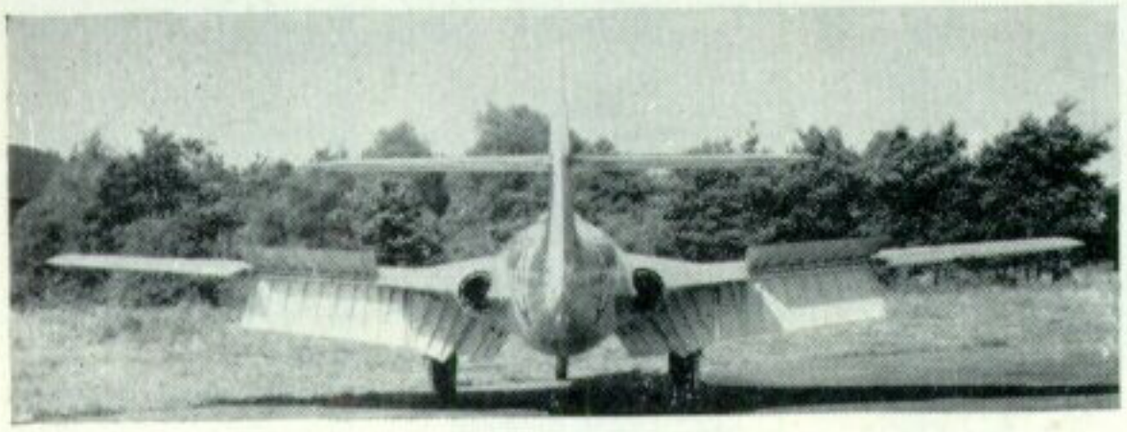


The Hawker P.1040, VP401, *in its original configuration with rectangular heat shield fairings aft of the jet pipes. Photo taken immediately after arrival at Farnborough in September 1947.*
(Photo: Ministry of Defence, Neg. No. 16274C)

In flight photo of VP401 *showing the pointed "pen nib" fairing aft of the jet pipes.* (Photo: Cyril Peckham, Neg. No. JF20)



First of the N.7/46 prototypes, VP413 *demonstrates* (above) *the method of wing folding and* (below) *the ample area of wing flap and airbrake of the Sea Hawk.* (Photos: above, Cyril Peckham; below, Ministry of Defence, Neg. No. 16963D)



interest; after all, the European war was clearly drawing to a close, and Meteors and Vampires were already either in or entering production. The Royal Navy was assured of adequate fighter strength with advanced Seafires, Corsairs and the rest, and, in any case, the first steps had already been taken in the development of the Supermarine Attacker.

Official interest was further dimmed when Rolls-Royce Ltd. expressed doubts about the likely feasibility of Hawker's bifurcated jet pipe. Nevertheless, following continued tunnel tests and work on numerous engineering mock-ups, Camm decided by October 1945 that sufficient data had been collected to enable a prototype to be started, and a Production Order was raised by Hawker Aircraft Ltd. and issued to the Experimental Department.

In the meantime, of course, both the European and Far Eastern wars had ended. The aircraft industry had already suffered widespread contract cancellations (not least Hawkers, who gave up production orders for about 300 Furies and 1,300 Tempests). With both the R.A.F. and Royal Navy adequately equipped for some years to come, the political atmosphere was scarcely conducive to further large scale R. & D. financing, and the Air Staff forthrightly announced that it would take no further interest in the P.1040 proposals. Nor, for that matter, were there any real reasons to believe that the Admiralty, who had yet to receive the first Sea Furies, would be any more sympathetic.

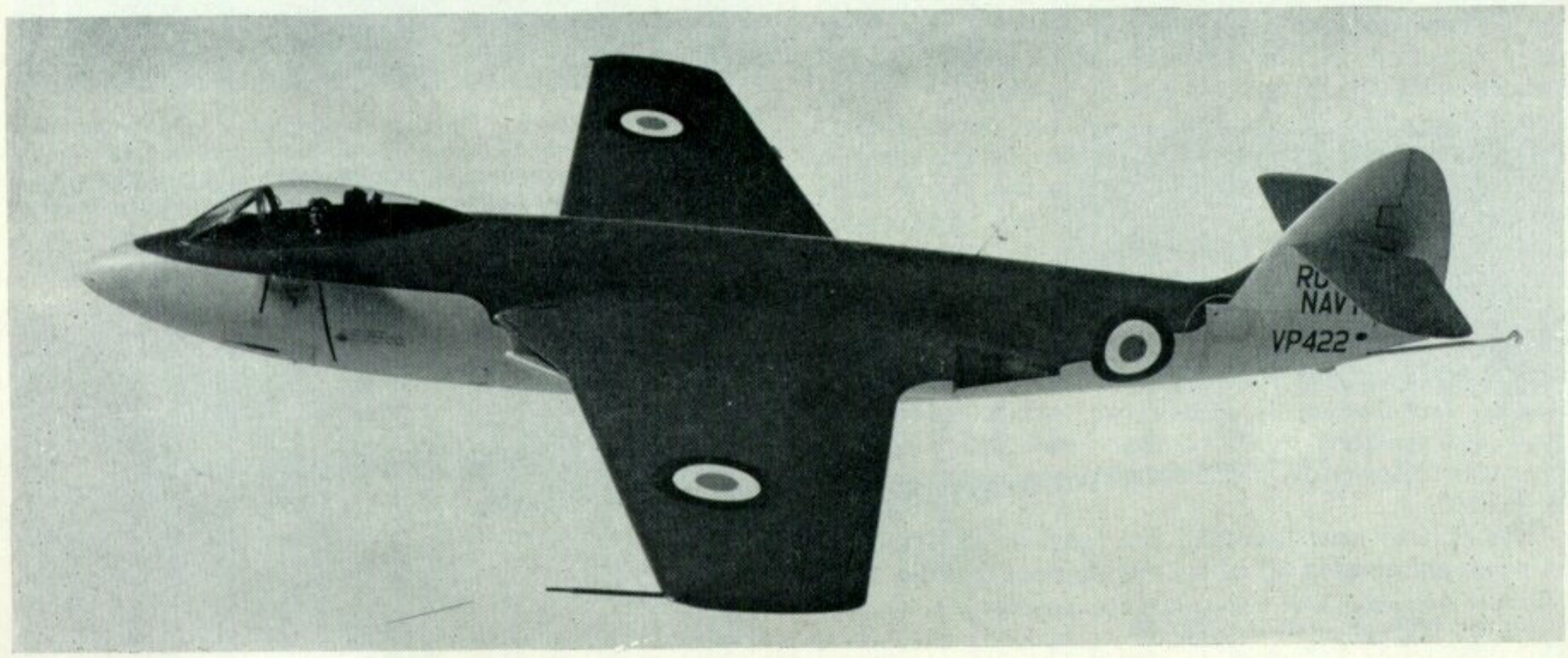
Be that as it may, the Naval Staff *were* looking further ahead than the Air Staff—who, placing too much significance in the Meteor IV's world record speed of more than 600 m.p.h., plainly believed that world supremacy in fighter design would be Britain's heritage for years to come, and this then laid the foundations of ten years' technological stagnation by depriving the industry of those vital post-war funds for continuing research.

Therefore by 1946, with Tempest and Fury production running out in the foreseeable future, Hawker's faith thus lay in the P.1040 and a navalised design was hurriedly submitted to the Admiralty in January that year. Obviously attracted by the long-range capabilities and by the promise of increased power from the B.41 Nene engine, the Naval Staff authorised the manufacture of three prototypes and a test specimen. The original Hawker P.1040 prototype was to become *VP401*, a second aircraft (preliminarily *VP407*) was completed as the test structure, and two further prototypes, *VP413* and *VP422*, were designed to meet the naval Specification N.7/46 issued in May 1946. With a promising naval fighter now in prospect, well might Sydney Camm remark, "Thank Heaven for the Navy!"

It was at this point that Hawker's energies divided: in one direction design efforts were aimed to bring about the success of the P.1040 as a naval interceptor, and in the other the P.1040 was used to provide the basis for research to develop more fundamental advances so that once again Camm might bid for an R.A.F. fighter. That the latter course was successful is evidenced by the eventual appearance of the Hunter which followed the P.1052 and P.1081—both prototypes developed from the P.1040.

VP401 was first flown at Boscombe Down on 2nd September 1947—Hawker's grass field at Langley being considered inadequate for jet flights. However a working party was established at Farnborough by the manufacturers and three days later the prototype was

Air-to-air shot of the second N.7/46 prototype, VP422, *being flown by "Wimpey" Wade; note the addition of the long arrester hook, and the absence of bullet fairing on tailplane.* (Photo: F. K. Mason collection)



transferred there to continue trials. As originally flown, *VP401* featured rectangular heat shield fairings at the jet pipe apertures, but after excessive heating of the rear fuselage skin was encountered these were replaced by the familiar "pen-nib" fairings.

When the P.1040 was first announced to the public within a month of its first flight, no mention was made of Admiralty interest, presumably for some obscure political motive. Nevertheless, as has been remarked, the prototype's existence was wholly owed to naval interest. No armament or naval equipment was carried, and the inference was that it was a company-sponsored private venture. The true *raison d'être* was demonstrated almost exactly one year later when *VP413* flew on 3rd September 1948. Designed to N.7/46, this prototype was fully armed and featured folding wings and catapult spools. Dummy deck assessment trials followed at Boscombe Down and in April 1949 *VP413* was flown on to H.M.S. *Illustrious* for general deck and handling trials. Perhaps the most important result of these was the necessity found to increase the wing span by 30 inches; it was demonstrated that the critical low speed handling was lacking and, due to a tendency by pilots to retain an "over-safe" round-out speed margin by easing the nose down during final approach to the deck, the relatively short sting-type arrester hook sometimes failed to engage the cables. In November 1949 *VP413* returned to *Illustrious* and performed about 25 deck landings without fault.

The last prototype, *VP422*, flew on 17th October 1949. This was fully representative of the intended production version with strengthened and lengthened hook, provision for RATOG*, and pick-up points for underwing drop tanks.

Preliminary Service trials were conducted on *VP413* and *VP422* throughout 1950, and *VP401* was transferred to Hawker's charge. Having been flown into first place in the 1949 S.B.A.C. Challenge Trophy Air Race by Sqdn. Ldr. "Wimpey" Wade, it was modified by the addition of an Armstrong Siddeley Snarler rocket motor in the tail to become the Hawker P.1072, Britain's first rocket-powered aircraft and Camm's first "twin-engined" design.

SUPER-PRIORITY FOR THEIR LORDSHIPS

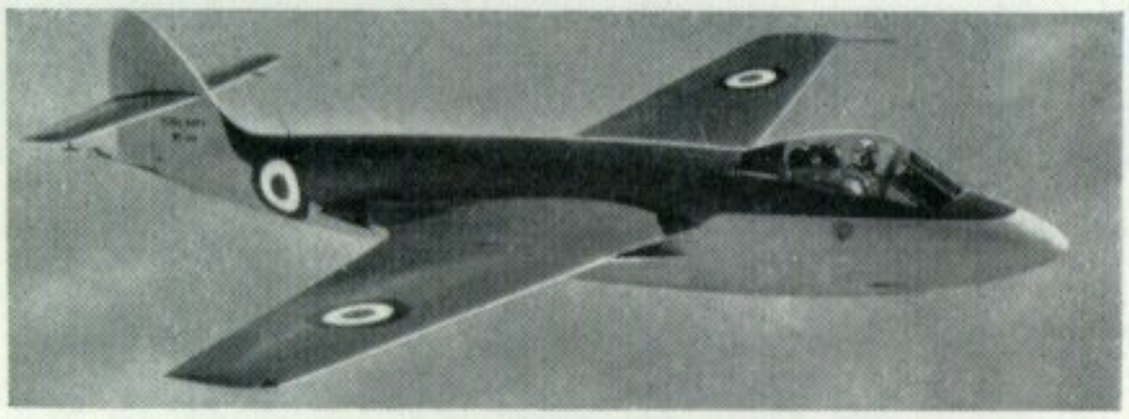
The first production contract for the new naval interceptor was placed on 22nd November 1949 for 151 aircraft and the name Sea Hawk was accepted. Preparations went ahead smoothly to put the design into production at Hawker's Kingston factory, but a number of details remained for development on the prototypes.

Then war broke out in Korea, a war that seemed likely to involve operations by carriers of the Royal Navy. Production of the Sea Fury was speeded up, and further orders were placed for Sea Hawks. Nevertheless industrial conditions in Britain were far from ideal to allow an immediate increase in output of military aircraft, it having been a studied intent to run down military appropriations since W.W.II.

With the fall of the Labour Government in 1951 and

*Rocket-assisted take-off gear.

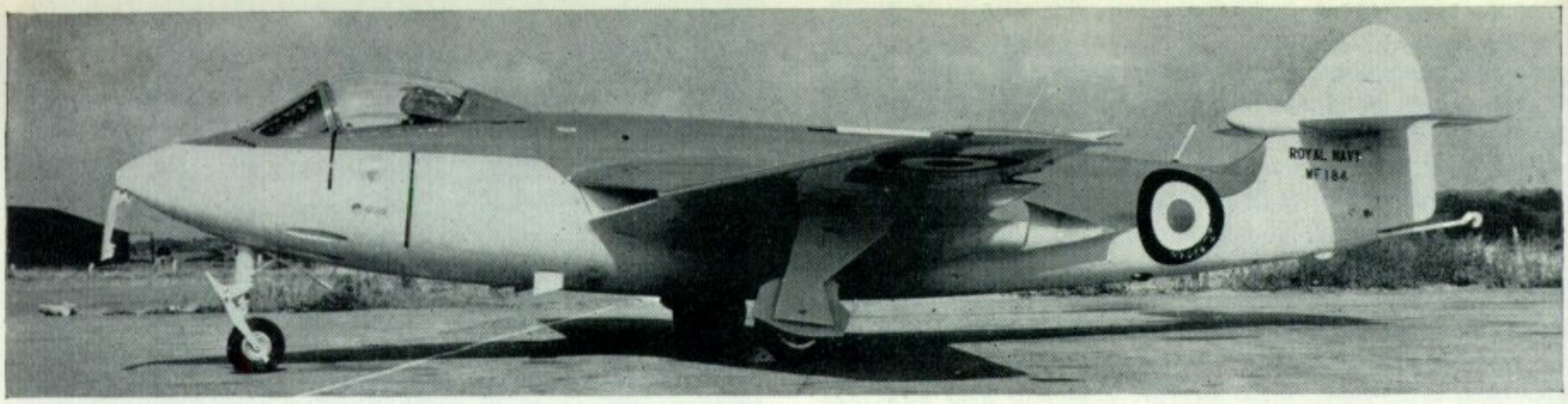
WF143, *the first production Sea Hawk F. Mk. 1, at Dunsfold in November 1951.*
(Photo: Ministry of Defence, Neg. No. 21928C)



WF144 *being flown by Sqdn. Ldr. Neville Duke, Hawker's famous test pilot.*
(Photo: Hawker Aircraft Ltd., Neg. No. H724)

Introduced during the initial production run at Hawkers was the bullet fairing on the tailplane seen here on WF159.
(Photo: F. K. Mason collection)

Sea Hawk F.1s of No. 898 Squadron, Fleet Air Arm; note the flying fish insignia on nose. (Photo: The Admiralty)



An Armstrong Whitworth-built Sea Hawk F. Mk. 1, WF184. (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A346)

the return of Winston Churchill to the premiership, these shortcomings were recognised and the preferential supply of vital materials was awarded to the aircraft industry to assist a small number of key designs into service. Of these, Hawker had two candidates—the Sea Hawk and Hunter—and so great was the strain now placed upon her production facilities that it was decided to transfer the Sea Hawk elsewhere in the Hawker Siddeley Group, and, after the failure of the Apollo airliner, Sir W. G. Armstrong Whitworth Aircraft Ltd. at Coventry was chosen.

Before production was transferred, however, 35 Sea Hawk F. Mk. 1s were produced at Kingston, many of these being engaged in various service trials. The first, *WF143*, was used for control and stability investigation, and demonstrated a weakness in lateral control, resulting from an undamped oscillation of the ailerons at speeds over 400 knots; already a power-assisted aileron system had been initiated and this was first flown in the fifth production aircraft, *WF147*. *WF144* and *WF145* (first flown on 21st February and 18th March 1952 respectively) were used for carrier trials aboard H.M.S. *Eagle*, and *WF148* was shipped to the C.E.P.E., Canada, for cold weather environmental tests. *WF149*, used for gun firing trials at the A. & A.E.E., crashed spectacularly at Boscombe Down when the wings folded up on unstick due to faulty wing locking. Whereas *WF147* was to become the prototype Sea Hawk 2 with powered ailerons, *WF157* was the prototype Sea Hawk F.B.3, equipped with underwing bomb-racks for two 500-lb. bombs.

Some of the 35 Hawker-built Sea Hawks (*WF143–WF161*, *WF167–WF177* and *WM901–WM905*) also entered operational service. The first Fleet Air Arm Sea Hawk Squadron was No. 806 ("Ace of Diamonds") which, based at Brawdy, Pembrokeshire, took on charge nine aircraft in March 1953 and, later that year, embarked in H.M.S. *Eagle*. Sea Hawk F. Mk. 1s also joined Nos. 804 and 898 Squadrons.

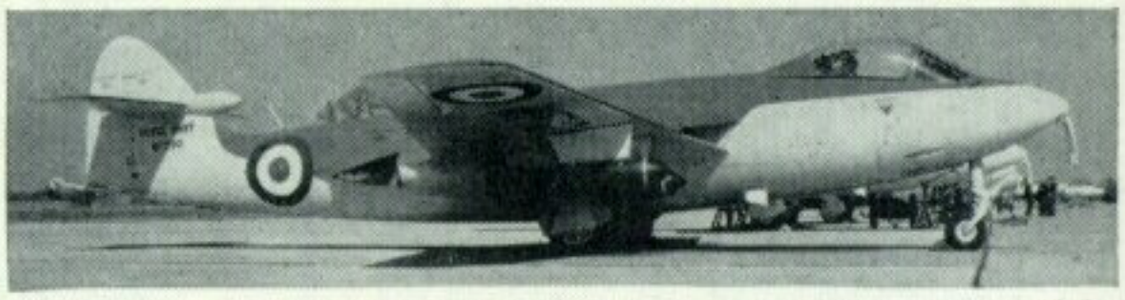
Churchill's "Super-Priority", short-lived though its benefits undoubtedly were, nevertheless speeded Sea Hawk production at Coventry, and the first AWA-built F. Mk. 1, *WF162*, flew before the end of 1953. Sixty production Sea Hawk 1 fighters were built by AWA before the Mark 2 was introduced. The first of these, *WF240*, was flown at Bitteswell on 24th February 1954, and, of the forty built, most joined No. 806 Squadron, replacing the Mark 1s.

The Mark 3 fighter-bomber was the most widely-used variant. Featuring powered ailerons with centring and spring-feel, this variant underwent considerable development for the carriage of external stores, rockets, bombs, mines and napalm being air tested at Bitteswell and Boscombe Down. The first F.B.3, *WF280*, was flown on 13th March 1954 and this aeroplane was used for trial installations of weapon combinations which included:
two 500-lb. bombs and two 88-gallon drop tanks; four 500-lb. bombs; up to twenty 3-inch rocket projectiles with 60-lb. warheads; combinations of drop tanks, bombs and mines on four wing pylons.

Production Sea Hawk 3s entered service with Nos. 800, 801, 806, 897 and 898 Squadrons both at sea and on shore stations. They also served with the T.R.U. at R.N.A.S. Ford on No. 700 Squadron, and the Naval Fighter School at R.N.A.S. Lossiemouth. Service and evaluation trials were conducted by the Naval Air Fighter Development Unit at the Central Fighter Establishment, West Raynham. Perhaps the most interesting trial installation was the outcome of a naval Fighter Reconnaissance requirement which led

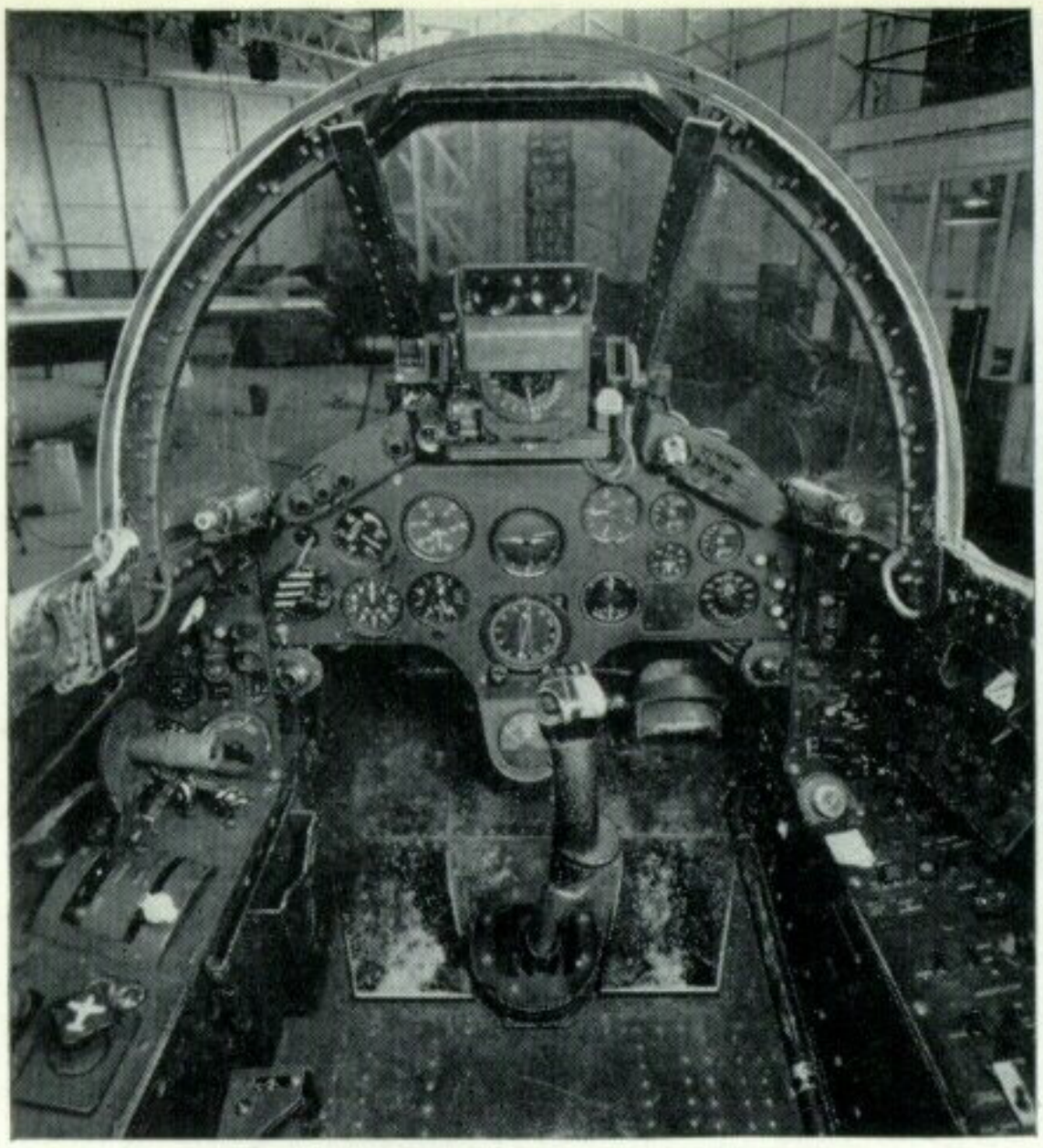
No. 806 Squadron Sea Hawk 1s displaying the famous Ace of Diamonds insignia. (Photo: via Hawker Siddeley Aviation Ltd.)

A Sea Hawk F. Mk. 2, WF274, *with two unfinned 88-gallon drop tanks.* (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A506)



The first production Sea Hawk F.B. Mk. 3, WF280, *was used for weapon trial installations and is shown here with four 500-lb. bombs.* (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A670)

Below: *Flight refuelling trials were carried out on Sea Hawk Mk. 4*, WV840, *using probes attached to the front of standard finned drop tanks.* (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A793)



Cockpit of the Sea Hawk (seat removed). It is believed that though the gunsight selector is set to RP, the aircraft is in fact a Mk. 2 which did not have provision to carry rocket projectiles.
(Photo: Ministry of Defence, Neg. No. 21943A)

to F-95 low-level cameras being mounted in the noses of otherwise standard 88-gallon drop tanks carried by *WM914*; Boscombe Down trials with this aircraft continued for a year and were later continued on a Mark 6, *XE369*.

Despite the multi-store trials performed on *WF280* (and also *WF294*), the Mark 3 was plagued by in-service limitations. For one thing, due to the drain on naval personnel occasioned by Korean obligations, the Service clearance programmes on the Sea Hawk were, by spring 1965, running up to eighteen months behind schedule. Clearance to use RATOG was never universally issued and the four-pylon carriage of stores did not become cleared at all for operational use in the Mark 3.

The Mark 4 Sea Hawk was intended as the definitive ground support version, but with Service acceptance of the "four-store" configuration the performance was now realised as being so poor as to be an embarrassment in service. Notwithstanding this, ninety-seven F.G.A. (fighter, ground attack) Mark 4s were built, the first, *WV792*, flying on 26th August 1954. By the end of the year Nos. 803, 804, 810, 897 and 898 Squadrons had received Mark 4s, so that a total of ten naval squadrons were equipped with the Sea Hawk.

That the Sea Hawk's performance was giving rise to official concern is indicated by a trial installation ordered from AWA for powered elevators in the Sea Hawk 4. With a critical Mach number of about 0·835, and the onset of compressibility being manifest in scarcely-controllable pitching at 0·84M, the addition of powered elevators and vortex generators on the tailplane was thought likely to raise the critical Mach number to about 0·87M. This installation was made in *WV825*, but the sheer lack of "urge" from the old Nene 101 engine rendered the aircraft incapable of overcoming the sharp drag rise, and the result of the trial was inconclusive. (It should be remembered that in the R.A.F. the Meteor 8, with a top speed of about 0·82M, was in 1954 giving way to the transonic F-86 and Hunter 1, while transonic North American FJ Furies had been in service with the U.S. Navy for some months.)

MORE POWER

The one inbred weakness of the Sea Hawk was its mandatory dependence upon a centrifugal-flow jet engine—acknowledged by 1950 as being only a transitional stage in the development of this powerplant. After withdrawal of Government support for the Rolls-Royce Tay in 1950, the Nene survived as the only centrifugal flow engine with any power potential remaining (apart from the de Havilland Ghost with single-sided impeller and an almost identical power spectrum).*

Sea Hawks 1–4 had been powered by the 5,000-lb. thrust Rolls-Royce Nene 101, incapable, as we've shown, of exploiting the ultimate airframe performance limit. Within a realistic budget for short-term development, Rolls-Royce in 1954 introduced the Nene 103, up-rated to give 5,200-lb. thrust and, as an immediate expedient, the Admiralty (through the Ministry of Supply) ordered Sea Hawk 3s and 4s to be re-engined with the more powerful engine.

About 50 Sea Hawk F.B.3s were retro-fitted with Nene 103s, redesignated F.B.5s, and most of them issued as replacements to Nos. 800, 801 and 806 Squadrons. The 4% increase in power had no effect in raising the top speed (simply because the powered elevator system itself was abandoned as an official gesture to post-Korean economic cutbacks) so it might be thought that the Nene 103 introduction was fruitless. However the low speed handling and take-off performance were much improved though early Service introductory trials were marred by a series of accidents. The author recalls a tragic incident in which a naval trials pilot suffered locking of the elevator controls during a shallow high-Mach dive from altitude, and was unable to open or jettison his hood to abandon his aircraft (in those days ejection could only take place after the hood had been jettisoned). As the aircraft pursued its relentless dive towards the sea, the helpless pilot calmly continued a narrative of events over the radio up to the moment of impact.

**Following the supply under Government sponsorship of 50 Rolls-Royce engines to Russia in 1947, that country managed to achieve a transonic fighter—the MiG-15—with what constituted a development of the centrifugal-flow Tay.*

The Rolls-Royce Nene engine with Hawker's patented bifurcated jet pipe. (Photo: F. K. Mason collection)

The Sea Hawk Mk. 4, WV825, *used for trials with powered elevators, identifiable by the vortex generators on the tailplane.*
(Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A675)

Rather fewer Mark 4s were re-engined and no new Mark 5s were built. The Nene 103-powered Mark 4 was redesignated the F.G.A. Mark 6, and in 1955 eighty-six new Mark 6s were also ordered. By mid-1956 many of these had been issued to Nos. 800, 802, 804, 897, 898 and 899 Squadrons, some of these units retaining a small number of Mk. 4s and 5s.

Five of these Squadrons, Nos. 800, 802, 804, 897 and 899, flying from the Carriers *Albion*, *Bulwark* and *Eagle*, were called upon to give support to the Anglo-French excursion at Suez in November 1956. This baptism of fire was sharp and, by most accounts, effective—but short-lived. In the absence of R.A.F. close support (Hunter 5s in Cyprus possessed neither the low level range nor clearance to deliver anything but gunfire), the Royal Navy provided all the British ground attack effort, and the Sea Hawks (with Sea Venoms as escort) pressed home many attacks against Egyptian shore targets, often in the face of heavy ground fire. Several aircraft were badly damaged. (A point worth mentioning here is that, for recognition purposes, British and French aircraft supporting the operations at Suez were painted with stripes in similar fashion to those used in the 1944 Normandy D-Day operations. It was intended that British aircraft would be painted with black and white stripes, and French with black and yellow; however confusion or individual initiative led to Fleet Air Arm aircraft being painted with both schemes, and, in one or two cases, neither.)

After Suez, the Sea Hawk's days were numbered; already a new generation of transonic fighters and strike aircraft was scheduled with the introduction of the Sea Vixen and Scimitar—aircraft designed around axial-flow engines, 30-mm. Aden guns, air-to-air guided missiles, nuclear strike capacity, and the new naval preference—twin-engine security (*sic*).

In the 1957 S.B.A.C. Display five scarlet Sea Hawks of No. 738 Naval Training Squadron performed a fine formation aerobatic routine using coloured smoke, landing and taking off in close formation. By 1958, with the operational acceptance of the Scimitar, the Sea Hawk commenced phasing out and by 1960 had been relegated to second-line duties with training establishments and radar calibration units.

SEA HAWKS IN FOREIGN COLOURS

During the course of Service evaluation of the Sea Hawk at the Central Fighter Establishment a number of Canadian and Australian pilots flew the aircraft and

A Sea Hawk F.G.A. Mk. 4 armed with thirty 3-in. rocket projectiles with 25-lb. warheads. (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A810)

Sea Hawk Mk. 6 XE369 *was used by A.W.A. for various trial installations; here it is seen with forward-facing F.95 low-level cameras mounted in the nose of an underwing drop tank.* (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A835)

it was officially suggested that the type might be considered as standard equipment of the Royal Australian and Canadian navies. This did not however come about, owing to preference being shown towards new American naval designs, and in the event only very small numbers of fighters were issued to these navies. However a few ex-Fleet Air Arm Sea Hawks were transferred to Australia and some flew from H.M.A.S. *Sydney*, while a small number also served with the Royal Canadian Navy; nevertheless the number was so small that the type did not enter full squadron service, and some were later returned to the United Kingdom.

Some months after the Coventry production line had been dismantled in 1956, the Federal Republic of Germany placed an order for 64 Sea Hawks, it being found that, among naval fighters available at that time, the Sea Hawk represented good value for money, bearing in mind that the German naval air arm was entirely land based. The German requirement was divided between fair-weather day fighters and fighter bombers, and day fighters with a bad weather flying capability (as distinct from "all-weather" fighters). The former, of which 32 were ordered, were designated Sea Hawk Mk. 100s, and the latter Sea Hawk Mk. 101s. The 101s possessed provision to carry Ekco search radar in a large pod carried on the starboard inboard wing pylon. Both versions were characterised by increased fin area, the fins being extended some 15 inches higher than other versions.

At about the same time as the German order was received, the Netherlands Government ordered about 30 Sea Hawk Mk. 50s to be paid for under NATO "off shore" funding. As originally delivered these aircraft were externally similar to those of the Fleet Air Arm, but were equipped with Philips UHF radio, characterised by a broad blade aerial on top of the rear fuselage. Later, also under NATO funding, most of the Dutch Sea Hawks were equipped to carry Philco Sidewinder IA air-to-air infra-red-seeking missiles, one missile being carried under each wing at about the outboard pylon position.

The only other country to purchase Sea Hawks was India, about twenty ex-Fleet Air Arm F.G.A. Mk. 6s being delivered during 1960.

SEA HAWK PRODUCTION AND SERVICE ALLOCATION

Hawker P.1040. One prototype, *VP401*, designed and developed during 1944–45, eventually covered by Contract No. 6/AC/234/CB.9b and built during 1946–47. Rolls-Royce Nene I (No. 30).
Hawker N.7/46. Two prototypes, *VP413* and *VP422* to Naval Spec. N.7/46 ordered under Contract No. 6/AC/234/CB.9b. Rolls-Royce Nene II (No. 136 in *VP413*, and No. 210 in *VP422*).
Hawker Sea Hawk F. Mk. 1. Production batch of 35 aircraft, *WF143–WF161*, *WF167–WF177*, *WM901–WM905*. Built by Hawker Aircraft Ltd. at Kingston under Contract No. SP6/AC/3142/CB.7b. Rolls-Royce Nene RN.4 (Mk. 101).
Hawker Sea Hawk F. Mk. 1. Production batch of 60 aircraft, *WF162–WF166*, *WF178–WF192*, *WF196–WF235*. Built by Sir W. G. Armstrong Whitworth Aircraft Ltd., Coventry, under Contract No. SP6/AC/9601/CB.5b. Rolls-Royce Nene RN.4 (Mk. 101).
Hawker Sea Hawk F. Mk. 2. Production batch of 40 aircraft. *WF240–WF279*. Built by AWA. Rolls-Royce Nene RN.4 (Mk. 101).
Hawker Sea Hawk F.B. Mk. 3. Production batch of 116 aircraft, *WF280–WF289*, *WF293–WF303*, *WM906–WM945*, *WM960–WM999*, *WN105–WN119*. Built by AWA under Contract No. SP6/AC/3142/CB.7b.
Hawker Sea Hawk F.G.A. Mk. 4. Production batch of 97 aircraft, *WV792–WV807*, *WV824–WV871*, *WV902–WV922*, *XE327–XE338*. Built by AWA under Contract No. SP6/AC/9601/CB.7b. Four-store provision. Rolls-Royce Nene RN.4 (Mk. 101).
Hawker Sea Hawk F.B. Mk. 5. Mark 3 aircraft re-engined with Rolls-Royce Nene RN.4 (Mk. 103). No new aircraft built.
Hawker Sea Hawk F.G.A. Mk. 6. Production batch of 86 aircraft, *XE339–XE344*, *XE362–XE411*, *XE435–XE463*, *XE490*. Built by AWA under Contract No. SP6/AC/6244/CB.5b. Rolls-Royce Nene RN.4 (Mk. 103); also some F.G.A. Mk. 4s re-engined.

Identified by the Caspian Tern emblazoned on the noses, No. 897 Squadron Sea Hawks are seen here flying from H.M.S. Eagle *over the island of Gozo in the Mediterranean.*
(Photo: The Admiralty)

No. 897 Squadron Sea Hawks being readied for a strike sortie during the Suez campaign of 1956; just visible are the rear fuselage identification stripes. (Photo: The Admiralty)

A fine air-to-air photo of a Sea Hawk equipped with 500-lb. bombs and 3-in. rockets with 60-lb. warheads.
(Photo: Flight International, Neg. No. 34711)

Another trial installation Sea Hawk 6, XE456. The aircraft is shown in high-gloss finish and carrying finned drop tanks, 500-lb. bombs and an assortment of rockets with 25- and 60-lb. warheads. (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A848)

Development of the German Sea Hawks. Top to bottom: XE456 *with early mock-up of Ekco radar outboard under wing.* XE456 *with later mock-up under inboard pylon; just visible is the instrumentation boom under the rudder (in place of arrester hook), and yaw meter on starboard wing tip to measure effect of increased fin area. Third photo shows* XE456 *equipped with prototype flight installation of Ekco radar and radome on rear fuselage: the standard arrester hook has been refitted. Fourth photo shows standard Sea Hawk Mk. 100 equipped with four wing pylons, four R.P. mountings and search radar sight-head. The bottom photo is of a German Sea Hawk Mk. 101 with Philips UHF radio (note blade aerial forward of rear fuselage radome).* (Photos: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. Nos. A826, A893, A954, A1046 and A1085)

Sea Hawk Mk. 100s during delivery by German pilots. (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A1051)

Hawker Dutch Sea Hawk Mk. 50. Approximately 30 aircraft, equivalent to F.G.A. Mk. 6 with Philips UHF radio.

Hawker German Sea Hawk Mks. 100 and 101. 64 aircraft total. 32 aircraft equipped to carry Ekco search radar in underwing pod.

Representative aircraft in Fleet Air Arm service:

No. 700 Squadron, T.R.U., R.N.A.S. Ford: *WF294, WF303, WM912.*

No. 736 Training Squadron: *WF301, WM975, WN105, WV803, WV830, WV919, XE328.*

No. 800 Squadron: *WM909, WN109, WN111, WN112, WN117, XE339, XE341, XE371, XE372, XE376.*

No. 801 Squadron: *WF301, WF302, WM990, WM999, WN115, WN117.*

No. 803 Squadron: *WV836, WV842, WV851, WV853, WV854, WV857.*

No. 804 Squadron: *WF175, WF177, WM903, WF200, WF202, WF207, WF208, WF210, WF212, WV802, WV827, WV833, WV852, WV914.*

No. 806 Squadron: H.M.S. *Eagle* and *Albion*: *WF169, WF171, WF173, WM902, WF163, WF187, WF191, WF199, WM911, WM916, WM932, WM937, WM942, WN119, XE362, XE371.*

No. 810 Squadron: *XE329, XE331, XE337.*

No. 897 Squadron, H.M.S. *Eagle*: *WF300, WM916, WM935, WM991, WN111, WV920, WV922, XE330, XE338, XE345, XE368, XE399.*

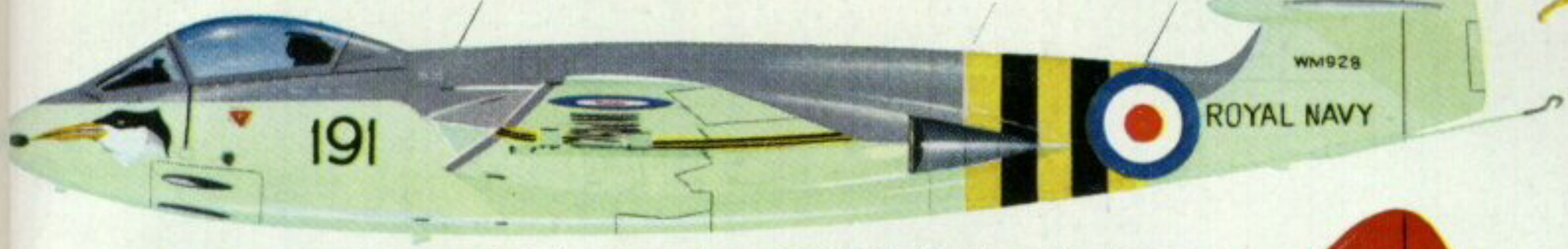
No. 898 Squadron, H.M.S. *Ark Royal*: *WF170, WF176, WF183–WF185, WF192, WF213, WM929, WM961, WM993, XE344, XE375, XE377, XE380, XE384, XE390, XE405, XE436, XE460.*

No. 899 Squadron: *XE364, XE382, XE383, XE388, XE402, XE411, XE444, XE462.*

Other Units: Trials at R.A.E., *WF143, WF145*; trials at A. & A.E.E., Boscombe Down, *WF143, WF146, WF149, WF161, WM901, WF243, WF280, XE327.* C.E.P.E., Canada, *WF148.* Naval Fighter School, Lossiemouth, *WF164, WF299, WM982.* Naval Aircraft Establishment, Bedford, *WF180, WF243, WM992.* Naval Air Fighting Development Unit, West Raynham, *XE327.*

One of the relatively few photos available of the Indian Sea Hawk Mk. 6. The serial number, IN151, *appeared in small black characters on the fin just below the tailplane.* (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A1107)

Sea Hawk F.B. Mk. 3, No. 897 Squadron, F.A.A., H.M.S. Eagle, Suez operations 1956.

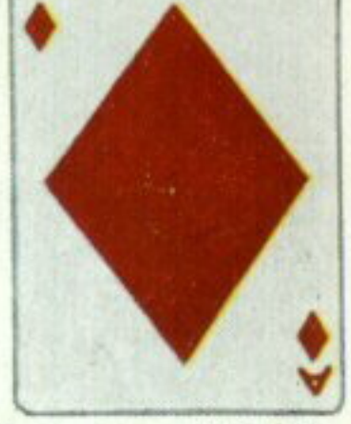


No. 897 Squadron, F.A.A.

Sea Hawk F.B. Mk. 3, No. 738 Training Squadron, S.B.A.C. Display, Farnborough, 1957.

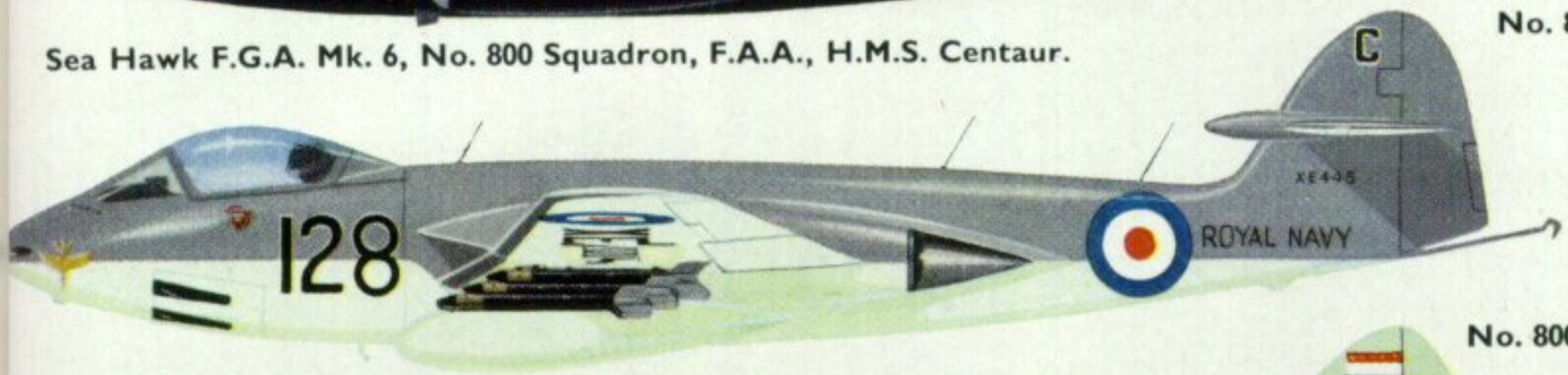
No. 898 Squadron, F.A.A.

Sea Hawk F.G.A. Mk. 6, operated by Airwork Services Ltd., under contract to the Admiralty for radar calibration and target towing duties, 1962.



No. 806 Squadron, F.A.A.

Sea Hawk F.G.A. Mk. 6, No. 800 Squadron, F.A.A., H.M.S. Centaur.



No. 800 Squadron, F.A.A.

Sea Hawk Mk. 50, No. 860 Squadron, Royal Netherlands Naval Air Service.

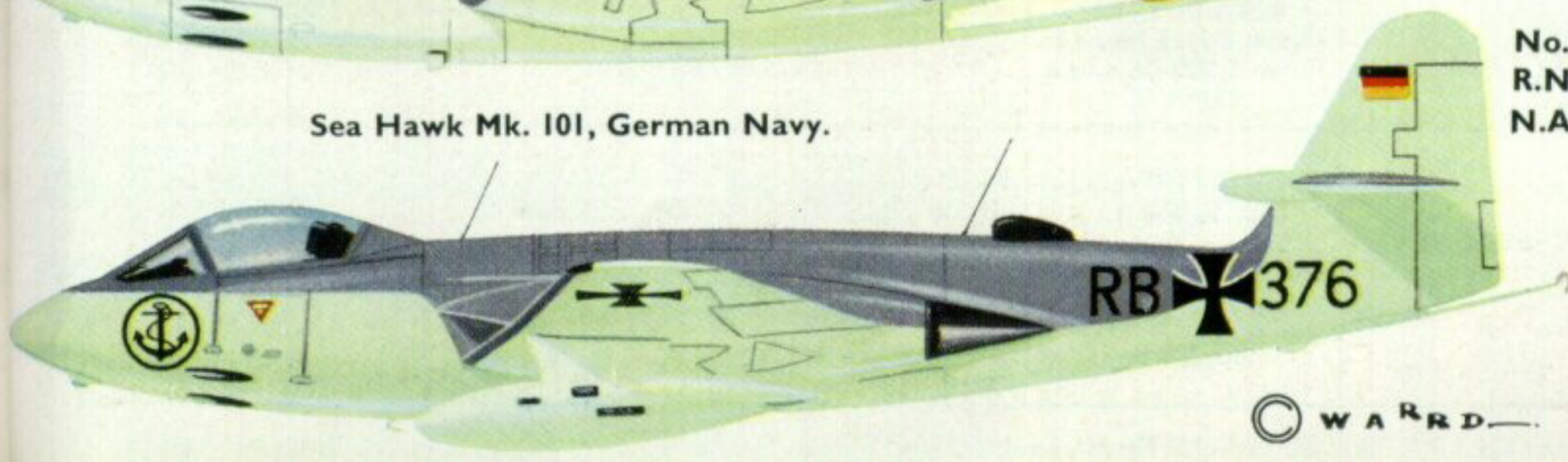
No. 860 Squadron, R.Neth.N.A.S.

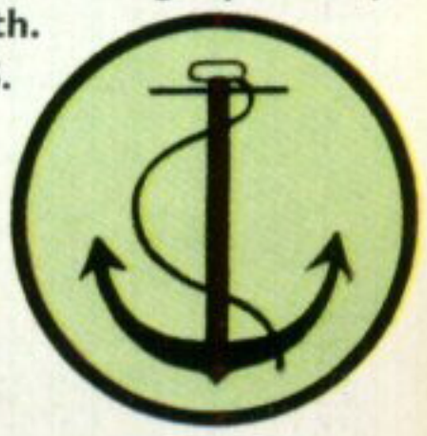
Sea Hawk Mk. 50, showing revised markings, Royal Netherland Naval Air Service.

No. 3 Training Squadron, R.Neth. N.A.S.

Sea Hawk Mk. 6, Indian Navy.

Sea Hawk Mk. 101, German Navy.





German Navy.

Netherlands Sea Hawk Mk. 50. Main external difference from the F.G.A. Mk. 6 lay in the blade aerial for Philips UHF radio—standard equipment among some NATO air forces. (Photo: Sir W. G. Armstrong Whitworth Aircraft Ltd., Neg. No. A976)

The five red Sea Hawks of No. 738 Training Squadron that performed the formation aerobatic sequence at the 1957 S.B.A.C. Display.
(Photo: Flight International, Neg. No. 36091)

SPECIFICATION

	P.1040	Sea Hawk F. Mk. 1	Sea Hawk F.B. Mk. 3	Sea Hawk F.G.A. Mk. 6
Dimensions				
Wing span (spread)	37 ft. 6 in. (later 39 ft. 0 in.)	39 ft. 0 in.	39 ft. 0 in.	39 ft. 0 in.
(folded)	—	13 ft. 3 in.	13 ft. 3 in.	13 ft. 3 in.
Length	37 ft. 2 in.	39 ft. 10½ in.	39 ft. 10½ in.	39 ft. 8 in.
Height (spread)	8 ft. 6 in.	8 ft. 9 in.	8 ft. 9 in.	8 ft. 8 in.
(folded)	—	16 ft. 9 in.	16 ft. 9 in.	16 ft. 8 in.
Weights				
Empty	7,705 lb.	8,840 lb.	9,190 lb.	9,560 lb.
Loaded	9,665 lb.	11,670 lb.	13,220 lb.	13,785 lb.
Overload	—	—	15,225 lb.	15,990 lb.
Powerplant	4,500 lb. s.l.s.t. Rolls-Royce Nene I (later 5,000 lb. s.l.s.t. Nene II)	5,000 lb. s.l.s.t. Rolls-Royce RN.4 Nene Mk. 101		5,200 lb. s.l.s.t. Rolls-Royce RN.4 Nene Mk. 103
Performance				
Max. speed (clean)	M=0·80 (530 m.p.h.) at 36,000 ft.	M=0·84 (560 m.p.h.) at 36,000 ft.	M=0·84 (560 m.p.h.) at 36,000 ft.	M=0·84 (560 m.p.h.) at 36,000 ft.
(with two drop tanks)	—	—	M=0·79 (525 m.p.h.) at 36,000 ft.	M=0·80 (530 m.p.h.) at 36,000 ft.
Time to 35,000 ft.	12 min. 15 sec.	12 min. 5 sec.	11 min. 50 sec.	11 min. 50 sec.
Service ceiling	43,000 ft.	43,200 ft.	43,200 ft.	44,500 ft.