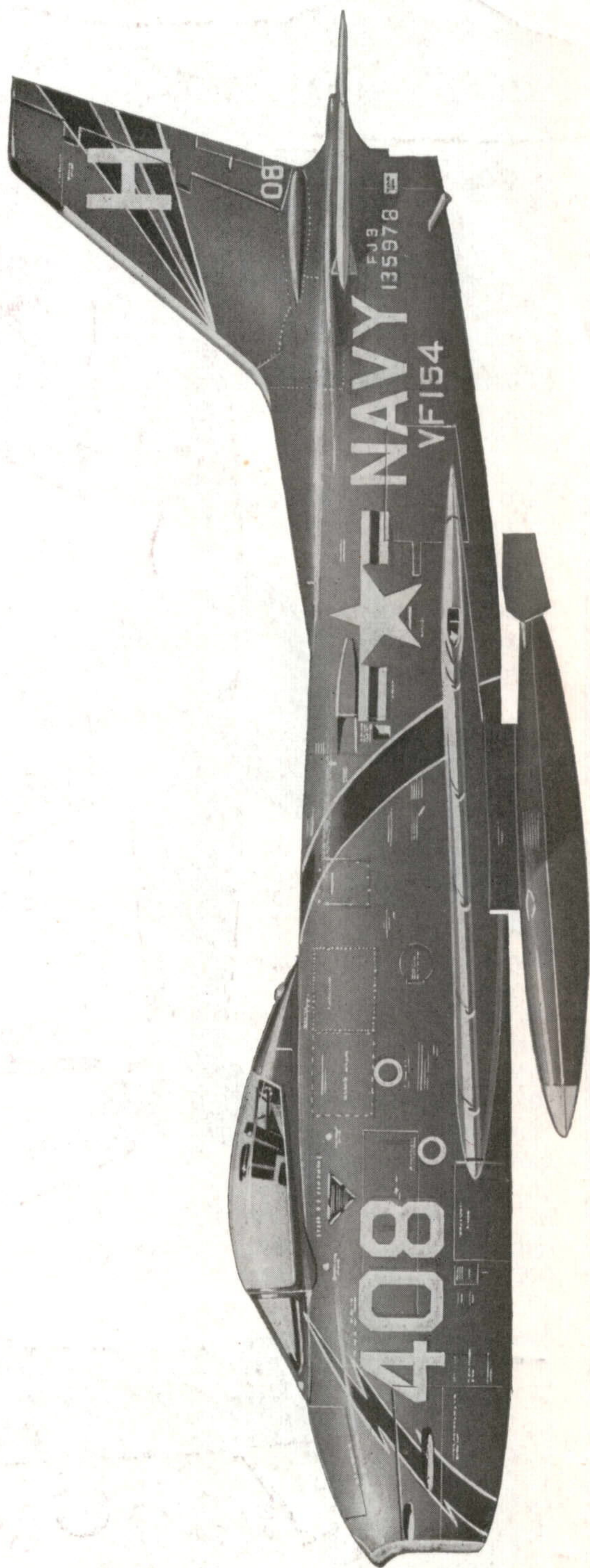
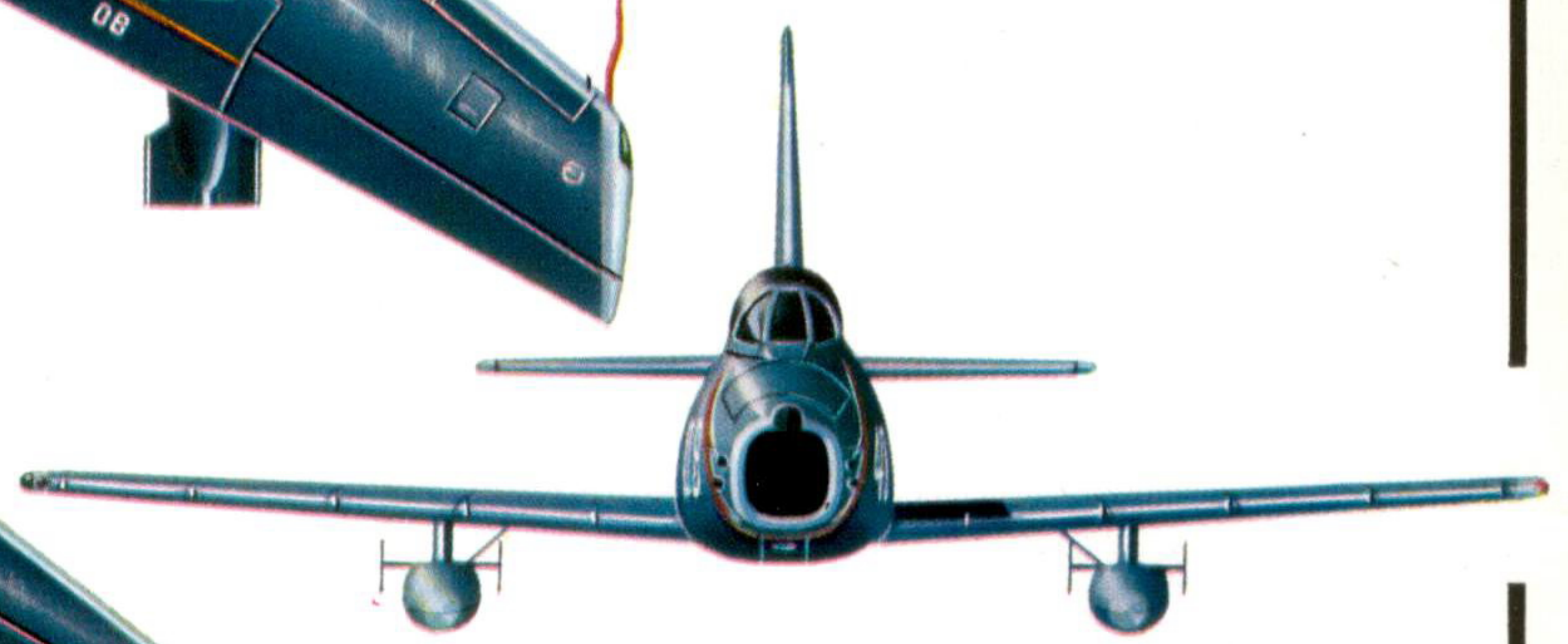


**PROFILE
PUBLICATIONS**

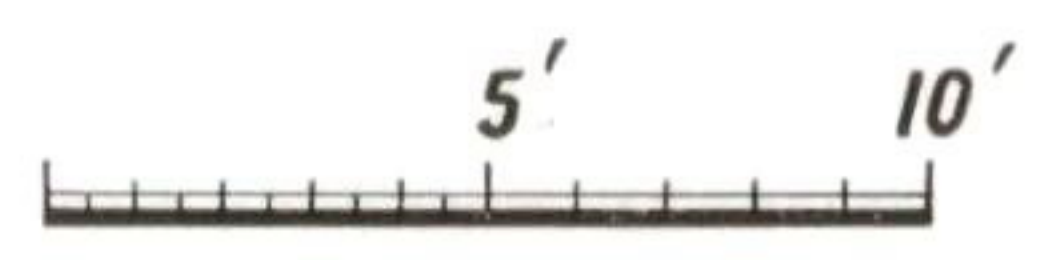
The
North
American
FJ Fury

**NUMBER 42
TWO SHILLINGS**





NORTH AMERICAN FJ-3 FURY,
No. 135978 of VF-154.





The North American FJ Fury

by Francis K. Mason

North American FJ-3M of VF-142 from U.S.S. Hornet. Note the four-station wing, refuelling probe and wing fences. Photo taken over Japan, 22nd January 1957.
(Photo: U.S. Navy)

The evolution of naval aircraft has for more than fifty years been a particularly exacting exercise, a commitment rendered infinitely more difficult by the economics of relatively small production orders. Thus by force of circumstances it has been found more expedient to adapt an existing or projected land-based aircraft design for the task of deck operation, with the result that with so much paraphernalia appended the naval combat aircraft has commenced life with an inbred inferiority when compared with its dry-footed contemporaries. Only in the years following W.W.II have high performance combat aircraft been evolved with deck operation of first importance in the Operational Requirement; this has undoubtedly followed the trend of uprating the fleet carrier to capital ship status.

One of the first examples of putting "the horse before the cart" was the North American FJ-Series of naval jet fighters. Of course the world recognises the excellence of the well-known F-86 Sabre (see *Profile* No. 2), yet it is perhaps an obscure fact that the NA-140 (XP-86) design stemmed from the NA-134, designed to a U.S. Navy requirement of 1945.

The North American NA-134 project designation covered the design and construction of three straight-winged fighter prototypes, ordered by the U.S. Navy on 1st January 1945. Developed from this was the NA-140 for an Air Force fighter, originally intended to have straight wings but, following intensive examination of sequestered German research data on swept wings, was destined to materialise as the famous F-86 Sabre.

Deck landing speeds required by Navy fighters eliminated the consideration of a swept wing on the NA-134 design at that time and the project went ahead with straight wings, to become the North American XFJ-1. Unlike current fighters (e.g. P-59 and P-80) in service with or in production for the U.S.A.F., the new naval aircraft was designed around the axial flow General Electric J-35 which made

possible the straight-through airflow from nose to tail without complications of wing-root or other lateral types of intakes.

Thus while efforts continued to develop an efficient swept wing for the XP-86 and extend its "on board" time, the Navy XFJ-1s commenced manufacture early in 1946 and first flew on 27th November that year—about ten months ahead of the XP-86.

With 3,820 pounds thrust from the J35-GE-2 engine, the first of the three prototypes (39053-39055) achieved a maximum speed of 542 m.p.h. at 16,000 feet, a service ceiling of 47,400 feet and an initial climb rate of 4,690 feet/minute. As a matter of passing interest these figures were extremely close to those of the British de Havilland Vampire I which had performed the world's first deck landing by a jet aircraft in late 1945 and which entered naval service during 1948.

Flight trials on the three XFJ-1s continued for almost a year, being accepted by the U.S. Navy during September 1947. Production had by then already started, the Navy having placed a contract for 100 FJ-1s as far back as 28th May 1945. Deliveries under this contract commenced in early autumn 1947 from the Los Angeles plant and passed to Navy Squadron VF-5A at San Diego on 18th November that year. In the course of two months this squadron, under Commander Evan ("Pete") Aurand, completed about 200

The unarmed first prototype XFJ-1, 39053.
(Photo: Courtesy North American Aviation Inc.)



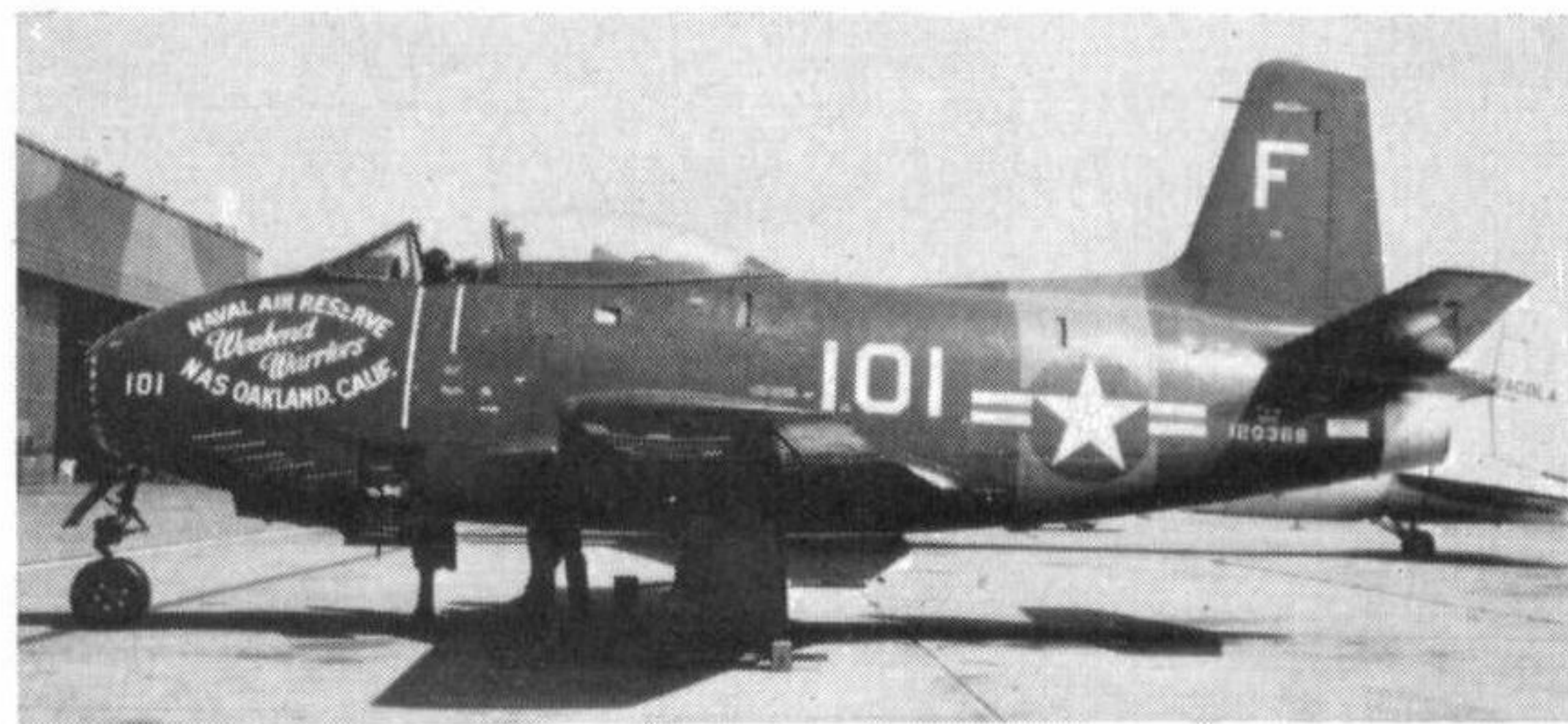
dummy deck landings on a runway marked up to deck size, and on 10th March 1948 the Commander landed an FJ-1 on U.S.S. *Boxer*—the first jet landing on a carrier at sea under operational conditions. Landings and take-offs by other members of VF-5A followed and much initial experience was quickly gained in jet operations from a carrier deck. Slower acceleration by jets during take-off led to catapulting becoming standard practice, while the jets' greatly increased fuel consumption demanded larger fuel storage aboard carriers.

The FJ-1s, of which only 30 (130342–130371) came to be built—all at Los Angeles—were powered by Allison-built J35-A-4 engines; with 4,000 pounds thrust, top speed was 547 m.p.h. at 9,000 feet, and with two 165-gallon wing-tip tanks supplementing the 465 gallons of internal fuel the ferry range was 1,500 miles.

Throughout 1948 VF-5A remained the only U.S. Navy squadron jet-equipped, but when this unit was re-numbered VF-51 and took delivery of Grumman F9F-2s, the FJ-1s were delivered to reserve units ashore.

SWEPT WINGS

Successful development of the swept wing on the



Resplendent in Naval Air Reserve colours, this FJ-1, 120368, flew from Oakland N.A.S., California, in 1950.

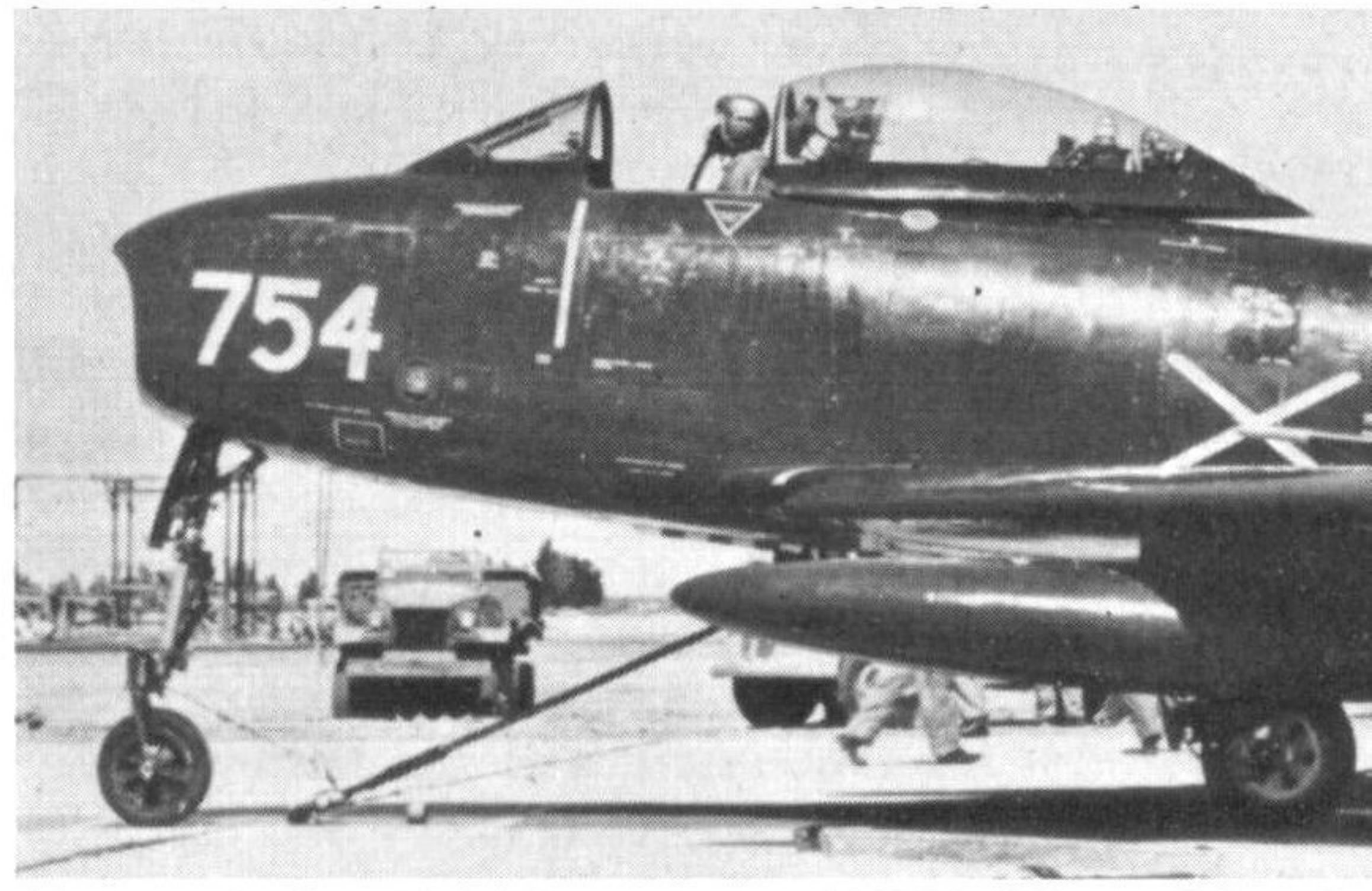
(Photo: William T. Larkins)

and Art C. Patch, and F-86As joined squadrons of the U.S.A.F. in 1948. By 1951, with events taking a more serious turn in Korea, the U.S. Navy had realised that swept-wing deck fighters were entirely feasible and, having studied a North American design proposal (NA-181) for a navalised F-86E, issued a letter contract on 10th February 1951 for development of prototypes. Commander Aurand, of VF-5A fame, was appointed Navy Project Officer.

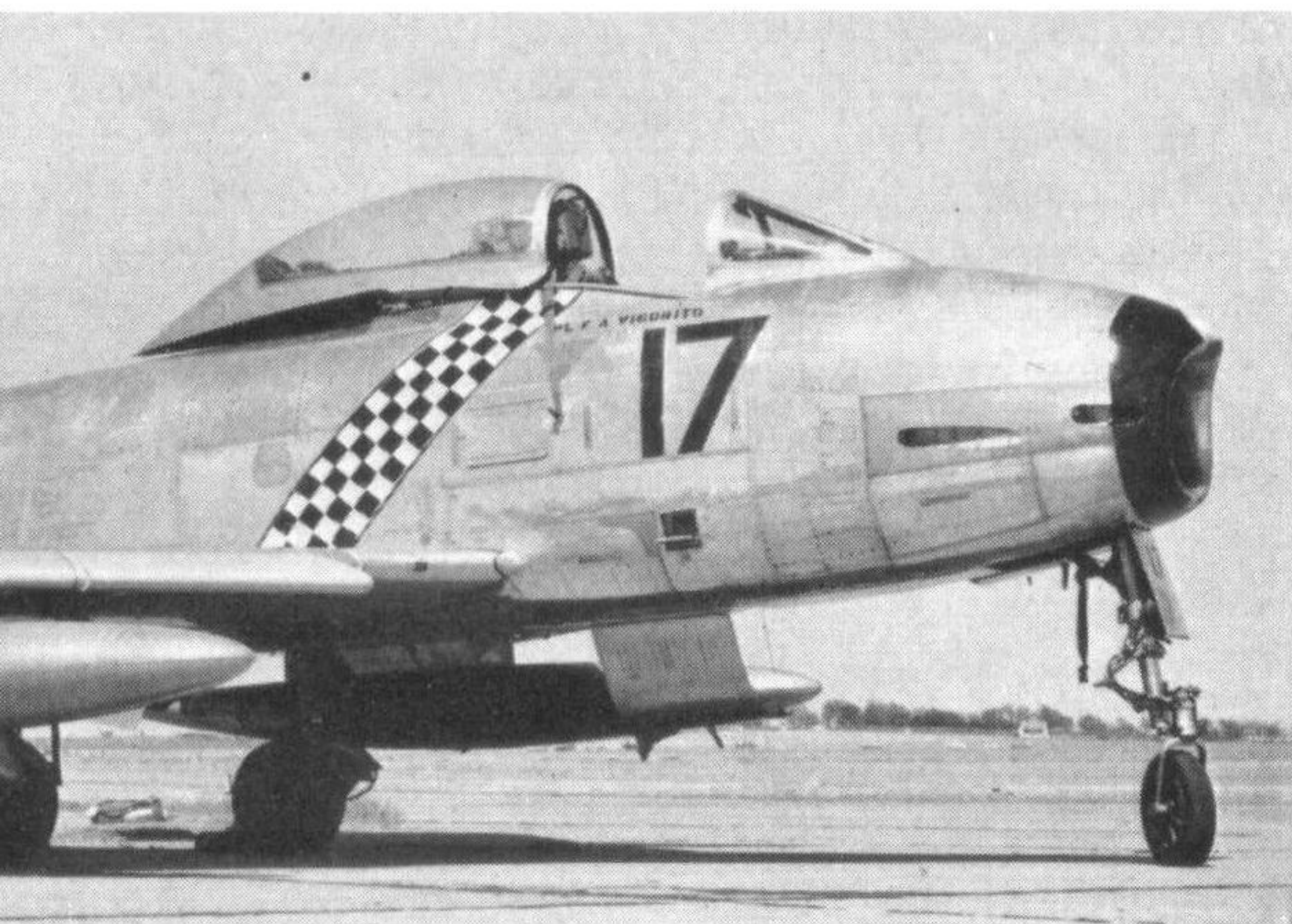
Three prototypes were ordered from the Los Angeles plant. 133754 and 133755 (under NA-179) were essentially navalised F-86Es with vee-frame arrester hooks, lengthened nosewheel legs and cata-



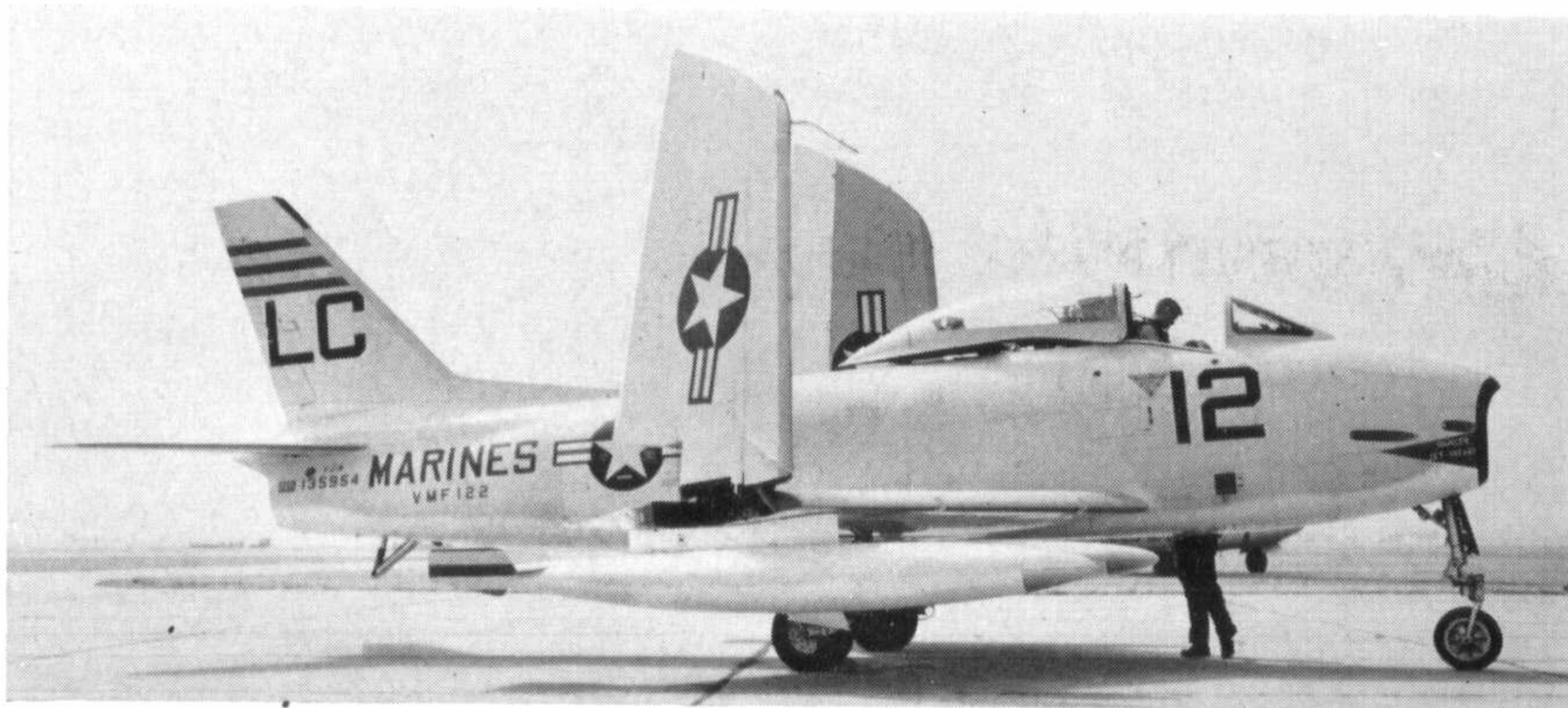
Below: *Marine FJ-2 in natural metal finish. Note wing slats*
(Photo: via John W. R. Taylor)



Above: *The first NA-179 prototype, 133754. (Photo: Manufacturer and two-store wings.*



Marine FJ-3, 135954, of VMF-122. Most FJ-3s were however delivered to the U.S. Navy. (Photo: via John W. R. Taylor)



Hoover on 27th December 1951. 133756 carried the designation XFJ-2B, the B denoting a special armament modification for this machine carried four 20 mm. guns in place of the hitherto standard six 0.50-cal. machine guns.

As would be expected, these radical swept-wing prototypes underwent intensive trials. The two XFJ-2s, with J47-GE-13 engines, were delivered to Patuxent River for Service trials in 1952, and armament trials were undertaken at Inyokern on 133756. Acceptance by the Navy of the prototypes was effected in June, July and December respectively, and carrier qualification trials were performed aboard U.S.S. *Coral Sea* in December 1952.

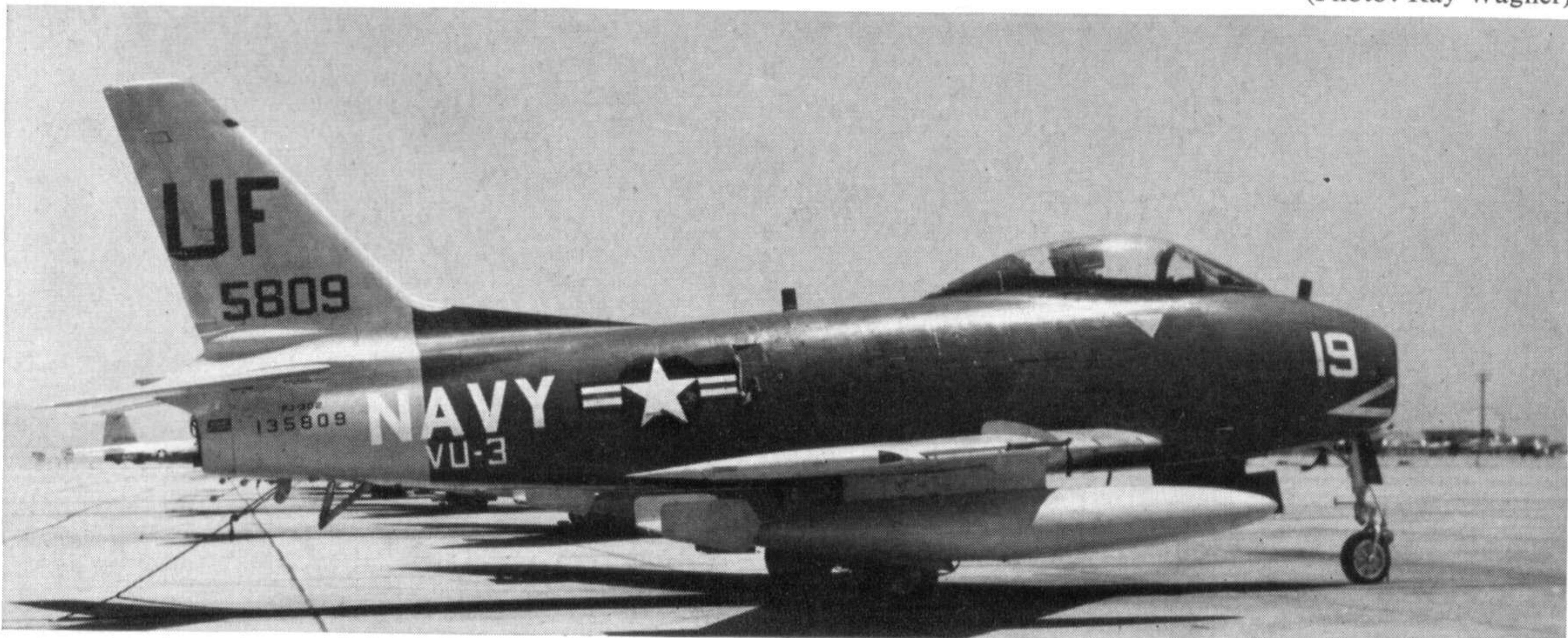
Production of FJ-2s was undertaken at North American's newly-opened Columbus, Ohio, plant in

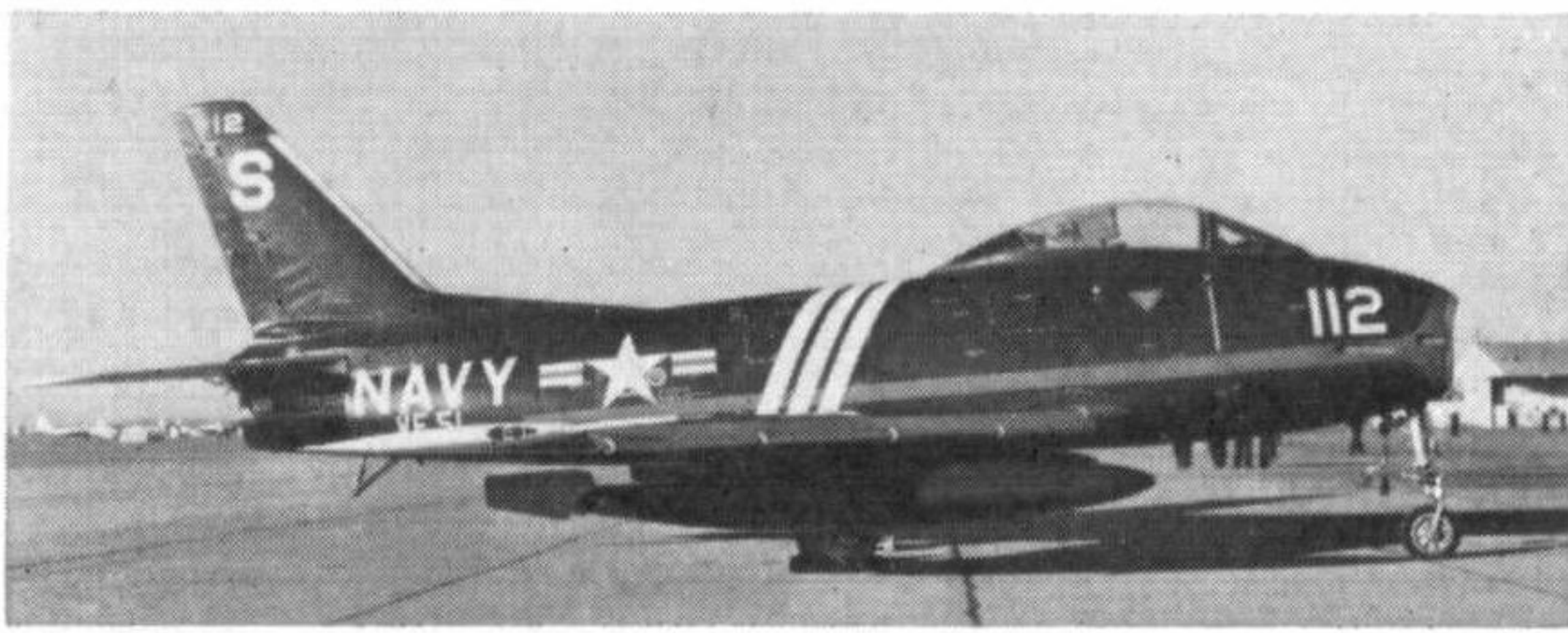
1952. The original contract for 300 aircraft was reduced to 200 owing to the running down of the Korean War and the first aircraft was delivered in October 1952. Production continued until September 1954.

The FJ-2 Fury was, in effect, the U.S. Navy equivalent of the F-86F. Powered by a 6,000 pound thrust J47-GE-2 (Navy version of the J47-GE-27), the FJ-2 was equipped with folding wings and all-flying tail, and was armed with four 20 mm. guns with 600 rounds, aimed by a Mark 16 Model 2 sight and



Above: An early FJ-3, 135810, with VC-3 during the Fleet Introduction Programme, at Patuxent River, Maryland, 1954. (Photo: William T. Larkins). Below: With retro-modified wings, FJ-3D2, 135809, served as a missile control aircraft with Navy Utility Squadron 3. (Photo: Ray Wagner)





FJ-3 of VF-51, 136008.

(Photo: William T. Larkins)



FJ-3 of VF-154, 136978, at Moffett Field.

(Photo: William T. Larkins)



Navy/Marine markings on FJ-3, 135812, at Willow Grove in June 1960.

(Photo: William T. Larkins)



Below: FJ-3, 136144, at Quonset Point, Rhode Island, June 1960. Above, left: Port side fuselage insignia of this aircraft.

(Photos: R. W. Harrison)



AN/APG-30 radar. Naval equipment raised the take-off weight to 18,791 pounds compared with 17,797 pounds for the F-86F-10; top speed was 676 m.p.h. at sea-level and 602 m.p.h. at the tropopause.

Although first production FJ-2s were delivered to the Navy in dark blue finish, most went to U.S. Marine Corps squadrons in natural metal finish. Korean War demands resulted in most of the Columbus effort being spent on Air Force F-86Fs, and FJ-2 production was slow during 1952, only five being completed during that year, and 25 by the end of 1953.

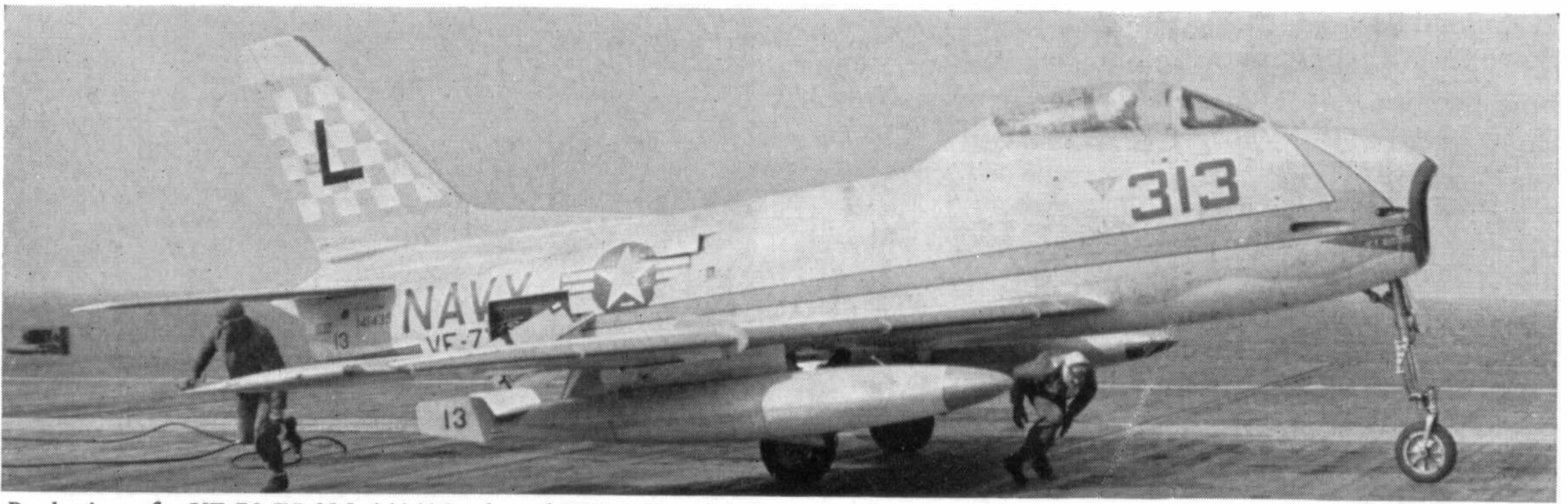
First squadron to receive FJ-2s was Marine VMF-122 at Cherry Point, North Carolina, in January 1954, being followed five months later by VMF-235 aboard U.S.S. *Hancock*, a newly-modified carrier equipped with C-11 steam catapults. By 1955 FJ-2s equipped six Marine squadrons, three—VMF-122, 232 and 312—with the Atlantic Fleet, and three—VMF-235, 334 and 451—with the Pacific Fleet. It was averred that the Grumman F9F-6 Cougar possessed a marginally better deck performance over the FJ-2 and it was the Cougar that gained Navy preference while the Fury remained with Marine units.

SAPPHIRE ENGINES

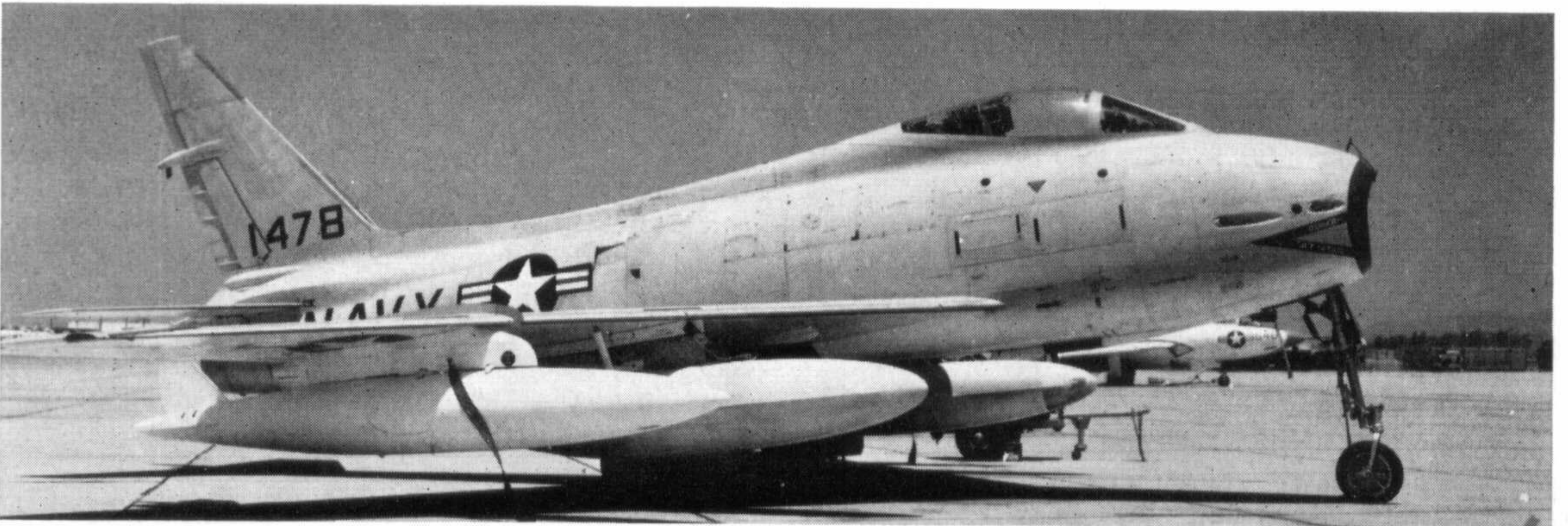
Perhaps as much on account of this failure to secure prime Navy contracts for the FJ-2 as for the successful development of late-series F-86s, North American commenced on March 3rd 1952 the design of the FJ-3 Fury* using the Wright J65-W-2 Sapphire engine of 7,700 pounds thrust, built under licence from Armstrong-Siddeley Motors Ltd., in England. The first Sapphire-powered Fury was the fifth production FJ-2, 131931, this being used as a trial installation aircraft and thus became the prototype FJ-3 (though no XFJ-3 was officially recognised).

The first production FJ-3, 135774, was completed

*Though contemporary designations are used for the FJ Fury series throughout this Profile, they were changed to conform to a standard U.S.A.F./U.S.N. designation system late in 1962. Under the new system the new designations were as follows: (FJ-3) F-1C; (FJ-3D) DF-1C; (FJ-3M) MF-1C; (FJ-3D2) DF-1D; (FJ-4) F-1E; (FJ-4B) AF-1E.

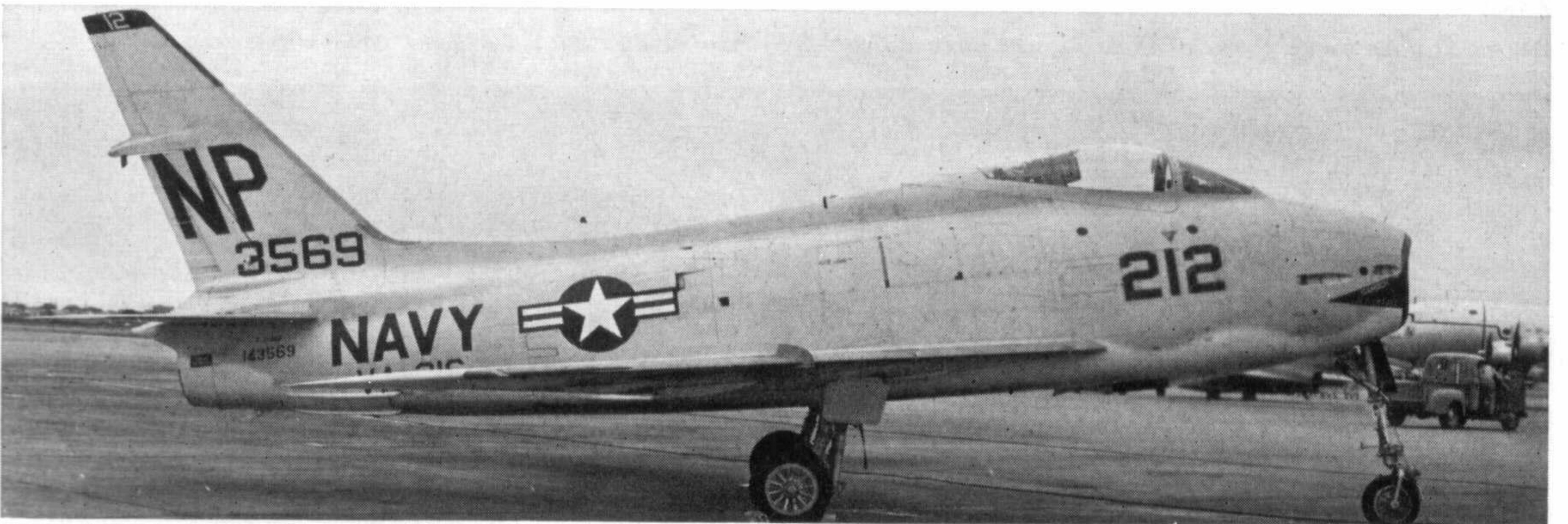


Deck view of a VF-73 FJ-3M, 141435, aboard U.S.S. Randolph on 22nd March 1957, during Carrier Qualification Trials.
 (Photo: U.S. Navy)



141478, an FJ-4B on external store trials.

(Photo: William T. Larkins)



FJ-4B, 143569, of Navy Squadron VA-216.

(Photo: William T. Larkins)

Fleet Air Gunnery Unit markings on FJ-4B, 139552.

(Photo: William T. Larkins)

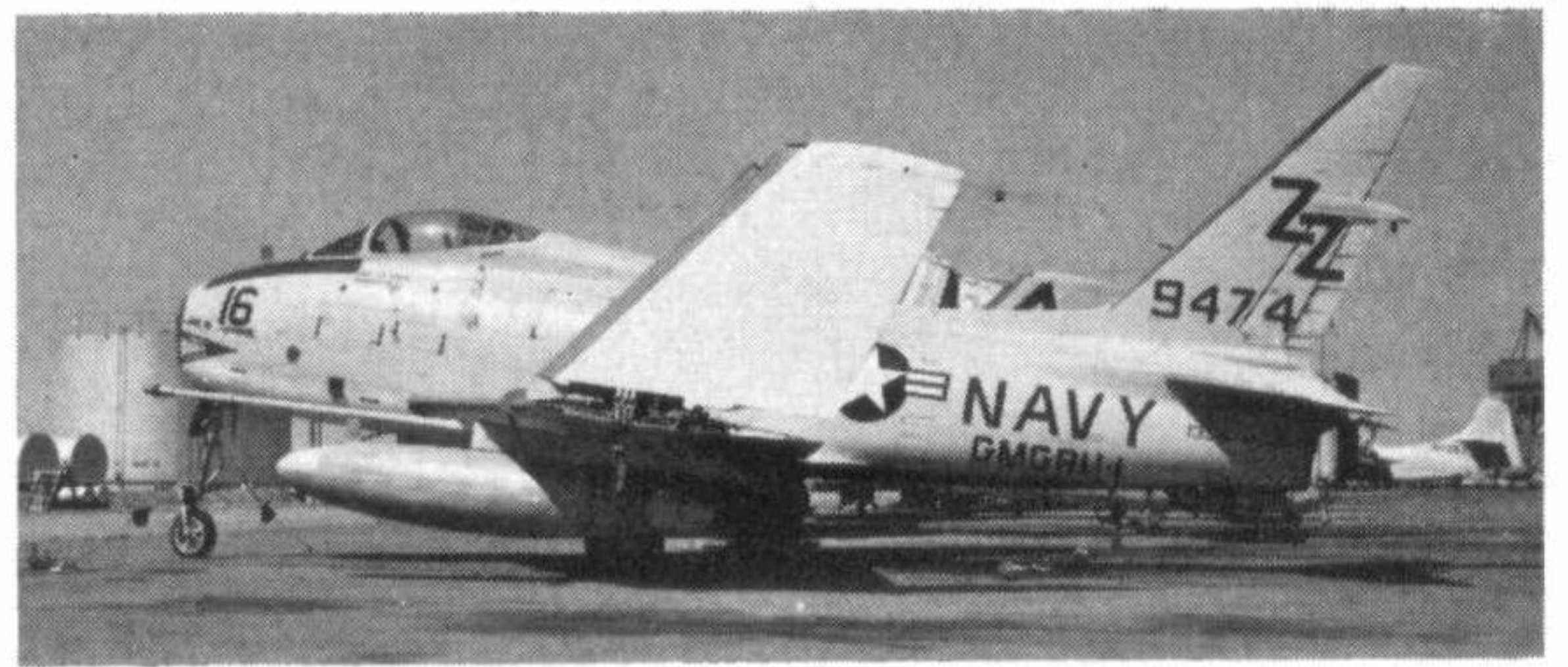


at Columbus on 11th December 1953 and was first flown by William Ingram. Differing from 131931, the production FJ-3s were powered by J65-W-4s with enlarged air intakes. Slatted wings and flying tail were retained but ammunition for the four 20 mm. guns was increased by 48 rounds.

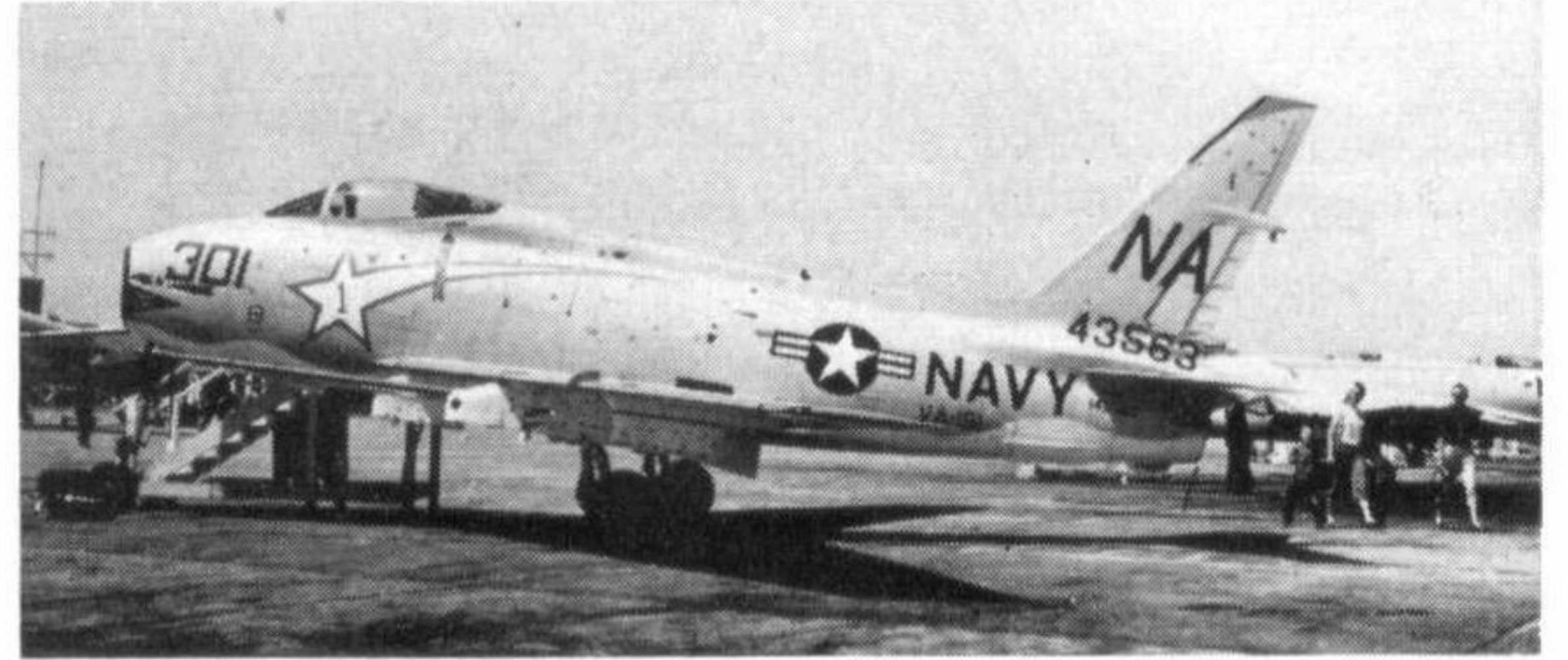
The FJ-3 succeeded where the FJ-2 had failed and altogether twelve Navy squadrons were thus equipped. By July 1954 twenty-four aircraft had been accepted and VC-3 and VF-173 performed the Fleet Introduction Programme at Patuxent River in the record time of 29 days, completing 703 flying hours. Two aircraft were written off, though through no fault of the design; one aircraft suffered an explosion after debris had been ingested during ground running, and another was ditched in the Patuxent River when the pilot became lost and ran out of fuel.

VF-173 was the first U.S. Navy squadron to land on a carrier when it joined U.S.S. *Bennington* of the Atlantic Fleet on 8th May 1955. A Fury of VX-3, flown by Commander R. G. Dose on 22nd August 1955, was the first American aircraft to use the mirror landing system, a system that became standard throughout American carriers. Another Fury squadron, VF-21, was the first squadron—in January 1956—to land on U.S.S. *Forrestal*, the giant carrier designed expressly for jet aircraft operation.

Furies had, during 1955, undergone a number of alterations; in July the U.S. Navy abandoned the all-blue finish in favour of dull grey upper and white under surfaces. Wing slats were replaced by extended leading edges in which were accommodated 124 gallons of additional fuel. Underwing store points



Above: FJ-4, 139474, with missile control electronics in underwing store. Below: Shooting Star insignia on FJ-4B of VA-151. (Photos: William T. Larkins)

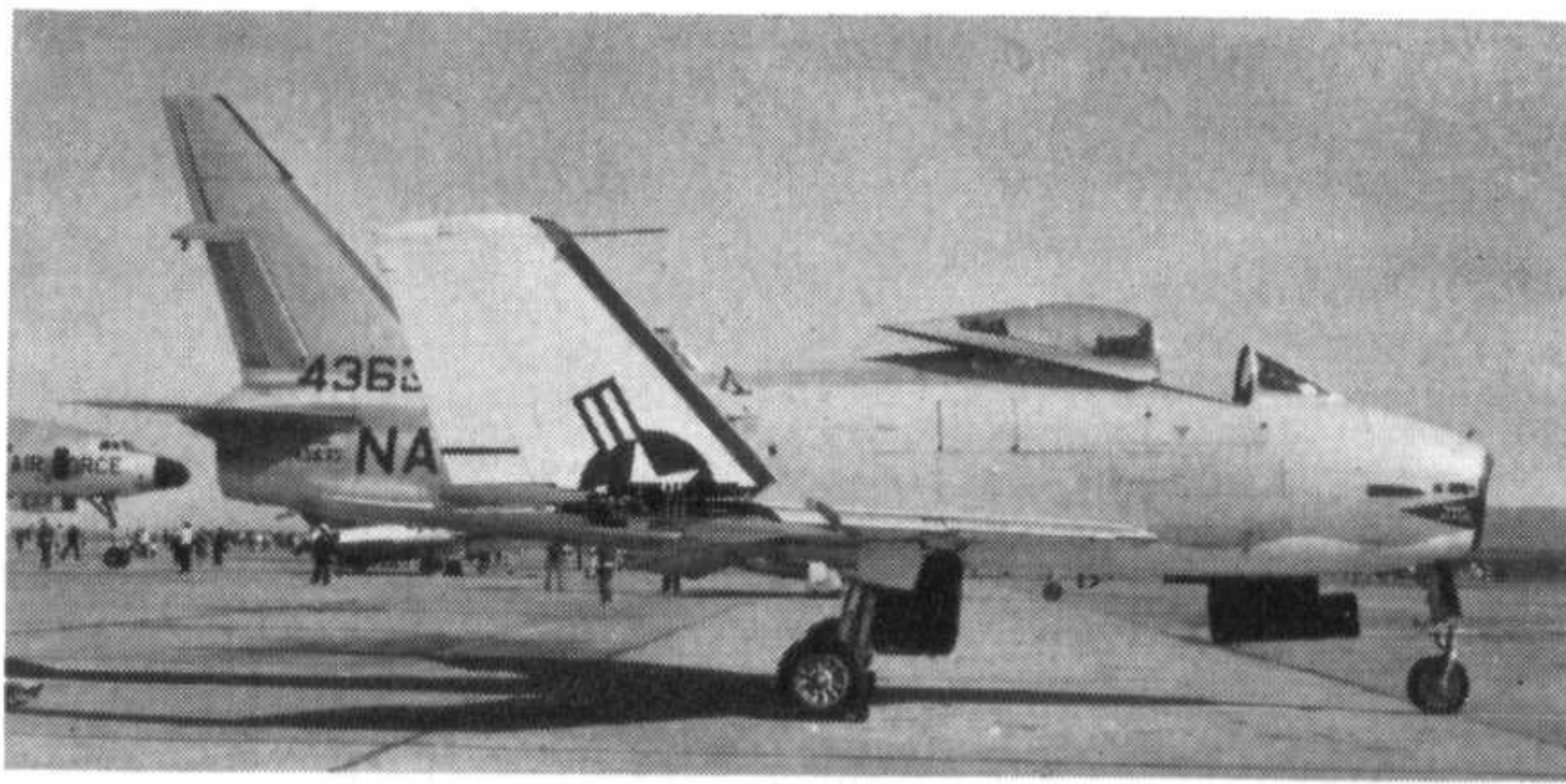


were increased from two to six making possible the carriage of 500 or 1,000 pound bombs, rocket packs or additional drop tanks. Sidewinder infra-red-seeking missiles, first fired at Inyokern in 1952, were fitted on the Fury from the 345th aircraft onwards. Sidewinder-equipped Furies, now designated FJ-3M, first joined the U.S. Pacific Fleet when U.S.S. *Bon Homme*, with VF-211 embarked, set sail from the West Coast for the Far East.

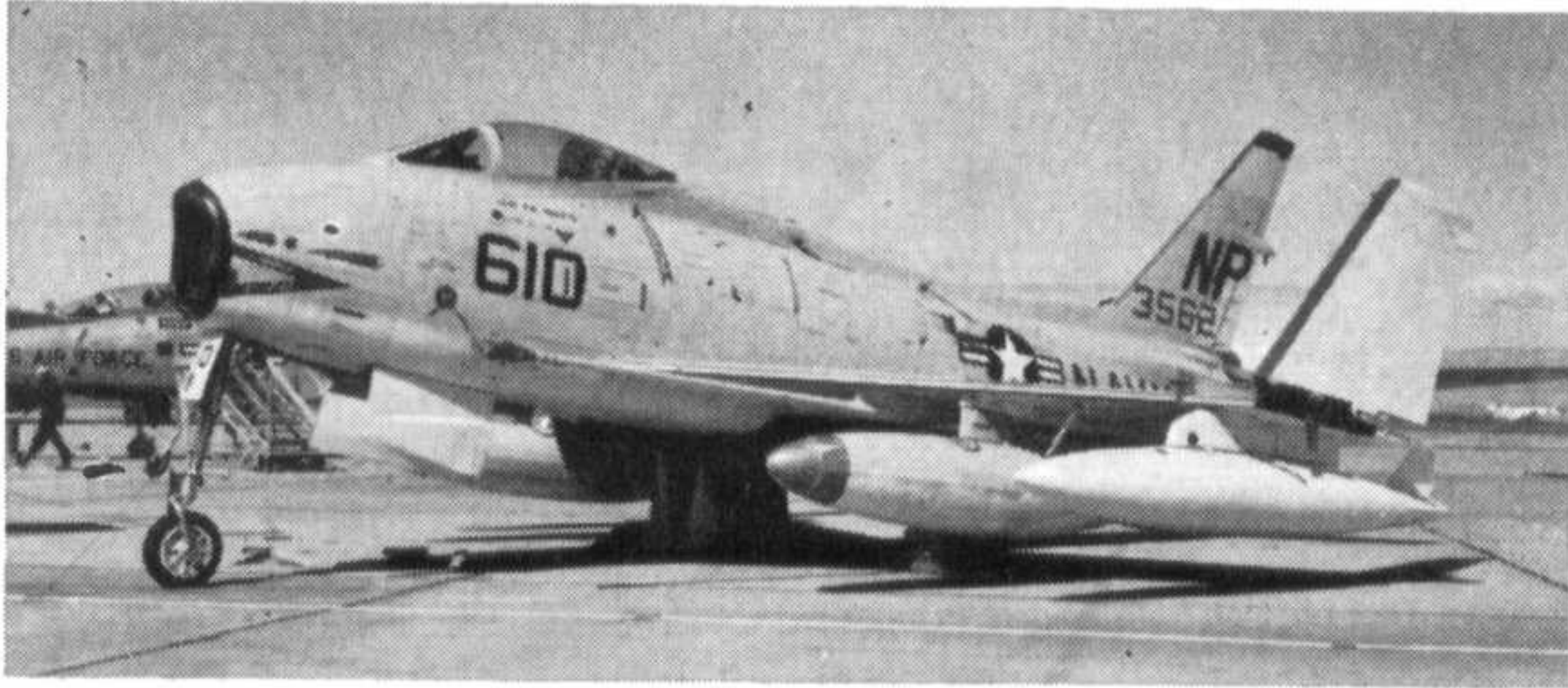
By the end of FJ-3M production in August 1956, the U.S. Navy and Marines were operating twenty-three Fury squadrons, a total which remained until

Below: Striking in-flight view of an FJ-4B with three ASM-N-7 Bullpup missiles, missile guidance pod and two drop tanks. (Photo: U.S. Navy)





Above: Late-standard FJ-4B, 143633. Below: FJ-4B of VA-216.
(Photos: William T. Larkins)



the end of that year although one of the Marine units, VMF-451, replaced its FJ-2s with a new, long-range Fury—the FJ-4.

LONG RANGE ATTACK

Design of the FJ-4 had commenced at Columbus in February 1953 under the direction of Frank Compton. In June that year the project was established under NA-208 for two prototypes and NA-209 for production, and by July the following year the Navy had placed contracts for a total of 177 aircraft.

The new design was identified fundamentally by a considerable increase in range, the fuel capacity being increased by 50%. To offset any loss of performance, the entire airframe was revised: a thinner wing of greater area and span, using integral skin/stringers and multi-spar construction, was milled from solid aluminium plate; mid-span wing control surfaces and high-lift flaps were incorporated, as were thinner tail surfaces—also with mid-span controls. A revised levered-suspension undercarriage was fitted to give an increased track of 11 ft. 7 in. Entirely new fuselage contours with a dorsal spine from cockpit to fin probably provided the most readily recognisable identification feature.

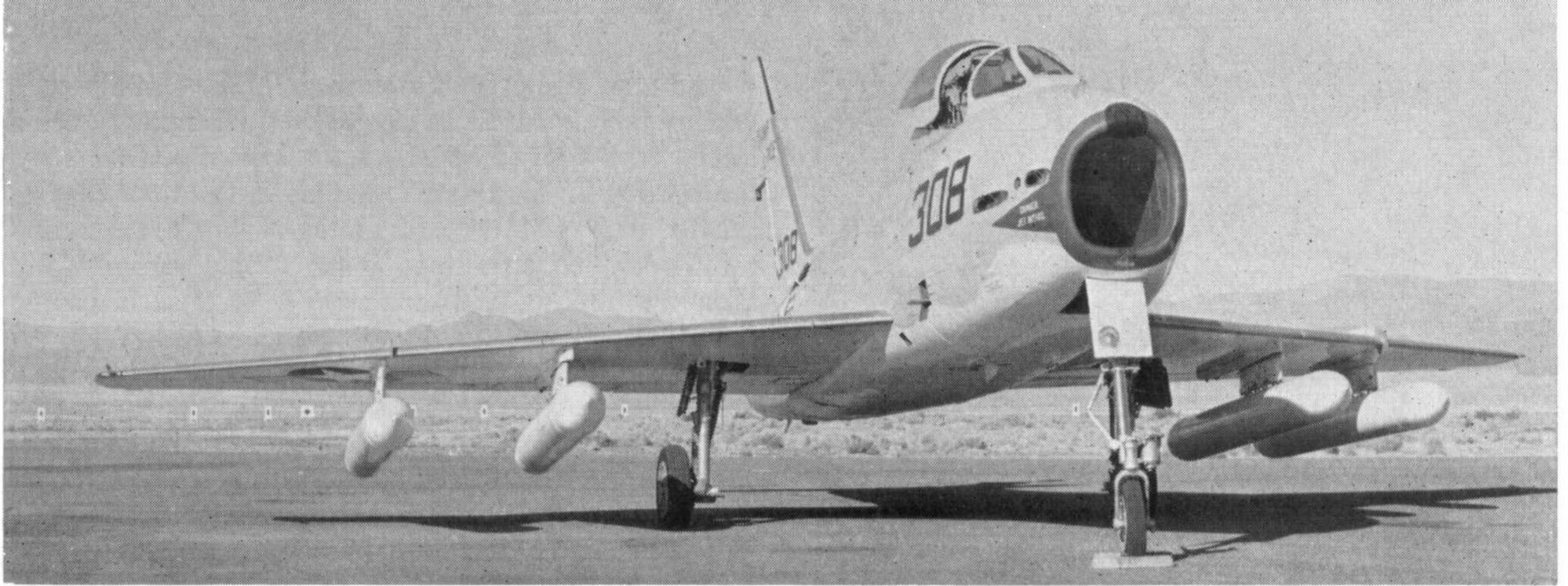
The first FJ-4, 139279, was flown by Richard Wenzell on 28th October 1954, and was powered by the Wright J65-W-4 of the FJ-3; production machines however had the 7,700 pound J65-W-16A. Classified as long-range attack fighters, the FJ-4 carried additional armour in the nose, space being provided by reduction of ammunition for the 20 mm. guns. Four store wings could carry drop tanks, bombs and/or Sidewinders, but the "M" designation was not used. Performance included a top speed of 680 m.p.h. at sea-level and 631 m.p.h. at the tropopause, comparable with that of the Hawker Hunter 6, a British land-based contemporary.

As already mentioned, the first FJ-4s to enter service joined Marine squadron VMF-451 in 1956, and by March 1957 152 aircraft had been accepted by the Military. On 4th December 1956, however, a new variant—the FJ-4B—had flown. This version used a strengthened wing providing six attack-store strong-

Below: Sidewinder-equipped FJ-3M, 141367. Nose boom was for flight trial instrumentation purposes.

(Photo: U.S. Navy)





On flight trial at China Lake, this FJ-4 was equipped with four underwing launchers each with four ZUNI rockets. (Photo: U.S. Navy)

points. Equivalent to the U.S. Air Force's F-86H, the FJ-4B was fully equipped for low-altitude attack and, apart from the additional store capacity, was fitted with a LABS installation for the tactical delivery of a nuclear weapon. Additional speed brakes were fitted under the rear fuselage to allow more precise control of speed at low level.

The Fleet Introduction Programme of the FJ-4B was performed by VA-126 and VMA-223 on the Pacific Coast, particular emphasis being laid upon loft-bombing procedures. When the "Bravo Fury" entered service it introduced a number of new flight techniques with the Navy and Marines. Like some FJ-3s, the FJ-4B carried in-flight refuelling probes under the port wing, and in June 1957 "Buddy" refuelling was introduced with the addition of underwing fuel packs. Thus a Fury fighter could take on an additional 3,163 pounds of fuel from another aircraft of the same type to extend its combat radius by about 50%.

In-flight refuelling was undertaken by Marine squadrons VMA-212 and 214 to enable them to complete the first trans-Pacific crossing by single-seat naval aircraft in October 1958.

Late development of the FJ-4 continued until the end of the nineteen-fifties. Martin Bullpup air-to-ground missiles, of which five (plus an equipment pack) could be carried, were added, and the first

overseas deployment of these weapons came about when VA-212 sailed aboard U.S.S. *Lexington* to join the U.S. Seventh Fleet in the Western Pacific in April 1959.

By the early nineteen-sixties Furies were being phased out of combat units and supplied to Reserve and shore units. All told, North American's Columbus plant delivered 1,112 aircraft to the Military between

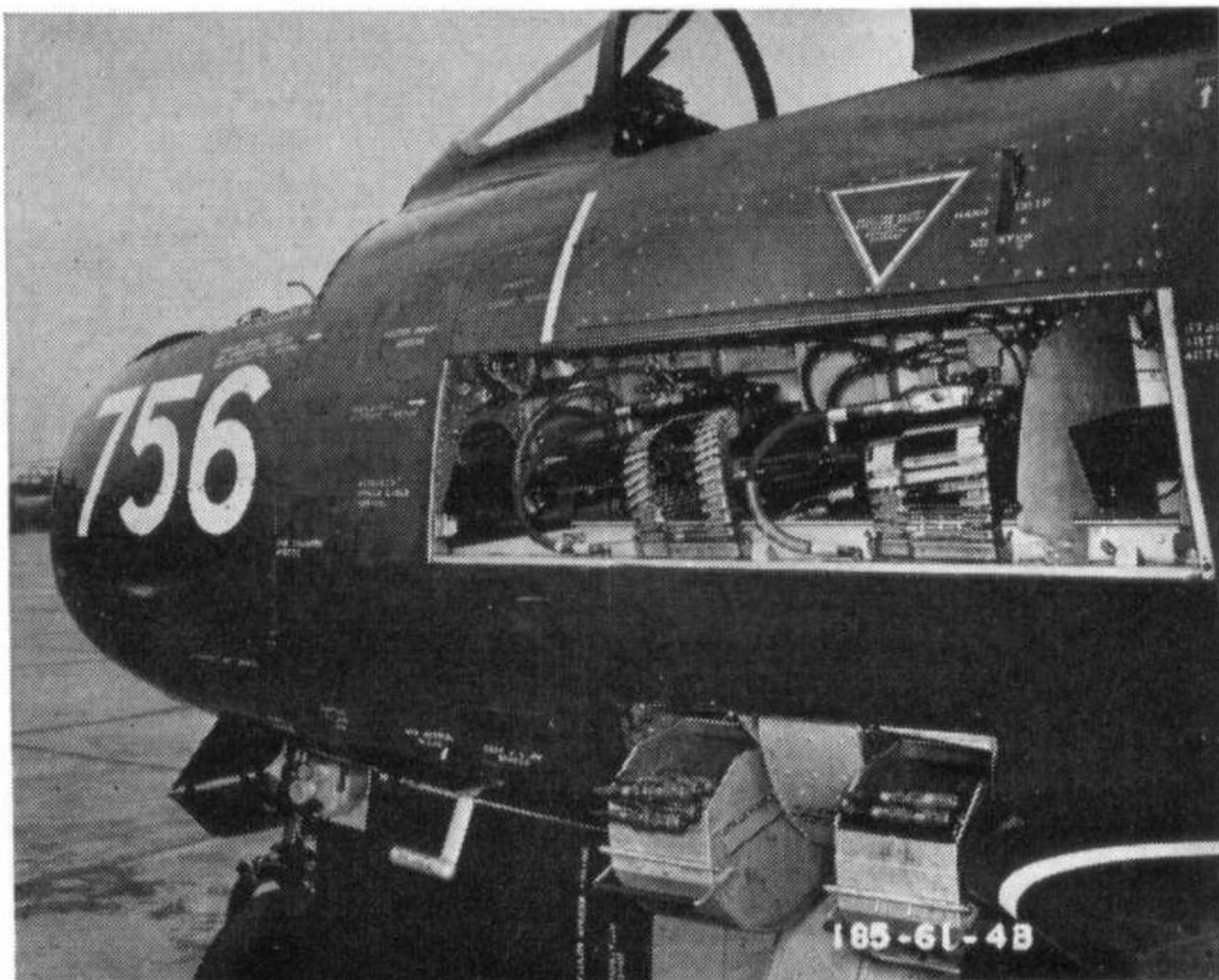
SERVICE DEPLOYMENT OF FJ FURIES

(A) denotes U.S. Atlantic Fleet

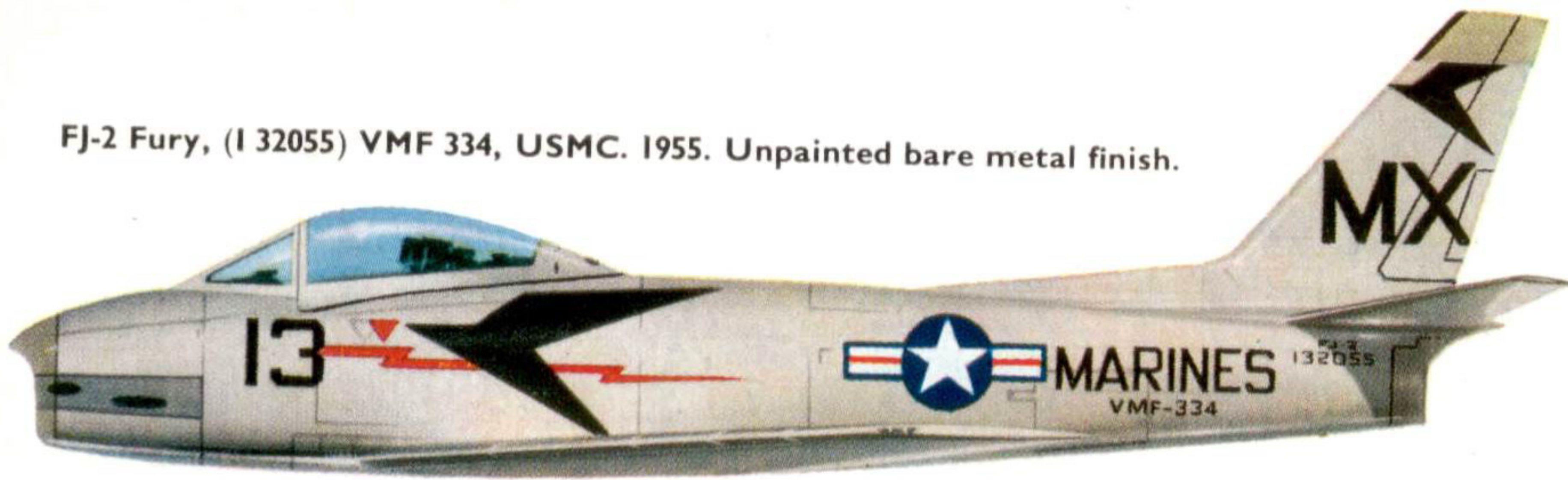
(P) denotes U.S. Pacific Fleet

Aircraft	U.S. Navy	U.S. Marine Corps
FJ-1	VF-5A	
FJ-2		VMF-122 (A) VMF-232 (A) VMF-235 (P) VMF-312 (A) VMF-334 (P) VMF-451 (P)
FJ-3	VC-3 (A) VF-24 (P) VF-33 (A) VF-91 (P) VF-154 (P) VF-191 (P) VF-173 (A) VF-211 (P)	VMF-122 (A) VMF-312 (A) VMF-333 VMF-511
FJ-3M	VA-172 (A) VF-12 (A) VF-21 (P) VF-51 (P) VF-62 (A) VF-73 (A) VF-84 (A) VF-121 (P) VF-142 (P) VF-143 (P) VF-173 (A) VF-211 (P)	VMF-235 (P) VMF-334 (A)
FJ-4		VMF-232 (P) VMF-235 (P) VMF-451 (P)
FJ-4B	VA-55 (P) VA-56 (P) VA-63 (P) VA-116 (P) VA-126 (P) VA-146 (P) VA-151 (P) VA-192 (P) VA-212 (P) VA-216 (P)	VMA-212 (P) VMA-214 (P) VMA-223 (P)

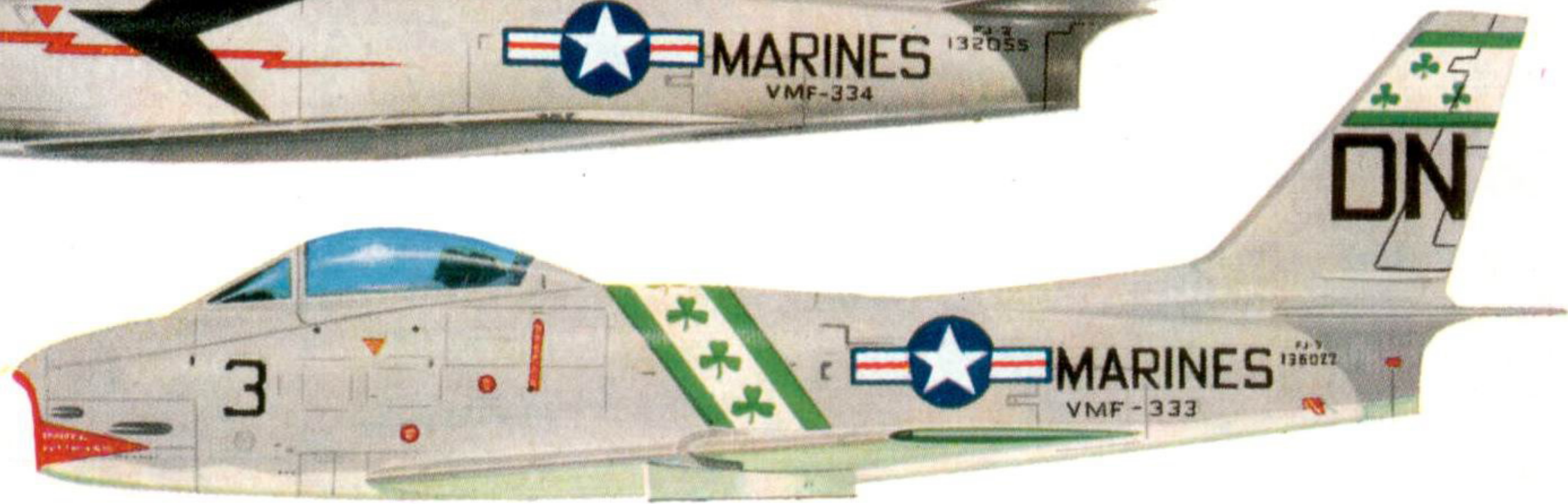
Close-up detail of XFJ-2 20-mm. gun installation.



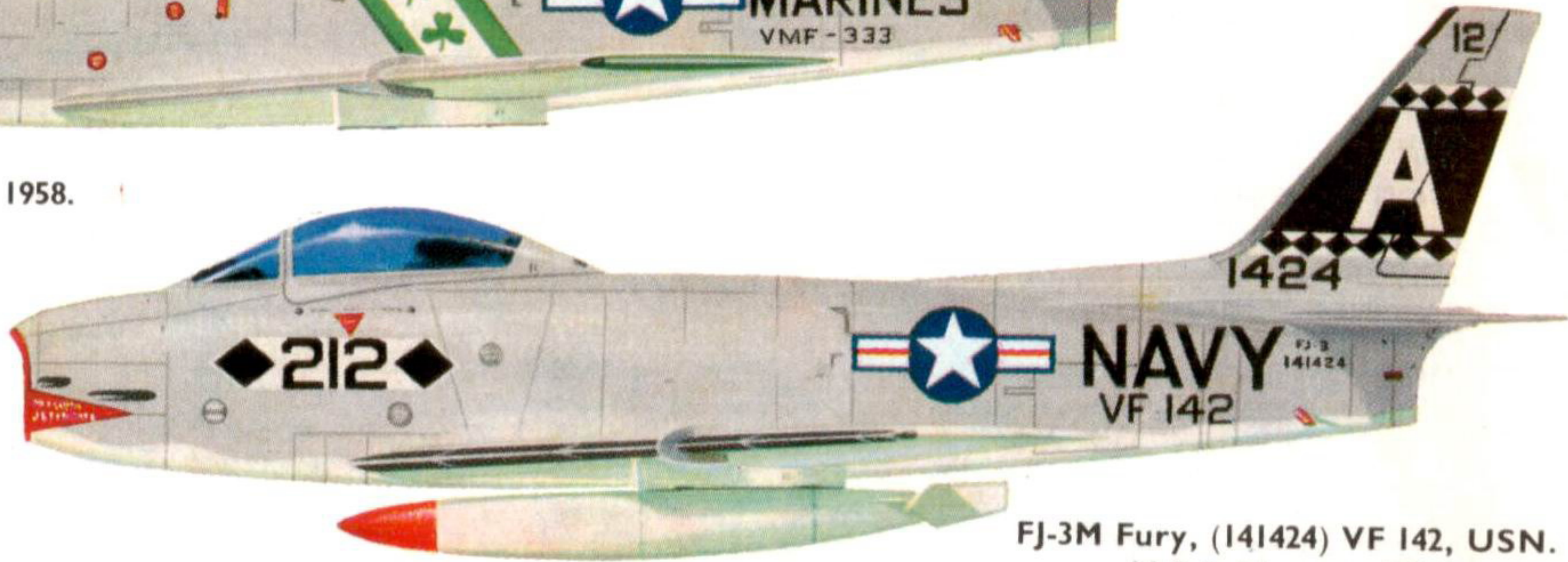
FJ-2 Fury, (132055) VMF 334, USMC. 1955. Unpainted bare metal finish.



Shamrock VMF 333



FJ-3 Fury, (136022) VMF 333, USMC. 1958.

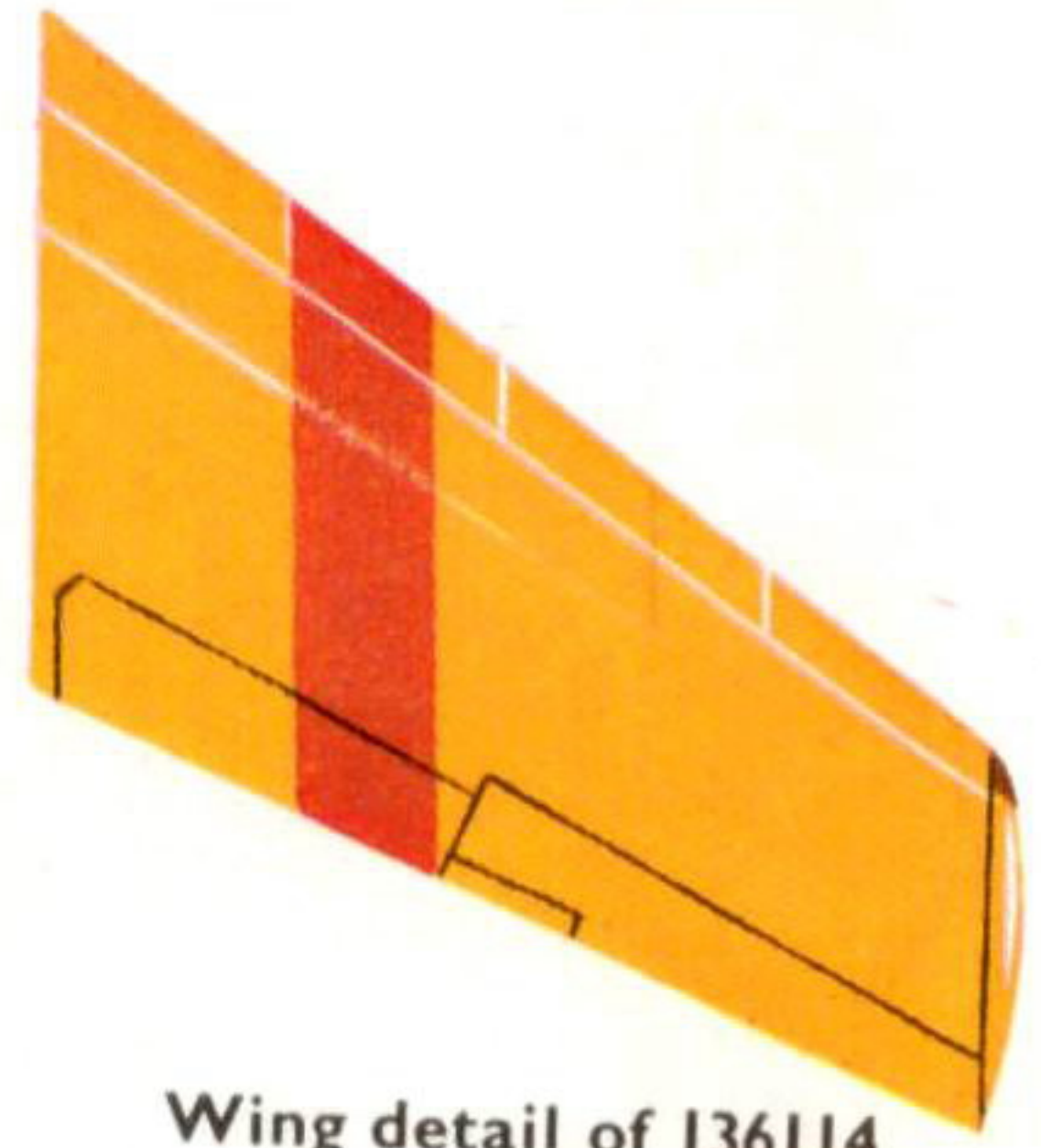
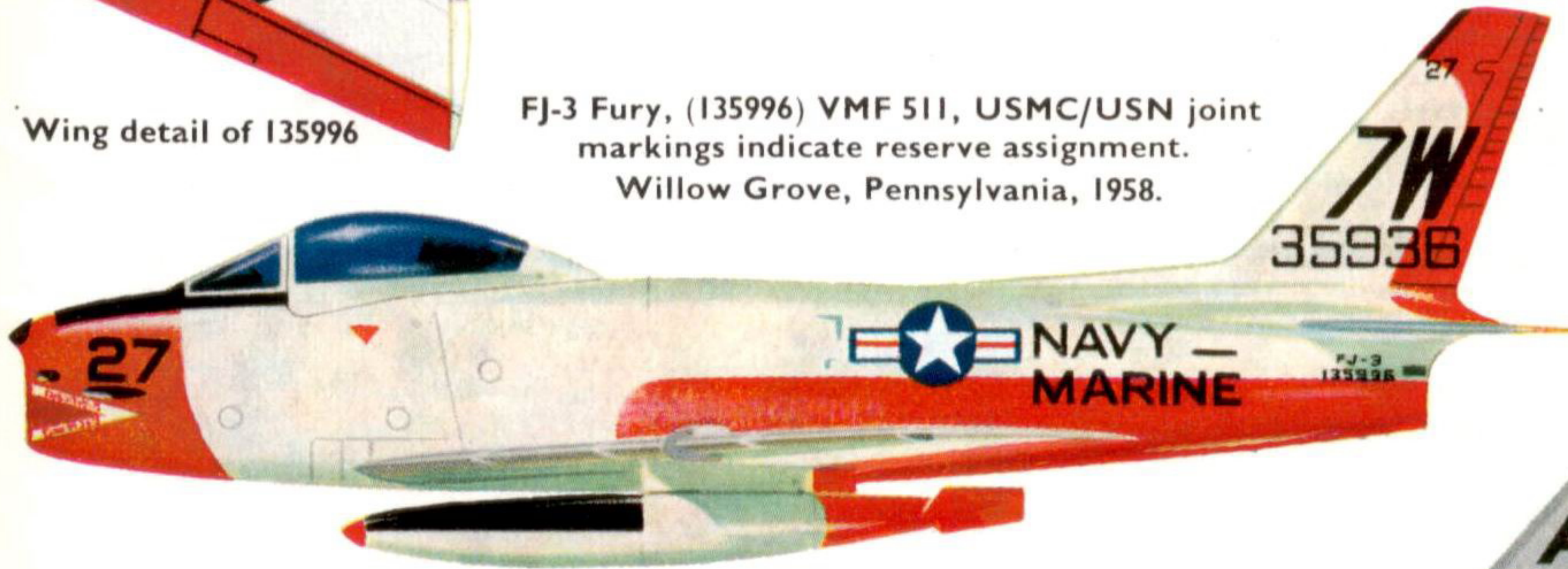


FJ-3M Fury, (141424) VF 142, USN. U.S.S. Hornet, 1957.

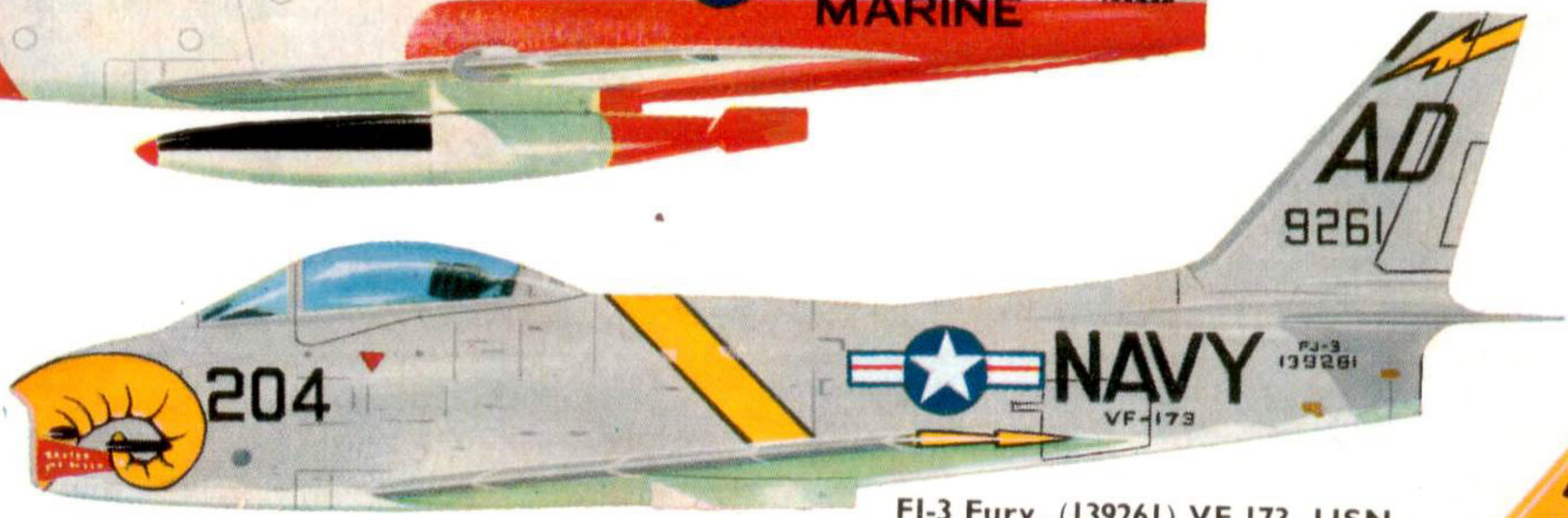


Wing detail of 135996

FJ-3 Fury, (135996) VMF 511, USMC/USN joint markings indicate reserve assignment. Willow Grove, Pennsylvania, 1958.



Wing detail of 136114



FJ-3 Fury, (139261) VF 173, USN.



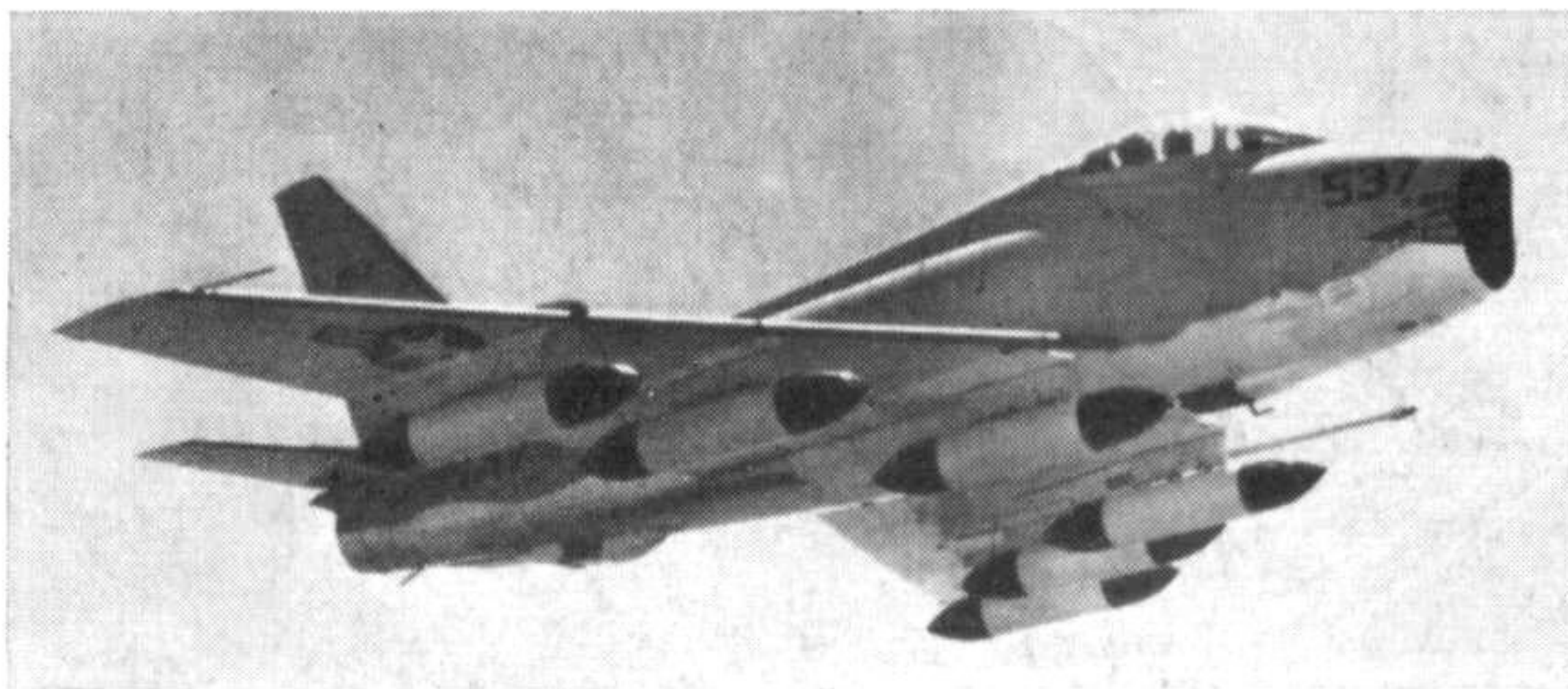
Intake warning panel.



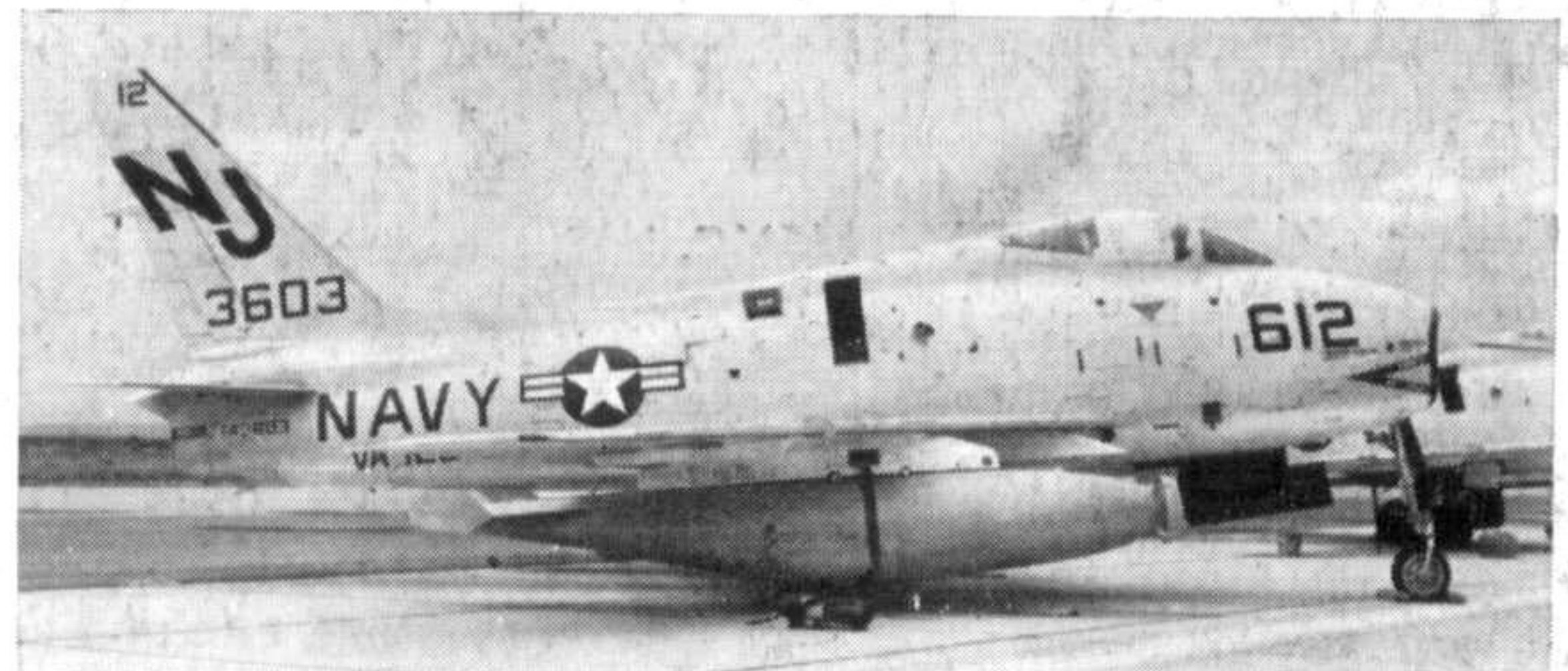
FJ-3 Fury, (136114) Guided Missile Service Squadron 2, NAS Jacksonville, Fla., and NAS Guantanamo, Cuba.



FJ-3M Fury, (141393) VMF 235, USMC.



FJ-4B with six ZUNI rocket launchers.
(Photo: via John W. R. Taylor)



FJ-4B, 143603, of VA-126 with underwing in-flight refuelling pack.
(Photo: Ray Wagner)

November 1952 and May 1958, perhaps a remarkable figure when it is remembered that Navy contracts were seldom regarded by manufacturers as prolific,

and that during the same period Grumman, McDonnell, Chance-Vought (LTV) and Douglas were also building Navy fighters.

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FURY PRODUCTION FJ-1 TO FJ-4B

NORTH AMERICAN XFJ-1. Three NA-134 aircraft, serials 39053 to 39055, ordered under Contract NOa(s) 5311, dated 1st January 1945. First flown on 27th November 1946. All three accepted, September 1947. Powered by a J35-GE-2. Six .50 calibre guns.

NORTH AMERICAN FJ-1 FURY. Thirty production NA-141, serials 120342 to 120371 built at Los Angeles under Contract NOa(s) 6911, 28th May 1945. Accepted with J35-A-4 from October 1947 to April 1948.

NORTH AMERICAN XFJ-2 FURY. Three prototypes, serials 133754 to 133756, Contract NOa(s) 51-756, 8th March 1951. As XFJ-2B (NA-185), 133756 was first flown 27th December 1951, at Los Angeles, while 133754 (NA-179) flew 19th February 1952. Powered by J47-GE-13, and accepted June, July, and November 1952. Last Navy Fury aircraft built at Los Angeles.

NORTH AMERICAN FJ-2 FURY. Production order for 300 NA-181 reduced to 200, serials 131927 to 132126 to Contract NOa(s) 51-642, 10th February 1951. First aircraft accepted at Columbus, October 1952, remainder from January 1953 to September 1954. Had J47-GE-2 and four 20-mm. guns, but 131931 had J65-W-2 as FJ-3 prototype.

NORTH AMERICAN FJ-3/FJ-3M FURY. The first production order was for 389 NA-194, 135774 to 136162, on Contract NOa(s) 52-978, 18th April 1952. First aircraft flown

11th December 1953 at Columbus with Wright J65-W-4 and four 20-mm. guns. Remainder accepted from January 1954 to February 1956. After delivery, many redesignated FJ-3M with GAR-8 provisions.

Second production batch was originally for 214 NA-215, on Contract NOa(s) 54-322, 15th March 1954, but 80 aircraft added by NOa(s) 55-174, and 145 cancelled. Total completed as FJ-3/FJ-3M was 149; 139210 to 139278, and 141364 to 141443. Accepted from December 1955 to August 1956.

NORTH AMERICAN FJ-4 FURY. Two NA-208 prototypes, 139279 and 139280, and 150 NA-209 aircraft, 139281 to 139323, and 139424 to 139530, on Contract NOa(s) 54-323, 16th October 1953. First aircraft flown at Columbus on 28th October 1954 with Wright J65-W-4, accepted same week, and second prototype accepted in December. Remaining aircraft had J65-W-16A and were completed by March 1957. Two aircraft, 139282 and 139284 modified to FJ-4F.

NORTH AMERICAN FJ-4B FURY. First production batch of 25 aircraft, 139531 to 139555 from NA-209s on NOa(s) 54-323, as amended 26th July 1954, plus 46 FJ-4Bs, 141444 to 141489 (formerly NA-229), added 2nd November 1954. First aircraft, 139531, flown 4th December 1956, and Contract completed in August 1957.

Second production order was for 184 NA-244, reduced to 151 FJ-4B, 143493 to 143643, on NOa(s) 56-121, 5th April 1956. Aircraft accepted between July 1957 and May 1958.

The author wishes to acknowledge the considerable assistance given by Jay Frank Dial, William T. Larkins, Charles Thompson and Ray Wagner in the preparation of this Profile.

NORTH AMERICAN FURY SPECIFICATION

	FJ-1	FJ-2	FJ-3	FJ-4
Powerplant	4,000 lb. thrust Allison J35-A-2	6,000 lb. thrust General Electric J47-GE-2	7,650 lb. thrust Wright J65-W-4B	7,700 lb. thrust Wright J65-W-16A
Dimensions:				
Span	38 ft. 2 in.	37 ft. 1 in.	37 ft. 1 in.	39 ft. 1 in.
Length	34 ft. 5 in.	37 ft. 7 in.	37 ft. 7 in.	36 ft. 4 in.
Height	14 ft. 10 in.	13 ft. 7 in.	13 ft. 8 in.	13 ft. 11 in.
Span folded	—	22 ft. 7 in.	22 ft. 6 in.	27 ft. 6 in.
Wing area	221 sq. ft.	287.9 sq. ft.	302.3 sq. ft.	338.66 sq. ft.
Weights:				
Empty	8,843 lb.	11,802 lb.	12,205 lb.	13,210 lb.
Loaded	15,115 lb. (clean)	16,482 lb. (clean)	17,189 lb. (clean)	20,130 lb. (clean)
Landing	—	14,125 lb.	14,165 lb.	15,333 lb.
Wing loading	68.3 lb./sq. ft. (clean)	65.3 lb./sq. ft. (clean)	56.9 lb./sq. ft. (clean)	59.5 lb./sq. ft. (clean)
Performance:				
Max. speeds (clean)	547 m.p.h. at 9,000 ft.	676 m.p.h. at sea-level 602 m.p.h. at 35,000 ft.	681 m.p.h. at sea-level 623 m.p.h. at 35,000 ft.	680 m.p.h. at sea-level 631 m.p.h. at 35,000 ft.
Initial climb rate ...	3,300 ft./min.	7,230 ft./min.	8,450 ft./min.	7,660 ft./min.
Max. range	1,496 miles (ferry)	990 miles (combat)	1,784 miles (ferry)	1,485 miles (combat)
Service ceiling	32,000 ft.	41,700 ft.	49,000 ft.	46,800 ft.
Stalling speed (all down)	121 m.p.h.	132 m.p.h.	133 m.p.h.	—
Source of material ...	U.S. Navy S.A.C. Chart dated 1/5/49	U.S. Navy S.A.C. Chart dated 1/10/55	U.S. Navy S.A.C. Chart dated 30/4/58	U.S. Navy S.A.C. Chart dated 30/8/58