



*The FJ-1 Fury, a milestone in naval air power.
(Photo Harry S. Gann)*

CURING FURIOUS HEADACHES or DOWN TO THE SEA IN JETS

By H.L. ELMAN

Even among aviation enthusiasts, North American's NA-141 is little remembered, and somewhat inaccurately. It was not one of North American's bigger contracts; only three prototypes and a 30-plane production. The only customer was not dissatisfied, but found them obsolescent and passed the planes to second-line use in little over a year, in spite of some record-making flights. Because almost the same military designation was used for another later design, and because of similarities to another North American product, this plane is often the subject of confusion that still rankles those who flew it. None are still flying and only one is in a museum. While some may be in the Arizona desert, or on some scrap pile, the chances of finding one are nil. Yet the *FJ-1 Fury*, even with its headaches, was a milestone in the development of Jet-Age Naval air power.

The XFJ-1 contract for jet fighter development was let near the end of World War II, along with the Army XP-86 contract. These two planes were to be developed together in what the Defense Department would today call a "Commonality Approach," like the TFX or F-111. However, the Army decision to remove the wing dive-brakes and use fuselage types led to numerous changes in the XP-86. First, this left room in the wings for fuel tanks. That, in turn, led to removal of the belly saddle tanks

and fuselage redesign. The delay meant that the plane had not yet flown when translated war-time German wind tunnel reports attracted Air Force attention to swept wings. The XP-86 was chosen as a swept-wing test case, and the result was the F-86 Sabrejet of Korean War fame.

Meanwhile, back at the drawing boards, the Navy was offered the same changes to the XFJ-1 project that had been chosen for the Sabrejet. The Navy was in a quandary. To accept these changes meant delay, for the XFJ-1 had already flown. There was also a serious question as to whether jets would ever be able to operate from carriers. The end of the War had left the Navy with a large number of new carriers that were not likely to be modified for some time, and could not handle the higher take-off and landing speeds a swept-wing design would require. Even straight-wing jets might not be carrier-capable, as they accelerated very slowly in cases of a wave-off and would, also, probably strain the catapult system to its ultimate.

On the other hand, acceptance of straight-wing designs might permanently hobble Naval fighters to lower performance than their land counterparts. Finally, the Navy decided that jet experience--as soon as possible--was most important, and might improve follow-on designs. (The high performance of such present-day carrier jets as the F-4 and the



FJ-1 on USS BOXER, March 1948. All photos by Admiral Aurand, CAHA Reference Numbers FJ-1-048, 036, 038, 065, 040, 055 (left to right, top to bottom).



*FJ-1 of VF-5A flies by the USS BOXER after wave-off.
March, 1948. CAHA REFERENCE FJ-1-057. (Photo - U.S. Navy)*

A-7 vindicate this decision.) However, the effect at the time was to leave the FJ-1 a fat, straight-winged caricature of the Sabre, with enough similarity of design philosophy and internal systems that the Air Force sent its initial F-86 ground and air crews to the Navy Fury squadron for training. Many changes in the design of early jets (and *not* just in the case of the F-86) resulted from the Navy decision to risk so much on early development of the FJ-1.

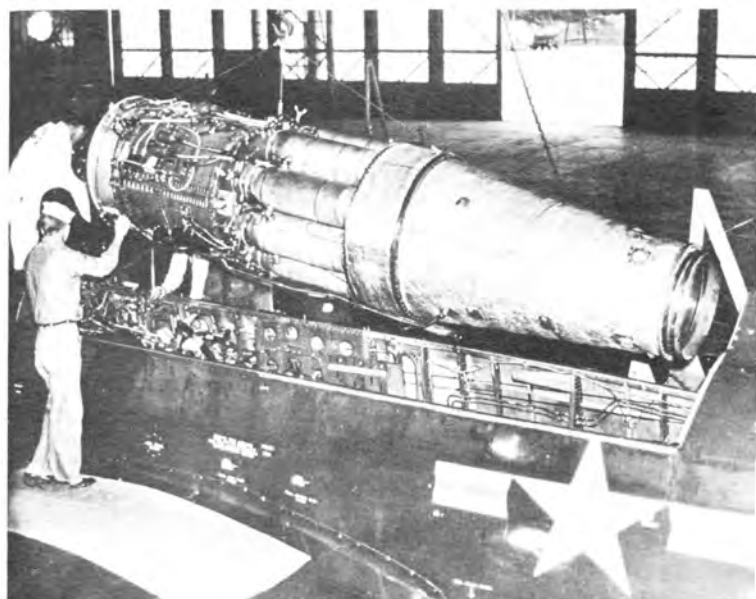
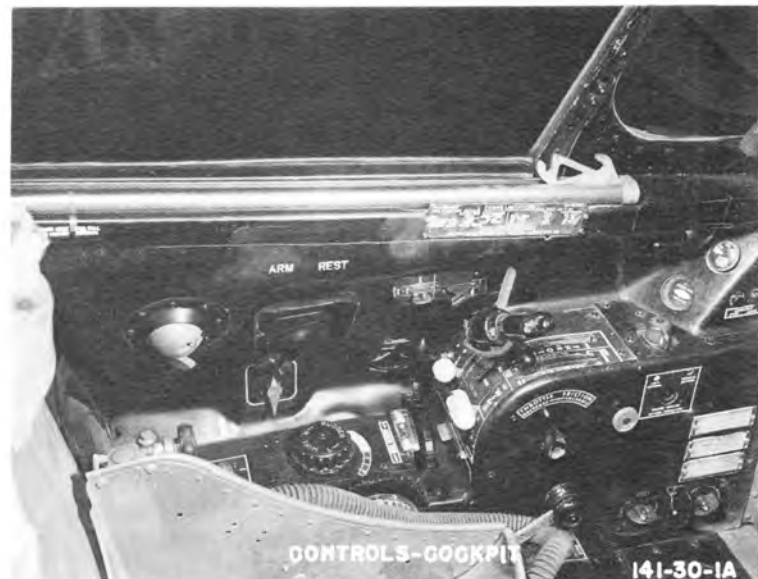
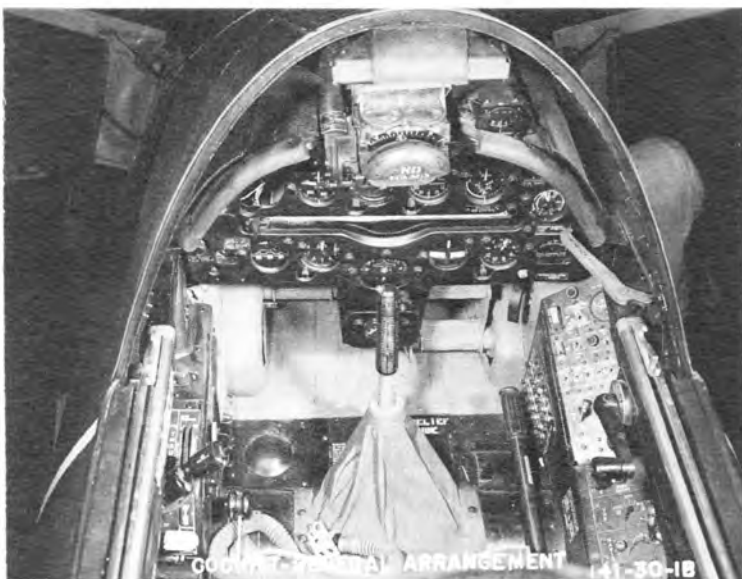
The wing dive-brake system, which had originally caused separation of the Sabre and Fury designs, provided the first major incident in the plane's service career. During prototype testing, the pantograph linkage, which assured symmetric operation of the dive-brakes, failed. One set of brakes popped open at once. Since only one wing was affected, the plane began an uncontrollable snap roll. The pilot could try to retract the extended ones, or extend the others. There was no ejection seat, and the rolls were so violent that there would be no chance to try both alternatives. Luckily, the pilot remembered enough of the dive-brake system to know that retraction would never work in this type of malfunction. He extended the other dive-brakes. A witness later said the XFJ-1 then flew like a "marriage between a barn-door and a rock," but it landed safely. Operational FJ-1s went to conventional fuselage-mounted dive-brakes.

By the time the test program was completed and production FJ-1's were being delivered, the basic design was quite good. The problems the aircraft was to encounter were more typical of the transition from prop to jet than of the sort one would find in a poor aircraft. Those who flew the FJ-1 loved the ship, but there were few such pilots. The decision to deploy these planes as soon as possible meant that the first squadron would have the mission of proving whether jets could be carrier-operated. There seemed little sense in risking too many planes, pilots, and carriers in the experiment, so only one FJ-1 squadron was formed. VF-5A, later renamed VF-51, was a West Coast-based unit of *Shangri-La's* Carrier Air Group, but had operated from many carriers. It was chosen. Its Commanding Officer, Commander (now Rear Admiral) E. P. Aurand, has described the official attitude toward jets at sea as a series of contradictions. On the one hand, he was given much backing and his men were hand-picked--the best of the Navy. On the other hand, only thirty planes were bought, so his spares and attrition problems were somewhat tougher than most new programs. The admirals were skeptical--but very, very interested.

The engines were initially rated at ten hours between overhauls, which meant an engine change every half-dozen flights or less. For comparison, today jet engines are rated in the thousands of



*First FJ-1 carrier landing, USS BOXER, 10 March 1948.
CAHA REFERENCE FJ-1-025. (Photo - U.S. Navy)*



(Cockpit photos courtesy of
North American Rockwell Corp.)

Changing an engine in an FJ-1
was quite unsatisfactory since
it had to be done frequently
(six hours' flying time inter-
vals), and support equipment
wasn't suited for hangar deck
replacement. This was FJ-1 of
VF-5A (later VF-51) in 1948.
CAHA REFERENCE FJ-1-109.
(Photo - Fighting Squadron 51)



FJ-1 BuNo 120349, S-102, at NAS
Sand Point prior to Seattle-Los
Angeles speed record flight of
4 March 1948. This FJ-1 is now
in the CAHA Museum. CAHA REFER-
ENCE FJ-1-075. (Photo - U.S.N.)

hours. While the time was later extended to twenty hours, the "Screaming Eagles" of VF-5A found that this meant their engines had better not scream except in flight. A pilot who taxied his aircraft unnecessarily was in serious trouble with the squadron maintenance personnel. On the other hand, it took much self-control for the new "jet jockey" to listen to the description of his ignominious tow from hangar to runway (and back after landing) as witnessed by a fellow Naval aviator assigned to F8F Bearcats. Such descriptions at the Officers' Club bar later extended to numerous other facets of early jet operations.

The maintenance people certainly had good cause to gripe about useless taxiing--the concept of a buried engine was comparatively new to the designers. How do you build a fuselage from which a jet engine must be removed every half-dozen flights or so? Do you pull the engine out the side? Or drop it out the bottom where there is little maneuvering room? What effect has this on structural integrity? How should wiring and control cables be routed? What components must be easily reached? North American decided to make the entire upper fuselage, from the cockpit aft to the fin, removable for engine changes. Since the components were not all located with this in mind, most engine work meant removals, in addition to the ten hour overhaul rule. This meant removing the entire upper fuselage, procuring a crane, and then upwards engine extraction. It was even rougher than it sounds; well nigh impossible, aboard a carrier at sea. VF-5A began sending protests and suggestions for a better engine extraction method. Whether the ideas all originated in the Squadron or not is unclear, as they at that time shared a hangar with VF-52, which was equipped with Lockheed Shooting Stars (P-80). However, pressure from VF-5A was instrumental in making the Services realize the need for a standard engine change method for single engine jets. The method adopted then, and still in use, involved "breaking" the fuselage aft of the wing, rolling the tail section out of the way, and extracting the engine to the rear (e.g., F-86, F-84, T-33, etc.).

Maintenance problems did not end with the engine access question. Before the wing dive-brakes were abandoned, their design had prevented inclusion of folding wings. Carrier space being (as always) at a premium, a new storage method was tried--the kneeling system. If the nose-gear were almost retracted while the main gear remained extended, the plane could be "stood on its nose" for closer packing on the hangar deck. The idea was a total failure. It did not make for as efficient use of deck space as predicted, primarily because few aircraft systems could be worked on while the plane was kneeled. Even a midget could now reload the guns; and the cockpit was almost at a convenient height, but all else was out of reach. To add insult to injury, the extra hydraulic connections for the kneeling system led to troubles. More than one aircraft landed with its supposedly-extended nose-gear at least partially kneeled. The minimum result was a damaged nose, but some pilots sustained injuries, such as a broken back.

The kneeling system was not the only source of hydraulic problems. The hydraulic system was the "open center" type, in which the components are in series and the fluid cycles past all of them, while their valves are in the neutral or center ("open") position. To operate an item, its valve

would move off-center and dam the flow. This would preclude operation of items down-stream of there. To top it off, the FJ-1 had hydraulic gun chargers, located first in the hydraulic system priority arrangements for combat reasons.

Between the kneeling system, the "open-center" hydraulics, and the gun chargers, landing gear extension problems were common in the FJ-1; and an FJ-1 log book with no down-time for a wheels-up landing was unusual. When the pilot suspected such problems, he would radio the Squadron for advice while orbiting the field. The check-list for such cases began, "Be sure gun-charger circuit breaker is OFF." And back at the Officers' Club Bar, the FJ-1 became known as the only plane in the Navy in which you turned off your guns to lower your gear.

If the pilots were miserable in the Club, they were far from comfortable in the air. The FJ-1 had no ejection seat, which left the pilots a bit concerned. However, the high state of training in VF-51 paid dividends. Only one man was lost in an FJ-1, although numerous dead-stick landings were made (the lack of reliability in early jets showed in more than just ten hour limits). One man did succeed in leaving the plane in flight, by brute force, but dead-stick or belly landings were more the rule in cases of trouble.

Not only were the bail-out procedures primitive for a jet, but the FJ-1 was unpressurized. For long altitude flights, pilots were on 100% oxygen throughout the flight. This meant a danger of the "bends," so the flight surgeon ordered all pilots to breathe pure oxygen on the ground for 30 minutes before departure. The Ready Room looked rather grotesque, with the entire squadron in oxygen masks and bail-out bottles. The Skipper used to keep a waste-basket near his desk, in a position so that his bottle rested there while he caught up on last-minute paperwork before takeoff.



Rear Admiral E. P. Aurand visits his old ship on June 18, 1987, at CAAH Air History Exhibit at Bradley International Airport, Windsor Locks, Connecticut. In this aircraft, BuNo. 120349, he set a speed record between Seattle and Los Angeles. (Author photo)

But if the oxygen requirements were inconvenient, the lack of heat in the cockpit was a real problem. At altitude, the cabin was "like a Minnesota privvy in the winter-time." The theory was that electrical flying suits would be sufficient. They were not. All of these short-comings were rectified by the Navy in later jets. It must be remembered that all prior experience in Naval fighters had been at lower altitudes, or for shorter times at high altitude.

After all these problems, it is only fair to see what the FJ-1 and VF-51 actually accomplished in the Navy. The FJ-1 is well remembered as the first jet to operate from carriers in squadron strength, since VF-51 spent much time at sea following their initial carrier qualifications in March 1948. What is little realized is that this included the first--and probably the only--non-catalyzed jet carrier takeoff. All piston fighters were then qualified for running take-offs! Jets, because of their slower accelerations, had never tried this. VF-51 decided to try it. Commander Aurand made the attempt. The FJ-1 was rolled to the aft end of the flight deck, its wheels just barely on the deck, its tail over the water. The carrier, CV-21, *USS Boxer*, was brought to full speed into the wind and a maximum effort takeoff began. Remember that acceleration for early jets (no afterburner) was quite marginal at low speeds. Pictures of the takeoff make one think the plane is only taxiing for almost half the length of the flight deck; "stills" show no motion "streaking" until the plane is about at the island. Wheels broke from the deck about thirty feet short of the bow, near the end of the large "21" painted on the forward end of the flight deck. Loss of ground effect even resulted in a lurch after the plane went over the bow, and Aurand was quite concerned over whether the ship would run him down. After that, no one in the Navy *wanted* to try another jet running takeoff.

After qualifying on the *Boxer*, VF-51 was used to familiarize five Pacific Fleet carriers with jet operations. These included *Tarawa*, *Valley Forge*, and *Princeton*. As VF-51 was supposedly assigned to the *Shangri-La's* Carrier Air Group, operations from that carrier also seem probable.

Ashore, VF-51 set the majority of its achievements. One of these was the attempted triple-speed record of March 1948. Three FJ-1's were to takeoff from Seattle and head south. One would peel off at San Francisco, one at Los Angeles, and the last would go to San Diego. Aurand's personal FJ-1, Bu.No. 120350, squadron marking S-101, was grounded. He borrowed his wing-man's S-102, Bu.No. 120349, and set the Seattle-Los Angeles speed record in 1 hour, 58 minutes, 7 seconds. Today, that is near the scheduled block speed of airliners on the route.

Another item ashore was the demonstration that the Navy need not use a "stripped" plane in speed demonstrations. For years, all Service participation in the Bendix Trophy Race was by non-stock aircraft, or aircraft stripped of some combat gear. In September 1948, three VF-51 FJ-1's won the top three spots in the jet division of the Bendix Race carrying full ammunition. These cartridges were later emptied of powder, chrome-plated, and appropriately lettered. These machine-gun shells are now museum pieces.

By late 1948, it was obvious that the FJ-1 would give way to later generation jets such as the F9F, with which VF-51 re-equipped in May 1949. Since jets were scarce and the planes were still quite new, it seemed best to use them as jet familiarization trainers for the Naval Reserve. In this guise, they did an admirable job of converting "Weekend Warriors" later recalled for Korea, but their small number and unusual features made them difficult to maintain. They phased out in a few years.

Only one, as far as is known, was submitted for civilian registration. The sportsman-pilot who wanted to register this one must have been rich; fuel consumption on this ship was a bit more than on a Piper Cub, to say the least. The FAA did not issue a license, and the plane sat on the edge of a Long Island airport collecting birds' nests. Then an agent for another country offered cash. "Sure, be glad to sell, if you can get an export license." The deal fell through when the State Department decided that Fidel Castro was not an appropriate customer. More nests followed.

The Spring 1962 A.A.H.S. JOURNAL has a picture of the FJ-1 at that time. The Bu.No. given there (Vol. VII, #1, pp. 60-61) is obviously incorrect, not being in either the FJ-1 or XJF-1 range, and not agreeing with the Constructor's Number either. The plane was, in fact, Bu.No. 120349 of the Seattle-Los Angeles speed record. Amusingly, engine changes had left it with the engine from the second place FJ-1 of the 1948 Bendix Race. This plane is now in the possession of the Connecticut Aeronautical Historical Association and is on display at the CAHA Museum, Bradley Field, Connecticut. It has been restored in the markings it wore for the Seattle-Los Angeles run, through the kind assistance of Admiral Aurand, Captain Elder (his Executive Officer, now with Northrop), Captain Davis (Aurand's wing-man and assigned pilot of the ship, now commanding *USS Kittyhawk*, CVA-63), Commander Ferguson (present VF-51 CO), and others. It is an excellent reminder of the early days of jet operations.



FJ-1 & B-47E, as currently displayed at CAHA Air History Exhibit, Windsor Locks, Connecticut. (Hamilton Standard Photo)

