1040

P-80 Shooting Star

T-33/F-94 in action

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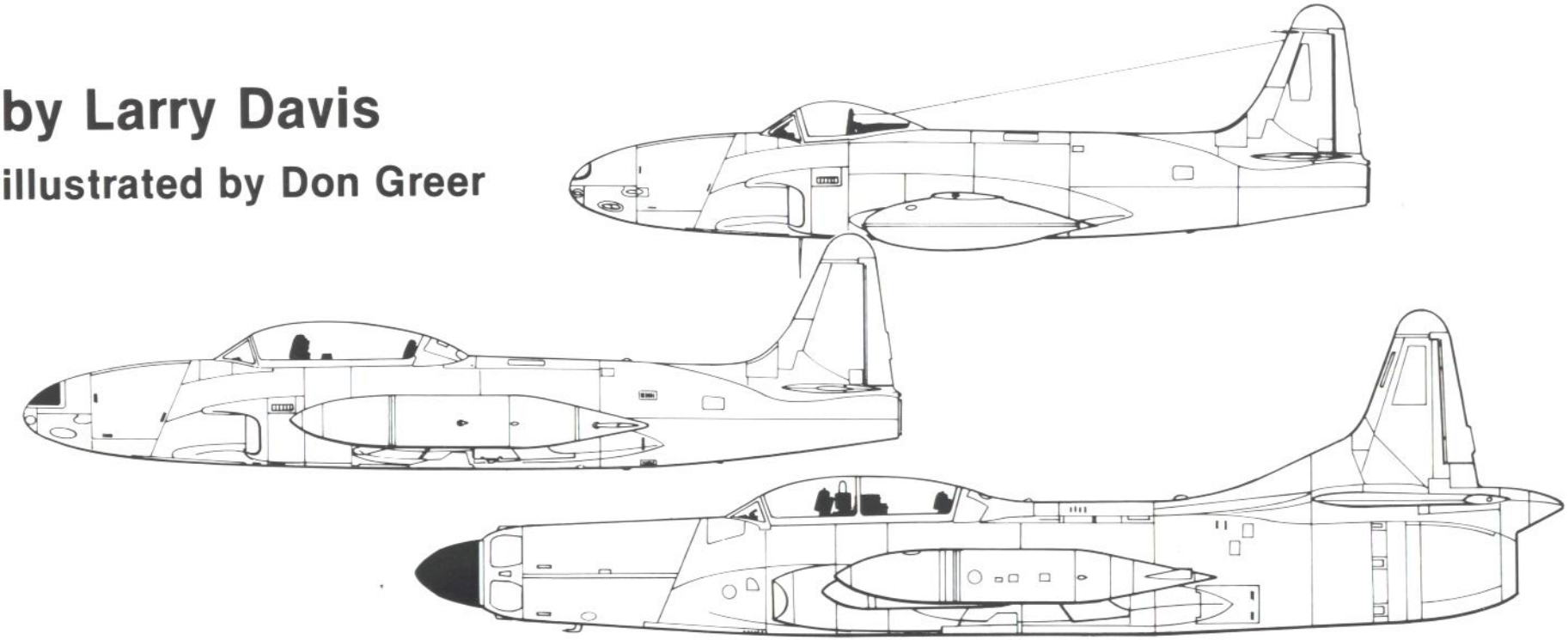
AIRCRAFT NO. 40

P-80 Shooting Star

T-33/F-94 in action

by Larry Davis

illustrated by Don Greer



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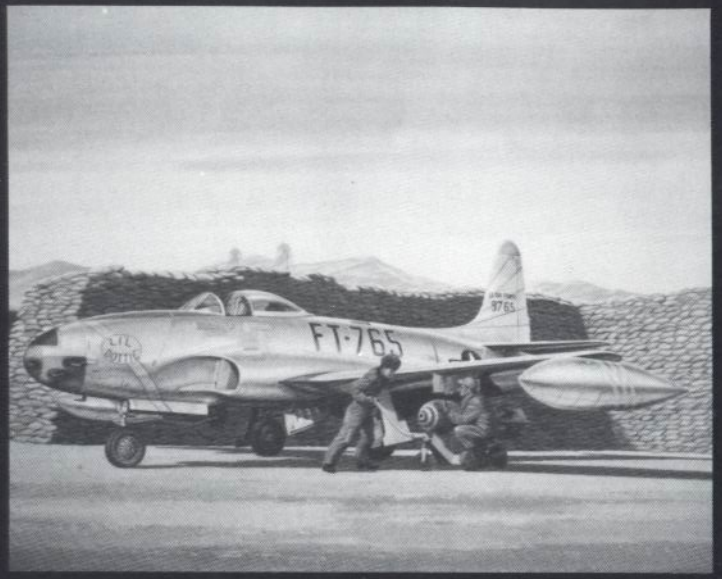

(Cover) "Li'l Dottie", an F-80C of the 80th FBS, 8th FBW, the personal mount of Capt. Roy W. Marsh, who eventually achieved three victories in this aircraft, is being re-armed by ground-crew at a forward air strip in Korea.

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DEDICATION

To all the men and women everywhere who carried the jet engine concept through.

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Four 8th FBW F-80Cs climb to cruising altitude, on the way to targets over North Korea, August 1952. The lead and far aircraft carry a 500 lb. bomb under each wing, the other two carry napalm. Such mixed loads in a four-plane element were unusual. (USAF)

Introduction

"Jet Propulsion: propulsion of a body produced by the forwardly directed forces of the reaction resulting from the rearward discharge from the body of a jet (a high speed stream of fluid) through a nozzle or orifice."

The theory of jet propulsion has been with us a very long time, since the second century when Hero of Alexandria created motion by rotating a metal ball on its supports by means of jets. But it wasn't until the late 1920s that the principle was applied to aircraft. In 1928 RAF Flight Cadet Frank Whittle put forth a thesis on the theory of reaction-thrust as applied to aircraft gas turbines. This led to the design, development and bench testing of the Whittle jet engine in 1937. But the British government had no interest in the jet engine at that time.

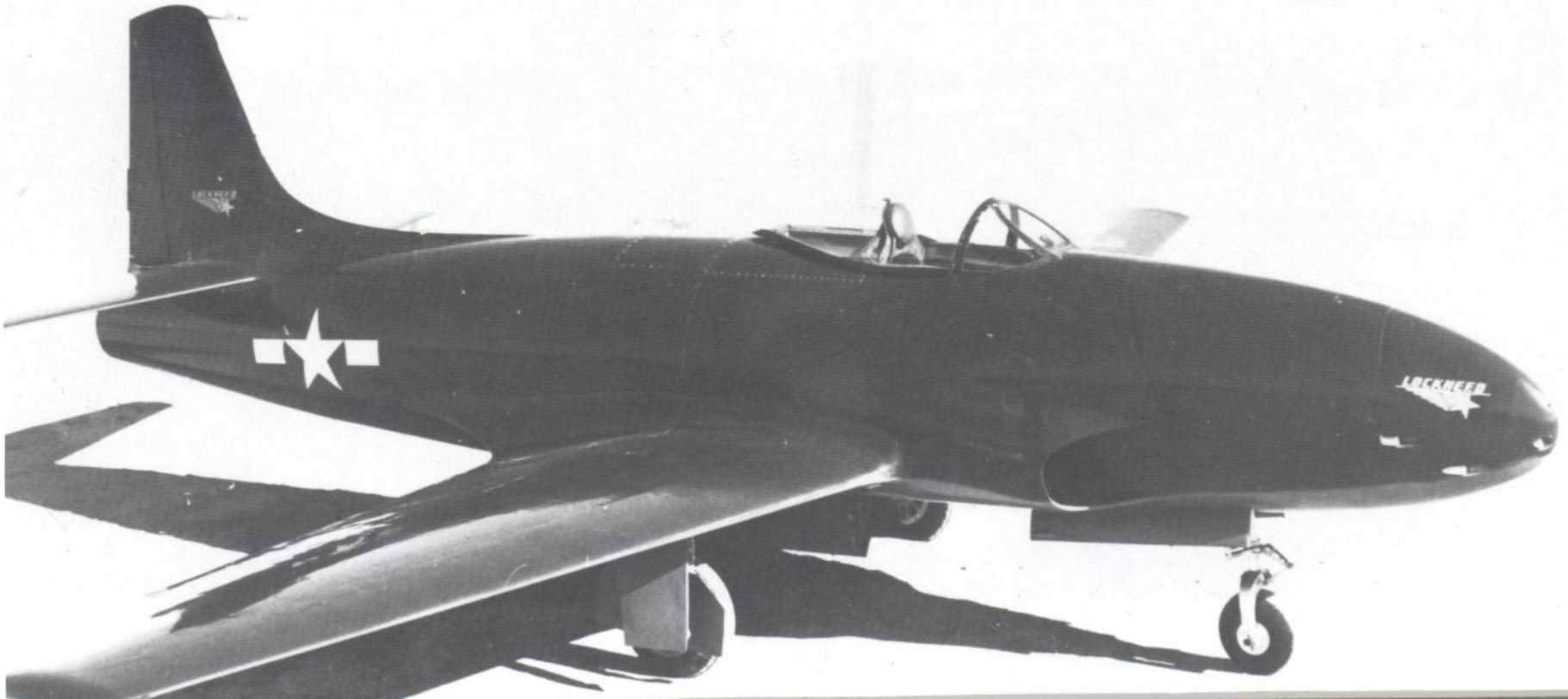
In Germany, Hitler had revived the air arm and developed it to a keen edge. But the German Air Ministry also turned deaf ears on the jet engine. A civilian, Ernst Heinkel, saw something valuable in the jet engine concept. With his own money, and using an engine designed and developed by a German student named von Ohain, Heinkel instituted an airframe and engine program that culminated in the flight of the world's first pure jet-propelled aircraft - the He178, which flew in 1939, powered by the HeS3A engine. Between the Heinkel developments and the infusion of younger, forward thinking officers in the Luftwaffe, the attitude of the Air Ministry changed. In 1938 an order was placed to develop the first jet propelled fighter aircraft - the Messerschmitt Me262.

In the United States, two companies had enough foresight to gamble on jet engine development - Lockheed and Northrop. Northrop was more interested in the turboprop idea. Lockheed, also without government support, not only designed an engine of their own - the L-1000 - but also an airframe to house it - the L-133. The complete L-133/L-1000 package was proposed to the Army Air Corps in the Spring of 1941. The L-1000 engine was to have twice the thrust of any jet engine in the world. When installed in the L-133 airframe, it promised a speed of 625 mph at 50,000 ft. The Army Air Corps turned down the proposal because U.S. policy dictated that engines and airframes have separate manufacturers, and because the L-133, a stainless steel canard design, was "too radical"!

At about this same time, an amazed Chief of the Army Air Corps, General Hap Arnold, found that in England, gas turbines had already been built and were almost ready to fly. With his insistance, the Army Air Corps decided to go ahead with development of an American jet aircraft. Due to the needed development time of the Lockheed L-1000 engine, first flight would take place no earlier than Spring 1945, it was decided to use the already developed British engine in a U.S. airframe. General Electric would further develop the engine and Bell Aircraft Co. would build the airframe. The result was the twin-engine Bell P-59 Airacomet.

Two things came to pass which killed the P-59A as a jet fighter design. In the Fall of 1942 the P-59 had its first flight and attained a speed of only 404 mph, less than the speed of a P-38J Lightning. The second, and far more ominous, was the flight of the Me262 in July 1942. With improved Jumo 004D and 004H engines of 3960 lbs. thrust each, the Me 262 was expected to top 600 mph. The Me262 was ordered into production in June 1943. Coincidentally, it was in June 1943 that the Army Air Corps gave the go-ahead to Lockheed to build the XP-80.

(Below) LuluBelle**, the original XP-80. Note the square fintip and glossy olive drab and gray paint. (USAF)**



XP-80/YP-80/P-80A

On June 23, 1943, General Hap Arnold approved a letter contract for Lockheed to build the XP-80. They had 180 days in which to do it. The XP-80, nicknamed **Lulubelle**, was built in the 'security' of a temporary structure thrown together in 10 days from old engine packing crates. An entire machine shop was purchased so that the tools needed to build **Lulubelle** would not be taken away from the Lockheed assembly line, then engaged in wartime production of the P-38. 128 men-23 engineers and 105 shopmen worked 10 hours a day, 6 days a week to build the first XP-80. One of those engineers was a man named Clarence L. "Kelly" Johnson.

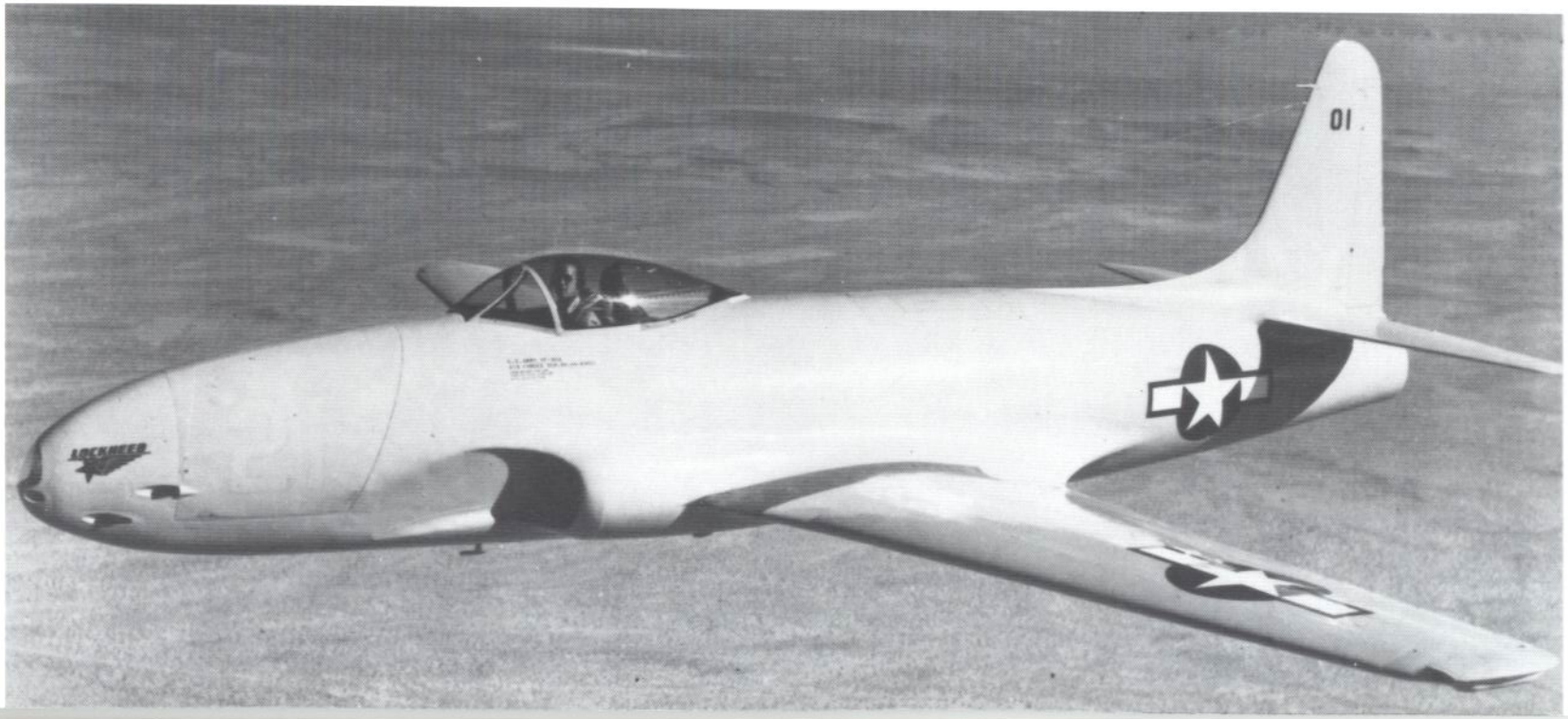
The XP-80 was a completely new aircraft from its experimental de Havilland H-1 Goblin engine to the never-before-flown laminar flow wing. The airframe was constructed without the engine and had to be altered after it arrived when it was discovered that the engine had 'grown' from its blueprint size. On Nov. 8, 1943, **Lulubelle** was pulled out of the hanger and trucked to Muroc Dry Lake Army Air Base. On Nov. 9 the Goblin roared to life for the first time. On Nov. 15, she was accepted as 'ready for flight'. It was the 143rd day of the contract.

But during the night prior to her first flight, Guy Bristow from de Havilland, ran up the engine one final time. At full throttle, both air intake ducts collapsed sending bolts, rivets and pieces of metal into the engine. Hoping that the engine was not seriously damaged, the Lockheed crew disassembled it. It looked good until the very end when Bristow discovered a crack in the compressor housing. **Lulubelle** would have to wait until another Goblin was shipped from England. On Jan. 8, 1944, 203 days after the contract was let, the XP-80, with a new engine and strengthened intake ducts, lifted off the dry lake bed with Milo Burcham at the controls. **Lulubelle** flew! Top speed was 502 mph.

Air Corps officers watched with delight and immediately wanted more, many more, jets. But de Havilland could not deliver the engines. General Electric proposed that Lockheed use their refined 'Whittle' engine called the I-40. But due to its much larger size, Lockheed would have to build an almost entirely new airframe. Lockheed built the new airframe as the XP-80A, and Tony LeVier test flew it on June 10, 1944. With 1600 lbs. more thrust and a slick new gray lacquer paint job, the XP-80A flew at 561 mph. Army Air Corps immediately ordered 13 YP-80As into production. But the airwar in Europe took a sudden, very ominous turn. The Me262s, with their four 30mm cannon and 540 mph speed, were bringing heavier losses to the Allied bomber offensive, and the Me163 Komets were also causing great concern. Even the anticipated He162 light fighter was expected to bring problems.

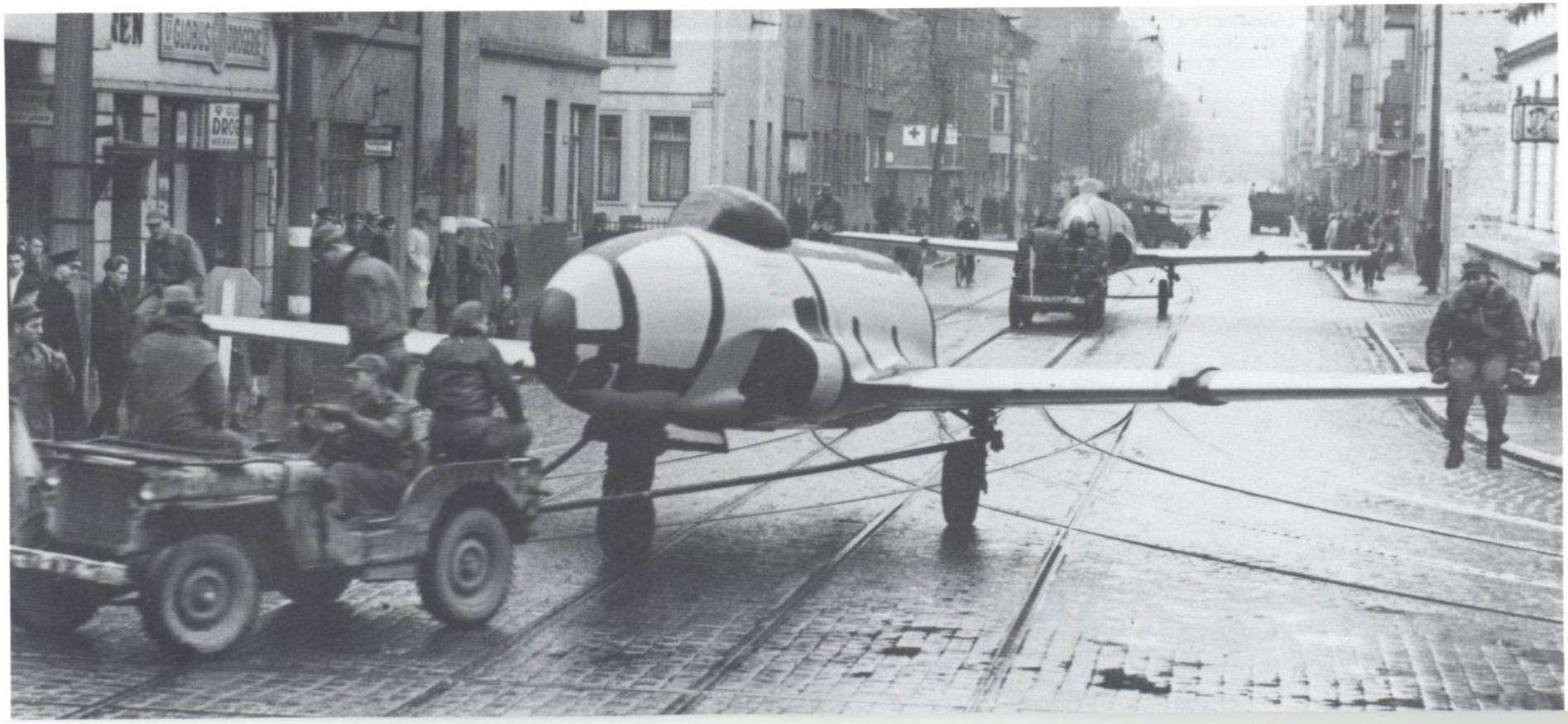
Army Air Corps did two things - put the P-80A into full production, and sent four YP-80As to Europe. In April 1945, Project Extraversion sent two YP-80As to Great Britain and two more to Italy. The purpose was combat testing and to build the sagging morale of bomber crews that faced the German jet threat every day. Both aircraft sent to England suffered from problems - one being totally destroyed and the other finally being refitted with a Rolls-Royce jet engine. The two sent to Italy performed well. They did get in a few combat missions, but VE Day closed out any chance of their meeting the vaunted German jets. Army Air Corps ordered 4390 F-80As. No YP-80As were sent to the Pacific, as Japan had no jet aircraft for them to fight.

The P-80A was essentially the same aircraft as the YP-80A. Dive brakes and boundary layer bleed ducts had now been installed, and the armament bay redesigned. The GE I-40, now designated J-33, was replaced by the Allison-built J-33-9/11, and in later F-80A-5s by the J-33-17. The 'Pearl Gray' paint originally applied in the hopes of adding some top speed had not worked out well. When the rain and sandstorms, high speeds, and booted mechanics had extracted their toll from the paint finish it was decided to go back to natural metal. The unique wingtip drop tanks were adopted after considerable testing. They improved the aerodynamic characteristics of the P-80, and actually reduced drag! In addition, the tanks improved aileron effectiveness and wing loading. For this reason, empty tanks were often retained instead of jettisoned. Several P-80As were modified for various special jobs, including one loaned to the Navy for carrier trials, one equipped with ramjets on the wingtips and one specially modified for racing. Shortly after VJ Day production orders for the P-80A were cut from 4390 to 525 aircraft.



The XP-80A with revised fintip, fuselage lengthened to accomodate the larger GE I-40 engine and new pearl gray paint. Note the traces of the numerals "21" on the painted-over gun bay door. (USAF)

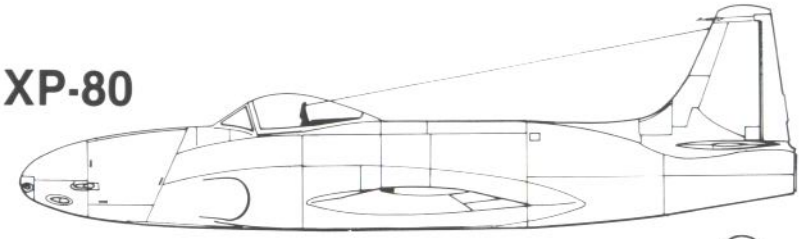
The two YP-80As that went to Italy under Project Extraversion pass over Mt. Vesuvius. The date is May 1945. (USAF/ Menard)



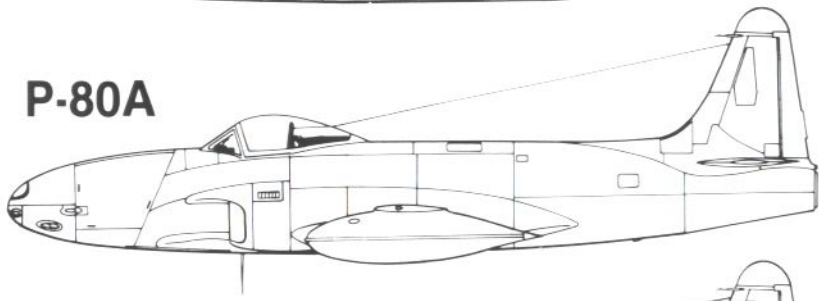
P-80As are towed through the streets of Bremen, Germany, on their way to the 55th Fighter Group based in West Germany. Black strips are anti-corrosion tape and sealant compound. (USAF)

F-80 Development

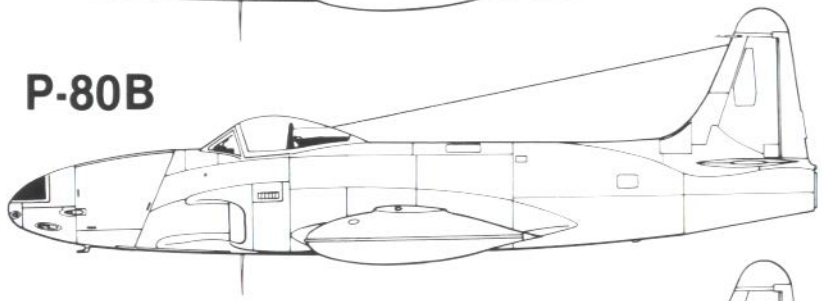
XP-80



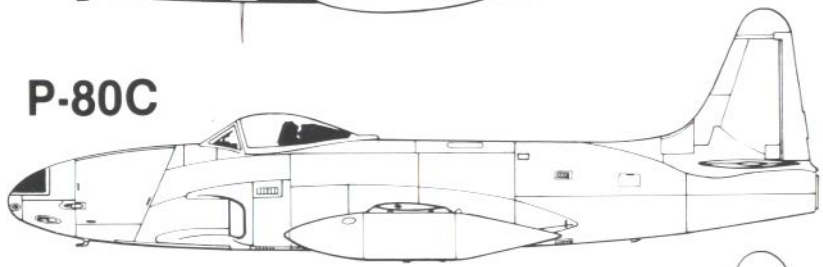
P-80A



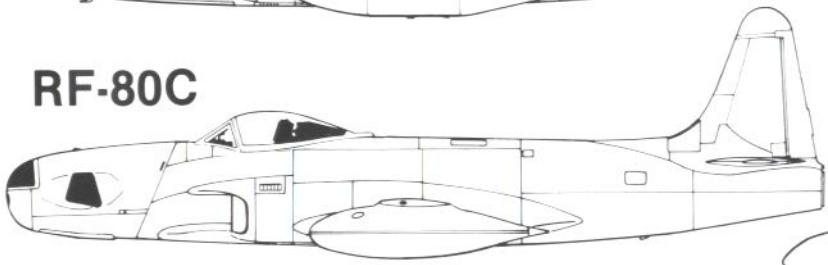
P-80B



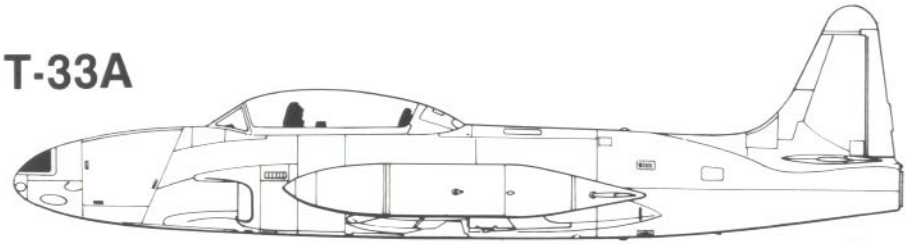
P-80C



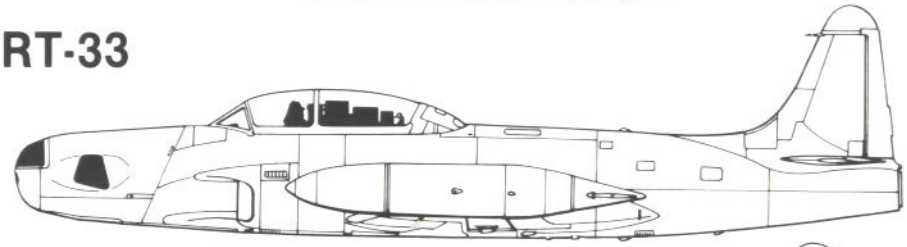
RF-80C



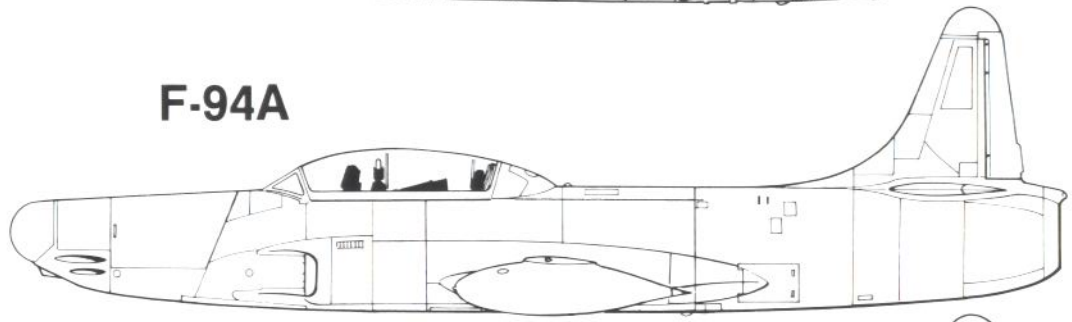
T-33A



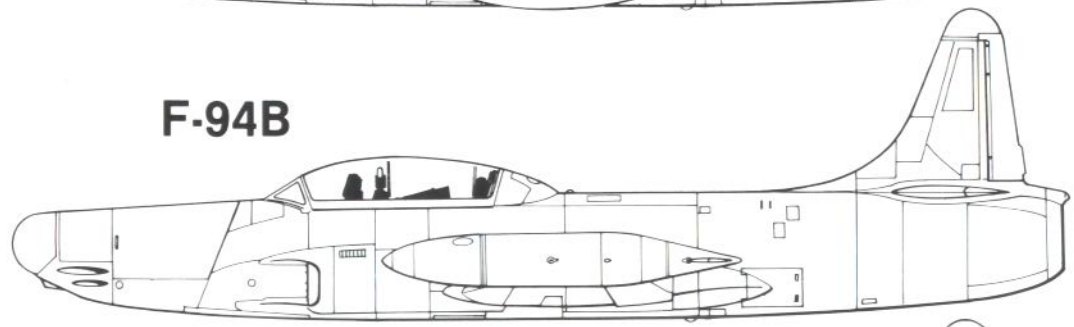
RT-33



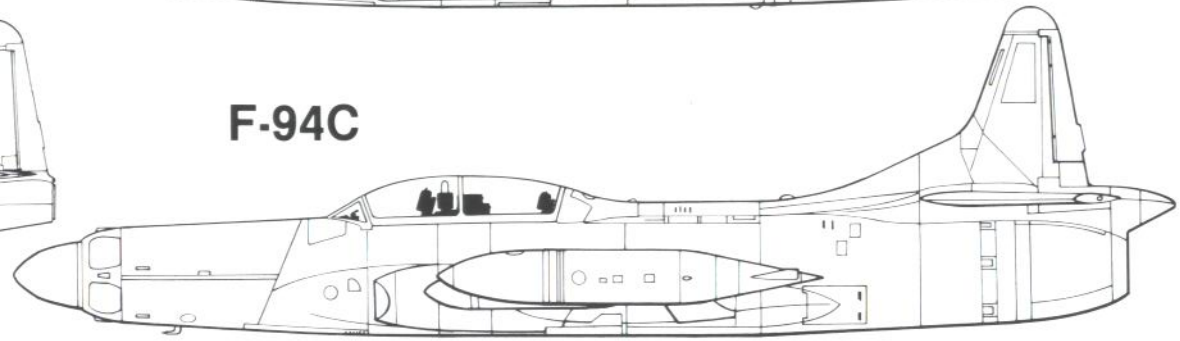
F-94A



F-94B

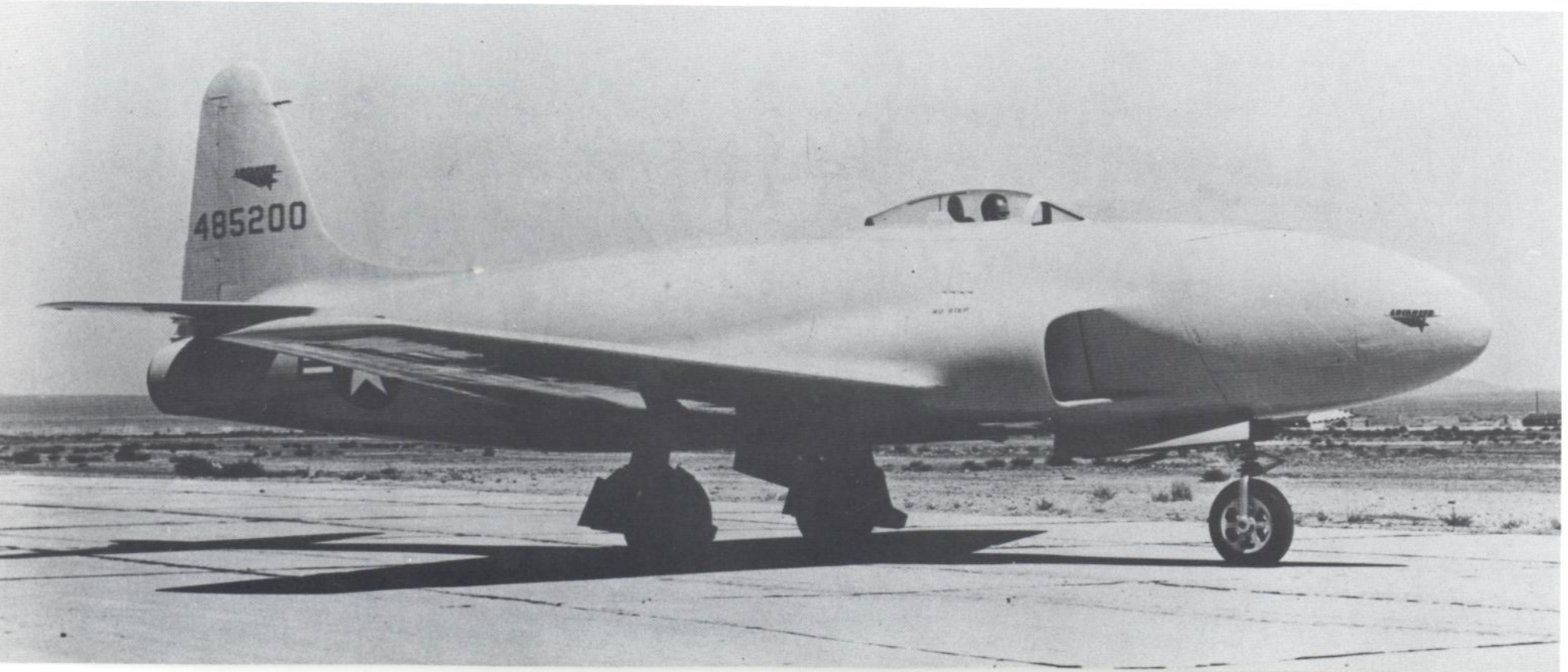


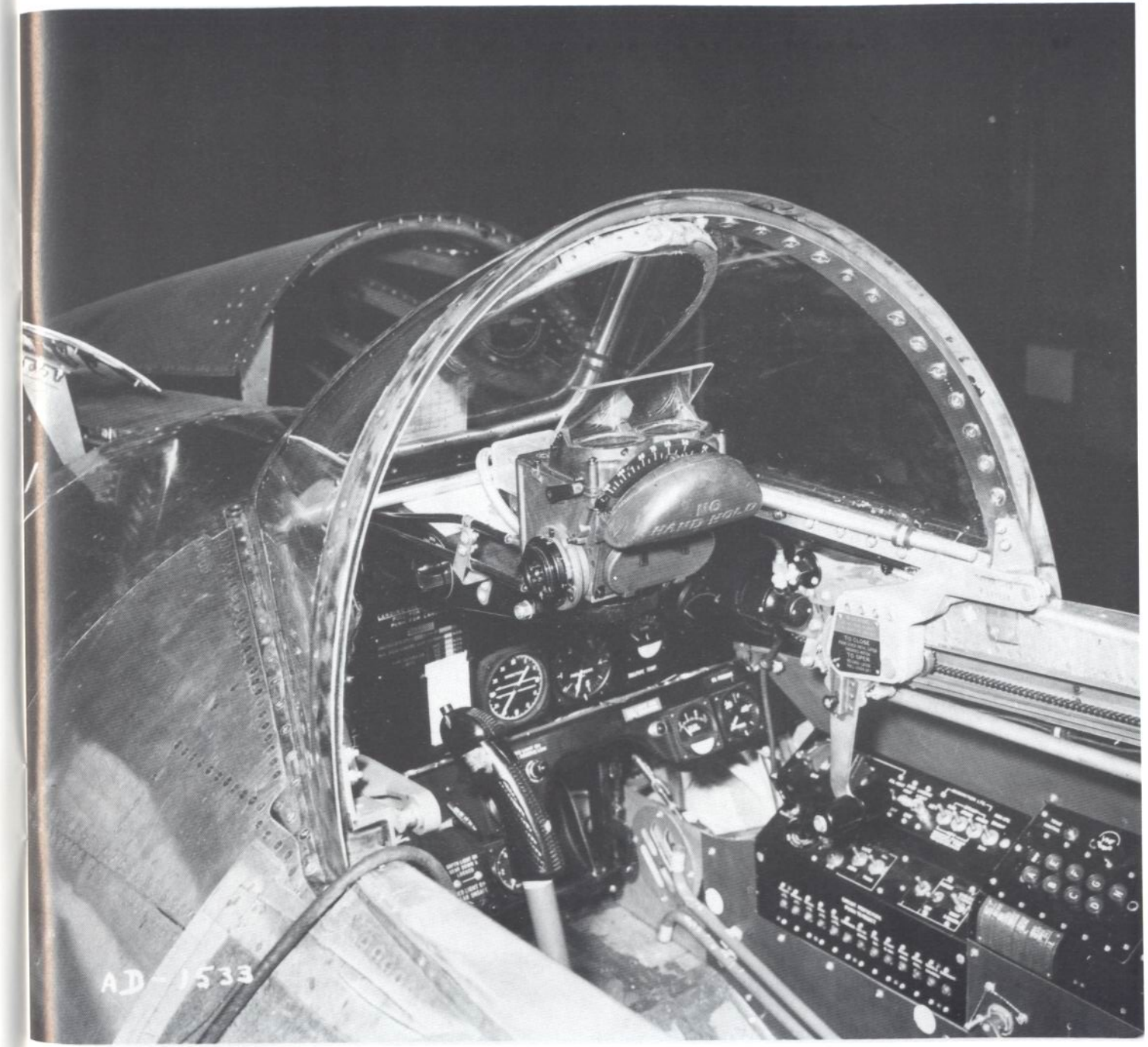
F-94C



LtCol. J. Reilly won the 'J' Division at the 1946 Cleveland Air Races. The aircraft was standard P-80A from the Wright Air Development Center. (AFM)

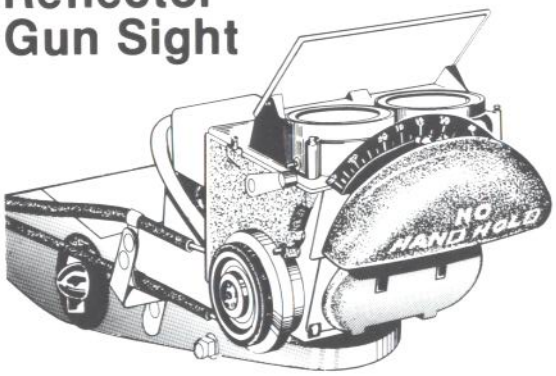
The XP-80R had clipped wingtips, revised intakes and a much samller canopy. It set a World Speed Record at the 1947 Cleveland Air Races, with a speed of 623.8 mph. (AFM)





The P-80A cockpit is very simple compared to the jets of today. Color is chromate green with black consoles. (Lockheed)

Reflector Gun Sight

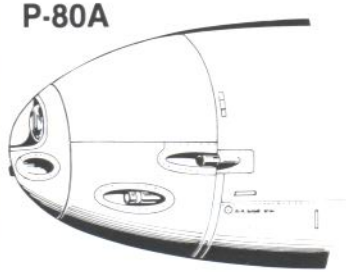


Stick

(Left) The 416th FGp flew the first trans-continental jet missions in 1946. They are shown parked at the National Airport in Washington, D.C. (Above) Maximum **and** Minimum Goose **at National Airport. (Above left)** Rhapsody In Rivets **belonged to the 416th FGp C.O. All 416th aircraft carried the pilots' WW2 scores on the tails. (USAF)**

Nose Development

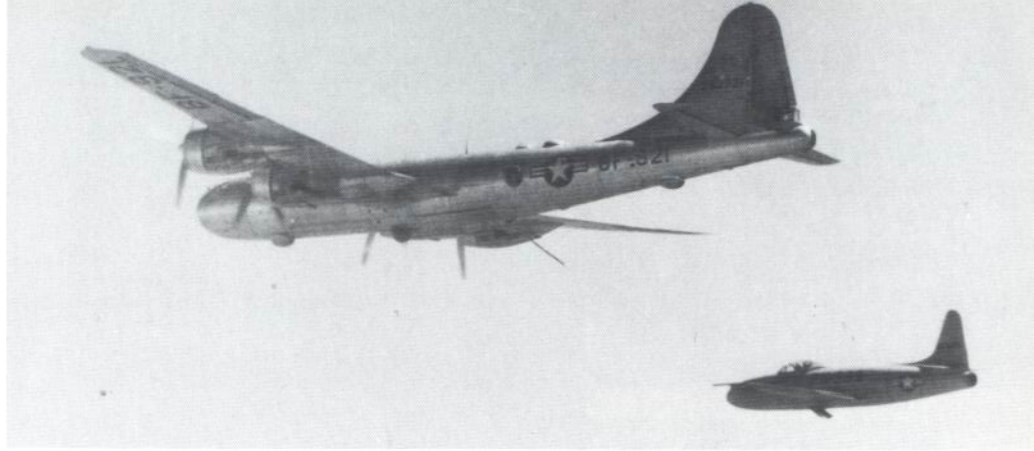
P-80A



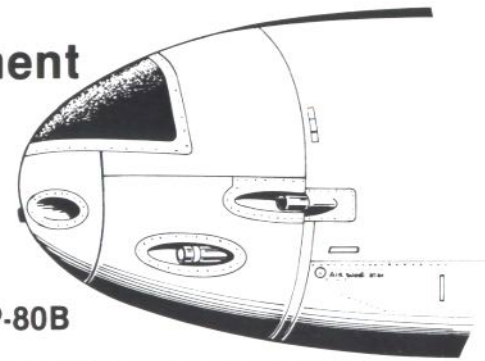
P-80B

The P-80B differed from the -A in several areas. Two firsts occurred in the P-80B -water/alcohol injection was added to the jet engine, and an American aircraft was equipped with an ejection seat (Germany had used them in the Dornier Do335). In addition, the thickness of the wing was reduced, wing skin was thickened and the cockpit was rearranged. Those changes added about 1000 lbs. to the gross weight. Several P-80Bs, and about 500 P-80As, were winterized for polar region use. Lockheed built 240 P-80Bs at a flyaway cost of $95,000.00 per aircraft.

(Right) An early attempt to extend the range of jet aircraft was to tow them behind B-29s. Here, a P-80B is seen during a test tow. Full development of these ideas would lead to the 'parasite fighters', the XF-85 and some F-84Fs. (AFM)



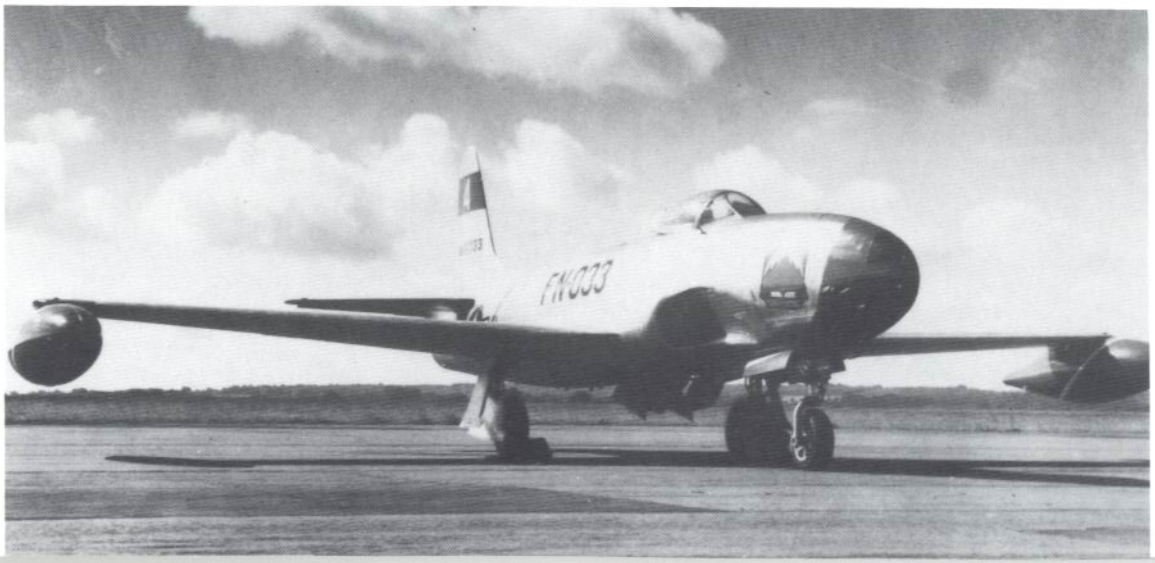
Nose Development

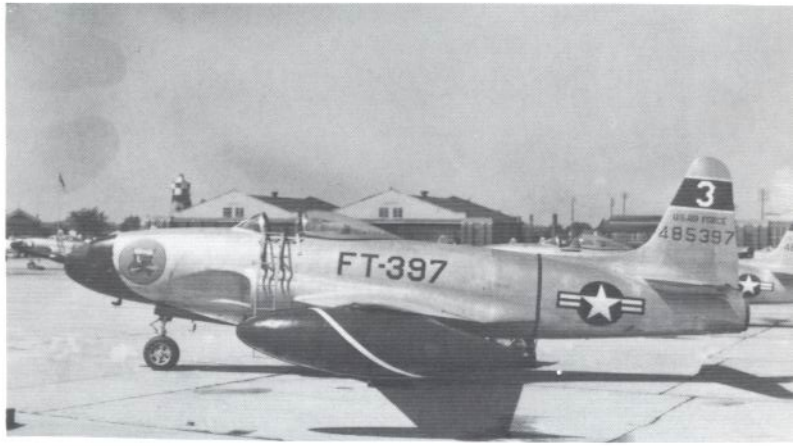


P-80B

P-80B of the 71st FSq, 1st FGp based at March Field, California. (USAF)

(Below left) The 56th FGp took its P-80Bs to Germany during the Berlin Crisis. (Below) 56th FGp P-80Bs seen at Selfridge AB; #4 seen at left is in the background. (AFM, Baker via Trump)





The AcroJets were the first 'official' USAF team. They were made up of instructor pilots from The Fighter School at Yuma AFB Flying P-80Bs. (USAF)

(Below right) The 36th FGp deployed to Europe in 1947. Seen is a flight of red striped 36th FGp P-80Bs over West Germany. The wingtip tanks are white with red flashes. (USAF)

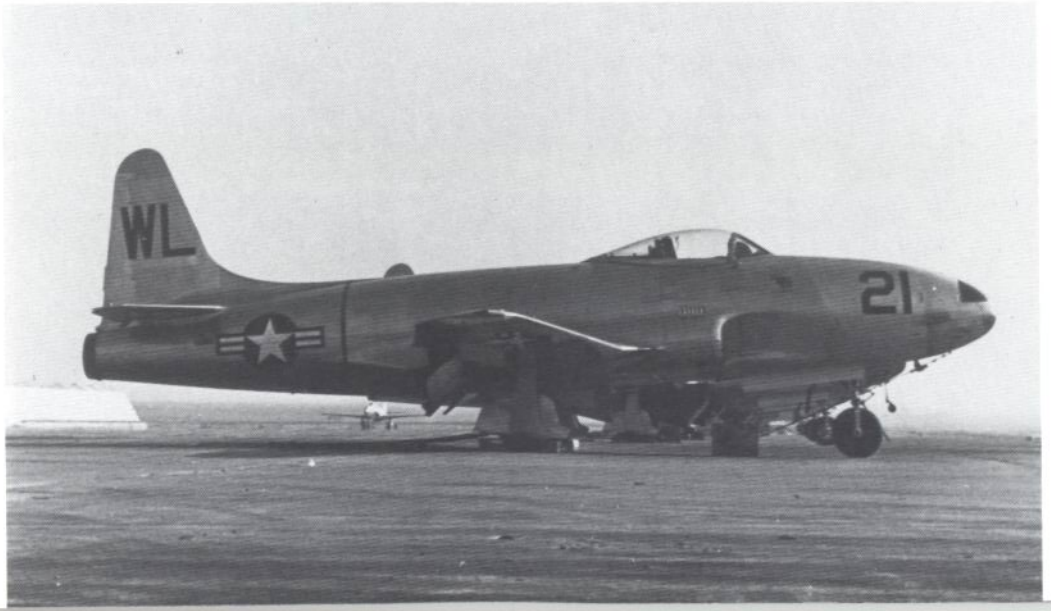
P-80Bs belonging to the 36th FGp are seen embarked on the escort carrier USS Sicily as she passes through the Pedro Miguel locks on the Panama Canal. The 36th FGp was on its way to Germany, via Scotland, and the Sicily carried 69 F-80s across the Atlantic. (USAF)

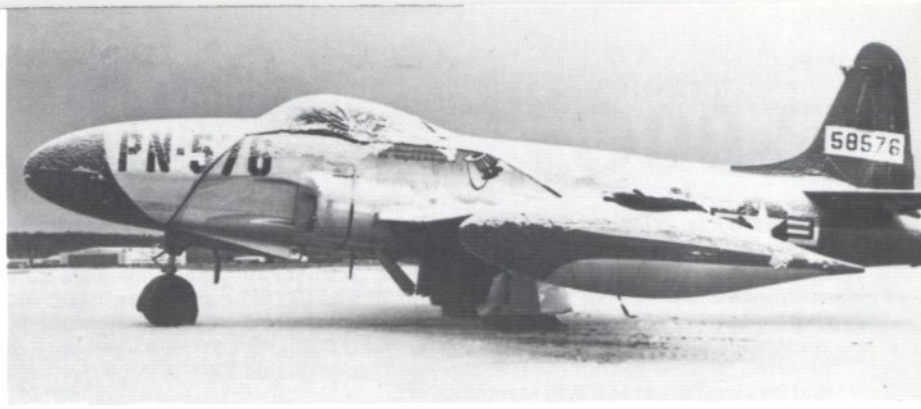
Capt. Vermont Garrison flew a sack of mail from New York to Washington in a 4th FGp P-80B to celebrate the 30th Anniversary of Air Mail Service on May 15, 1948. The nose is black, tip tanks are black and red, and the tail stripe is red. (USAF)

A P-80B of the 94th FSq shows the special precautions needed in cold weather climates like Alaska. The upper wing surfaces and cockpit canopy are covered with tarpaulins to prevent ice and frost from forming on the aircraft itself. In an emergency, the covers could be quickly removed, leaving the canopy and wings ice-free, ready for the plane to scramble for an interception. (USAF)

P-80Bs of the 94th FSq in echelon formation over Alaska. These aircraft now carry the famous "Hat in the Ring" emblem made famous in WWI. The tails and outer wing panels are painted in 'Arctic Red', a color intended to aid in spotting any downed aircraft. (USAF)

VMF-311 was the first US Marine Jet unit when they converted to TO-1s (P-80Bs) in 1947. (USMC)

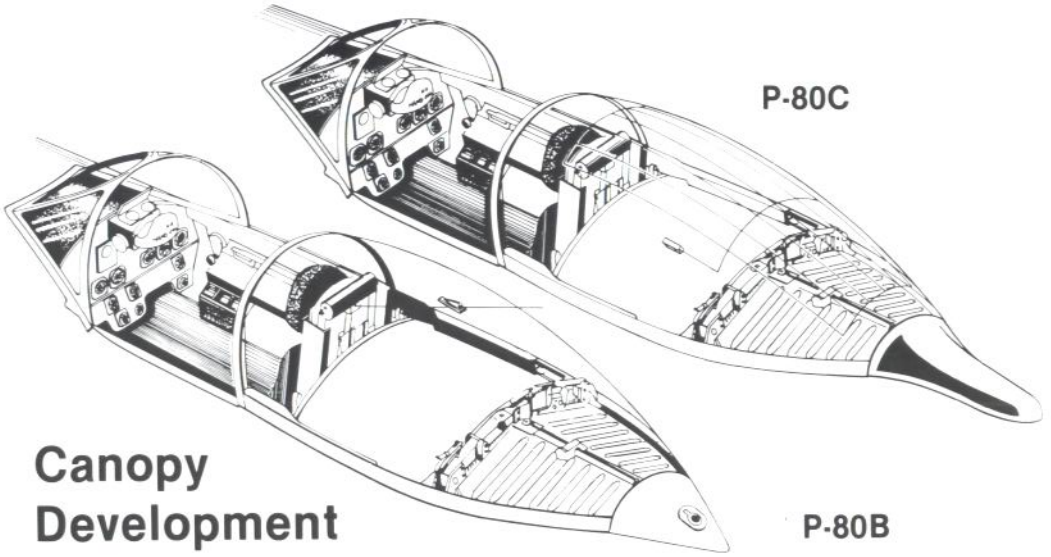




P-80C

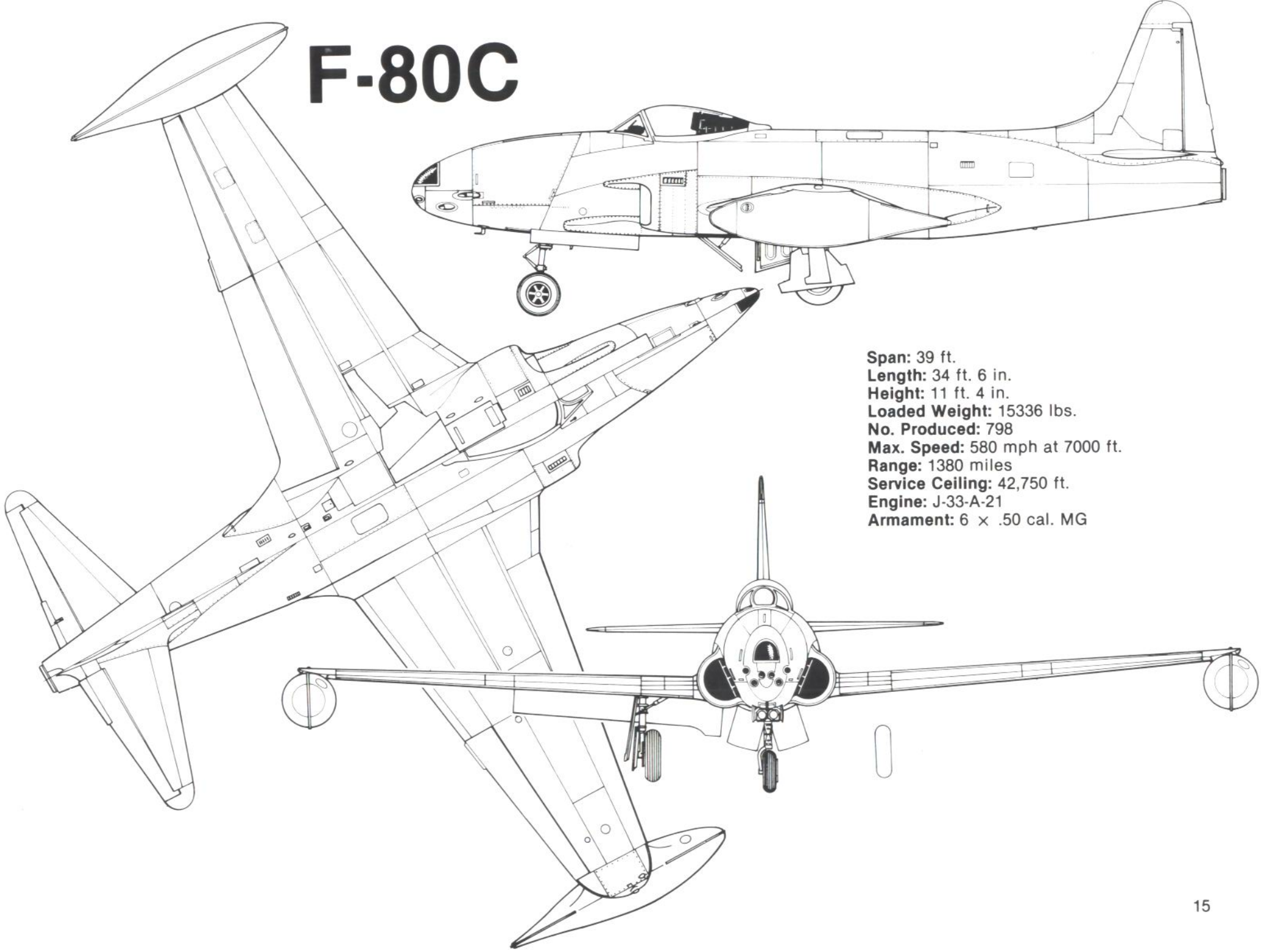
The P-80C was built in greater numbers than any other variant. Incorporating the J33-23 engine with 4600 lbs. of thrust, the -C's top speed rose to 580 mph. The P-80C was the first aircraft to use an explosive canopy remover. Additionally, the wings were strengthened and racks added to hold either ten rockets or two 1000 lb. bombs. The P-80C was the true 'fighter-bomber' Shooting Star. In June 1948, all P-80s, indeed all fighter-type aircraft, were redesignated "F" for Fighter by the new U.S. Air Force. There were 798 F-80Cs built, of which 50 were sent to the U.S. Navy and redesignated TV-1. A large number of F-80As and Bs were rebuilt to F-80C standards.

This P-80C opened up for engine maintenance shows how the tail was designed to come off. Access to the engine was excellent, and with the top fuselage panel removed, as seen here, most of the engine accessories could be inspected and serviced without having to remove the engine from the aircraft. The flaps of the P-80 were fairly large and extended back as well as down when they were extended. Note the redesigned cockpit canopy–the integral antenna in the plexiglass canopy can just be seen. (USAF via Menard)



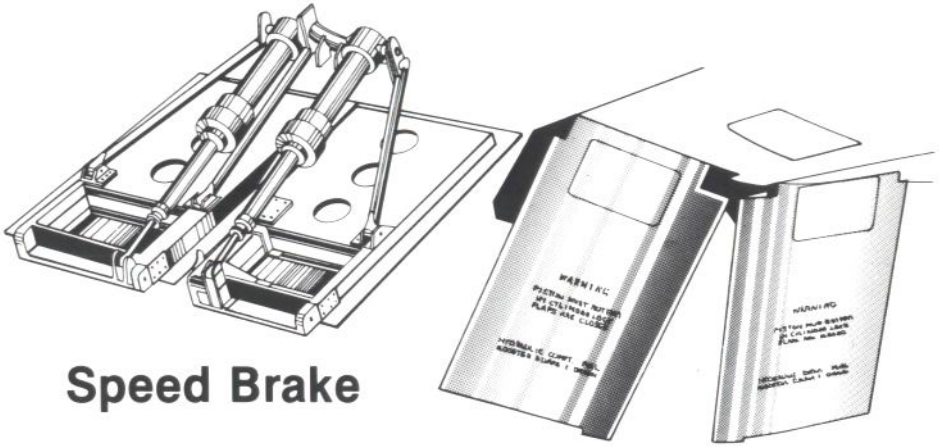
Canopy Development

F-80C



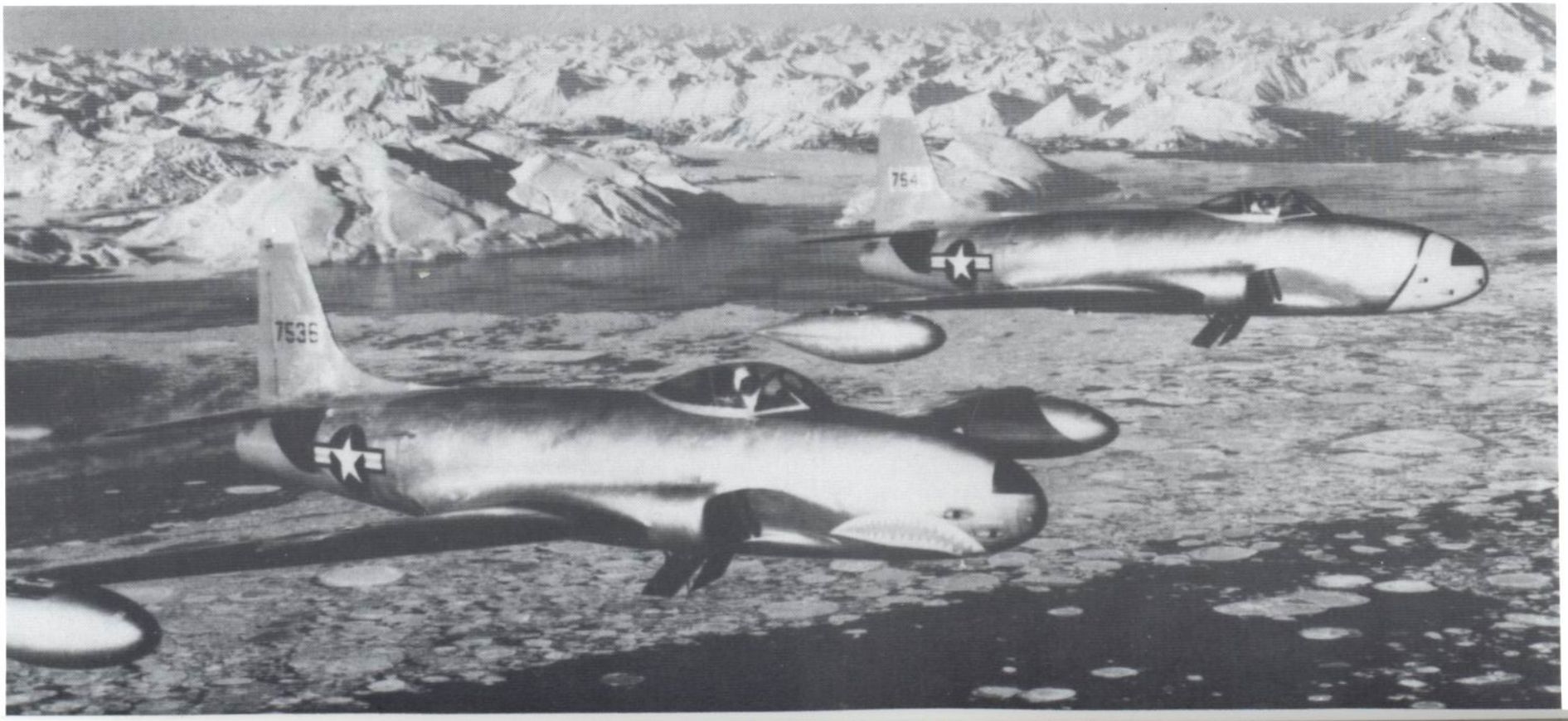
Span: 39 ft.
Length: 34 ft. 6 in.
Height: 11 ft. 4 in.
Loaded Weight: 15336 lbs.
No. Produced: 798
Max. Speed: 580 mph at 7000 ft.
Range: 1380 miles
Service Ceiling: 42,750 ft.
Engine: J-33-A-21
Armament: 6 × .50 cal. MG

Seen in July 1956, this is one of the F-80Cs transferred to the Navy as TV-1s for use as jet familiarization trainers. These aircraft were essentially identical to standard USAF F-80Cs. (Menard)

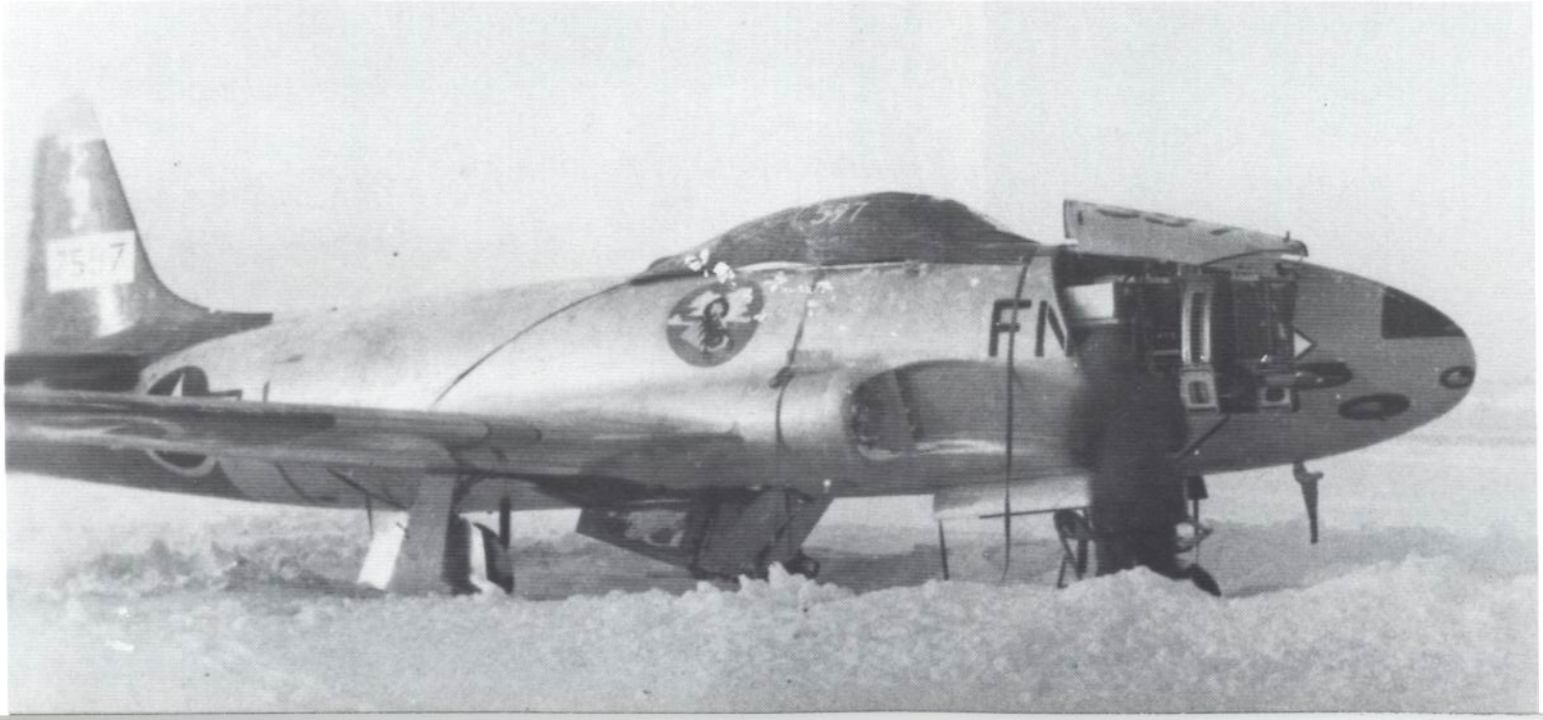


Speed Brake

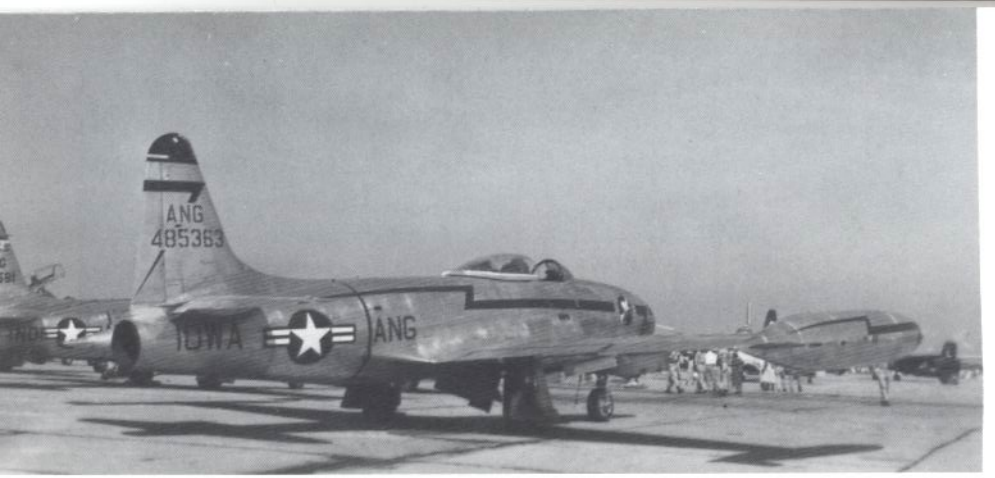
Some 65th FISq F-80Cs had sharkmouths in addition to their Arctic Red Markings. The Air National Guard got F-80Cs as soon as they were phased out of active USAF service. (USAF)



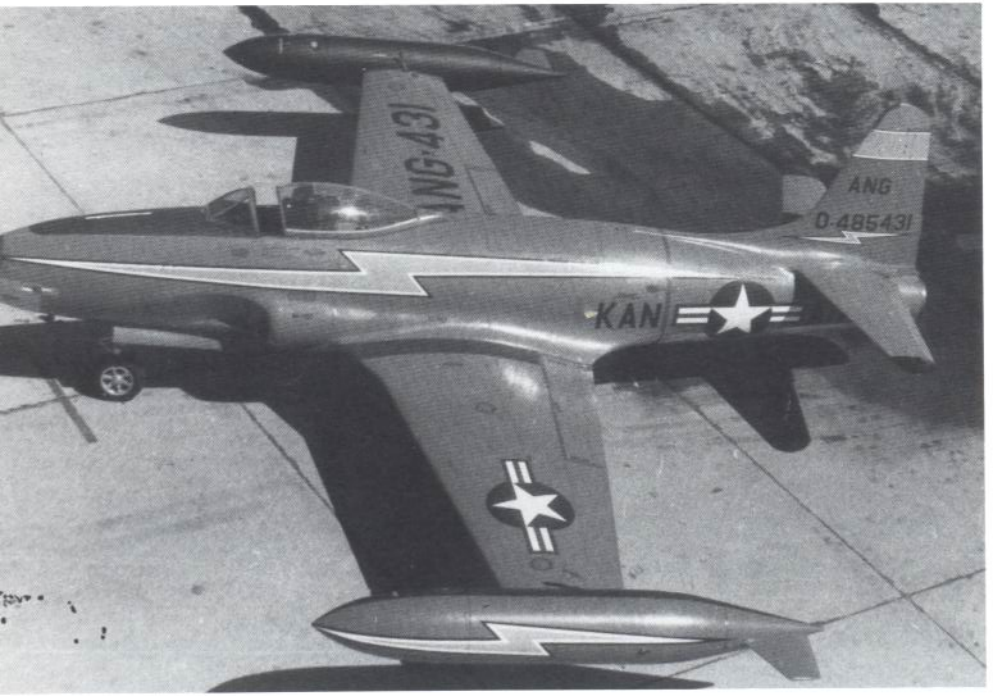
F-80C #49-429 was forced down in the Alaska tundra and had to be fitted with special skis so she could be flown out. (USAF)



The 66th FISq was charged with defense of the polar region in 1948-49. Their aircraft had yellow noses and wing stripes with black borders, plus normal Arctic Red wings and tails. (USAF)



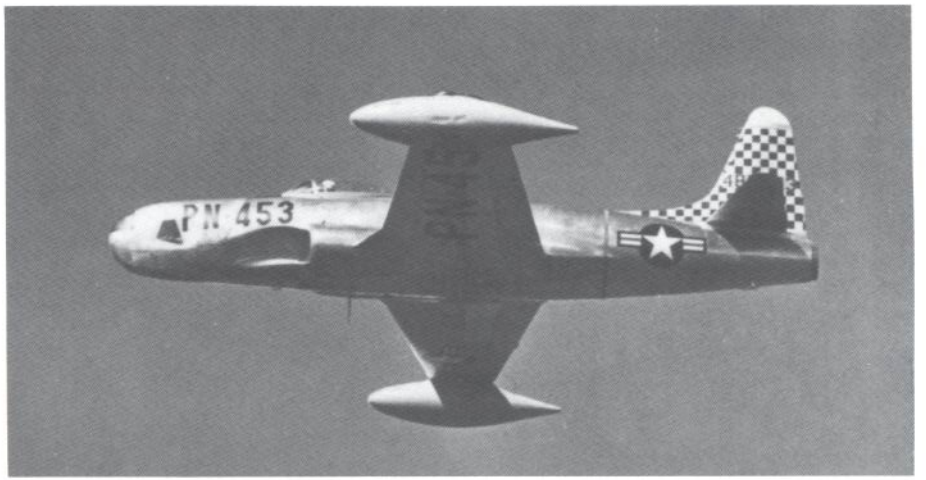
F-80s were asigned to many Air National Guard squadrons as they were replaced in the Air Force inventory by the F-86 and F-84. (Above) An F-80C of the Iowa ANG, displaying red flashes and a squadron insignia. Indiana ANG F-80 is in the background. (Above right) An F-80C of the Oklahoma ANG, with a medium blue flash and stripe outlined in white and black. Canopy frame is "anti-glare" black. (Right)The nose of an Oklahoma ANG T-33 shows to good advantage the flash, stripes and FSq insignia. (Below) A red F-80C of the Kansas ANG flown as a target tug. The flash is yellow with white and black borders. The undersides are gloss white with the last two digits of the serial no. in large black numerals on the speed brake doors. (Below right) City of Wichita carried yellow and black diagonal bands—the name was also yellow and black. (Baker via Trump, Trump)

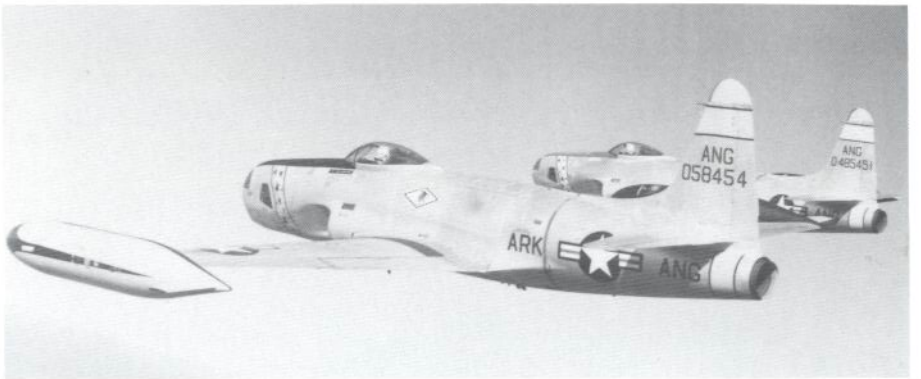


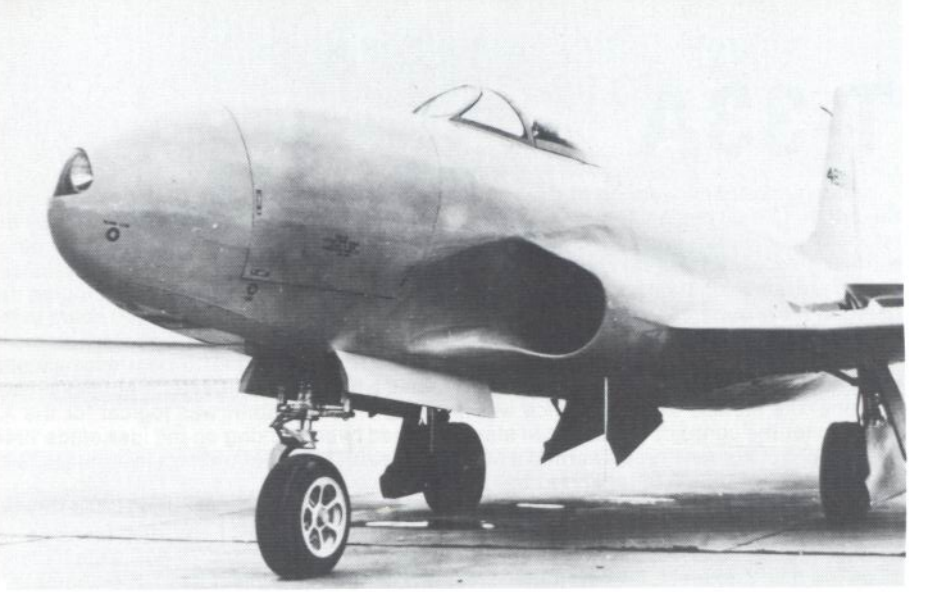
FP-80A/RF-80

Design of a recon version of the F-80 began in mid-1944. General "Tooey" Spaatz deemed high-speed reconnaissance as the most important job the P-80 would have in World War 2. The photographic reconnaissance XF-14 was converted from YP-80A, #44-84988. It had a completely redesigned nose area that rotated forward so mechanics could service the cameras. No armament of any type was carried. In March 1945, two standard P-80A-1s were converted to photo recon versions and designated XFP-80-1. They were identical to the XF-14 but used P-80A-1 components. Lockheed produced 152 of the FP-80As between July 1946 and April 1947.

There were three basic type RF-80Cs, all developed during the Korean War. The first was a simple conversion of a standard F-80C airframe that mounted two vertical cameras in place of the six .50 calibre guns. The shape of the nose was the same as a gun-armed F-80C. The second was a simple upgrading of some RF-80As to -C specs. Third was the addition of a full recon nose to a standard F-80C airframe. Most of the first two types of RF conversion were done at major maintenance centers in Japan. Lockheed did the conversion of the full RF-80C version.







(Top) The original XF-14 Photo Reconnaisance Jet had only downward looking cameras. (Above) The FP-80A nose was reconfigured to add side-looking oblique and forward-looking cameras. (AFM)

(Above left) An RF-80A from the 363rd TRWg, seen taking off from Shaw AFB. The checker pattern on the tail is red on natural metal background. (USAF) (Left) Two Arkansas ANG RFs of the 154th TRS formate at altitude. Anti-glare black inner surfaces were applied to the "Fletcher" tank. (Trump)

T-33A

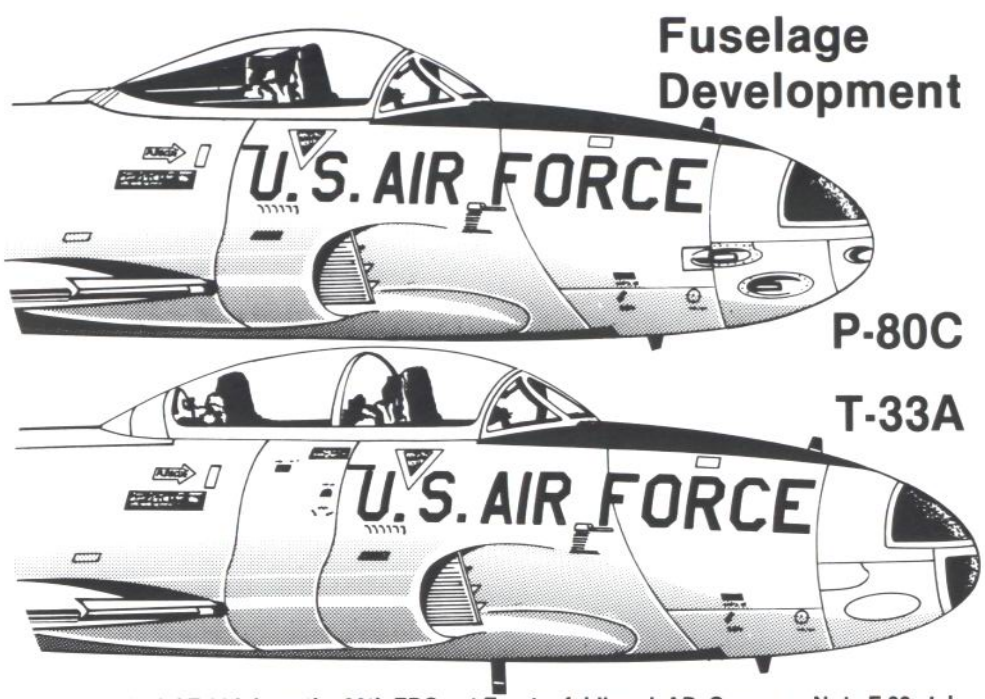
Interest in a trainer version of a jet powered aircraft began at almost the same time as the original XP-80 design. Insight into the fact that flying a jet aircraft would be vastly different from any prop-driven aircraft led Lockheed to push for development of a jet trainer. But Army Air Corps saw no need for such an aircraft, and they did not want to 'waste' any fighter airframes on trainers. Other methods for training jet pilots were tried including the fixing to the ground of a standard F-80. In 1947, jet pilot training called for 180 hours in the T-6 Texan, 50 hours in P-51 Mustangs, and about 25 hours in the 'captive' P-80.

Finally in 1947, with Lockheed's business almost finished due to contract cancellations, the Air Force decided it might be able to use a two-place jet trainer. England already had one - the Meteor VII - and France was working on one also. It was logical for the Air Force to let the contract to Lockheed since they had been working on the idea since 1944. A cost-conscious Air Force awarded a contract for 20 TF-80C jet trainers in January 1948. The designation was later changed to T-33A.

The original trainer version was an F-80B fuselage with a 26 inch section added forward of the wingroot. Another 12 inch section was added forward of the rear fuselage for balance and stability. Additional differences between the P-80B and TF-80C were: smaller 85 gallon fuselage fuel tank, nylon fuel cells, two .50 calibre guns instead of six, improved air conditioning, and of course the additional seat and flight controls. Lockheed proposed a three piece side-opening canopy for the trainer but USAF insisted on the single clamshell canopy so familiar on T-33s. If the need arose, the regular six-gun nose could be fitted to the T-33. Early T-33s even had the dual 1000 lb. bomb shackles on the wings. The only major change to the T-33 throughout the years was the addition of the Fletcher-type wingtip tanks. However, there were some T-33As fitted with the RF-80 nose and designated RT-33. These were all sold to other nations. Almost 6,000 T-33s were built, including 649 for the US Navy (TV-2s) and 1058 for foreign air forces.

(Above) The first Air Force jet trainers were the 'Captivair' F-80As secured to the ground by steel frames around the wings. (Below) The first TF-80C (T-33A) was actually a converted P-80B. It was the first real U.S. jet trainer. (USAF and Lockheed)

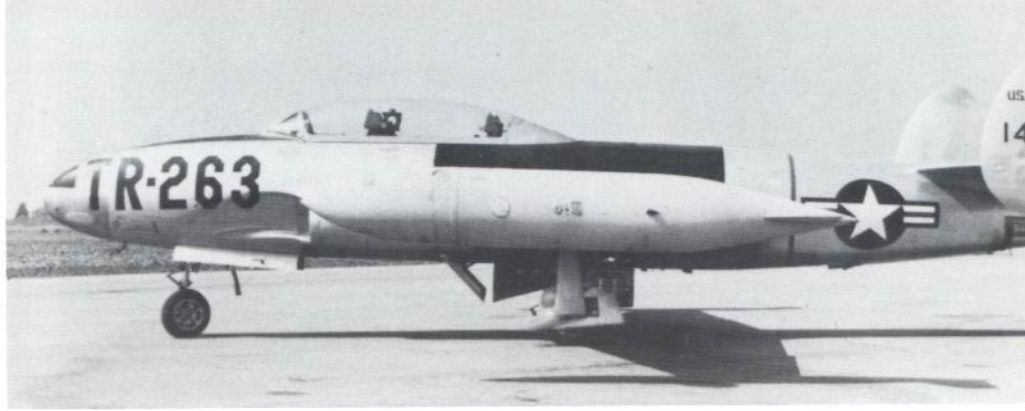
A very unusual twin-tailed T-33A was built in attempt to improve stability. It never was adopted although the modification did work. (AFM)

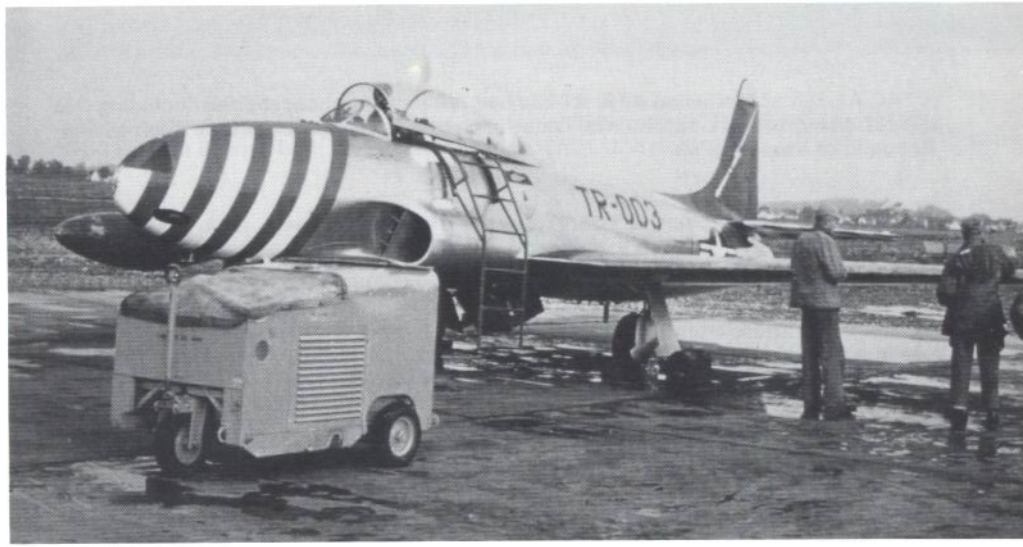


A very colorful T-33A from the 36th FBGp at Furstenfeldbruck AB, Germany. Note F-80 style tip tanks. See the back cover art for color details. (USAF)

(Below right) Bicentennial T-33A from the 26th Air Division at Luke AFB in 1977. (Roth)

All Air Defense Command units had T-33As assigned. This one is from the 5th FISq with blue and yellow lightning on the tail and pale blue tip tanks with dark blue stripe and yellow Spittin' Kittens. (Isham)



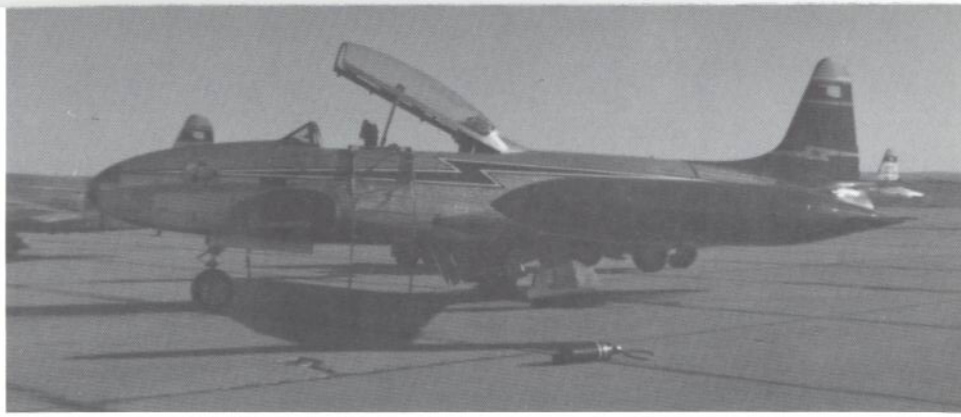


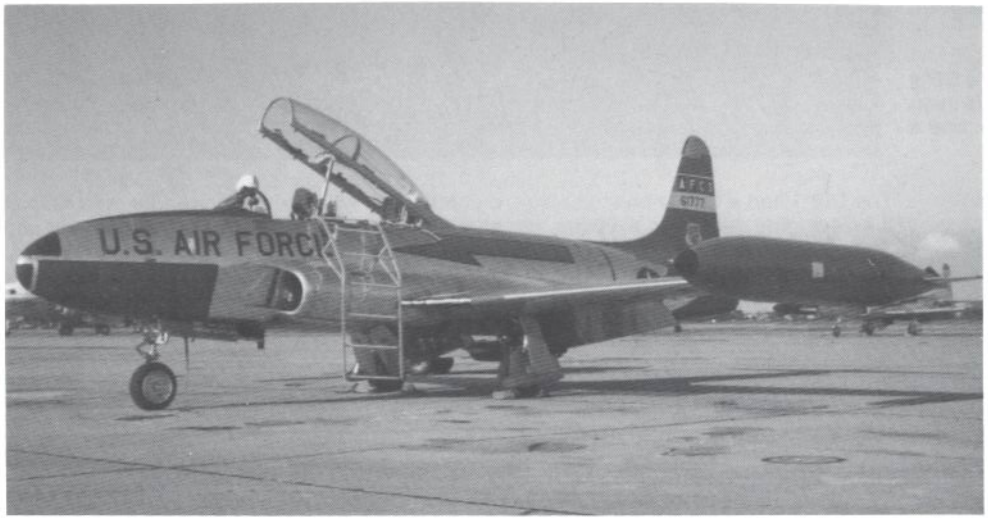
A TAC AT-33A at McClellan AFB. AT-33s had full armament capabilities including two .50 cal. guns, rockets and bombs. Most served with foreign air forces such as the Republic of Korea. (AFM)

(Above Right) A very colorful T-33B from the Blue Angels team. Note the very fine checks on the tip tanks. (Larkins/Menard)

A T-33A of the Thunderbirds team. The T-Bird was used to give VIPs and press people a ride in a jet. (USAF)

T-33As of the 69th Training Sqdn at Suwon AB, South Korea in 1955. Color bands on the tip tanks and fuselage are blue with yellow stars. (USAF)





This T-33A of the Oklahoma ANG was assigned to the 125th FBSq. Fuselage flash, tail and wing tip tanks are red, the squadron insignia is a yellow circle with a brown beaver with a blue coat. The aircraft is natural metal. (Trump)

(Above Left) A gorgeous T-33 from Canada is this orange CT-33 from the RCAF. CT-33s were license-built T-33As by Canadair. (Wm. J. Balogh Sr.)

(Left) Easily one of the prettiest T-33As is this one from the Air Force Communications Service. All markings are gloss orange with black outlines. AFCS is in white on black squares on a blue band background. (Miller/Menard)

(Below Left) A nice inflight shot of a typical Navy T-33B in the standard Navy trainer orange and white paint scheme. (Lockheed)

A U.S. Marine T-33A from NAS Washington in the standard gull gray paint scheme. (Menard)

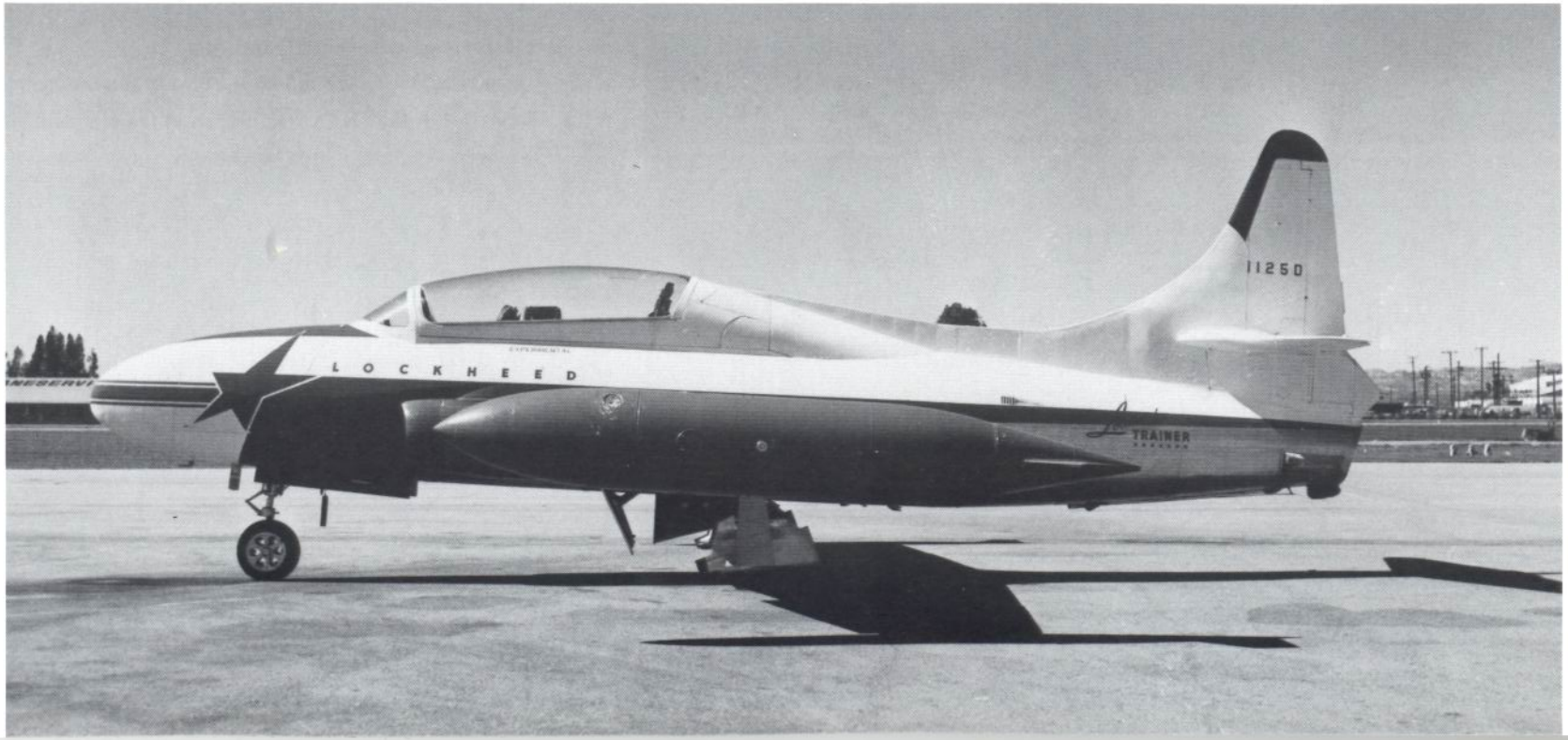
Many T-Birds have been converted to drone QT-33Bs. Note radio gear in place of second pilot. This QT's overall gloss orange. (Jem Slides)

The T-33A is still very much in USAF inventory, though it is now most likely to be used as a CO's personal transport, such as this immaculate example from the 84th FIS, George AFB. It is seen taking off from Offutt AFB, NE, 18 December 1979. The stripes are red, white and blue, and a TAC insignia has replaced that of the ADC on its tail. (George Cockle)

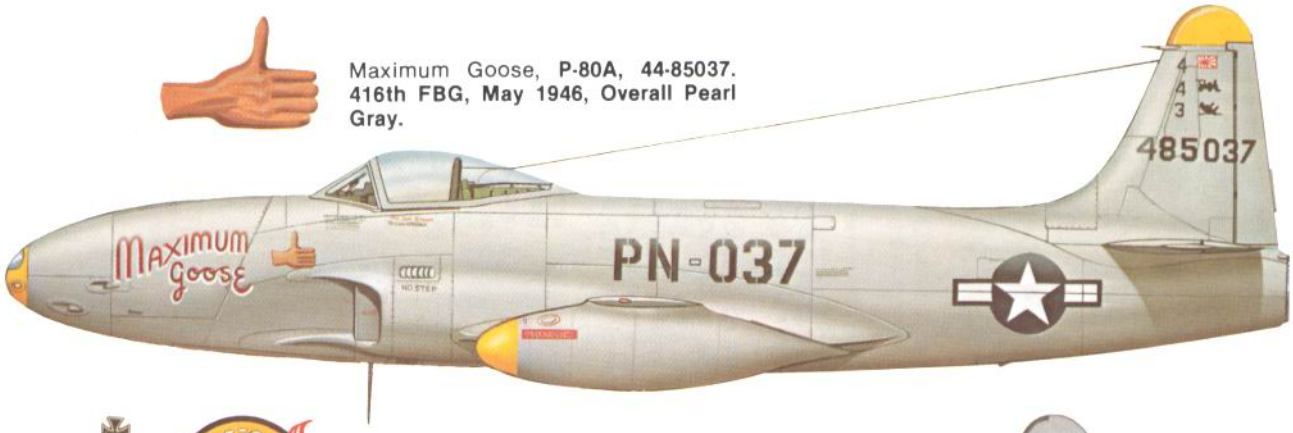
During the Fall of 1952, Lockheed began a study on improving the T-33 jet trainer. This study led to the T2V-1 Advanced Trainer. The original design was offered to Air Force but they declined since they were well pleased with the T-33A and unit production cost of the T-33A was decreasing. The Navy was very interested, however, if the trainer could be 'carrierized'. To do this, major changes had to be made which almost evolved into an entirely new aircraft. The T2V-1 would have only 20% of its base in the T-33A.

The T2V-1 had a totally new fuselage, much thinner wing, larger fin/rudder, and Allison J33-A-24 engine delivering 6100 lbs. thrust, and all the equipment needed to catapult and recover from an aircraft carrier. Both the T-33A/B and the T2V-1, now designated the T-1A, are operational with all major units of the US Air Force, Navy and Marines. Additionally, at least fourteen countries fly the T-33A in various roles including trainer, recon, and attack.

The prototype T2V-1 on rollout from the factory. As only 20% of the airframe were T-33 components, the T2V-1 was considered an all-new aircraft. (Lockheed)

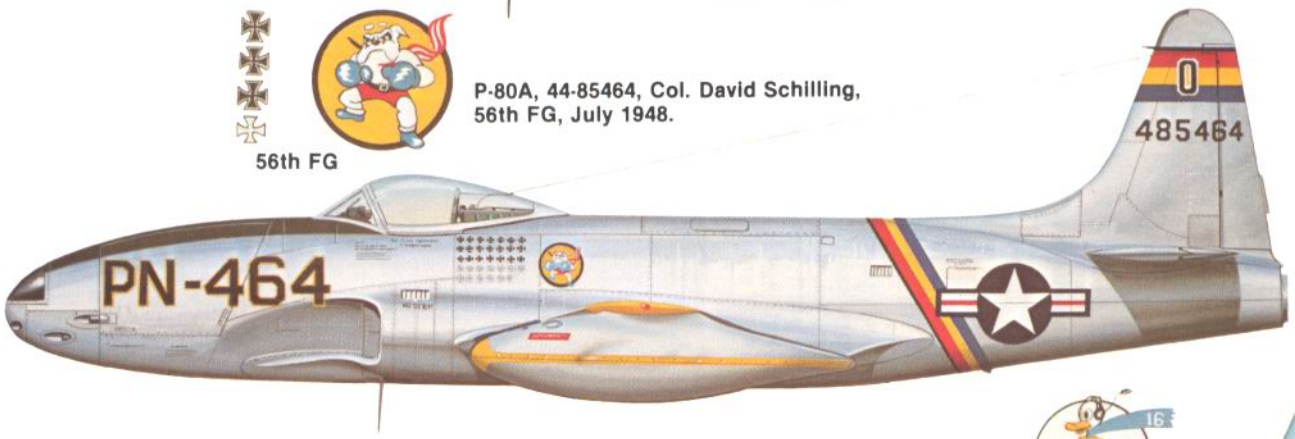


Maximum Goose, **P-80A, 44-85037. 416th FBG, May 1946, Overall Pearl Gray.**



56th FG

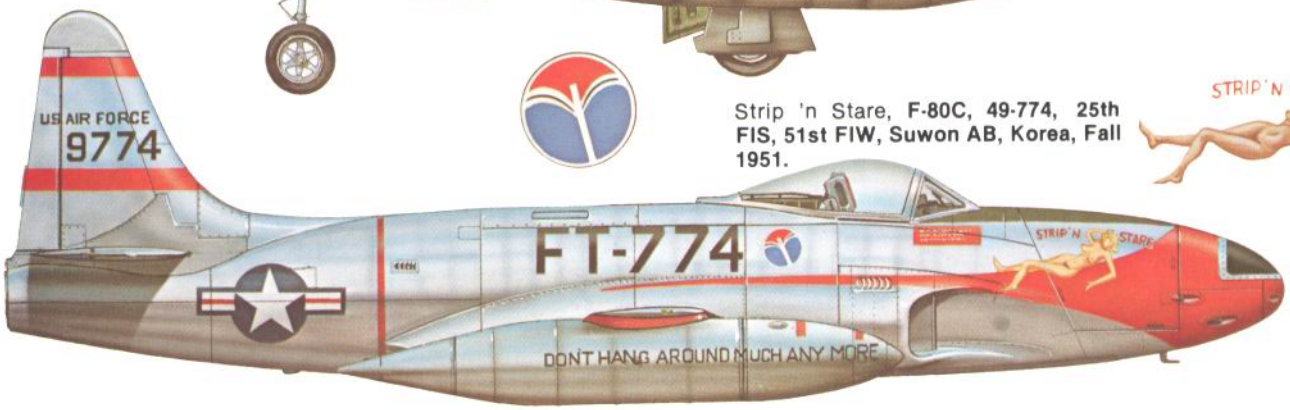
P-80A, 44-85464, Col. David Schilling, 56th FG, July 1948.



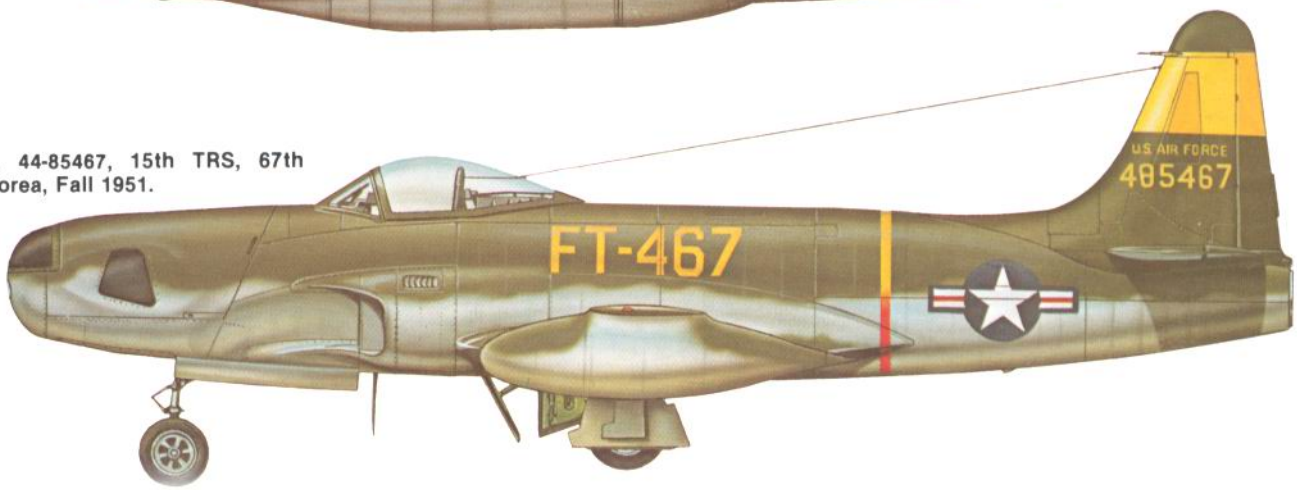
Dorothy L-Panther Queen, **F-80C, 49-653, 16th FIS, 51st FIW, Suwon AB, Korea, Spring 1951.**

16th FIS

Strip 'n Stare, **F-80C, 49-774, 25th FIS, 51st FIW, Suwon AB, Korea, Fall 1951.**



RF-80A, 44-85467, 15th TRS, 67th TRW, Korea, Fall 1951.




UN Forces in Korea
(on both Gunbay Doors)
F-80C, 49-580, 8th FBW, Suwon AB, Korea, Fall 1952.
U.S. AIR FORCE
FT-580
T-33A, 48-0592, 26th AD, Luke AFB, 1976.
80592
U.S. AIR FORCE
RESCUE
26TH AIR DIVISON
57th FIS
0-80540
JAWS
Jaws, T-33A, 48-0540, 57th FIS Keflavik, Iceland, 1975.
449th FIS
F-94B, 49-2520, 449th FIS, Thule AB, Greenland, 1953.
U.S. AIR FORCE
92520
FA-520
FALCONS
27th FIS
113555
FA-555
F-94C, 51-13555, 27th FIS, Wright-Patterson AFB, 1955.

F-94 Starfire

If not for two significant events, there probably would have been no F-94 Starfire. The first was the discovery that adding jet engines to the Convair B-36 bomber suddenly produced an aircraft that the USAF could not stop. The B-36 could do 450 mph at 40,000 ± feet and the USAF's most modern jet fighters, the F-80, F-84, and F-86, could not defend against it, at least not in all types of weather. It might be snowing on the ground but the B-36s flew over the weather. The second event was the exploding of an atomic weapon by the Soviet Union. Fear of an atomic attack over the polar routes, with US intercepter aircraft grounded by weather, brought about the crash development program leading to the F-94 Starfire.

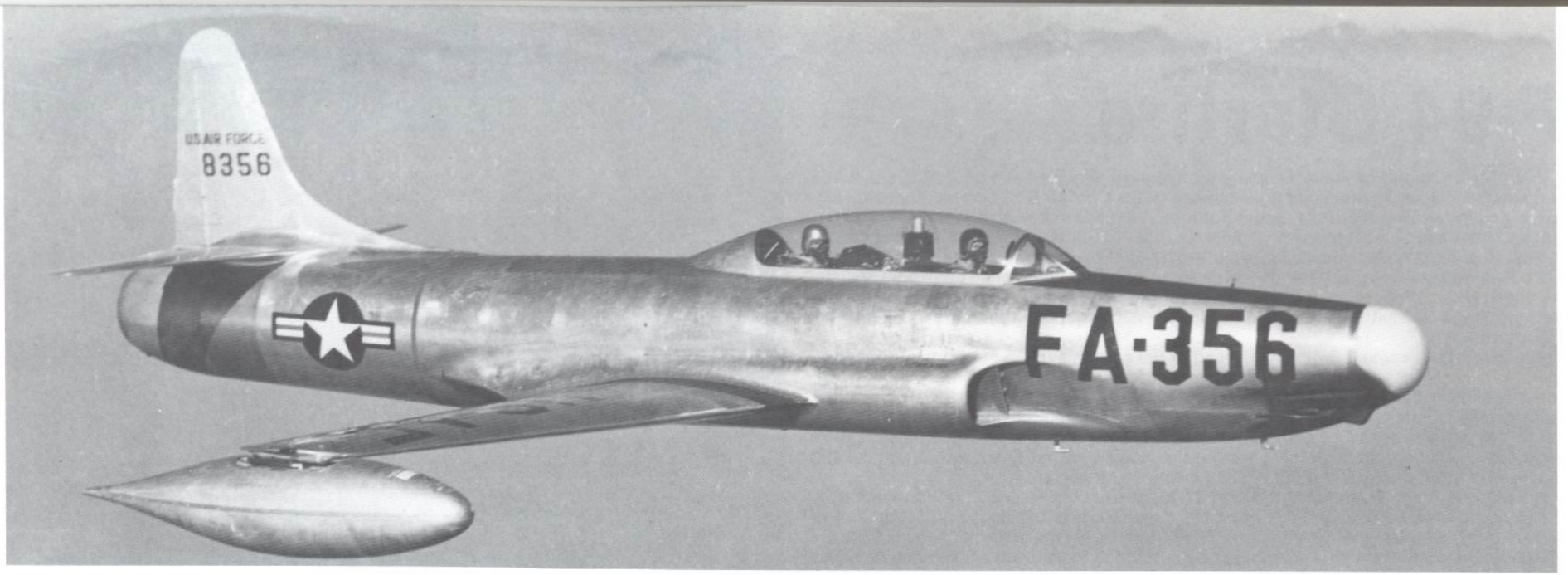
Hughes Aircraft came up with an all-weather fire control system but it took two men to operate it. There was only one two-man aircraft in the Air Force inventory - the T-33A. Could Lockheed build an 'interim' interceptor by mating the Hughes E-1 system and the T-33 airframe? Again Lockheed found itself using an experimental powerplant -- the F-94A would use an afterburner -- and had to develop both airplane and powerplant. With Lockheed and Allison both working around the clock, the first F-94A, powered by a J33 engine with afterburner, rolled out of the hangar in thirteen weeks.

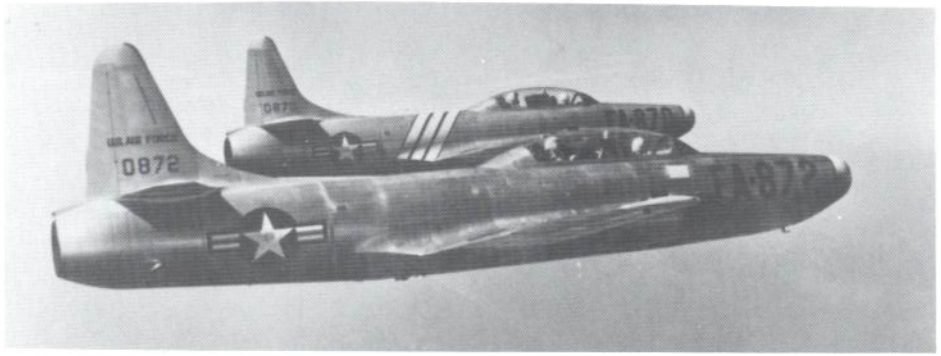
The airframe itself was that of the first T-33A, already once converted from an F-80B. The basic T-33A now had an entirely new nose shape to cover the Hughes E-1 Fire Control System, APG-33 radar, and A-1 gunsight. To make room for the electronics two of the six .50 calibre guns were removed. A radar scope was added to the front cockpit and full radar intercept gear added to the rear cockpit. The J33-A-33 engine and afterburner necessitated a complete redesign of the aft fuselage which included larger stabilizers.

After all the problems with the afterburners had been worked out, and the E-1 system was proven, the first F-94A flew from Lockheed/Van Nuys on April 16, 1949, less than one year from the start of design. The first production F-94A was turned over to the Air Force in December 1949, less than three months after the Soviet Union exploded their first atom bomb. In May 1950 the 325th FIWg at McChord AFB received the first operational F-94As. There were 109 F-94As built for use by the U.S. Air Force.

Original USAF plans were to go directly from the F-94A design to the F-97 (F-94C). But when technical problems with the F-97 held up the program, Air Force decided to further develop the F-94A. Addition of a Sperry Zero Reader gyroscopic instrument landing system, high pressure oxygen system, improved hydraulics and the Fletcher centerline wingtip tanks resulted in the F-94B. The first F-94Bs were operational with the 61st FISq at Selfridge AFB in April 1951. There were 356 F-94Bs built.

The F-94B front cockpit. Cockpit colors were chromate green floors and walls with black consoles. (AAHS)

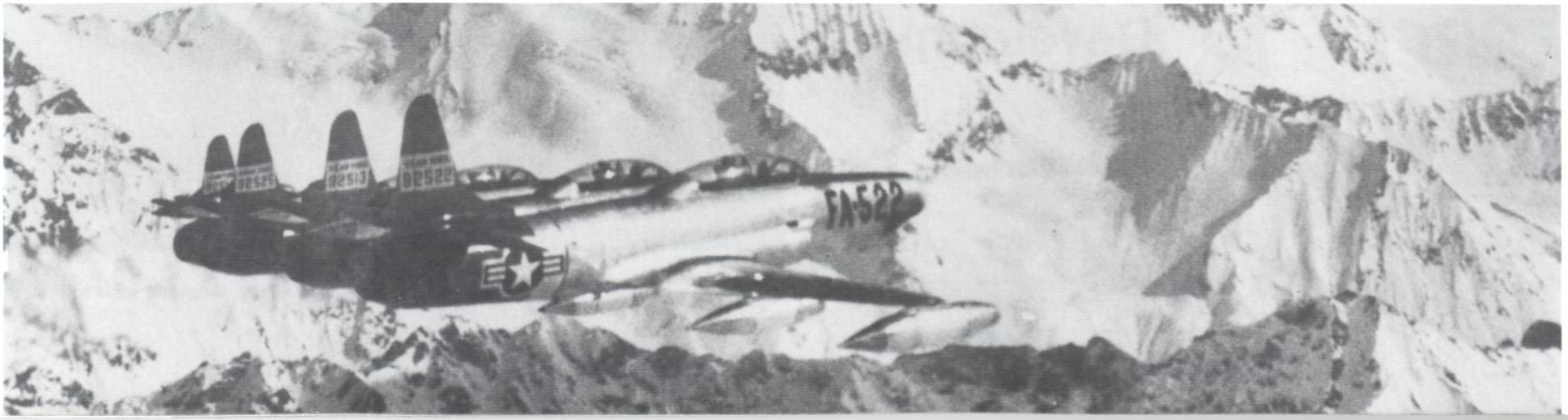




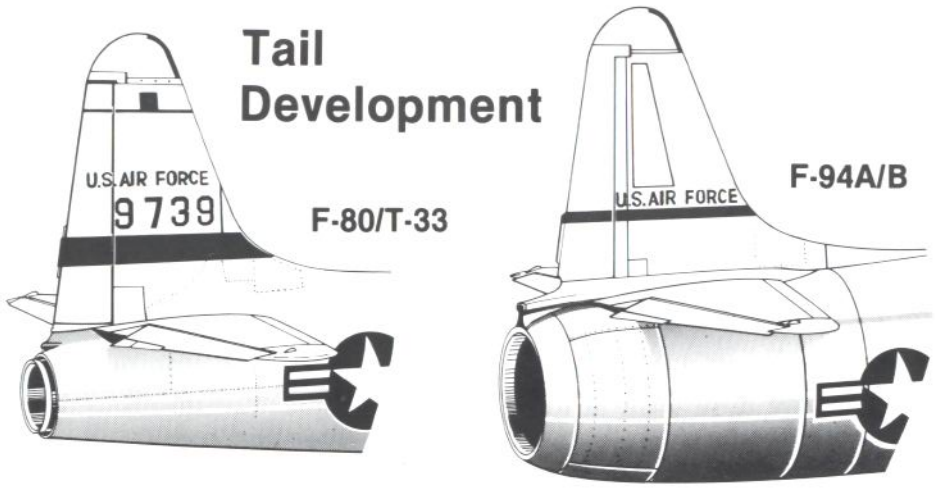
The prototype F-94A was actually the prototype T-33A with a new nose, tail and afterburner. An easy way to recognize F-94As is by the F-80 style wing tanks. (Lockheed)

Two 59th FISq F-94As in flight near Cape Cod. F-94As were rushed into service after the Soviets exploded their atom bomb. (USAF)

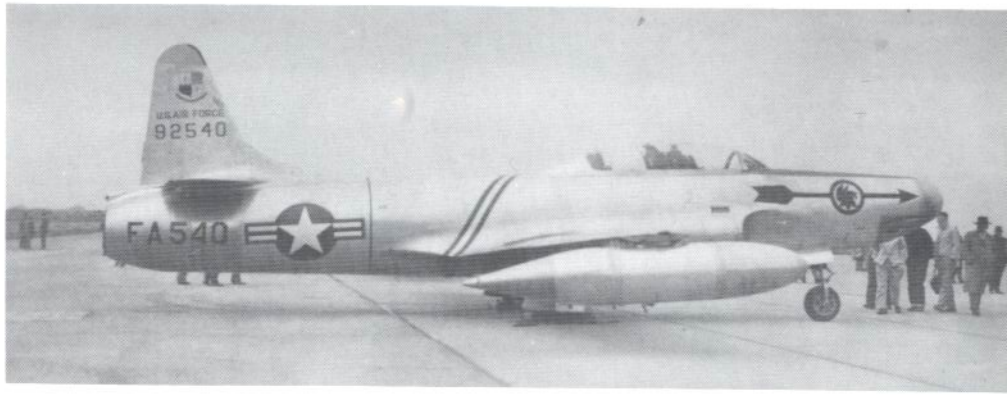
Flight of four 449th FISq F-94As 'tucked-in tight' over the Alaskan mountains. (USAF)



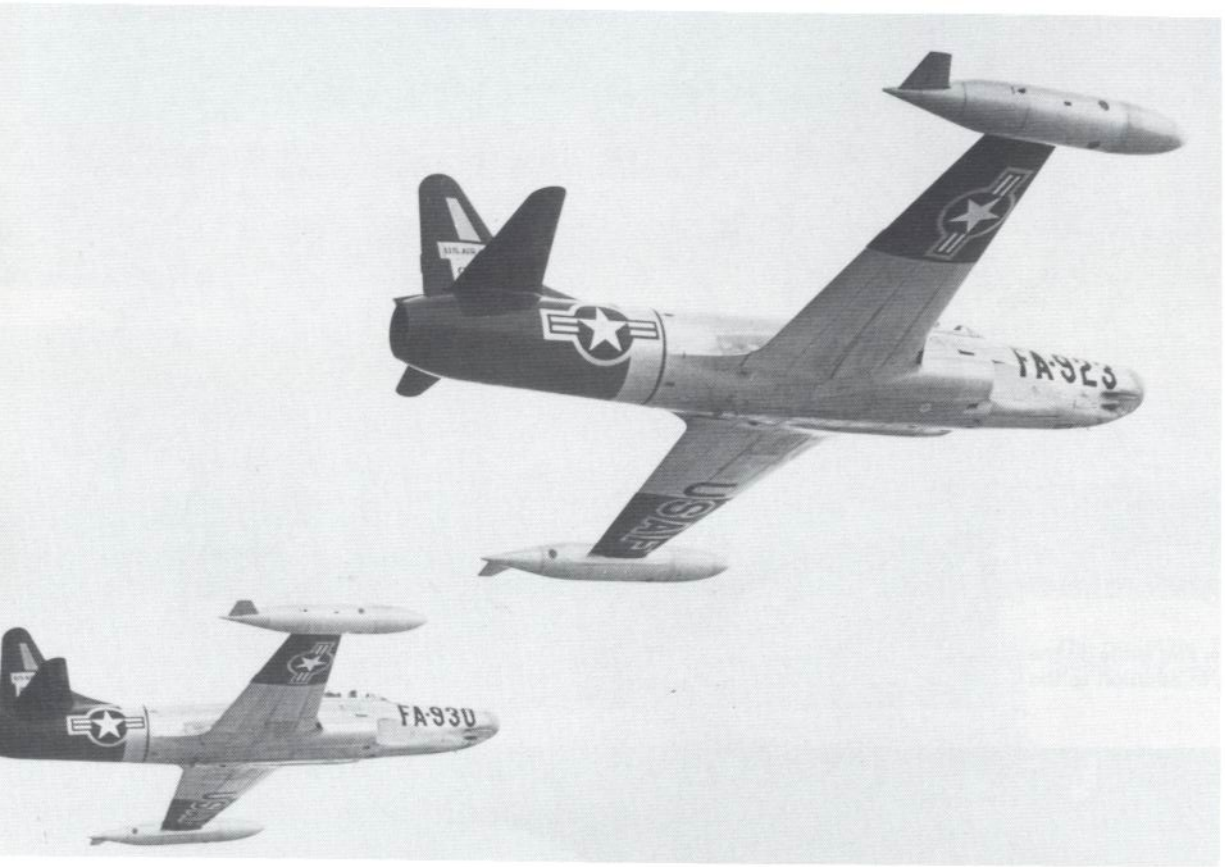
A sharkmouth F-94A from the 61st FISq at Selfridge AFB, Michigan. Note that these aircraft carry no tip tanks. (Wm. J. Balogh Sr.)



An F-94A from the 2nd FISq . Note 'Misawa' type tip tanks normally found only on Korean based F-80s. (Collect-Air Photos)



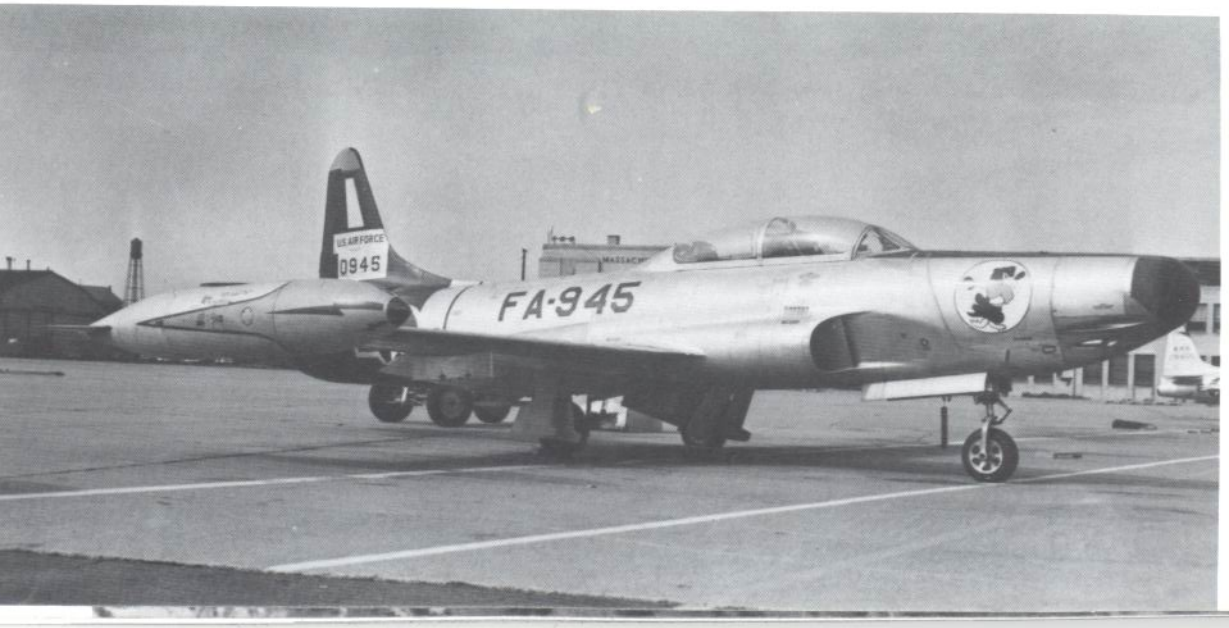
An F-94A from the 449th FISq at Ladd AFB, Alaska in 1951. Note red, yellow and white on the nose doors, speed brakes, main gear doors, and red and black tip tanks, in addition to the standard Arctic paint scheme. (USAF)



An F-94A from the 118th FISq, Connecticut ANG. F-94As and Bs were phased into Air Guard service as F-102s and F-106s became available. (Candid Aerofile)

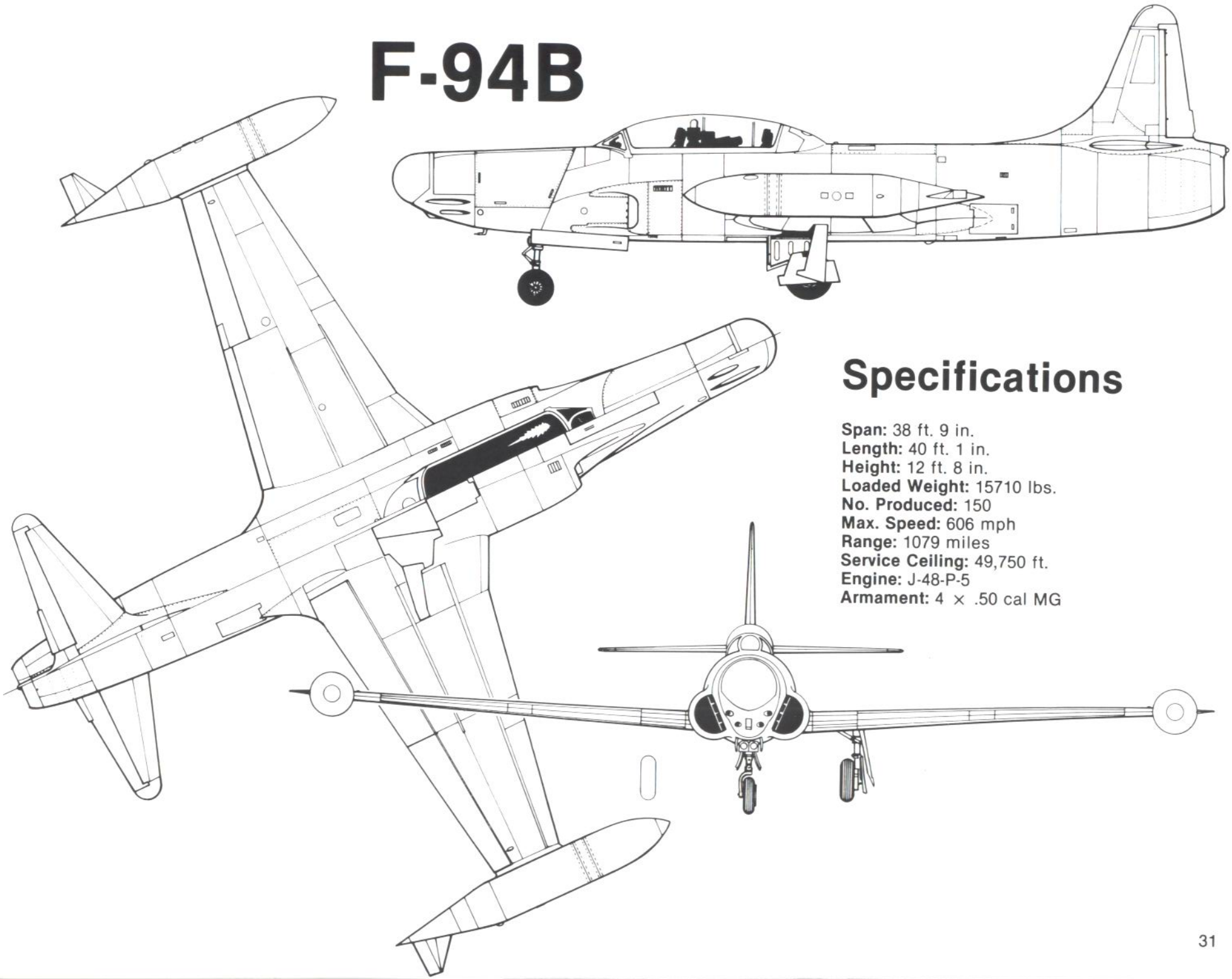
Two F-94Bs from the 66th FISq show the typical Arctic Red paint scheme. Note the silver surround to the nation insignia and "USAF" (AFM)

(Below Left) F-94Bs from the 66th FISq with yellow tank tips and black lightning bolts plus the usual Arctic paint scheme. (Menard)



The F-94B may have passed from USAF's inventory, but its ghost lives on in the form of this T-33A seen at Offutt AFB, NB, 13 February 1980. The trainer has been fitted with an F-94B nose complete with blanked off gun troughs. (LTC George R. Cockle)

F-94B



Specifications

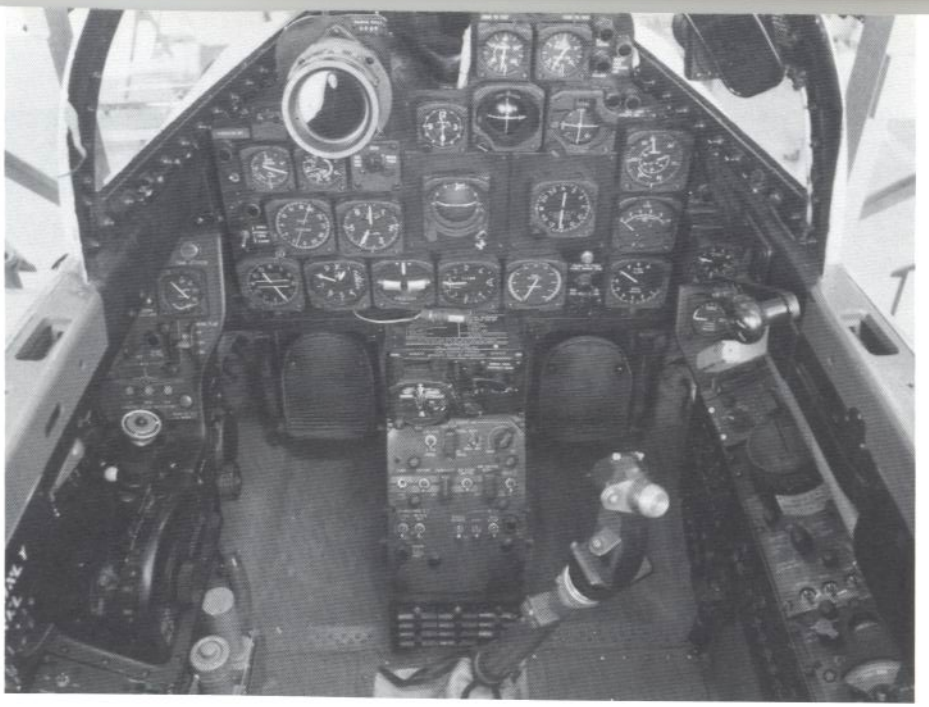
Span: 38 ft. 9 in.
Length: 40 ft. 1 in.
Height: 12 ft. 8 in.
Loaded Weight: 15710 lbs.
No. Produced: 150
Max. Speed: 606 mph
Range: 1079 miles
Service Ceiling: 49,750 ft.
Engine: J-48-P-5
Armament: 4 × .50 cal MG

F-94C Starfire

The F-94C, originally designated F-97, actually was on the drawing boards more than a year before the F-94B. But all the design changes, some incorporating untested equipment, held up production for another three years. The F-94C was an entirely new aircraft from rocket nose to tailtip. It had its all-rocket armament wrapped around a new Hughes E-5 Fire Control. The wings were much thinner and had far more dihedral. Horizontal tail surfaces were swept back and the fuselage dive brakes were moved to the rear fuselage sides. A completely new engine - the Pratt & Whitney J48-P-5, with 8300 lbs. thrust in afterburner - was fitted into the redesigned aft fuselage. Later models also included two rocket pods built into the leading edges of the wings.

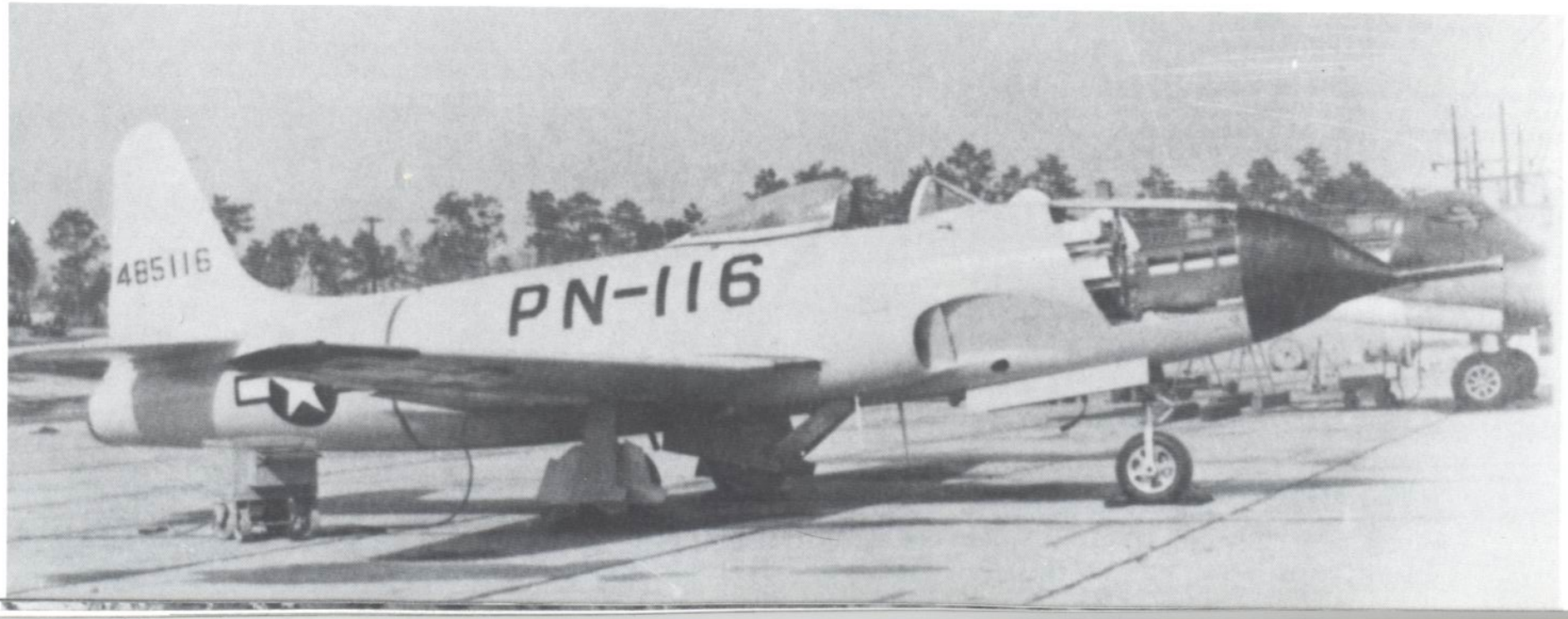
Problems plagued the early development of the F-94C. Lockheed had promised delivery of a production F-94C in 1951. But this time the schedule could not be met - there were simply too many untested items at one time. Neither the new engine nor the laminar flow wing designed specifically for the F-94C would be ready on time. Testing of the new electronics packages and armament system was not even due to start until 1951. Engine problems arose and were not completely cured until well into the production run. One particularily annoying problem was that when all the nose rockets were fired at once, a flameout frequently occurred.

But the problems were slowly ironed out and the F-94C went operational with the 437th FISq at Otis AFB on 7 March 1953, nearly two years behind schedule. Operation Hop-Up was a program that fixed many of the problems. The E-5 Fire Control System was improved, 'weather-proofing' and leaky fuel tanks were sealed, and safer ejection seats were installed. With the problems ironed out, the F-94C really started to perform. By mid-1954 the F-94C was the best two-man intercepter in the world. Indeed, F-94Cs swept the honors at the Air Force Gunnery Meets held at Yuma AFB throughout all of 1954. Although not liked by Air Force brass, the F-94C was praised by air and ground crews alike. F-94Cs remained in active Air Force service until late 1959. There were a total of 387 F-94Cs built.



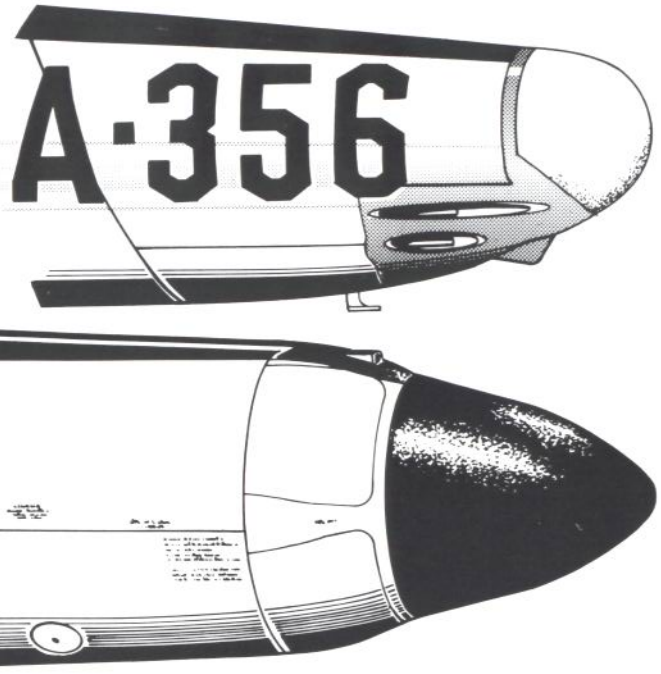
The F-94C front cockpit, now painted in medium gray with black consoles. (Lockheed)

The actual prototype of the F-94C rocket installation was this test P-80A with a single rocket launcher in the nose. Note the hole forward of the intake for rocket blast relief. (AFM)

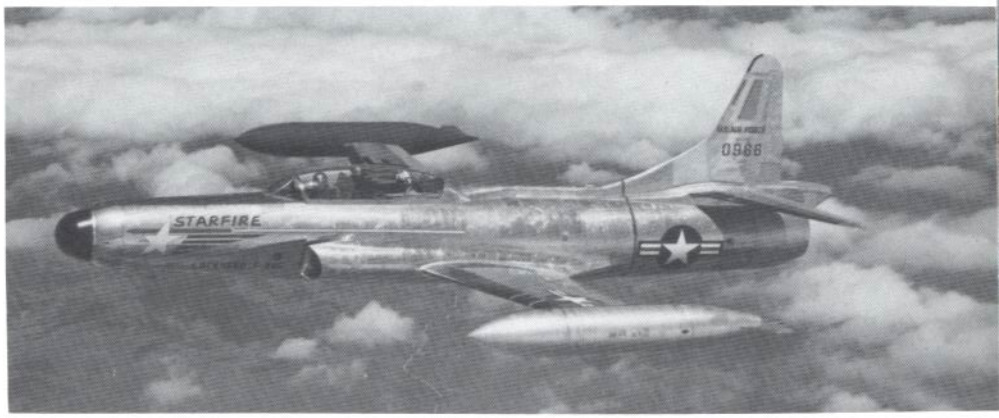


F-94B #50-955 was the test bed for many F-94C features including the new canopy, swept tail surfaces, tip tank design (not adopted) and the new fire control system. (AFM)

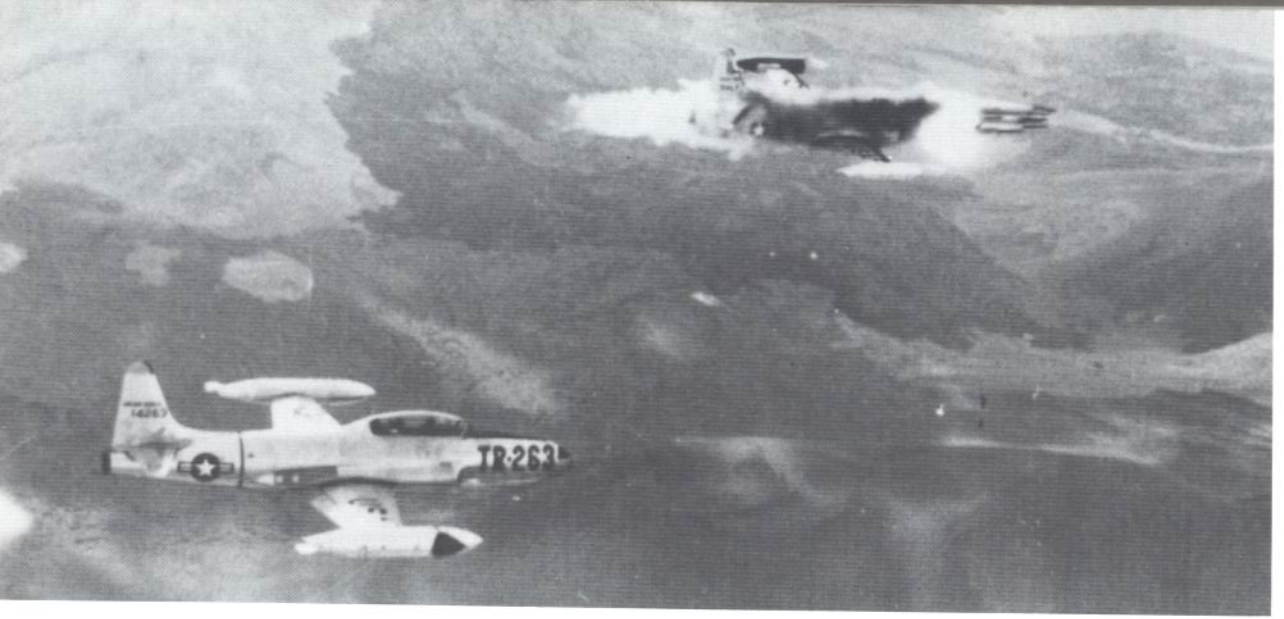
Nose Development



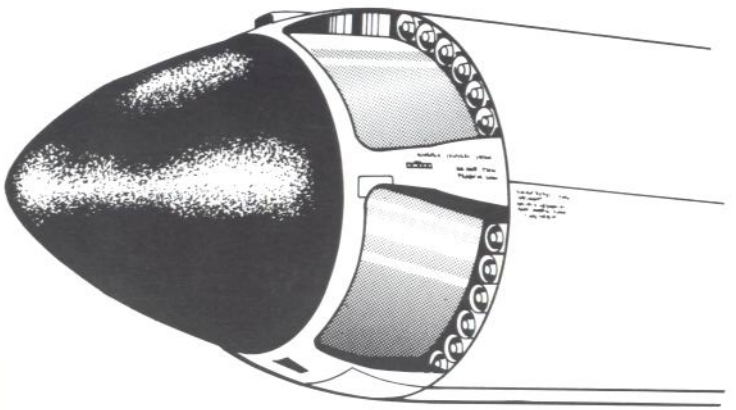
A fine inflight study of an early F-94C carrying the 'Starfire' name and logo. At this point in the development the wing rocket pods had not been added. (USAF)



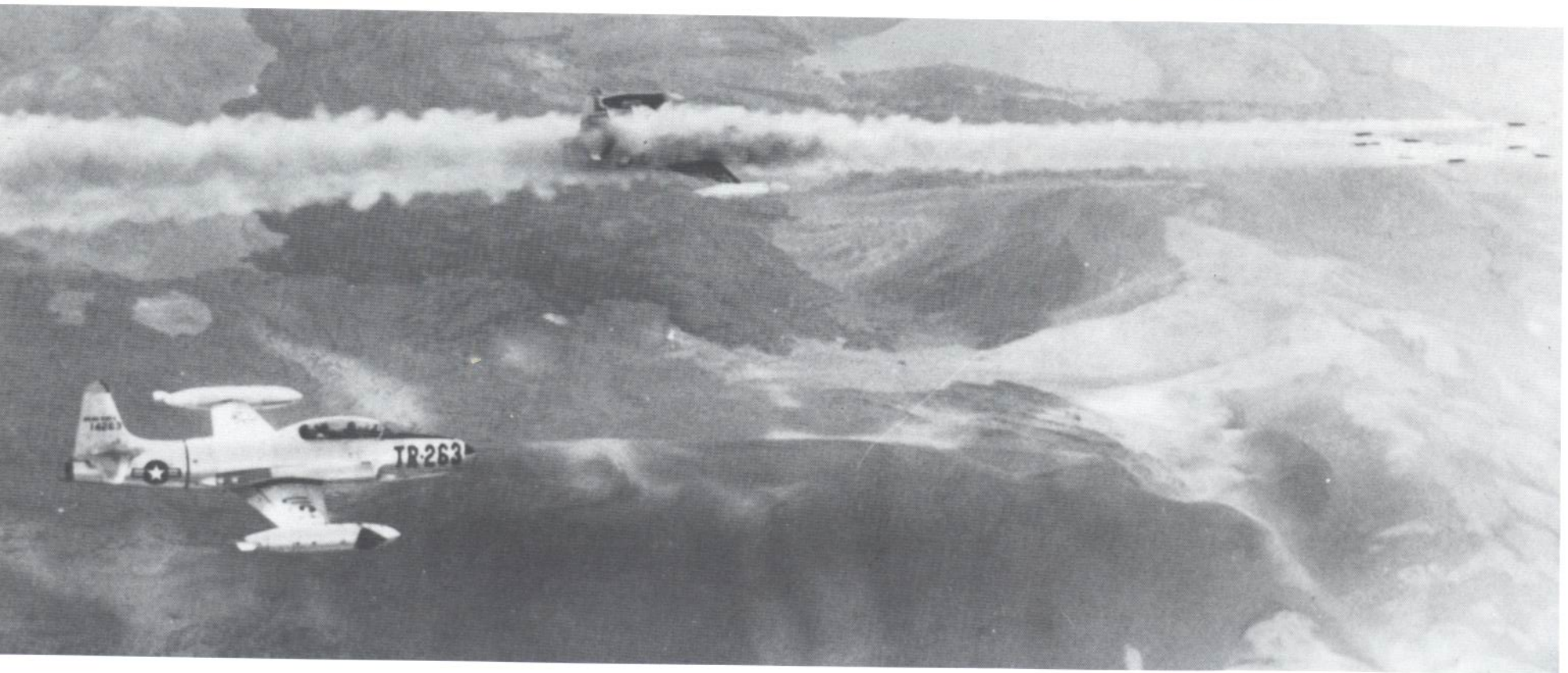
A colorful F-94C streaming its chute at Philadelphia Airport in 1955. The F-94C was the first version to use a drag chute. (USAF)



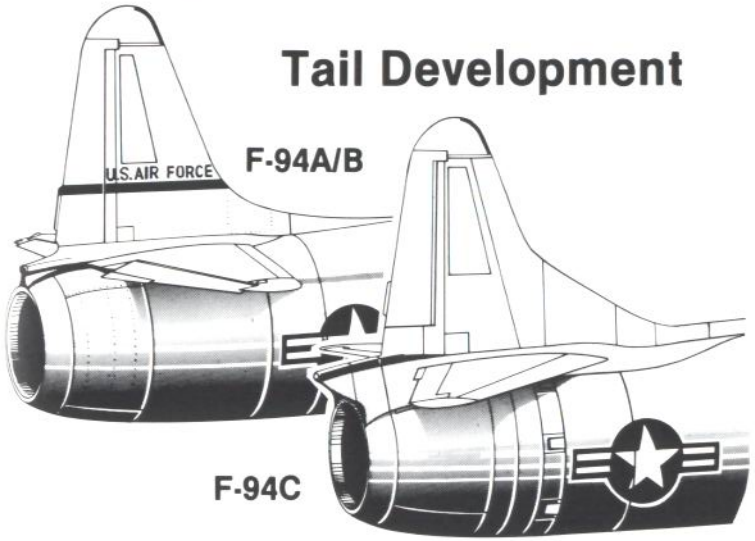
F-94C Rocket Doors (open)

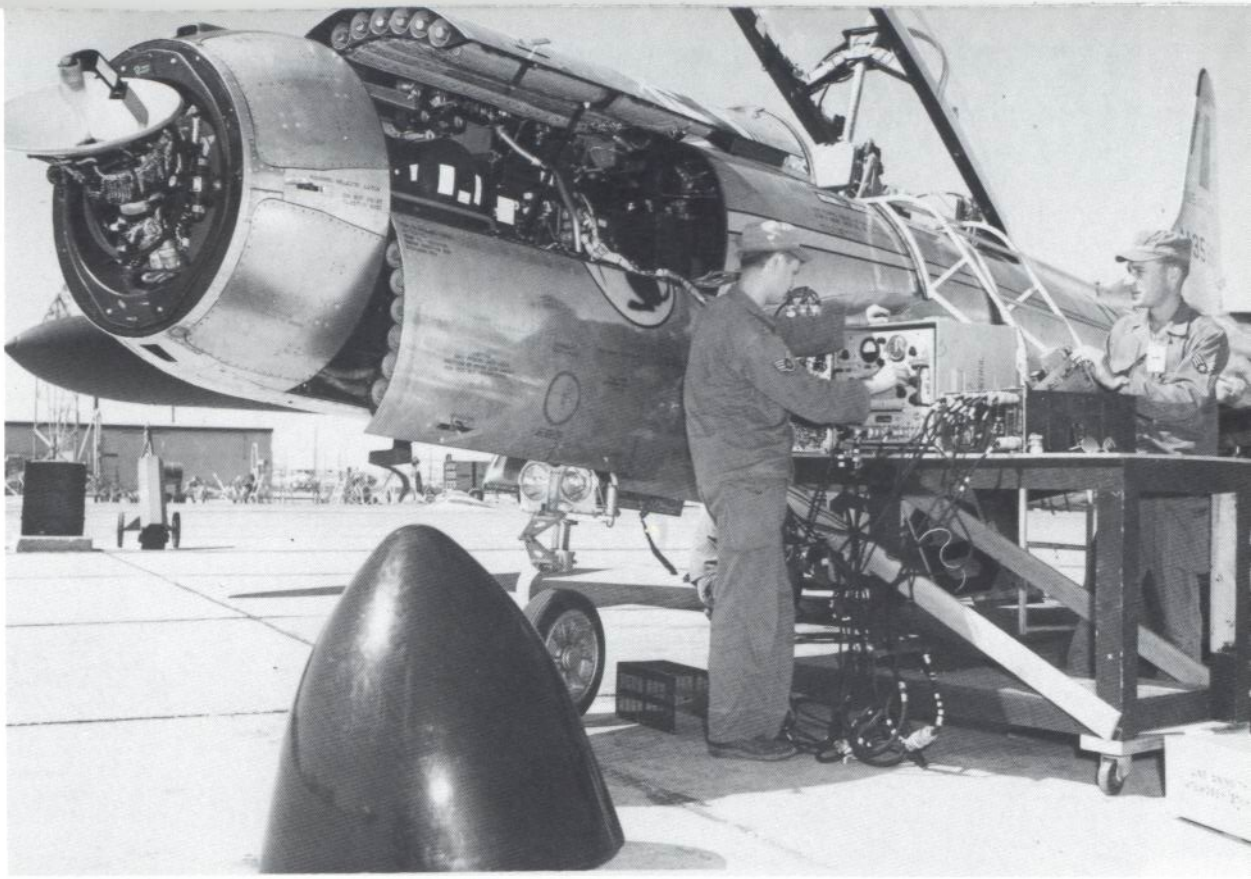


An F-94C firing the nose rockets. Note that the crew cannot see forward after the firing. (AFM)



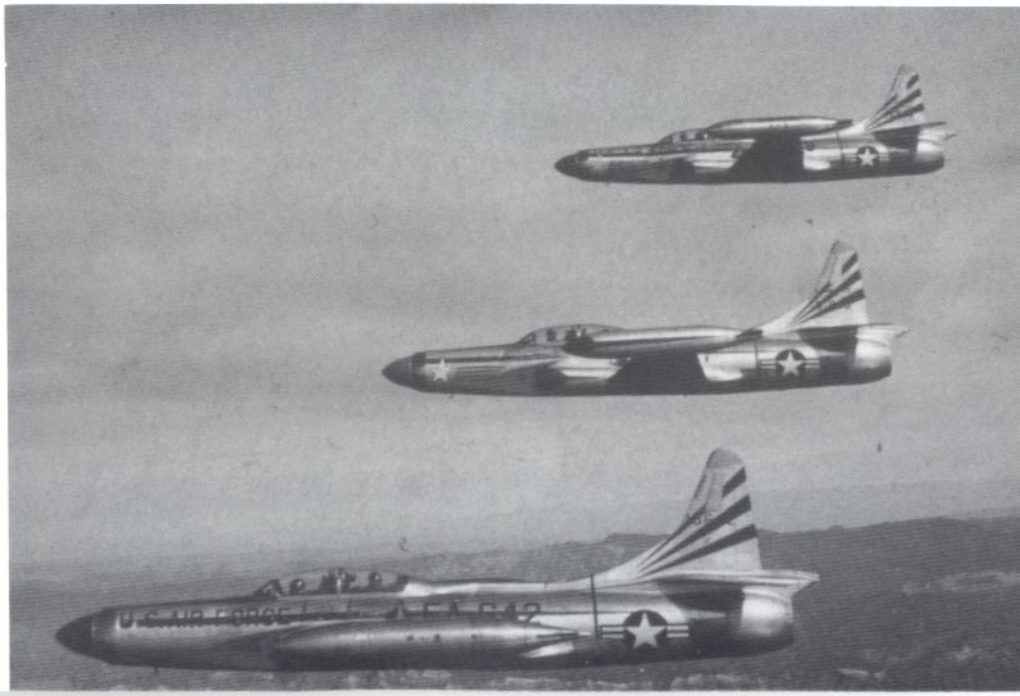
Open radar and armament bays of an 84th FISq F-94C. Note the rocket 'tubes'. The rocket doors hinge at the front and open when the rockets are fired. (USAF)

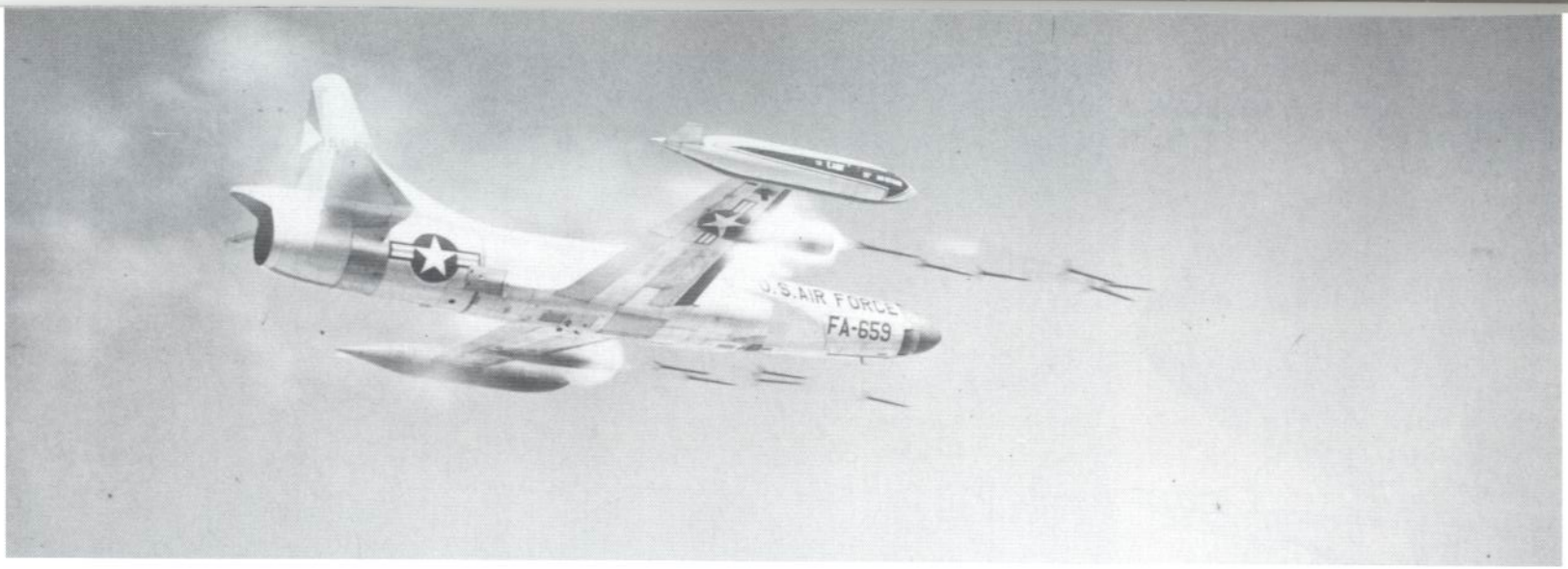




(Below Right) F-94-Cs of the 354th FISq which adopted the Starfire logo as the unit insignia when they transitioned into the F-94C. (USAF)

F-94C radar operators scope. The scope is hinged and slides forward when not in use. (USAF)



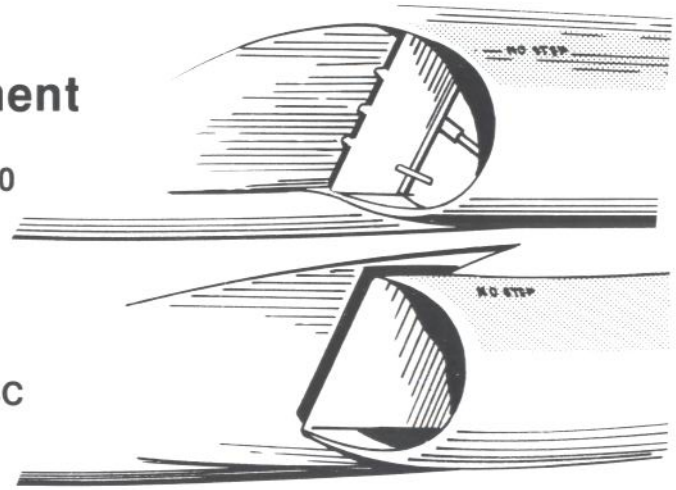


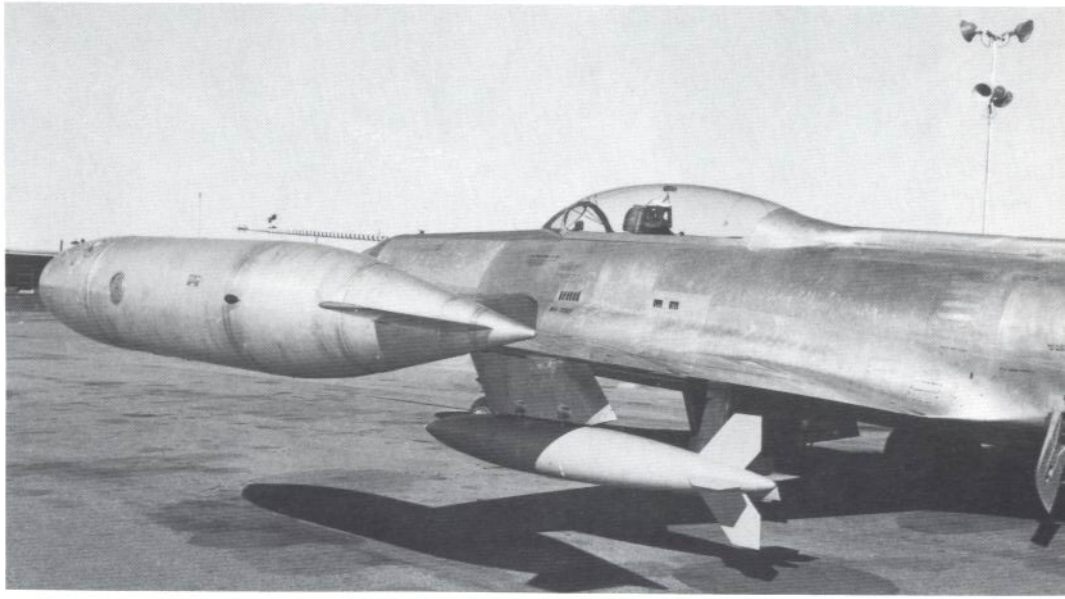
A 26th Air Division F-94C fires a volley from the newly developed wing pods. Note the fins on the rockets unfolding (AFM)

A very clean F-94C of the 84th FISq at the Yuma Air Gunnery Meet in 1954. Very clean aircraft were a trademark of Air Defense Command. (USAF)

Triple Nickel **from the 27th FISq at Wright-Patterson AFB in the mid-'fifties. (Wm. J. Balogh Sr.)**

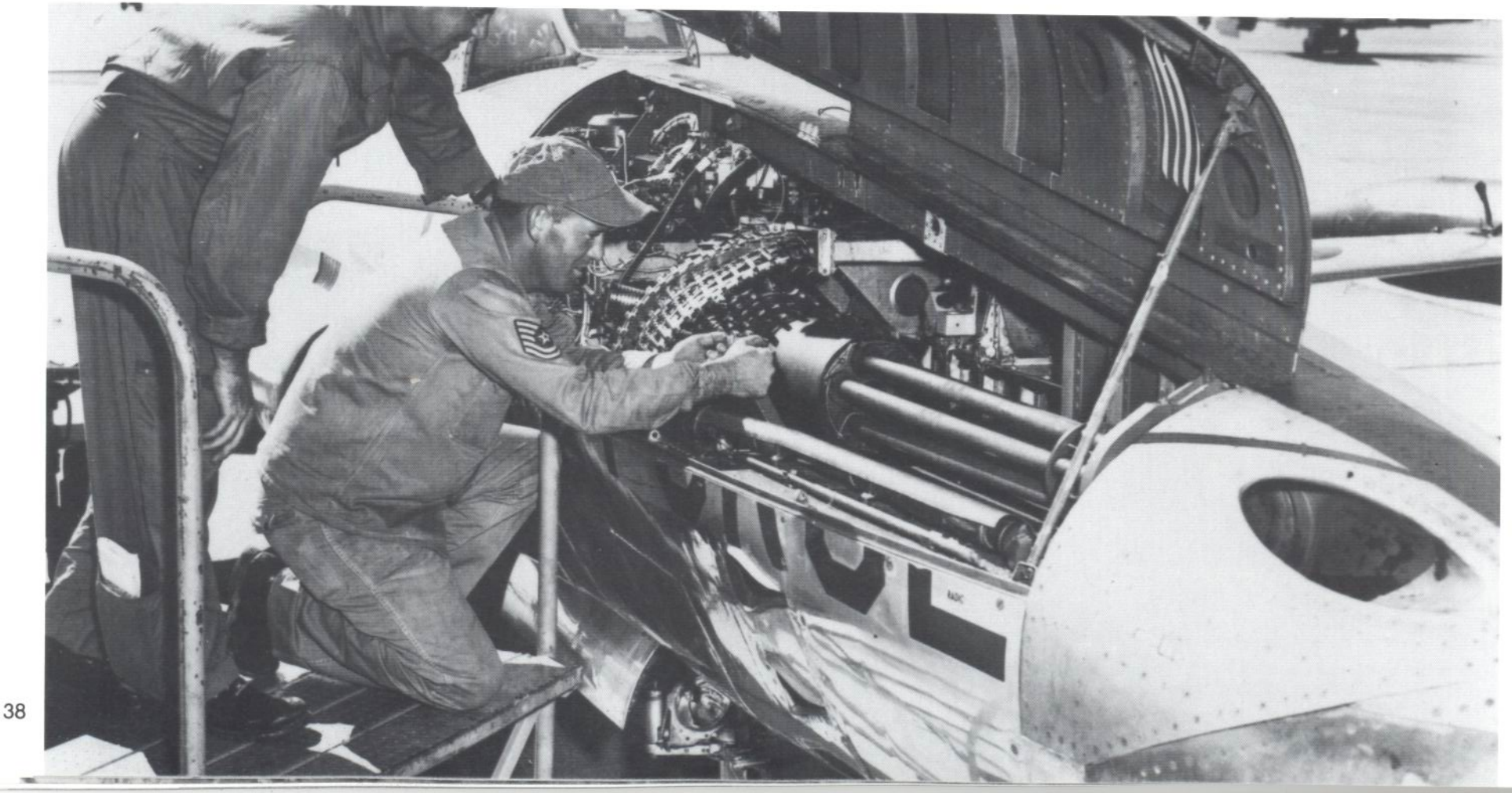
Intake Development



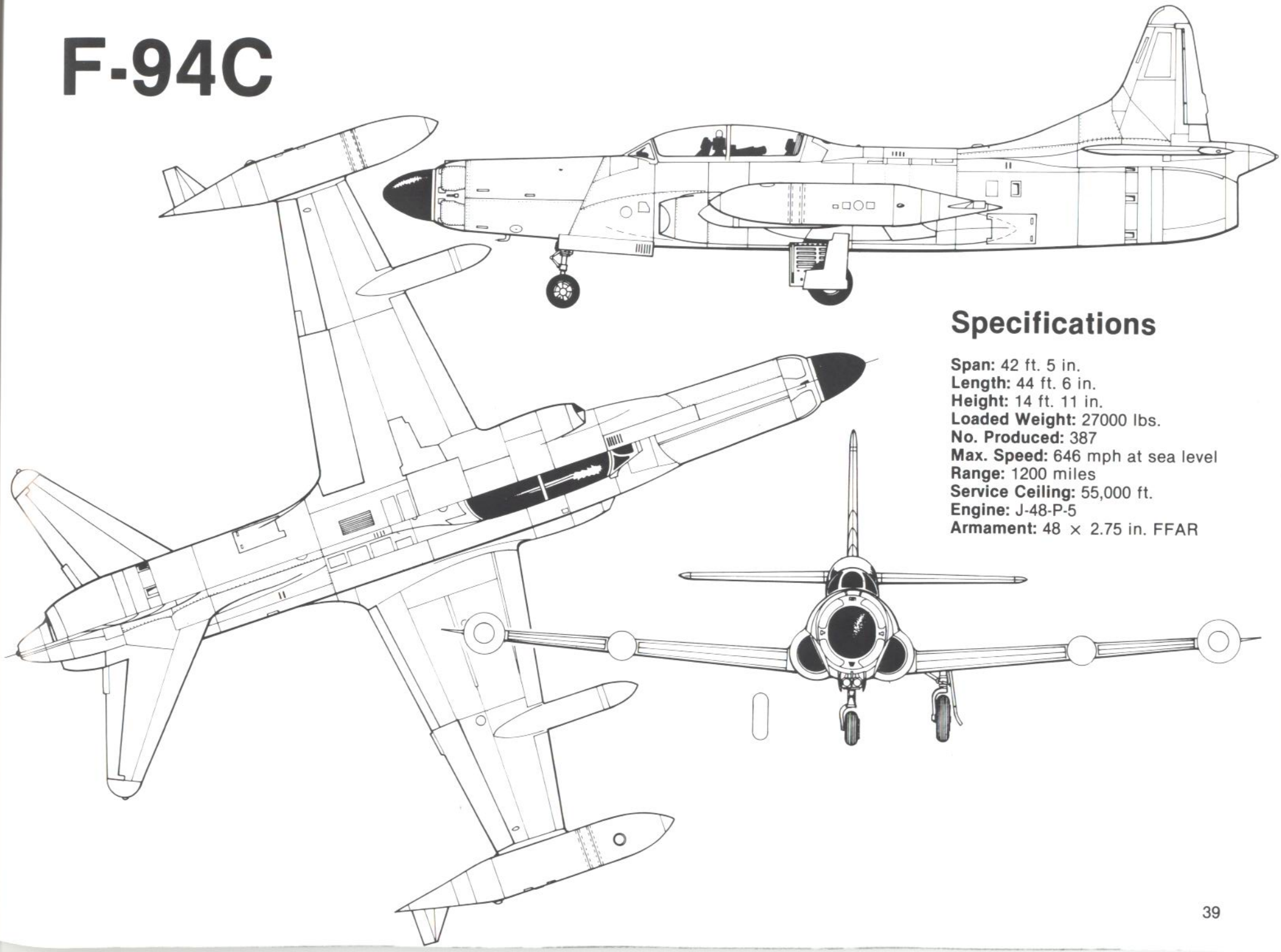


A rare photo of the one and only F-94D Fighter-Bomber Starfire. Note the 500 lb. bomb on pylon and single seat cockpit. (Lockheed)

F-94C #51-5500 was fitted with a General Electric M-61 Vulcan rotary cannon, later used in the F-104 Starfighter. (USAF, Baker via Trump)



F-94C



Specifications

Span: 42 ft. 5 in.
Length: 44 ft. 6 in.
Height: 14 ft. 11 in.
Loaded Weight: 27000 lbs.
No. Produced: 387
Max. Speed: 646 mph at sea level
Range: 1200 miles
Service Ceiling: 55,000 ft.
Engine: J-48-P-5
Armament: 48 × 2.75 in. FFAR

Shooting Stars over Korea

When the Korean War broke out on June 25, 1950, Far East Air Force (FEAF) was called on to secure the skies over South Korea. F-80 Shooting Stars were the most prevalent aircraft type available to FEAF, which had 365 F-80s in the assigned total of 553 aircraft. The 8th FBWg, 35th FIWg, and 49th FBWg, all with F-80Cs and based in Japan, and the 51st FIWg based at Naha, Okinawa, were all pressed into action covering the evacuation of U.S. personnel from Korea.

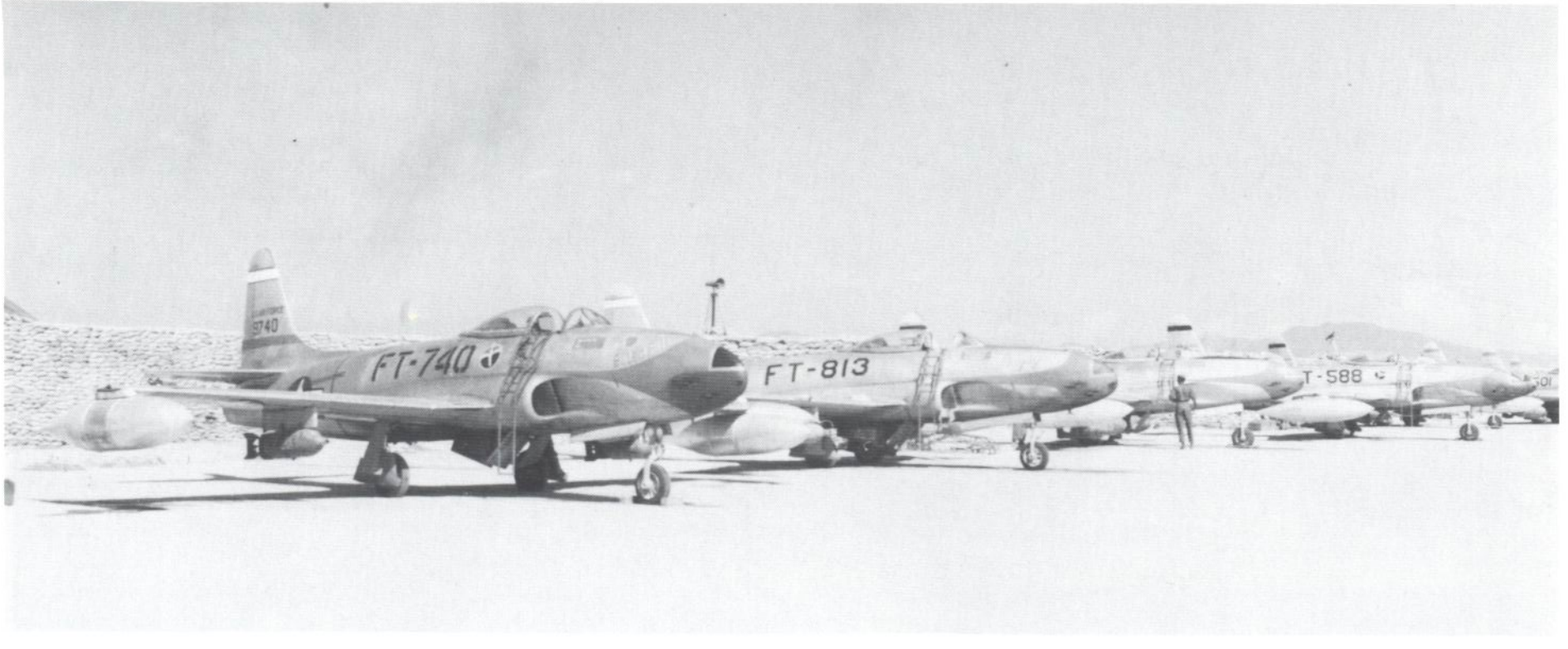
It wasn't long until the F-80s drew first blood. On the afternoon of the second day of the war, 27 June, North Korean Yaks attempted to interrupt the evacuation at Kimpo AB. F-80s from the 35th FBSq, 8th FBWg, were on patrol over the base. When the fight was over, about two minutes after it had begun, four Yaks had been shot down with no F-80s even hit. Capt. Raymond Schillereff and Lt. Robert Dewald each got one, while Lt. Robert Wayne shot down two. The F-80, born to fight in World War 2, had finally been blooded.

The majority of F-80 missions, however, were not to be the glamorous air superiority type. They were the air support missions needed to break the armored spearhead of the Communist armies. In the early going, inexperience with the F-80 (some units had just transitioned into the aircraft) led to the conversion of some squadrons back to the F-51D Mustang. This was temporary, however, and most units were back in their F-80s by 1951.

After the North Koreans closed the Pusan Perimeter, the F-80s started operating from bases in Japan. This meant long flights in the cramped cockpit of an F-80. The typical mission flown by 8th FBWg pilots from Itazuke Air Base was two hours forty minutes long. And in 1951, some F-80 crews started flying "back to back" missions - morning takeoff from Itazuke, fly the mission to N. Korea, land, refuel and rearm at Taegu, Korea, fly a second mission, land and refuel again at Teagu, then the flight home to Itazuke. It made for a full day of combat flying.

On November 8, 1950, the first jet-vs-jet aerial combat took place in an area in northwest Korea later known as "MiG Alley". Several days prior to the fateful day, MiG 15 jets had been encountered by USAF F-51Ds on patrol near the Yalu River. Although no Mustangs were lost, it was obvious that they were no match for the speedy MiGs. FEAF countered the threat by increasing F-80 combat patrols in the Yalu River area. On the afternoon of 8 November, Lt. Russell Brown, 16th FISq, outmaneuvered two attacking MiG 15s, tacked onto the tail of one of them, and poured .50 caliber fire into him until the MiG exploded. It was the first of 827 MiGs to be shot down in Korea and the first jet-vs-jet victory ever.

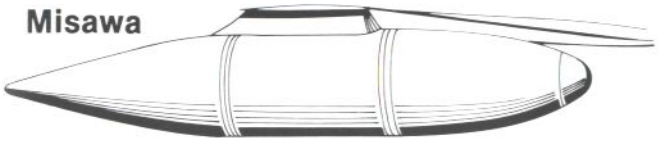
51st FIWg F-80Cs on line at K-13, Ellen F.II **and** Bugsy **lead the line. In the early part of the war the 51st was charged with air superiortiy over Korea. After the MiGs arrived in November 1950, the F-80 was relegated to fighter-bomber missions. (USAF)**



Panther Queen **when she was with the 8th FBGp in June 1950. The 8th changed their markings to the sunburst tail in August 1950. (Sides/Olmsted)**

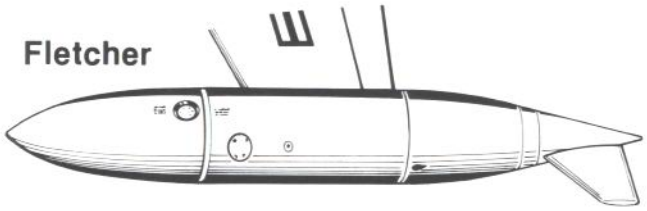
Drop Tanks

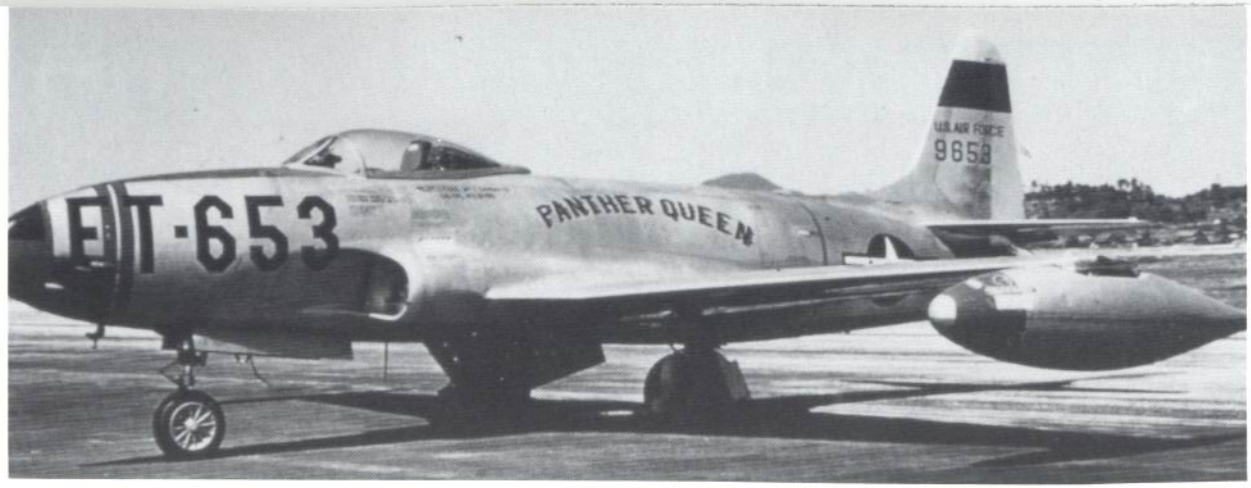
Misawa



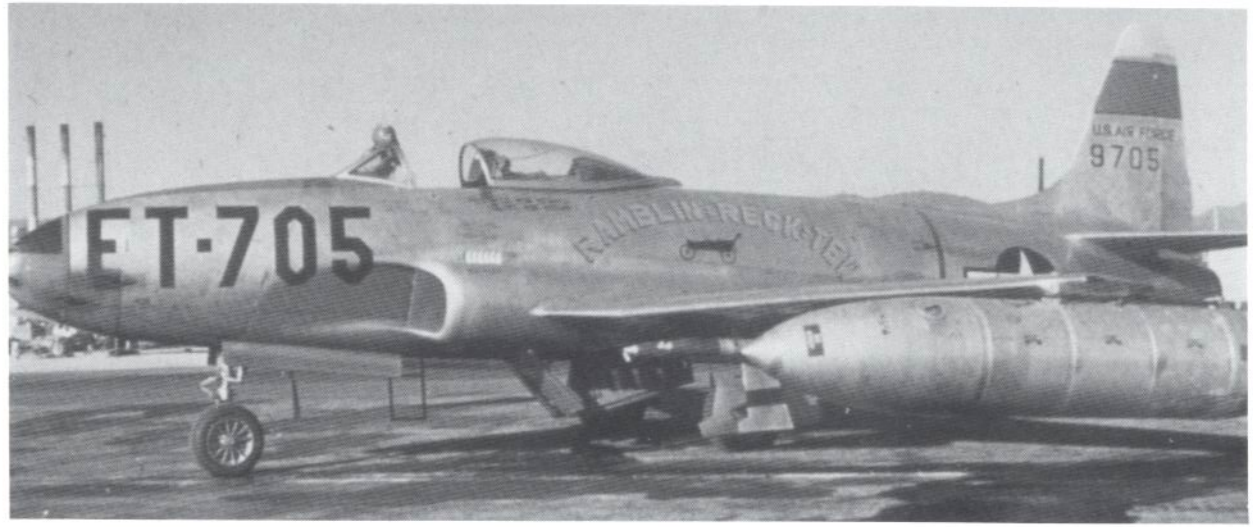
Standard

Fletcher

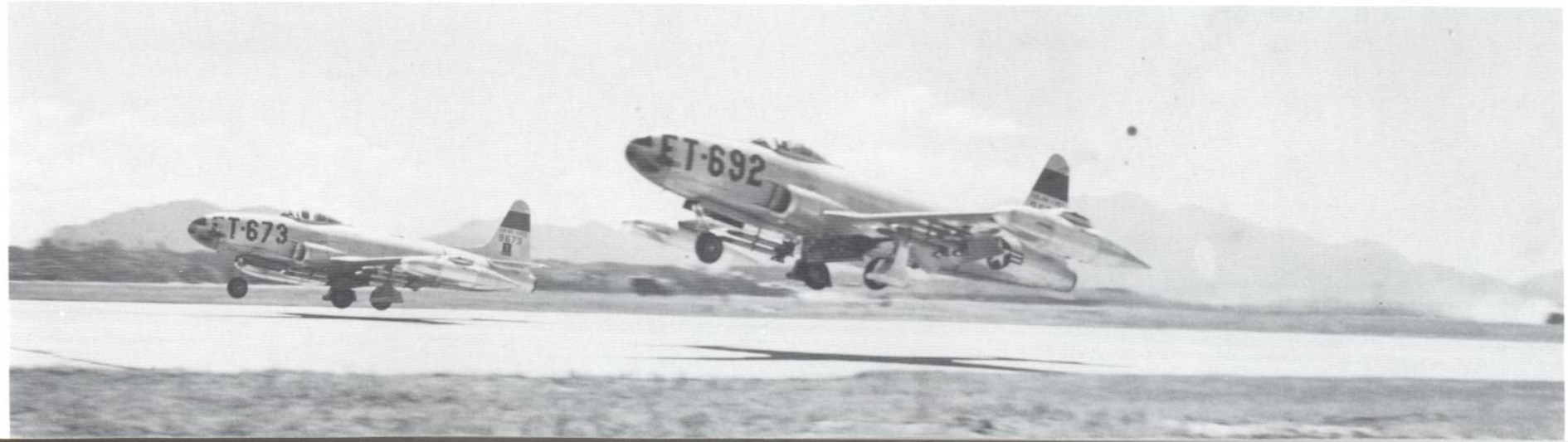


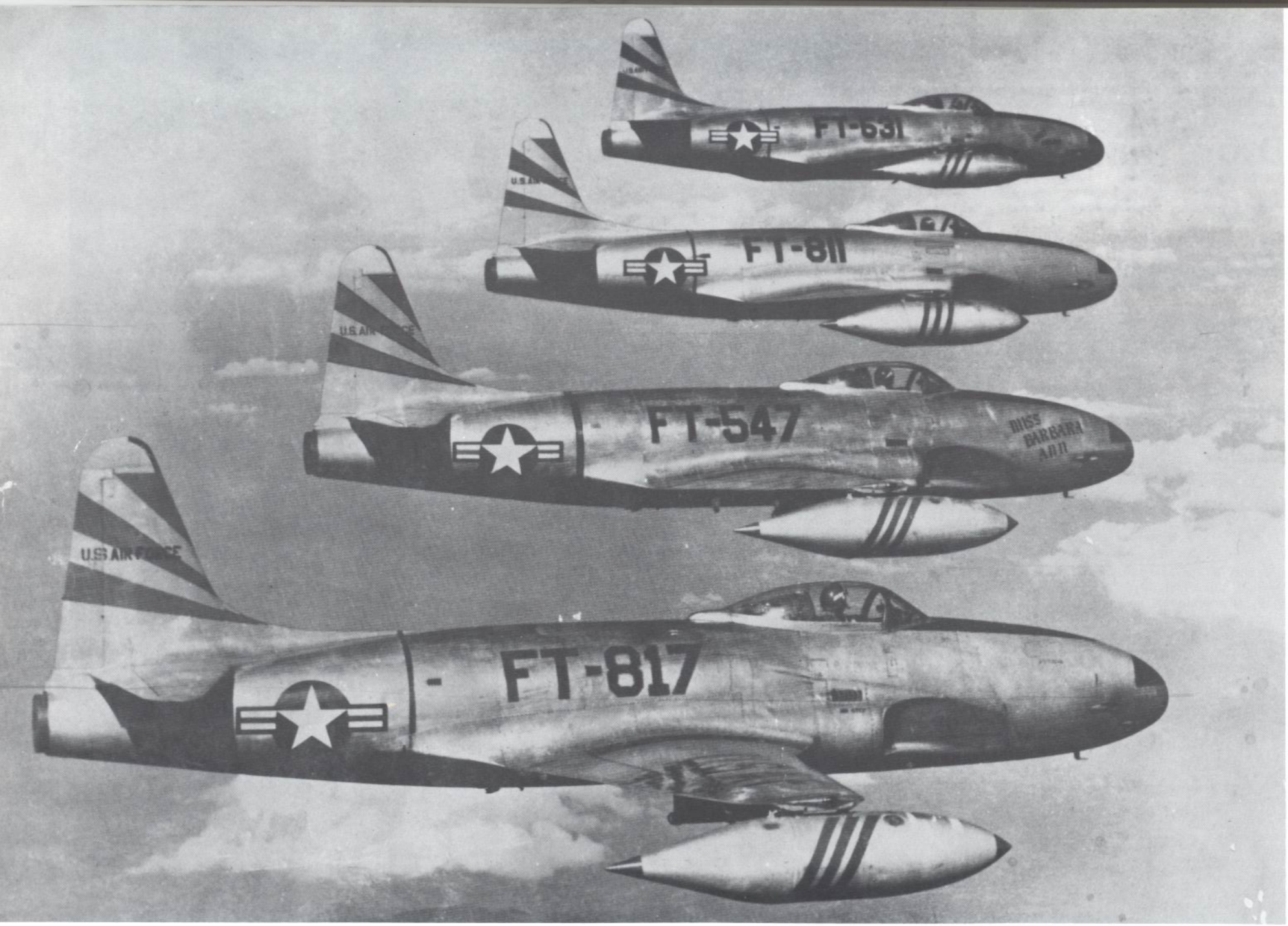


Ramblin'-Wreck-Tew **was the personal mount of 1Lt. Robert Dewald, 35th FBSq/8th FBGp. Lt. Dewald got one of the first F-80 kills when he downed an IL-10 on 27 June, 1950. (Dewald/Thompson)**



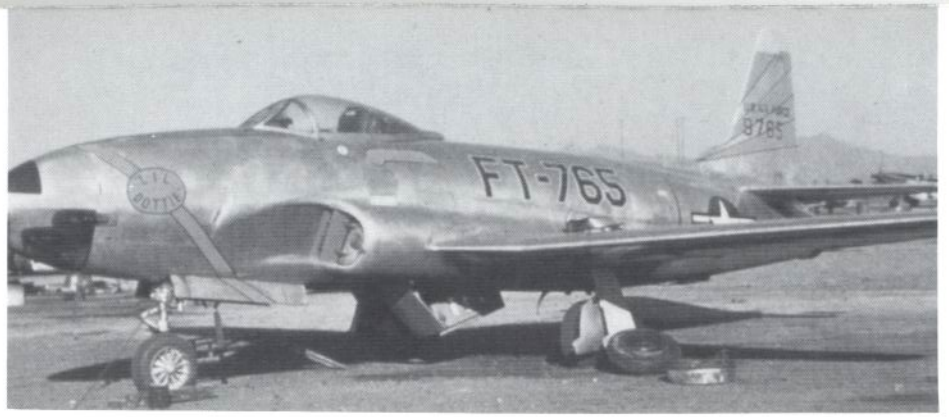
A pair of 35th FIWg F-80Cs lift off from Taegu on a tank hunting mission in August 1950. (USAF)





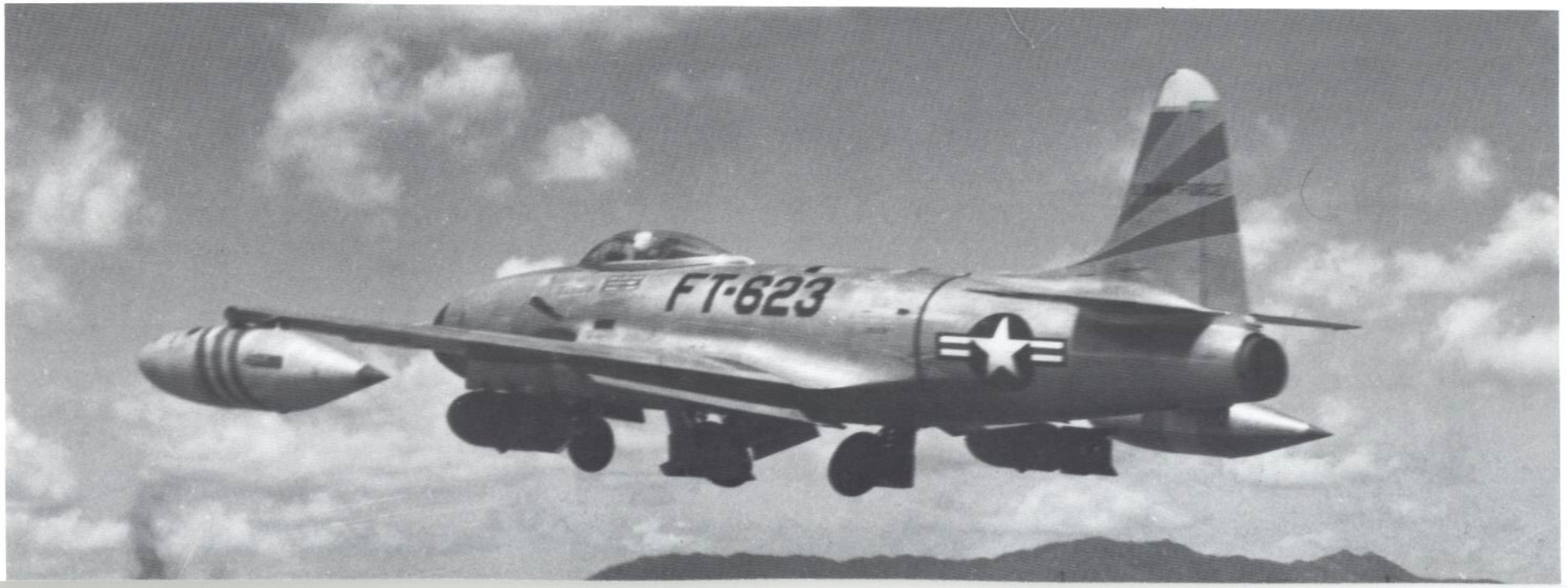
This famous shot of 36th FBSq F-80Cs includes Miss Barbara Ann **as found in the Monogram kit. (USAF/Demint)**

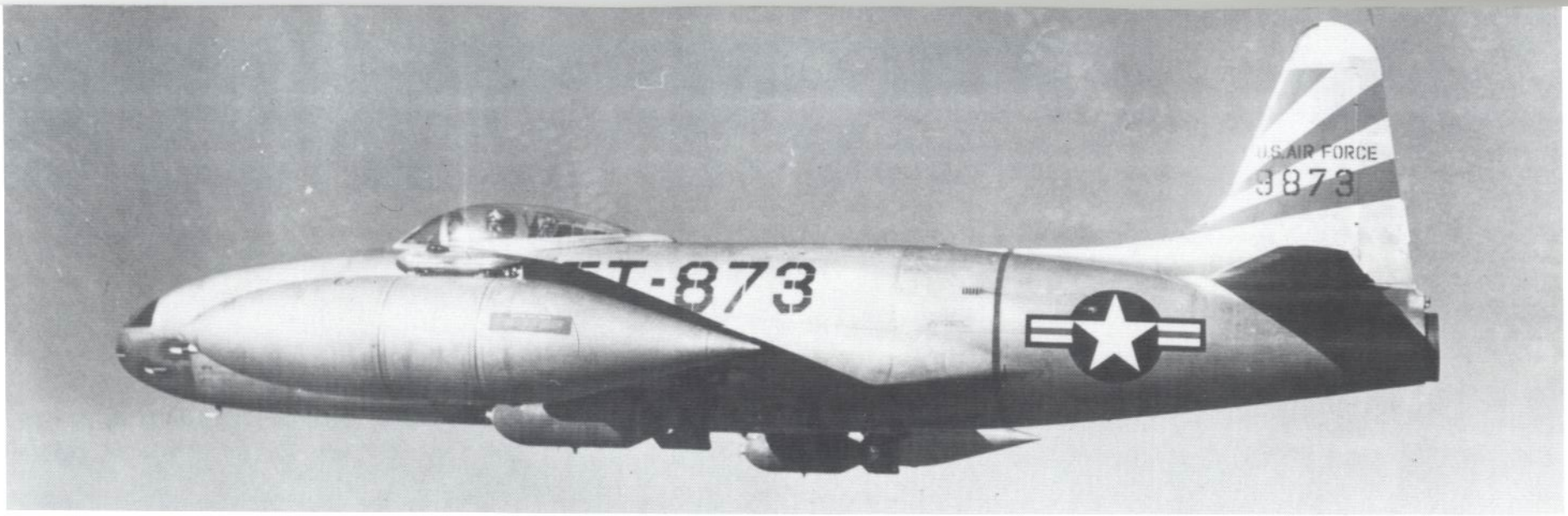
"Li'l Dottie" was the personal aircraft of Capt. Roy Marsh of the 80th FBSq. Marsh had three North Korean aircraft to his credit. (Marsh/Thompson)

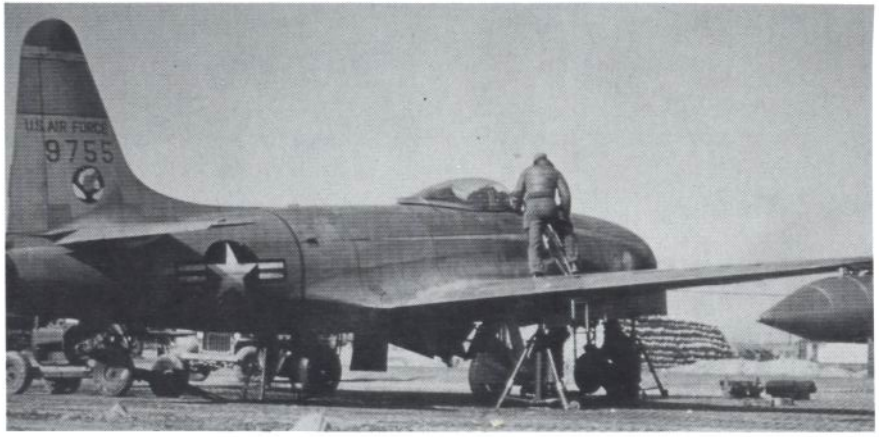


(Bottom) A 36th FBSq F-80C with a typical load of two 1000 lb. bombs and two 'Misawa' tip tanks. (USAF)

Bobbie and a mate take off on a mission against the Communists in October 1952. The F-80C was excellent in the interdiction role. Both aircraft are yellow sunburst 80th FBSq birds. (USAF)



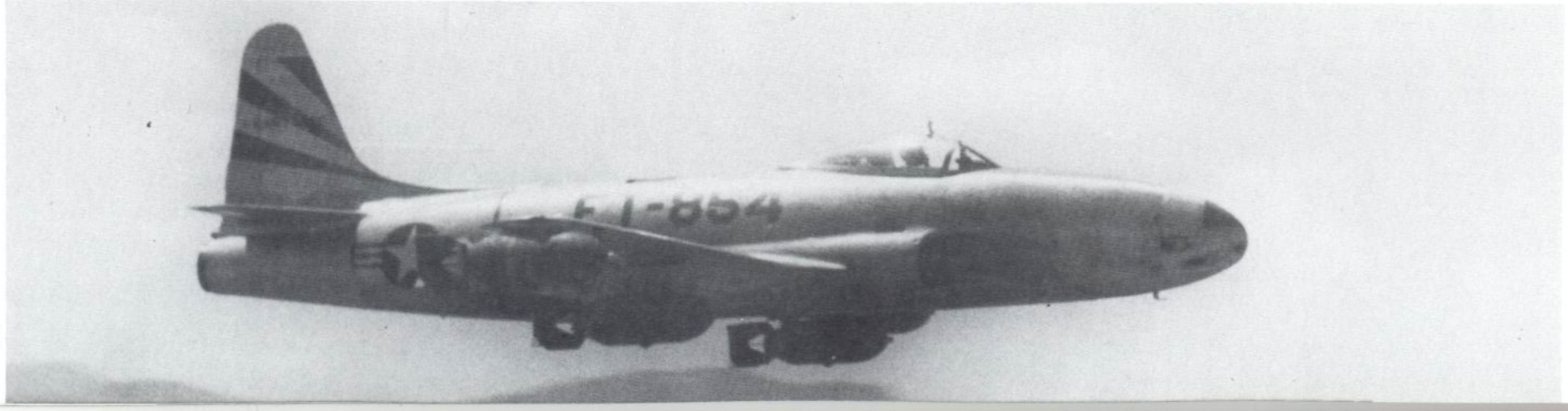


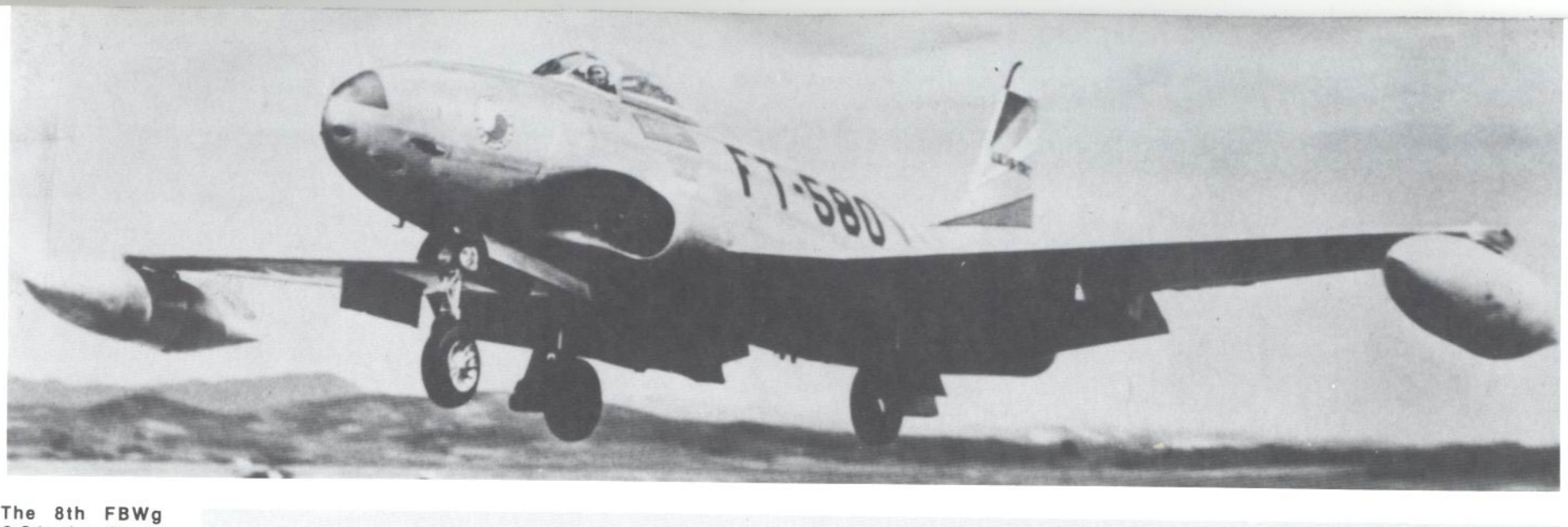


This F-80C shows the typical appearance of Shooting Stars in Korea. The larger 'Misawa' wing tanks carried more fuel and gradually replaced the original Lockheed tip tanks. Used for fighter-bomber missions during most of the Korean conflict, F-80s usually carried 500 lb. bombs on wing racks. This plane is from the 36th FBSq. (USAF)

An F-80C from the 35th FIWg at K-13 in 1952. The 35th was charged with air defense over Japan but had two of its squadrons operational in Korea until late 1952. (USAF)

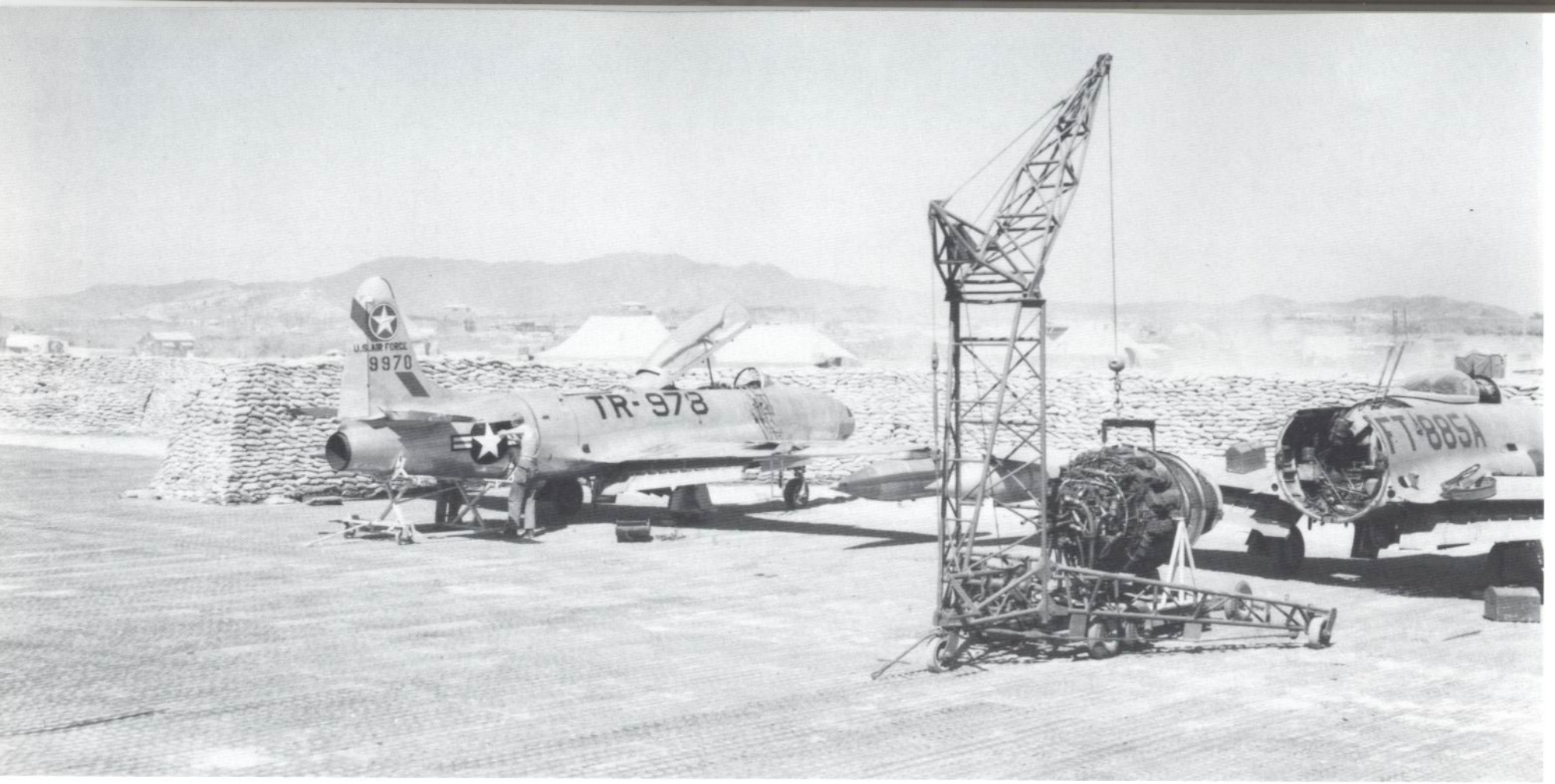
A not-unusual load for F-80Cs was four 1000 lb. bombs. Range with this heavy load was extremely short, about 100 miles, since no wingtip tanks were carried. (USAF)





The 8th FBWg C.O.'s aircraft was denoted by the three color sunburst on the tail. The 8th FBWg converted to F-86F fighter-bombers soon after this photo was taken 1 March 1953. (Chapman)

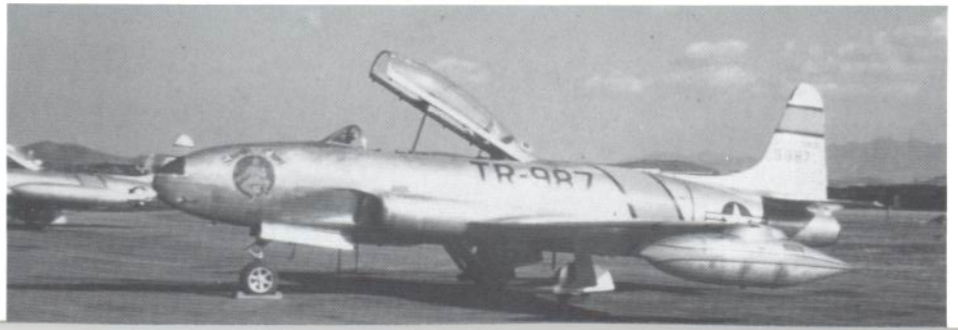
Markings on the 8th FBWg F-80Cs got pretty wild toward the end of the war as evidenced by the sharkmouthed Beer City Special from the 36th FBSq. (Owen)



A T-33A from the 116th FBGp, an F-84 unit, undergoes an engine change at K-14. The 116th was a Texas ANG unit called into active service. (USAF)

"Rice Paddy Daddy", a T-33 hack from the 51st FIWg, ran into some flak over N. Korea and had to land in its namesake near Suwon. (Chapman)

All fighter units had T-33As assigned for combat orientation flights. Skoshi Chief is from the 4th FIWg. The I.D. bands, tip tank flashes are yellow with black borders. The Skoshi Chief figure is flesh on a blue disc with the name in black.

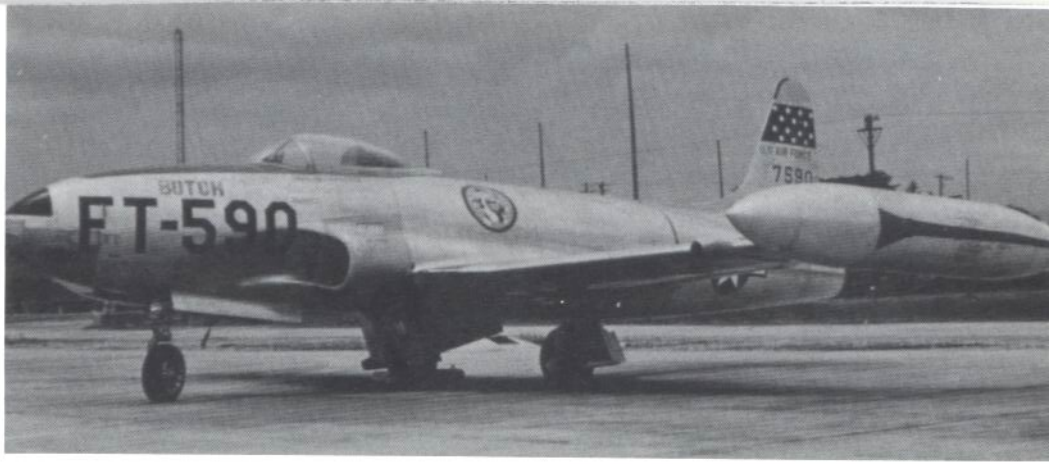


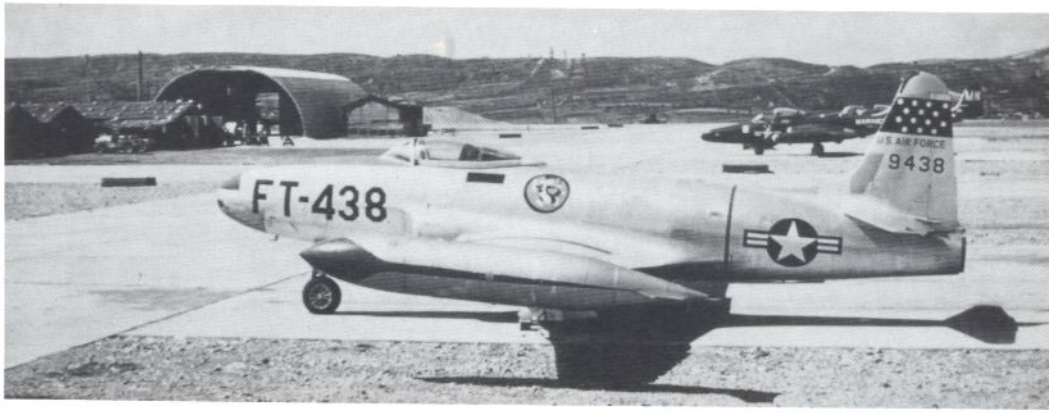
RFs over Korea

Photo reconnaissance played a vital part in the Korean War. And again the job fell to the F-80. RF-80s from the 67th TRWg flew sortie after sortie deep into MiG Alley, trying to keep tabs on the MiG activities north of the Yalu. It was easily the most hazardous of all F-80 duties. Flying "alone, unarmed and unafraid (??)" straight into the MiG 15's den, the pilots of the 67th consistently brought back the needed photos. Sometimes their aircraft were shot to pieces or badly bent by extreme 'G' forces encountered trying to evade the MiGs. But they came back! In three years of combat flying only one RF-80 was lost in the MiGs.

When the war ended the F-80 had rolled up an impressive set of statistics; 97,126 sorties delivering 33,266 tons of bombs, 8327 tons of napalm, 80,935 rockets, and firing 588,344,000 rounds of 50 caliber ammo. There were 277 operational losses but only 15 to the MiGs - 14 F-80Cs and one RF-80. In return, the F-80s shot down 17 enemy aircraft, including 6 MiG 15s.

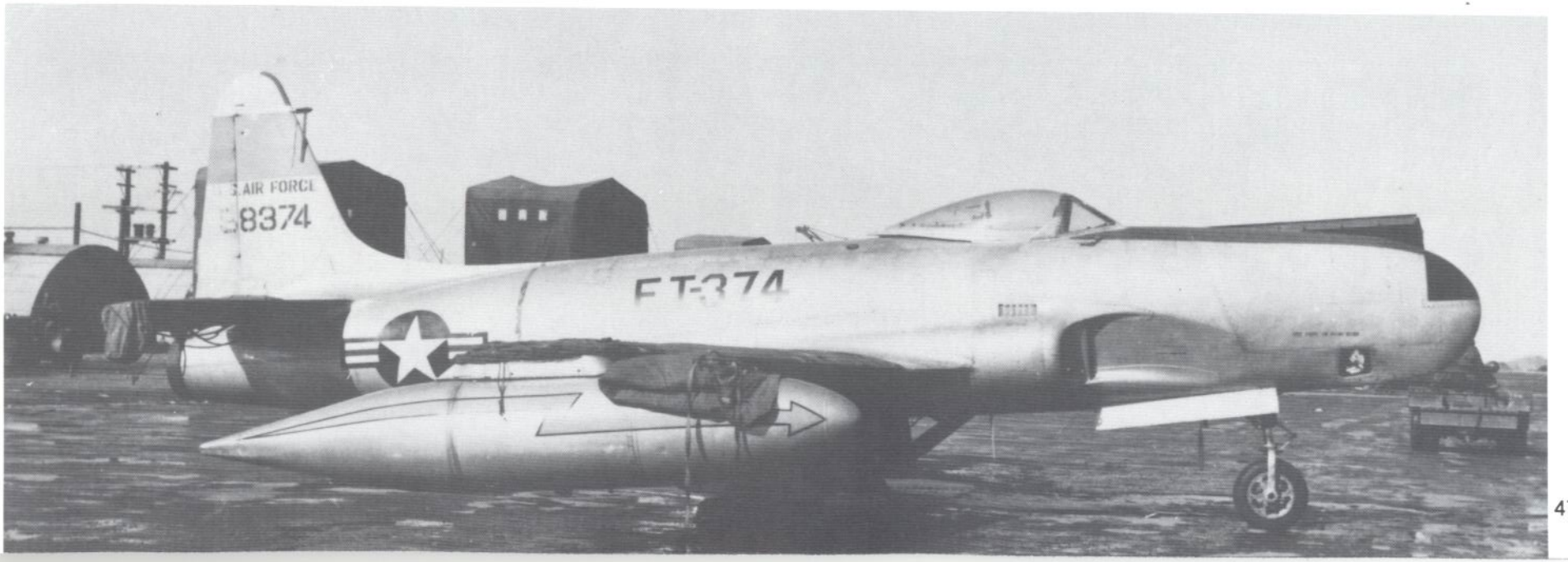
FEAF Headquarters requested deployment of some F-94As to Korea as soon as the aircraft became operational. This was to counter the growing 'Bedcheck Charlie' biplane threat. They were a good deterrent to the increasing night MiG activity. FEAF also employed the 319th on long range escort missions for the B-29s flying to targets in the Yalu River area.

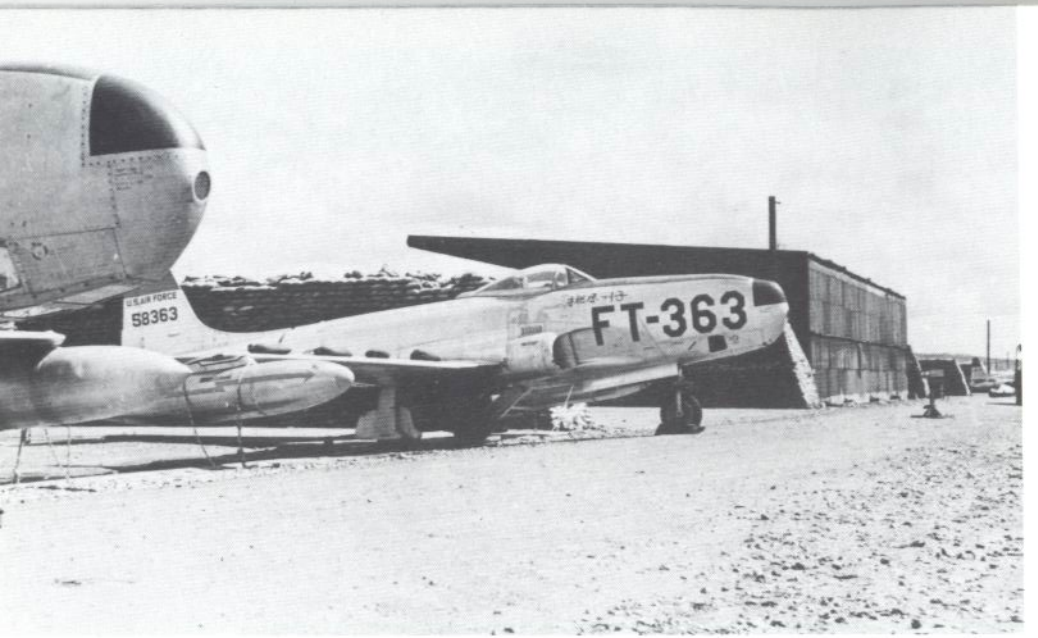




(Above right and right) RF-80Cs of the 45th TRSq at K-14. These are two of the 40 field modified F-80Cs that carried only the downward looking cameras and looked exactly like standard F-80C fighters without guns. Wing tank designs are red. (APN/Picciani Aircraft Slide)

An RF-80A of the 67th TRWg, seen at K-14, Korea. The tip tank flash and vertical tail band are yellow. Note the side camera window sports decoration in the form of a pinup. The wings and horizontal tail are covered with tarps to prevent formations of ice while the plane is parked.

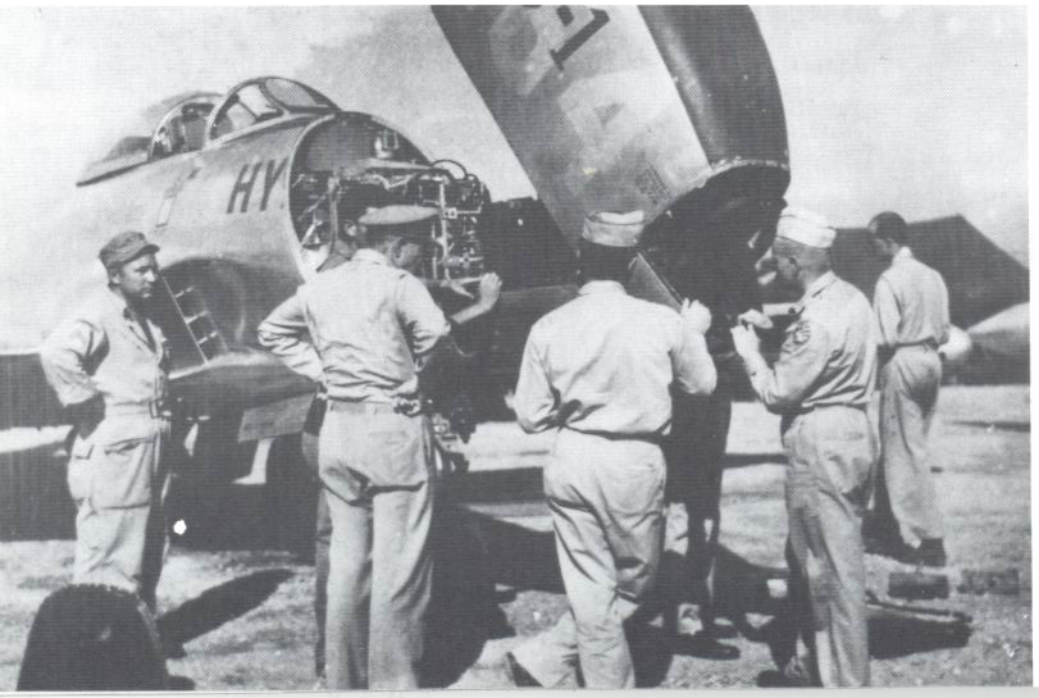


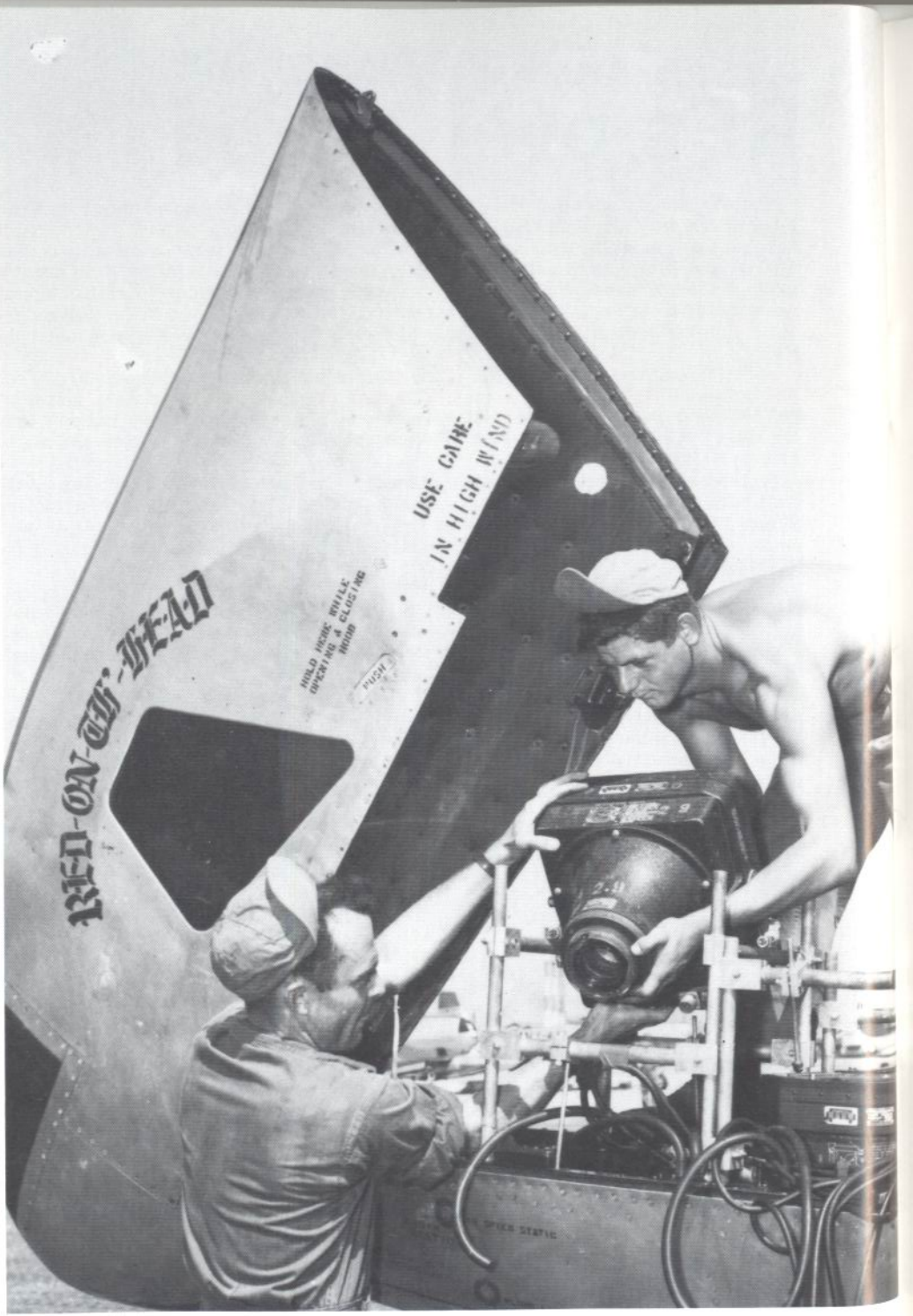


RF-80As of the 67th TRWg at K-14 in 1952. The 67th handled all USAF photo recce missions including the very dangerous Yalu River sweeps. Note the girls photo in camera port of the near aircraft. (Coffey)

A good closeup of an oblique camera being installed in Red-On-The-Head, **a 67th TRWg bird. Note how the nose tilts forward. (USAF)**

The Hybrid I **was the mating of an F-80C fuselage and engine with the complete nose of an RF-80A, resulting in the RF-80C. (AFM)**

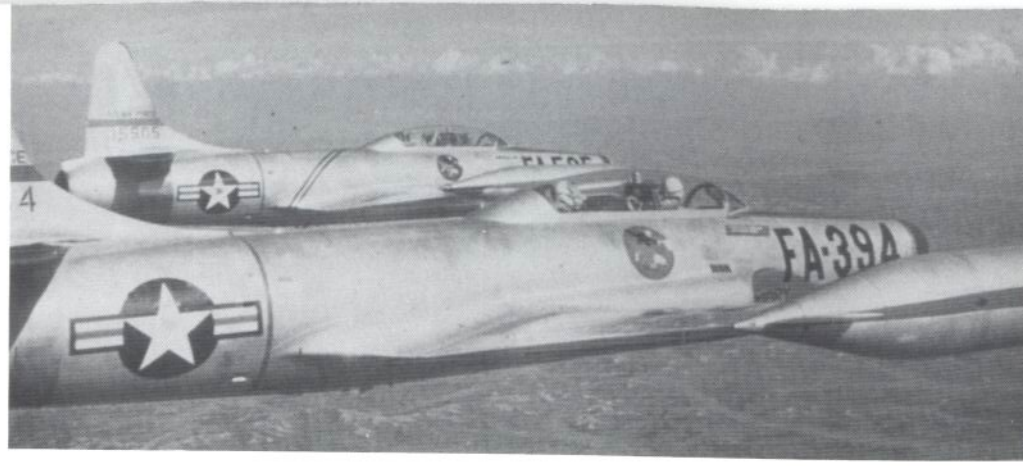




F-94s over Korea

Capt. Ben Fithian and Lt. Sam Lyons got the first F-94 kill when they shot down a Yak 9 on the night of 30 Jan 1953. During their tour in Korea, the F-94s accounted for 4 enemy aircraft while losing only one of their own. The one loss occurred when an F-94 flew right into the PO-2 biplane it was trying to intercept.

When the Korean War drew to a close on 27 July 1953, there were no F-80s in the skies. They had all been replaced by faster F-84G and F-86F fighter-bombers. However, they continued to defend the free world until the mid-1950s. F-94s remained on duty in Korea until the last shot was fired. Lockheed's jet 'step-child', and its descendants, had written a glorious page in the annals of air warfare.



A pair of 319th FISQ F-94Bs returning to Suwon in late 1952. Tank stripe is medium blue while tail strip is red. (Jeffers/Thompson)

An F-94B from the 319th FISq being towed back to its revetment at K-14. Two fuselage stripes indicate it was a flight leader's aircraft. (USAF)

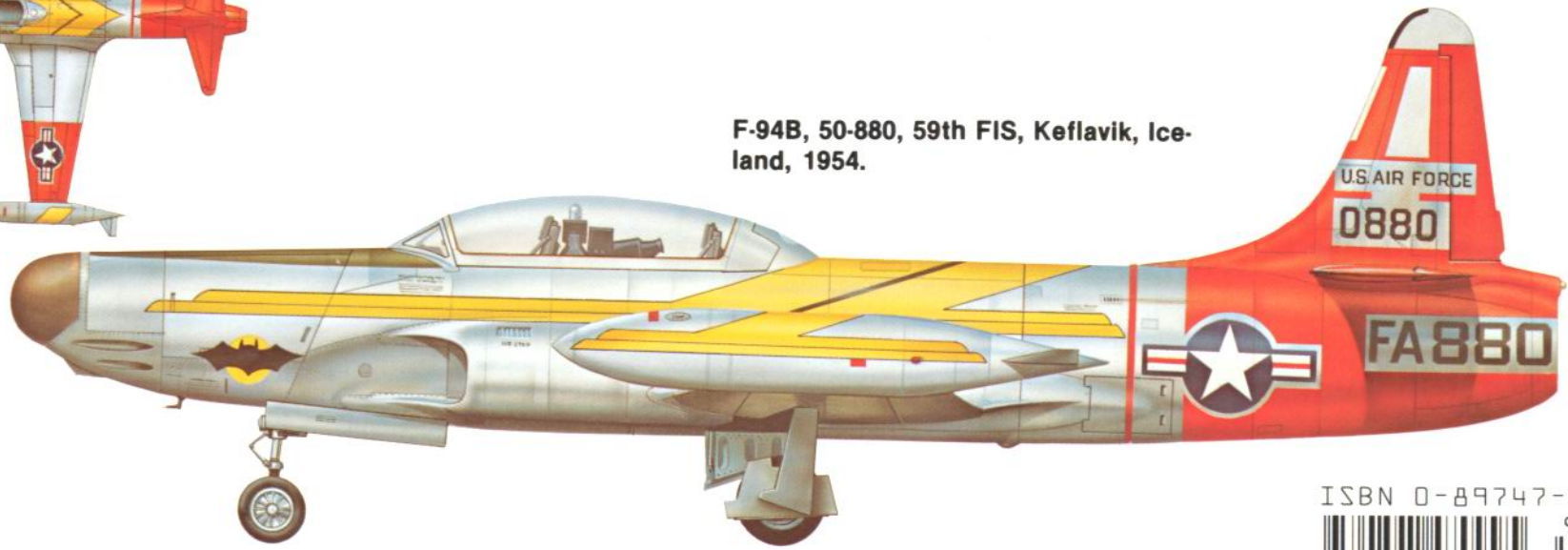
With afterburner on, a 319th FISq F-94B goes hunting for 'Bedcheck Charlie'. 319th F-94Bs bagged four enemy aircraft by war's end. (USAF)

A fine study of FA-428 in flight. The 319th FISq flew both night intercept and night escort missions. (Chapman)

T-33A, 49-1007, 36th FBS, Furstenfeldbruck AB, Germany, 1952.

Top View, Arctic Markings

F-94B, 50-880, 59th FIS, Keflavik, Iceland, 1954.



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