F-15 EAGLE in action

squadron/signal publications

AIRCRAFT NO. 24

F-15 EAGLE in action

by LOU DRENDEL
& CAPT. DON CARSON

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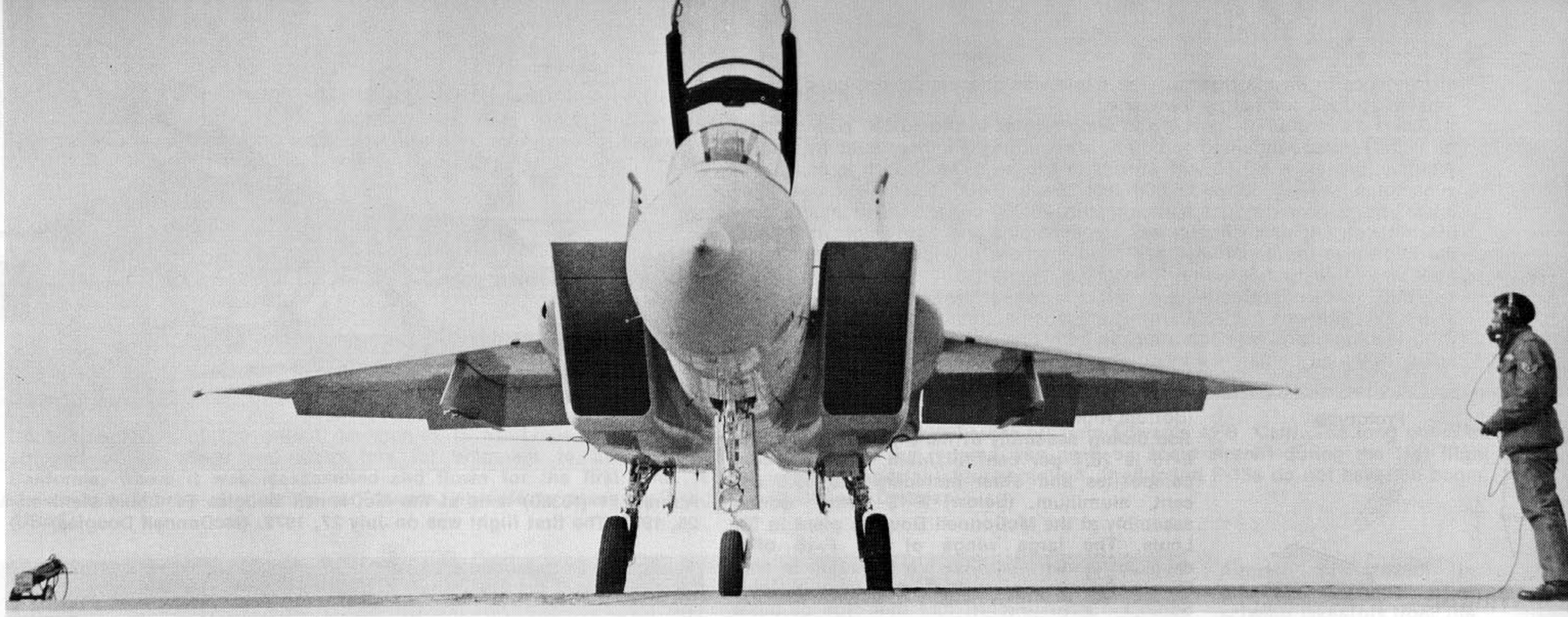


BACKGROUND

As any fighter pilot will tell you, air superiority is the key of tactical airpower. The success of all other tactical air missions depends upon first attaining and then maintaining air superiority — that is, eliminating effective interference by the opposing air force. Control of the air will bear significantly on the outcome of the battle.

Combat experience has taught that encounters between fighters capable of high altitude and supersonic flights normally take place below 20,000 feet and at speeds slower than Mach 1. As the fight progresses, visibility limitations and basic physics keep the aircraft in the transonic flight regime —that area around Mach 1.

As a result, the fighter pilot has been continually asking for more maneuverability, close-in weapons, and a better understanding of the inherent performance capabilities of his aircraft during a dogfight. Thus, agility — and not speed alone — in the air at medium and low altitudes is the prime requisite for success in air-to-air engagements.

This was one of the tactical lessons learned in Southeast Asia — that the fastest was not necessarily the best. It was the acceleration, the climbing/diving, the turning, the positioning, the ability to get the best angle first that the pilot needed.

The Air Force was stringent in its demands for performance in a new fighter when feasibility studies began in 1965. With its prime purpose of air superiority, it would be the first of its type since the F-86 Sabrejet, introduced in 1948. Prerequisites included excellent cockpit visibility, panel and instrument design, engine and flight control response, integrated components to perform multiple functions and a faster turn-around time on the ground.

On January 1, 1970, the die was cast. McDonnell-Douglas Aircraft Company was awarded the go-ahead development contract.

Twenty F-15s were ordered for the research and development programs. These fighters were specially modified to conduct the ground and flying test phases.

Two and a half years after the "go-ahead," on June 26, 1972, the first F-15 Eagle was officially welcomed off the production line in a rollout ceremony at McDonnell-Douglas headquarters in St. Louis.

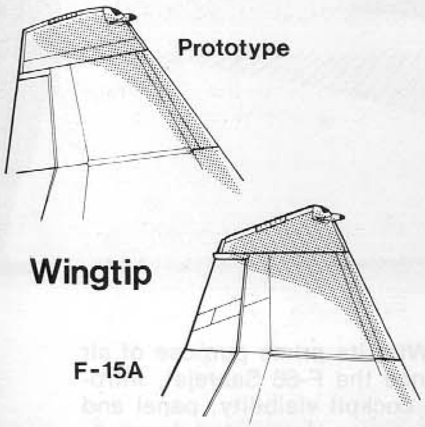
One month after rollout, on July 27, 1972, the Eagle took to the air on its initial flight.

From the very beginning, pilots praised the F-15's outstanding maneuverability, performance and handling qualities as "feeling like a fighter." A test pilot put it in fighter pilot terms when he said, "It's a genuine pleasure to suck the Eagle into a turn that leaves any chase airplane staggering around, unable to hold the G or the speed."

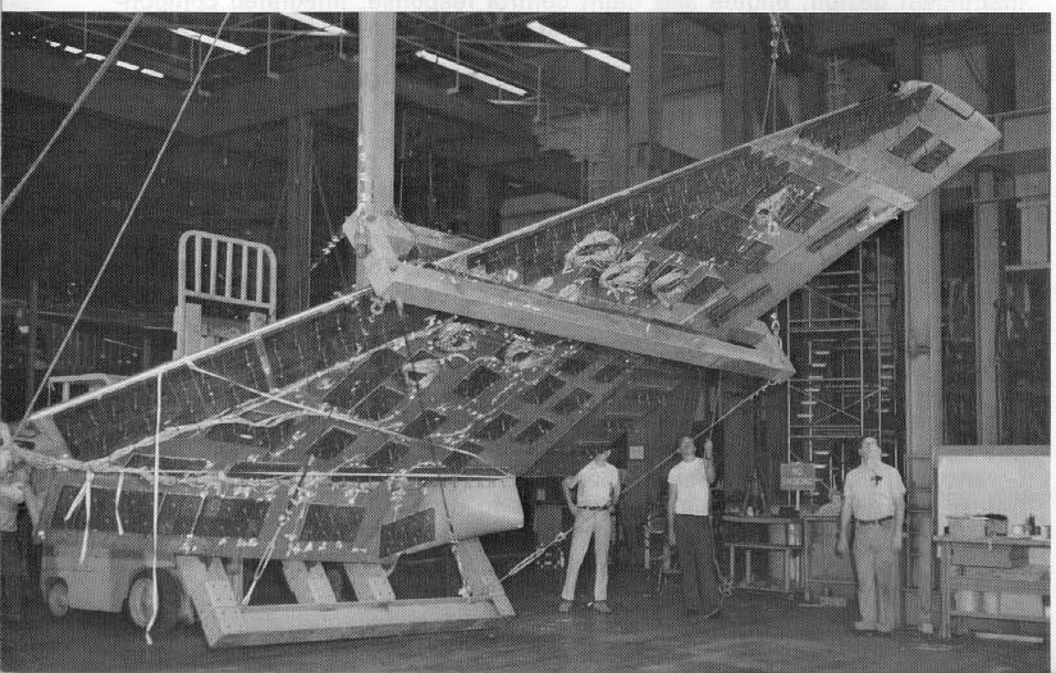
The Eagle is the most advanced and most maneuverable high-speed fighter ever developed, designed to meet and exceed the challenges of the 1980s. It can out-climb, out-maneuver and out-accelerate any fighter threat in existence or on the horizon. The Eagle was specifically designed for the most strenuous combat performance.

The F-15 is a single-seat, fixed wing fighter in the 40,000 pound class. Its twin, fuselage-mounted turbofan, afterburning engines, built by Pratt & Whitney, provide the F-15 with speeds in excess of Mach 2. It is capable of supersonic speeds above 65,000 feet. Each F-100 powerplant, weighing 3,000 pounds, can produce approximately 25,000 pounds of thrust. Because of advanced engine technologies, aerodynamics and lightweight materials, the Eagle has the capability of producing more pounds of thrust than its total take-off weight — a first for any U.S. fighter.

The F-15 can accelerate to supersonic speeds while climbing vertically. In its air-to-air combat role, this high engine thrust, combined with low wing loadings, provides low drag at both low and high lift to achieve an agility in the air unmatched by any current fighter aircraft in the world.

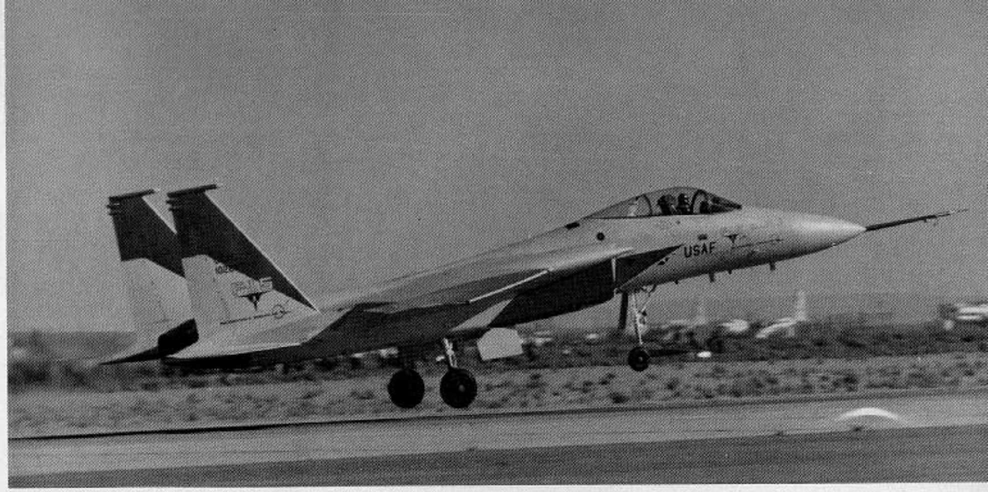


(Bottom Right) An F-15 gets a close up inspection during assembly at the St. Louis plant. The F-15 is 26.7 per cent titanium, 37.8 per cent composites and other materials and 35.5 per cent aluminum. (Below) F-15 wing during assembly at the McDonnell Douglas plant in St. Louis. The large wings of the F-15 offer excellent maneuverability. Wing loading is only 56 pounds per square foot at combat weight. Some F-15 test aircraft had this type of blunt wingtip. Production models offer slightly extended and rounded wingtips for improved performance. (McDonnell Douglas)

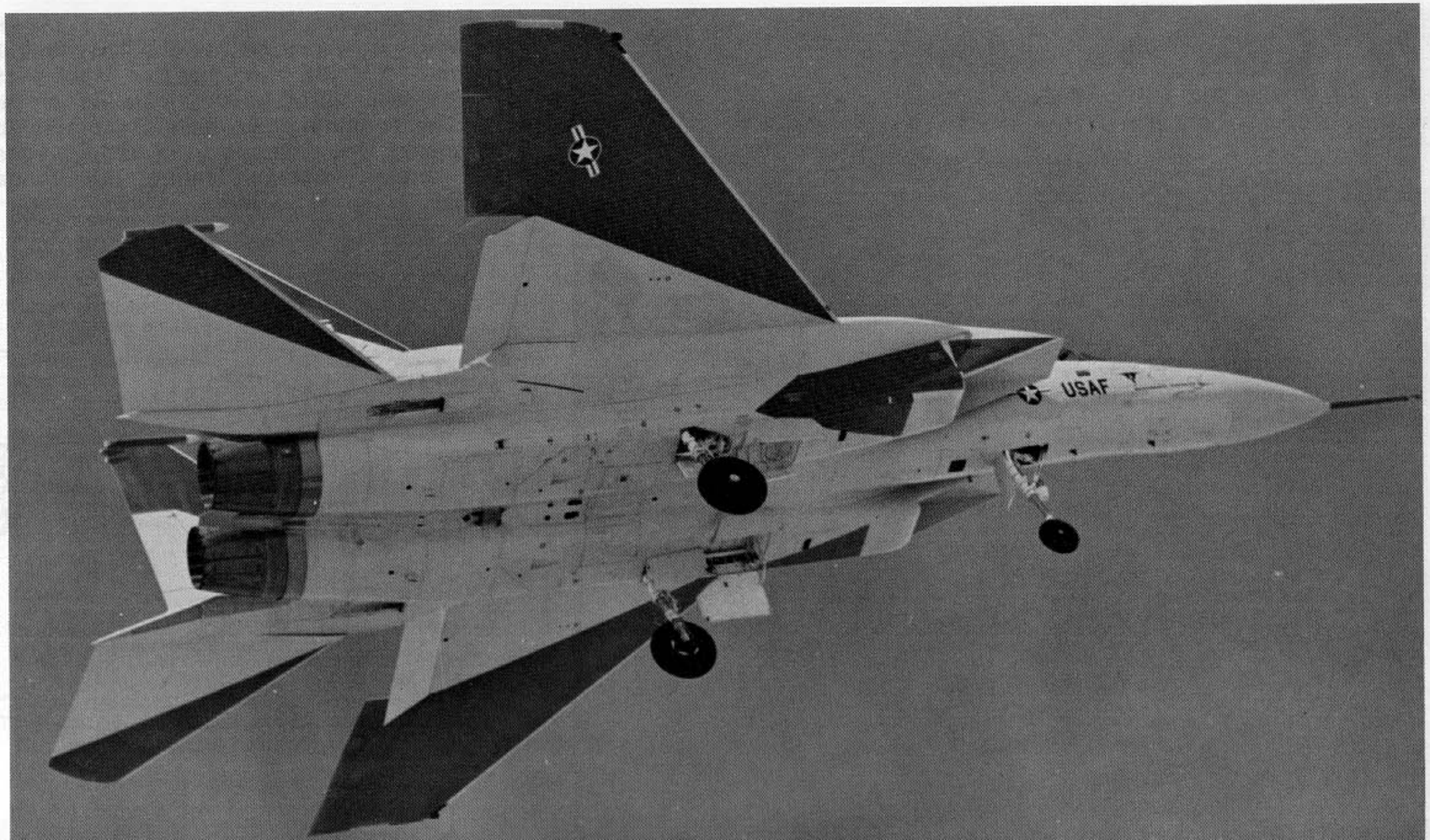


Aircraft #1 (10380) taxis at the McDonnell Douglas St. Louis plant on May 25, 1972. The first flight was on July 27, 1972. (McDonnell Douglas)

Upon completion of the rollout ceremonies in St. Louis, the Eagle was stripped of its wings and stabilators for shipment to Edwards AFB, California, where it was reassembled and flown for the first time. It is shown here shortly after arrival at Edwards, enroute to assembly hangar. (USAF)



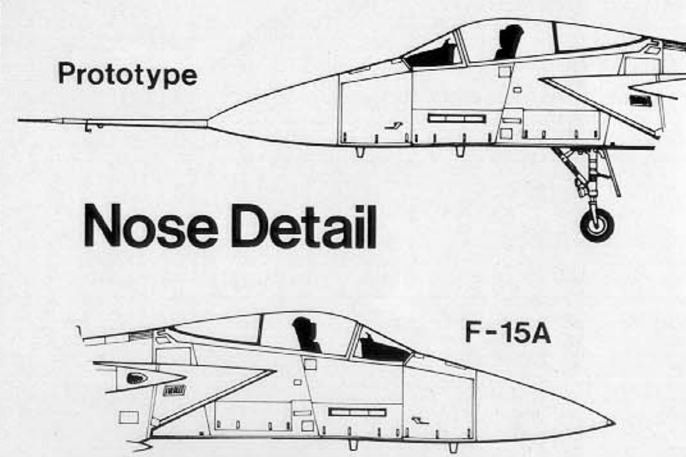
The first F-15 (10280) takes off from Edwards AFB, Calif. The long boom on the nose of the radome was used on some aircraft during the test flight period for special instrumentation. Production F-15s do not have the boom. (McDonnell Douglas)



Aircraft #1 (10280) in orange and blue paint scheme takes off from the Edwards AFB runway. The F-15 has so much power that afterburner is normally not used for takeoff. Note the elevons do not have the "notch" in their forward surface. The first two F-15s came from the factory this way but were later modified with the "notched" elevon that is now used on all F-15 models. (McDonnell Douglas)

Aircraft #5 (10284) in test colors is shown during a landing with the speed brake extended. The F-15 has excellent brakes and with its low landing speeds does not require a landing drag chute to stop. (McDonnell Douglas)

Aircraft #1 (10280) taxis in front of six F-15s and three F-4s at the USAF Flight Test Center, Edwards AFB, Calif. Note that five of the F-15s have the test "pitot boom" installed on the nose. The remaining two have the production type radome. The F-4s are used as high speed chase aircraft during testing. (McDonnell Douglas)

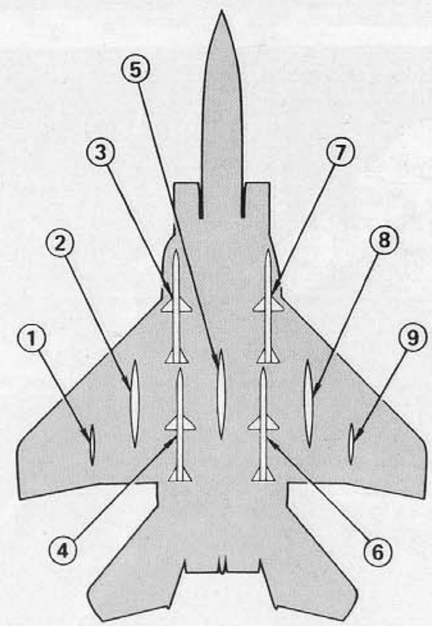


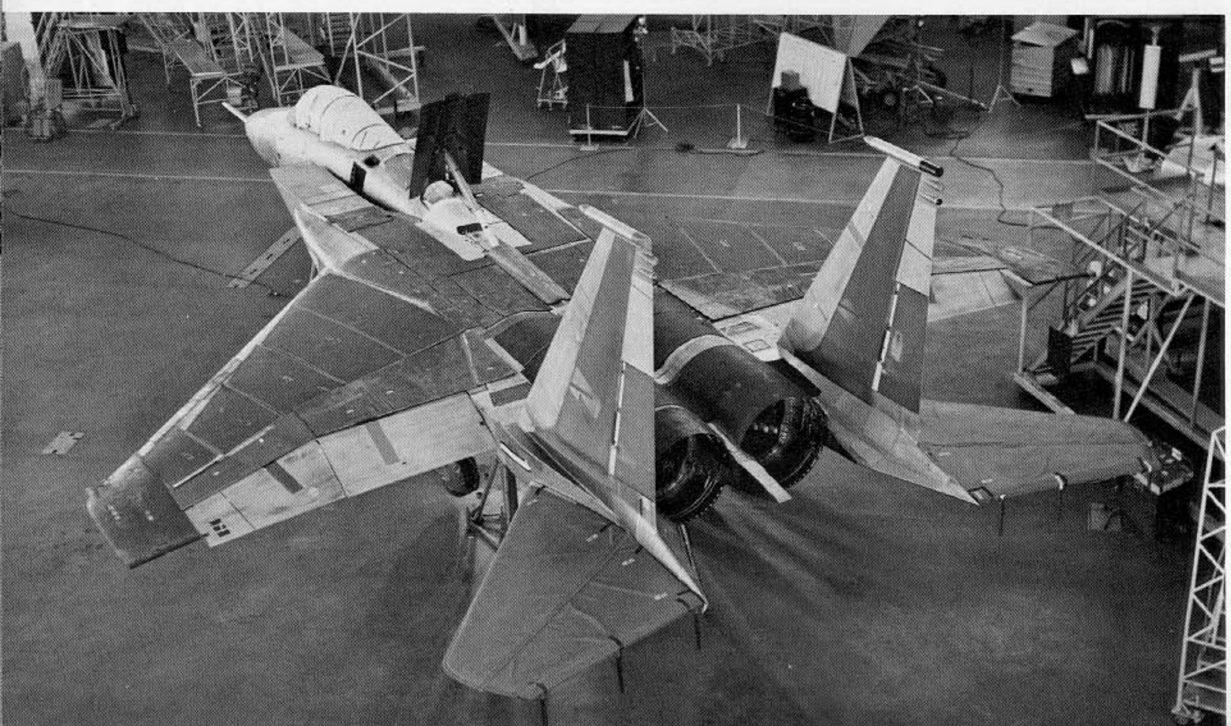
Aircraft #3 (10282) with a mixed load of air-to-air and air-to-ground ordnance. See chart below for Weapons Stations and Loads. (McDonnell Douglas)

External Stores Stowage

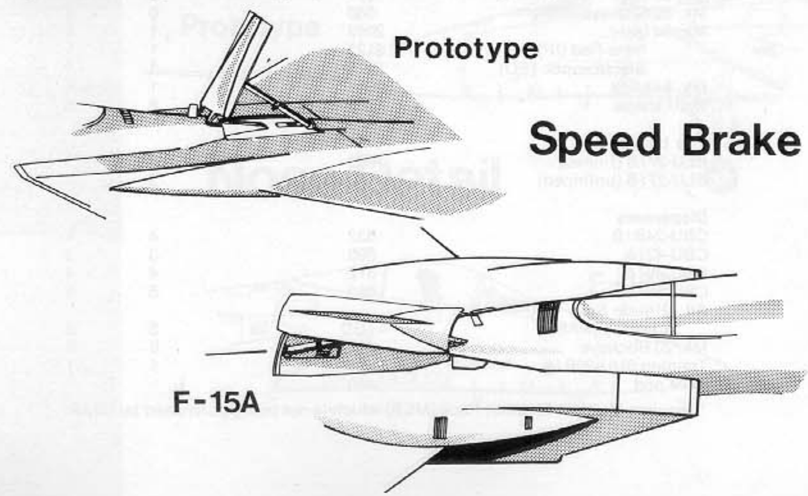
Weapon type	weight per item (lb)	Stores station no. (see diagram) 1	2	3	4	5	6	7	8	9	Total
Air-air-missiles											
AIM-7F Sparrow	510			1	1		1	1			4
AIM-9E Sidewinder	168		2						2		4
AIM-9L Sidewinder	195		2						2		4
General purpose/ demolition bombs											
Mk. 82 slick	531		6			6			6		18*
Mk. 82 Snakeye	560		6			6			6		18*
Mk. 84 laser	2052		1			1			1		3
Infra-Red (IR)	2123		1			1			1		3
Electro-optic (EO)	2276		1			1			1		3
Mk. 84 slick	2054		1			1			1		3
Bluff shape	500		6			6			6		18*
Fire bombs											
BLU-27/B (finned)	800		3			3			3		9*
BLU-27/B (unfinned)	750		3			3			3		9*
Dispensers											
CBU-24B/B	832		4			4			4		12*
CBU-42/A	895		3			3			3		9*
CBU-49/A	812		4			4			4		12*
CBU-52/B	680		5			5			5		15*
All Altitude Spin Projected (AASP)	TBD		5			5			5		15*
Mk. 20 Rockeye	460		6			6			6		18*
Training SUU-20B/A	451		1			1			1		3
ECM pod	440	1								1	2

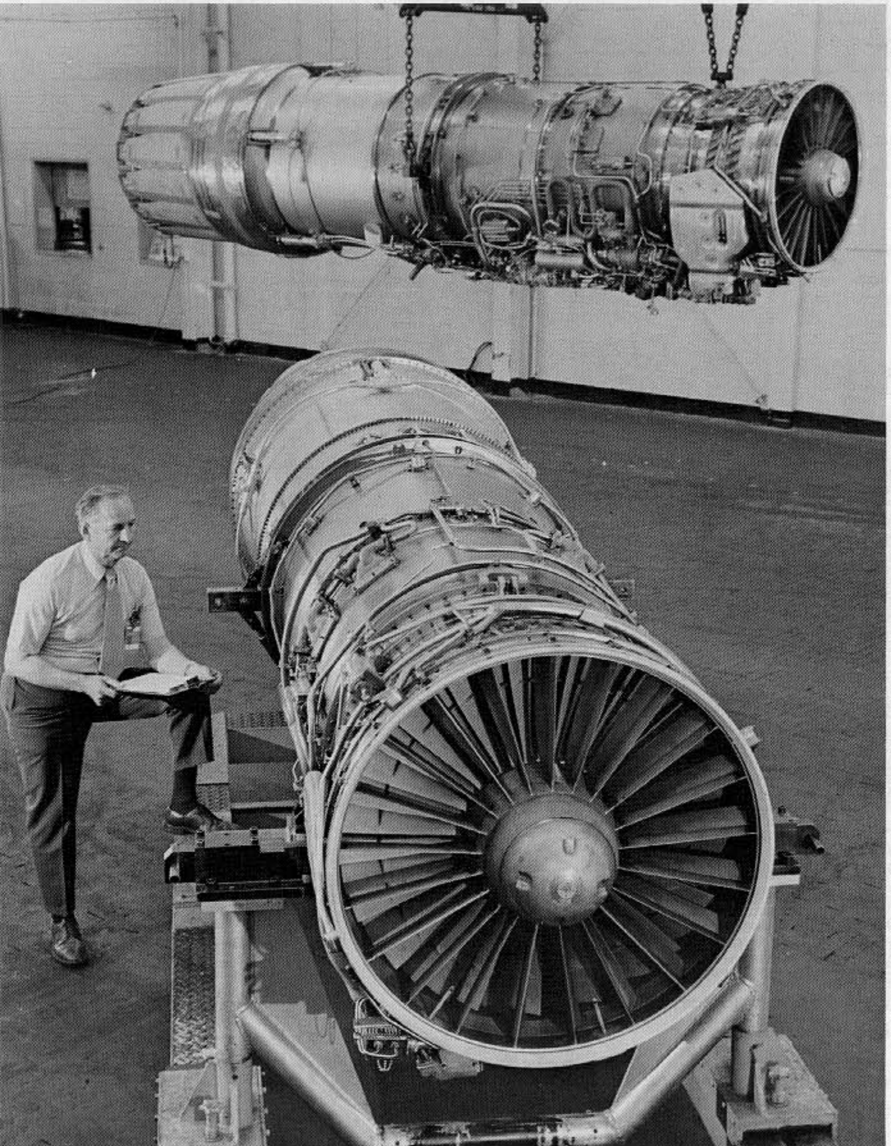
* requires Multiple Ejection Rack (MER) which is not being purchased by USAF.

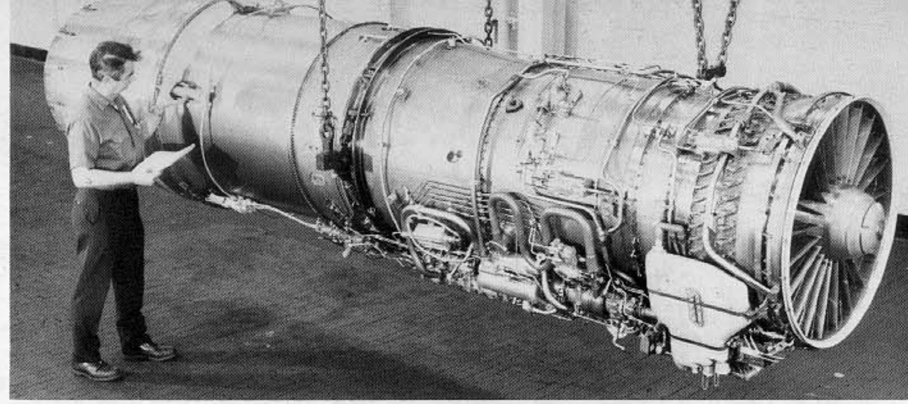


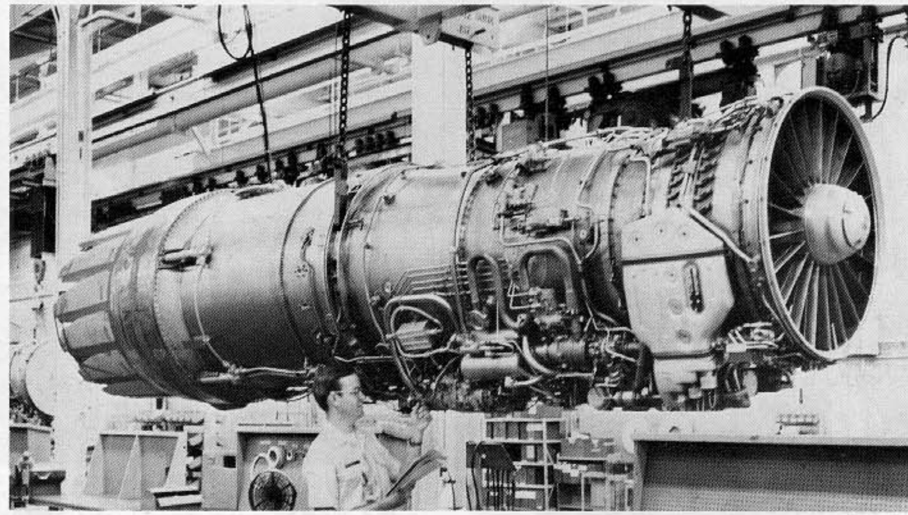


Early F-15s await completion at McDonnell Douglas St. Louis plant in May 1972. Note the various shades of aircraft skin. The many shades of metal are due to the use of light weight materials for certain areas of the fuselage, wings and tail assemblies. The white cover over the canopy is to protect the Plexiglas from scratches and paint during assembly. (McDonnell Douglas)





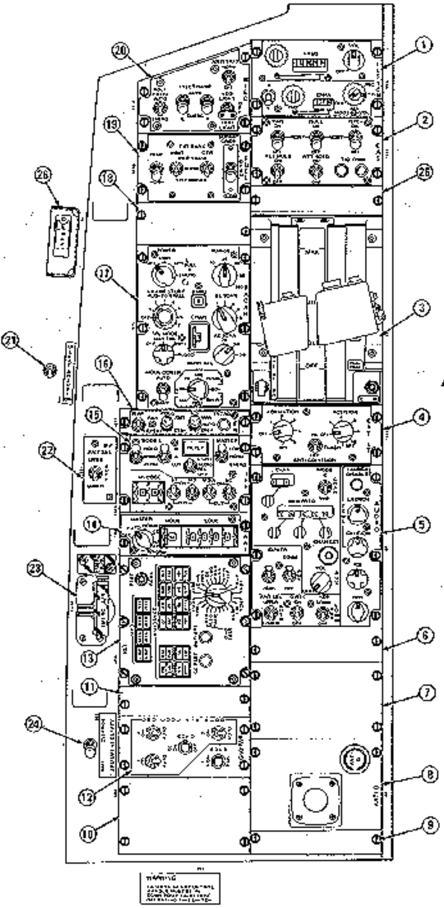


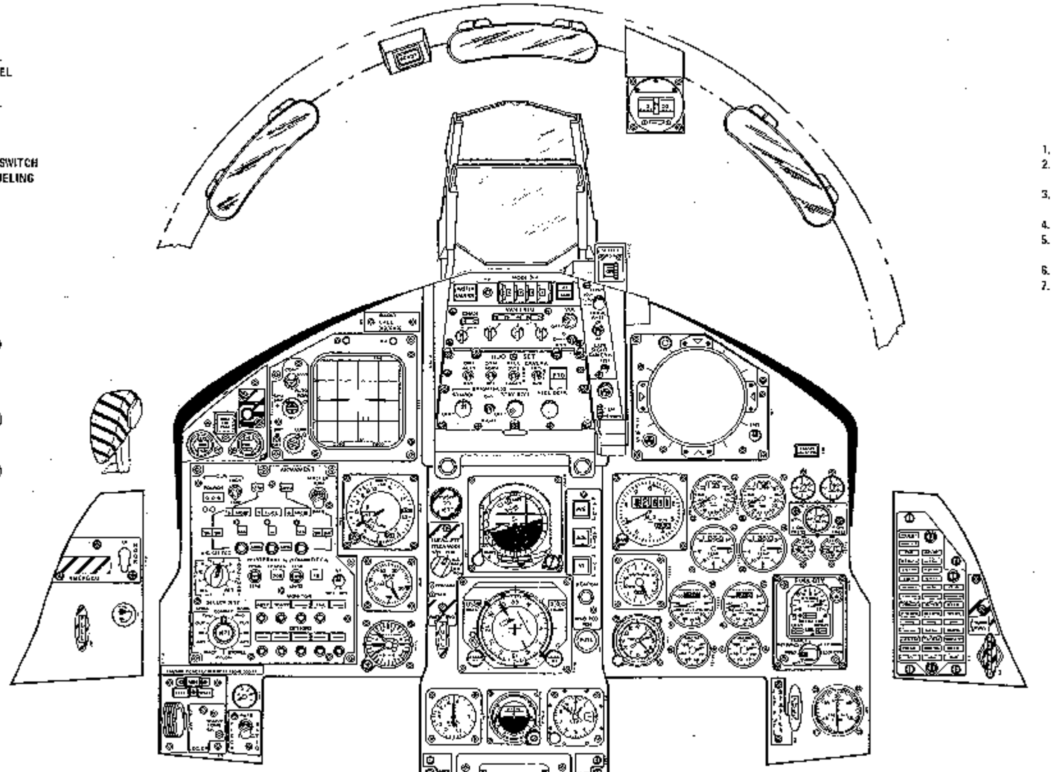


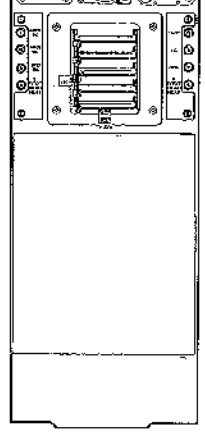
[Left] Two Pratt and Whitney F100 turbofan engines get final checks before shipment to the USAF. The F100 engine is 191 inches long and 37 inches in diameter at the inlet. It is in the 25,000 pound thrust class and has proven to be reliable and economical. [Top] The Pratt and Whitney F100 engine represents a major advancement in jet engine technology. The F100 produces 25 per cent more thrust per pound of engine weight than the best previous engines. Advanced technology is represented in almost every section of the engine — the fan, compressor, combustor, turbine and nozzle. The engine's high thrust-to-weight ratio also stems from extensive use of improved materials to reduce weight. The F100 has a thrust-to-weight ratio in the eight-to-one class. It produces almost no smoke and is equipped with a lightweight, variable exhaust nozzle that provides near-optimum performance at all operating conditions. [Above] Close up shows detail of accessories and external plumbing of the Pratt and Whitney F100 engine. Simplicity of engine mounting and uncluttered engine bays permit a complete engine change in as little as 19 minutes. It takes five or six hours to change an F-4 engine. The 19 minutes is the record time to change an F-15 engine, set by a factory team of experts. Routine engine changes will take about 30 minutes. [P&W]

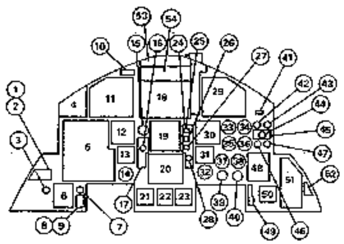
F/TF-15A Forward Cockpit

1. NAVIGATION AIDS PANEL
2. CONTROL AUGMENTATION SYSTEM (CAS) PANEL
3. THROTTLE QUADRANT
4. EXTERIOR LIGHTS CONTROL PANEL
5. INTEGRATED COMMUNICATIONS CONTROL PANEL
6. BLANK PANEL
7. BLANK PANEL
8. ANTI-G PANEL
9. BLANK PANEL
10. BLANK PANEL
11. BLANK PANEL
12. GROUND POWER PANEL
13. BIT PANEL
14. AAI CONTROL PANEL
15. IFF CONTROL PANEL
16. TEWS CONTROL PANEL
17. RADAR CONTROL PANEL
18. BLANK PANEL
19. FUEL CONTROL PANEL
20. MISCELLANEOUS CONTROL PANEL
21. SEAT ADJUST SWITCH
22. IFF ANTENNA SELECT SWITCH
23. EMERGENCY AIR REFUELING CONTROL
24. ARMAMENT SAFETY OVERRIDE SWITCH
25. BLANK PANEL
26. V_{MAX} SWITCH



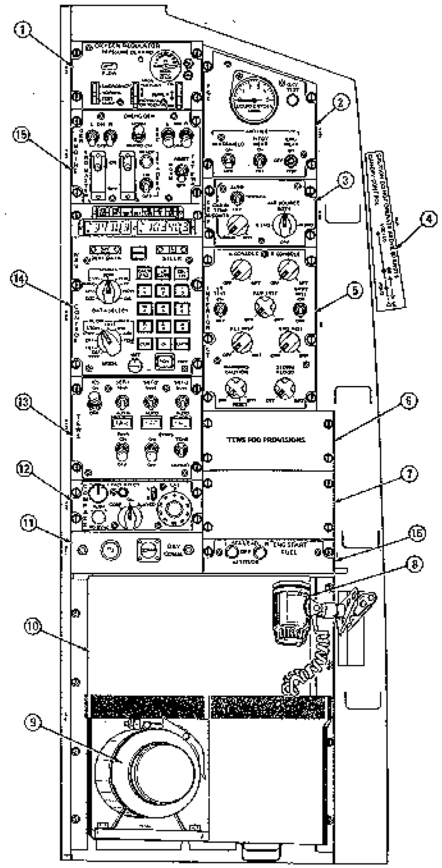


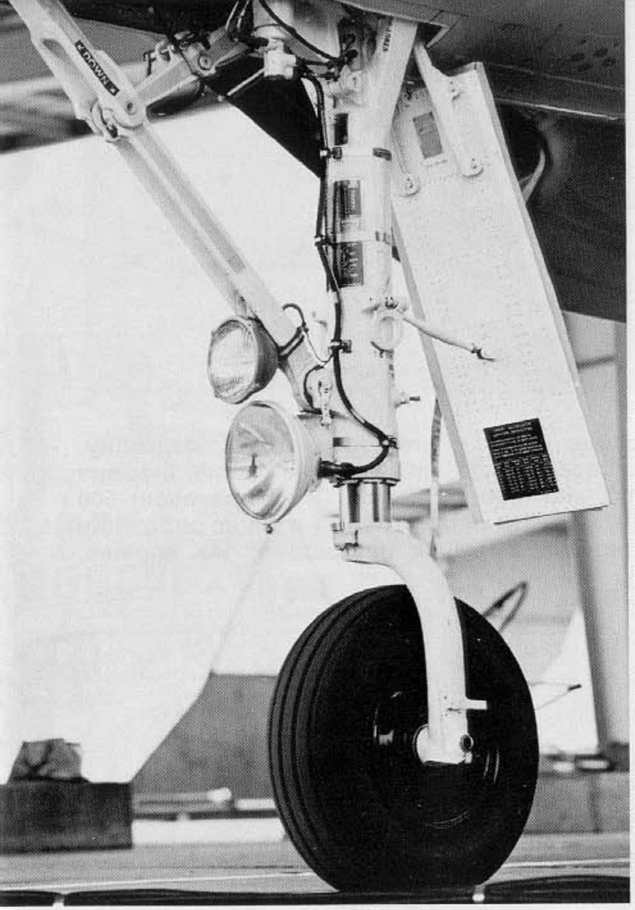


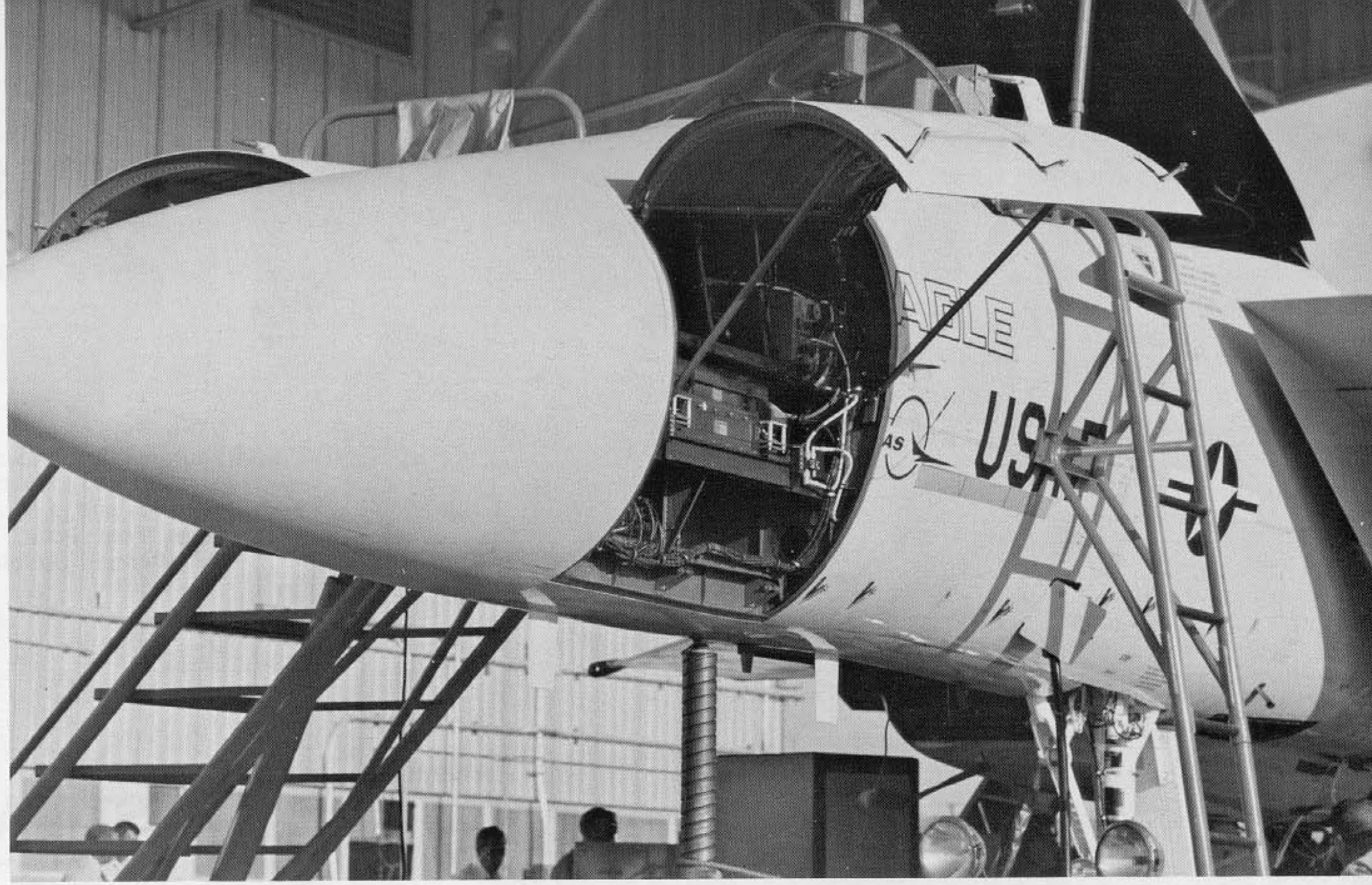


1. HOOK SWITCH
2. HOOK PANEL
3. FLAP INDICATOR
4. FIRE WARN PANEL
5. ARMT CONT'R PANEL
6. GEAR HANDLE
7. PITCH RATIO INDICATOR
8. PITCH RATIO SWITCH
9. PITCH RATIO PANEL
10. RADIO CALL PANEL
11. RADAR SCOPE
12. AIR SPEED INDICATOR
13. ANGLE OF ATTACK INDICATOR
14. G METER
15. EMER JETT SWITCH
16. STEER MODE SWITCH
17. STEER MODE PANEL
18. HUD CONTROL PANEL
19. ALTITUDE INDICATOR
20. HORIZONTAL SITUATION INDICATOR
21. AIR SPEED (STANDBY)
22. ATTITUDE (STANDBY)
23. ALTIMETER (STANDBY)
24. MASTER MODE PANEL
25. A/G MODE BUTTON
26. ADI MODE BUTTON
27. VI MODE BUTTON
28. BEACON LIGHT
29. TEWS DISPLAY
30. ALTIMETER
31. VERTICAL VELOCITY
32. CLOCK
33. LEFT TACHOMETER
34. RIGHT TACHOMETER
35. LEFT TEMPERATURE
36. RIGHT TEMPERATURE
37. LEFT FUEL FLOW
38. RIGHT FUEL FLOW
39. LEFT NOZZLE POSITION
40. RIGHT NOZZLE POSITION
41. CANOPY UNLOCKED LIGHT
42. PC1 INDICATOR
43. PC2 INDICATOR
44. UTILITY INDICATOR
45. OIL/HYD IND PANEL
46. LEFT OIL PRESS.
47. RIGHT OIL PRESS.
48. FUEL QTY INDICATOR
49. JFS PANEL
50. CABIN PRESS ALT
51. CAUTION PANEL
52. EMER VENT PANEL
53. IFF REMOTE PANEL
54. UHF REMOTE PANEL

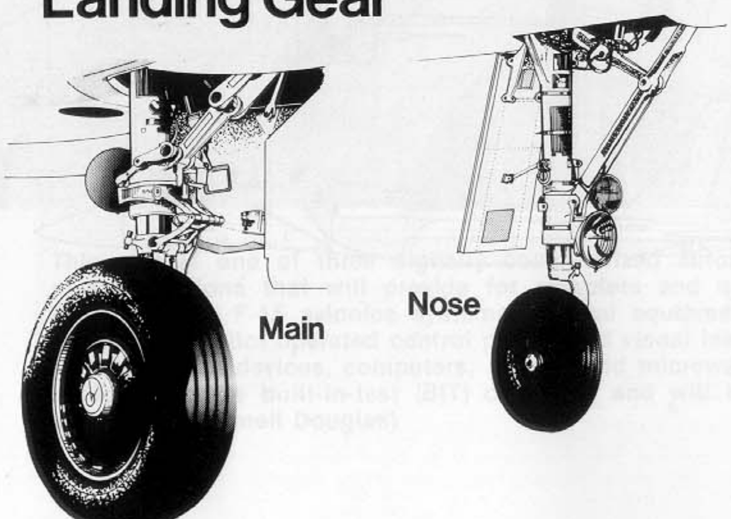
1. OXYGEN REGULATOR PANEL
2. ENVIRONMENTAL CONTROL SYSTEMS PANEL
3. CABIN TEMPERATURE CONTROL PANEL
4. CANOPY CONTROL
5. INTERIOR LIGHTS CONTROL PANEL
6. TEWS POD CONTROL PANEL
7. BLANK PANEL
8. UTILITY LIGHT
9. VACUUM BOTTLE
10. STOWAGE COMPARTMENT
11. OXYGEN/COMMUNICATIONS OUTLET PANEL
12. COMPASS CONTROL PANEL
13. TEWS CONTROL PANEL
14. NAVIGATION CONTROL PANEL
15. ENGINE CONTROL PANEL
16. ENGINE START PANEL



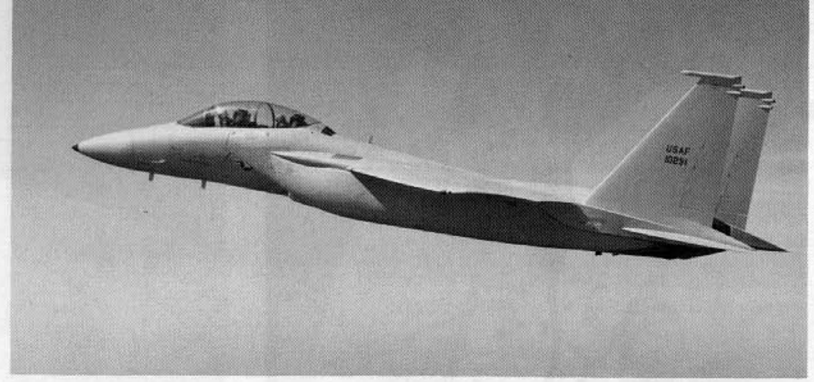




Landing Gear



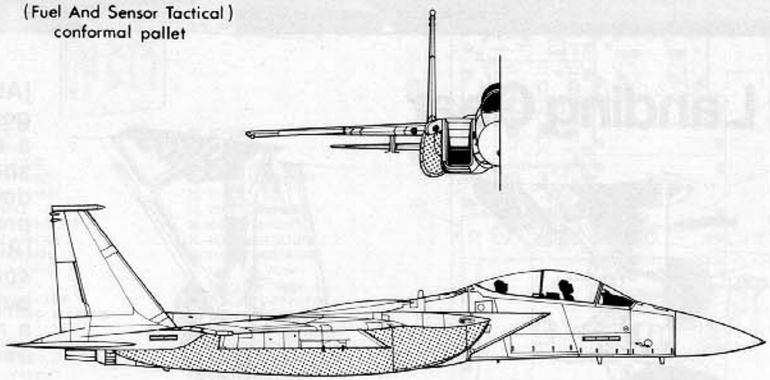
[Above Left] Close up shows details of F-15 nose gear and taxi and landing lights. Note the F-15 uses a single nose wheel. [Above] Open panel shows some of the many parts of the multi mode pulse doppler radar. This radar offers clutter free radar presentations and has a "look down" capability. [Right] A technician checks some of the F-15's radar components. The APG/63 radar used in the F-15 is built by Hughes Aircraft Company. It is said to have a much better reliability than any system now in use in other aircraft. [McDonnell Douglas]



The F-15 Pulse Doppler radar offers "look down" capability, automatic and manual modes, excellent electronic counter measure resistance, long range, and modular design. It weighs about 500 pounds and is designed for ease of operation by a single pilot. Note the "Fast Pack" external fuel pallets outboard of the engines. [McDonnell Douglas]

FAST PACK

(Fuel And Sensor Tactical)
conformal pallet



An F-15 with "Fast Pack" external fuel pallets outboard of the engines. "Fast Packs" each hold 4400 pounds of fuel and add a minimum of drag. The pallets can have Sparrow missiles mounted on their outboard corners. Special versions with reduced fuel capacity can hold ECM gear, reconnaissance equipment or weapons. This was not an Air Force Program. One set of pallets were built by the contractor and are not standard USAF equipment. (McDonnell Douglas)

This unit is one of three digitally computerized automatic stations and three manual stations that will provide for complete and quick operational integrity checks of the F-15 avionics systems. Typical equipment includes radar system components, pilot operated control panels and visual instruments, communication and navigation devices, computers, display and microwave components. All shop stations include built-in-test (BIT) capability and will isolate a fault within the station. (McDonnell Douglas)

Close up detail of F-15 wing tip. "Day glow" orange paint was used during the flight test period to make the F-15 easier to see from chase aircraft and the ground. Black horizontal stripes on the inside of the tails were to measure flutter during speed brake tests. The white rectangle areas under the wing, just above the "danger" sign, are indirect lighting for formation flying at night. (McDonnell Douglas)

10285 flies over downtown St. Louis on its way to Edwards AFB, Calif. F-15s are manufactured at the McDonnell Douglas plant at Lambert Field in St. Louis, MO. (McDonnell Douglas)

Flying the F-15

By Capt. Don Carson, USAF

EDWARDS AFB, CALIF.—My leg muscles tightened as I held the brakes and eased the throttles up to military power. Checking the gauges, I released the brakes and selected afterburner. The airspeed climbed rapidly. At 120 knots, I raised the nose ten degrees above the horizon, and we broke ground in about 1,000 feet.

Gear and flaps up, I quickly pulled back on the stick and climbed in a thirty-five degree pitch attitude while accelerating to 250 knots. At 10,000 feet, I pulled the throttles out of afterburner, as briefed, and rolled the aircraft over. I could not believe it . . . . We had not traveled even halfway down the 15,000-foot runway at Edwards AFB, Calif.

I have flown fast airplanes before, but nothing that could come near duplicating that takeoff in an F-15. With an irrestrainable grin beneath my oxygen mask, I climbed to 16,000 feet in military power to continue the mission.

I was flying in the TF-15A with Mr. Denny Behm, a McDonnell Douglas experimental test pilot. Denny was working the radar and would demonstrate the capabilities of the F-15 in its air-superiority role while I flew the bird. We were flying with a T-38 chase aircraft that was also serving as our target.

Heading to the Tehachapi Range area, Denny set up the radar for the intercept. The target was many miles away as we turned to meet him head on. He appeared on the scope before we had rolled out. Denny locked on to the T-38 immediately, and we headed toward it. We broke the radar lock-on, as briefed, and instructed the target to descend and continue on the deck. When the T-38 called level, we again locked on to him in a "look-down" intercept.

The radarscope was completely clear of ground clutter. The only returns on the scope were those of the target and another aircraft passing through our flight area. I had been very skeptical of claims for the F-15 radar and its look-down capability. Every other radar set I have operated was always filled with the clutter of ground returns, making it very difficult to pick out your target when looking down. Not so with the F-15. Anyone who could not pick out the target on this scope needs his eyes checked. This look-down capability gives a fighter pilot the needed ability to pick out his target from the weeds.

I pressed in to the target and, at five miles, I began following the captive AIM-9 air-to-air missile, steering on the scope as I swung around to the T-38's stern.

Pressing the Attack

There is never any doubt what is happening during an F-15 intercept. The Visual Situation Display (VSD) scope gives the pilot all the information he needs to complete any intercept. The target's range, altitude, speed, heading, closure rate, G-force, and aspect angle are displayed in easily read numerals right on the VSD. You always know if your target is climbing,

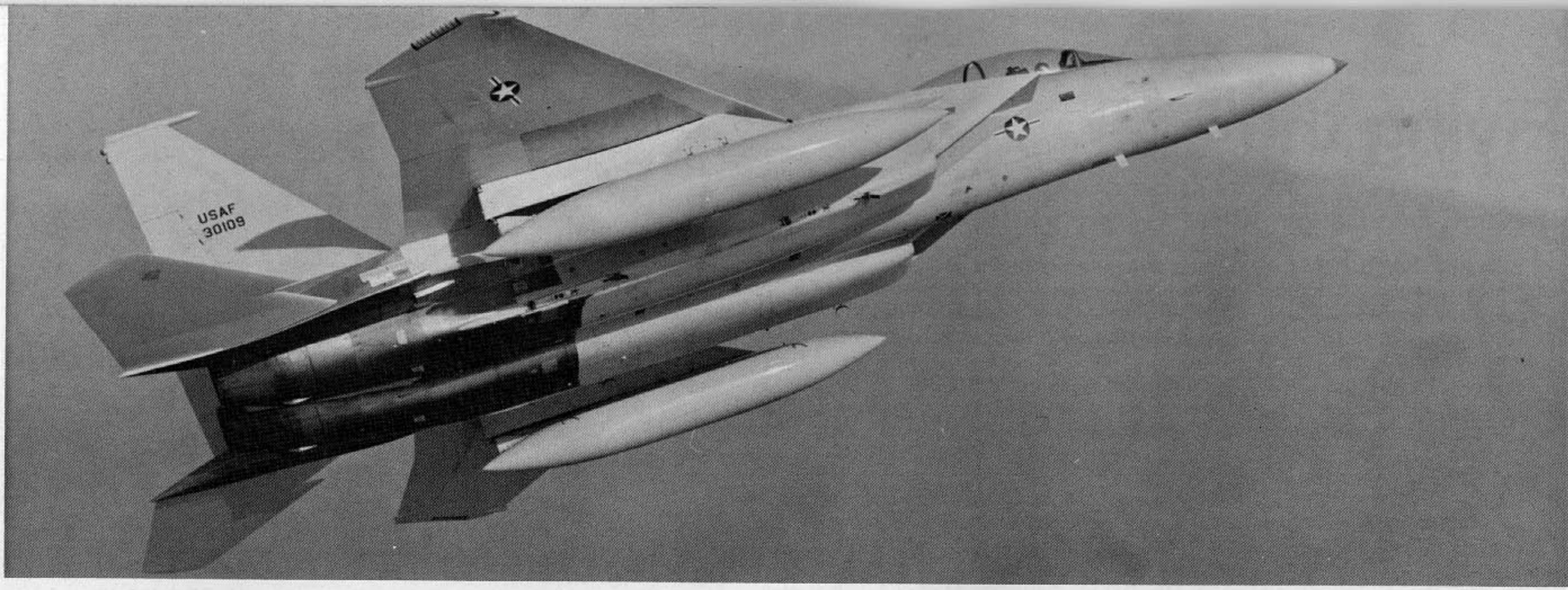
diving, or turning to avoid you. Most of this information is also displayed on the Head-Up Display (HUD) once you have locked on to your target.

The HUD and VSD also indicate when you are in range for the missiles you have selected and the number of missiles remaining. Radar controls are easy to operate and conveniently located on the throttle and stick. There is no need to remove your hands from the flight controls when conducting an attack. This is a single-seat fighter, and it was designed to make the job as easy as possible for the pilot.

We closed into range on the T-38, and the in-range indicator on the VSD and HUD told us we could launch missiles at any time. I continued steering the dot as we simulated launch and closed into gun range. Moving the weapons-select switch on the inside of the right throttle, we placed the avionics into the gun mode. The HUD display now gave information for a gun attack. Displayed were gun rounds remaining, a gun cross showing the boresight line, sight reticle, radar range, and a box indicating target position.

The target designator box is especially valuable to a pilot during an intercept. If you have a radar lockon, the box will indicate where to look to pick the target up visually. You may be too far out to see the target, but the designator box will pinpoint his position, so you will know where to look for him when he comes into range. Closing on the T-38, we were given an in-range cue on the HUD when we were within gun range. I rolled off and pulled up as we reached minimum range and had completed the simulated gun attack.

The T-38 was now briefed to go into some hard defensive maneuvering as I attempted tracking him again. I slid into a comfortable six o'clock position at 800 feet as the T-38 afterburners lit and he began a series of



five- and six-G turns to lose us. I easily maintained tracking position and, in fact, had to throttle back to about ninety percent rpm to keep from over-running him. We followed him straight up and down and through every defensive turn he could make, and I never needed to use the afterburners once. Even in a hard turn, the F-15 is smooth and does not buffet.

The wing loading of the F-15 is fifty-six pounds per square foot. This is much lower than most fighters flying today and is the prime reason the F-15 can turn so well. The wings are large and do not require slats or any other lift device to help in a turn. The F100 engines enable the F-15, which weighs about 40,000 pounds at takeoff, to sustain turns far beyond the capabilities of most aircraft flying. The F-15 can start a four-G turn at 20,000 feet and Mach 0.9 and, within 180 degrees of turn, can climb to more than 27,000 feet. For comparison, this is where an F-4 can just hold a level turn at four Gs.

Firmly convinced that I could easily handle a T-38 target without even using military power, I joined on his wing and flew some close formation. The F-15 is a delight to fly in formation. The flight controls and power response are excellent. The aircraft is very stable throughout its envelope and feels like a T-38 or F-106 in roll rate and pitch sensitivity.

The stick is fairly heavy and feels similar to an F-105. Most pilots who have flown the F-105, myself included, believe that the Thud has the best stick feel and stability of any aircraft flying. The F-15 is equal to the F-105 in this respect and offers far better maneuverability. This stability is quite important when flying someone's wing in weather or in night formation when you really have to hang in close.

Nothing to Criticize

I could not find anything in the F-15's flight controls to criticize. The aircraft uses a system of hydromechanical linkage and a dual-channel Control Augmentation System (CAS) for roll, pitch, and yaw control. The ailerons are controlled by mechanical linkage only. CAS roll inputs are provided through the differential stabilator and the rudder. The CAS creates no noticeable changes in feel, and contributes significantly to the solid stability of the F-15 in flight. The excellent roll rate of the F-15 is accomplished by using the ailerons and differential movement of the stabilators. The stabilators work differentially in conjunction with the ailerons to produce roll and together to produce pitch.

Should the CAS system malfunction or be shot out, the aircraft is fully controllable by the hydromechanical flight-control system. The flight controls also incorporate an effective pitch-trim compensator (PTC). The PTC automatically adjusts for changes in pitch caused by speed transitions, speed-brake operation, and weapons release. This is very helpful when you extend the speed brakes while tracking a target.

The speed brakes currently used on the F-15 test aircraft were inadequate and have been changed on production models. The speed brake on the test aircraft opened sixty degrees, but was not large enough to provide the needed deceleration. Speed brakes on the production models have a larger surface area and open only forty degrees, while providing greater drag. The speed brake location behind the pilot on the top of the aircraft has been criticized by some pilots flying the F-15. They believe that, when the speed brake is extended, visibility is somewhat restricted at six o'clock. The best answer to this was given by the TAC F-15 Project Director, Col. Frank Bloomcamp. He said, with a smile, "If anyone is flying around with his speed brake out while he has a MIG at his six o'clock, he deserves to be shot down." I agree, and I did not find the speed brake to be a problem during my flights.

This is probably a good time to comment on the F-15 cockpit visibility. It is, by far, the best in any fighter ever owned by the USAF. That is a strong statement, but it is true. You sit high in a huge bubble canopy that extends down almost to your waist. You have enough room to move around and look over the canopy rails or turn around and see both rudders behind you. That gives all the visibility I could ever ask for. There is a slight blind spot in the rear caused by the seat rails. This is very small and does not pose a serious restriction. All you have to do is move your head a few inches, and you can see around the rails. Pilots testing the F-15 are not satisfied with this, but this is really picking at the fine points. The visibility, even with the existing rails, is at least twice that of any current fighter.

The ejection seat, however, does pose a problem. The seat is uncomfortable, and it is difficult to turn around to look behind due to the straps that attach the pilot to the seat-mounted parachute. The problem has been recognized, and a fix is included on production aircraft to lengthen the straps and permit pilots to more easily turn around and look behind. Comfort should be improved by changes to the seat cushion. These problems are minor and do not present any restriction to successful operations. Having someone at your six o'clock will not be a problem in the F-15. If he does manage to get there, he will not stay for very long.

Shooting an ILS Approach

After completing a couple more intercepts, we headed over to the Palmdale Airport, and I shot an ILS approach. The instruments are well located, and the entire cockpit is designed with the pilot in mind. The radio, IFF, HUD controls, instruments, and weapons panel are all directly in front.

There has been a lot of planning in the cockpit layout, and it is set up for one-man operation. There will never be a need to bend over or turn to the side to change a radio or IFF frequency when you are flying in IFR conditions or on the wing of another aircraft. Even the systems and lighting controls on the right- and the left-hand consoles have different-shaped toggle handles so the pilot can feel which switch he is reaching without looking down. At last we are getting something fighter pilots have begged for over the years—a cockpit laid out for the man who is going to use it, not to satisfy an engineer sitting behind a desk.

Picking up the Localizer, I turned in for my ILS approach at fifteen miles and lowered the gear and flaps. There is no change in aircraft pitch feel as the gear and flaps go down. The approach may be flown on the conventional attitude indicator display, using the ILS steering bars, or by using the ILS display on the HUD. This is the preferred method and enables the pilot to check for the runway during poor visibility while monitoring the instruments. The HUD presents all information needed to successfully fly an ILS approach without looking down into the cockpit.

Intercepting the ILS glide slope, I extended the speed brake and noticed there was still no change in pitch. The F-15 flies a stable and easily controllable approach at about 140 knots and nineteen units' angle of attack. If you allow the angle of attack to get to 20.5 units, you begin to get a very mild buffet that is remedied by adding about one percent rpm. The F-15 should be an excellent all-weather aircraft due to instrument location, stability, and the relatively slow speeds at which it flies final approach.

I executed a missed approach at ILS minimum and cleaned up the speed brake, gear, and flaps. We headed toward the high-speed corridor for a supersonic run. Climbing out, I did several rolls at low speed. The aircraft responded well and exhibited no adverse handling characteristics. Once in the corridor, I plugged in the burners and, with amazing acceleration,

The F-15 Eagle has been flown up to 9.0 Gs during flight testing at Edwards AFB, Calif. The pilot said the airplane had excellent and stable handling under these conditions. (McDonnell Douglas)

passed through the Mach. I tried several supersonic rolls at 20,000 feet and some very hard turns. The aircraft handles easily and turns exceptionally well even at supersonic speeds.

The performance of the F100 engines is fantastic. In military power, the F-15 will outperform almost anything flying today, and, with the afterburners going, it seems just too good to be true. Coming out of afterburner, I continued a very hard turn to bleed off the speed and let the aircraft go subsonic. This is a critical area in most fighters, where they dig in as the speed slows through Mach 1. To prevent overstressing an aircraft, pilots must ease off the Gs as they go through the Mach. This is a major problem when you are trying to outturn a target or track him. The F-15 slid back through the transonic area into subsonic flight with hardly a noticeable change in feel. There was little, if any, dig-in that I could feel.

The red bingo fuel light came on to indicate that we were at the fuel level we had dialed into the gauge. This light is set by the pilot and should prevent his running out of fuel during the heat of a dogfight. The entire fuel system is automatic. There is no tank selecting required by the pilot to get all of his fuel. The pilot can concentrate on the air battle until his bingo light comes on, indicating it's time to disengage and head home. More than one fighter has been lost during a dogfight because it ran out of fuel.

Back in the Edwards traffic pattern, we lowered the gear and flaps and slowed to final approach speed. The aircraft touched down at 110 knots and, with aerodynamic braking, rolled to a stop in plenty of time to turn off at midfield.

There was a significant problem with the crosswind landing stability

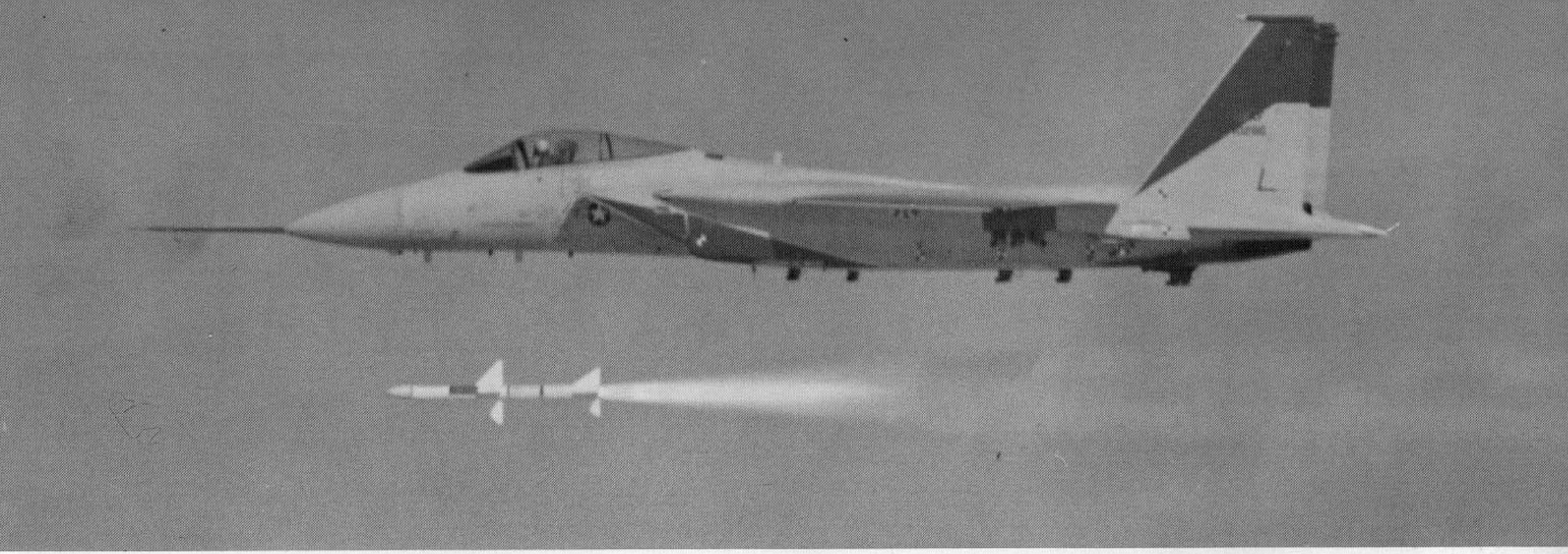
F-4 chase plane flys formation on an F-15 with three 650 gallon fuel tanks installed. F-15 performance exceeds that of the F-4 by a wide margin. **(McDonnell Douglas)**

during early testing of the F-15. The pilots had a feeling that they were going to roll over in a strong wind. This problem has been solved with a much stiffer landing gear. The aircraft now handles well in up to thirty knots of crosswind.

The F-15 does not use a drag chute since it has slow landing speed and excellent brakes. There is an operational tail hook for emergency barrier engagements. We taxied into the ramp, opened the canopy, and took off our masks. It is quiet in the cockpit, even with the canopy open. You can leave your mask hanging without blasting out the other pilot with the noise picked up in the intercom.

The nosewheel steering is continuous and has two modes. Normal steering is automatic and is available anytime the aircraft is running. To obtain more sensitive steering, you must hold the nosewheel steering button on the stick. Both modes work well and give the pilot the stability of dampened steering for long straight taxiways and sensitive steering for tight turns.

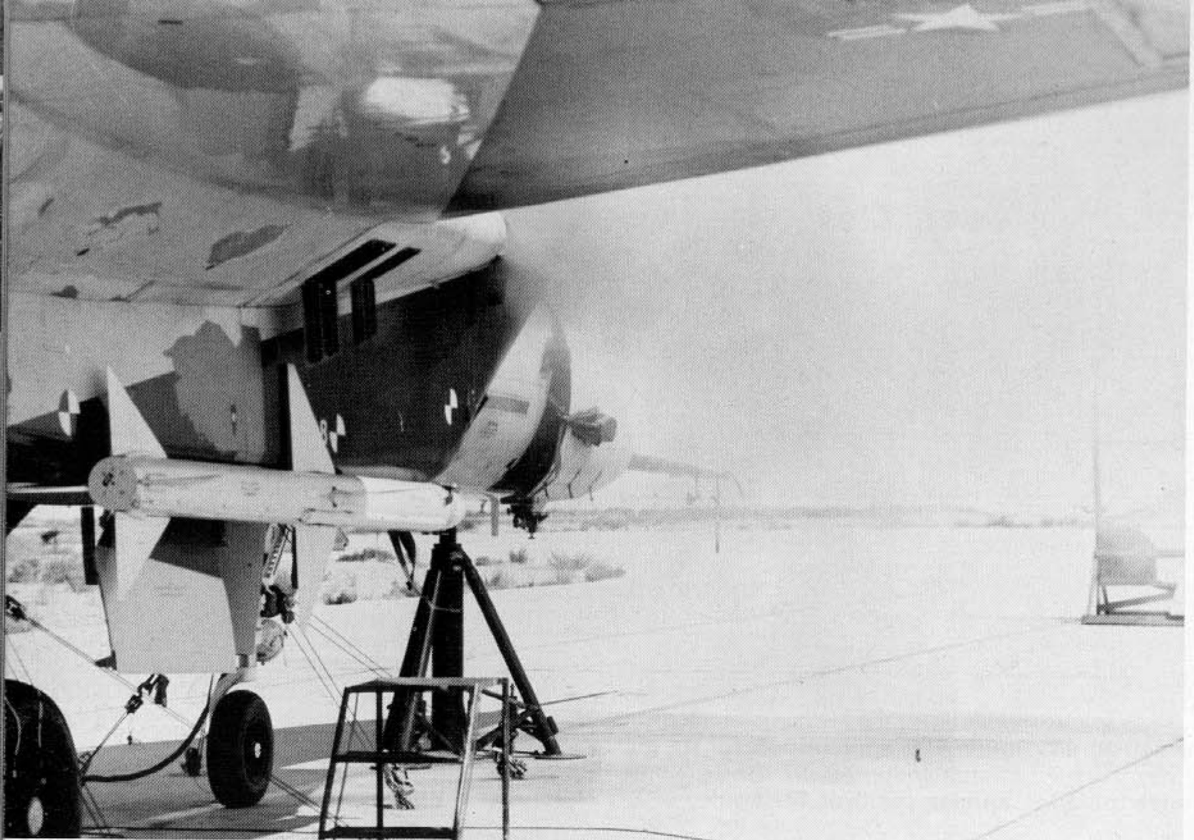
I taxied back to the parking area, and, with a signal from the crew chief, we shut down the engines and climbed out. I am sure that I was grinning like a possum as we talked to the maintenance men who were around the aircraft. As a matter of fact, I think I was still grinning when I went to sleep many hours later. The F-15 is quite an airplane!



[Above] Aircraft #7 [10286] fires an AIM-7 "Sparrow" medium range air to air missile. The F-15 can carry four AIM-7 radar missiles and four AIM-9 "Sidewinder" infra-red missiles. The aircraft also has 940 rounds of 20 millimeter ammunition for its gun. [USAF] [Below] F-15 with twelve 500 lb. bombs mounted on wing pylons. The aircraft is parked on the McDonnell Douglas ramp at St. Louis, MO. [McDonnell Douglas]

WEAPONS

GUN
SPARROW
SIDEWINDER
BOMBS

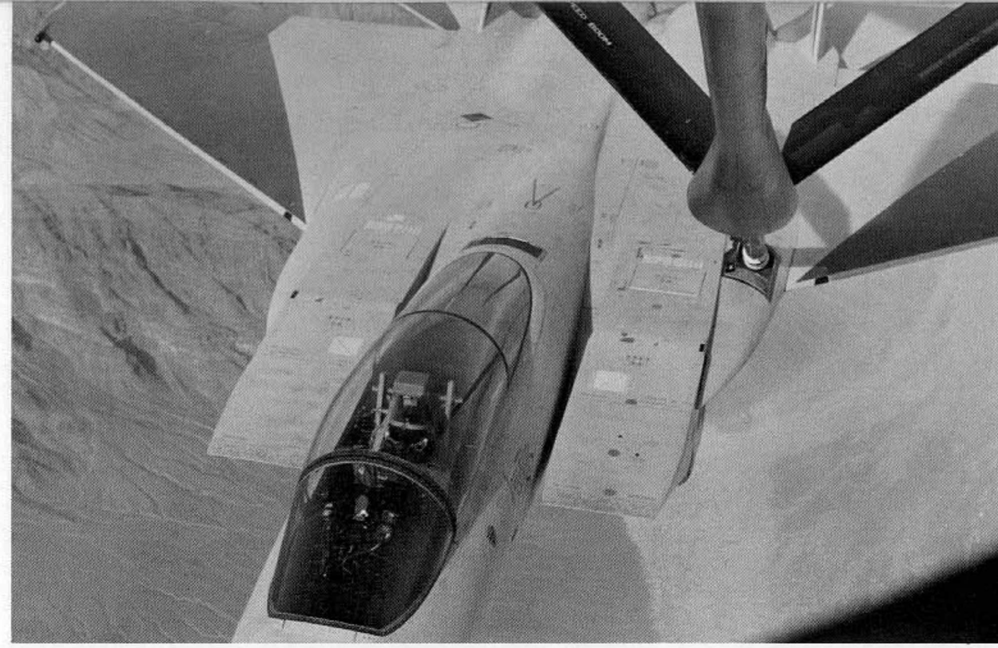


Ground test firing of the M-61 20MM gatling gun. The F-15 will carry 940 rounds of ammunition. An AIM-7 Sparrow missile is mounted on the lower fuselage corner. [McDonnell Douglas]

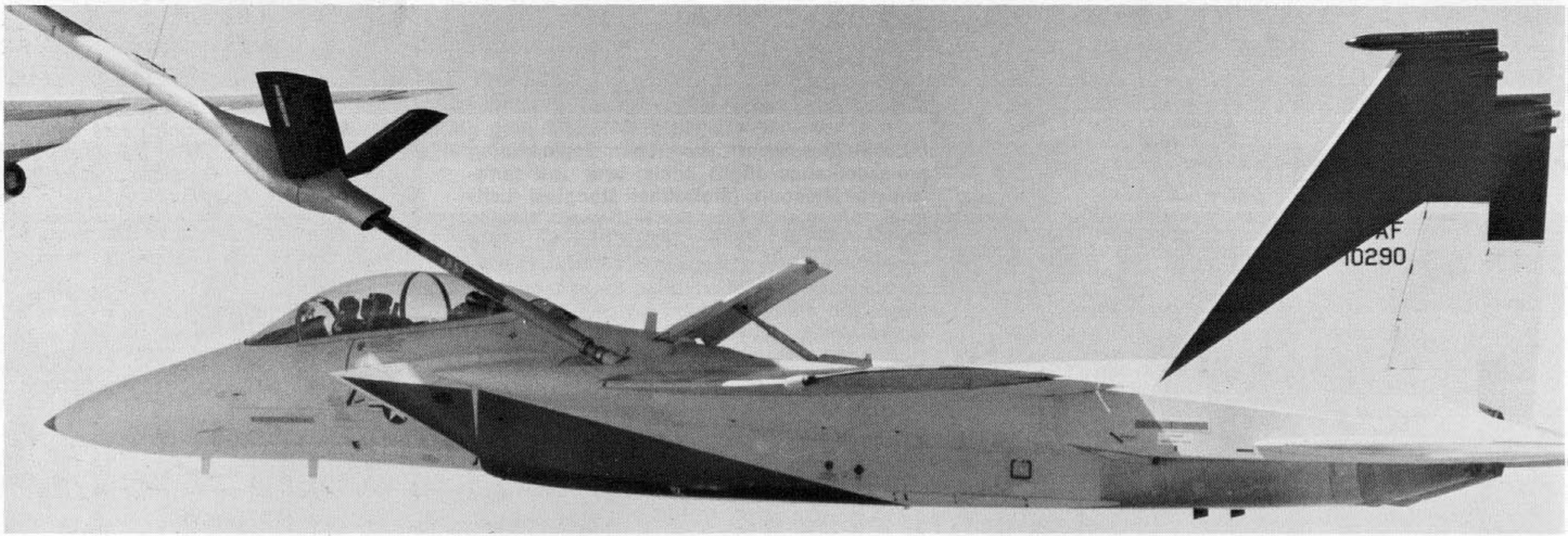
(Above) The seventh production Eagle during pre-acceptance flight trials over the farmlands of Missouri. (McDonnell Douglas) (Left) An F-15 is towed from the McKinley Climatic Laboratory at Eglin AFB, Florida. This hangar can duplicate weather conditions over a wide range of temperatures. Tests done here check the aircraft's operating capabilities in extreme climates. [USAF] [Right] Irv Burrows, McDonnell Douglas Chief Test Pilot, dismounts after the F-15's first flight. [McDonnell Douglas]

REFUELING

This is what the KC-135 boom operator sees as an F-15 moves into position to take on fuel. Refueling slip away door (not open in this photo) is outlined by the orange rectangle on the left wing root area.

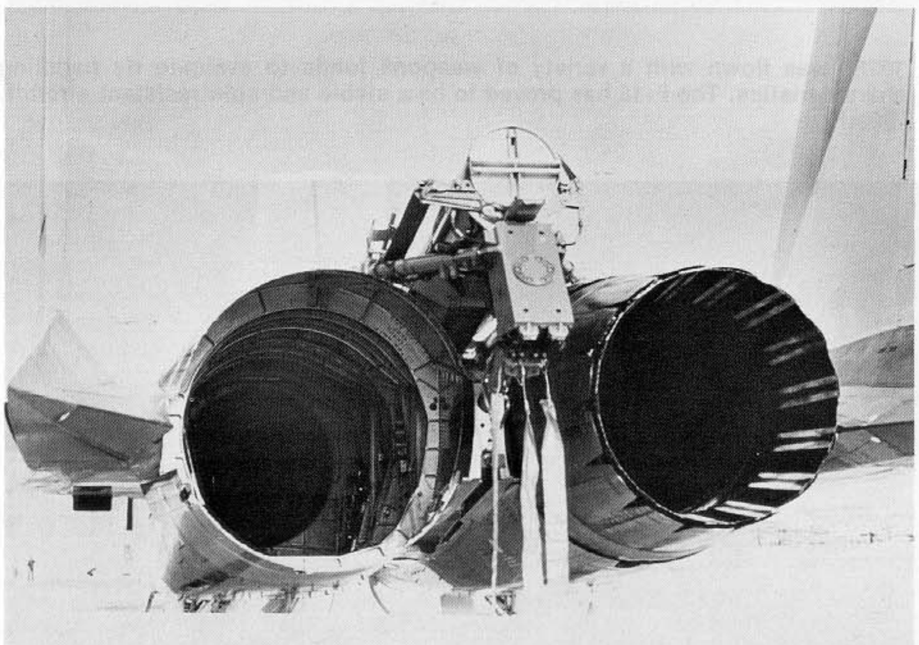


Close up views of an F-15 taking fuel shows details of top side. Note large canopy and excellent visibility available to the pilot. (USAF)



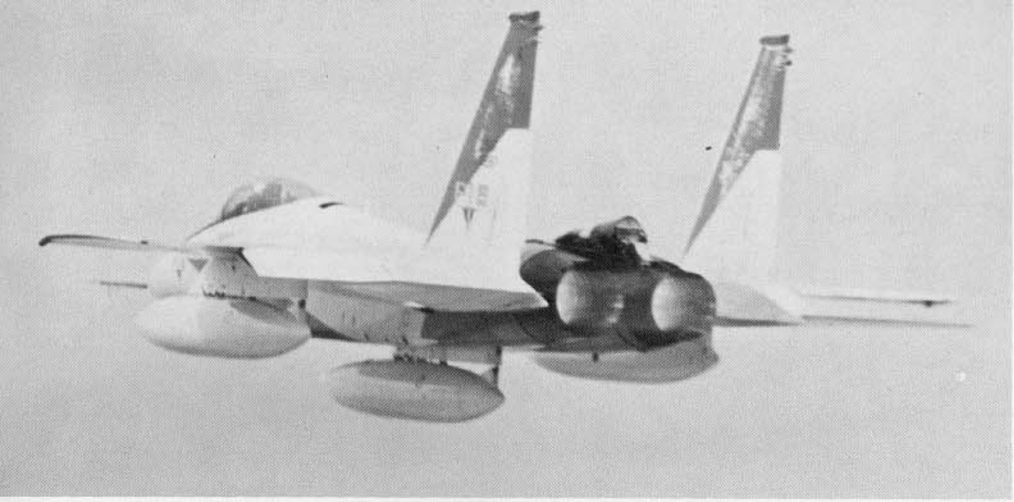
An F-15 (10290) in the test paint scheme takes on fuel from a KC-135 tanker. The speed brake is open for stability and improved throttle response during the tests. Note the hydraulic actuator that extends the speed brake. (USAF)

Aircraft #8 was painted white and orange for better visibility and radar reflectivity by chase aircraft. It was used to conduct spin tests and was fitted with a 33½ foot diameter spin recovery chute. (McDonnell Douglas)



Close up shows details of the spin recovery chute installed on Aircraft #8 (10287). This was the only test aircraft to be fitted with a spin chute. Production F-15s do not have spin chutes. (USAF)

McDonnell Douglas employees attach the left wing to #10287. This was the test aircraft #8 used for spin evaluations. Note the spin recovery chute cannister installed between the tailpipes. (McDonnell Douglas)



10287 accelerates in full afterburner. The aircraft is configured with three 650 gallon external fuel tanks. This aircraft was flown with many different ordinance and fuel loads to test its spin characteristics. [USAF]

Aircraft #8 (10287) in white and day glow orange paint scheme shows off its impressive rate of climb in military power (non afterburner). Note the absence of exhaust smoke. Smoke is a give away in air combat since it makes it easier for an enemy to visually find an aircraft. (USAF)

10287 was flown with a variety of weapons loads to evaluate its handling characteristics. The F-15 has proved to be a stable and spin resistant aircraft. [USAF]

#10287 returns from a test mission. Note excellent visibility from the large canopy that extends down to the pilot's waist. The F-15 offers exceptional visibility in all areas. (USAF)

The Day the Eagle Streaked

By Major Roger J. Smith

On February 1, 1975, a US Air Force F-15 Eagle broke its eighth time-to-climb record in seventeen days, shattering all existing marks established by a US Navy F-4 Phantom and a Soviet MiG-25 Foxbat. The pilot who made the final assault on the records tells his story.

Saturday, February 1, 1975, dawns cold and clear in Grand Forks, N.D., contrary to the forecast of the previous evening. Weather forecasting in North Dakota is more a black art than a science. Weather often originates here. A typical forecast is, "Clear to partly cloudly with a chance of snow." That leaves a lot of room for change.

I'd set the alarm radio for 6:00 o'clock. When it begins playing country music, I lean across my wife to turn it down. Marilyn came up from Edwards AFB last Sunday. That was my fortieth birthday, and the day I had hoped we would set the 30,000-meter time-to-climb records so I could tell our kids that life really begins at forty. Instead, Maj. Dave Peterson, another of the Project Streak Eagle pilots, knocked off the 25,000-meter record that day, and it then was too late to try for 30,000. The rest of the week has been a series of frustrations.

Monday we had a shot at 30,000 meters, but the temperature at 36,000 feet, the acceleration altitude, was four degrees above the standard of minus 56.2 Celsius. The big Pratt & Whitney F100 fan engines that power the F-15 couldn't produce the acceleration required to set world class time-to-climb records at that temperature.

Also the fifty-five-degree climb angle shown by the flight simulation to be optimum for the final climb had not accounted for only fifty knots of tailwind, which would add total inertial energy for the conversion of speed into altitude.

So much for Monday. I didn't get to the 98,425 feet required for the 30,000-meter record. Two thousand feet short. Tuesday, Wednesday, and Thursday were devoted to installing a modified engine control and watching the bad weather. On Friday, we had a two-hour break in the weather, but the aircraft pitch trim control wouldn't work after engine start. By the time the mechanics and engineers sorted that one out, the weather was back.

Let me explain what we need for weather. Because we'll be shutting the engines down at the top of the climb and restarting coming back down, we want clear skies and ten miles of visibility at Grand Forks and Fargo—our landing alternate. We need standard temperature, or colder, at acceleration altitude and all the tailwind we can get out of the northwest since Fargo, our only alternate, is southeast of Grand Forks. This is no small order for North Dakota in winter.

Weather and Systems "Go"

Today is Saturday, February 1. At 6:00 a.m., I stumble into the bathroom to shave and wake up, before I call the weatherman. As I look out the window, I see stars and a setting moon. No clouds!

My subsequent call is not very encouraging. The weatherman says it might be clear now, but he'll stand on his original forecast of clear to partly cloudly with a chance of snow—at least until the sun comes up.

On Saturdays, we don't have people automatically report for work unless we think there is reason for optimism after the 6:00 a.m. weather check. The final weather check is in the radar van that tracks the flights and provides data to verify the records. It takes those folks about three hours to power up and run their preflight checks.

I try to call Jerry Callender, chief of the RCA radar crew. He has apparently already seen the moon and stars. No answer. I know these people well enough to know that Jerry is not sleeping elsewhere. Jerry and his crew have gone to work. I call the room of Sgt. Jim Flaggart, our weather balloon team chief. No answer. His group is also at work.

Four more phone calls—to Pete Garrison, chief test pilot for McDonnell Aircraft and the voice of mission control; to Maj. Joe Higgs, Deputy Project Leader and coordinator of all base support; and to Majs. Dave Peterson and Mac Macfarlane, the other Air Force Project pilots.

Dave will be flying safety chase today, and Mac will be operating the mobile control unit in a radio-equipped staff car. With the primary notification net working, I am again pleased with myself for insisting that all fifty of the Streak Eagle staff live in the same motel. Otherwise, I'm afraid we might have missed someone. Except for the radar van and weather balloon functions, we could launch a record attempt in two hours from notification. That's starting with everyone asleep in the motel.

A quick breakfast and everyone arrives at work by 0815. The briefing doesn't take long. We have briefed this mission three times before. We again discuss the frequencies, call signs, and who's going to do what.

I will be Eagle I in the F-15. Dave will chase in the F-4 with Lt. Col. Carl Anderson, the Grand Forks AFB Chief of Operations, in the back seat. Carl was selected for his thorough knowledge of the area and a pair of keen eyes to help Dave relocate the Eagle if the contrail level does not provide reasonable visual cues over the top.

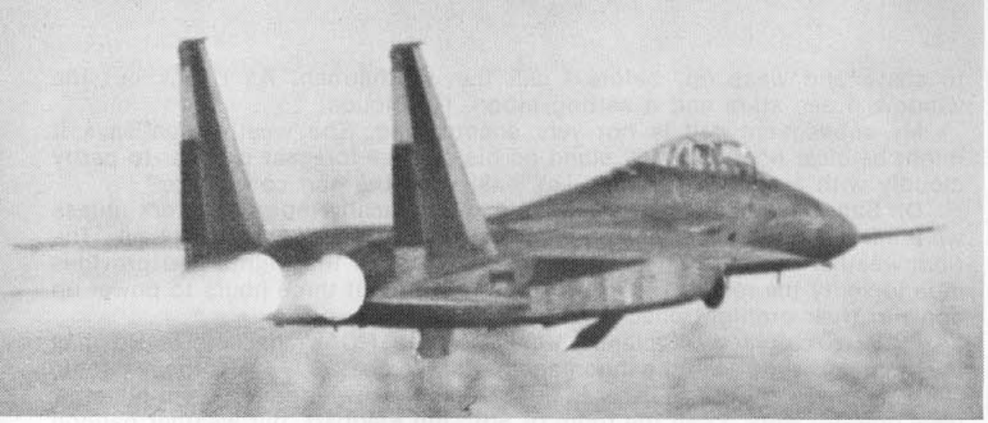
Pete Garrison will run the radar van, be my ground contact, and provide assistance in the event of problems or emergency. Pete had flown all development flights on the Streak Eagle F-15 and knows it inside out

His primary assistant will be Dick Cahill, the genius McAir (McDonnell Aircraft Co.) Project Engineer who "invented" Project Streak Eagle. Dick built the optimum flight profiles to achieve maximum altitude in minimum time and overall knows more about what we were doing than anyone in captivity.

Dick's job during the flight is to monitor fuel remaining, time, and Mach number and advise Pete if we are "go" or if we should abort early and avoid the rush.

Maj. Joe Higgs will run Eagle Operations and ensure that crash crews, helicopters, and clearances are available on time. Norm Gaddy and Tom Hassler are the McAir crew chief and chief inspector who will make sure the Eagle is ready to fly. Sgts. Art Ball and Riley McVey are the crew chiefs on the F-4 chase aircraft.

Wayne Kupferer, Mo Gardner, and Roger Crane, the National Aeronautic Association observers, will certify and submit the record if we succeed. The team includes about forty other people.



Maj. "Mac" Macfarland accelerates to 500 knots before climbing straight up to set a new 6,000 meter record. The F-15 accelerated through the speed of sound (Mach 1) 23 seconds after brake release. Maj. Macfarland also set new 9,000 and 12,000 meter climb records in the F-15. (USAF)

It is 0900 and the briefing is over. A crowd of well-wishers is starting to assemble outside the briefing room. The weather still looks good. The runway has been cleared of snow, and the Fargo weather is excellent. The balloon results are in. Temperature at 30,000 feet is ten degrees below standard and two degrees below standard at 36,000 feet, where final acceleration will occur. The wind is more from the west than the north, but is blowing at eighty knots.

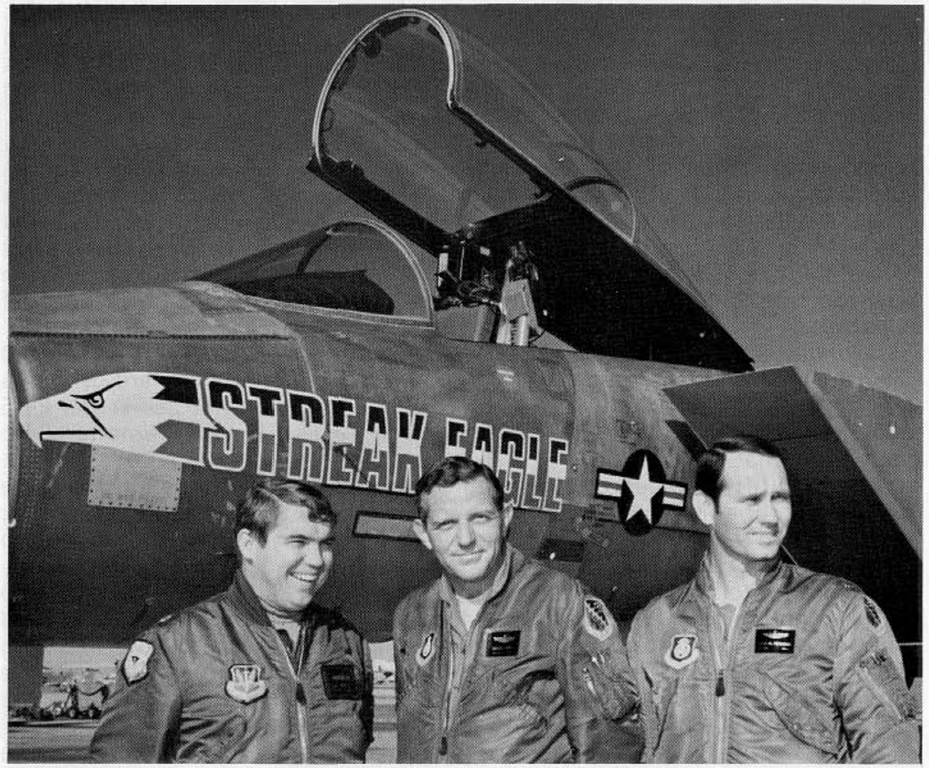
This is a go! The aircraft is released by maintenance. Everyone and everything is ready.

My stomach feels as it had in high school, twenty-two years ago when I stood on the goal line waiting for the opening kickoff. The difference is that this time I know the ball will be coming to me and although I have fifty other people to help me, the largest share of any failure will probably be mine. After Monday's attempt, I'm not sure how much more embarrassment the project will tolerate. At a time like this, I don't communicate well with my wife (or anyone else) so take my flight data to an empty briefing room and lock the door.

The Flight Profile

The Profile hasn't changed much since Monday's unsuccessful attempt. Release from the holdback cable at full afterburner with 7,000 pounds of fuel. Gear up and rotate for takeoff at the first indication of airspeed, about seventy knots. Watch the gear unsafe light and hope it goes out by 350 knots. If not, abort fast. Look for 0.65 Mach—about 420 knots. Rotate vertically into an Immelmann and hold 2.65 Gs. Expect to arrive level upside down at 32,000 feet at 1.1 Mach. Roll 180 degrees to right side up and accelerate to 600 knots. Climb at eight degrees to 36,000 feet at 600 knots. Hold 36,000, accelerate to 2.25, pull four Gs to fifty-five degrees. (I know it will now take sixty degrees with today's strong tailwind.) Look for four degrees' angle of attack. Hold four degrees until Pete Garrison calls to recover (passing the required 98,425 feet). Shut down afterburners when they blow out. Shut down the engines when they quit. At the "recover" call, try to hold zero angle of attack to minimize any tendency for control or gyroscopic unknowns to the flight path in the rare atmosphere. Ride ballistically to a fifty-five-degree dive angle. Look for 100 knots airspeed and start turning for home—if you can figure out where home is on the snow-covered terrain without a compass.

At 55,000 feet or below, look for four green lights on the instrument panel to indicate the boost pump is on. Try to start both engines at once when above 350 knots and twelve percent rpm. If at least one starts and you have radio contact with Pete Garrison, talk about coming home to Grand Forks, depending on fuel remaining. If there is no start or no contact on radio, think about Fargo or ejection. It sounds complicated but really all the important decisions were made ahead of time. Except one thing: That's the fifty-five-degree climb angle intercepting zero angle of attack at 300 knots. This had



In all, four pilots were involved in the time-to-climb record attempts — three USAF pilots and one McDonnell Douglas test pilot. The three Air Force pilots, Major Roger Smith, Major W. R. Macfarlane and Major Dave Peterson were all members of the F-15 Joint Test Force (JTF) which is in charge of the test and evaluation of the Eagle. The fourth pilot, Mr. Pete Garrison, was instrumental in the development of the flight profiles used for the time-to-climb records. USAF pilots, from left, are: Macfarlane, Smith & Peterson (USAF)

given us about fifty-five knots of airspeed over the top in the simulator. Ample longitudinal pitch control on Monday when I ended up 2,000 feet short at 96,300 feet.

My boss at Edwards called afterward to assure me of his faith in simulators and me, "But don't go where you haven't been." "Hell, Boss, I've never been to 103,000, and that's where we've got to go to get through 98,400 in a climb."

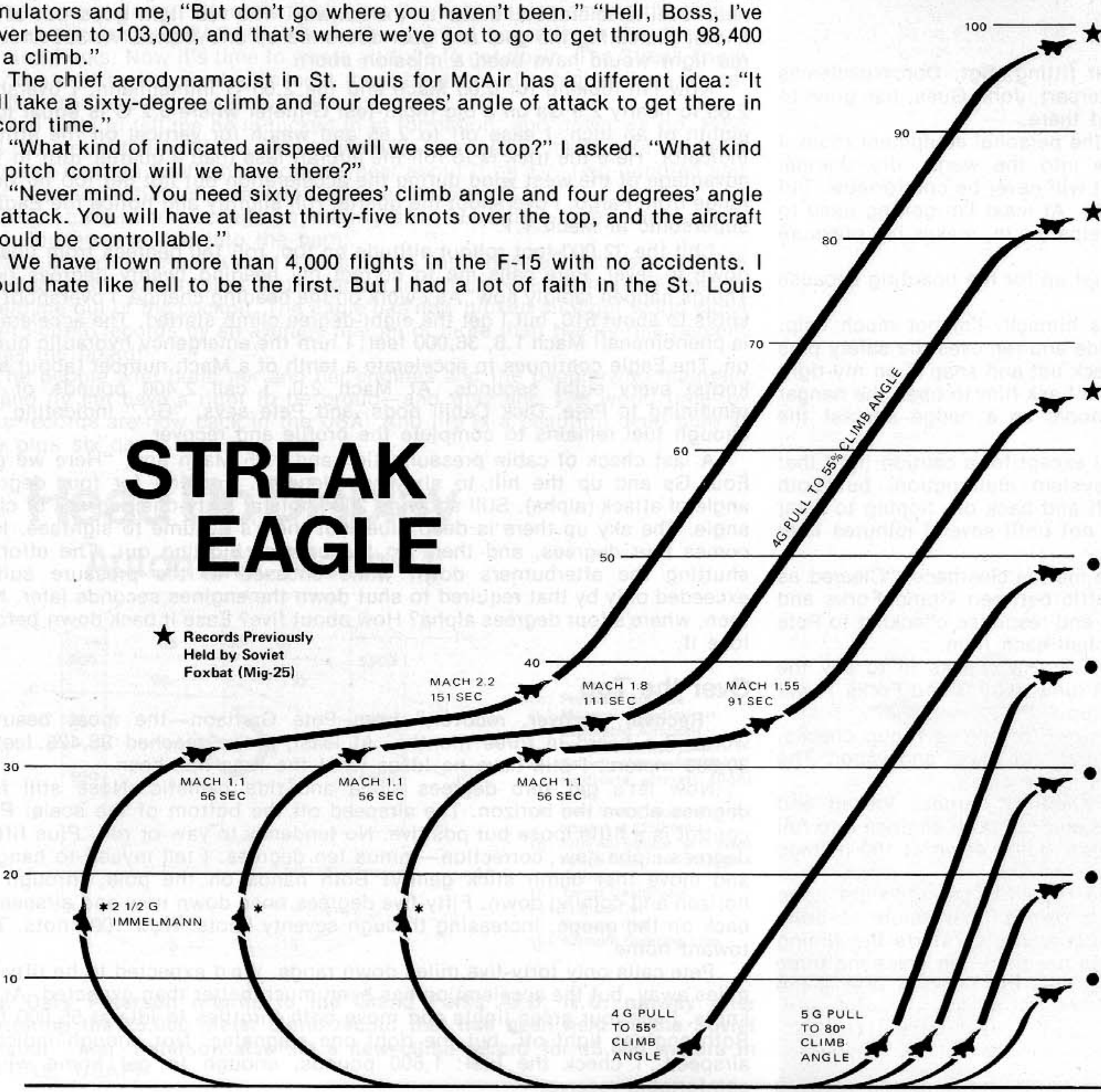
The chief aerodynamacist in St. Louis for McAir has a different idea: "It will take a sixty-degree climb and four degrees' angle of attack to get there in record time."

"What kind of indicated airspeed will we see on top?" I asked. "What kind of pitch control will we have there?"

"Never mind. You need sixty degrees' climb angle and four degrees' angle of attack. You will have at least thirty-five knots over the top, and the aircraft should be controllable."

We have flown more than 4,000 flights in the F-15 with no accidents. I would hate like hell to be the first. But I had a lot of faith in the St. Louis

STREAK EAGLE



	ALTITUDE (FT)	TIME (SEC)	PILOT	DATE	PREVIOUS RECORD (SEC)
★	98,425	207.80	MAJ. R. SMITH	1 FEB 75	243.86 (MIG-25)
★	82,021	161.02	MAJ. D.W. PETERSON	26 JAN 75	192.60 (MIG-25)
★	65,617	122.94	MAJ R. SMITH	19 JAN 75	169.80 (MIG-25)
•	49,212	77.02	MAJ D.W. PETERSON	16 JAN 75	114.50 (F-4)
•	39,370	59.38	MAJ W.R. MACFARLANE	16 JAN 75	77.14 (F-4)
•	29,528	48.86	MAJ W.R. MACFARLANE	16 JAN 75	61.68 (F-4)
•	19,685	39.33	MAJ W.R. MACFARLANE	16 JAN 75	48.79 (F-4)
•	9,843	27.57	MAJ R. SMITH	16 JAN 75	34.52 (F-4)

• set in a single climb

pros, and the simulation had never been wrong. If I go over the top at thirty-five knots indicated, we will have only three pounds of dynamic pressure, but the aircraft will indeed be controllable. It will not exhibit any squirrels in directional control or roll control. Or will it?

Cleared as Filed

Now it's 0930. Time for the pressure suit fitting. Sgt. Don Needles is suiting me up alone today as his McAir counterpart, John Guss, has gone to Fargo to help me unsuit in case I must land there.

Don stretches the suit out on the floor of the personal equipment room. I strip down to my birthday suit and hustle into the warm, dry thermal underwear he's laid out. The full pressure suit will never be comfortable, but I'm glad I insisted on wearing it on every flight. At least I'm getting used to the discomfort and restricted mobility. Don helps me in, makes his pressure checks, and we are ready for the aircraft.

A step stand instead of a ladder has been set up for the boarding because of my decreased mobility.

Don does all the checks and connections himself. I'm not much help. Crew Chief Norm Gaddy helps from the left side and removes the safety pins from the emergency power unit. I find my check list and snap it on my right leg. Tom Hassler is on the interphone now, and I ask him to open the hangar doors. The curious crowd retreats behind doors as a hedge against the subzero cold and expected noise.

The start and after-start checks are normal except for a caution light that indicates a heading and attitude primary system malfunction, but both systems look normal. I cycle the generator off and back on, hoping to clear the malfunction indicator. It does clear, but not until several minutes later when I am on the runway.

As I taxi from the hangar, Joe Higgs gives me the clearnace: "Cleared as filed." This means essentially that all air traffic between Grand Forks and Fargo has been rerouted. I read the command and response checklist to Pete Garrison, and he acknowledges as I accomplish each item.

Dave Peterson is already airborne in the F-4. He checks in to say the weather is good all the way. I'm cleared on the runway by Grand Forks Tower and take my position on the hold-back hookup.

When I'm secured, the crew chief signals me for engine runup checks, after which he and his crew inspect the aircraft for leaks and vapor. The attitude and heading warning light blinks and goes out.

Pete acknowledges my final checks of shoulder harness locked and cockpit camera on. I now push up the throttles and put both engines into full afterburner. The fuel gauge shows 7,300 pounds, going down at 100 pounds every ten seconds.

Deciding that I'd rather be 100 pounds fat than 100 pounds light upon return, I call, "Twenty seconds to launch." I give a final salute to John Roberts, who operates the hold-back release (which also starts the timing clock in the radar van) and look at the airspeed needle. John gives me three seconds to get my eyes focused forward and fires the release. This is the kickoff!

Up the Hill

The release is less spectacular than on the 3,000-meter profile because the fuel load is two-and-a-half tons heavier. Instead of immediate rotation at the first indication of airspeed, I delay about a half second, then try to rotate the nose smoothly upward and raise the gear handle. The Eagle is airborne in less than four seconds from release. Now I sweat out the gear retraction in a near level acceleration, close to the runway. The red light goes out at 320 knots, indicating the gear and gear doors are up and locked. At 350 knots, a red light would have been a mission abort.

Now I'm looking for 0.65 Mach and the 2.65 G Immelmann. I overshoot 2.65 to nearly 2.9 Gs on a big flight-test G-meter where 0.2 G is equal to an eighth of an inch. I ease off to 2.65 and watch for vertical on the attitude indicator. Here the trick is to roll the aircraft less than a quarter turn to take advantage of the west wind during the acceleration but not get too far down range from Fargo. I overshoot the quarter roll slightly and notice the Eagle is supersonic at Mach 1.1.

I hit the 32,000-foot rollout altitude on top, roll 180 degrees from upside-down to level. Pete calls me to correct my heading twenty degrees right. Things happen rapidly now. As I work on the heading change, I overshoot 600 knots to about 610, but I get the eight-degree climb started. The acceleration is phenomenal! Mach 1.8, 36,000 feet; I turn the emergency hydraulic pumps on. The Eagle continues to accelerate a tenth of a Mach number (about sixty knots) every eight seconds. At Mach 2.0, I call 2,400 pounds of fuel remaining to Pete. Dick Cahill nods, and Pete says, "Go," indicating that enough fuel remains to complete the profile and recover.

A last check of cabin pressurization and 2.25 Mach and, "Here we go!" Four Gs and up the hill to sixty-one degrees. Looking for four degrees' angle of attack (alpha). Still showing 200 knots at sixty-one degrees of climb angle. The sky up there is deep blue, but there's no time to sightsee. Here comes four degrees, and there go the burners blowing out. The effort of shutting the afterburners down while encased in the pressure suit is exceeded only by that required to shut down the engines seconds later. Now then, where's four degrees alpha? How about five? Ease it back down before I lose it.

Over the Top

"**Recover, recover, recover,**" from Pete Garrison—the most beautiful words I've heard in three months. At least, we've reached 98,425 feet or 30,000 meters. I still have no ideas what the time has been.

Now let's get zero degrees alpha and ride ballistic. Nose still forty degrees above the horizon. The airspeed off the bottom of the scale. Pitch control is a little loose but positive. No tendency to yaw or roll. Plus fifteen degrees alpha now; correction—minus ten degrees. I tell myself to hang on and move that damn stick gently! Both hands on the pole, through the horizon and coming down. Fifty-five degrees nose down now and airspeed is back on the gauge, increasing through seventy knots. Now 100 knots. Turn toward home.

Pete calls only forty-five miles down range. We'd expected to be fifty-five miles away, but the acceleration has been much better than expected. At 350 knots, I see four green lights and move both throttles to idle at 55,000 feet. Both engines light off, but the right one stagnates. Not enough indicated airspeed. I check the fuel: 1,600 pounds, enough to get home with a comfortable reserve.

Pete calls, "Deep Blue," our code word for much better time than expected. "Red" would have indicated no record time or failure to achieve record altitude; "White" a valid record time but not as good as expected, based on computer analysis. We had expected about 226 seconds.

Three more airstart attempts finally get the right engine among the living, and the compass and TACAN indicate I'm pointed generally in the direction of Grand Forks. Now it's time to waste attitude to get down. The Streak Eagle has no speed brakes, and a descent must be made at a higher-than-normal speed or the aircraft glides forever.

Dave calls to tell me he is tucked in in formation, and down we go. Pete calls the record time with an additive we have arranged to make sure we get a chance to discuss the flight before we hear about it on TV. Two hundred and eight seconds—thirty-six seconds off the old record!

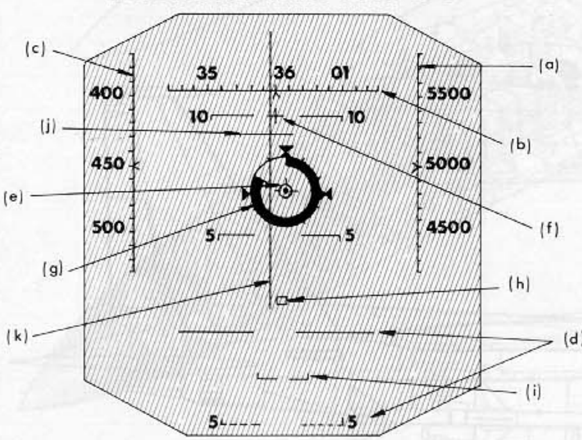
God, I have to concentrate on landing now. No flybys today. Gear check good, touchdown, and into the barn.

The crowd of spectators has grown, and they all appear to have champagne. My wife is first up the ladder, and Don Needles is right behind, to help me out of the cockpit. The Eagle has now broken all eight world class time-to-climb records by an average margin of more than twenty-one percent across the board!

The people who build her and her engines and the people who maintain her and fly her have a right to be proud—and they are. The world time-to-climb records are now back in the USA. And life is a beautiful deep blue at forty plus six days.

Head Up Display

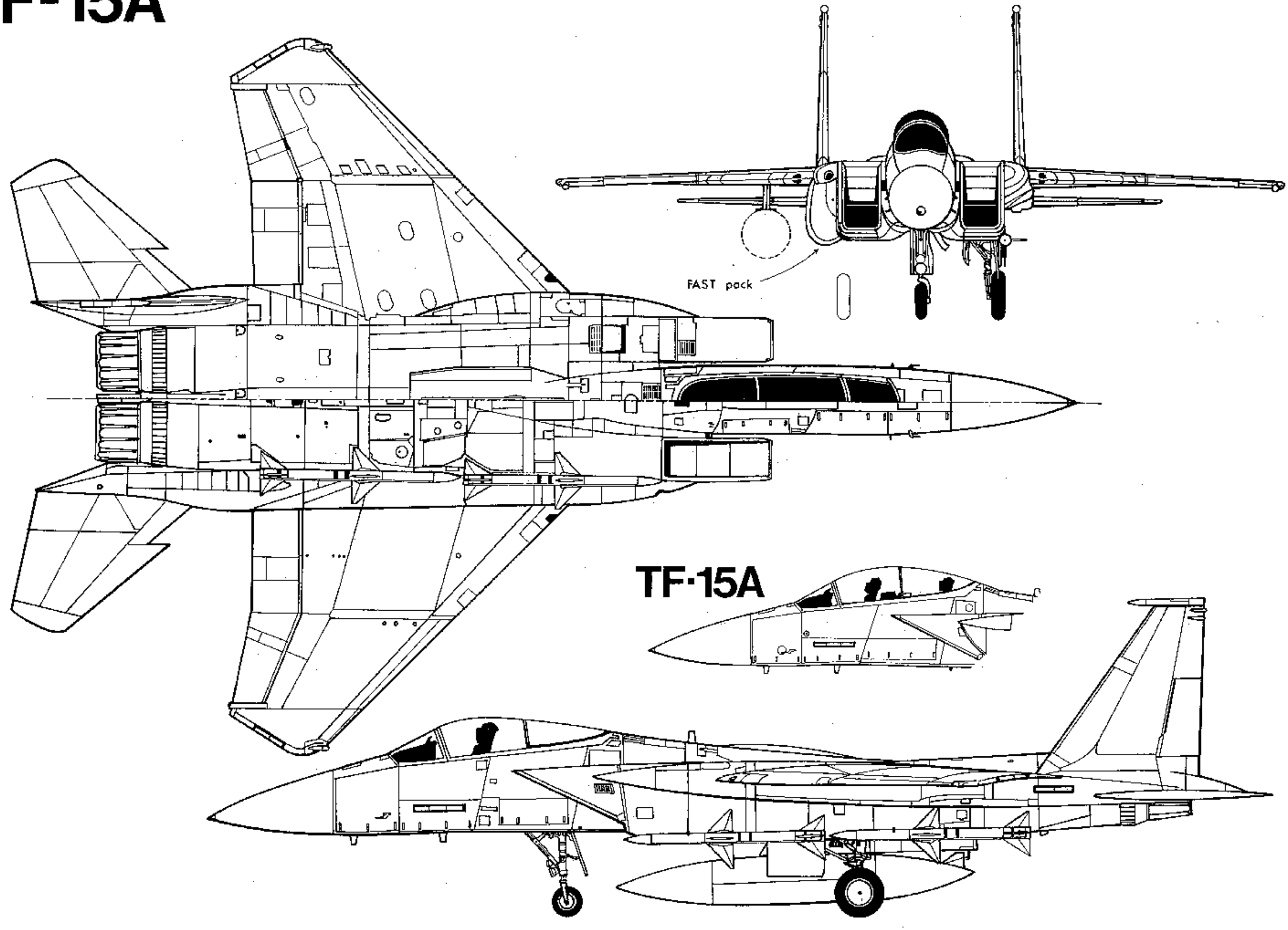
Automatic Mode



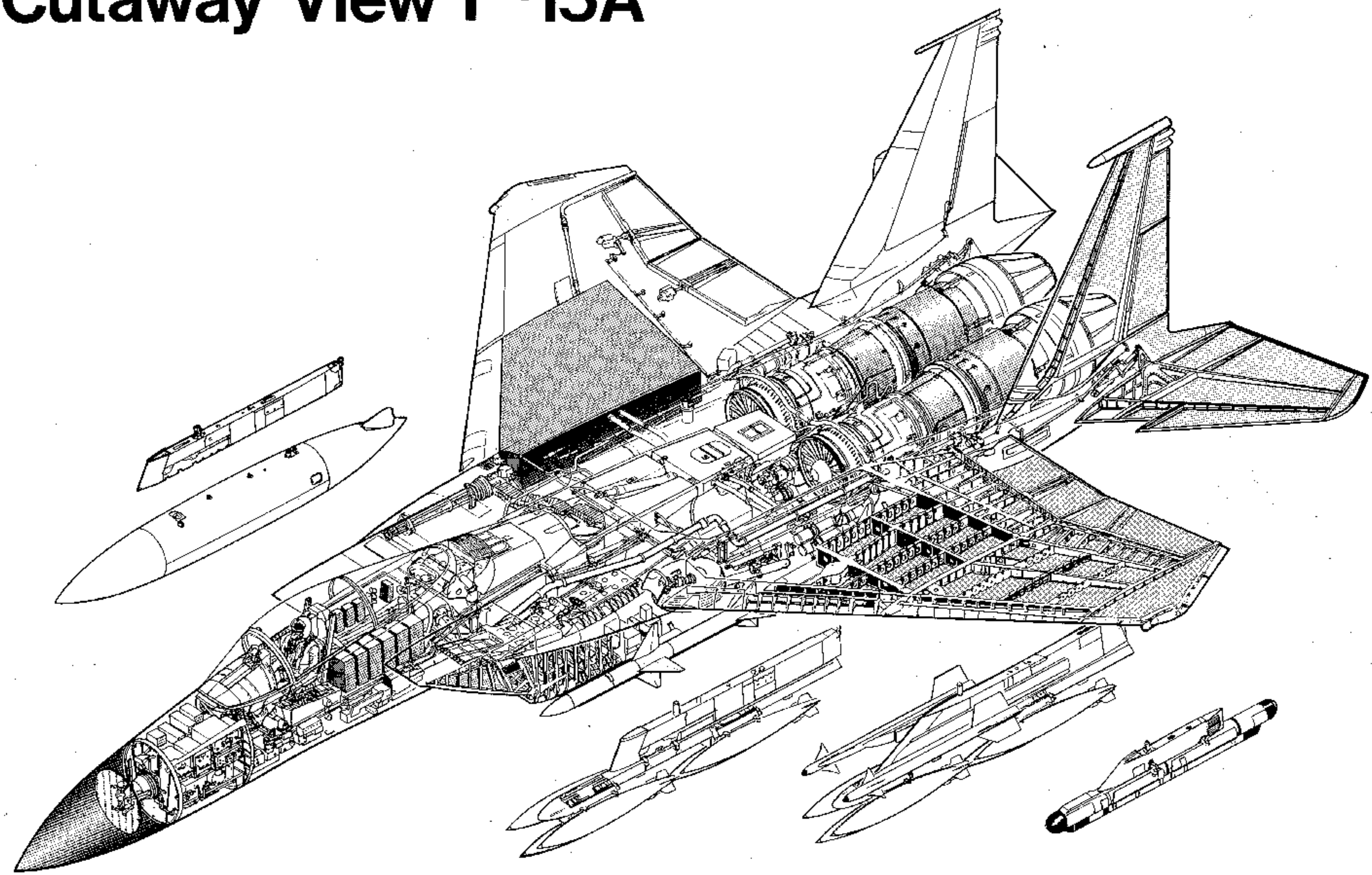
(a) Pressure Altitude
(b) Magnetic Heading
(c) Calibrated Airspeed
(d) Pitch Reference Lines
(e) Velocity Vector Symbol (indicate aircraft flight path)
(f) Gun Cross (computed for impact at 2250 feet)
(g) Fifty Mil Reticle (with plant range bar for weapon delivery)
(h) Target Designator
(i) Pull-Up Cue
(j) Release Cue
(k) Azimuth Steering Line

Maj. Dave Peterson returns to the Grand Forks AFB, N.D. runway after shattering the 25,000 meter climb record that had been held by the Soviet "Foxbat." Maj. Peterson also set a new climb record for 15,000 meters in the F-15. (USAF)

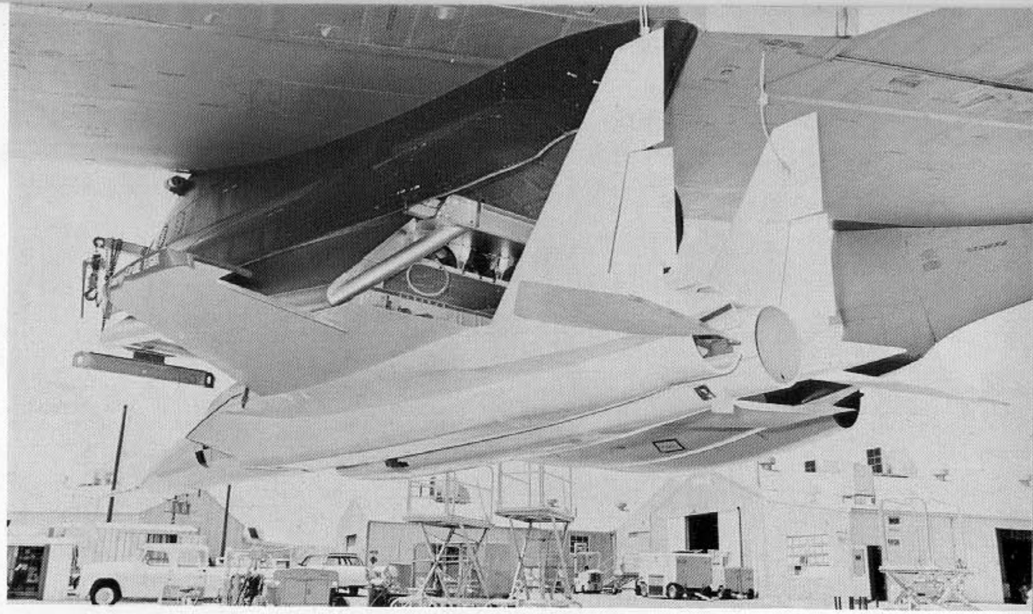
F-15A



Cutaway View F-15A

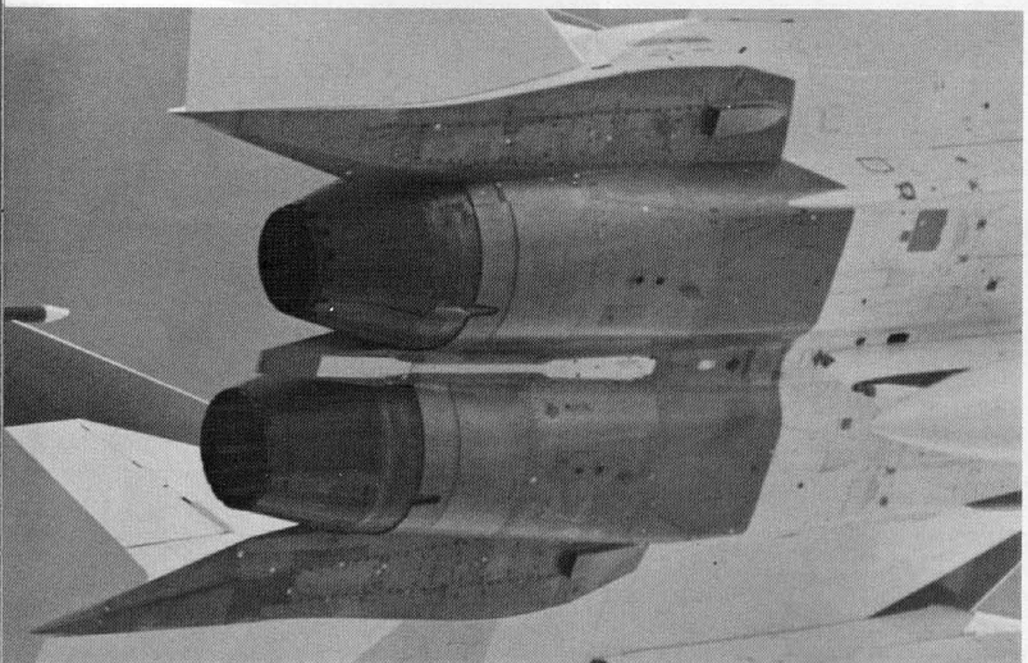


This 5/8ths scale model of the F-15 was used for test drops from a B-52 launch aircraft. The remotely guided model was used to gather flight data and was then recovered by parachute to be used again. (McDonnell Douglas)

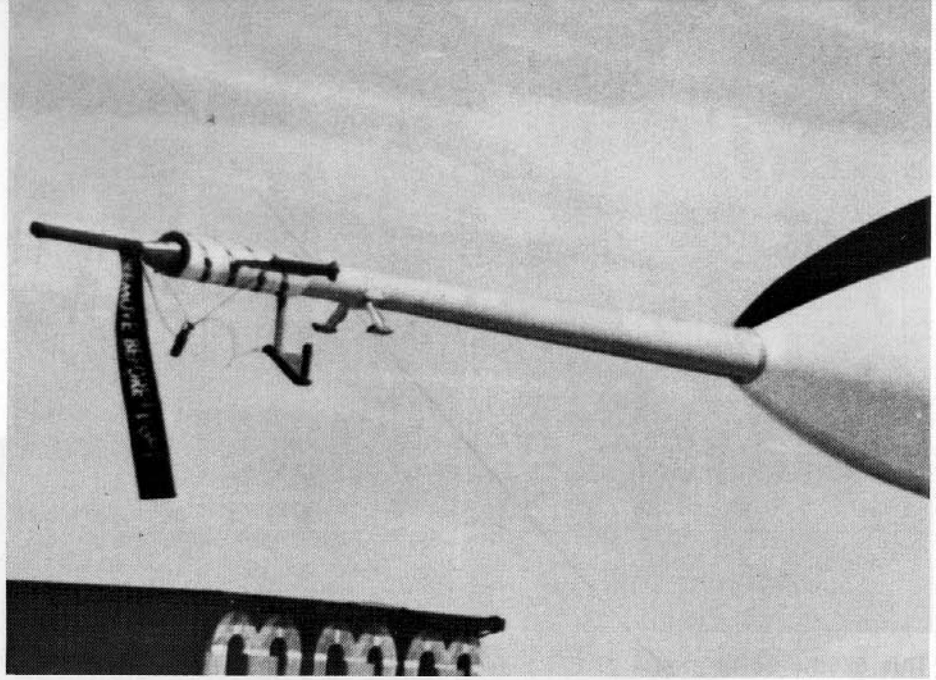


This is the F-15 scale model mounted under the wing of a B-52 launch aircraft at the USAF Flight Test Center, Edwards AFB, Calif. It was used in a series of tests to gather flight characteristics data for actual flights that followed. (NASA)

McDonnell Douglas maintenance technicians prepare an F-15 for flight at the Edwards flight test center. Air Force and contractor maintenance men worked side by side during the test program. Note detail of nose gear and door assembly. Also warning stenciled on intake cover — an allusion to engine capability to "pick your pockets" (McDonnell Douglas)



UNDERSIDE DETAILS

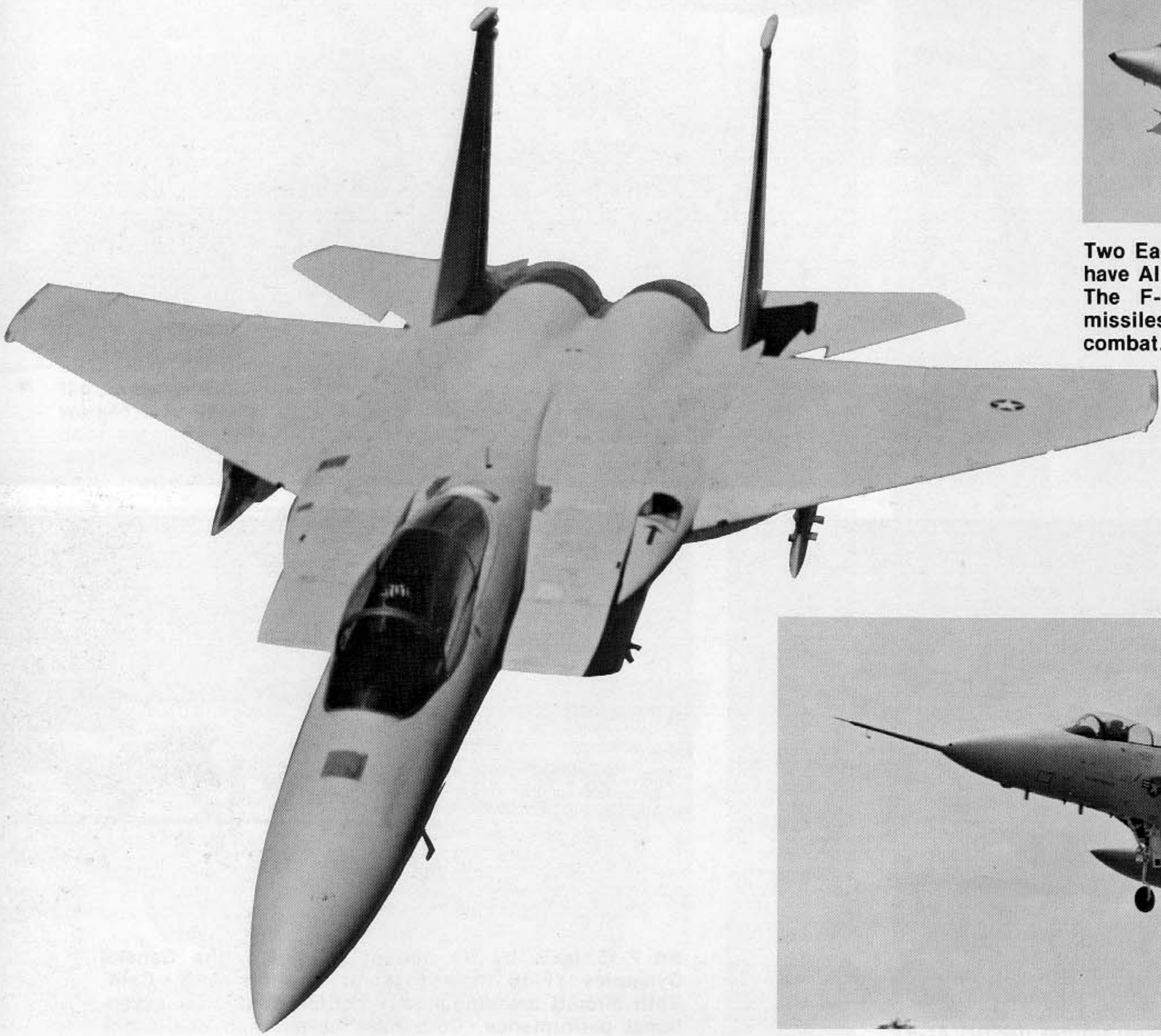


NOSE PROBE TEST BOOM

TF-15 (10290) returns to St. Louis plant after a test flight. Note the speed brake extended to help slow the aircraft. The speed brake is very effective and may be opened at any speed up to the aircraft limit. (McDonnell Douglas)

10287 vents fuel from wing ports as it returns from a spin test mission. The F-15 has proven to be a very stable aircraft and fully recoverable from any type of spin that it can be forced into. (McDonnell Douglas)

An F-15 taxis by its newest teammate, the General Dynamics YF-16 (now F-16) at Edwards AFB, Calif. Both aircraft are single seat fighters and offer exceptional performance. Both have better than one-to-one thrust ratios and share the Pratt and Whitney F100 engine. The F-15 is a twin engine fighter and the F-16 has one engine. (USAF by Kokojan)

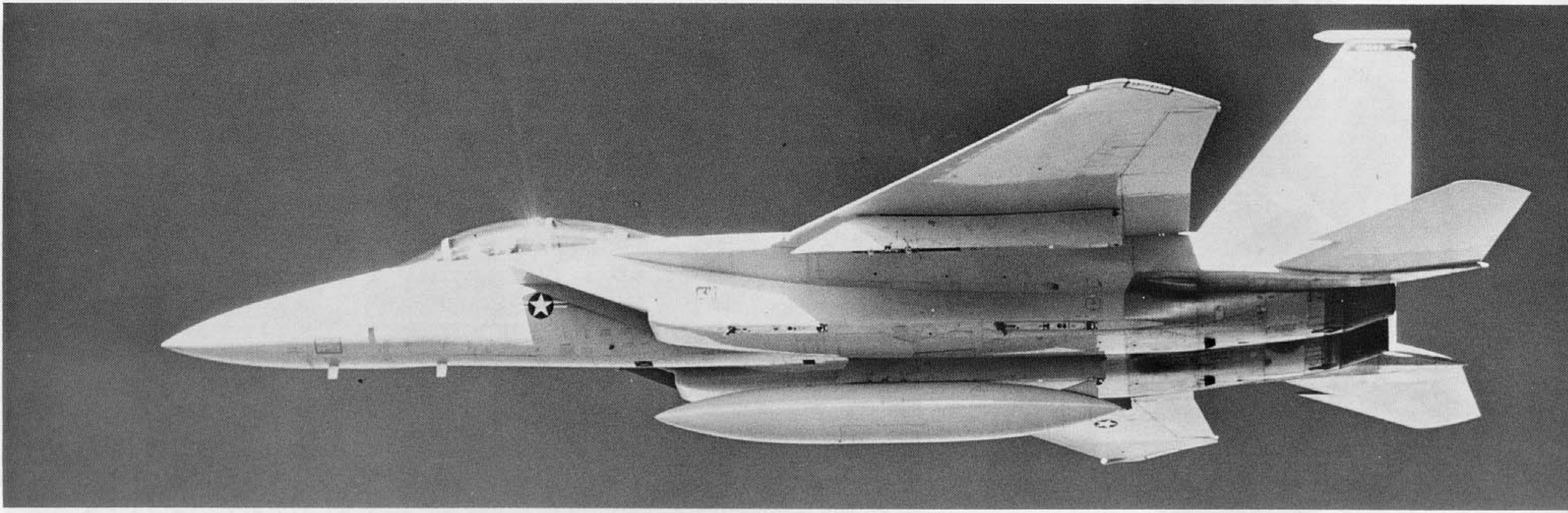


Two Eagles come in for a formation landing. Both aircraft have AIM-9 Sidewinder missiles mounted on wing pylons. The F-15 can carry both AIM-9 and AIM-7 Sparrow missiles, giving it great weapons flexibility during aerial combat. (McDonnell Douglas)

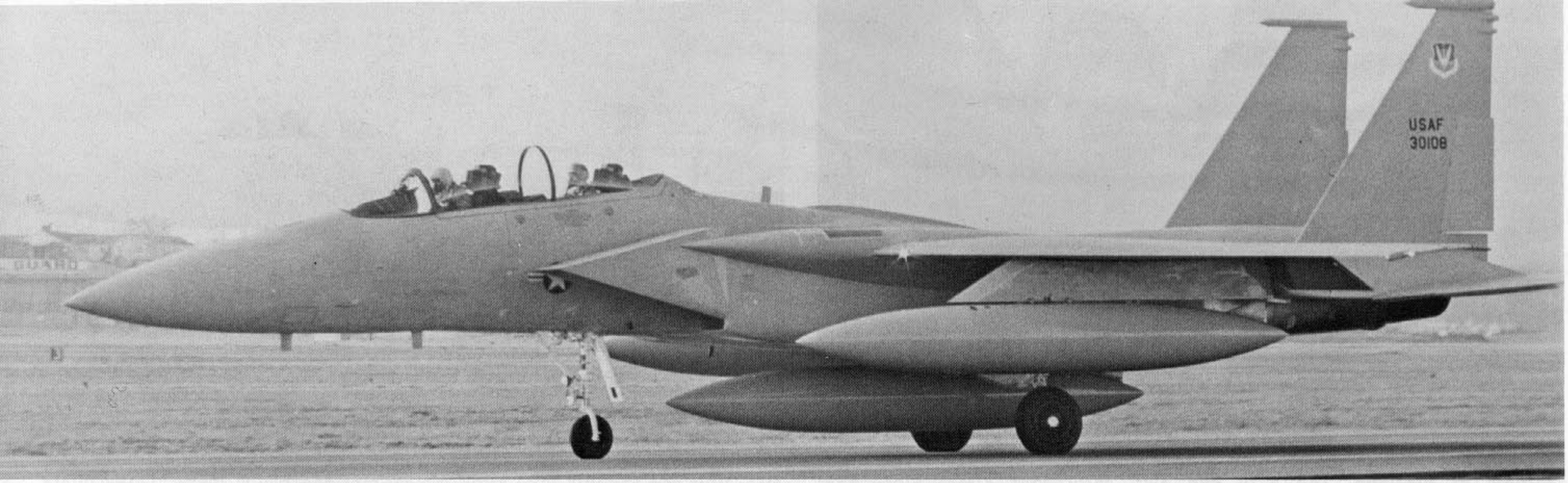
F-15 with three 650 gallon fuel tanks comes in for a landing. The F-15 lands at relatively slow speeds and does not require a drag chute to help stop. The aircraft does have an emergency tail hook to use in case of brake failure. (McDonnell Douglas)

Ground level view shows location of four AIM-7 Sparrow missiles on lower corners of fuselage. The F-15 can also carry four AIM-9 Sidewinder missiles, 940 rounds of 20 MM ammunition, and a variety of ordnance totaling up to 12,000 pounds (McDonnell Douglas)

An F-15 prepares for flight from the McDonnell Douglas facility at St. Louis, MO. Note the variable inlet ramp (below rear cockpit) is down. These inlets move with different throttle settings and flight conditions to adjust air flow to engines during all phases of flight. (McDonnell Douglas)



A Production F-15 shows "rounded" wing tips and "notched" leading edge of the horizontal stabalator. The first two F-15s had a straight leading edge on the stabalator. They were re-fitted with the production modification for improved performance. Note the small fin on top of the tail end of the 650 Gal. fuel tank. (USAF)



Delivery of the Tactical Air Command's first TF-15 was on Nov. 14, 1974. 30108 is shown taking off from St. Louis enroute to Luke AFB, Ariz., wearing a TAC patch on its tail. (McDonnell Douglas)

TAC's first operational F-15 was delivered to the 555th Tactical Fighter Training Squadron (TFTS), Luke AFB, Ariz., on Nov. 14, 1974. Over 20,000 visitors and many distinguished guests turned out to greet the Eagle. Among them was President Gerald Ford. The President's aircraft "Spirit of 76" is parked beside the F-15. [USAF by Sgt. McHargue]

President Ford is shown the F-15 by Lt. Col. Ernest "Ted" Laudise at Luke AFB, Ariz. Lt. Col. Laudise, 555th commander, and Col. Frank Bloomcamp, 4486 Test Squadron, Edwards AFB, Calif., were the pilots of the first F-15 to be delivered to Luke. [USAF by Taylor]

President Ford said in his speech "The F-15 will serve the purpose of peace for a generation or more." [USAF by Taylor]

"TAC-1", the first F-15 delivered to Luke AFB, Ariz. taxis out for a training mission. Dark area where the leading edge of the wing joins to fuselage is from gases caused by firing the gatling gun. (USAF by Kokojan)

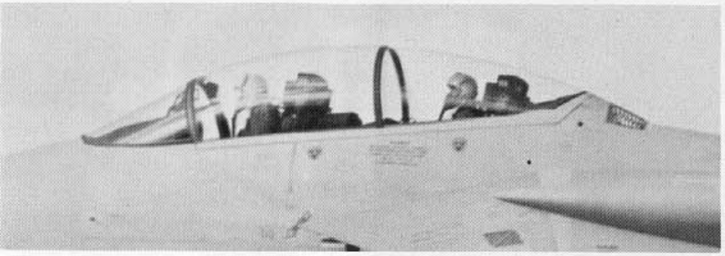
Two 58TFTW TF-15s line up for a formation take off at Luke AFB, Ariz. The F-15 has been operational at Luke for about a year and has lived up to the high expectations of its pilots. (USAF by Kokojan)

A ramp full of Triple Nickel (555TFTS) F-15s rest on the Luke flightline. In the background are several F-106s from the 87th Fighter Interceptor Squadron (FIS) of K.I. Sawyer AFB, Mich. The F-106s came to Luke to give the USAF Test and Evaluation Center an opportunity to evaluate the F-15 against the F-106 in air combat. The F-15 has also flown against several other fighters including the F-4, T-38, and Navy F-8. (USAF by Kokojan)

(Left) 73086 climbs out in a near vertical attitude. The aircraft is configured with one 650 gallon fuel tank and is branded with the "LA" tail marking of the 58th TFTW at Luke AFB, Ariz. For years fighter pilots have dreamed of an aircraft that would accelerate while climbing straight up. The F-15, with its better than one-to-one thrust-to-weight ratio can accelerate in the vertical and also under extremely high sustained G forces. (USAF by Kokojan)

An F-15 and TF-15 (closest) run through some cockpit checks prior to a training mission at Luke AFB, Arizona. Both aircraft have 650 gallon fuel tanks mounted on their centerlines and wing weapons pylons installed. (USAF by Kokojan)

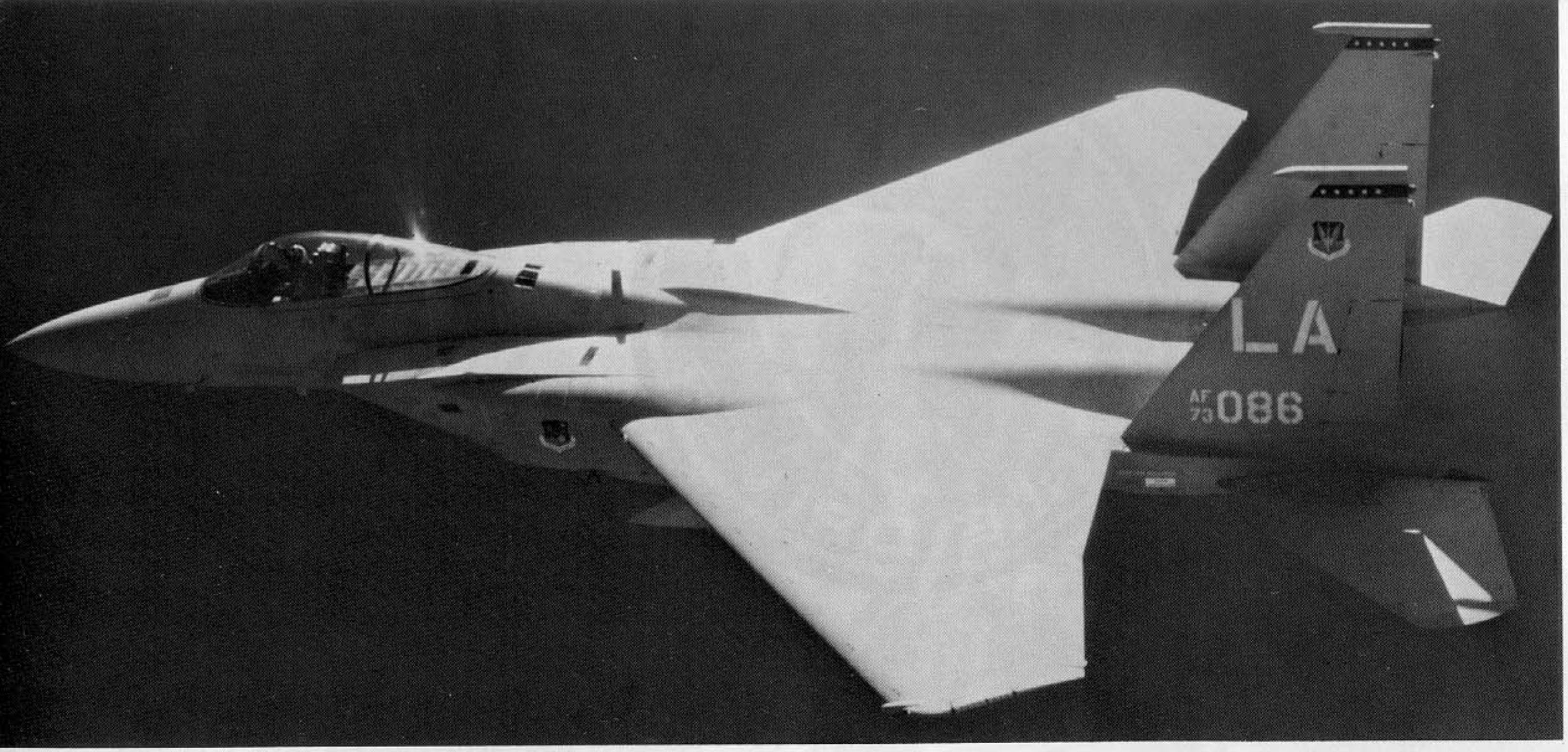
Ground crewmen remove intake duct dust covers and make final checks on a 555th F-15 as the pilot climbs into his bird for a mission at Luke AFB, Ariz. The F-15 is a large aircraft. The height to the top of the tails is 18 ft. 5 in. It is 12 ft. to the top of the closed canopy. (USAF by Kokojan)



Two pilots of the 555 TFTS, Luke AFB, Ariz., on their way to an F-15 training mission. The 555th (Triple Nickel) squadron achieved fame in Southeast Asia by shooting down 40 MiGs. The squadron was then flying F-4 Phantoms out of Udorn, Thailand. The 555th was the first squadron to get the F-15 Eagle. (USAF by Kokojan)

Prior to a training sortie in the F-15 "Eagle", at Luke AFB, Ariz., Captain Jerry Hanchey and SSGT Hank Bruggeman inspect the bird to ensure all systems are OK. (USAF by Kokojan)

Major Jack Petry of the 555 TFTS adjusts his oxygen mask before a mission at Luke AFB, Ariz. (USAF by Kokojan)



(Above) An F-15 Eagle takes off at Luke AFB, Ariz. The F-15 can take off in less than 1000 ft. in its interceptor configuration of full internal fuel and four AIM-7 missiles. (Right) An F and TF-15 fly formation over Monument Valley, Ariz. The F-15 is extremely stable and responsive in formation flying. (USAF by Kokojan)

A TF-15 (73110) of the 555 TFTS takes on fuel as an F-15 waits off the right wing of the KC-135 tanker. Every seventh F-15 off the production line is a two seat "TF" model. The only external difference is a slightly raised rear portion of the canopy. Performance of both models is essentially the same. The "TF" weighs about 800 lbs. more than the "F". (USAF by Kokojan)

73086 moves into position to take on fuel as 73110 flys formation off the right wing of the tanker. The large white letters "LA" on the tail are the markings of the 555 Tactical Fighter Training Squadron (TFTS), at Luke AFB, Ariz. (USAF by Kokojan)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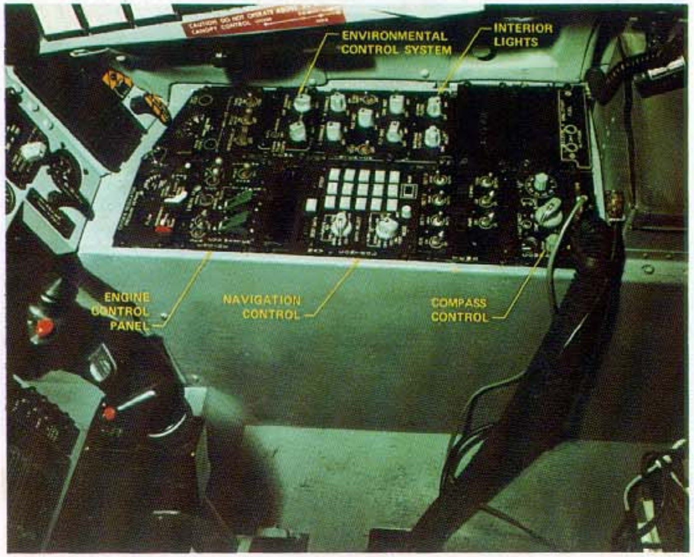
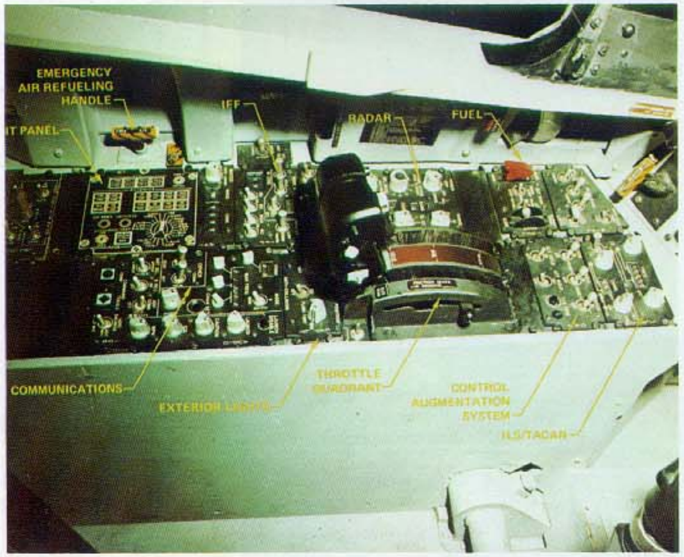
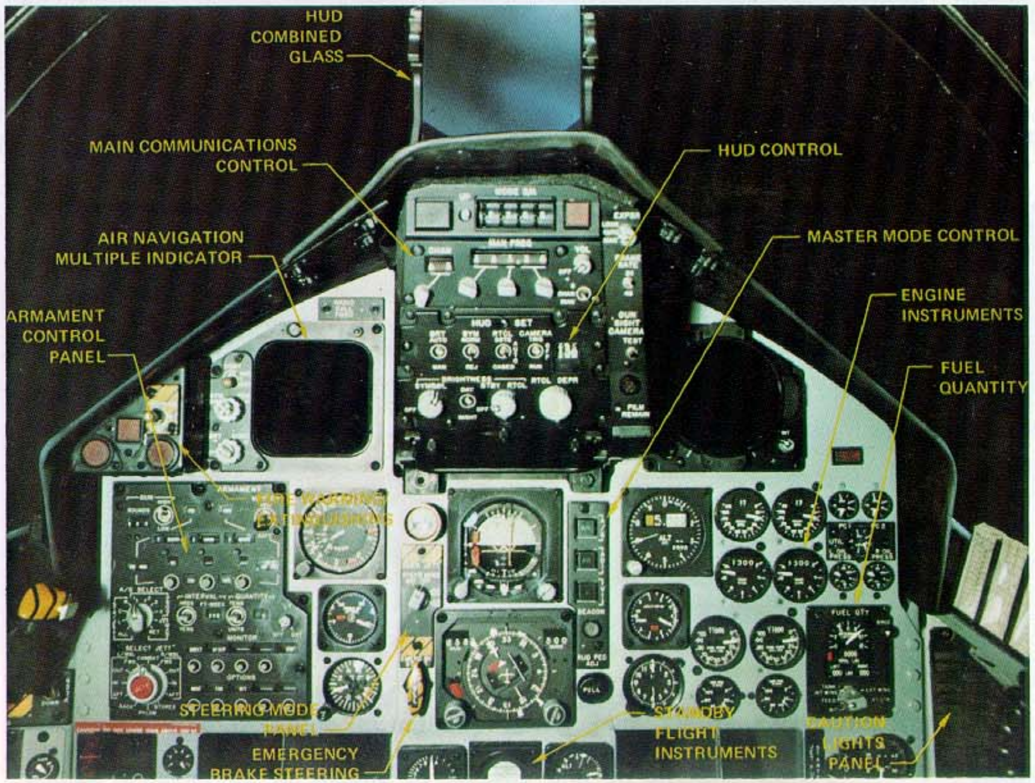
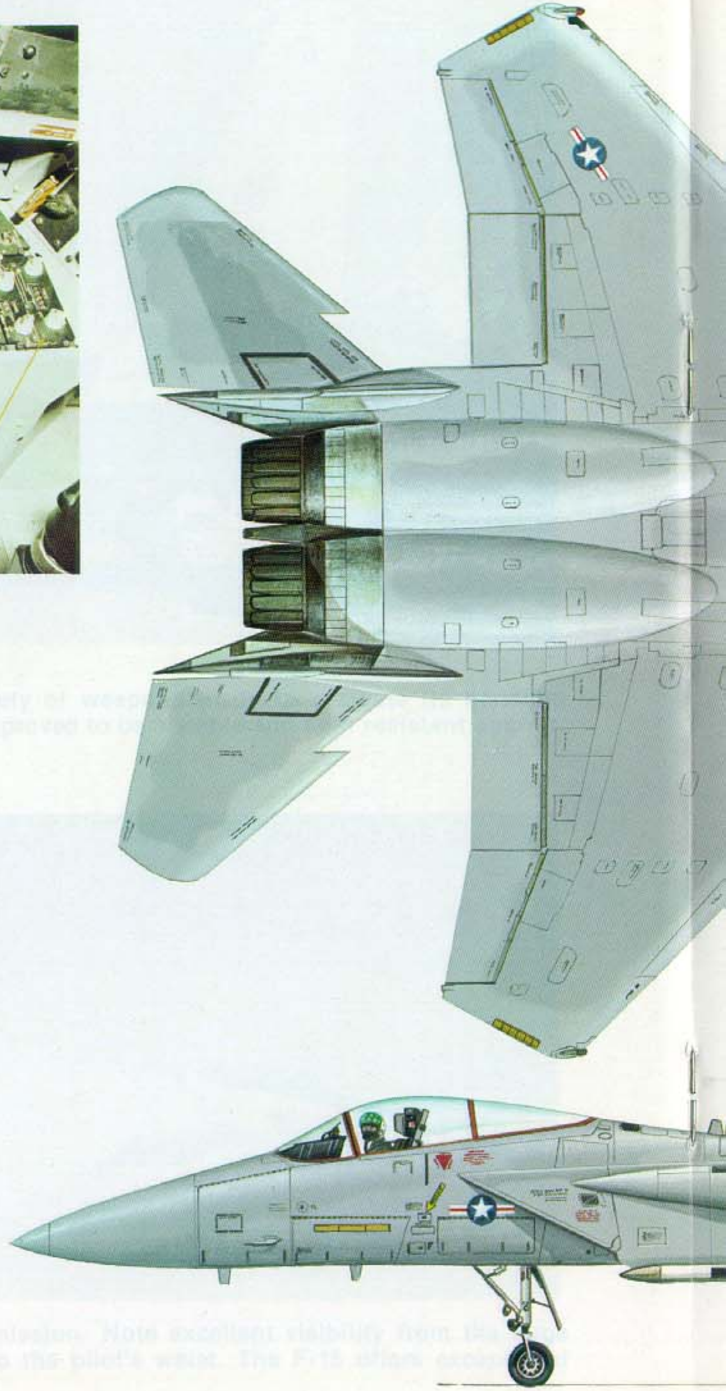
Undersecretary of the Air Force James W. Plummer signals his approval of F-15 flight characteristics to pilot of F-4 chase plane. Note AFSC badge on Eagle intake. (Col. Don Kutnya)


ENVIRONMENTAL CONTROL SYSTEM
INTERIOR LIGHTS
ENGINE CONTROL PANEL
NAVIGATION CONTROL
COMPASS CONTROL


EMERGENCY AIR REFUELING HANDLE
IFF
RADAR
FUEL
COMMUNICATIONS
EXTERIOR LIGHTS
THROTTLE QUADRANT
CONTROL AUGMENTATION SYSTEM
ILS/TACAN


HUD COMBINED GLASS
MAIN COMMUNICATIONS CONTROL
HUD CONTROL
AIR NAVIGATION MULTIPLE INDICATOR
MASTER MODE CONTROL
ENGINE INSTRUMENTS
ARMAMENT CONTROL PANEL
FUEL QUANTITY
FIRE WARNING EXTINGUISHING
STEERING MODE PANEL
EMERGENCY BRAKE STEERING
STANDBY FLIGHT INSTRUMENTS
CAUTION LIGHTS PANEL



F-15A in new two-tone grey camouflage scheme and markings of the 555th TFS.

Streak Eagle, shown with tail patch which was removed before it made its record breaking flights. (McDonnell Douglas)

Eighth production Eagle was the only F-15 to carry all-white paint and black anti-glare panel ahead of cockpit. It was used for spin recovery testing. (McDonnell Douglas)

Streak Eagle lifting off for time-to-climb record breaking flight.

The first Eagle, as it appeared on an early test flight.