F-14 Tomcat Walk Around

Walk Around Number 3

squadron/signal publications

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By Lou Drendel

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Introduction

Arguably the best fighter/interceptor ever built, the F-14 is today, even after celebrating it's 22nd anniversary, without peer. Ironically, the best of all Grumman "cats" will probably be the last. Grumman is no more, it is now Northrop-Grumman. In any case, the F-14 is not likely to be replaced by any aircraft any time soon. With it's new engines and state-of-the-art avionics, there is simply no finer fighter/interceptor on the horizon. It fires the full range of air-to-air missiles, the long range Phoenix, the mid-range Sparrow and the short range Sidewinder. These are backed up by a close-in 20MM Vulcan cannon.

In it's latest role, the F-14 will become the "Bombcat", carrying air-to-ground weapons on it's fuselage hardpoints. F-14 RIOs, like their F-4 counterparts of a generation earlier, will learn to use their radars to "move mud" in support of American national interests. Unlike the F-4, no American F-14 has ever been shot down by an enemy aircraft, although Iranian Tomcats may have been during the Iran-Iraq war.

Visually, the Tomcat is a distinctive and graceful presence, especially with it's wings in the full swept back position. But swept and swift, extended and loitering, or waiting on the deck, the F-14 presents many facets. We will look at all of them.

Acknowledgments:

I am particularly indebted to two photographers who have contributed to this book. Both Ted Carlson, of Fotodynamics, and Dave Mason, a dedicated and talented model builder, understand the WALK AROUND predication. They have provided most of the photos in this volume. Other contributors include: Grumman, U.S. Navy, Peter Mancus, Jim Sullivan and Shinichi Ohtaki.

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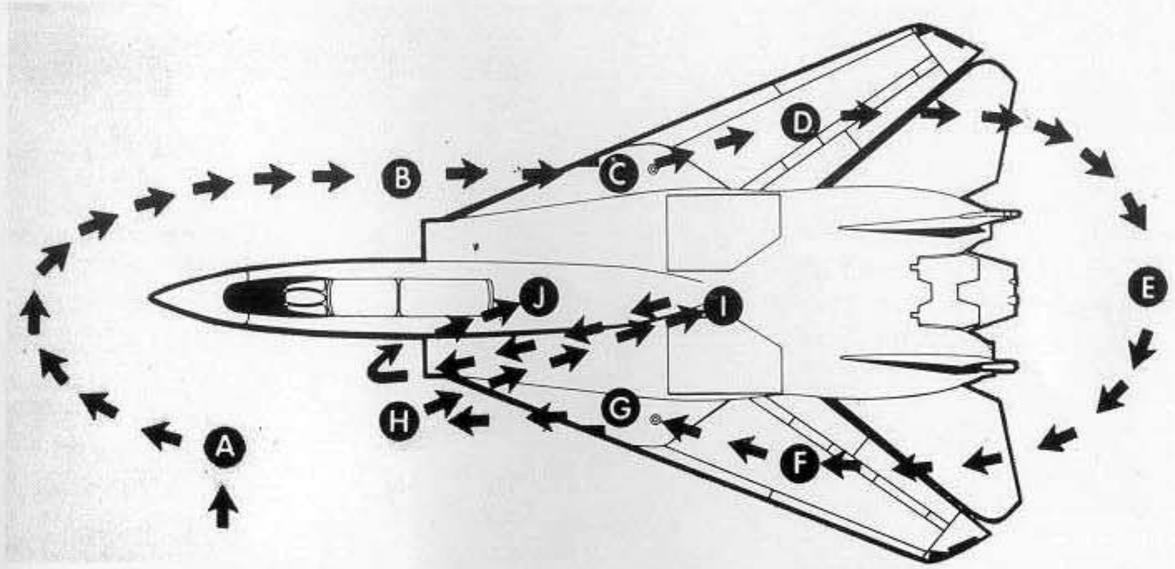
Overleaf: A F-14D Tomcat of VF-2 aboard USS CONSTELLATION (CV-64) on 7 March 1994.

(Left) This F-14A (BuNo 158621) of VX-4 was parked on the ramp at the Naval Missile Center, Point Mugu, California during October of 1973.



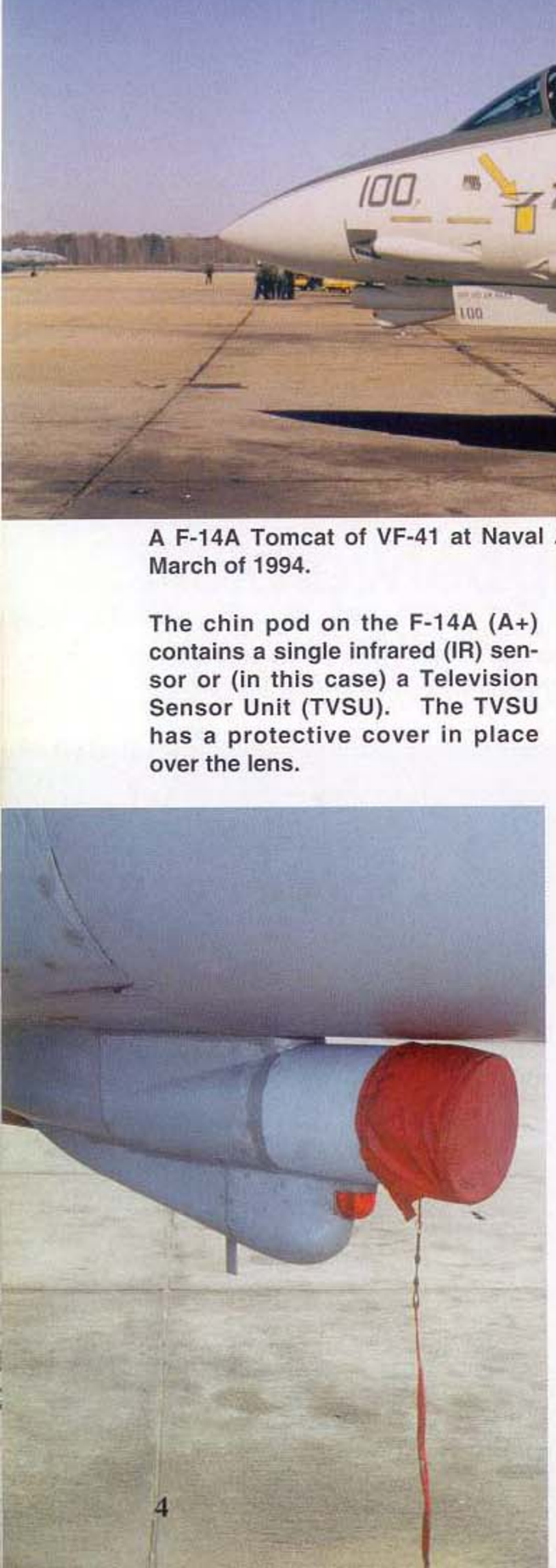
This is the official Navy Flight Manual F-14 Walk Around path that pilots are to use when pre-flighting their aircraft before a mission.

A F-14A Tomcat armed with six long-range Phoenix air-to-air missiles. The F-14 AGW-9 fire control radar allows it to track and shoot at six different targets simultaneously.

The latest version of the Tomcat to enter service was the F-14D. This F-14D was fresh from the factory at Calverton. There were both new production F-14Ds and some conversions from earlier F-14As.

A F-14A Tomcat of VF-41 at Naval Air Station Oceana, Virginia Beach, Virginia during March of 1994.

The chin pod on the F-14A (A+) contains a single infrared (IR) sensor or (in this case) a Television Sensor Unit (TVSU). The TVSU has a protective cover in place over the lens.



The Television Sensor Unit lens with its protective cover removed. An anti-collision light and an ALQ-100 antenna are located under the TVSU housing.

The chip pod housing on a F-14A (A+) Tomcat. The TVSU allows the crew to visually identify targets at ranges far beyond normal vision. The unit was used during an engagement with Lybian MiG-23s to visually identify the hostile targets at ranges best suited for engagement with Beyond Visual Range (BVR) missiles (Sparrow).

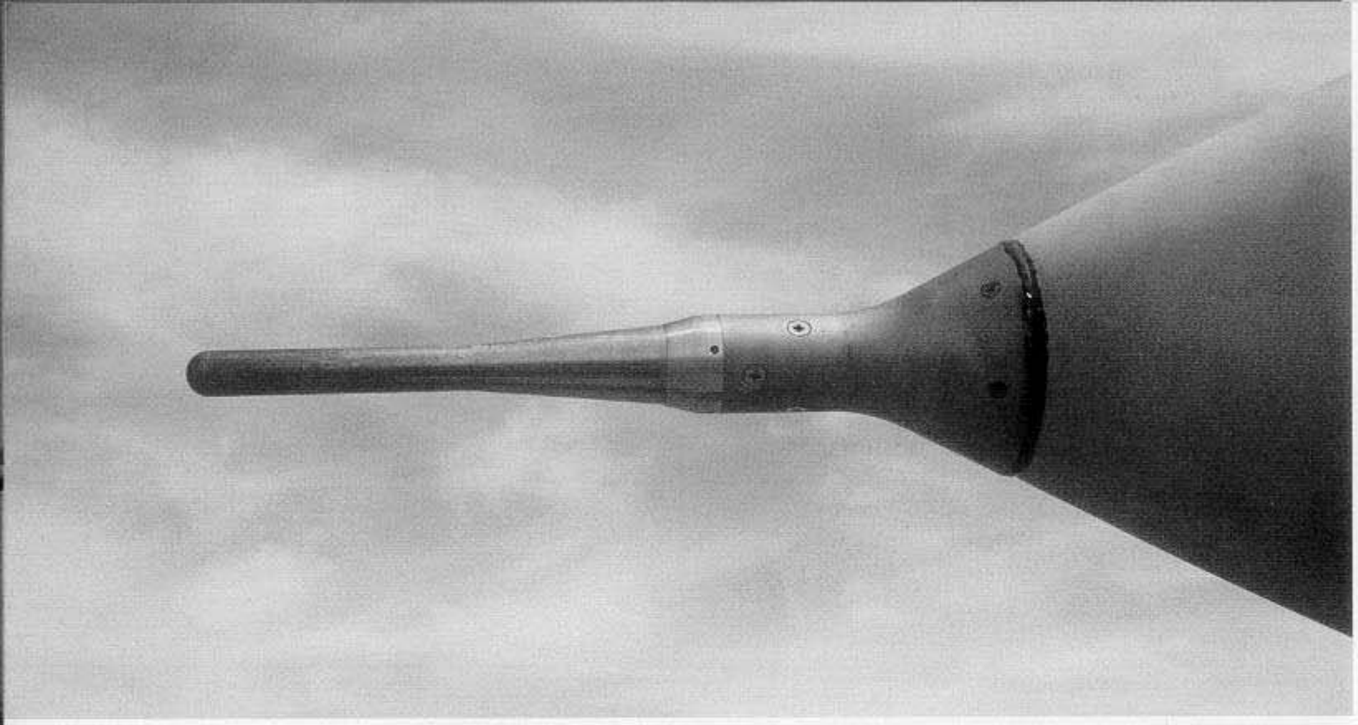
The F-14D chin pod incorporates TVSU camera, IR sensor, ALQ-100 antenna and anti-collision light.

Port and starboard views of the chin pod on a F-14D Tomcat. Along with the AWG-9 radar, the sensors in the chin pod give the F-14 the ability to engage multiple targets at long ranges under positive control.

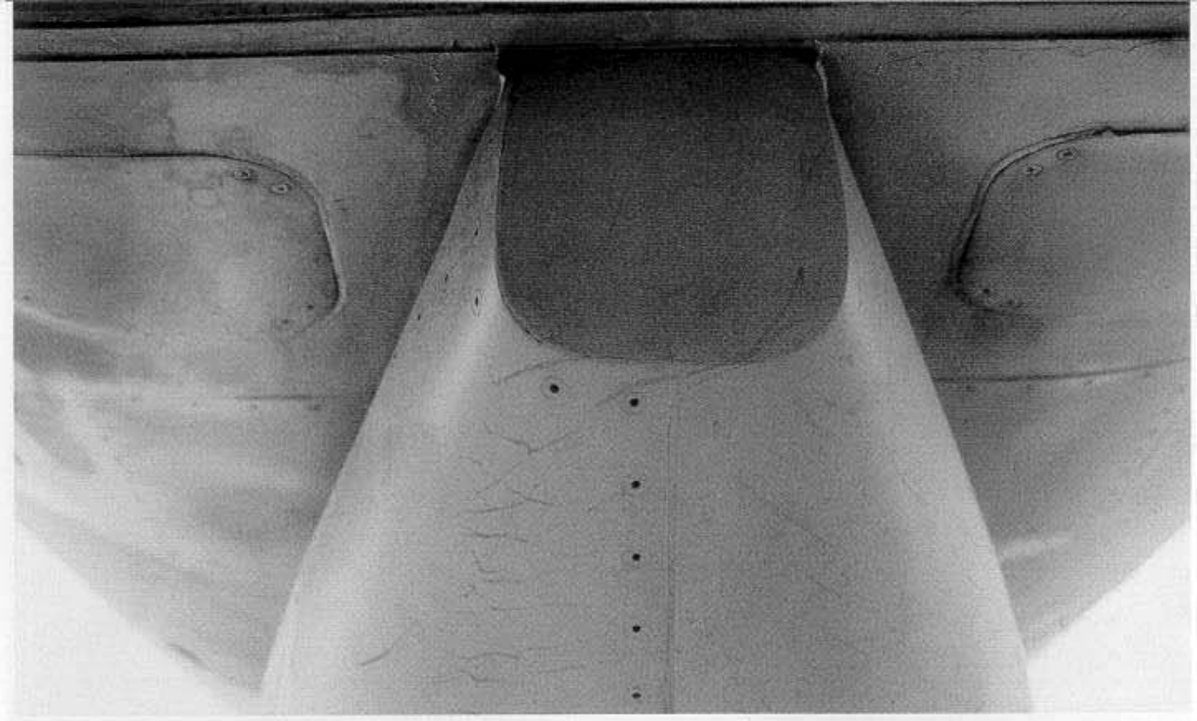
The F-14D chin pod has the General Electric/Martin Marietta Television Camera System (TCS) mounted on the port side and the Infrared Search and Tracking Set (IRST) mounted on the starboard side.

The chin pod has an ALQ-100 antenna and anti-collision light mounted between and below the other sensors.

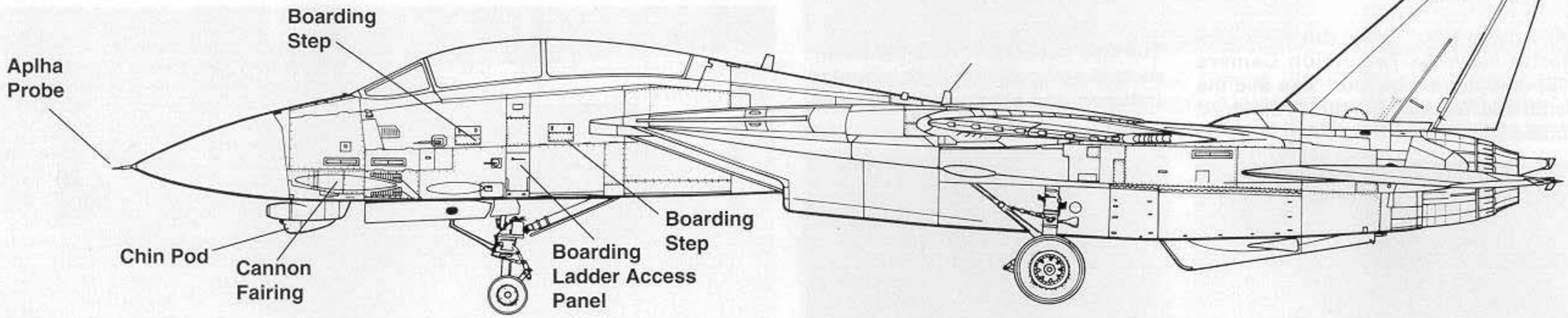
The Northrop AN/AXX-1 TVCS has both wide and narrow fields of view with the images displayed on a CRT in the cockpit. Operation of the TCS is automatic, tracking targets designated on the radar. The long range camera allows visual ID of targets which are out of normal visual range.



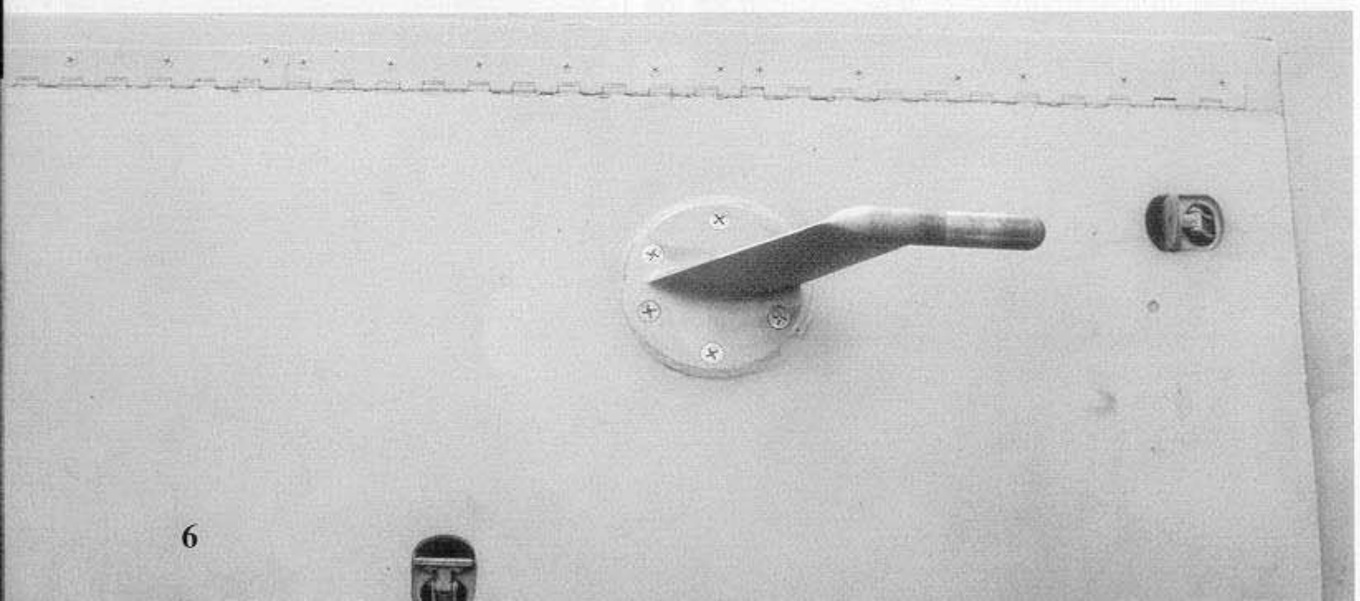
The Alpha probe mounted at the extreme end of the radome, measures the angle of attack of the aircraft. Accurate measurement of the aircraft's Angle of Attack (AOA) is very important for both air combat and carrier landings.

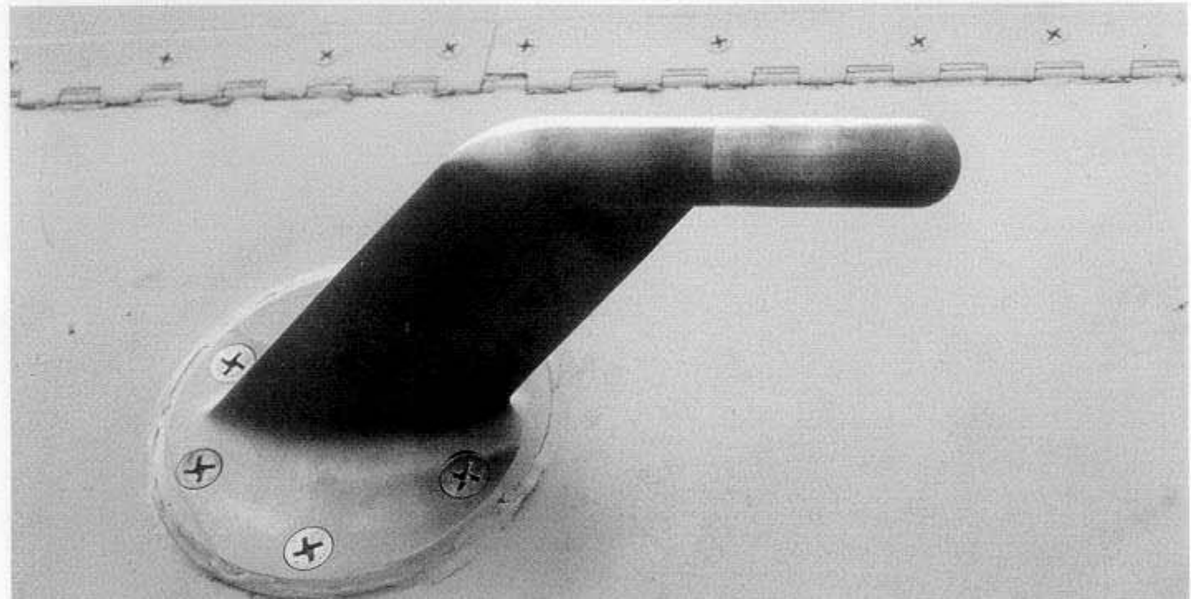


The rear of the chin pod on the F-14D is squared off, rather than faired in like on the F-14A.

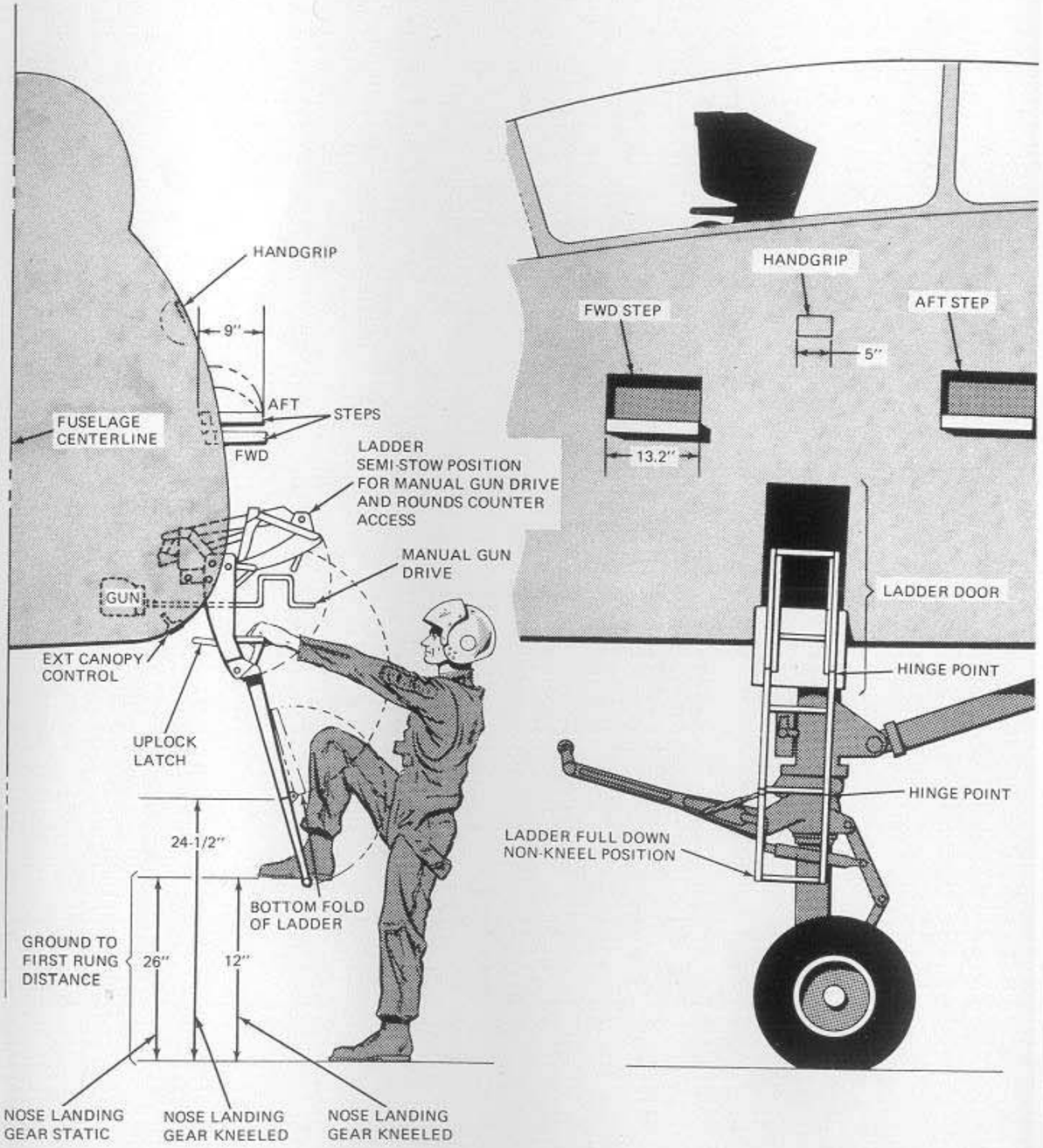


The Air Inlet Control (AIC) probe provides information to the air inlet control system, which automatically adjusts the inlet ramps to provide sub-sonic airflow to the engines. (Starboard side shown)

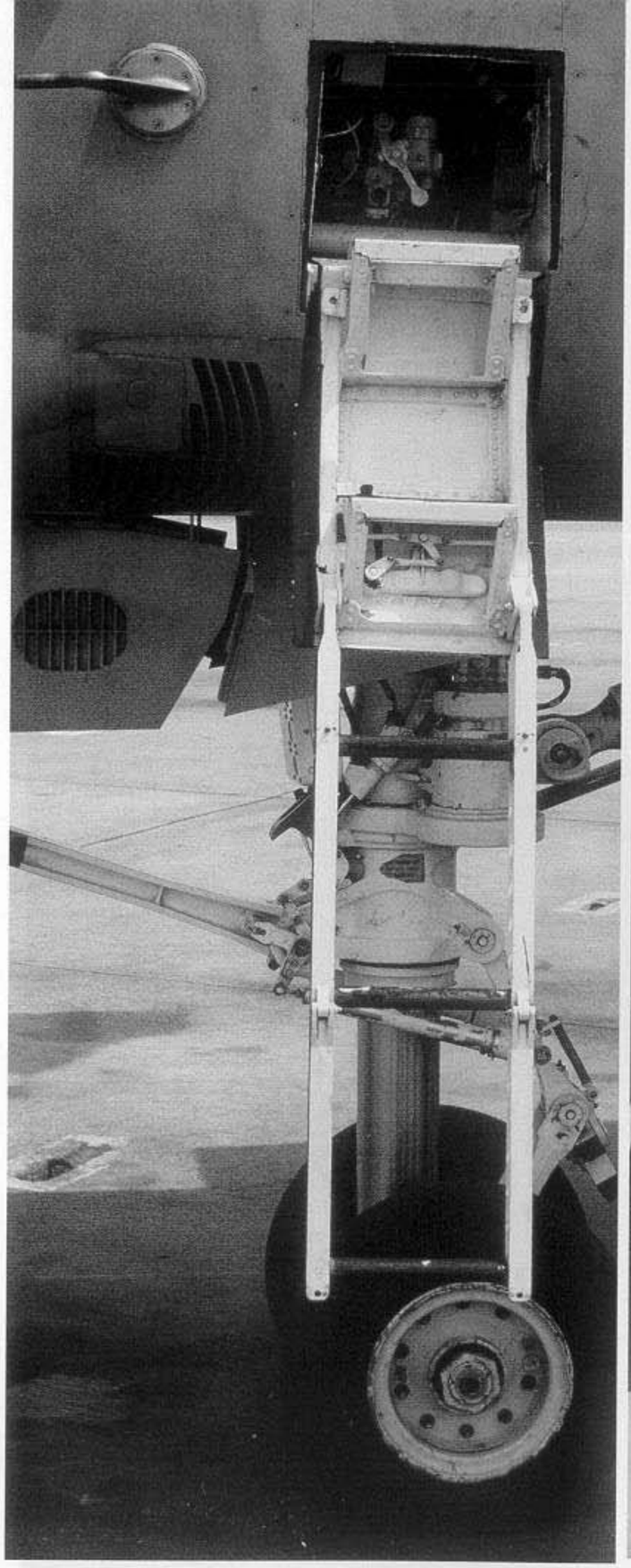




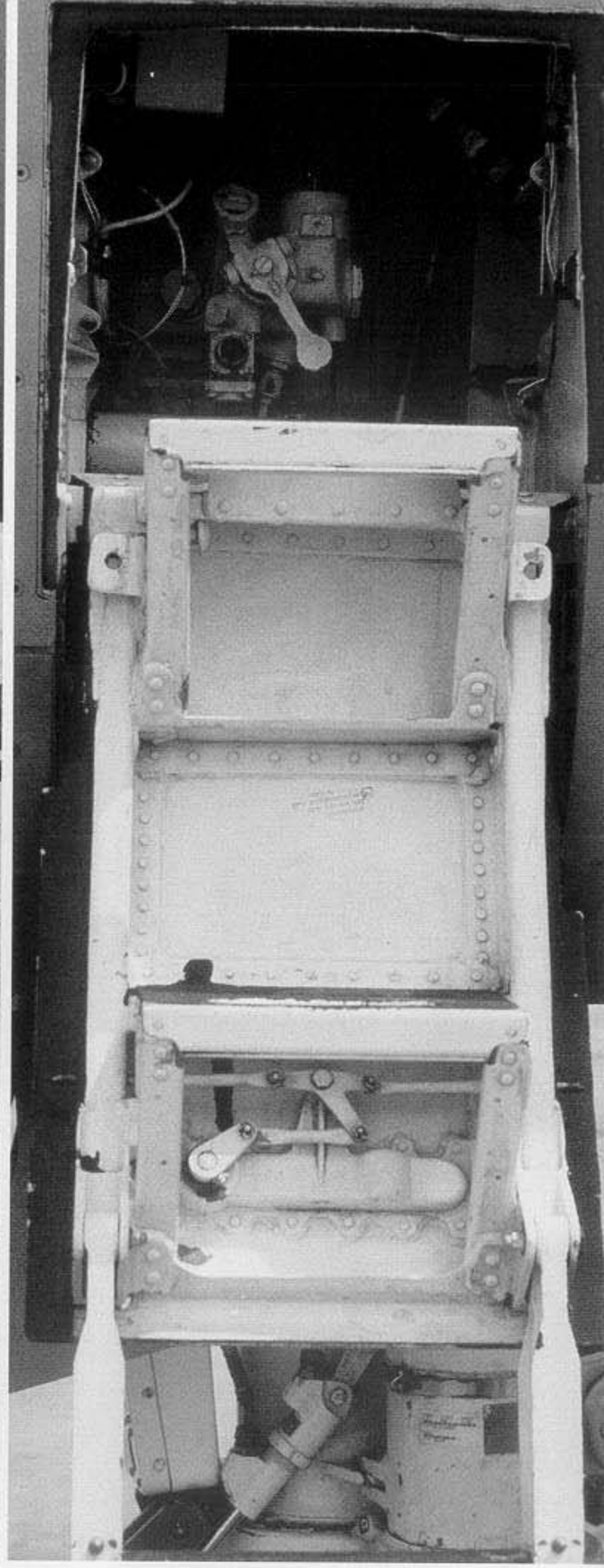
BOARDING LADDER



The Flight Manual details the workings of the crew boarding ladder used on the F-14 Tomcat. With this ladder, the crew is independent of ground support equipment to gain access to their aircraft.



The crew boarding ladder is housed on the port side of the aircraft. The port AIC probe is visible above and forward of the ladder.



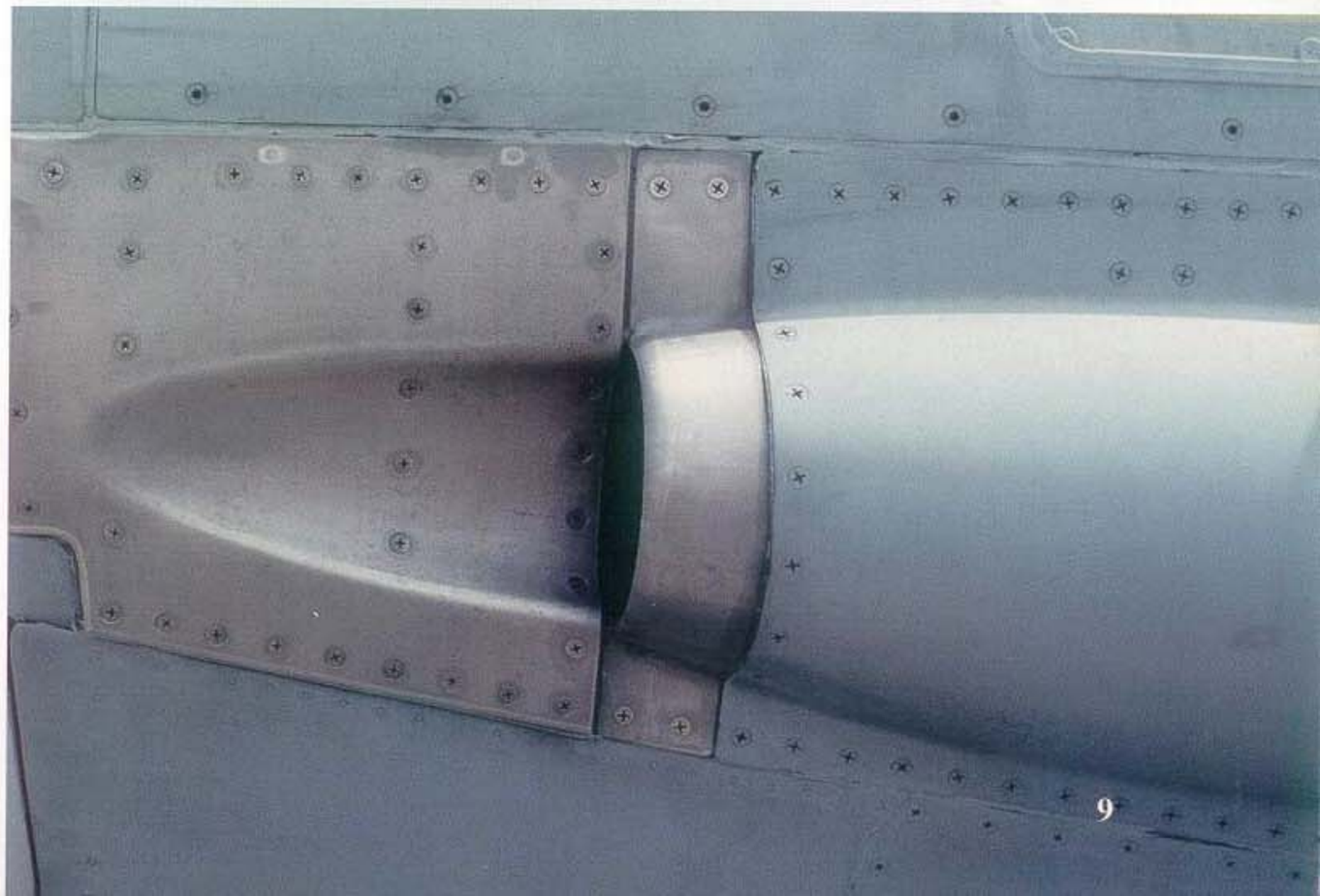
The boarding ladder is manually deployed and stowed in its recess in the fuselage.

The crew boarding ladder in the fully deployed position. The bar extending from the nose wheel strut is the catapult tow bar, which attaches to the catapult shuttle and pulls the F-14 down the catapult track when the aircraft is launched from an aircraft carrier. The crew boarding ladder folds in three sections to fit into the fuselage bay.

A front view of the fully deployed crew boarding ladder on an F-14.

These NACA air intakes behind the M61 cannon fairing direct airflow to dissipate gun firing gases. Lighter colored strips above the fairing are formation lights. Used for night formation, these strips are only visible at close (formation) range. They are also located on the aft fuselage and vertical fins, giving the joining pilot a chance to detect relative motion during night formation.

The muzzle-blast fairing for the M61 Vulcan cannon is unpainted. The M-61A-1 20MM cannon is 74 inches long, weighs 265 pounds, and can fire up to 6,000 rounds per minute. The Tomcat carries enough ammunition (675 rounds) for a seven second burst.



A F-14A(A+) Tomcat of VF-143 stationed aboard USS GEORGE WASHINGTON (CVN-73).

F-14A+ (shown) and F-14Ds have an improved system to purge gun gases, involving NACA vents just behind the gun fairing and another NACA vent on a fairing just forward of the main vent.

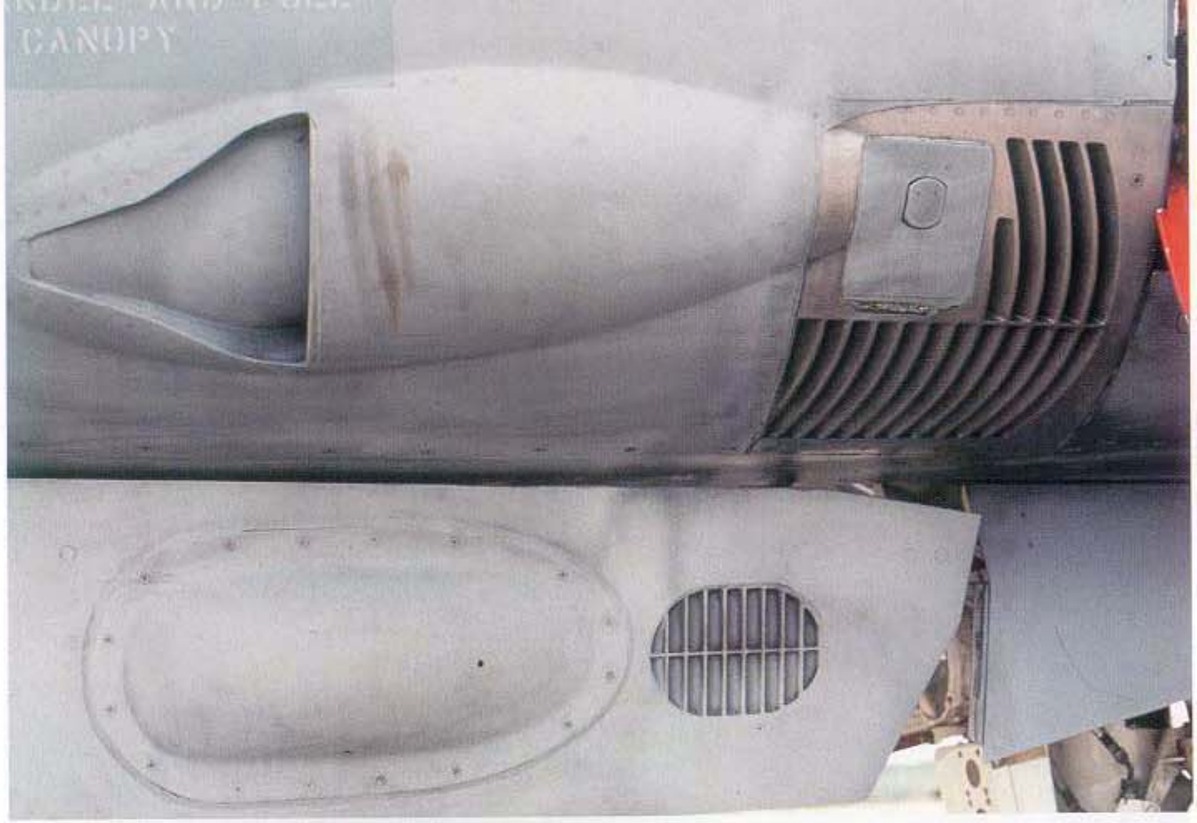
The F-14A had a system of gun gas vents behind the gun fairing. These vents often vented gun gases into the engine intakes, causing compressor surges of the touchy TF-30 engines. The fairing immediately behind these vents covers the rain repellent container.

The starboard side of the F-14A fuselage, showing the open refueling receptacle door below the rescue arrow.

This F-14 has Red protective covers with Remove Before Flight flags on all the vents and probes to protect them while the aircraft is parked.

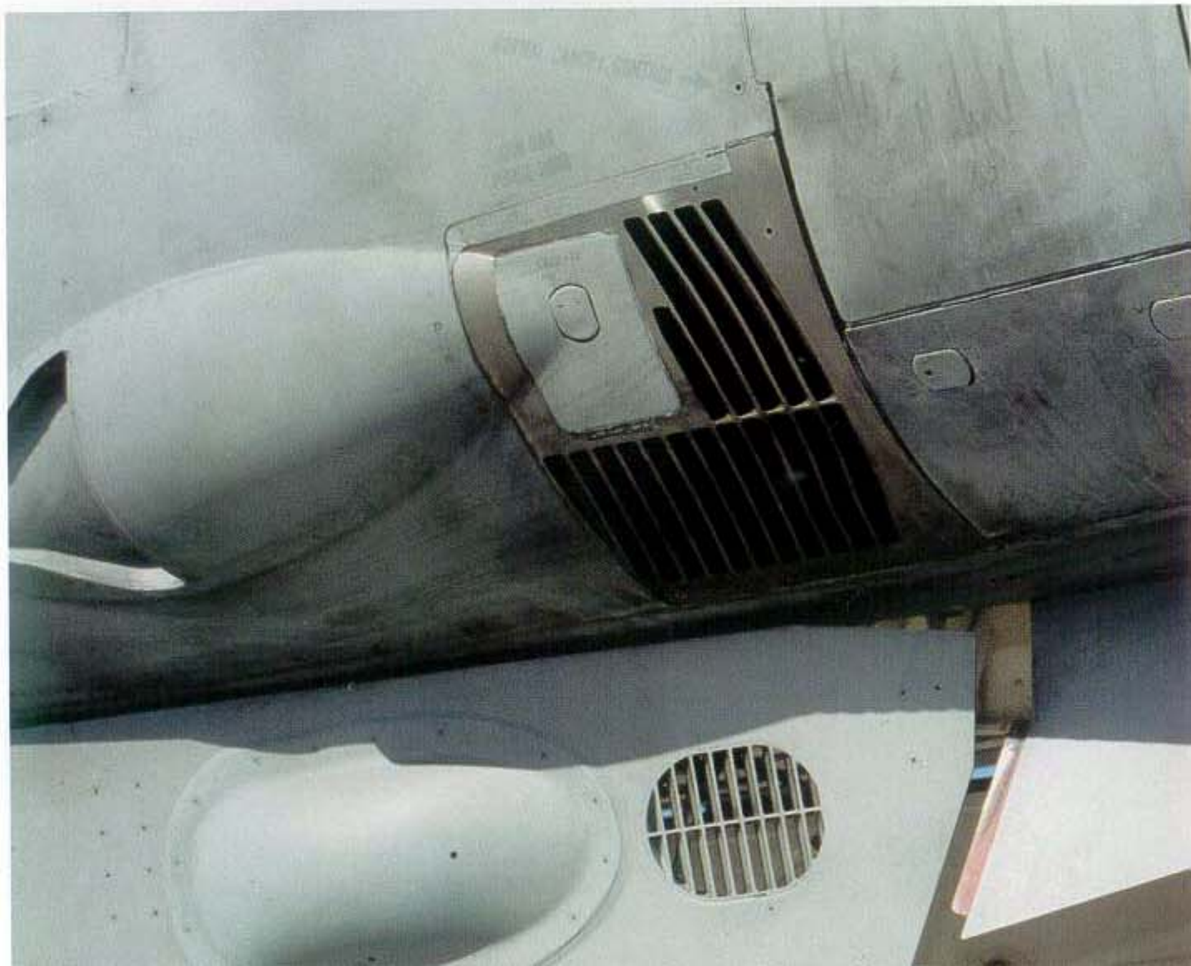
A Purple Shirt (fuels) crewman refuels a F-14 Tomcat aboard USS SARATOGA (CV-60) during 1986. The single point ground refueling-defueling system allows a maximum refueling rate of 525 gallons per minute.

The single point fueling/defueling port on a F-14. This system is compatible with both shipboard and land-based fueling systems. The use of a single point system allows for much faster turn-arounds between missions.

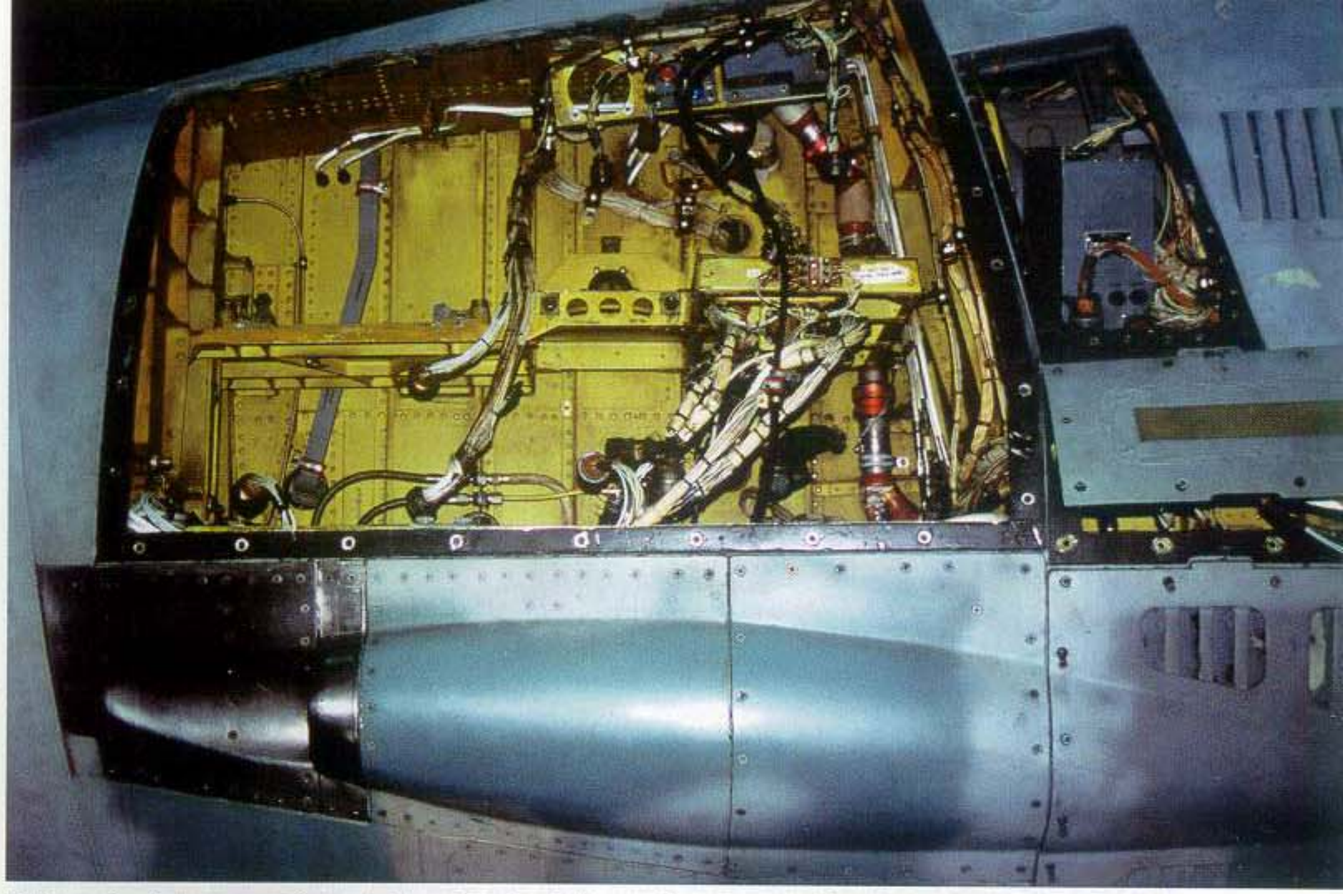


The F-14D gun gas purge vents (right) differ from the F-14A in that the F-14A had a vent door in this position. All F-14s will eventually be retrofitted with the F-14D system.

The nose gear doors and gun gas vent on a F-14D Tomcat. The F-14D purge system has eliminated the problem of gun gasses entering the engine air intakes.

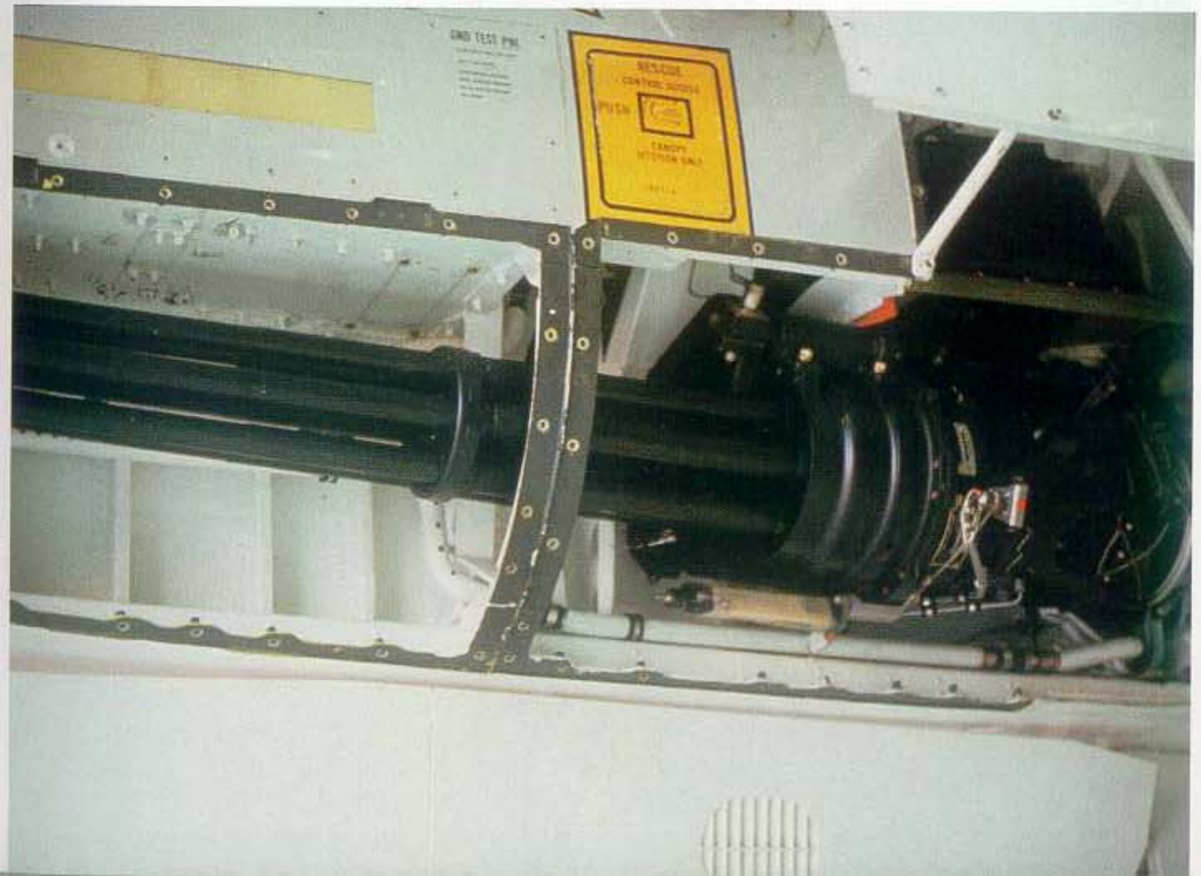


This is the M61 Vulcan cannon fairing on a F-14D. The muzzle blast area is unpainted Natural Metal, since any paint on this area would be quickly burned off during gun firing.



This avionics compartment, located just above the cannon bay is empty. The Inertial Navigation and Weapons control computers were removed for maintenance.

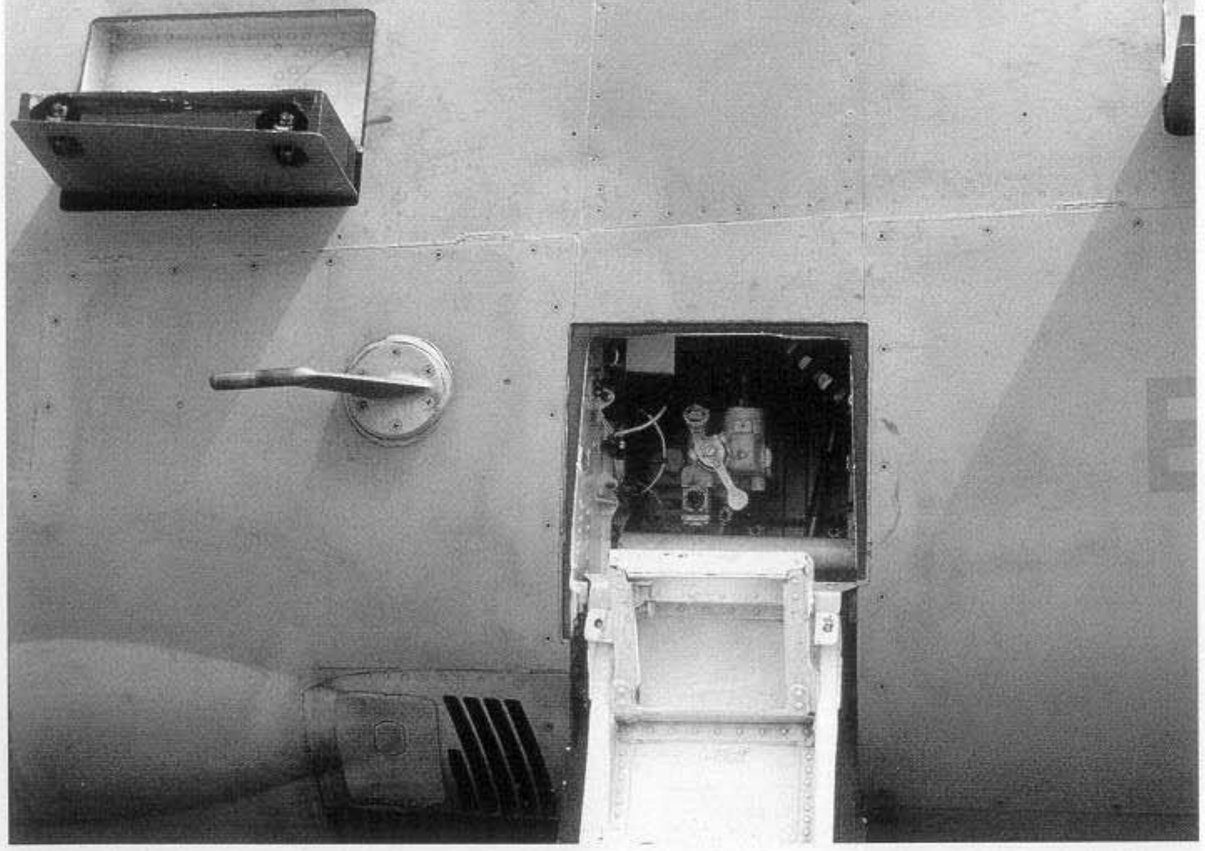
The M61 Vulcan cannon and cannon bay on a F-14A Tomcat. The M61 is an electrically driven weapon which can fire at some 6,000 rounds per minute. It is a highly effective close in weapon.



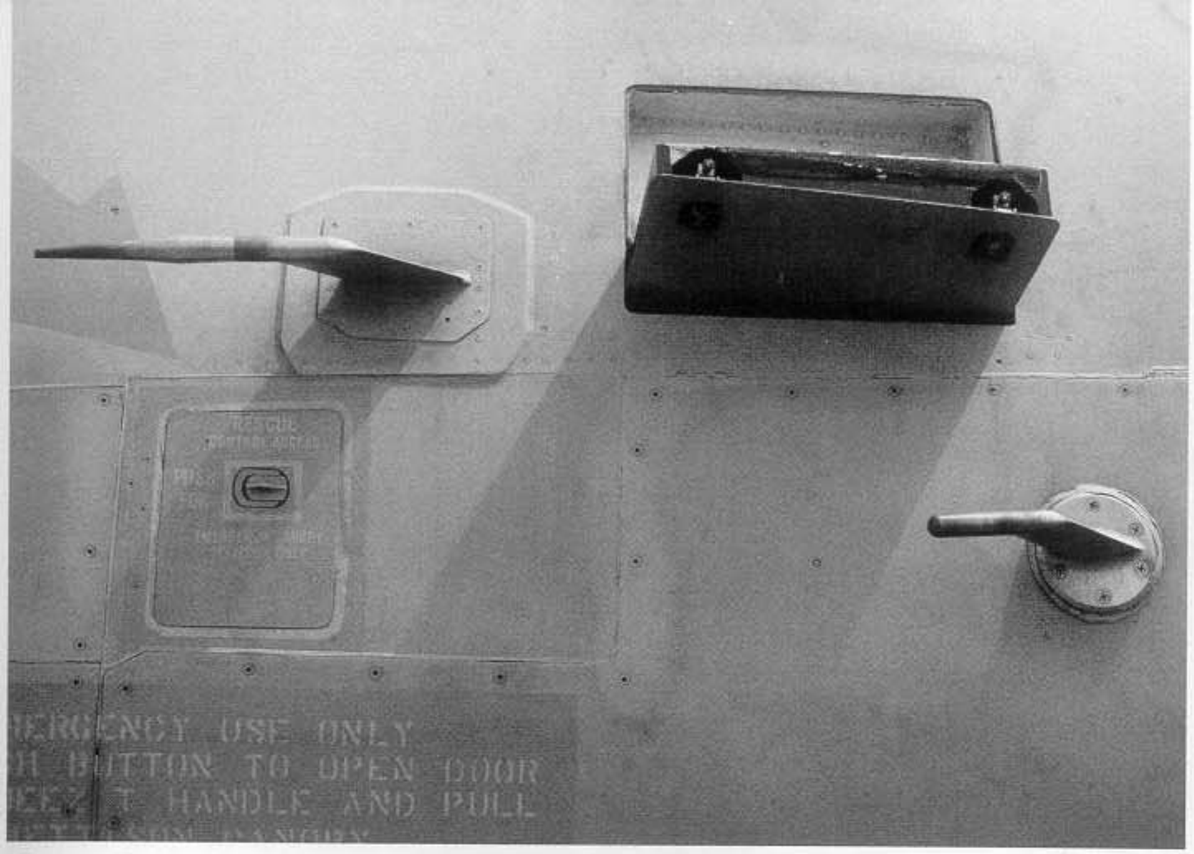
Empty M61 cannon bay and avionics bay on a F-14. The access panel has its own support rod to hold the panel open while maintenance is being performed on the bay contents.

The open Vulcan gun bay on a F-14A. The shell casings of the 20MM cannon are returned to the ammunition drum after firing.

The fold out crew boarding steps fold down from the port side of fuselage manually. Two push-in spring-release buttons allow them to fold down to the 90 degree position.

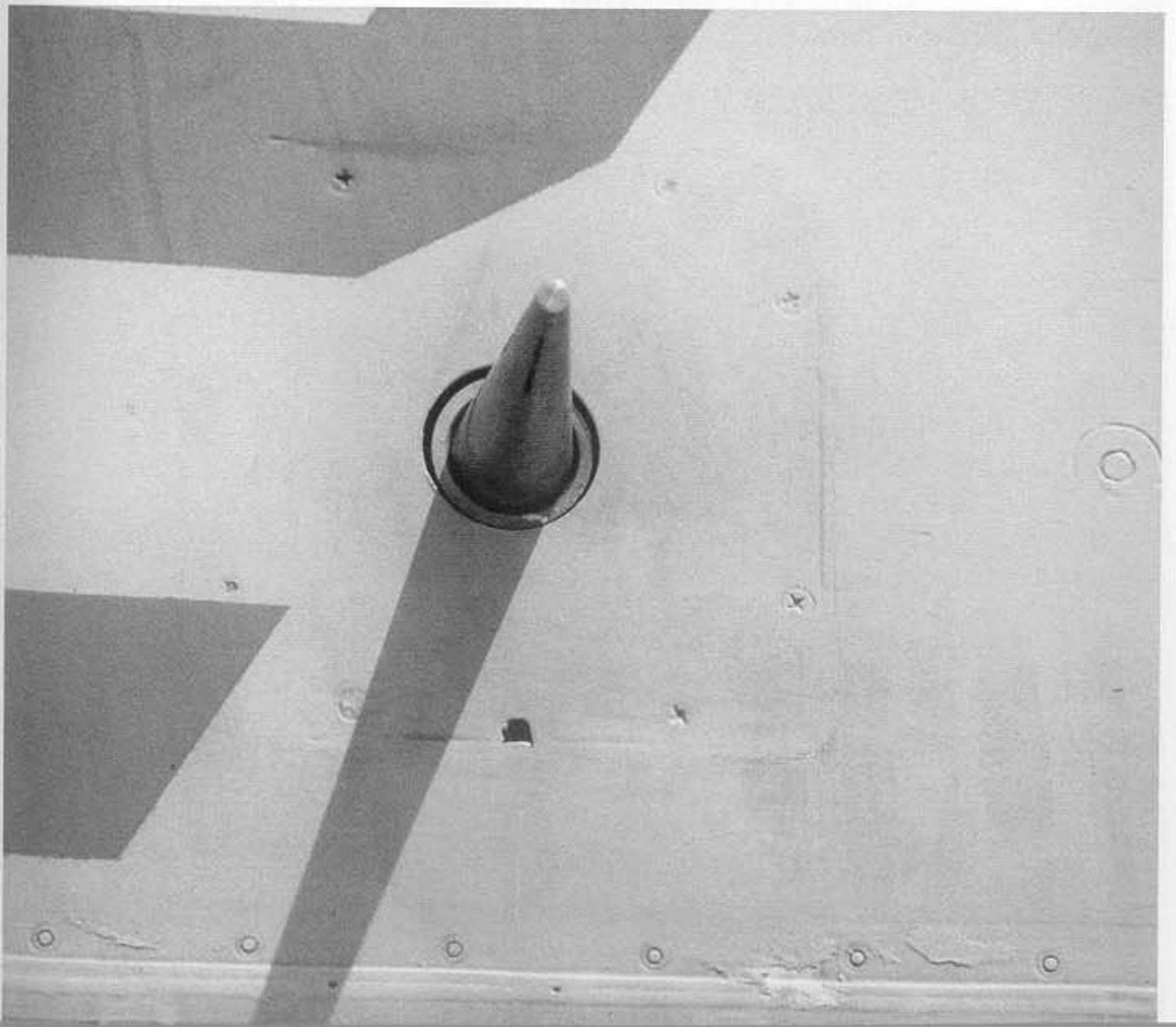


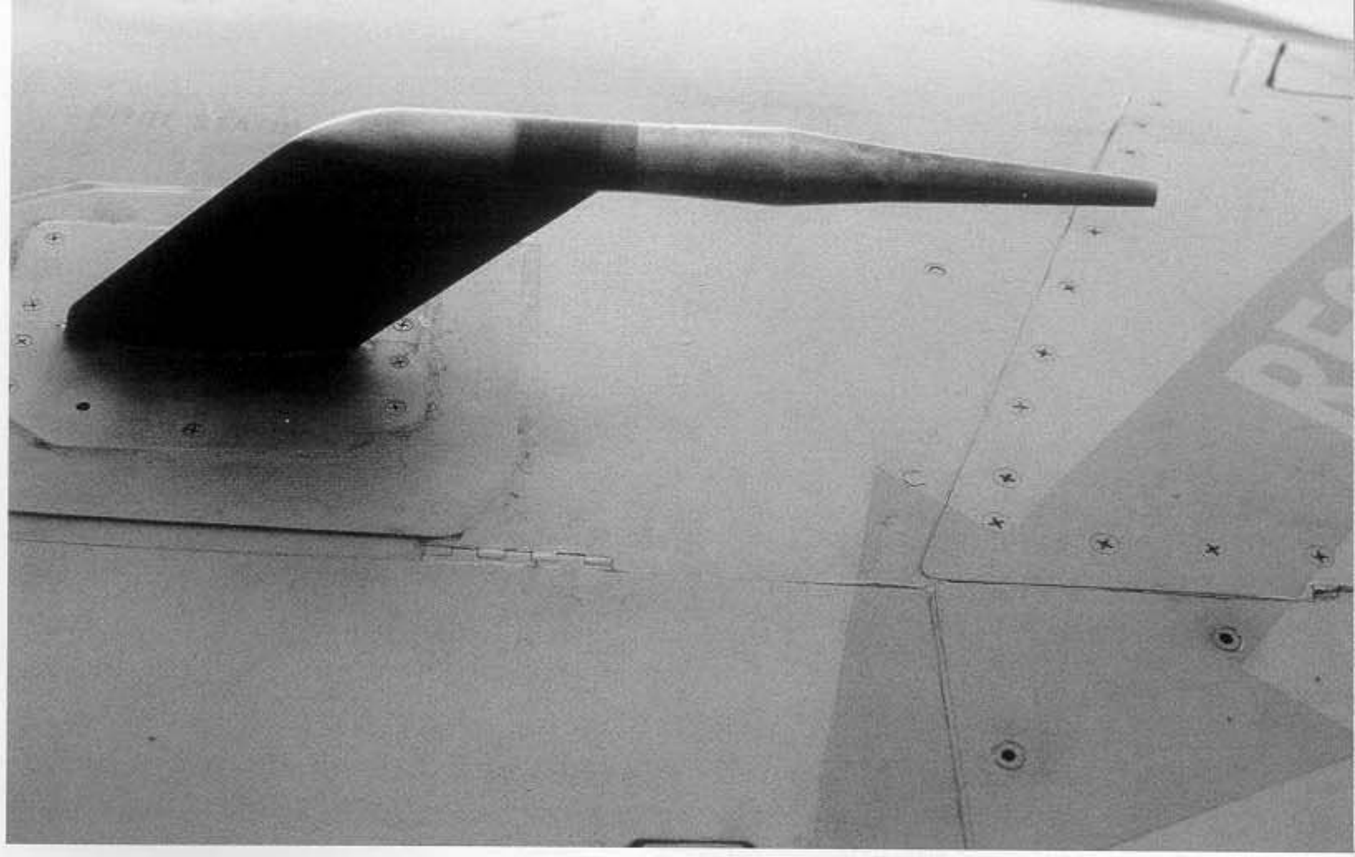
The muzzle of the M61 Vulcan 20MM cannon in a F-14D. The cannon has six barrels that fire individually as they align with the muzzle opening.



Forward crew fold down boarding step and sensor probes.

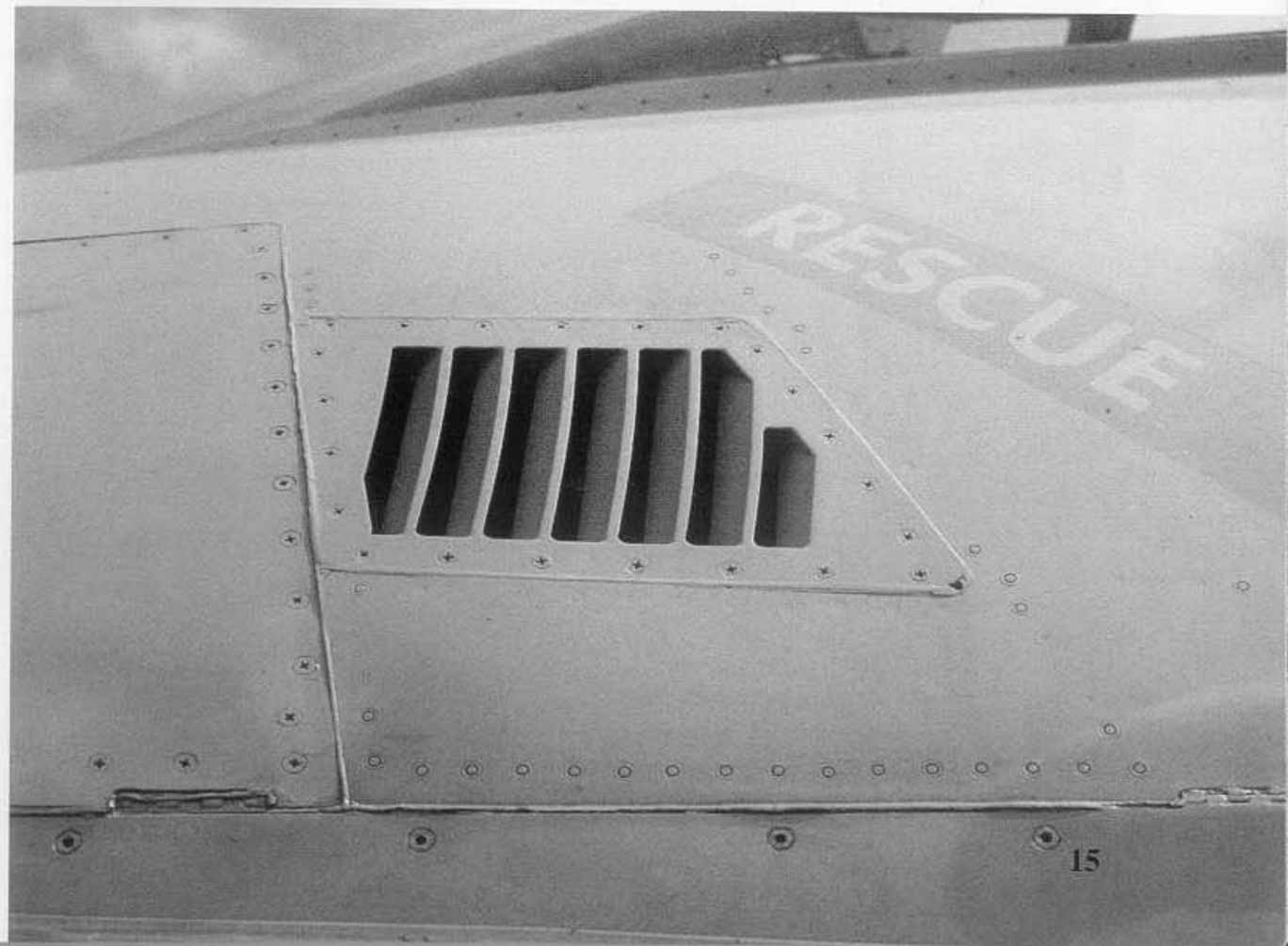
The F-14 also carries a Angle of Attack (AOA) sensor probe on both sides of nose.





The F-14 has temperature probes on both sides of nose.

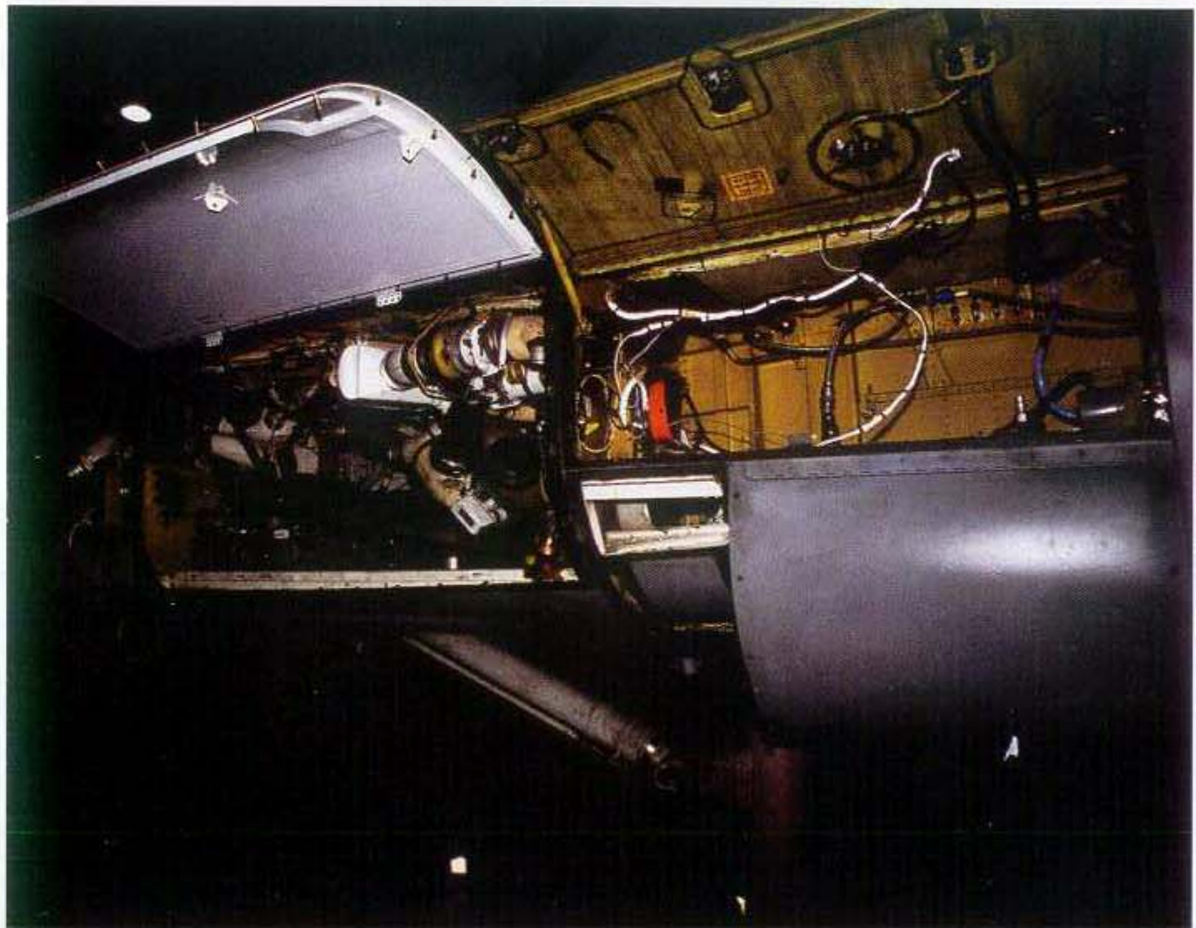
This is the avionics compartment heat vent. It allows heated air from the electronics to vent overboard, preventing a damaging heat build-up within the compartment.



A F-14D about to take on fuel from a tanker. Windshield rain removal pressure vents and yaw string are just in front of the windscreen. The yaw string is an elementary piece of equipment (it really is a string!) that shows the pilot graphically how well he is coordinating his turns.

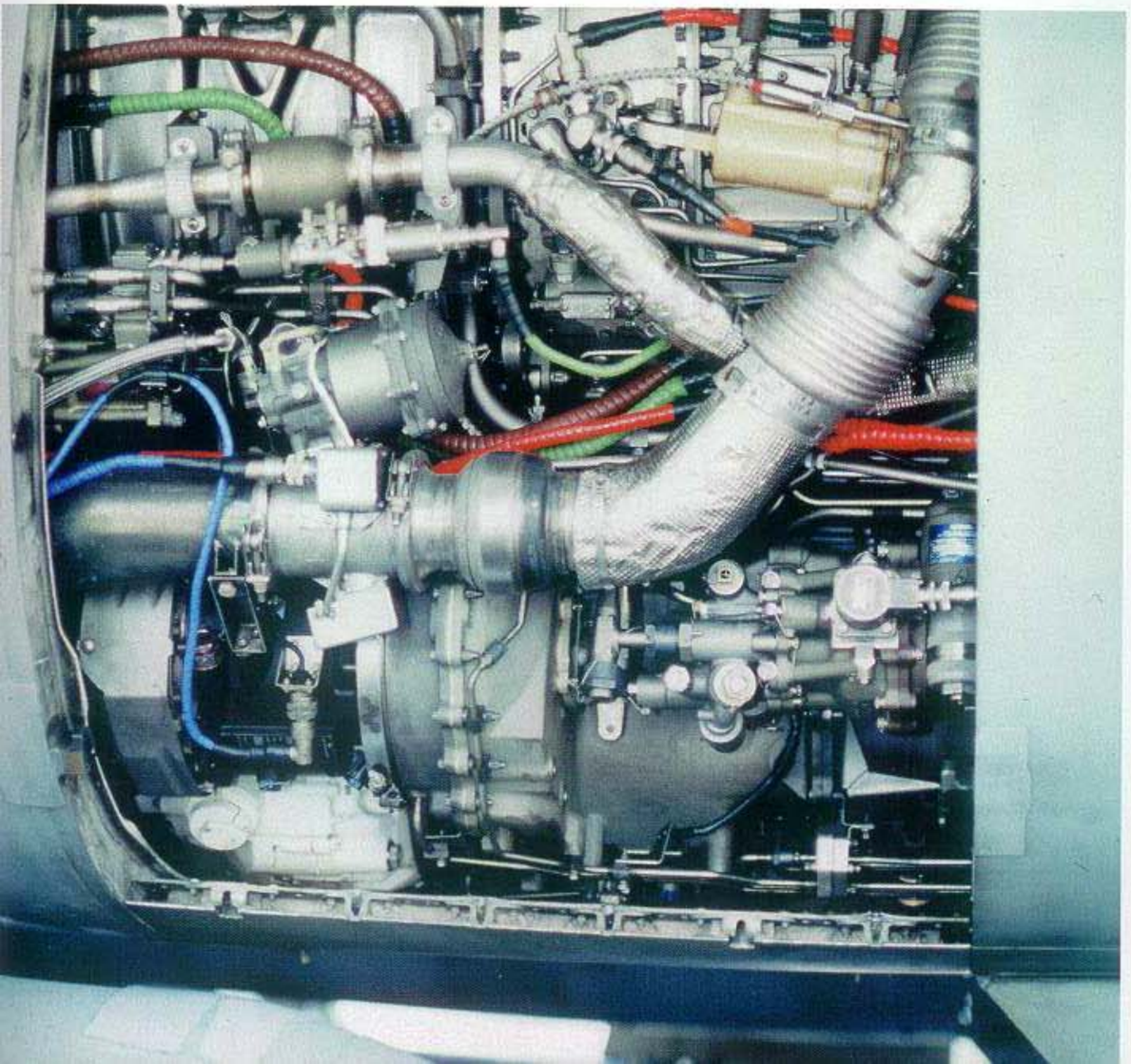
This full size mock-up of the F-14A shows the ease of maintenance accessibility to the various sub-systems on the aircraft.

The open access panels for the Liquid Oxygen (LOX) system and Dessicant tanks (rear) along with an open avionics bay.

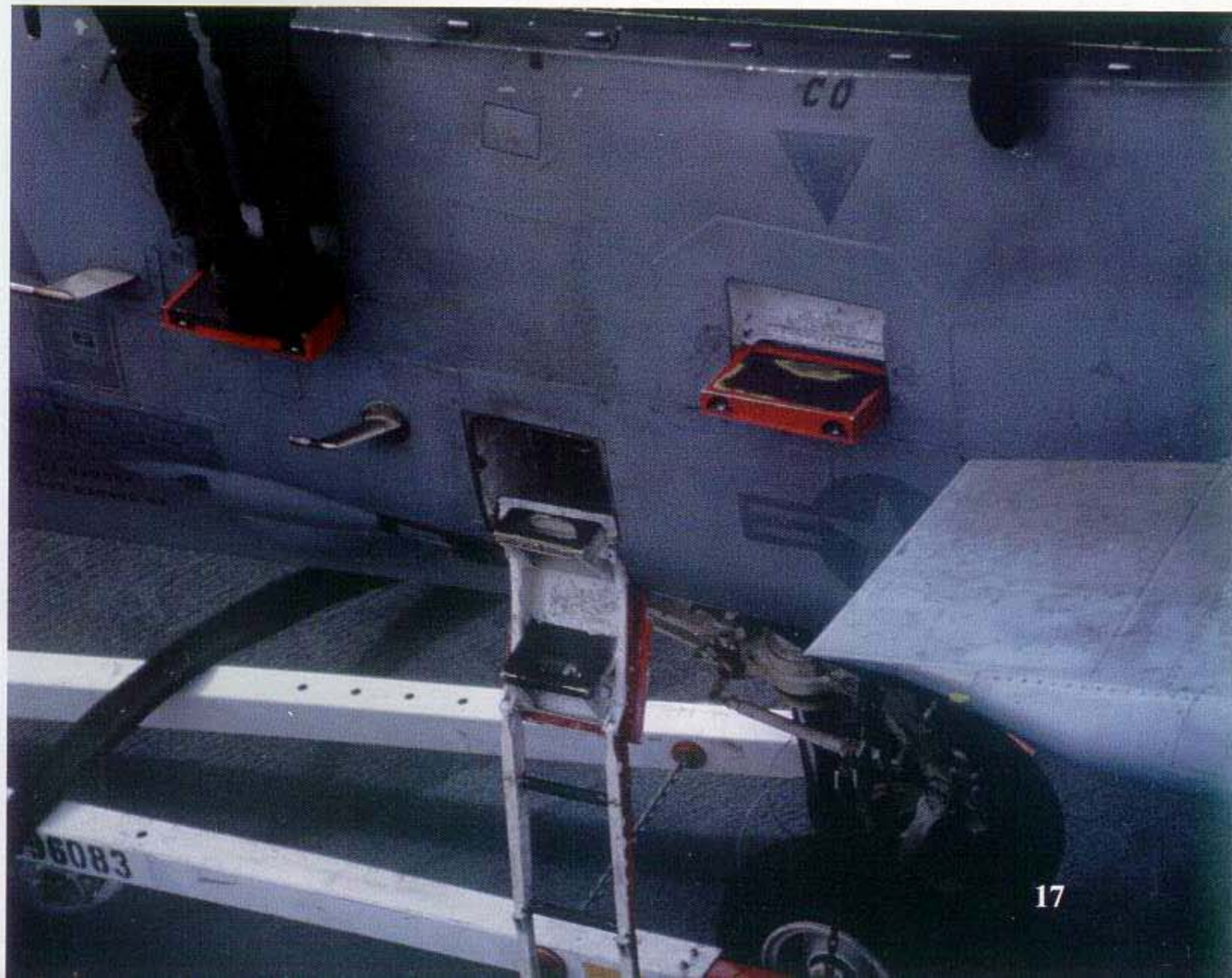


A F-14A of the U.S. Navy Fighter Weapons School "Top Gun" parked on the ramp at Naval Air Station Miramar, California on 12 April 1994. It carries the special two-tone Gray camouflage applied to Top Gun Tomcats. The ground refueling-defueling receptacle door is open.

The open port side engine access door on a F-14D.



A crewman stands on one of the folded down crew mounting steps on a F-14. The aircraft also has a tow bar attached to the nose gear.



This F-14D has the radome open for servicing of the AN/APG-71 radar during testing of the F-14D at the Naval Air Test Center, Naval Air Station Patuxent River, Maryland.

This F-14D (BuNo 164346) NK 203, was assigned to VF-31 at NAS Miramar, California on 24 April 1994. It carries a pair of 267 gallon external tanks under the engine air intakes. The aircraft has a double missile rail on the starboard wing pylon and a single missile rail on the port pylon.

The pilot and RIO of this F-14 are going through pre-flight checks prior to a 1993 Top Gun mission from NAS Miramar, California.

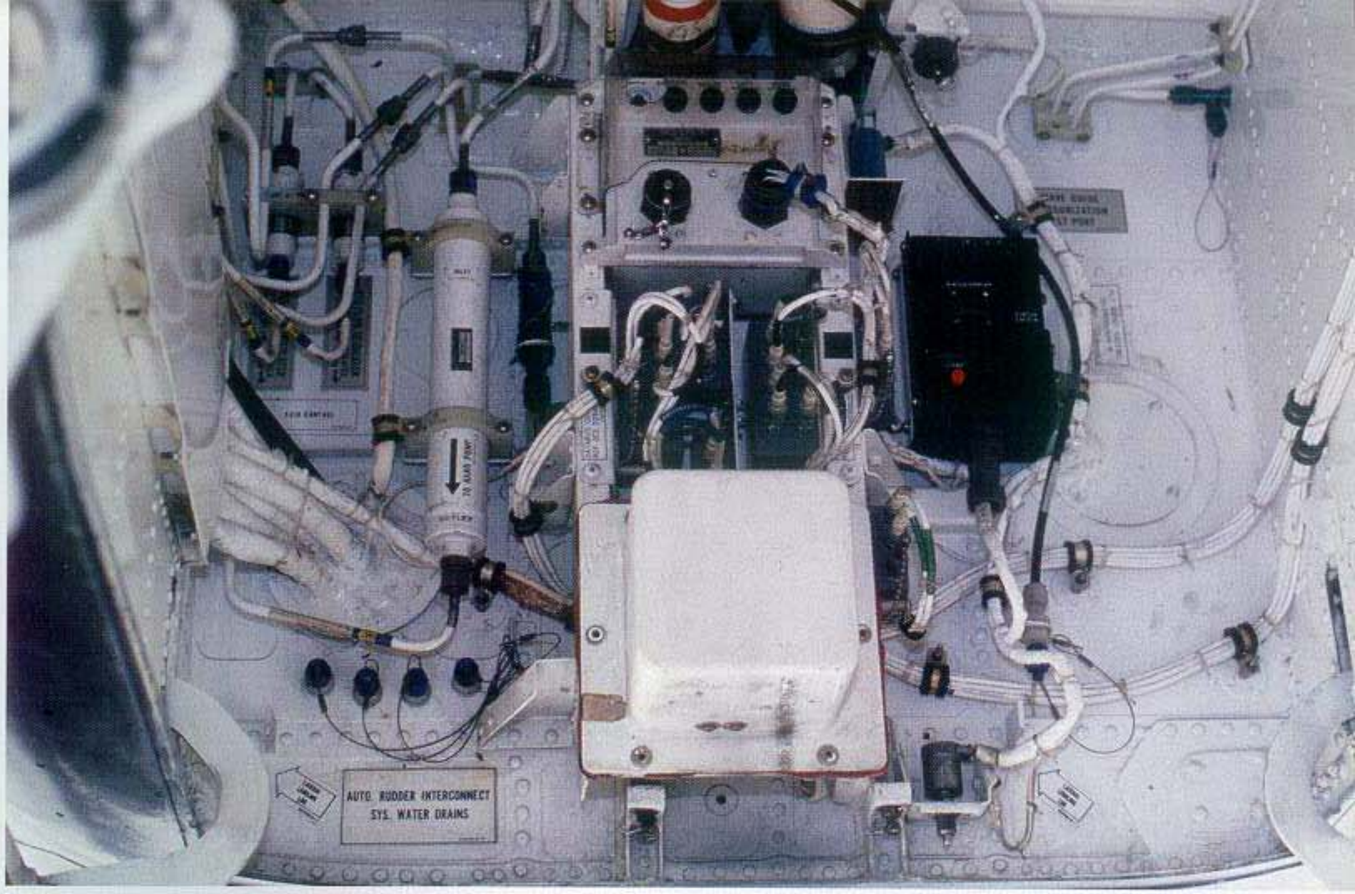
Maintenance and ground crew personnel at the Top Gun school are civilian employees and many of them learned their trade during Navy enlistments. Although their pay is higher than that of their Navy counterparts, these maintenance contracts are money-savers for the Navy because of the high experience level of these veterans.

The nose gear and wheel well of a F-14D, looking rearward. The nose gear retracts forward. The multi-colored lights under the landing light are visual reference for the Landing Signal Officer, who notes "fast" (Green), "on-speed" (Amber), or "slow" (Red), enabling him to coach the pilot on power management during carrier approaches.

The nose gear of an F-14D. The catapult launch bar is in the retracted (up) position.

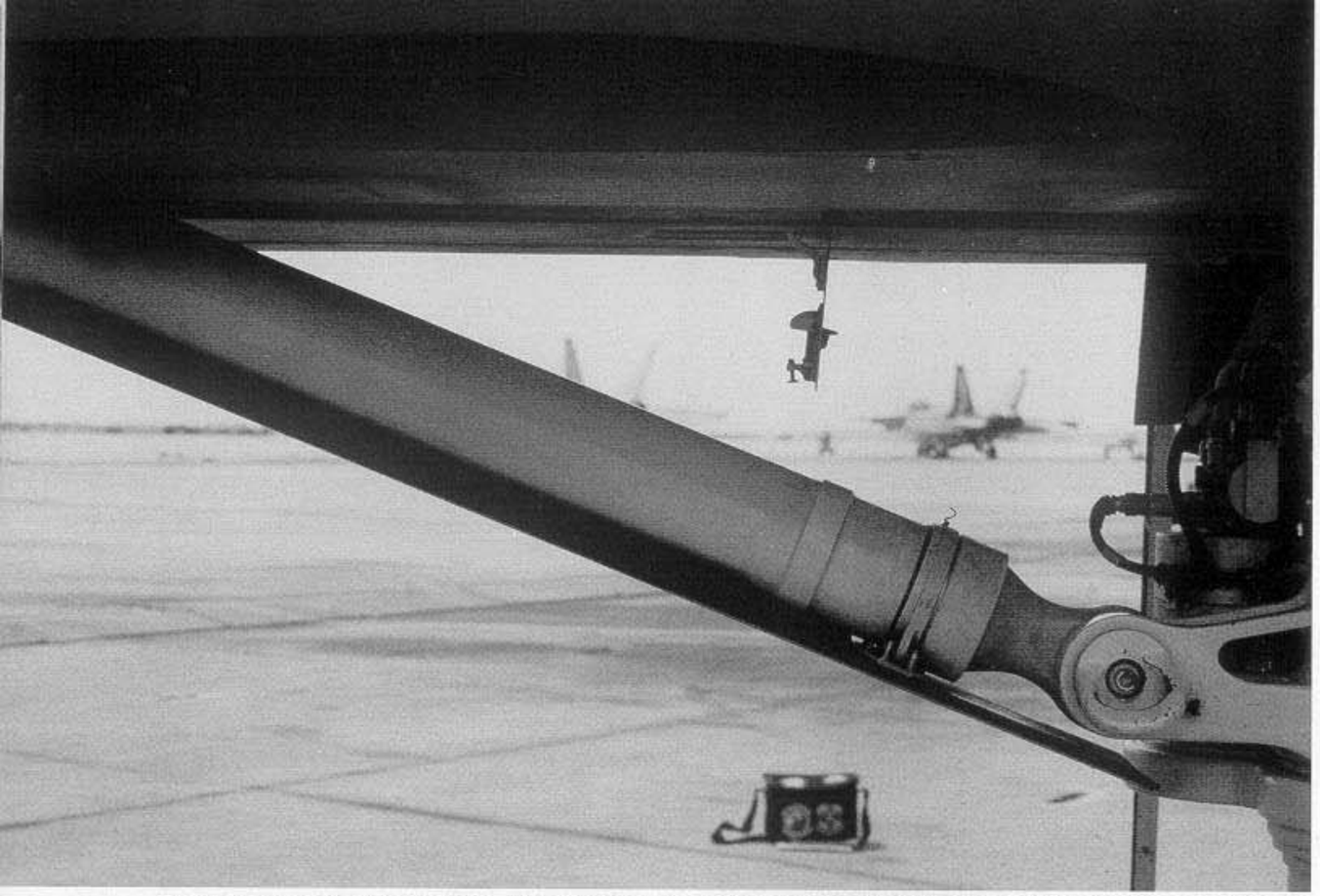
The nose landing gear wheel well. The wheel well door retraction rod is in the center. There are numerous wiring bundles running through the wheel well.

The nose wheel well contains a number of hydraulic actuators for raising and lowering the landing gear and opening and closing the gear doors. The edges of the doors are painted Red to make them more visible.



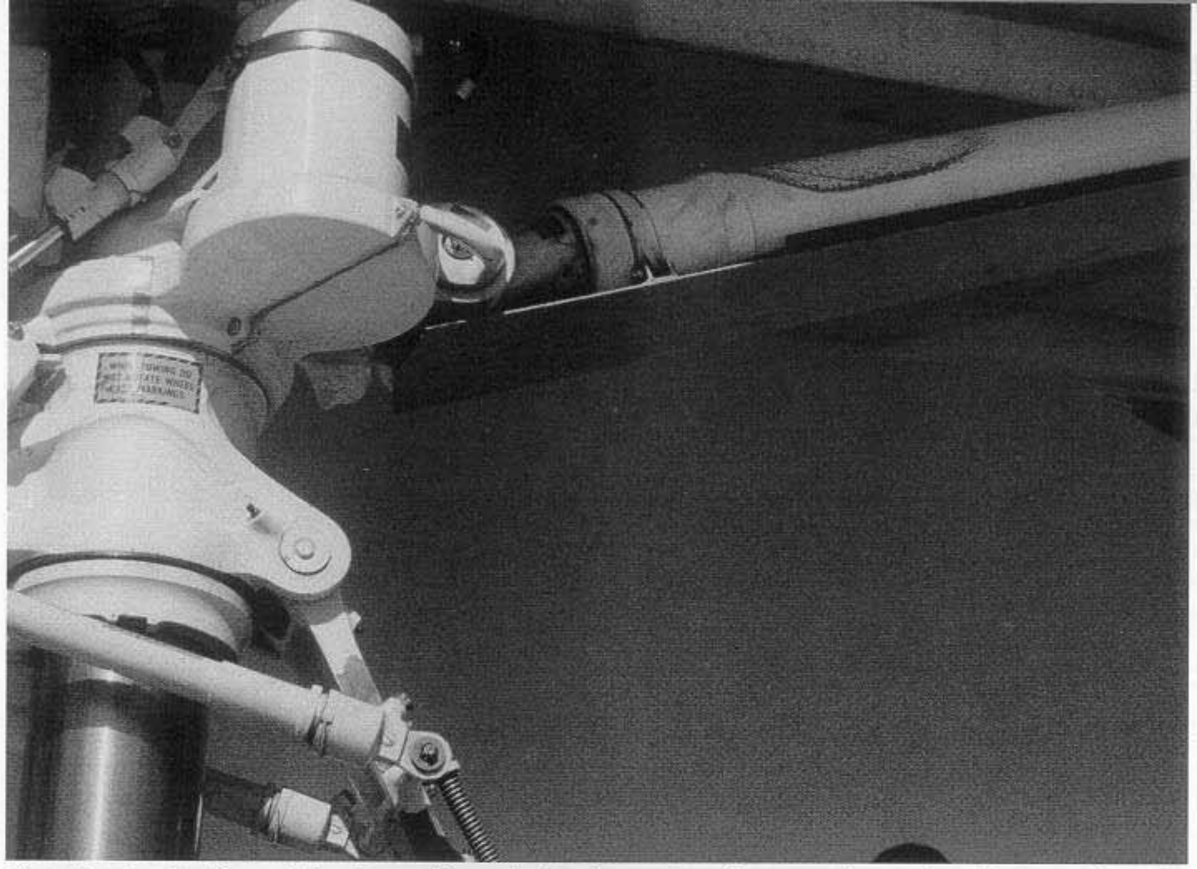
F-14D nose gear wheel well, looking forward. The boxes on the forward wheel well bulkhead are the power brake module and the anti-skid control box.

The port gear door has a vent and an electrical junction box mounted on the inside of the door. The interior of the wheel well and the insides of the doors are painted Gloss White.



The nose gear drag brace. The fairing under the brace forms one of the landing gear well doors when the landing gear is retracted.

The attachment for the tie down chains is located in front of the drag brace. The rear nose gear doors are mechanically linked to the shock strut for positive operation.



The shock strut has 18 inches of travel. During catapult operations, the pilot can "kneel" the nose gear to within four inches of full compression for attachment to the catapult shuttle.

The single split-type wheel assembly incorporates a tire pressure relief device to prevent over-inflation of the tires. The axles have recessed holes for the attachment of a tow bar with maximum steering angle of ± 120°.

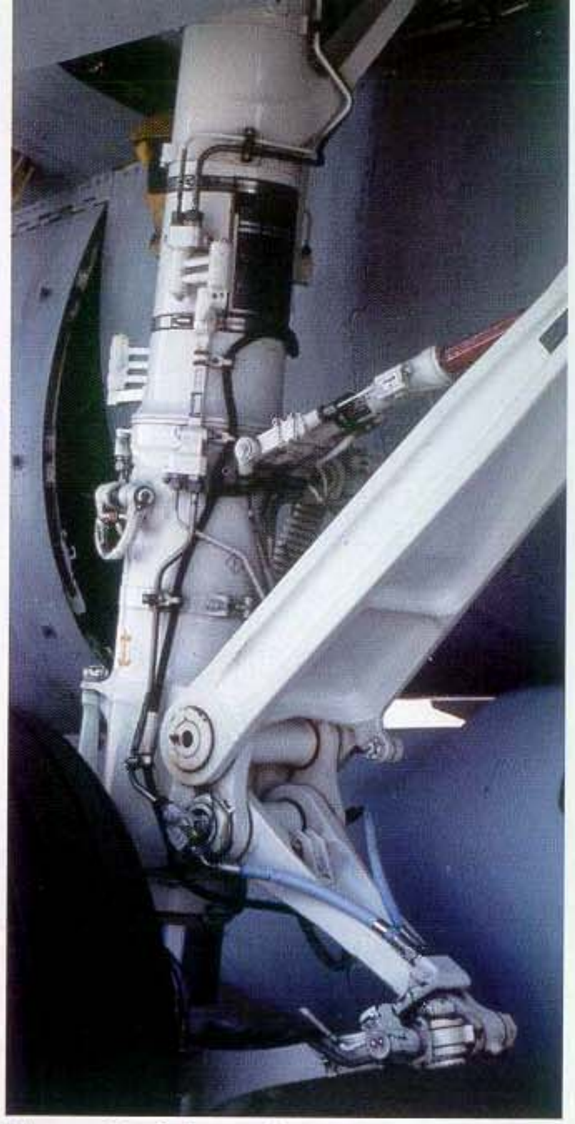
The nose of the prototype F-14A lacks several of the sensors and probes that were later incorporated in the production F-14A and later models. The prototype was preparing for launch during the Tomcat's initial carrier qualifications. The chin pod was very different from production aircraft and there was no probe mounted at the tip of the nose.

This F-14A+ of VF-74 on the ramp at Naval Air Station Oceana, Virginia, March 1994 carries full color markings and is in the colors of the Squadron commanding officer . This concession to the colorful markings of the sixties was made as a farewell gesture to VF-74 prior to it's disestablishment.

The starboard main landing gear assembly. The main landing gear retracts forward, rotating 90° to lay flat in the wing glove wheel well which is located forward of the wing box.

The side brace link on the main wheel strut pivots from the inboard side of the strut outer cylinder to engage in a nacelle fitting, which provides additional side load support for ground operations.

The main gear struts are housed in the glove sponson area. They are 16.4 feet apart, which provides good lateral stability during ground handling.

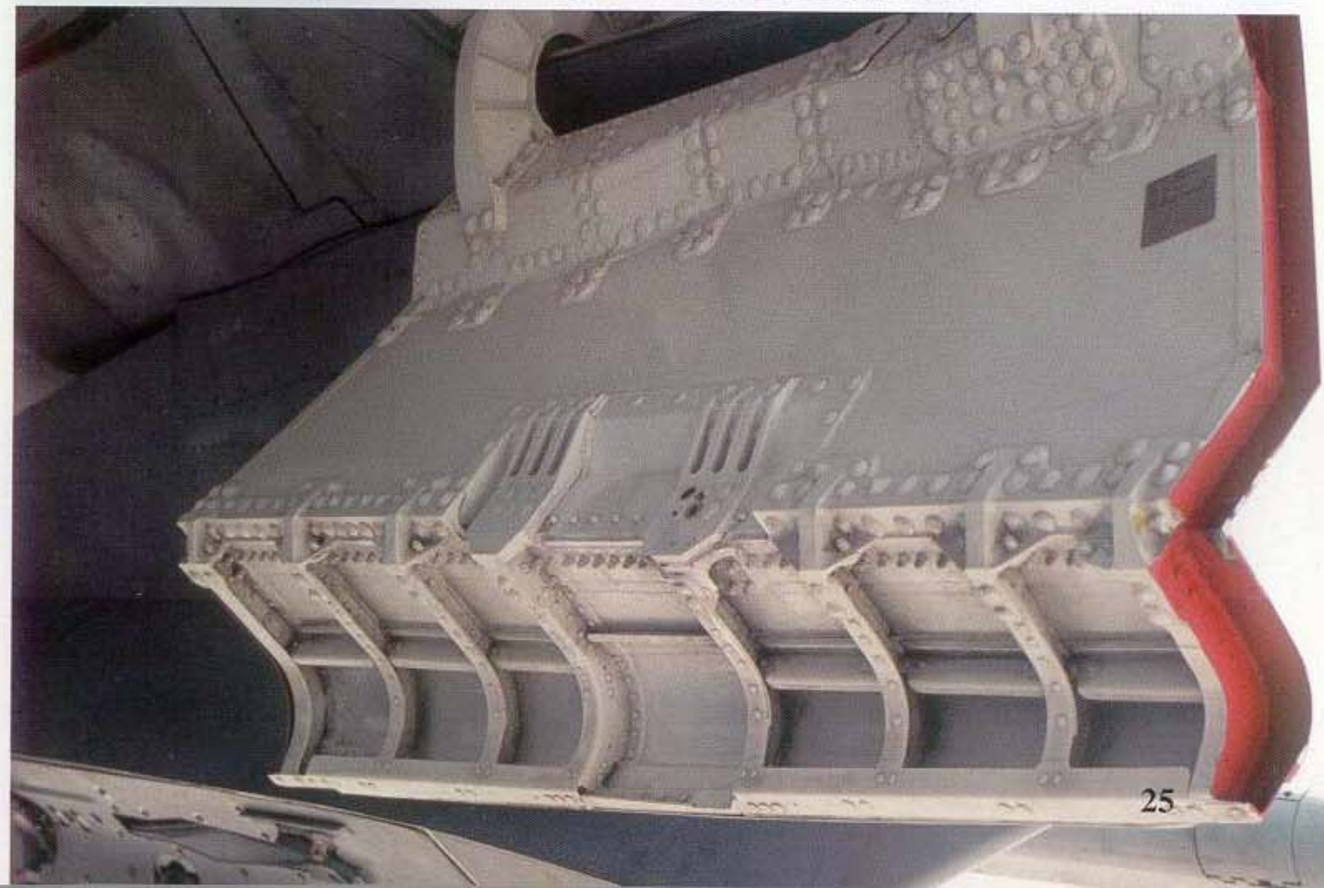


The path of the main landing gear, as it retracts, is controlled by the drag brace as it jack-knifes upward.

This is the starboard main gear on a F-14D. The landing gear struts are painted Gloss White, as is the wheel hub.

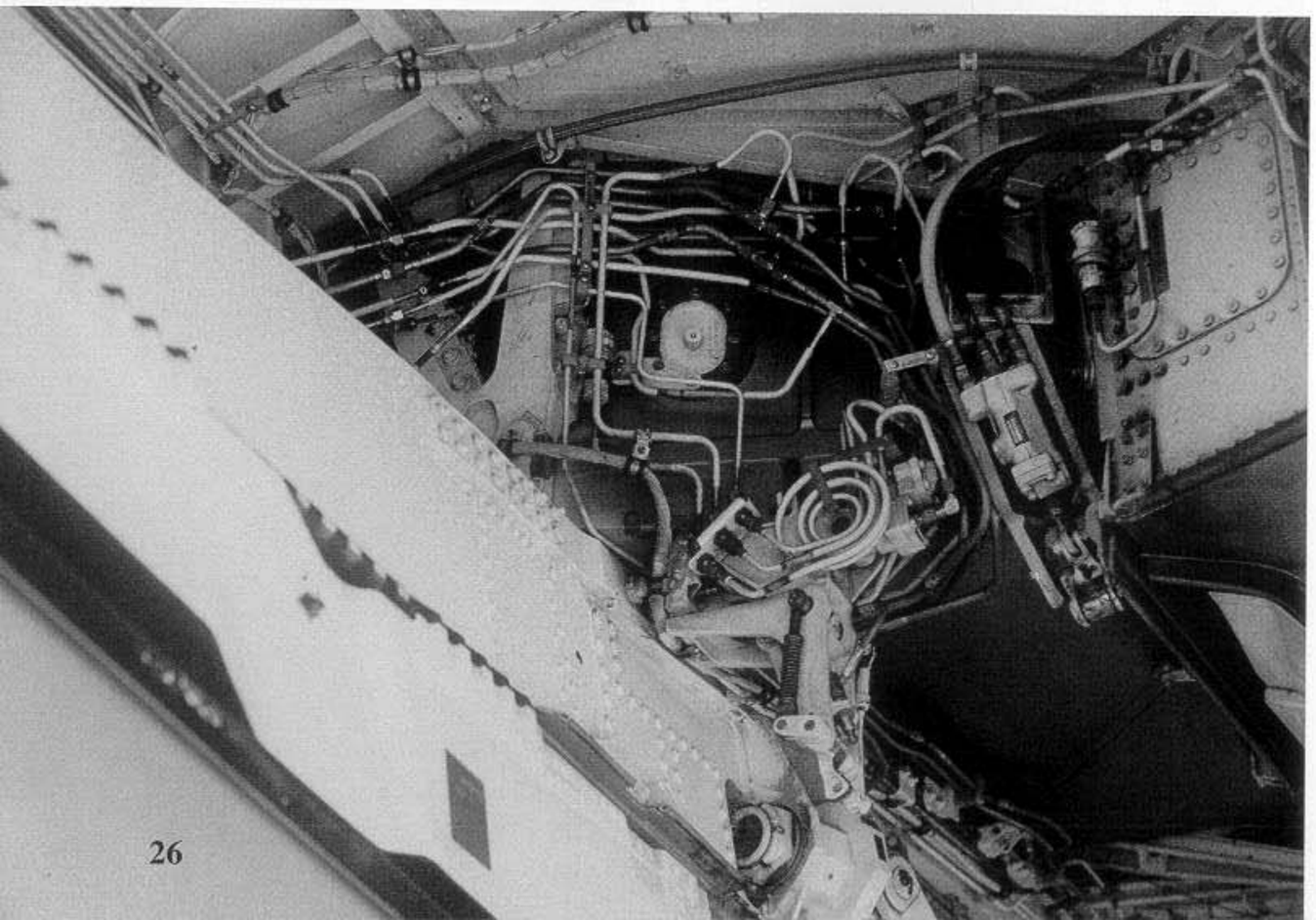
Port outboard main gear door. The outboard landing gear door is much larger than the inboard door. It is hinged in two locations, one at either end of the door.

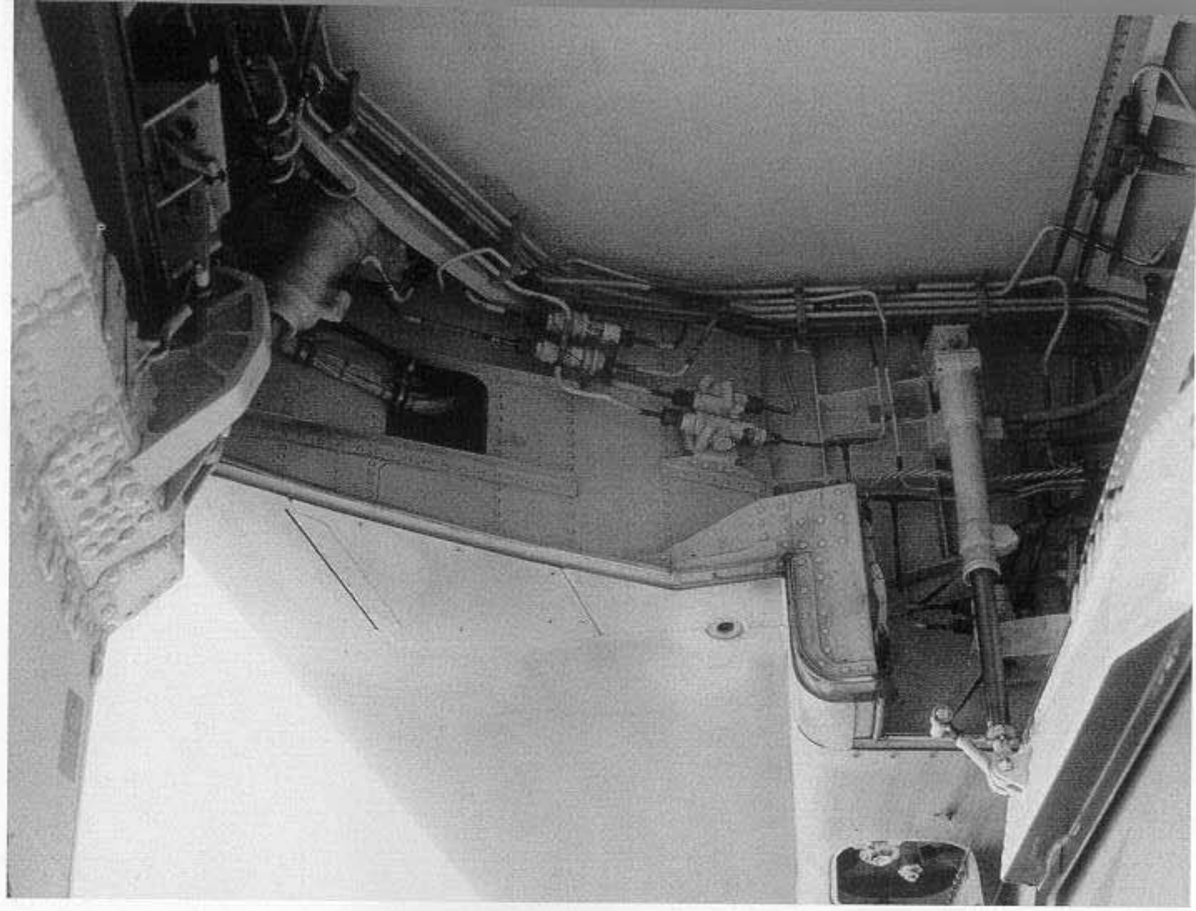
This is the forward inboard main gear door. The inboard landing gear door is much smaller than the outboard door. It is painted in Gloss White with Gloss Red edges.



This is the inboard forward main landing gear door. Although it is hinged in two locations, one at either end of the gear door, there is only one closing arm (Left)

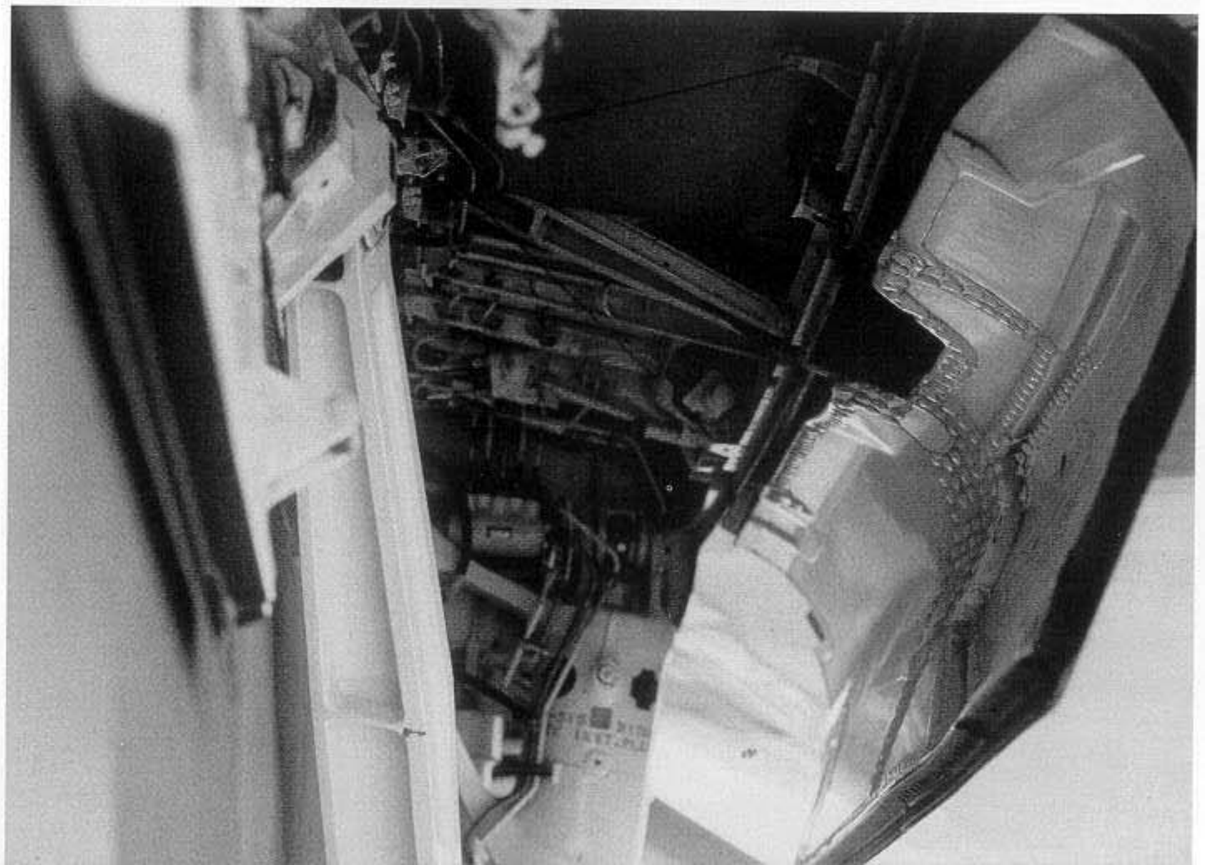
The interior of the port main landing gear well is filled with stainless steel hydraulic lines, rubber air lines and electrical lines.

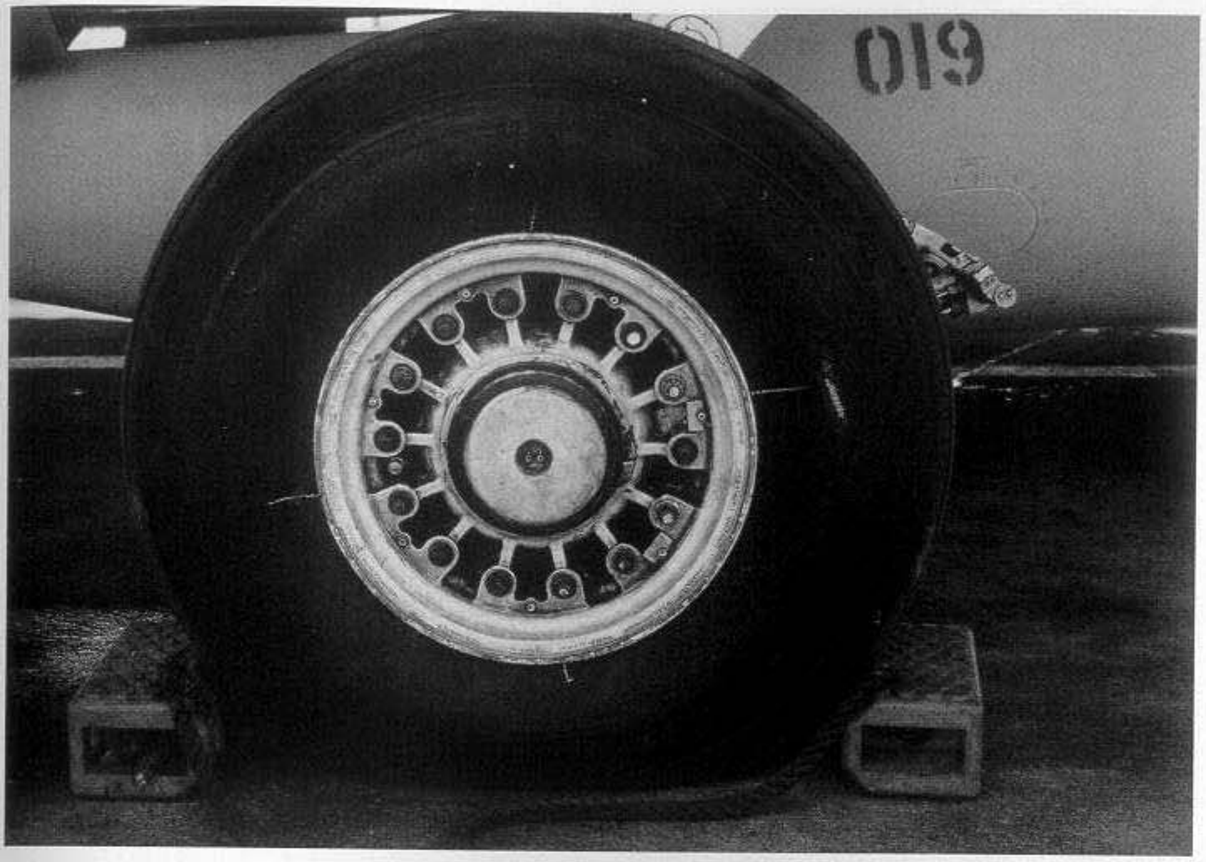




The Natural Metal and White hydraulic piston at the right is the inboard main landing gear door retracting rod. The outboard landing gear door retraction rod is visible at left, beind the door hinge.

The outboard main landing gear door and the landing gear main mount are connected at the rear portion of the gear door.



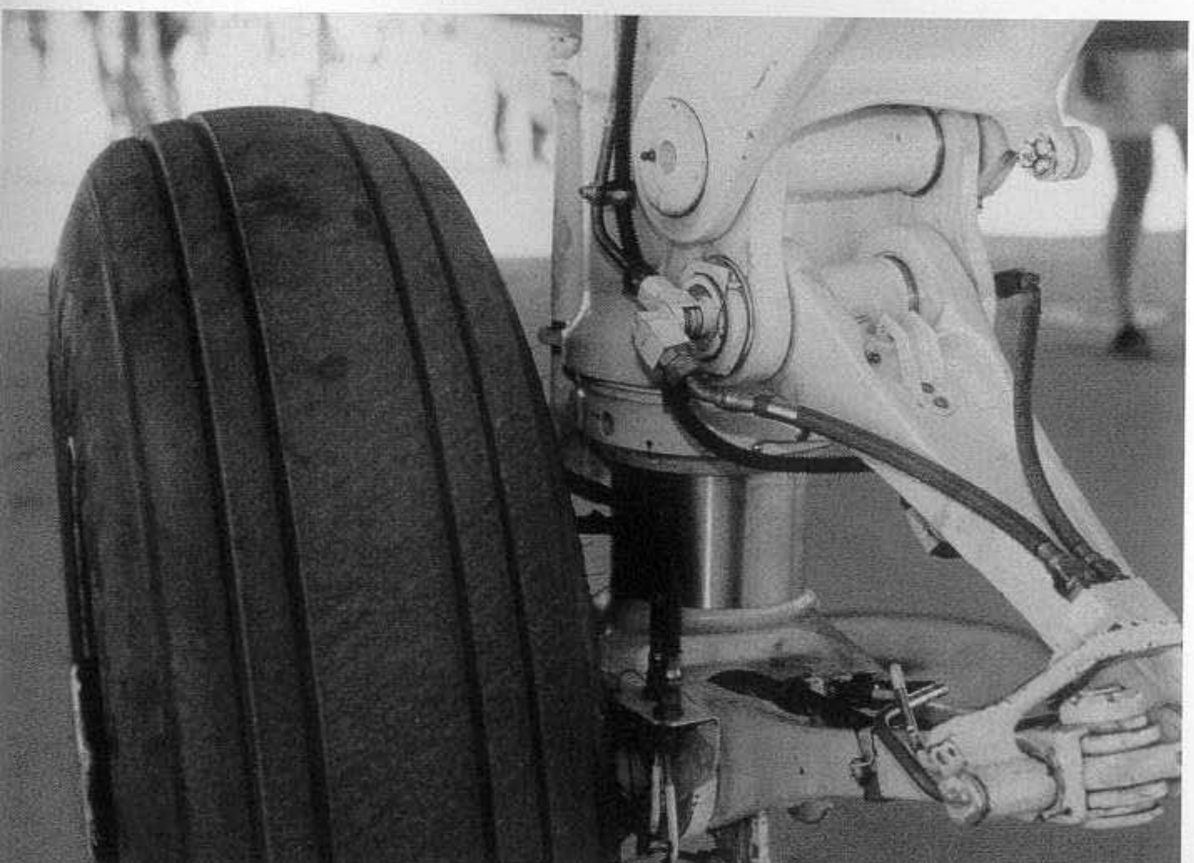


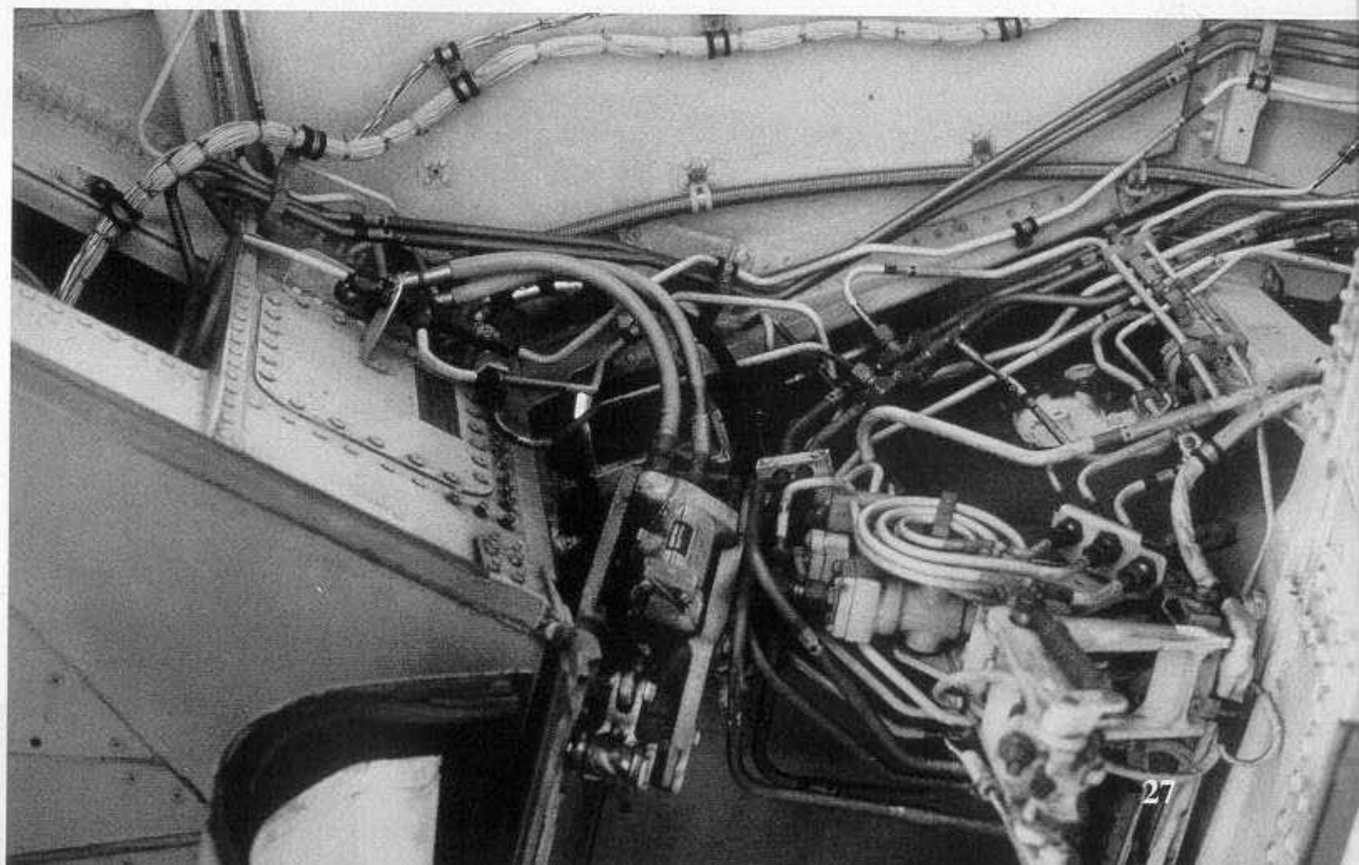
The main gear wheel incorporates a multiple-disk, hydraulic brake assembly and a wheel rotation sensor used in conjunction with the anti-skid system.

The main landing gear mount shock strut has a maximum stroke of twenty-five inches. On the ground, the maximum travel is four inches when the aircraft has a gross weight of at least 31,000 pounds.

The main landing gear wheel well (port side). The landing gear strut drag brace attachment point is in the foreground.

The main landing gear wheel well, looking rearward. The wheel well is filled with a myriad of hydraulic and electrical lines.

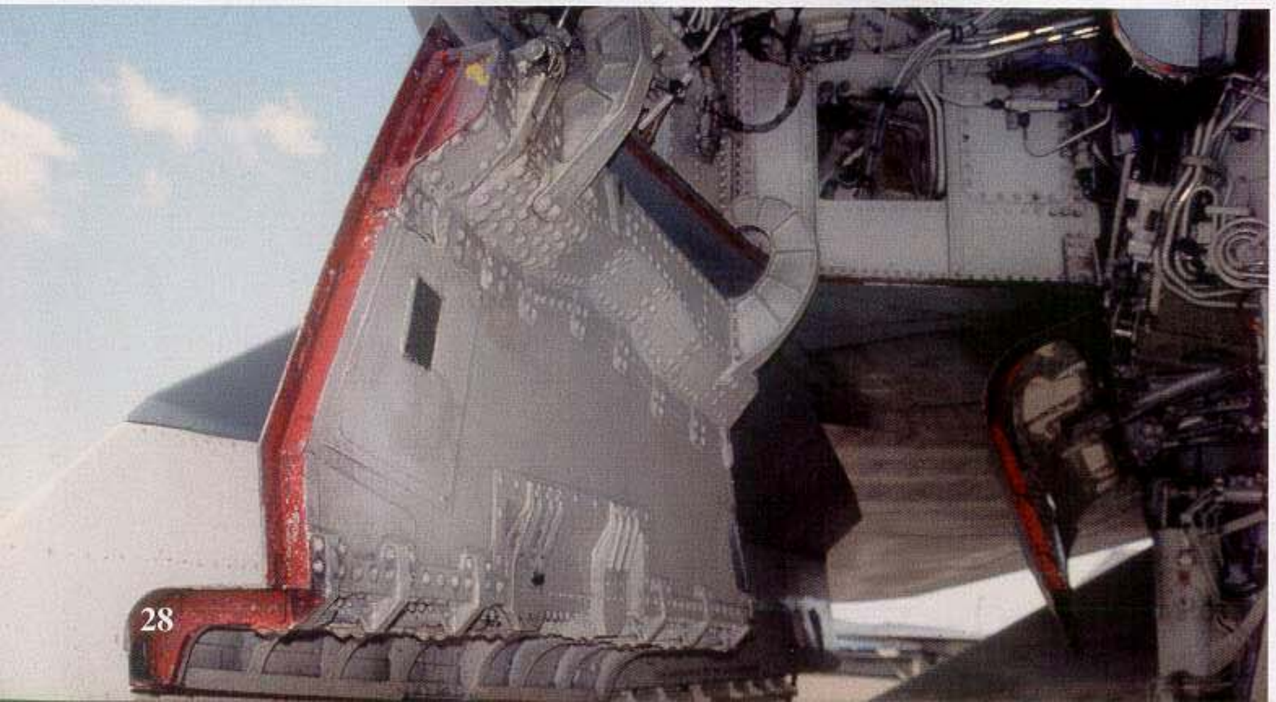




The port main landing gear assembly and landing gear wheel well. The open access door is for hydraulic service. The heavy duty landing gear is made to withstand the heavy sink rates encountered in full-stall landings aboard aircraft carriers. The landing gear on naval aircraft must be much stronger than the landing gear on a comparable land-based USAF fighter.

(Bottom Left) The outboard main landing gear door, looking rearward. There are two circular hinges, one at either end of the door panel. These are secured with heavy steel pins. The bottom portion of the door closing rod is visible at the upper left.

The inboard forward main gear door is much smaller and lighter than the outboard door. The structure outboard of the outboard gear door is a weapons pylon, which is equipped with two guided missile launch rails.



The large hinge point (upper right) is the attachment point for the drag link arm. The drag link controls the path of the retraction of the main landing gear assembly into the main landing gear wheel well.

The main gear wheel well. The U shaped hinge with the Natural Metal bearing is the attachment point/hinge for the main landing gear strut.

The main landing gear wheel well, port side. The main landing gear strut attachment point is visible at the lower center.

This is the main gear strut with the drag link arm (lower) and strut retraction arm (upper).

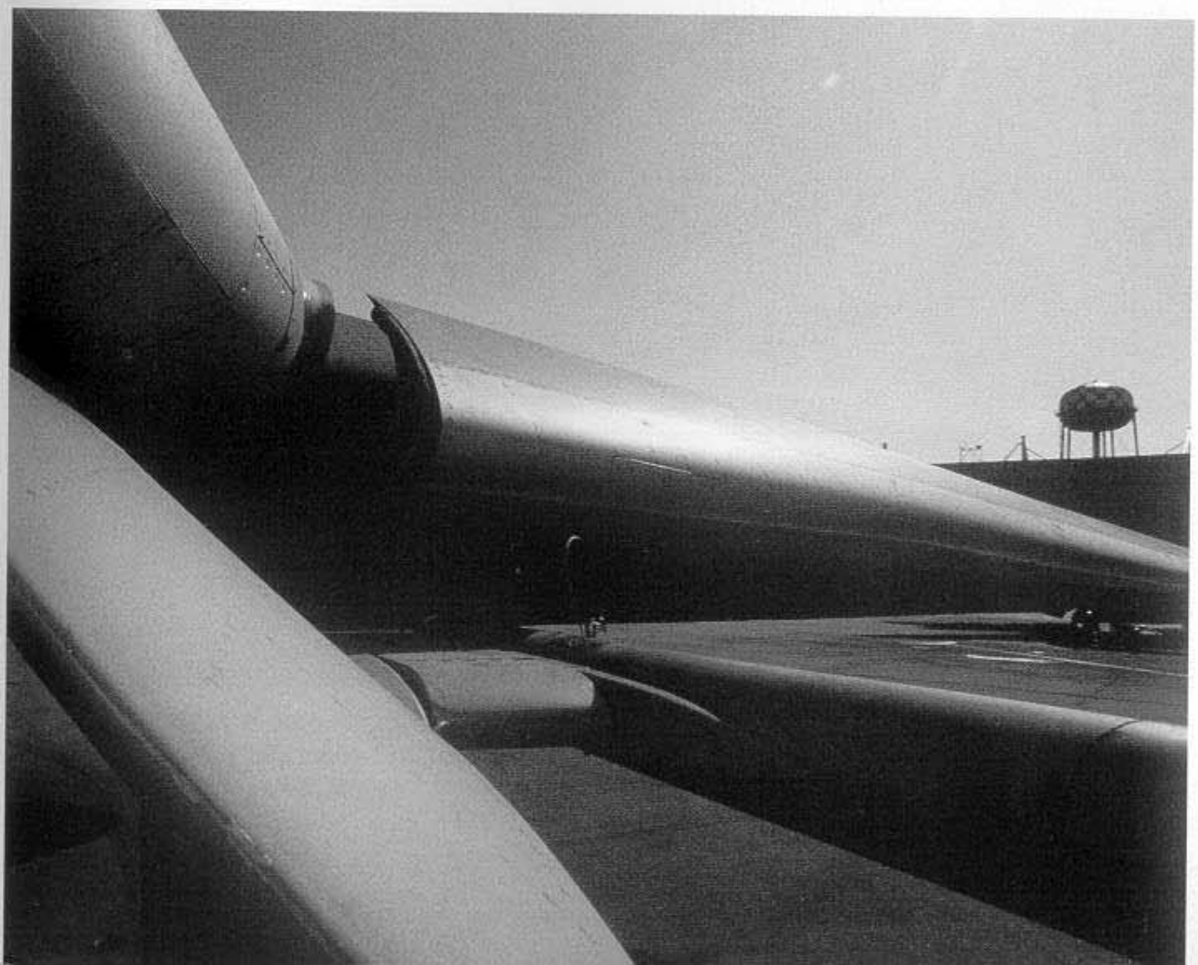
The upper and lower position lights on the wing glove (Red on port wing, Green on starboard wing).

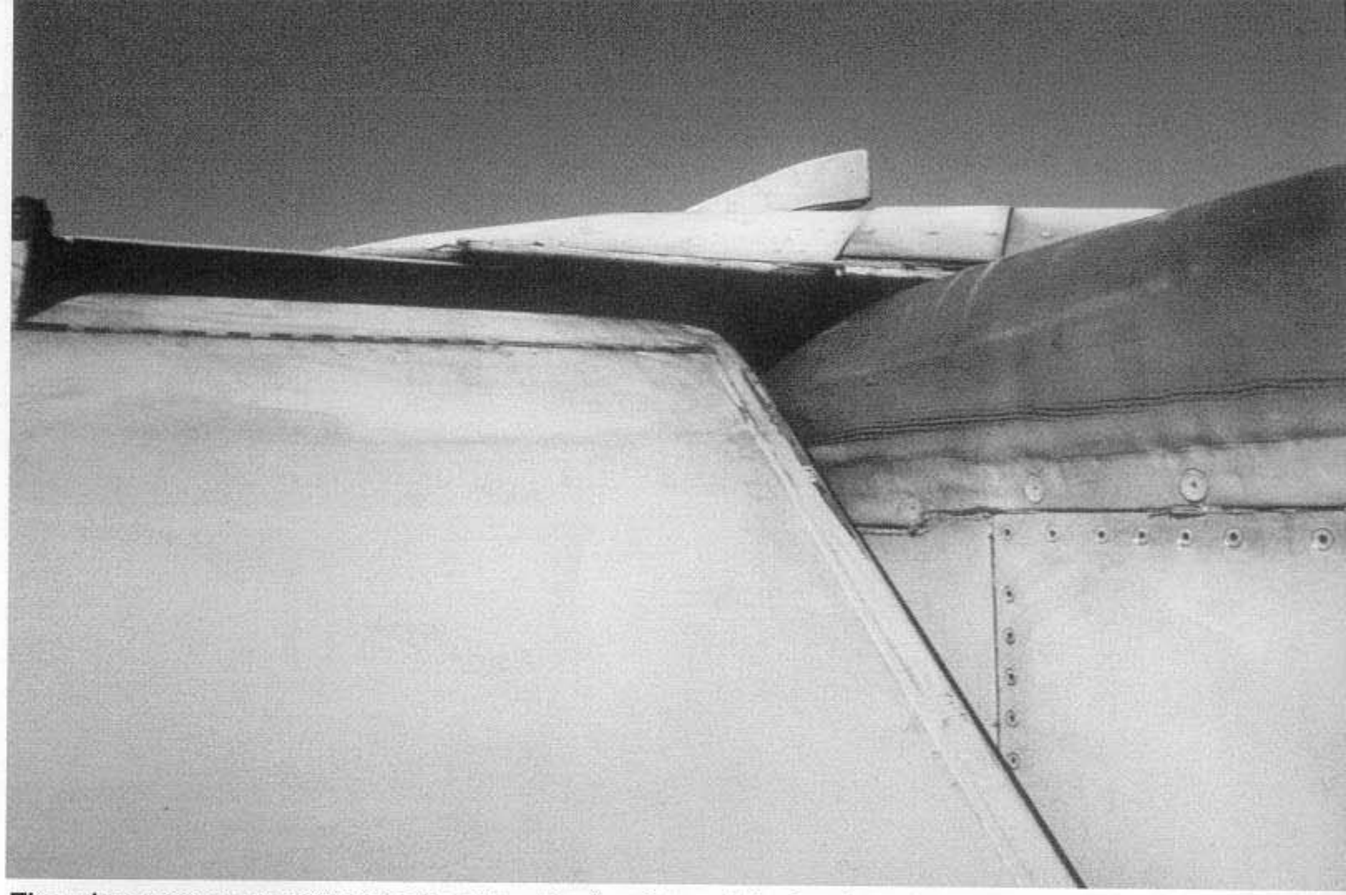
This is the port air intake area of a F-14D. The wing glove vanes were deleted on the F-14D.

The starboard air intake on a F-14A. The retractable wing glove vane (canard wing surface) is located in the front of the wing sponson in between the position lights. The vane deployed automatically at supersonic speeds and manually at subsonic speeds. They served to increase the effective wing area and extended out some fifteen degrees from the wing root.

The F-14 has full-span trailing edge flaps that operate at the full forward wing sweep position (20°).

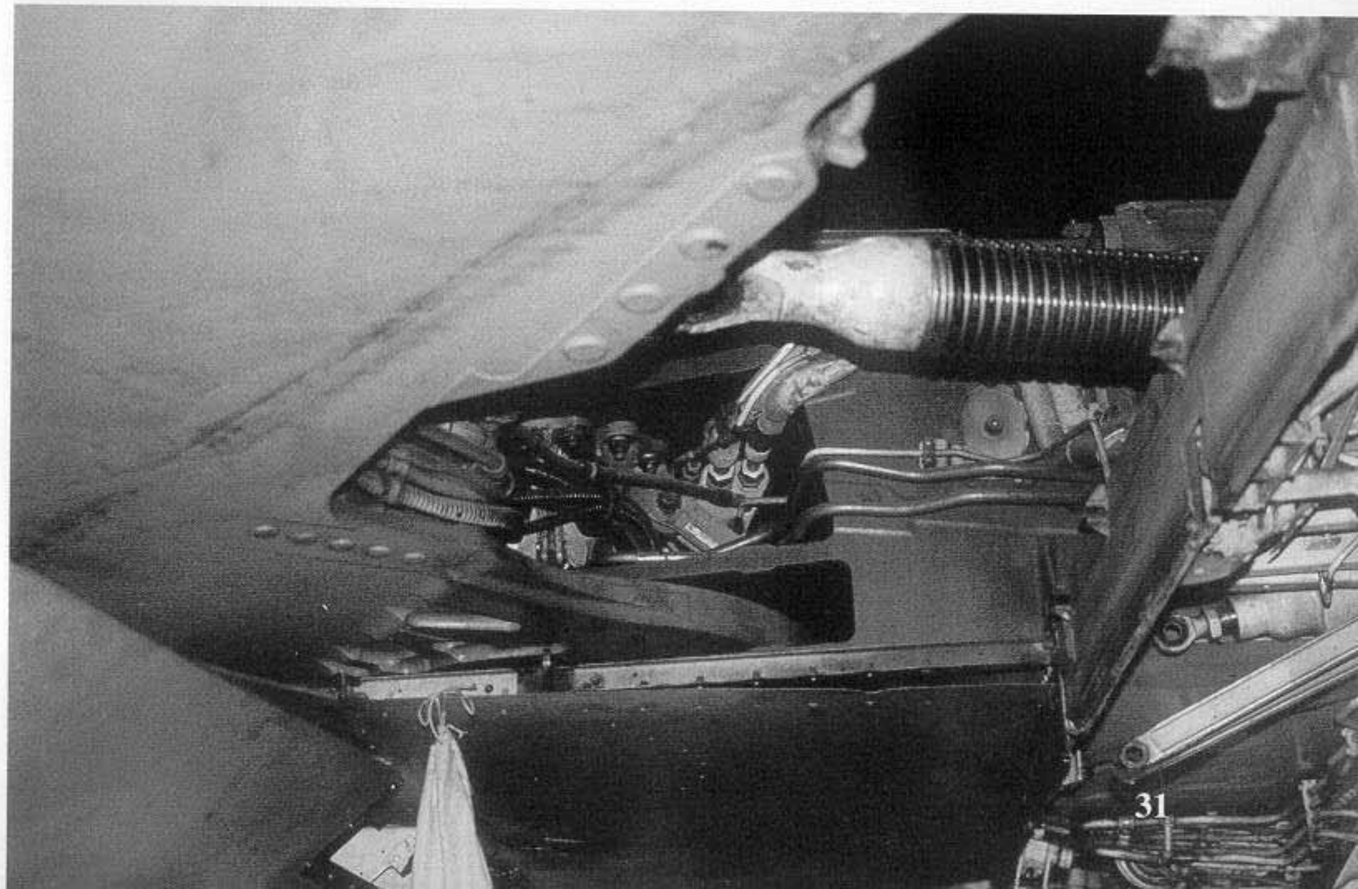
The wings also incorporate full span leading edge flaps that are used to enhance low speed maneuvering by improving the airflow over the wing at high angles of attack.





The wings sweep to 68° retracting into the fuselage. The fuselage incorporates sealing plates to maintain aerodynamic efficiency when the wings are in the full forward position.

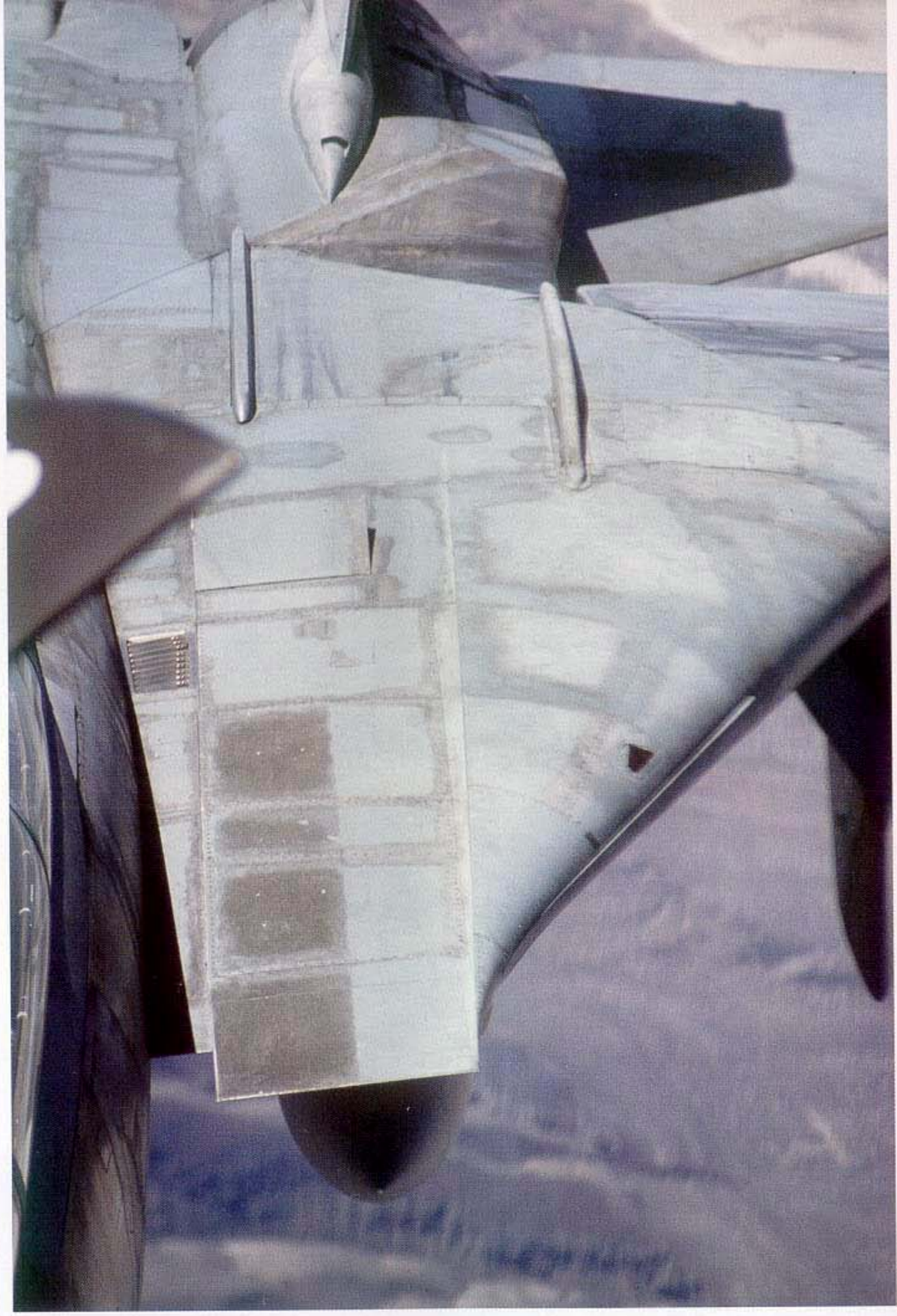
This large jackscrew controls the movement of the wing during wing sweep. It is mounted in the wing carry-through box.



The lower port wing sponson position light.

Lower starboard wing sponson position light.

Lower port wing sponson sealing plate. This plate maintains the aerodynamics of the wing during sweep changes.



The upper surface of the port air intake and wing glove structure on a F-14A. The blow out door on top of the intake is in the open position and the wing glove vane is partially extended.

The interior of the port air intake reveals the Air Inlet Control System (AICS) ramps and pistons. There are three ramps within the intake and a bleed air door on top of the intake. These are programmed to provide sub-sonic air to the engine.

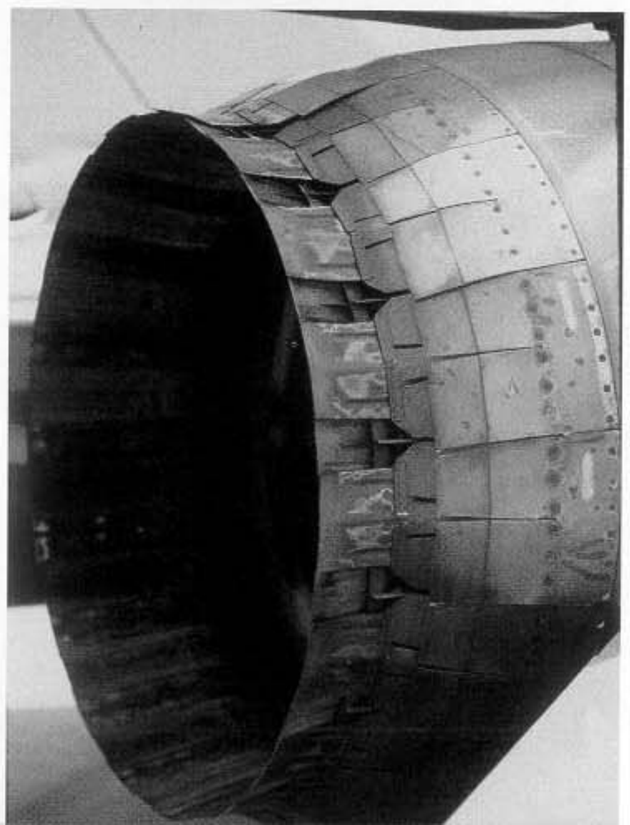
The two air intakes on the Tomcat are set at divergent angles. This is the intake chin of a F-14D.

Even in the toned-down Gray markings, the intakes are marked with danger markings and the jet intake warning triangle.

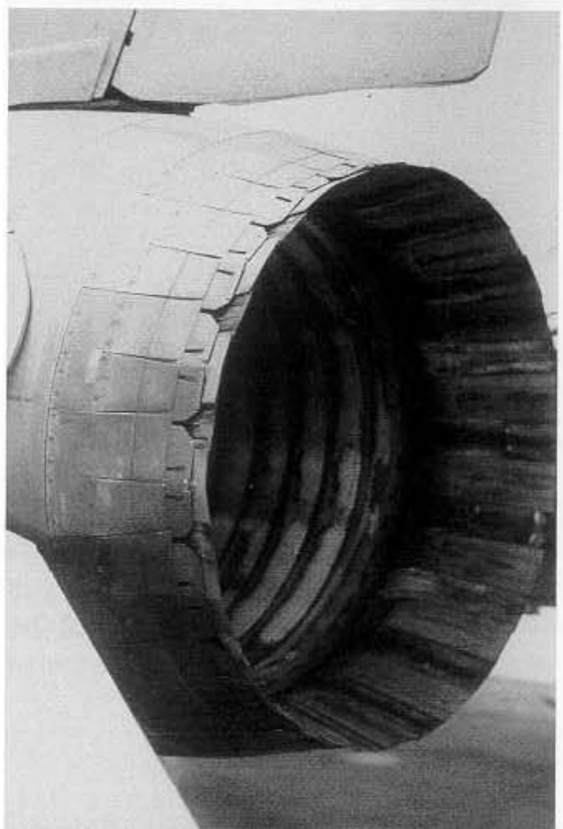
A F-14A of VF-41. The exhaust of the TF-30 engine is open on the starboard engine and closed on the port engine. This is a normal condition when the aircraft is secured. The aircraft is carrying an Air Combat Maneuvering Instrumentation (ACMI) pod on the port underwing missile pylon. This is used as part of the the ACMI system to send real time information back to a computer for exercise evaluation. It also evaluates surface-to-air and air-to-air engagements and recently has been reprogrammed to include bombing accuracy.

Air intake showing all the intake ramps. The first (top) ramp is fixed. The third ramp is lowered, revealing the path to the bleed door on the top of the fuselage.

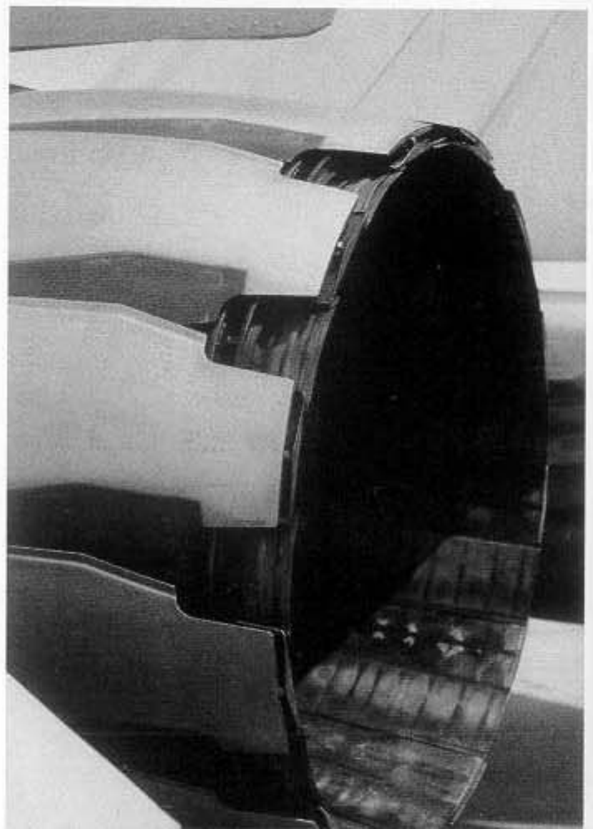
The partially closed exhaust of the TF-30-P-414A turbofan engine used on the F-14A. The TF-30 engine has been a source of a number of problems with the F-14A.

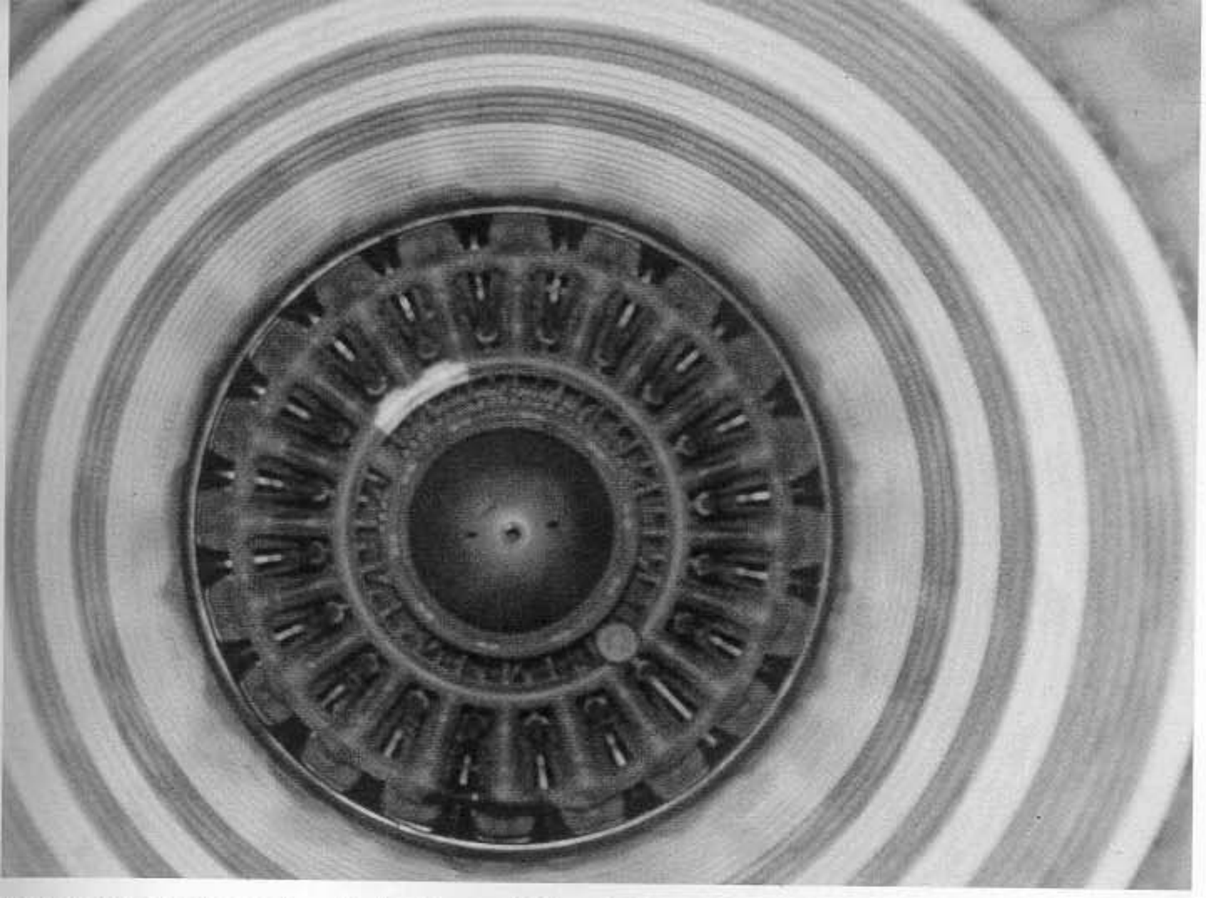


TF-30 engine exhaust fully open. This is the zone five afterburner position, where the engine would generate 20,900 pounds of thrust.



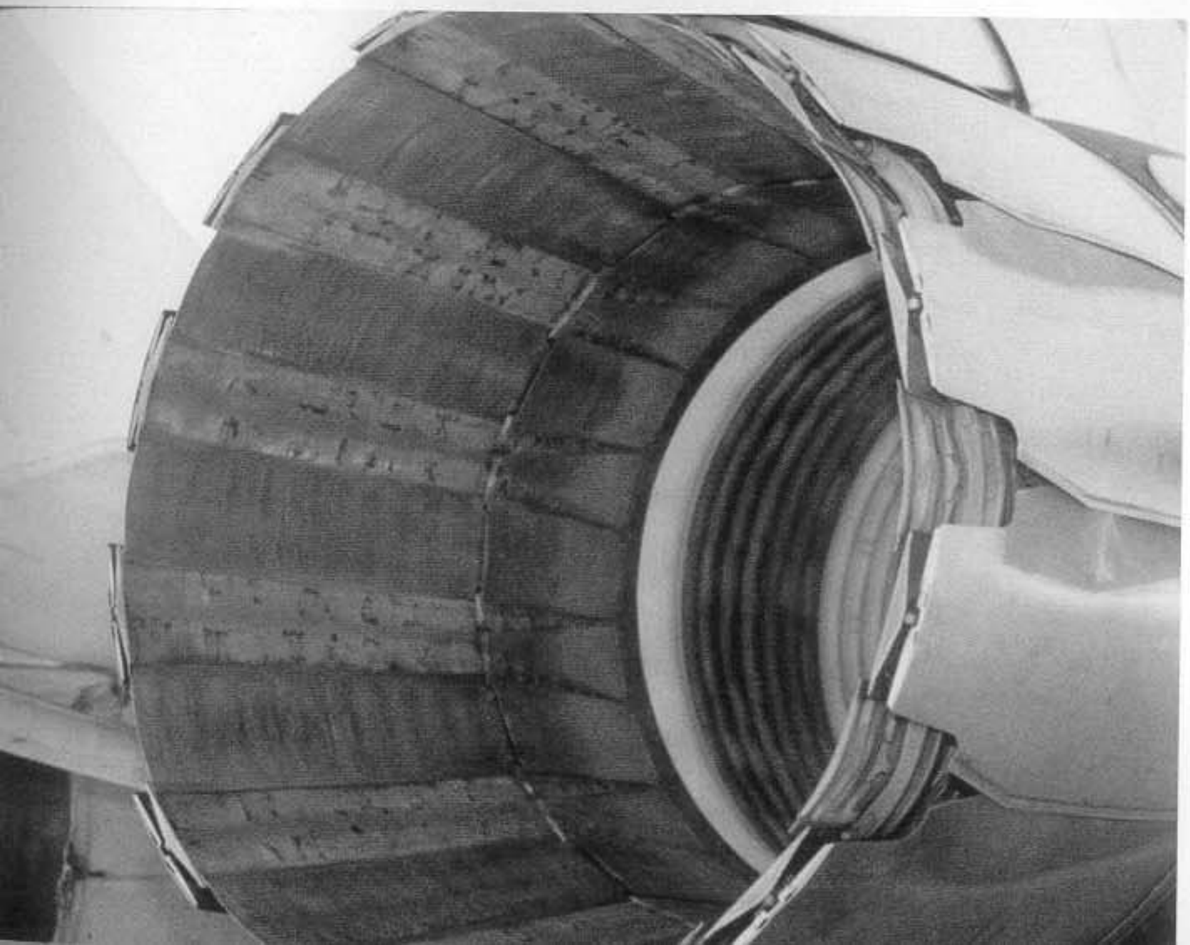
The exhaust vanes of the GE-F-110-GE-400 turbofan engines fitted to the F-14A+ and F-14D differ from those of the earlier TF-30 engine and are one of the identification features of the F-14A+ and F-14D.





The interior of the exhaust of a General Electric F-110 turbofan engine.

The exhaust vanes of a F-110 engine in the open (afterburner) position. The F-110 engine produces 23,100 pounds of thrust in full afterburner.

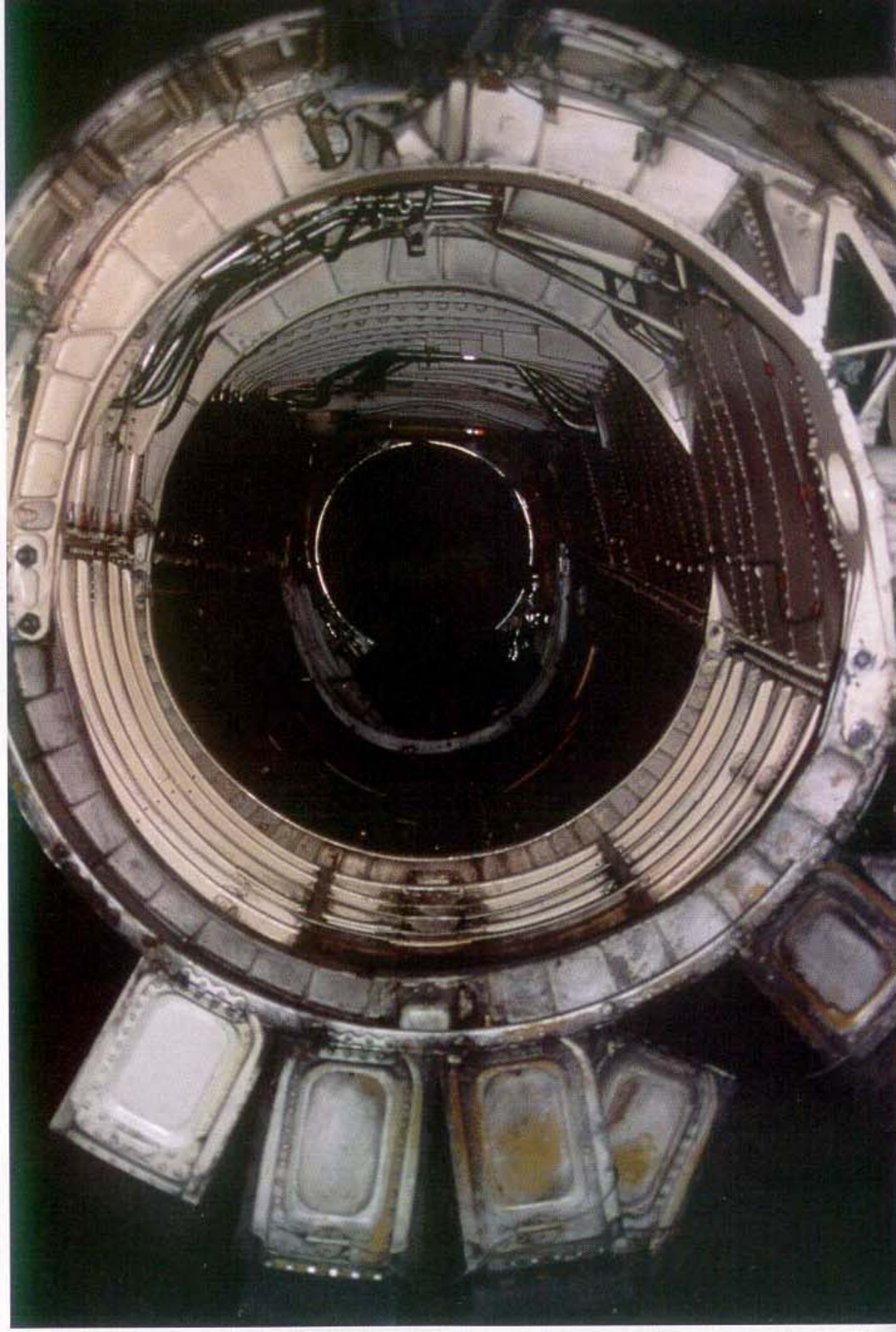


The F-110 engine exhaust and boat tail of a F-14D Tomcat. The change from the TF-30 to the F-110 has made the F-14D a much better aircraft and cured the various engine related problems that plagued the F-14A.

Part of the pilot's preflight walk-around is a visual examination of the engine exhaust area.

A TF-30 turbofan engine on its servicing cart in a hangar at Naval Air Station Oceana, Virginia Beach, Virginia during March of 1994.

This is a TF-30 engine. Very little modification to the airframe was required to retrofit F-110 engines to the F-14A to create the F-14A+.



This is the engine bay of the F-14A with the TF-30 turbofan engine removed for maintenance.

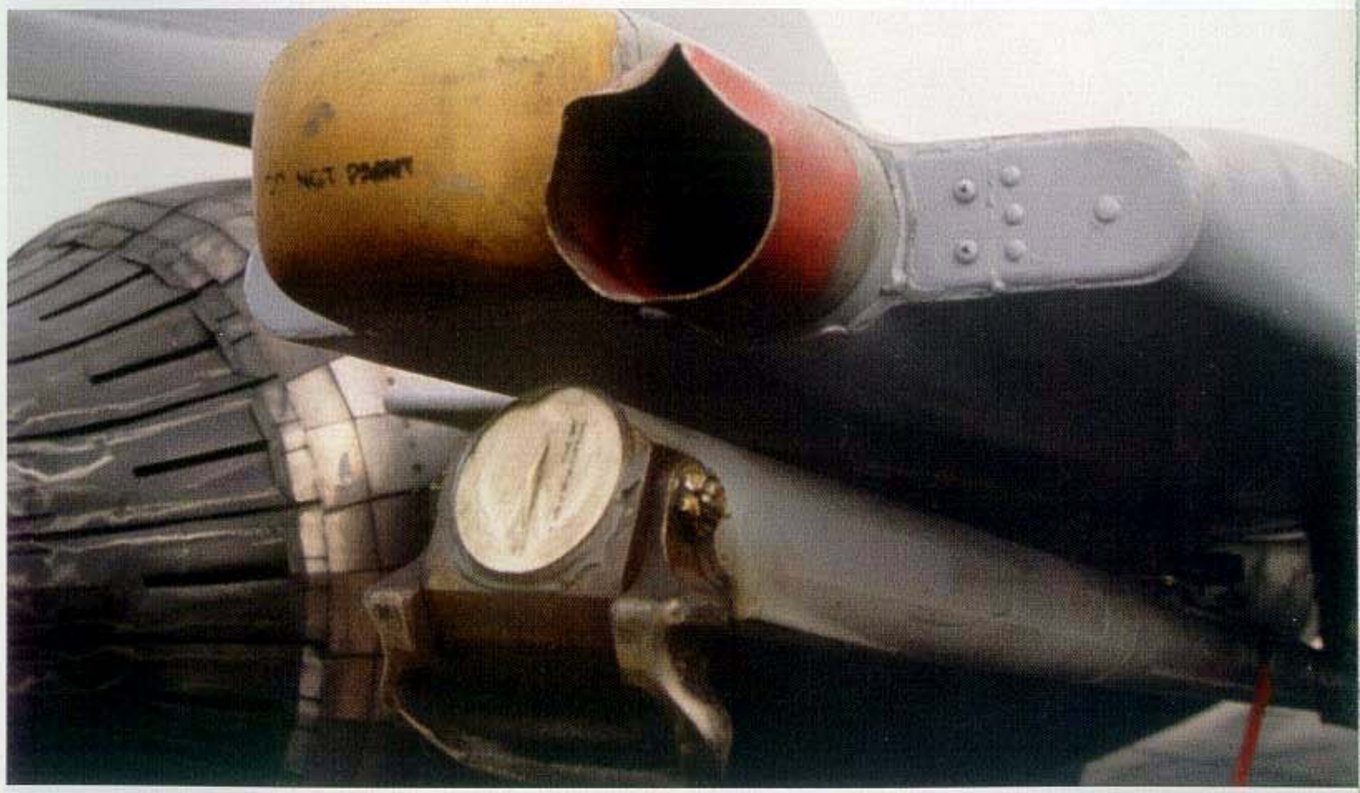
The starboard wingtip position light.

The port wingtip position light.

Two chaff/flare dispensers are mounted under the boat tail. These openings accept removable plug-in cartridges, "egg crates", that can contain flares, chaff or a combination of both.

(Right) The arresting hook used on the F-14 has a replaceable hook point. After a certain number of arrested landings the point is replaced as a safety measure.

This is the boat tail of a F-14D. The object at the left is a Electronic Counter-Measures (ECM) antenna. Next to it is the fuel dump pipe. The arresting hook is under the boat tail.



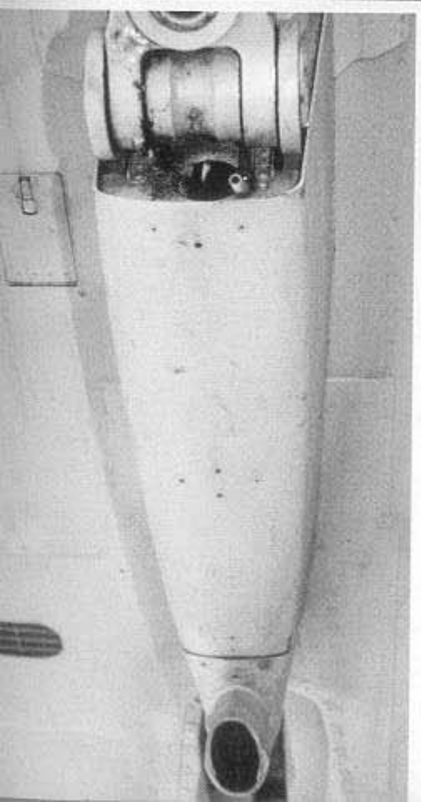
The open recesses for the chaff/flare cartridges. None are fitted to this F-14. Flares are considered dangerous and are not loaded unless actually needed.

The boat tail on the F-14A differs from the F-14A+ and F-14D in that it does not have an ECM antenna next to the fuel dump pipe. A pneumatic dashpot preloads the hook down to minimize hook bounce on the deck during landings.

The underside of a F-14A. There are two Phoenix missile mounting rails between the intakes. The arresting hook is painted with Black and White stripes to make it more visible.

The arresting hook attachment point, showing the retract actuator (in the fuselage). The arresting hook is free to move laterally ±26°.

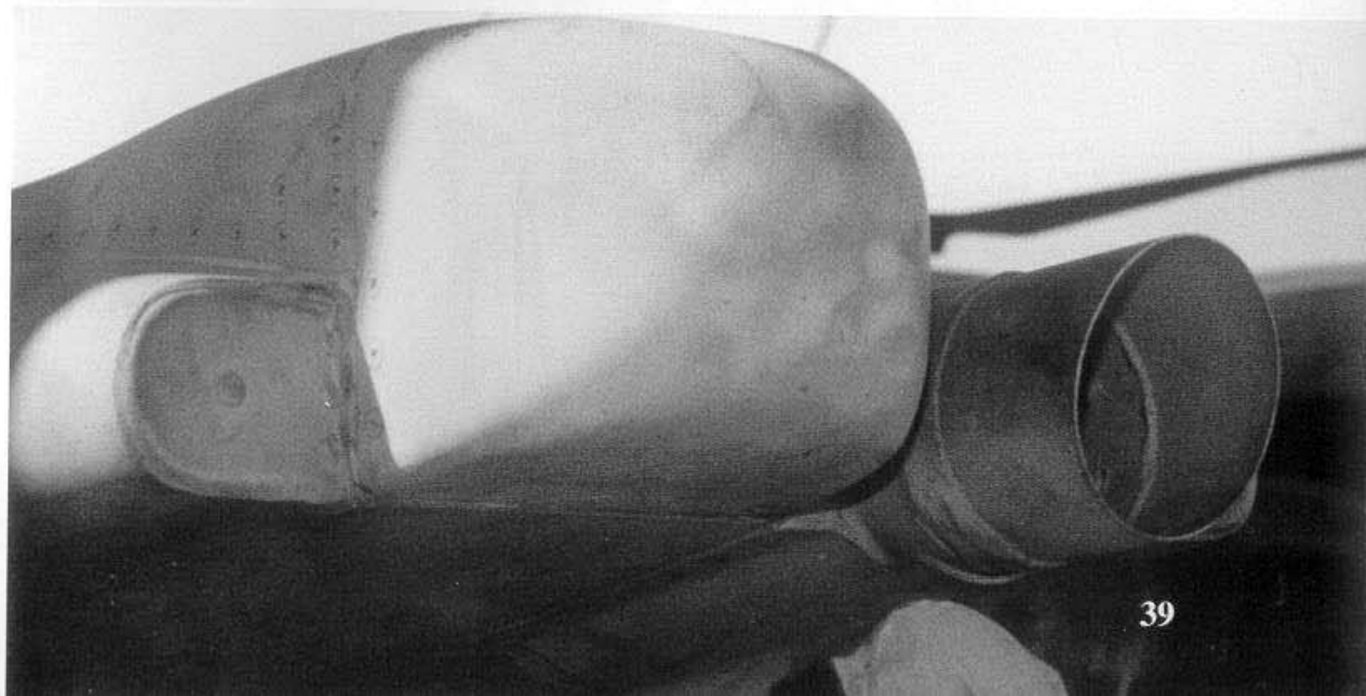
Rear view of an early F-14A, showing the faired boat tail, with a navigation light on the left and the fuel dump pipe at the right.

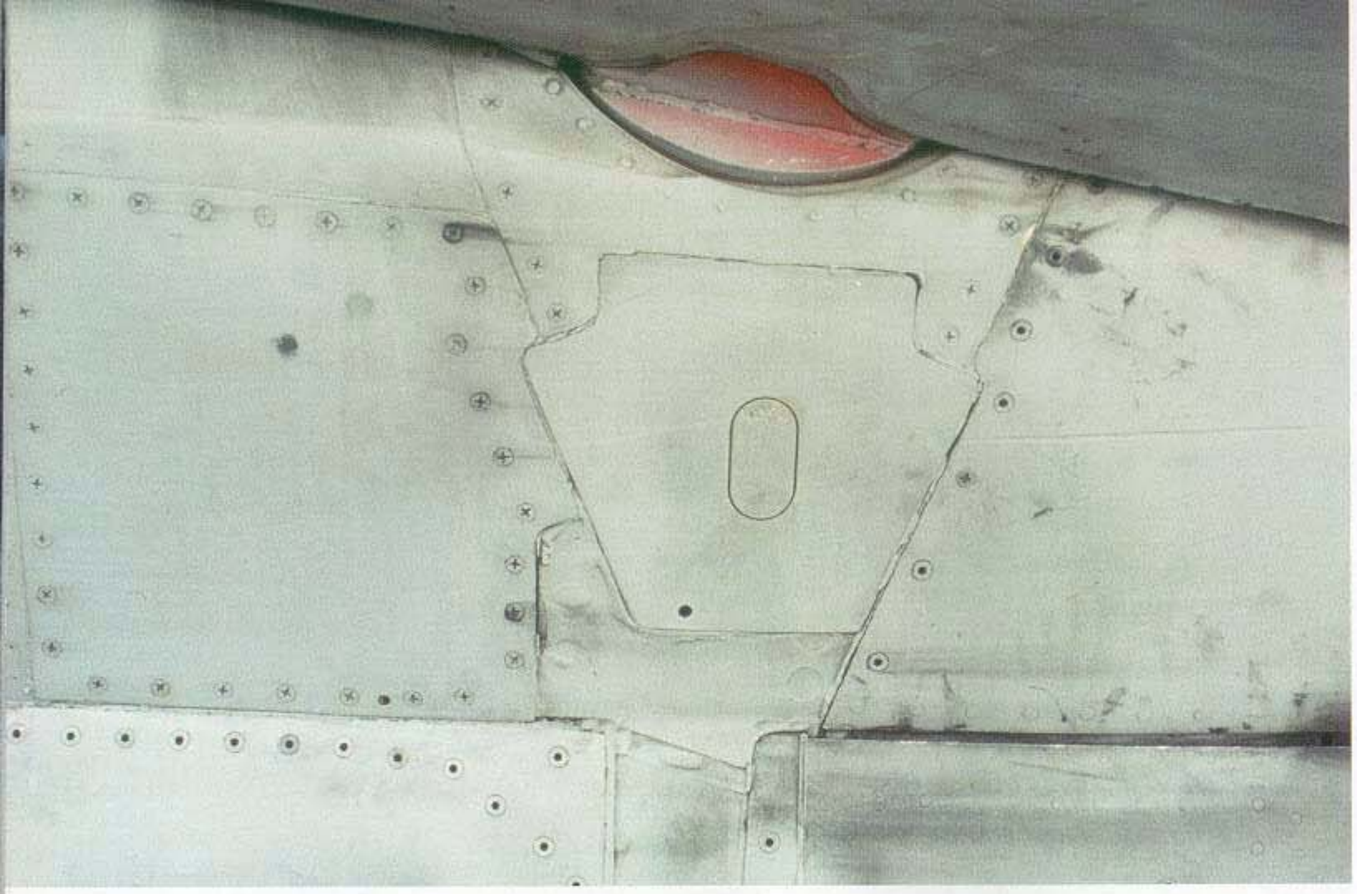


F-14D arresting hook attachment point and fairing.

This is the forward end of the F-14D arresting hook attachment fairing.

The boat tail of a F-14D. The ECM antenna is on the left, the fuel dump pipe is on the right and the arresting hook is under the boat tail.



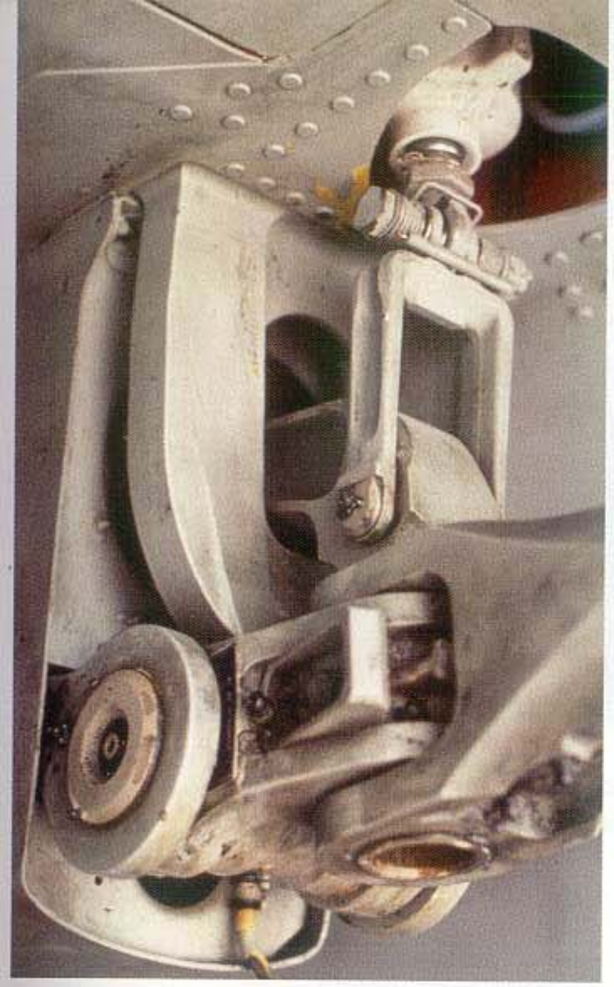


This is the underside of the port stabilator pivot. Each stabilator is a single unit that turns independently of the opposite stabilator to control roll.

This is the port stabilator and ventral fin of a F-14D. The NACA ventral fin intake provides cooling air to some of the electronics within the fuselage.

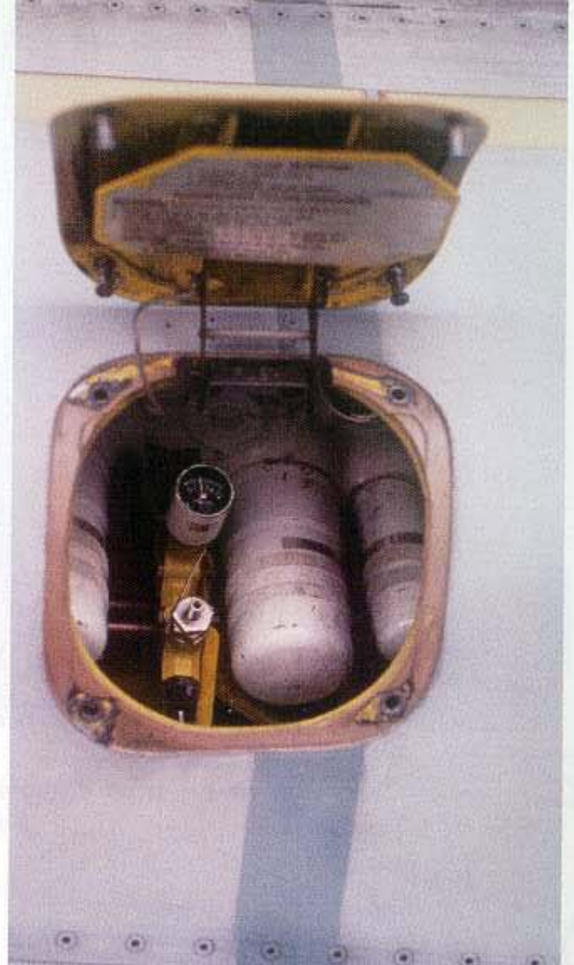
The rear portion of the starboard ventral fin is uncovered.

The arresting hook attachment point during maintenance. The lower speed brake has been removed. The hook attachment point must be able to withstand the stress of a carrier landing. During landing, the aircraft is slowed from over 100 mph to 0 in a matter of seconds.



F-14D arresting hook attachment point.

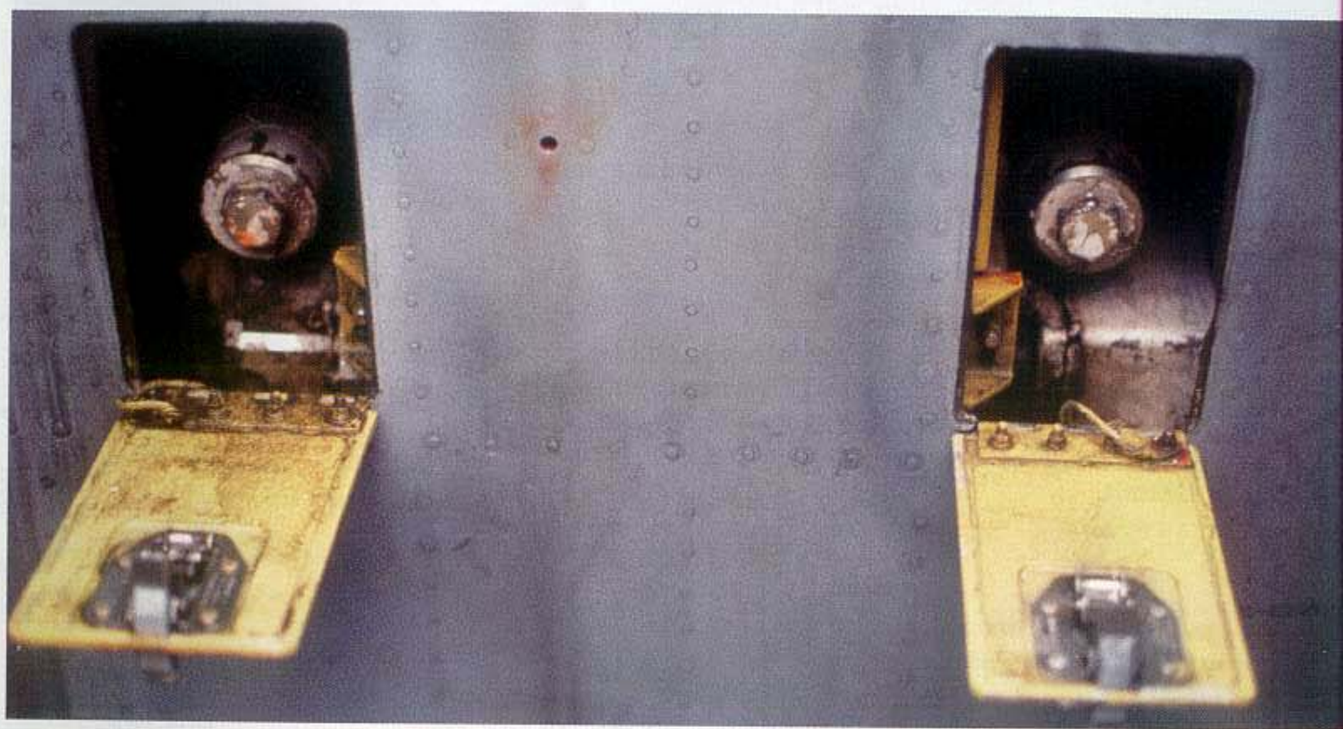
This access panel is located on the port sponson, under the wing.



Combined hydraulic gauge is under the access panel on the port rear fuselage.

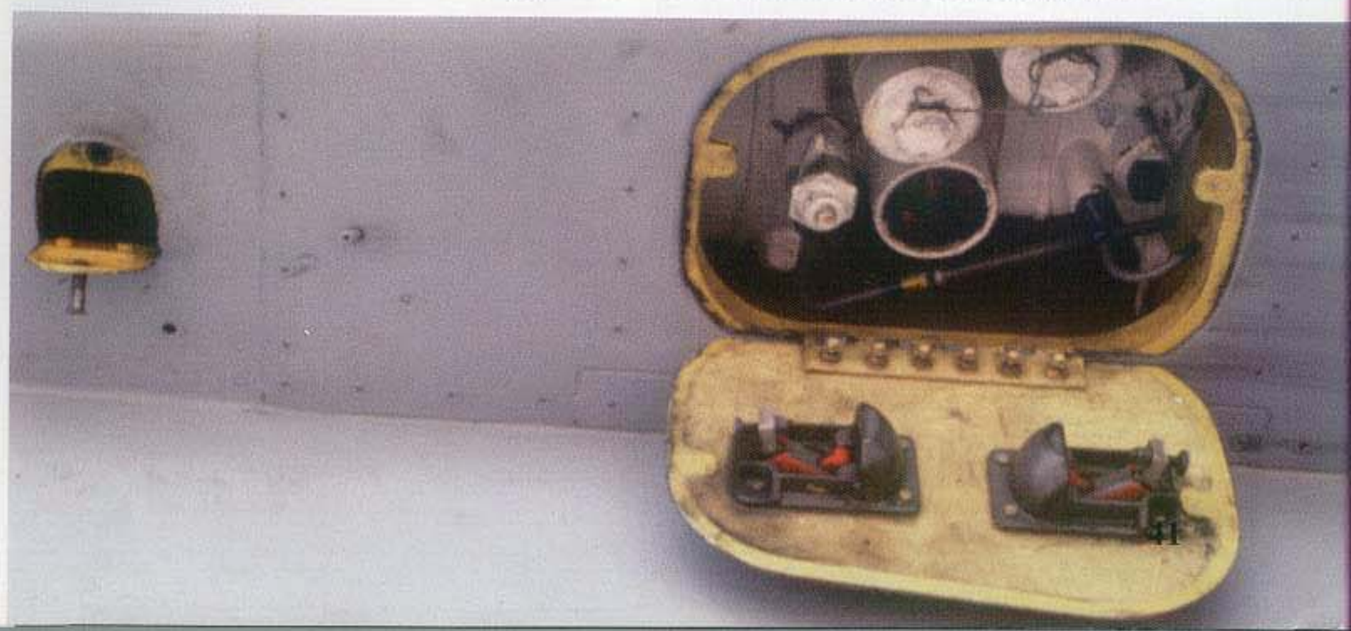
A under wing access panel on the port sponson.

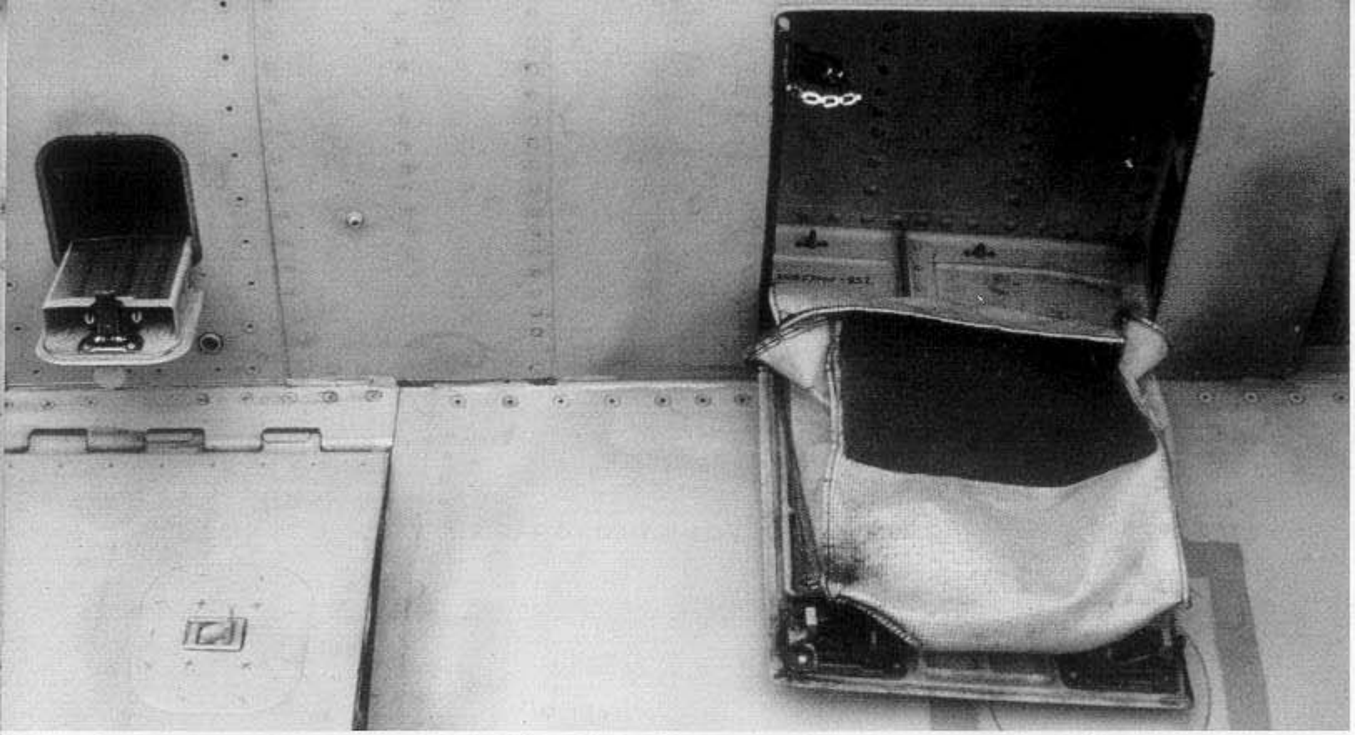
The drop tank jettison cartridges are inserted in the two cylinders behind this open access panel.



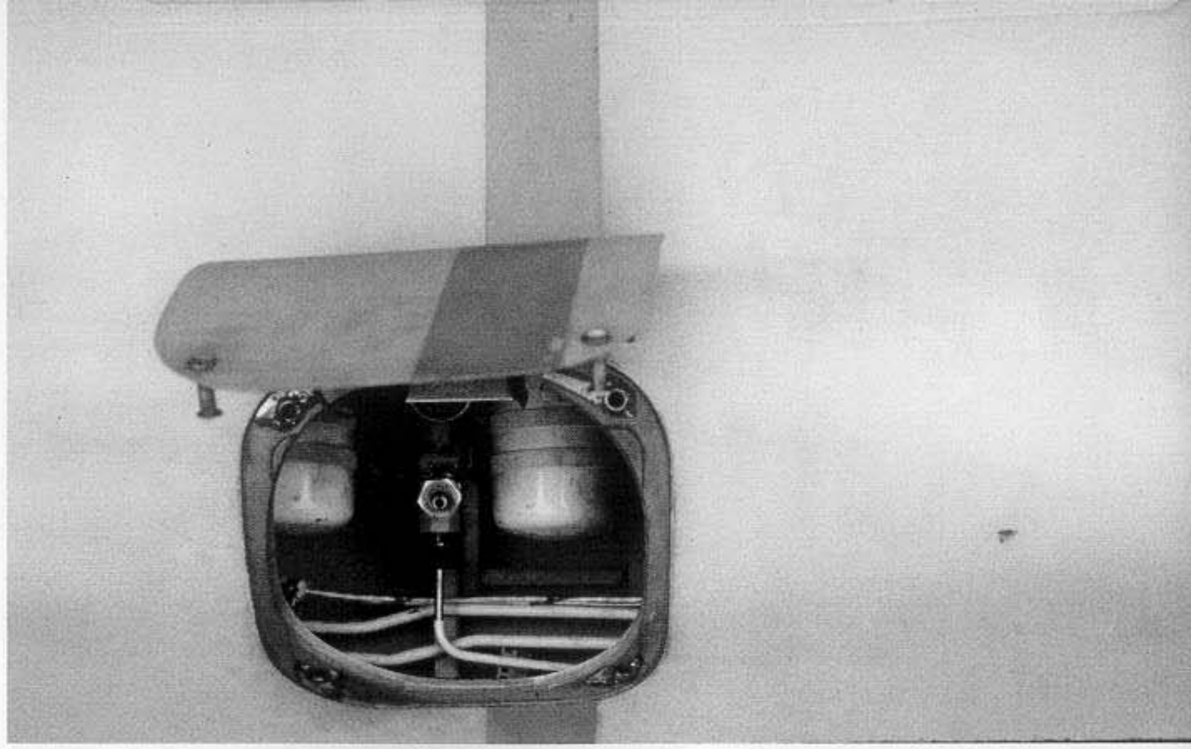
These open access panels are adjacent to the left side of the tailhook attachment fairing.

The outboard spoiler module servicing panel is in the sponson next to the air intake.



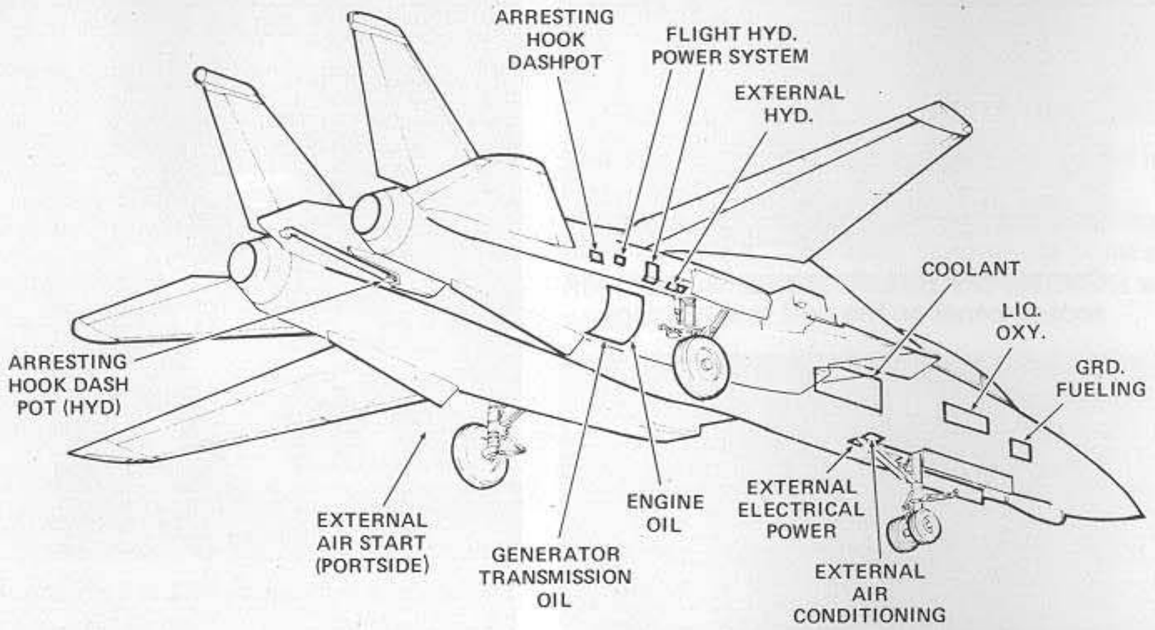


These access panels are directly behind the main landing gear on the starboard side.



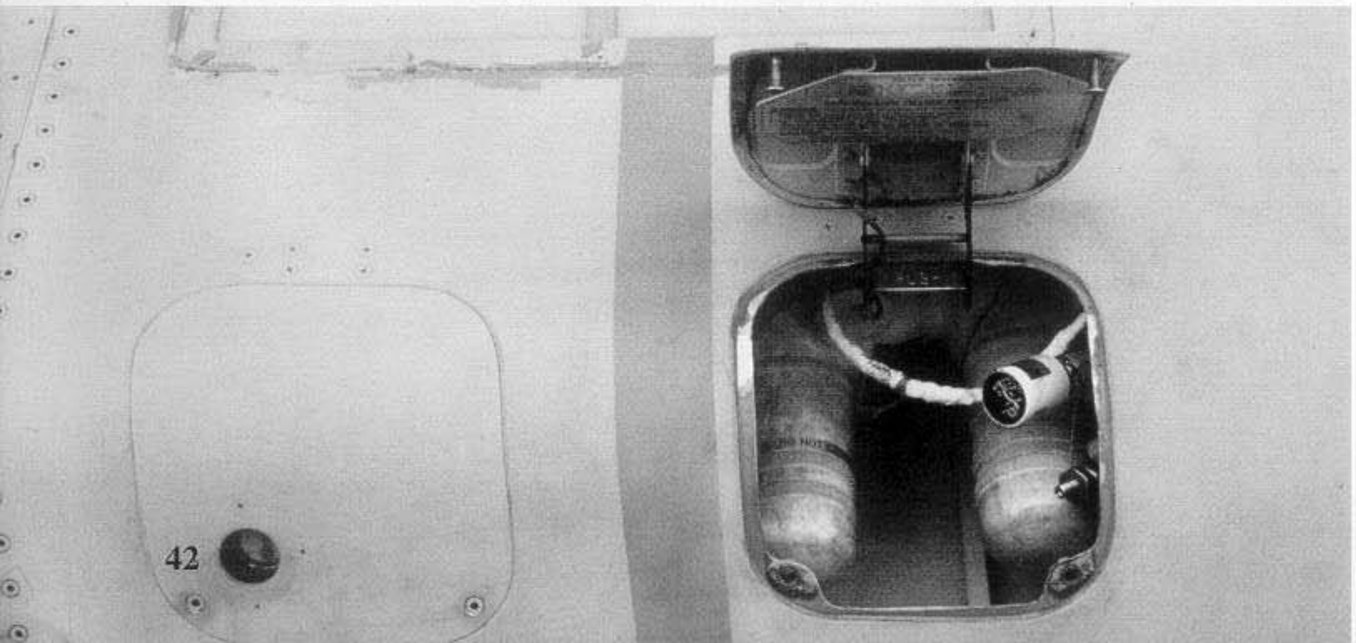
This access panel is on the port side directly under the rear fuselage formation strip light.

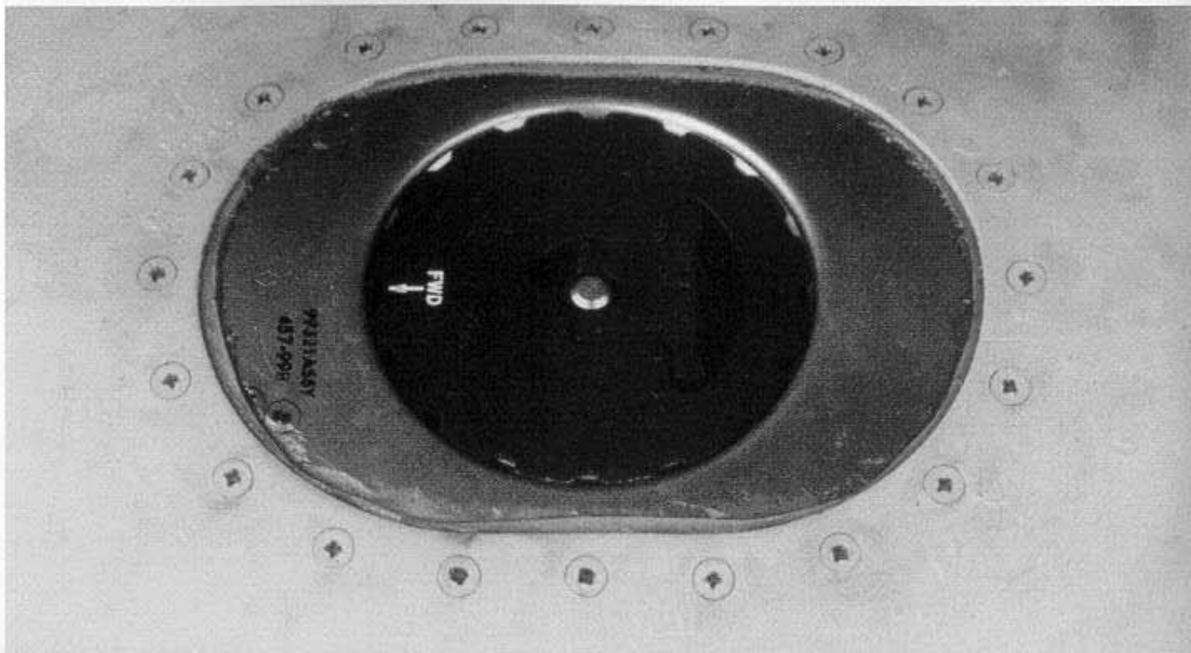
The F-14 Servicing Diagram (starboard side) shows the locations of some of the many access panels on the fuselage that allow maintenance personnel access to various systems within the aircraft.



This is the arresting hook dampener inspection access panel located on the aircraft's starboard side.

This is the external fuel tank filler cap.

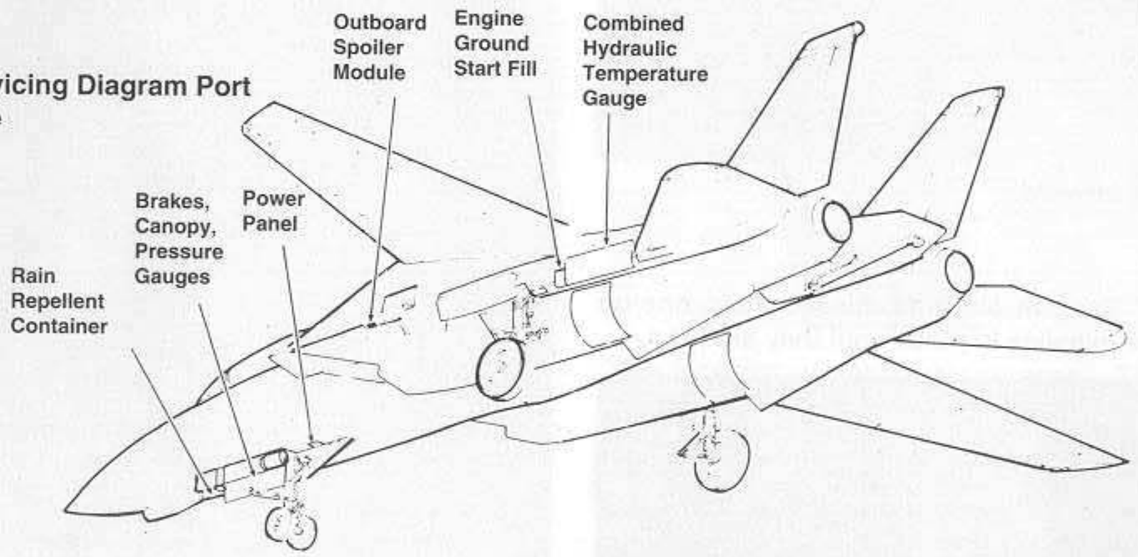




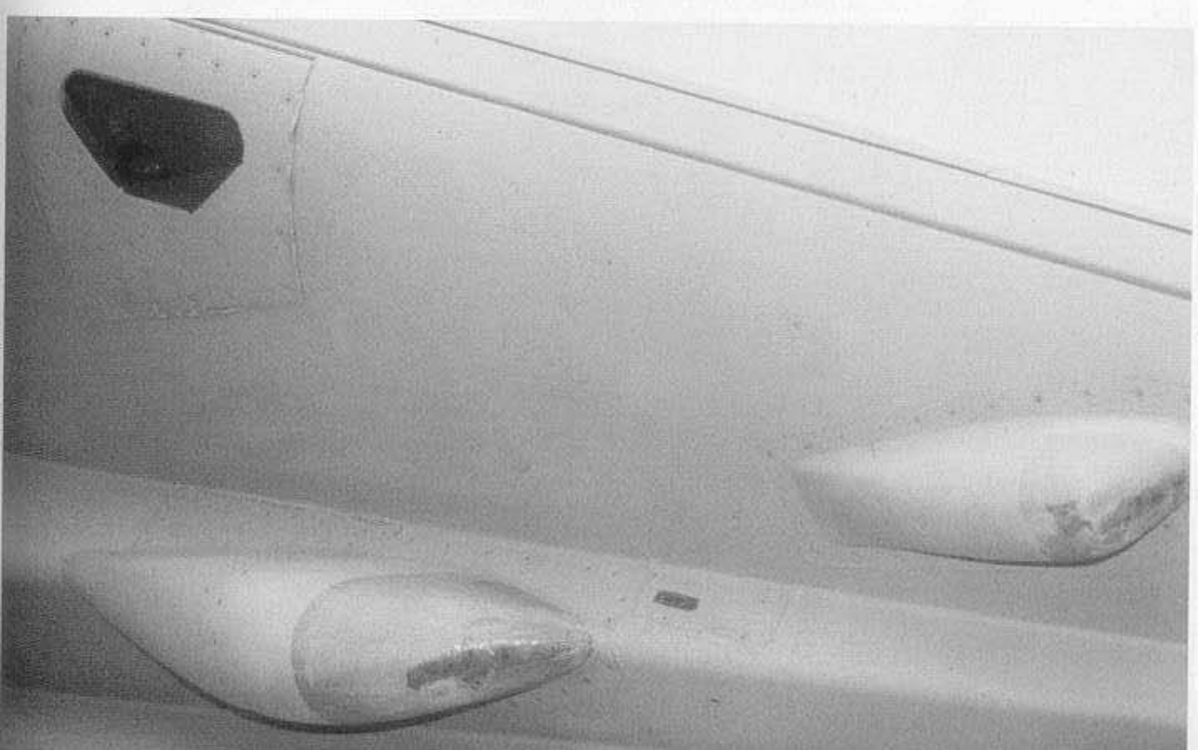
The port ventral fin on the F-14D has a NACA air intake on it.

The starboard side ventral fin on the F-14D lacks the NACA air intake.

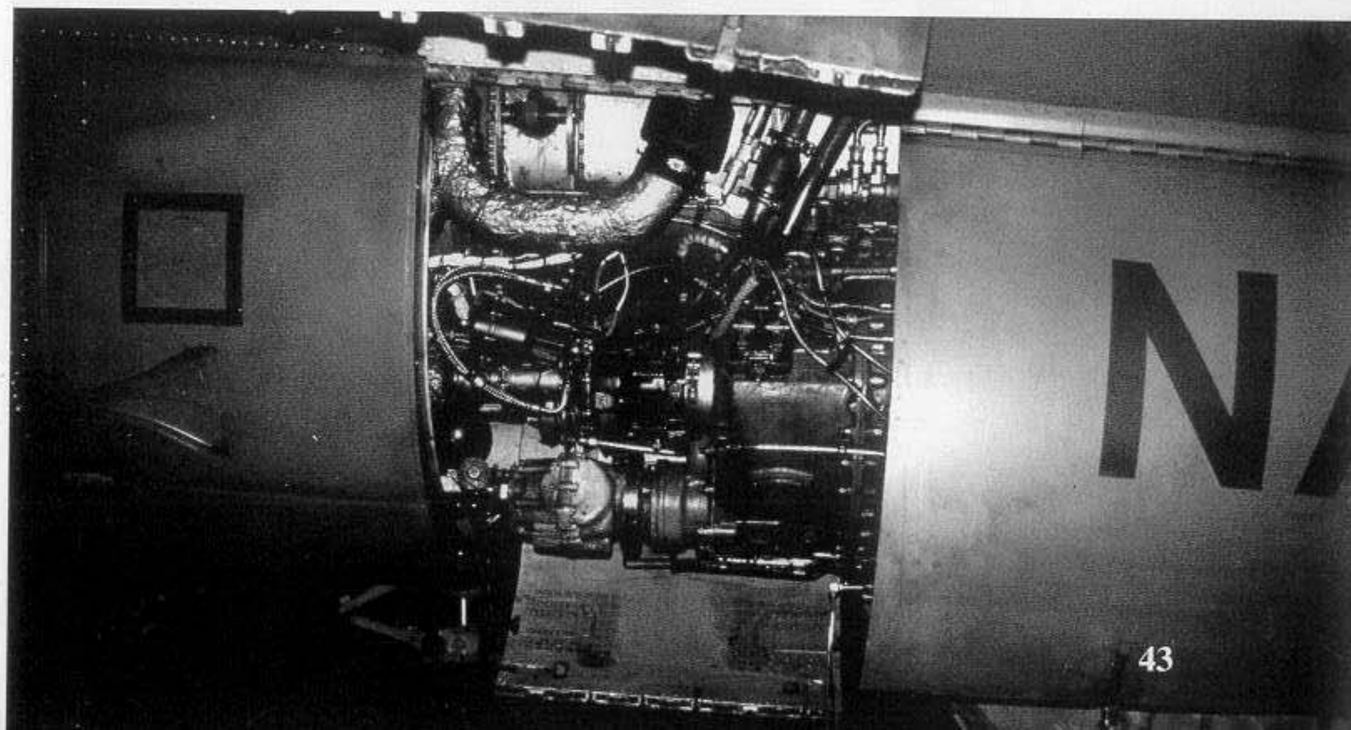
Servicing Diagram Port Side



These Electronic Counter-Measures (ECM) antennas are located under the wing glove on the F-14D.

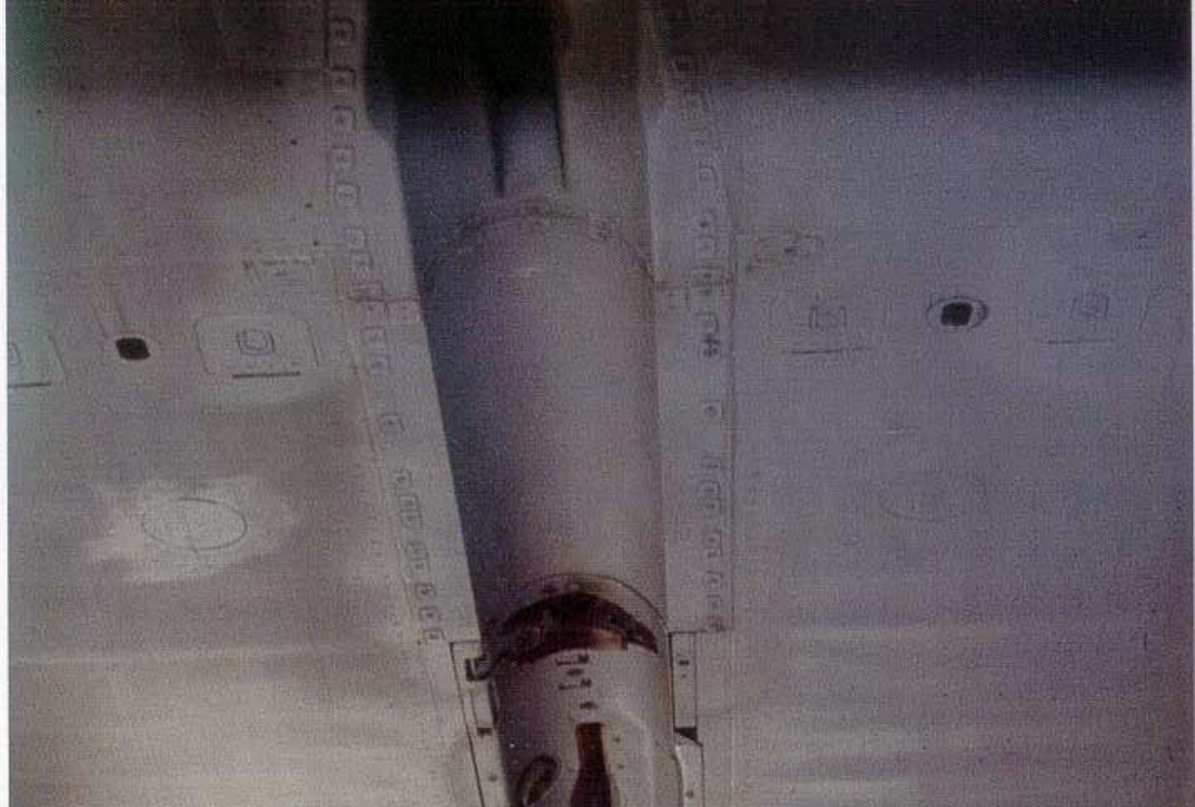


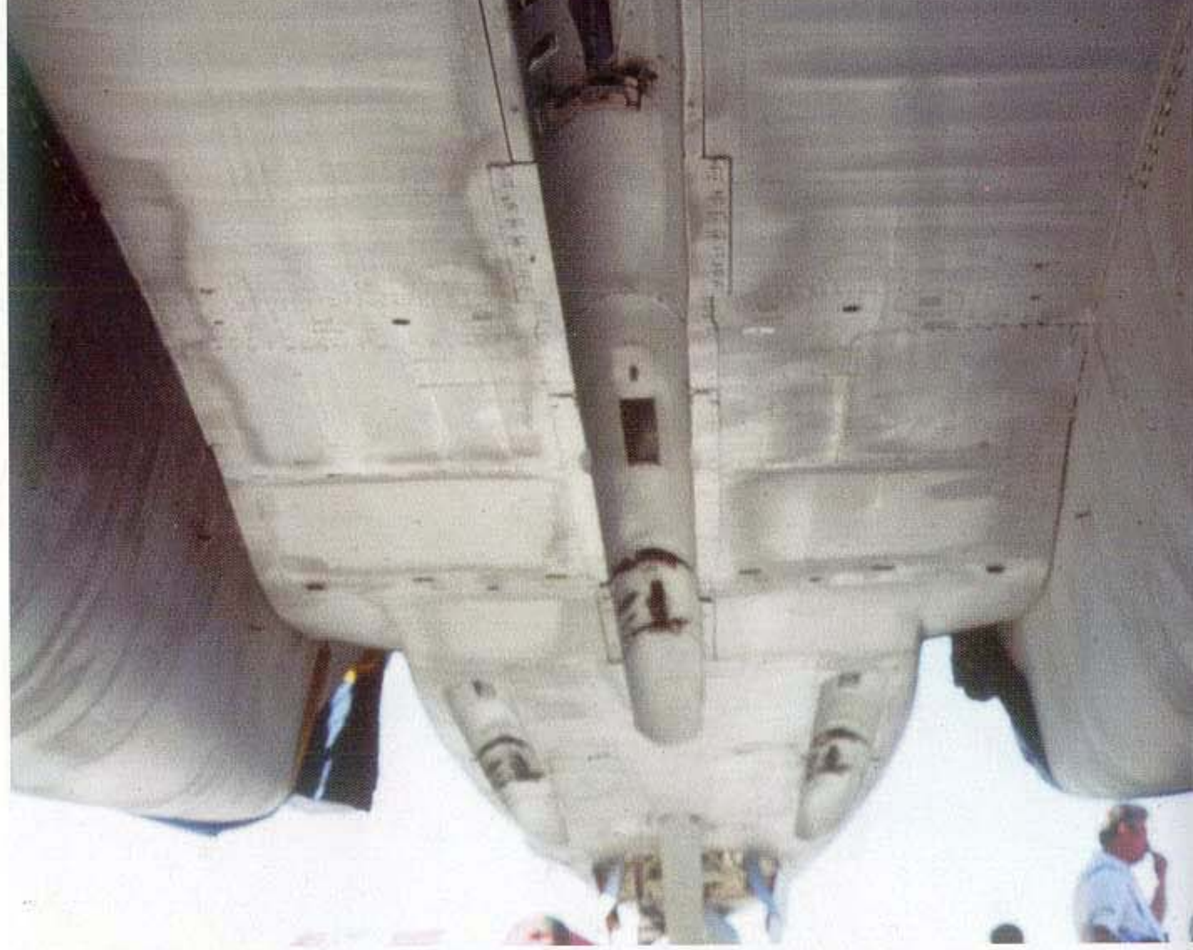
This is the engine access panel on the F-14A. It allows visual inspection of engine control components.



The underside of the fuselage of a F-14D, looking forward.

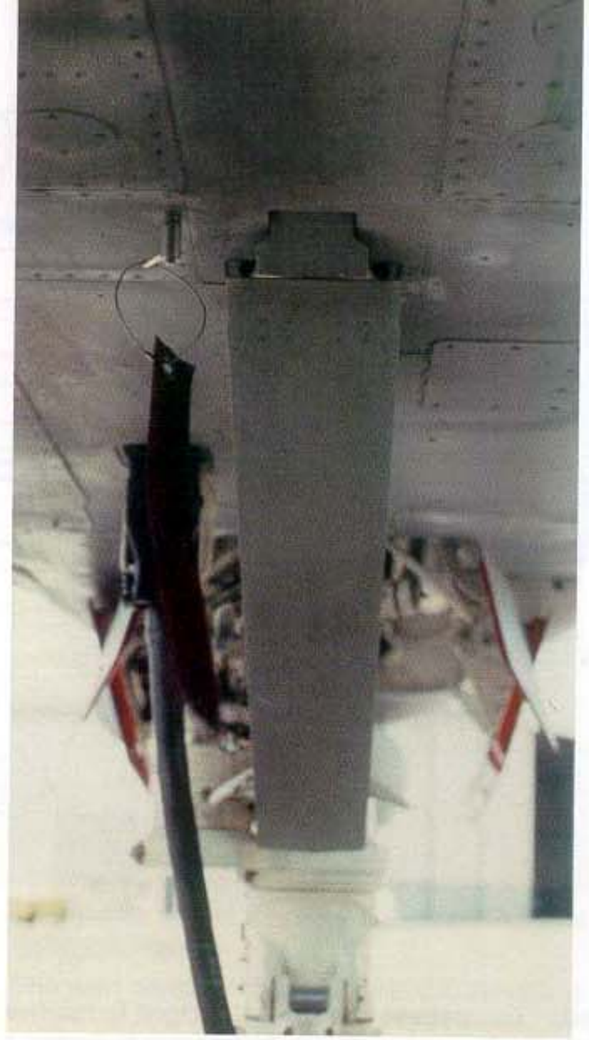
The forward under fuselage area contains AIM-7 Sparrow air-to-air missile wells, one on either side. The brackets within the wells hold the missiles in place until they are fired.





Two additional AIM-7 Sparrow missile wells are located behind the forward pair. They are directly in line with the fuselage centerline.

AIM-7 Sparrow air-to-air missile well. Visible are the slots for missile fin and the electrical firing connection plug and missile bracket.

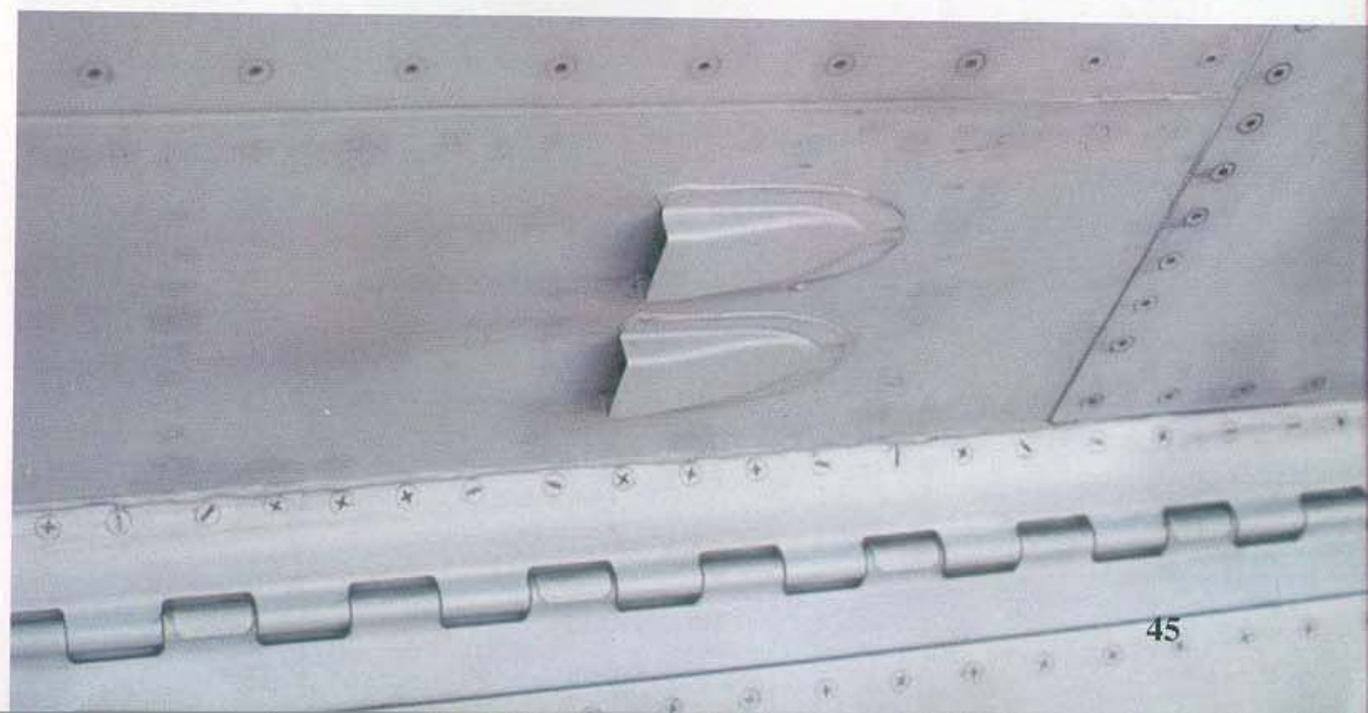


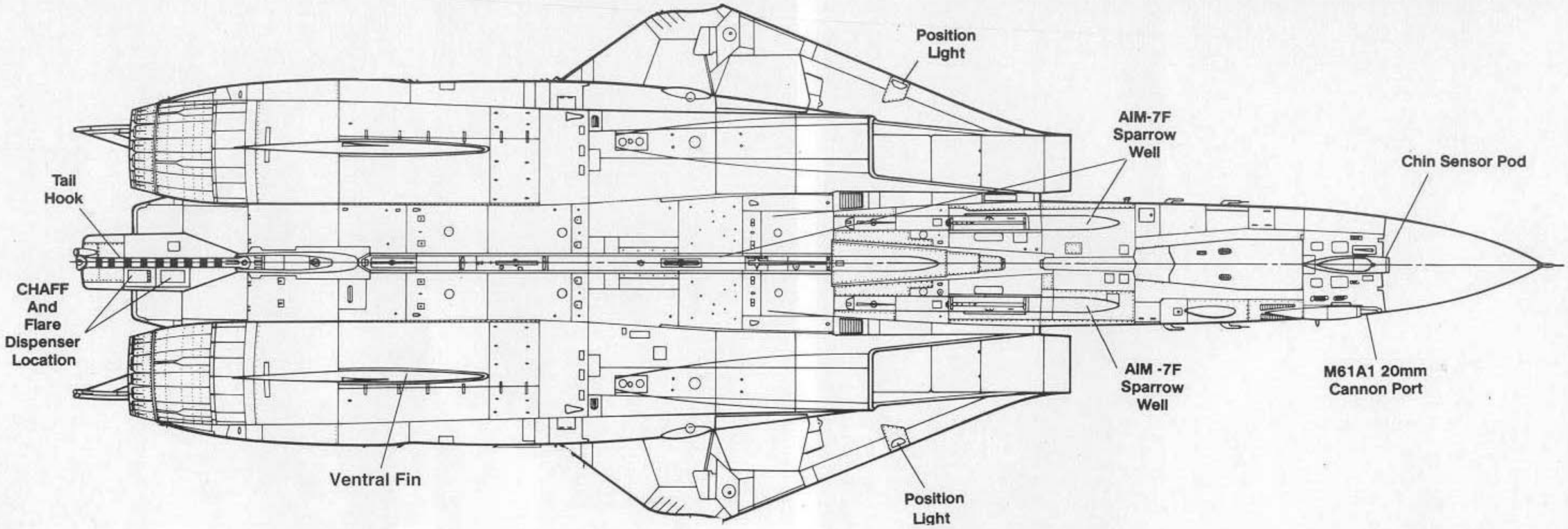
The forward under-fuselage area. The object in the center is the nose gear drag link door. The aircraft has an external power cord plugged into the external power receptacle.

AIM-7 Sparrow air-to-air missiles loaded in the under fuselage missile wells.

The under-fuselage area immediately adjacent to the arresting hook attachment fairing.

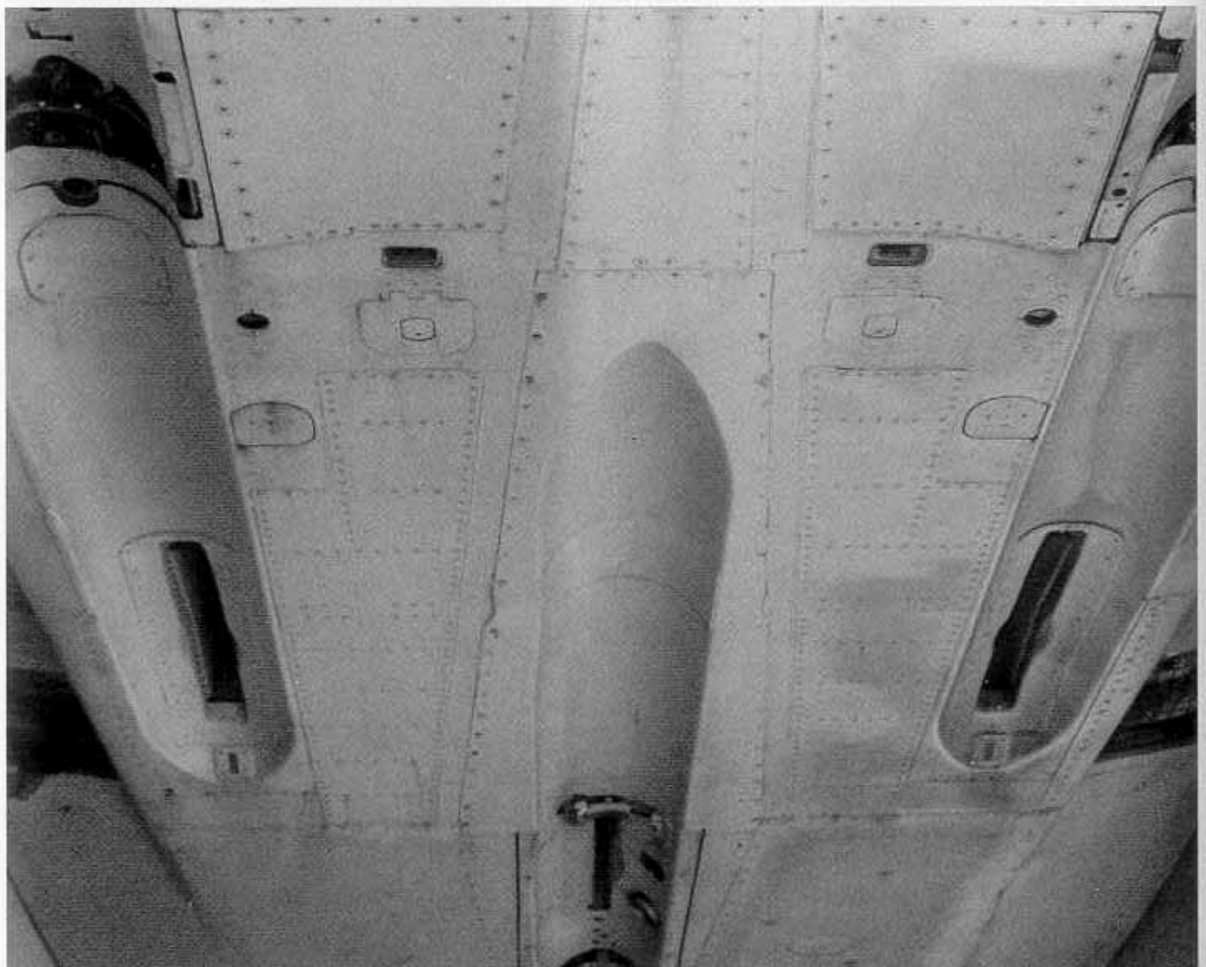
The are a number of vents on the fuselage underside which are used to exhaust hot air from various compartments within the fuselage.





Open access panels behind the port main gear. The access panel at the right is for the engine ground start connection.

AIM-7 missile wells, looking rearward. There are a total of four AIM-7 Sparrow missile wells, two along the centerline of the fuselage and two to either side of the fuselage.



This is an early F-14A, with the small boat tail, two AIM-54 missile mounting pylons under the fuselage, and no TCS or IR sensor under the nose. The differential position of the stabilators reveals how they operate to provide primary roll control, since the F-14 has no ailerons. Wing top spoilers are used for low speed (wings forward) roll control, or to kill lift.

The inside of the starboard ventral fin has a NACA air intake for cooling air.

The port ventral fin has the NACA air intake on the outboard side.

The rear of the port ventral fin is open and unfaired.

The starboard rear fuselage has several large hinged access panels. The small open access panel is for the arresting hook dashpot and above it is a formation light strip.

This NACA air intake is located on the underside of the inboard engine nacelle.

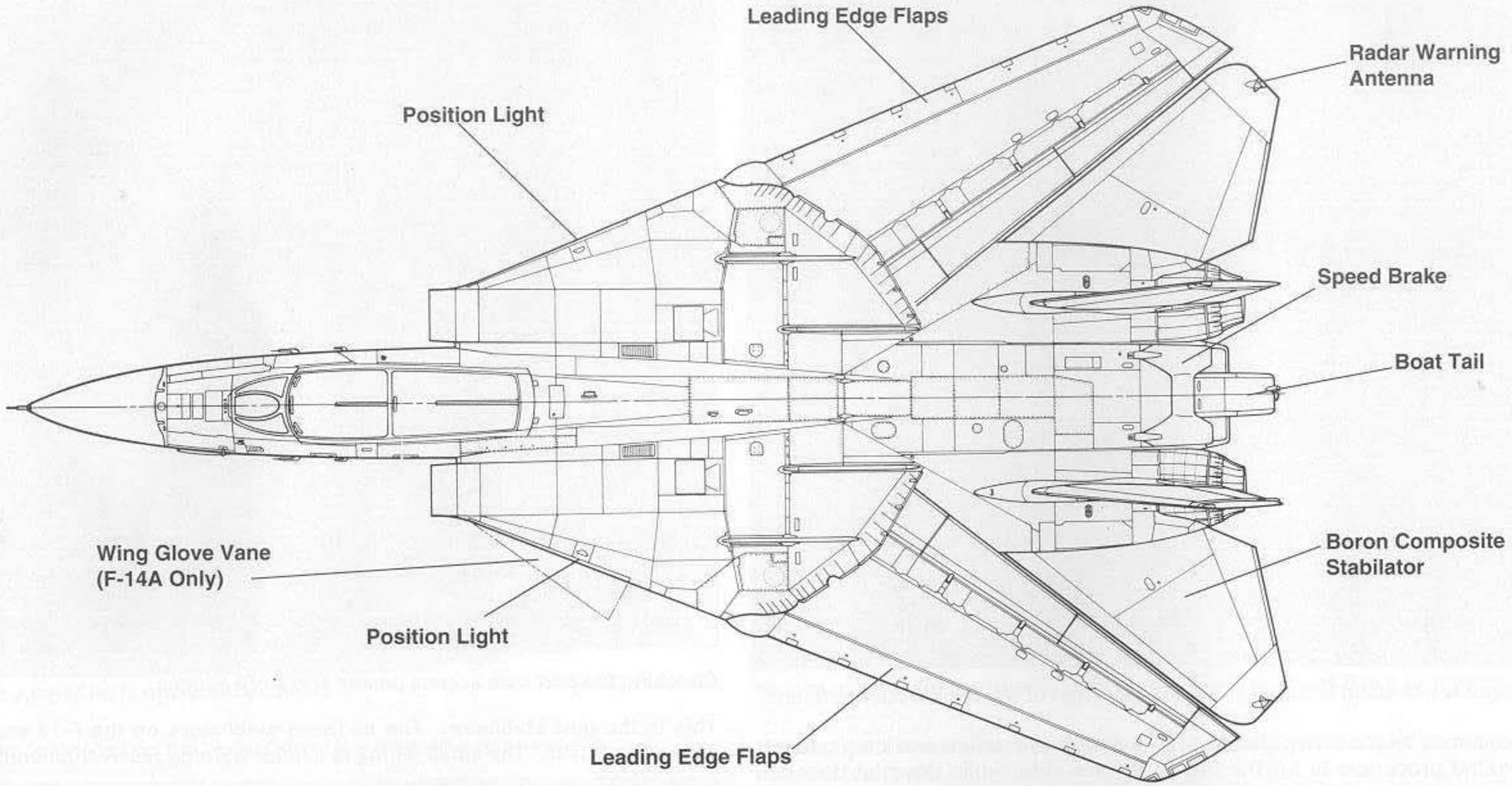
This is the lower inside of the port engine nacelle. The object under the nacelle is an external fuel tank.

Part of the preflight walkaround includes a visual inspection of the engine compartment.

The preflight continues with an inspection of the external hydraulics servicing gauges. Normal walk around procedure is for the RIO to do one side, while the pilot does the other side of the aircraft.

Checking the port side access panels and sight gauges.

This is the port stabilator. The all-flying stabilators on the F-14 are made of a boron epoxy composite. The small fairing is a radar warning receiver antenna.



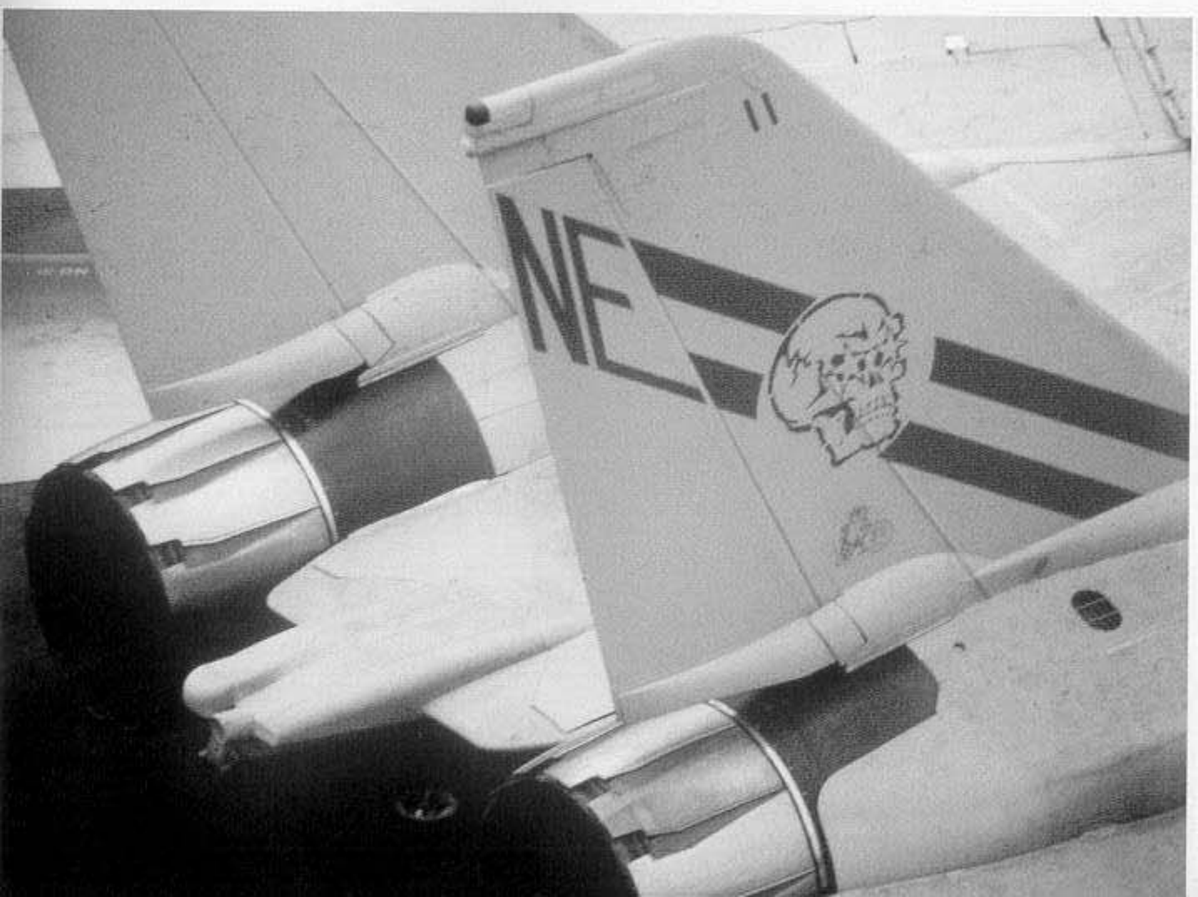
A F-14D of VF-2 aboard USS CONSTILLATION (CV-64) during March of 1994.

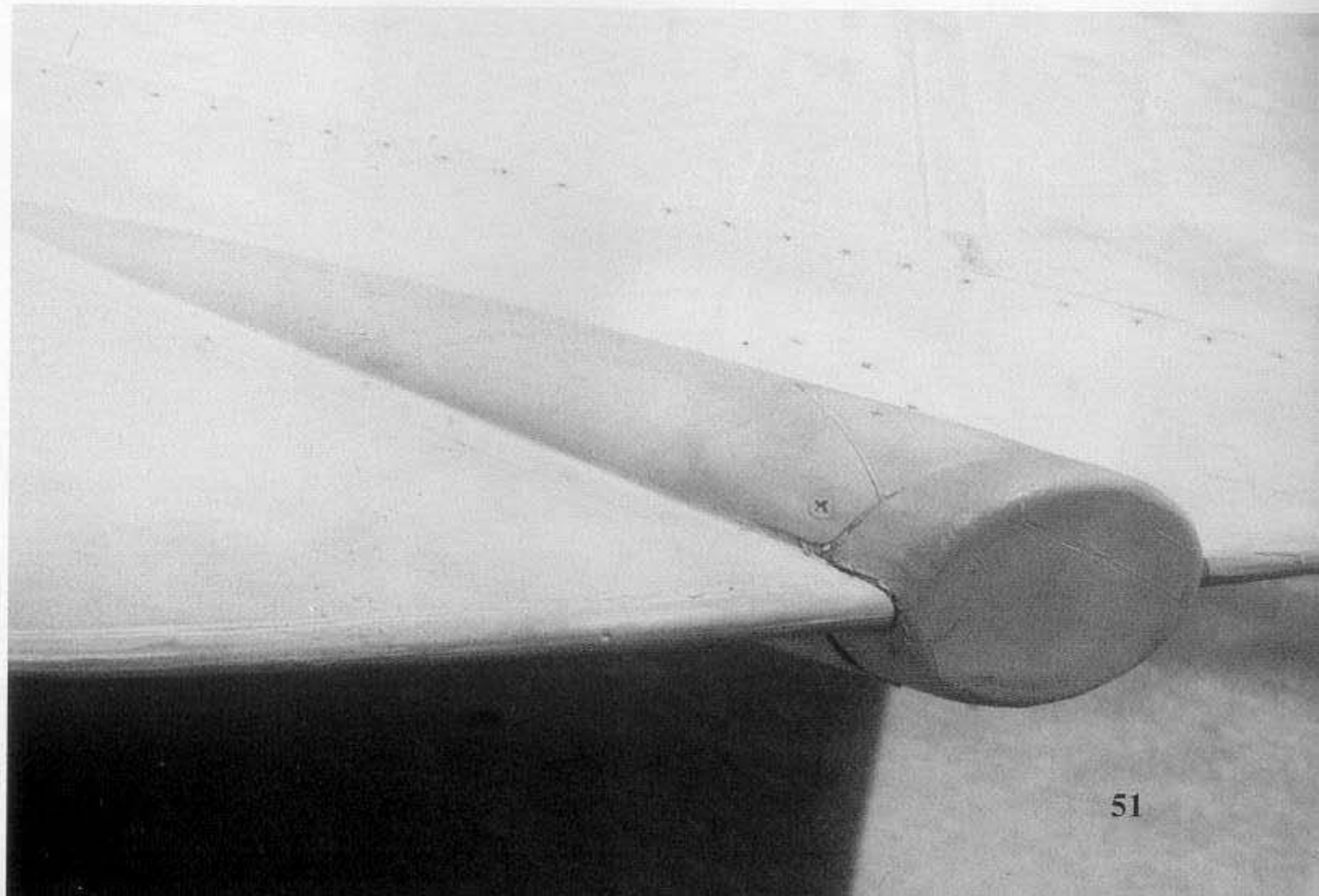
The outboard side of the port vertical fin on F-14D BuNo 164602 of VF-2. The fairing at the top of the rudder is an anti-collision light. There is a formation position light at the front of the fin.

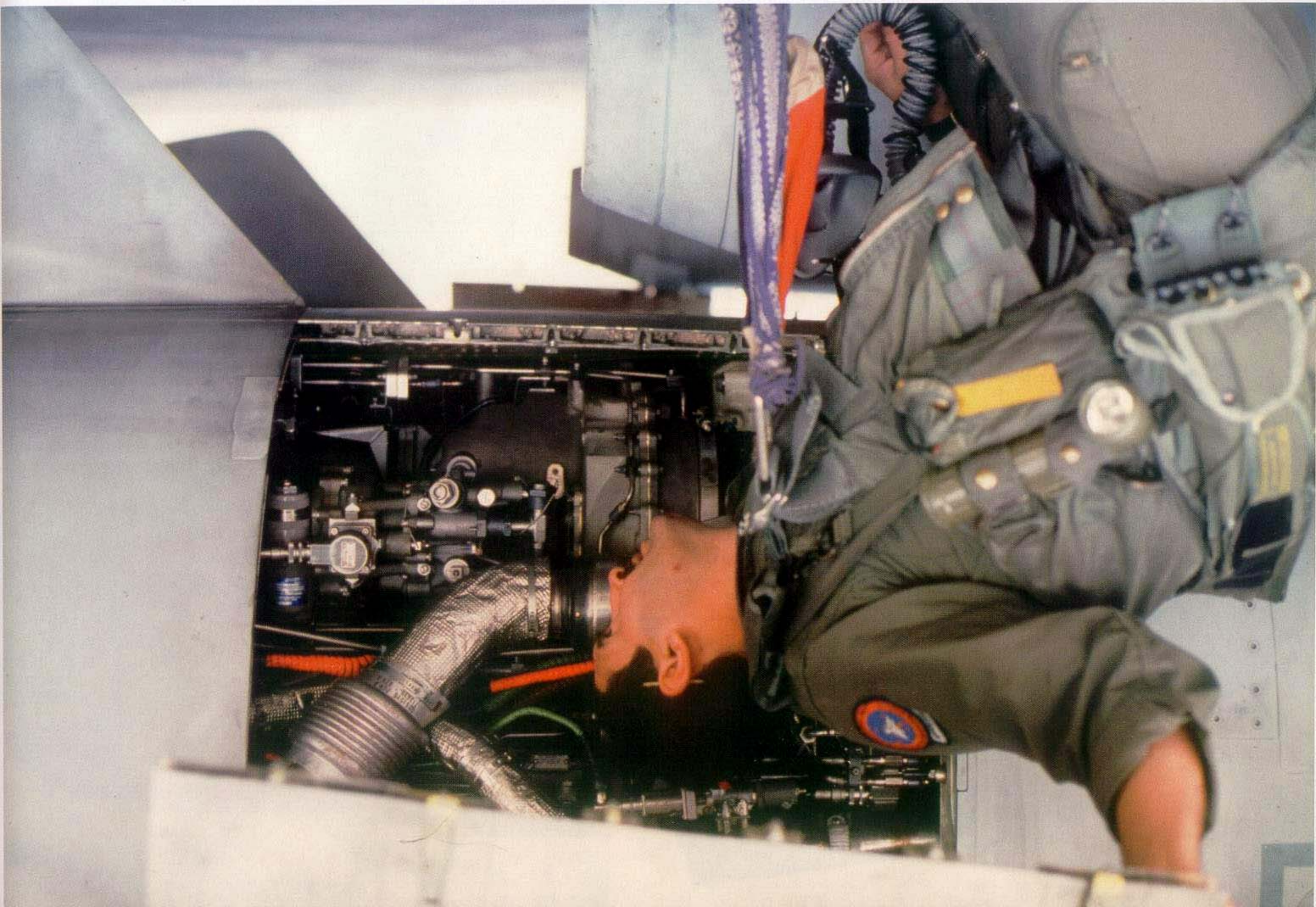
The outboard side of the starboard vertical fin of F-14D BuNo 164602 of VF-2. There is an ECM antenna just below the tip of the fin and strip formation lights at the top of the fin.

F-14D boat tail and General Electric F-110 engine exhausts. The engine air cooling exhaust vent is at the base of the ventral fin.

This type of button radar warning antenna fairing is located on the outboard side of each stabilator. They provide rear warning of hostile radars.



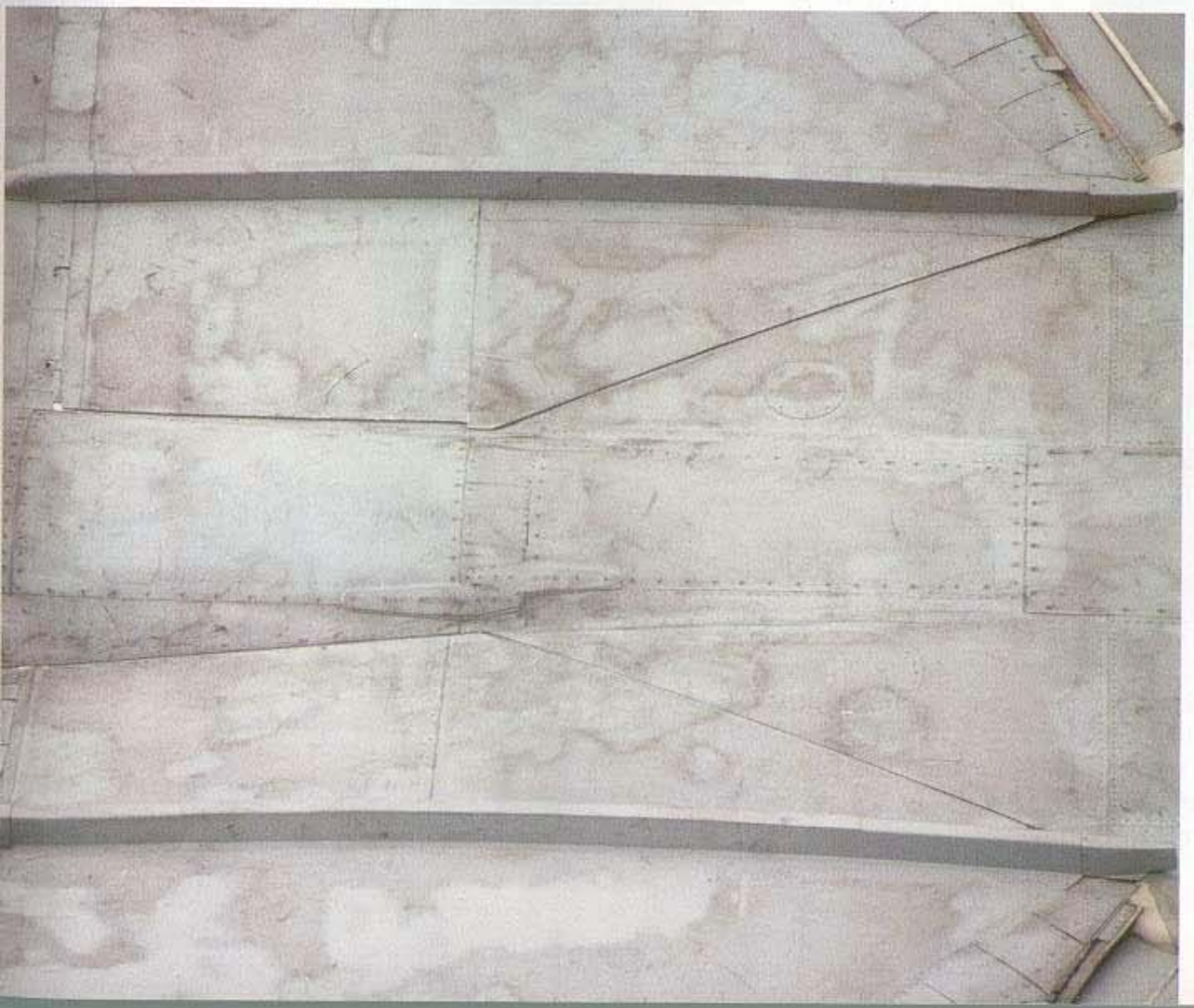




This F-14 pilot is examining the port engine during the preflight walk around inspection.

The upper fuselage of a F-14D. The openings are the engine air intake bleed doors. The antenna is the TACAN and UHF communications antenna.

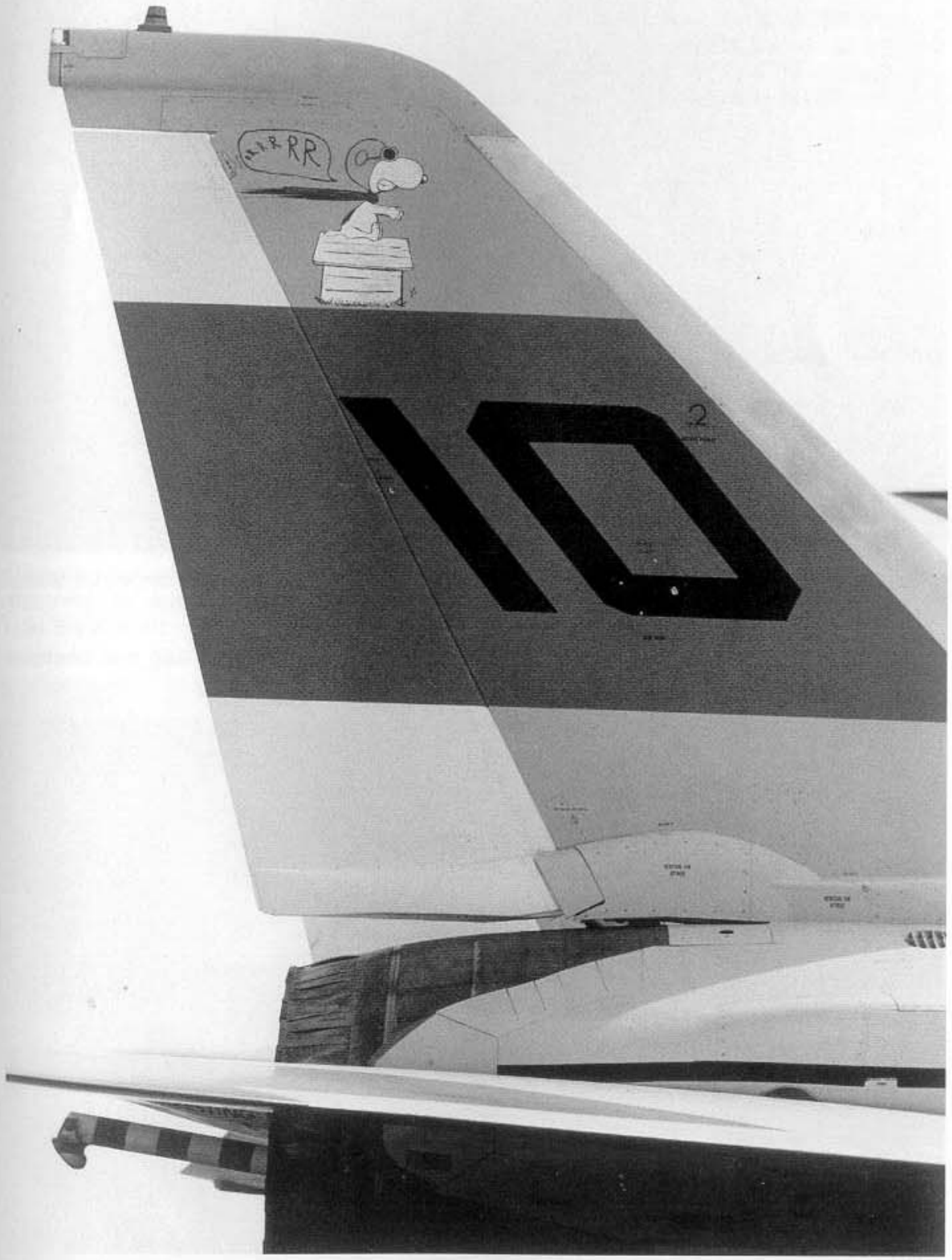
These are the wing glove external stiffeners, which are used to add structural integrity and strength to the wing.



Close-up detail of the air intake bleed doors, avionics cooling vents and UHF communications/TACAN blade antenna.

The wing glove sealing plates and the "bag" at the rear of the inboard edge of the wing trailing edge help to smooth airflow. This Tomcat has the wing in the 68° oversweep position, used for storage on carrier decks.

A F-14A+ (BuNo 162924) of Fighter Squadron Seventy-four (VF-74) on approach for landing at Nellis Air Force Base, Nevada on 13 December 1993. The aircraft has the wing full forward, the trailing edge flaps are full down, the leading edge flaps are extended and the speed brake between the vertical fins is deployed to slow the aircraft in preparation for landing. The aircraft carries a temporary two tone Gray camouflage on the uppersurfaces and an ACMI pod on the underwing missile pylon.



The comic character "Snoopy" adorned the vertical fin of the prototype F-14A during carrier trials aboard USS FORRESTAL (CVA-59) in July of 1972. The fin differed from production aircraft in that the small antenna on the fin tip was deleted on production aircraft.

The plane captain stands by to assist the crew of this F-14A as they man their Tomcat aboard USS SARATOGA (CVA-60) on 22 March 1986. The RIO is already in the rear cockpit and the pilot is standing on one of the retractable boarding steps.

VF-302 F-14A pilot and RIO exchange last-minute ideas just prior to carrier qualifications aboard USS CONSTELLATION (CVA-64) on 20 January 1987.

The pilot of this F-14B of VF-74 at NAS Oceana, Virginia Beach, Virginia during March of 1994 conducts a preflight check of the liquid oxygen (LOX) bottles.

Cotton or suede skull caps are worn under the flight helmets by fighter crews for sweat absorption, additional cushioning and sound protection.

Pilot and plane captains preflight an F-14B. The pilot carries a small bag that contains the aircraft checklists and other documents.

A pair of F-14Ds of VF-2 aboard USS CONSTELLATION (CV-64) during March of 1994. The aircraft in the foreground is carrying an AIM-9 Sidewinder air-to-air missile on the underwing pylon with the Yellow safety cover still in place over the missile's IR seeker head. Both aircraft are still chocked, indicating that they have not yet started their engines.

(Below) The Head Up Display (HUD) of a F-14D. The HUD provides the pilot with all the necessary flight information allowing him to concentrate on the mission and what is going on outside the aircraft.

This is the UHF/TACAN blade antenna located on the fuselage spine just behind the cockpit canopy on the F-14D.

The F-14A used the Martin-Baker GRU-7A ejection seat. The canopy rail on the pilots cockpit has three rear view mirrors while the RIO's rail has only a single mirror. The small door next to the S on the fuselage side is one of the push-in boarding steps.

The plane captains of this F-14A confers with the pilot and RIO prior to launch from USS SARATOGA (CV-60) while the ship was operating in the Med on 22 March 1986.

This F-14D crew, Pilot CDR Joe "Hose" Christofferson and RIO CDR "Boom" Serhan, strap into a VF-2 F-14D at NAS Miramar on 12 April 1994. The F-14D uses Naval Aircrew Common Escape System (NACES) Martin-Baker Mk MB-14 ejection seats.

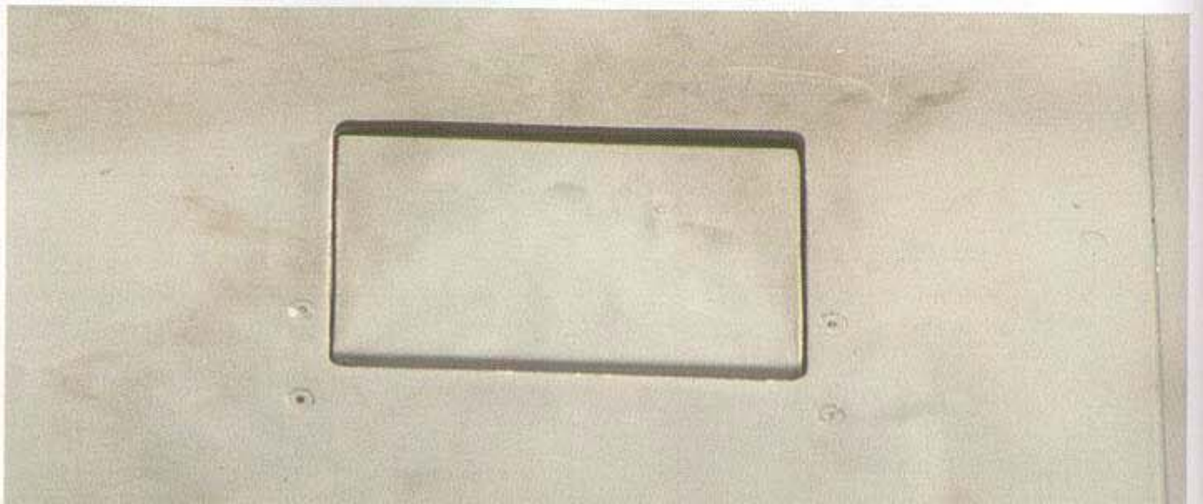
The air crew of this F-14A aboard USS JOHN F. KENNEDY await the order to start engines on 13 October 1986. The ship was deployed to the Med as part of the U.S. Sixth Fleet. The triangles below the cockpit are ejection seat warning markings.

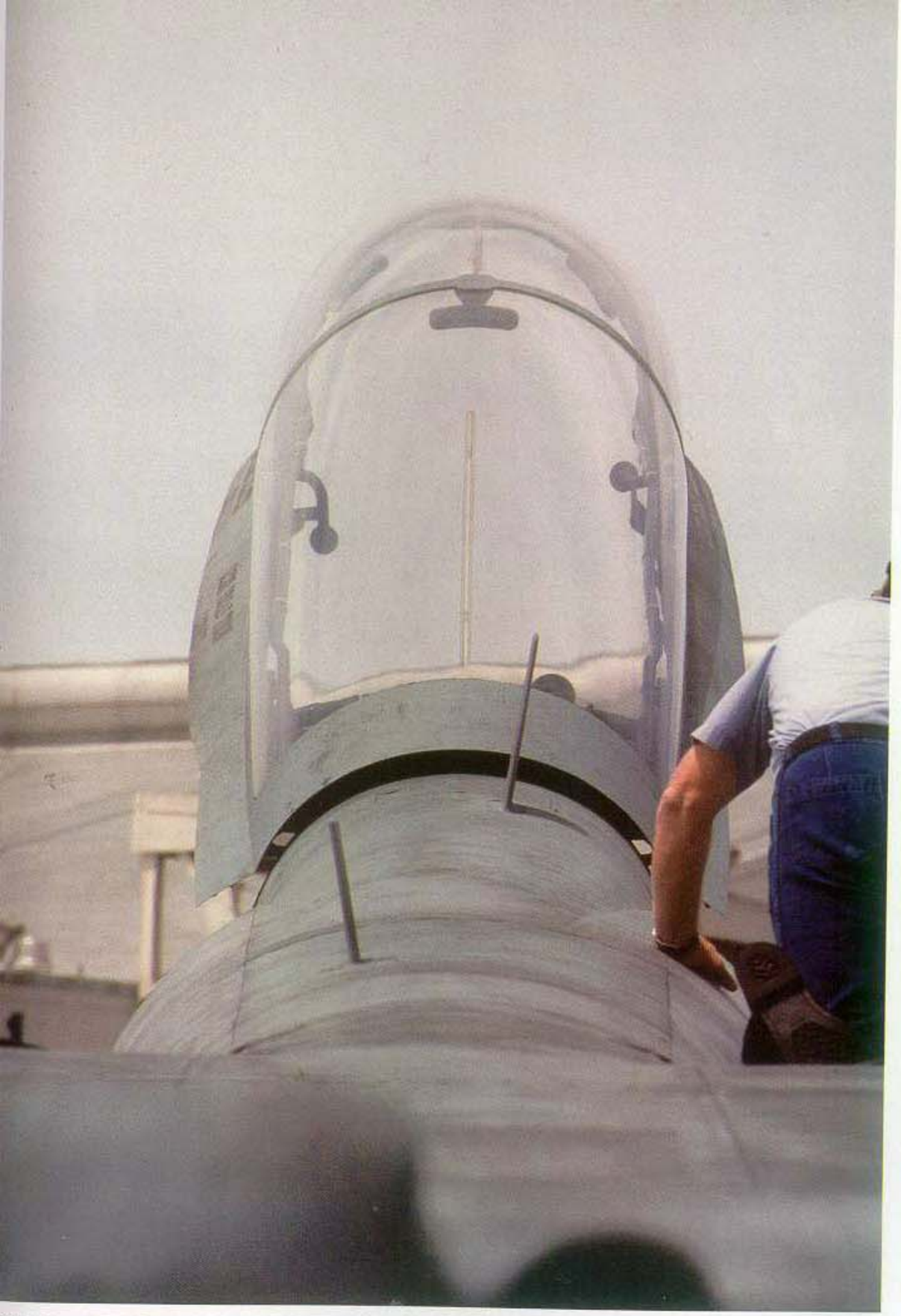
This F-14D aboard USS CONSTELLATION during March of 1994 has a nose wheel tow bar attached to allow the aircraft to be moved to a new parking spot on the flight deck by the tow tractor.

The tops of the NACES ejection seats are visible through the canopy of this F-14D of VF-2.

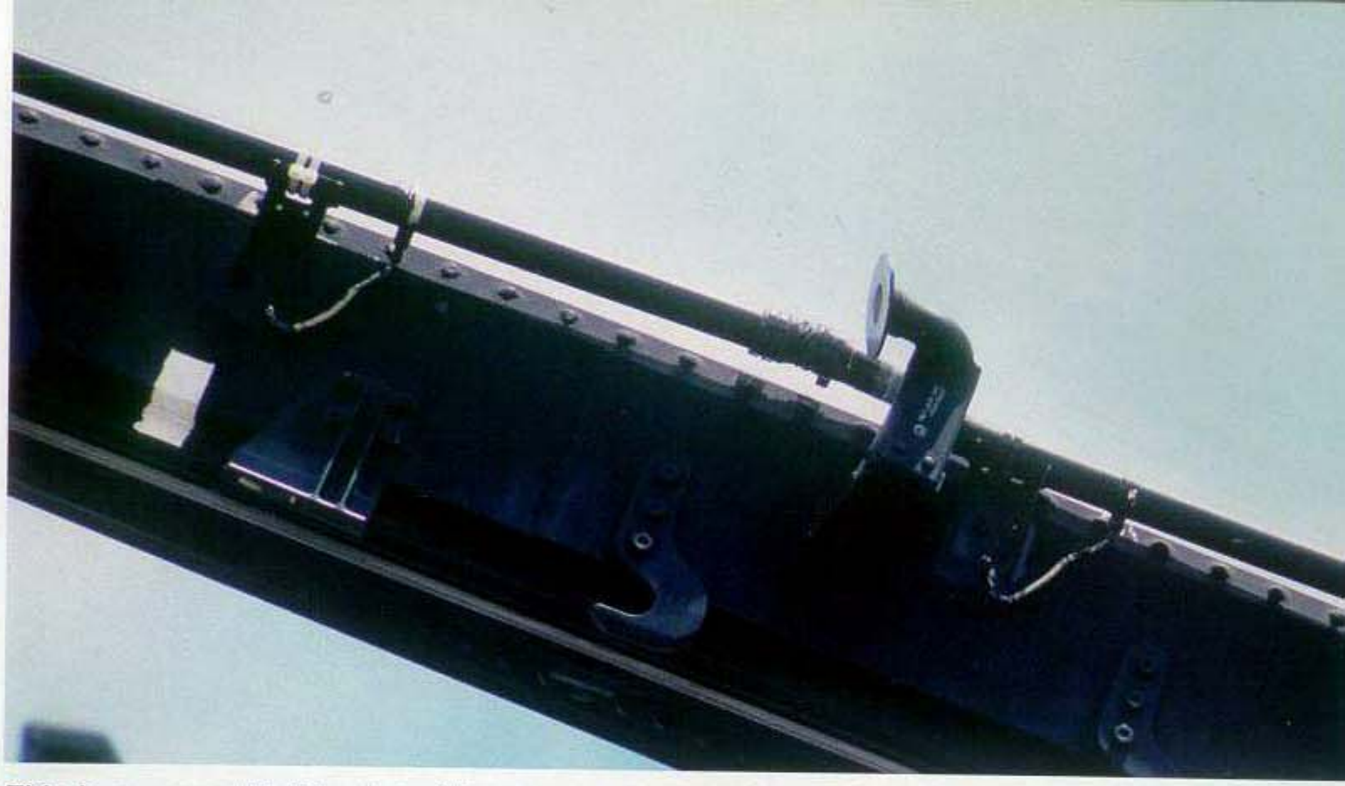
The crew of this F-14D of VF-2 board their fighter on the flight deck of USS CONSTELLATION (CV-64). Once they are in the cockpit, the plane captain will secure the boarding ladder.

This is one of the push-in hand holds located just below the cockpit rail.





This is a rear view of the fuselage spine of a F-14D with the canopy in the raised position. The aluminum tape on the top of the canopy provides protection against lightning strikes.



This is a canopy locking lug. The canopy is opened and closed by pneumatic and hydraulic action. The canopy can be jettisoned by either crew member, or from outside on either side of the fuselage.

The underside of the rear section of the canopy clamshell.

The pilot and RIO use the push in boarding steps to man a F-14. They are equipped with a torso harness, survival vests and G suits.

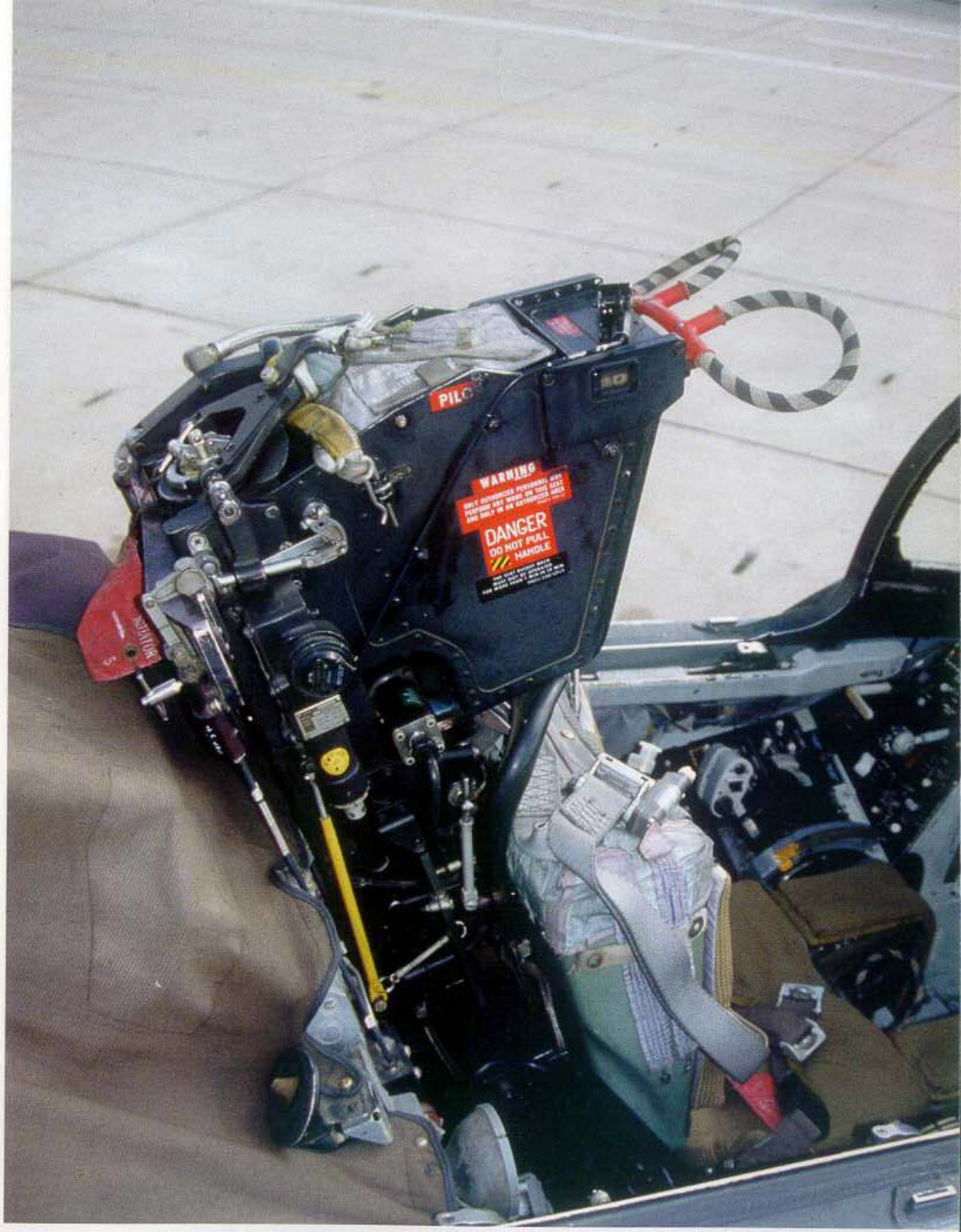
One of the responsibilities of the plane captain is assisting the crew to strap in, making sure all straps and fittings are correctly fastened.

This is the rear cockpit of a F-14D without the NACES ejection seat. The large circular object in the center is the Tactical Information Display (TID) . Directly below it is the Hand Control Unit, which controls the radar. Above the TID is the Detail Data Display panel.

F-14D front cockpit is dominated by the Kaiser Aerospace AN/AVG-12 vertical and head-up display. Directly below the instrument panel are the rudder pedals and in the center is the pilot's control stick. The throttle is located on the left side console. The right console contains the lighting control panel, environmental control panel and master test panel.

The HUD and pilot's instrument panel on a F-14D. The F-14D uses the Hughes AN/APG-71 radar, with AN/APX-76(V) IFF interrogator. The panel is dominated by the two video display panels in the center and at the right.

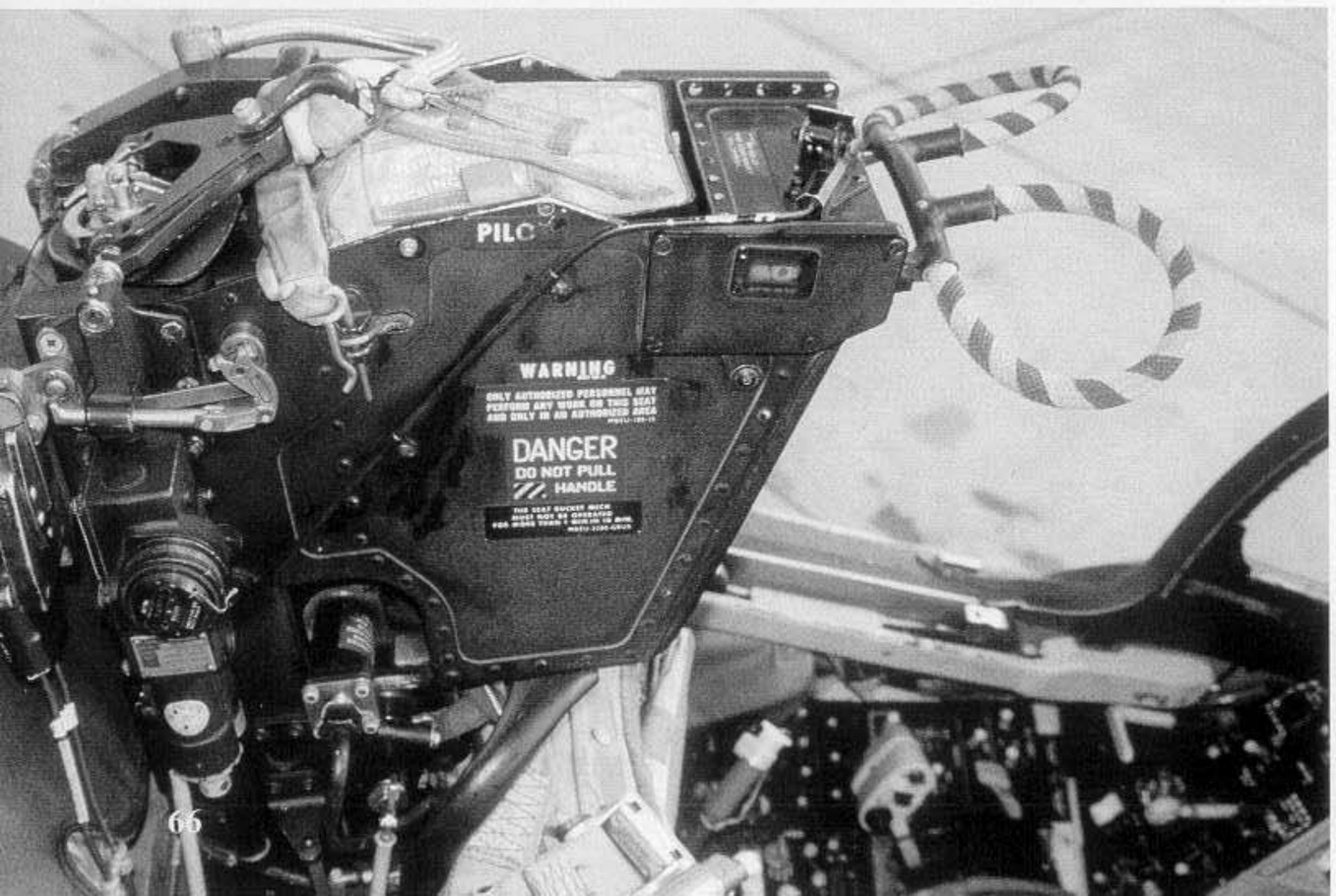
The front cockpit of a F-14A. The large, Yellow-striped handle at the right is the canopy emergency jettison handle.

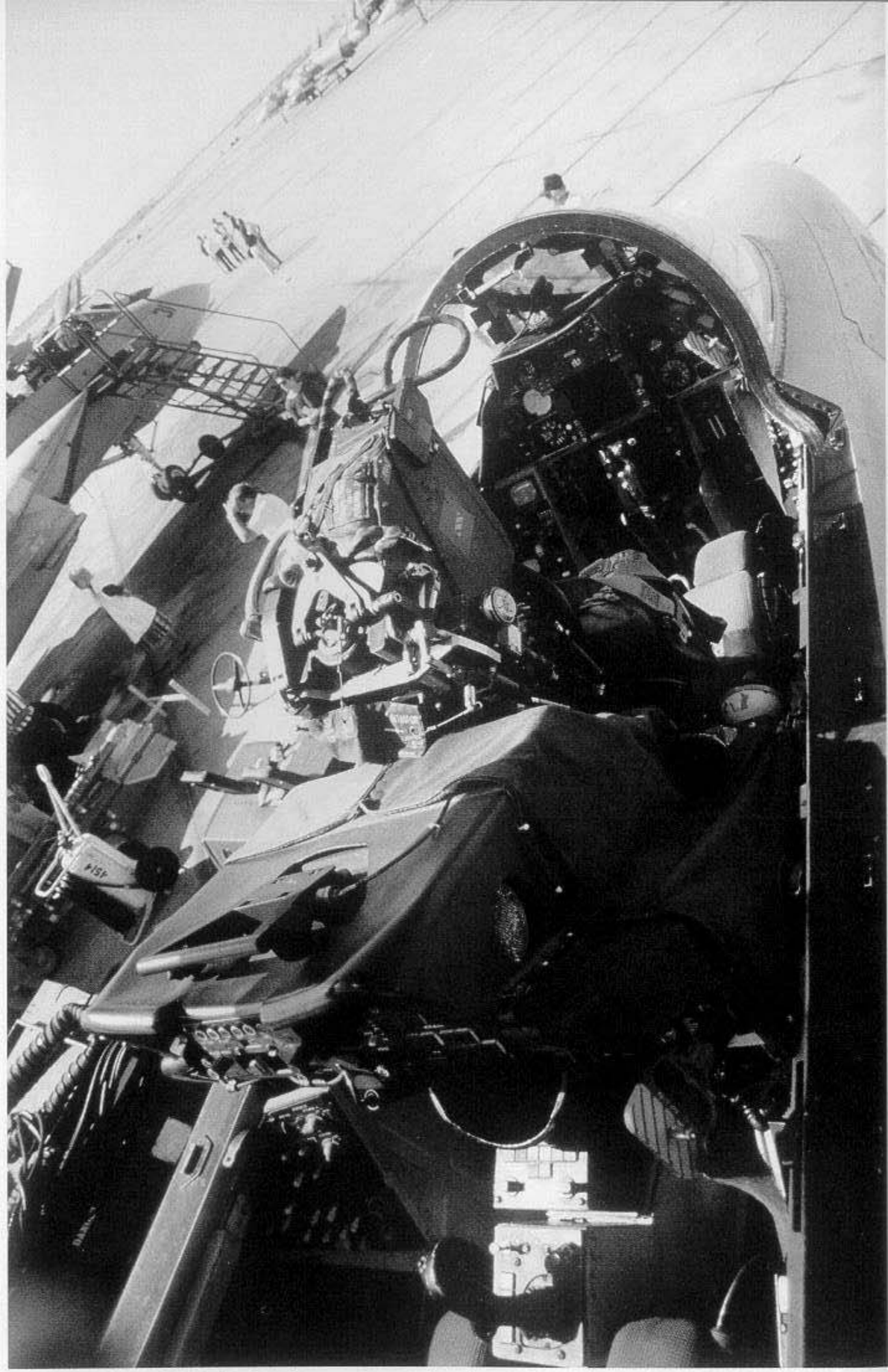


Martin-Baker GRU-7A ejection seats were standard equipment on the F-14A Tomcat. This seat is in the front cockpit. The pilot has the capability to command eject both crewmen from the F-14.

This is the RIO's hand controller. The RIO is a Naval Flight Officer (NFO) who controls the radar and weapons systems with this stick.

The drogue chute lanyard is visible on the top of this GRU-7A ejection seat in the front cockpit of a F-14.





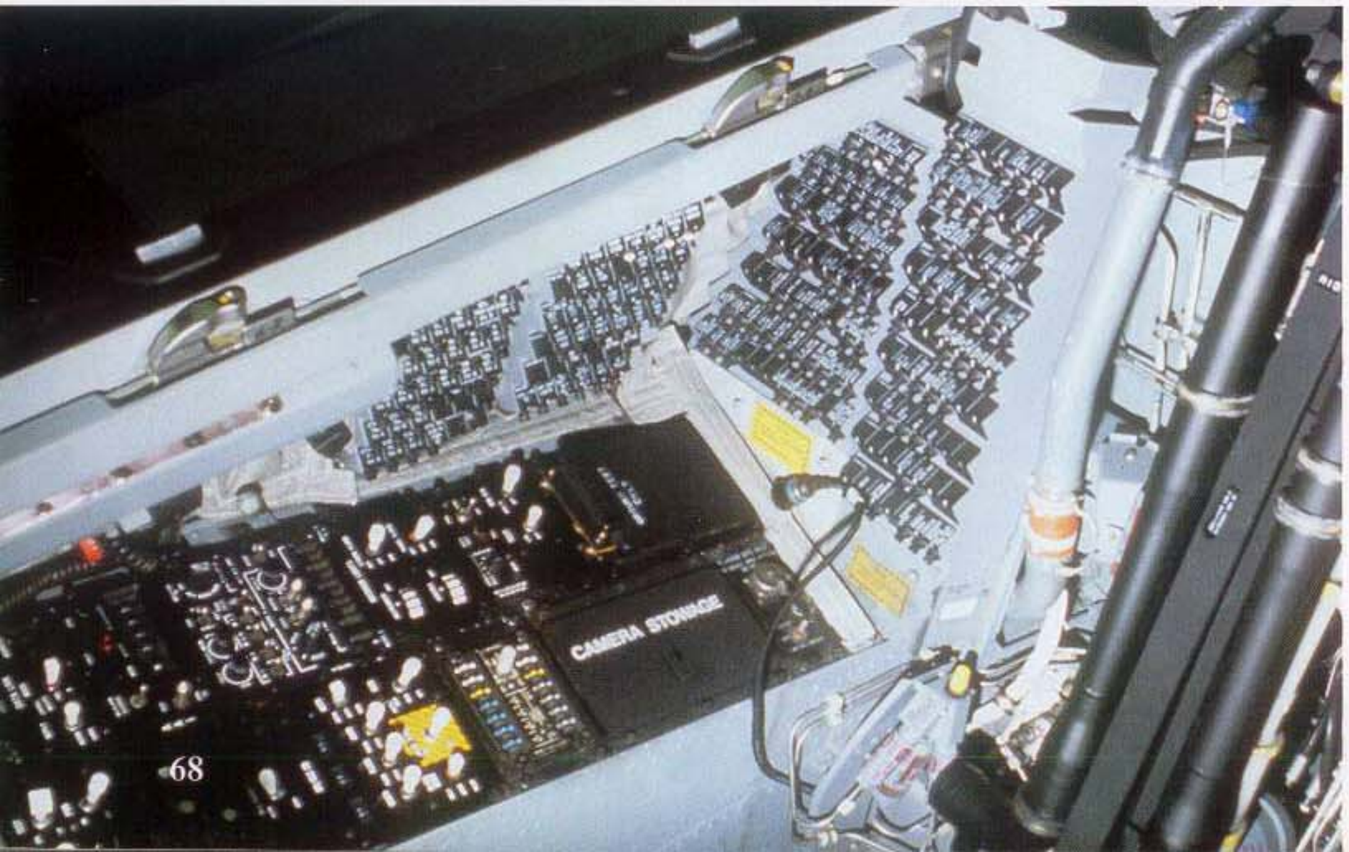
The rear of the GRU-7A ejection seat contains the rocket charge that propels the seat.

The front cockpit of a F-14A. The buttons on the engine throttle control are the Wing Sweep Mode selector, Speed Brake selector and the Radio/ICS button.

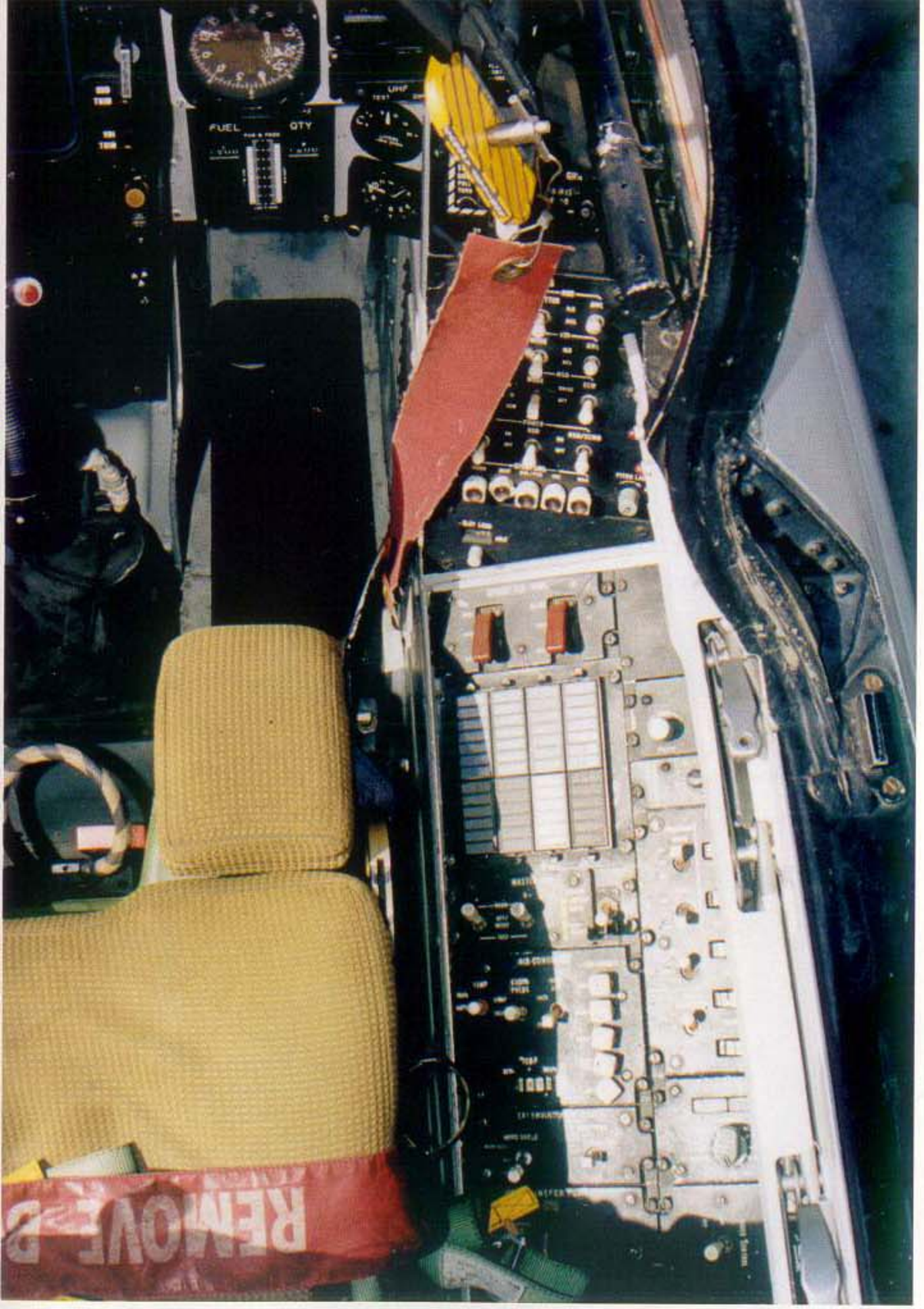
A disarmed GRU-7A ejection seat on its wheeled transport dolly for maintenance.

The F-14D replaced the GRU-7A seat with the NACES ejection seat. The NACES ejection seat is used on several other Naval jets.

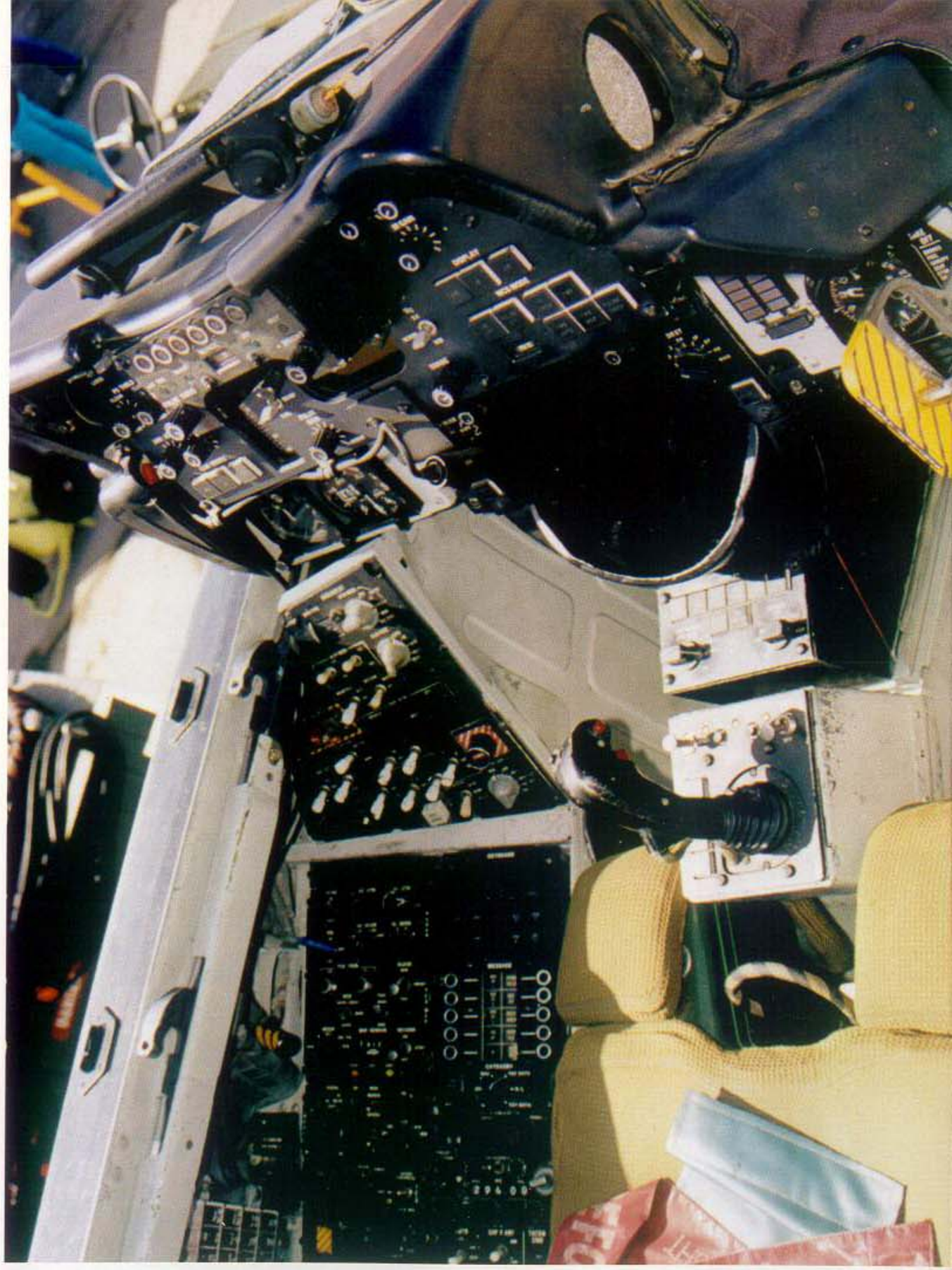
This is the front cockpit of a F-14D with the ejection seat removed. The panels on the rear and side walls of the cockpit contain electrical circuit breakers.



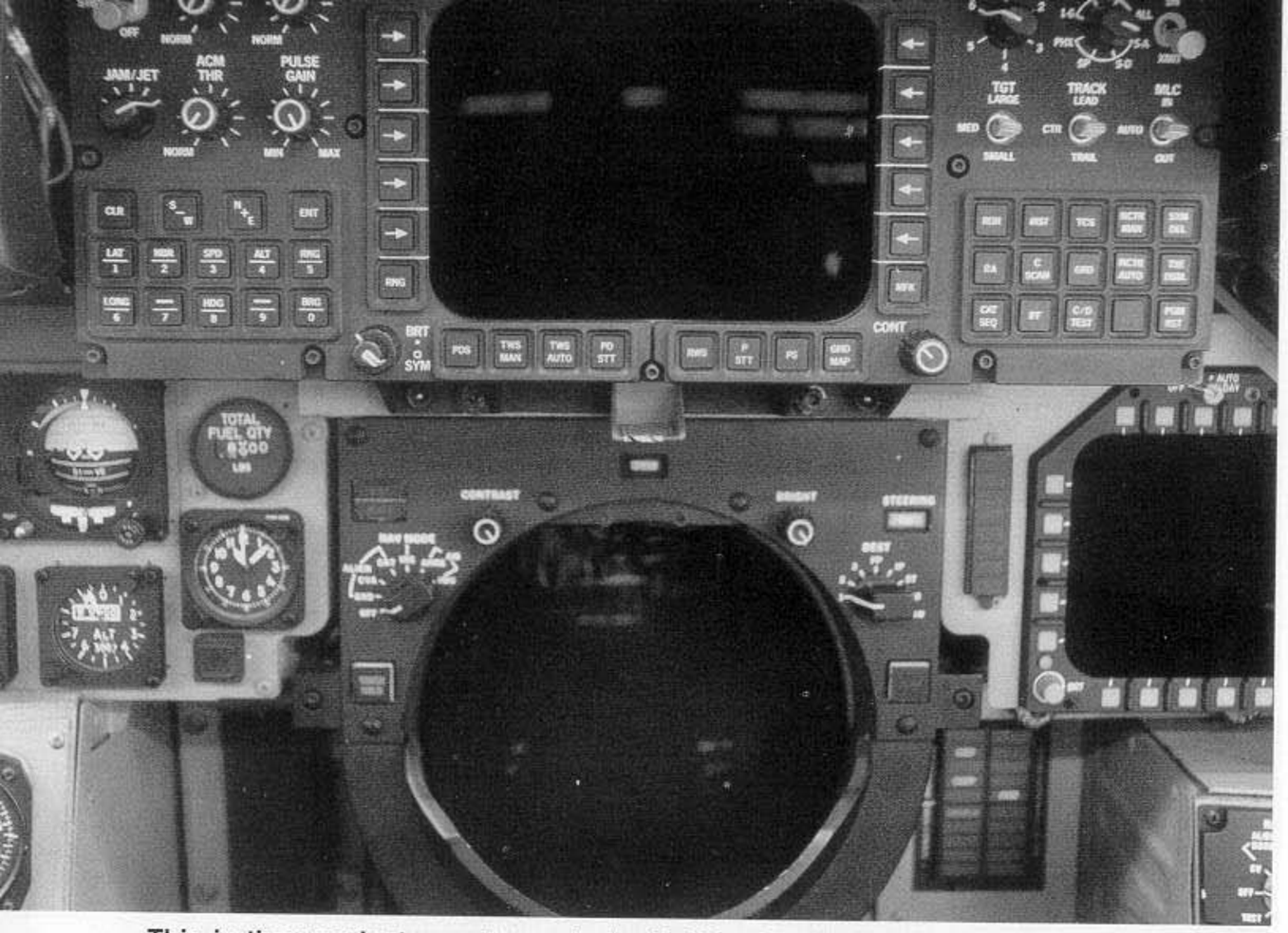
Side view of the GRU-7A ejection seat used on the F-14A. The seat can be fired from either the front or rear seat, via the command ejection sequence switch. It is activated either by pulling the dual handles at the top of the seat, which are connected to a face curtain, or by pulling up on the handle at the front center of the seat.



This is the front cockpit right console of a F-14A. The Yellow-striped handle at top operates the emergency canopy jettison, and is safety wired on the ground. Also visible is the lower ejection seat firing handle.

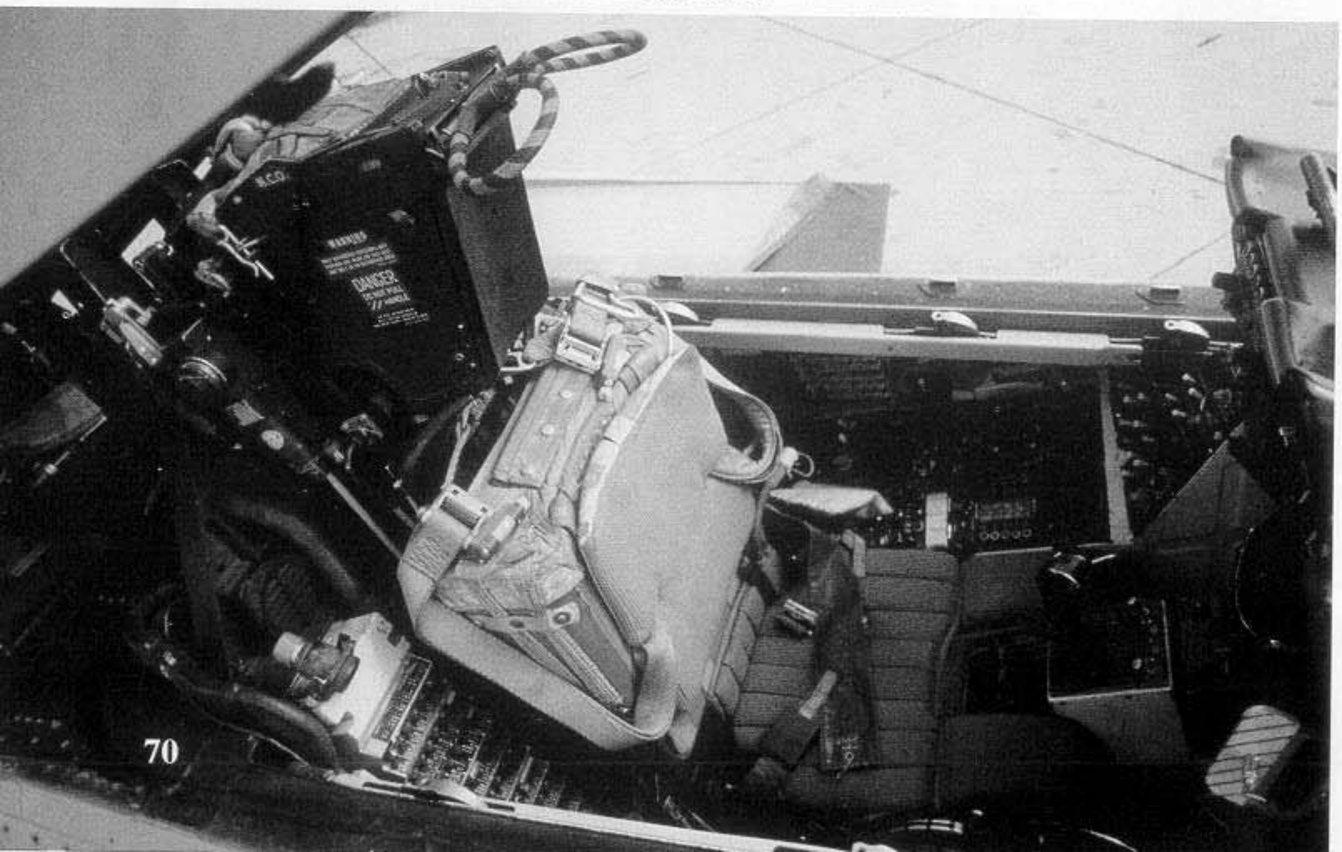


This is the F-14A rear cockpit, showing the AWG-9 system radar scope and RIO's hand controller.



This is the rear instrument panel of a F-14D with the Detail Data Display (DDD) panel (upper) and Tactical Information Display (TID) scope (center). The display at the right is the Multiple Display Indicator panel.

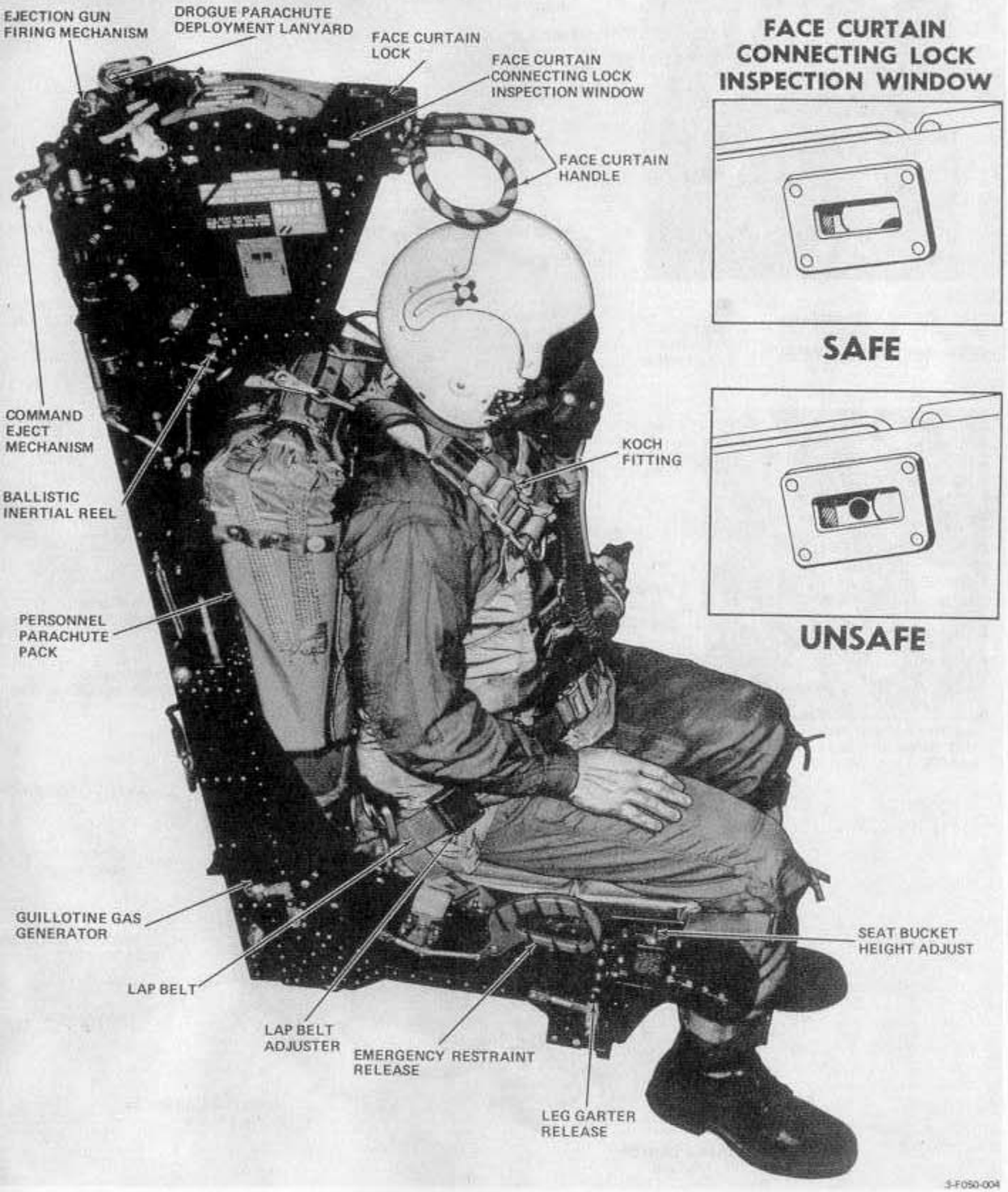
F-14A rear cockpit, with GRU-7A ejection seat in place. The seat is rocket propelled and can be used both in the air and on the ground.



This crewman is the RIO of a F-14 at NAS Oceana, Virginia Beach, Virginia during March of 1994. He is outfitted with an anti-exposure ("poopy") suit to protect him from hypothermia in case of ejection over water.

The rear cockpit of a F-14A. The canopy hinge is visible just behind the GRU-7A ejection seat.

EJECTION SEAT–MK GRU 7A

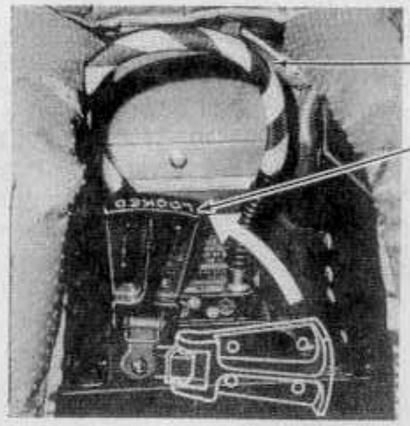


FACE CURTAIN CONNECTING LOCK INSPECTION WINDOW

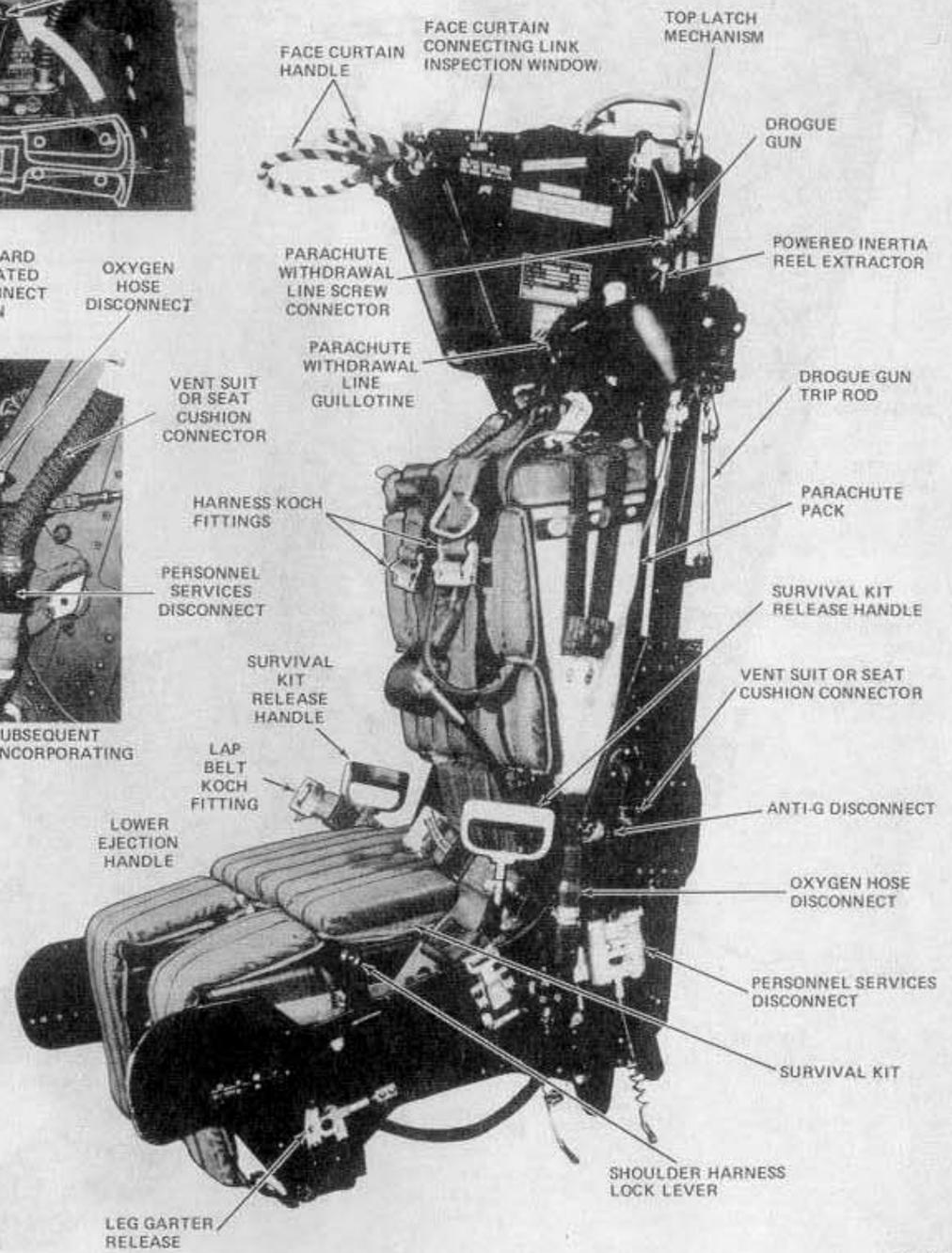
SAFE

UNSAFE

S-F050-004



AIRCRAFT 159631 AND SUBSEQUENT AND THOSE AIRCRAFT INCORPORATING AAC 309



S-F050-004

The Martin-Baker GRU-7A rocket propelled ejection seat was the standard seat on the F-14A. It featured an air conditioned, semi-inflatable seat pad to add to crew comfort and lower fatigue on long missions. The GRU-7A was replaced by the NACES seat in the F-14A+ and F-14D. The F-14A pilot's manual illustration of the seat highlights most of the seat's prominent features.

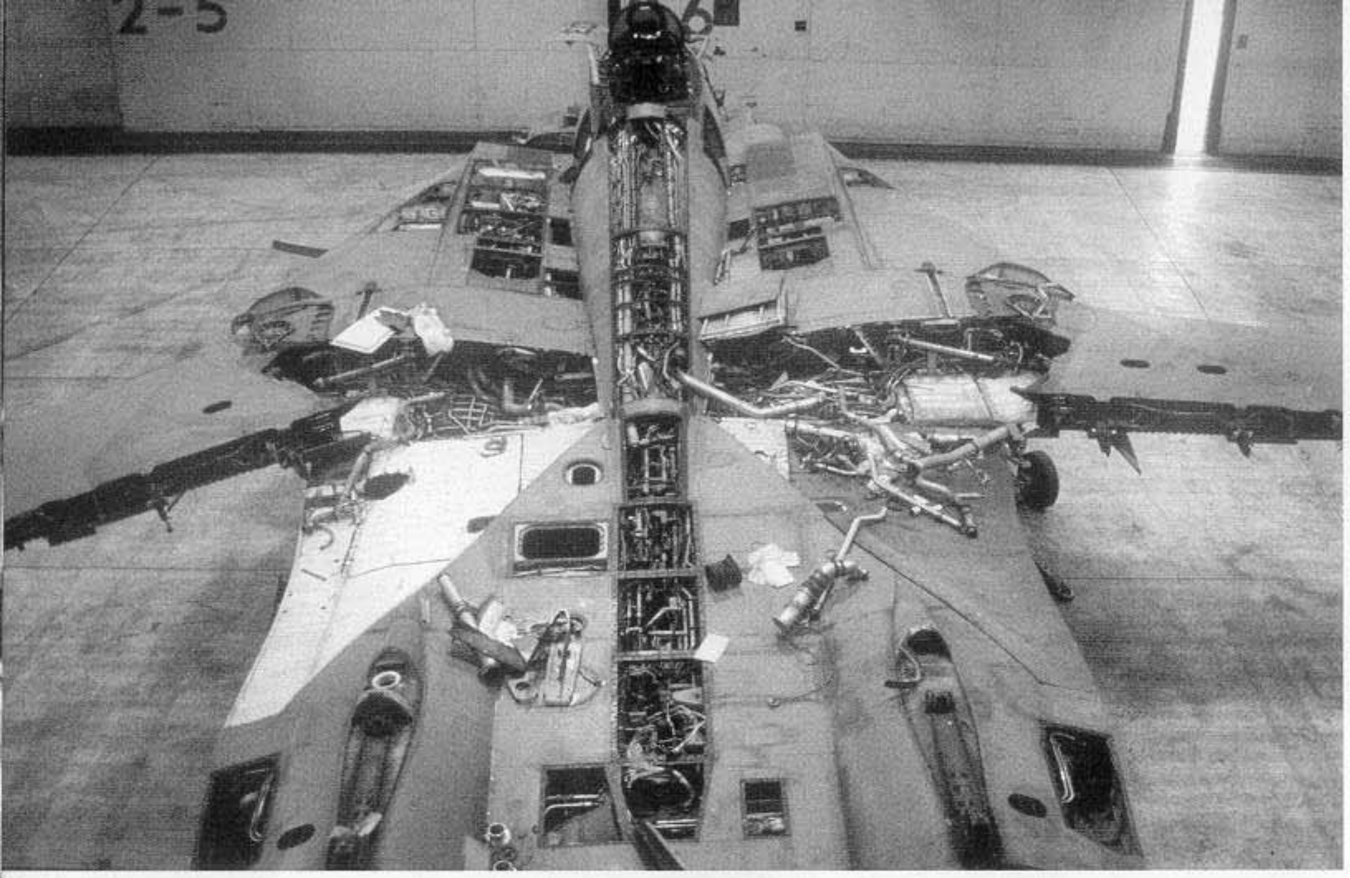
The rear (RIO's) cockpit of a F-14A. The stick in front of the seat is the Hand Control Unit, which controls the radar system and missile fire control. The console at top contains the radar system control panels, circuit breakers and other weapons systems control panels. The console in front of it is the armament control panel.

The rear instrument panel of a F-14A. The F-14A RIO panel lacked the CRTs of the F-14D's Tactical Information Display (TID).

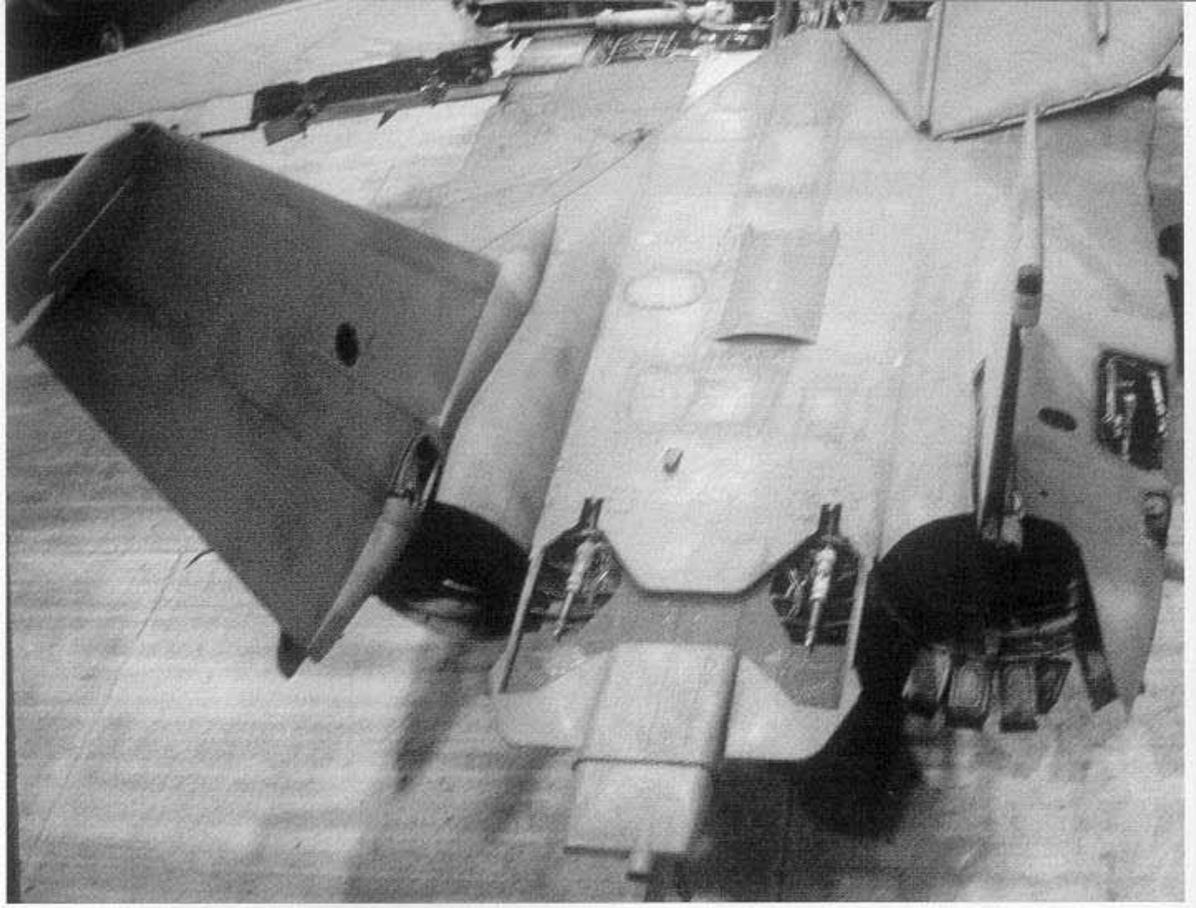
A F-14D of VF-2 aboard USS CONSTELLATION (CV-64). The wing is in the 68° oversweep wing position, used for parking on carrier decks, where space is always at a premium.

The canopy of a F-14D in the fully open position. Even when fully open, the RIO has to duck to clear the canopy as he climbs into the rear cockpit.

The canopy of a F-14D of VF-2 in the closed and locked position, ready for launch.

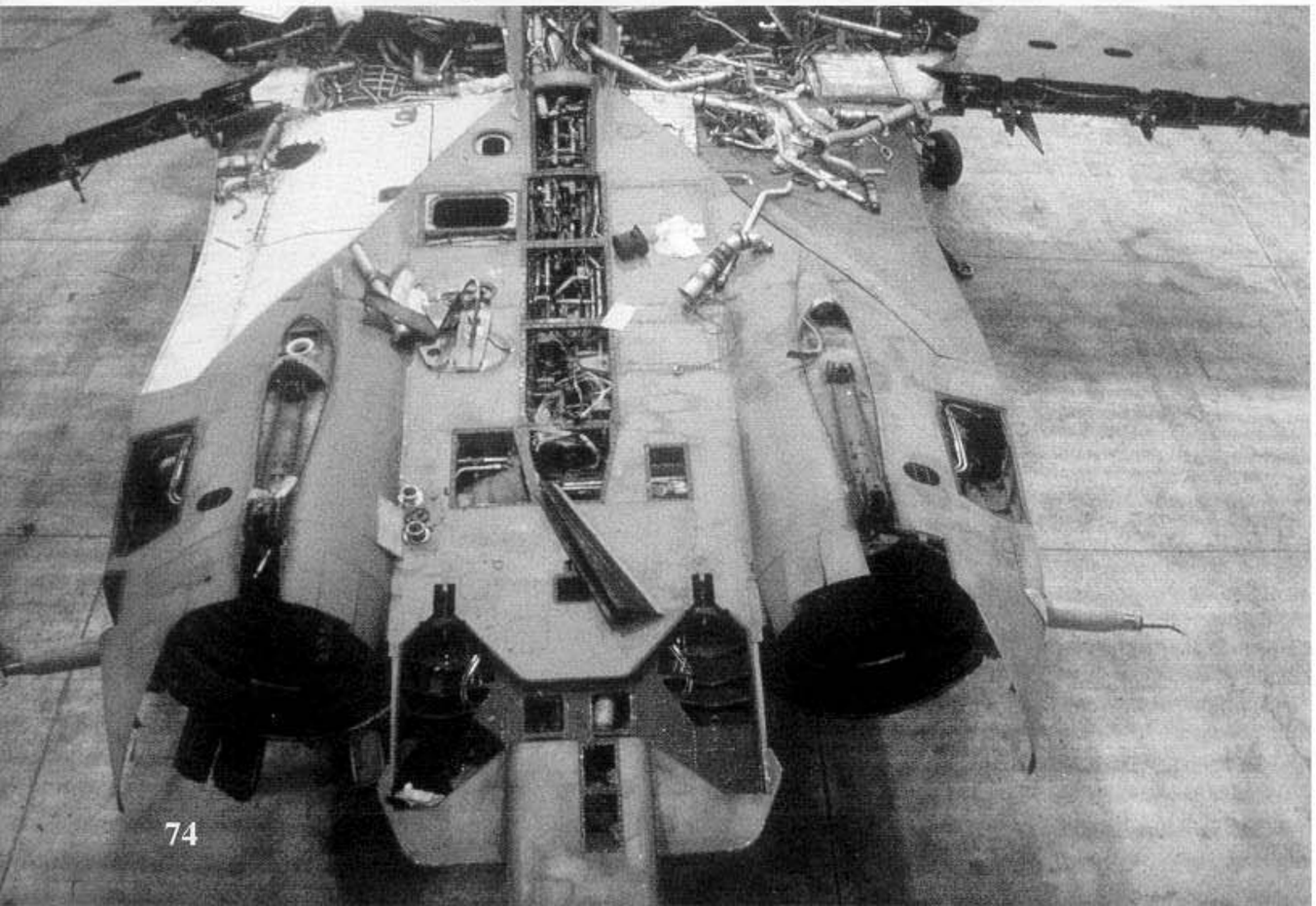


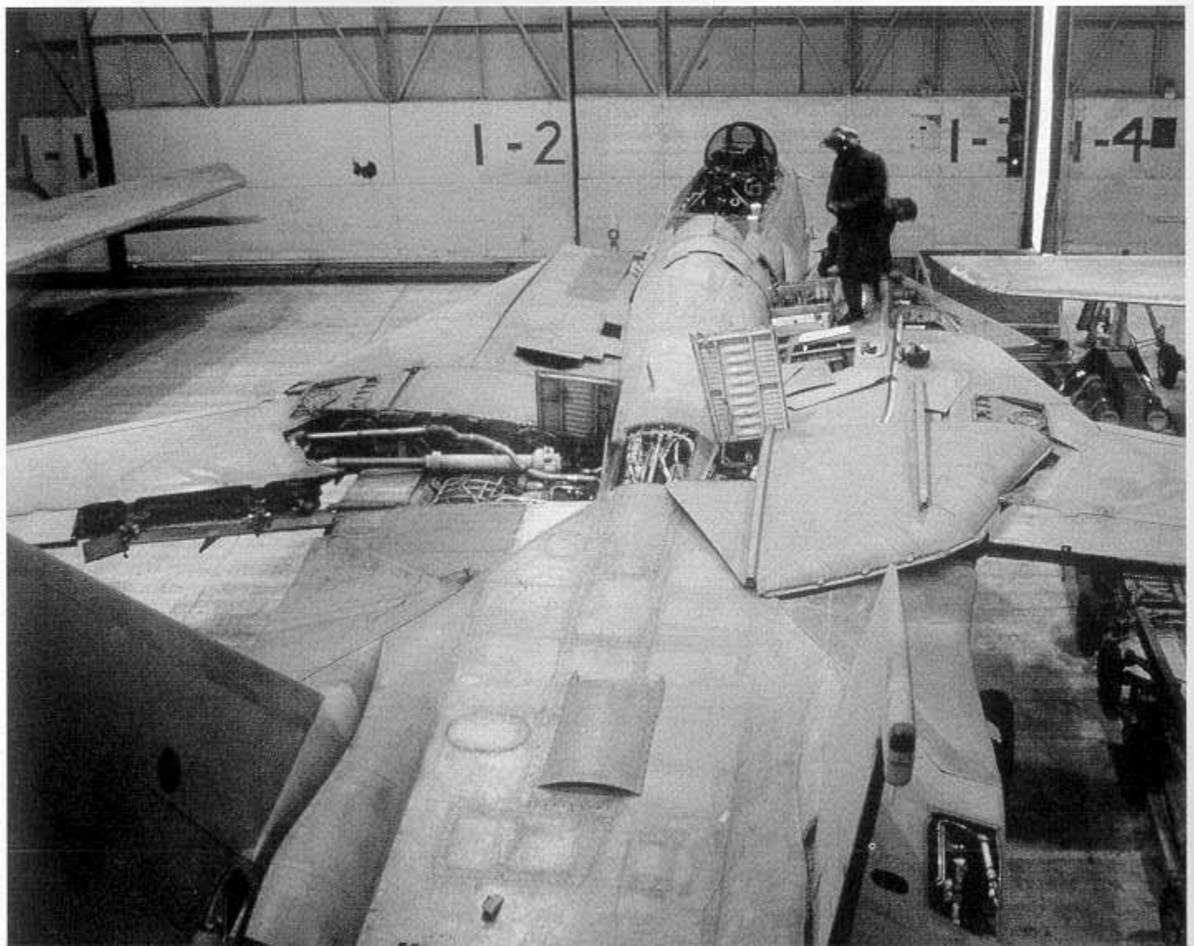
F-14A undergoing major maintenance/overhaul at Naval Air Station Oceana, Virginia Beach, Virginia with many of the fuselage panels removed to allow access to internal systems.



The speed brakes have been removed, revealing the speed brake operating pistons.

The engines and vertical stabilizers have been removed for overhaul and most of the inspection panels are open.





The wing glove cover has been removed from one side revealing the wing sweep jack screw mechanism that actually moves the wing in flight.

The nose landing gear and M61 Vulcan cannon have been removed for maintenance.

This is an AIM-54 Phoenix missile carriage rail on a F-14A outfitted for carrying an external fuel tank instead of a missile.

The wing leading edge flaps/spoilers and trailing edge flaps have also been removed.

Bomb racks can be attached to the underfuselage Phoenix missile launch pylons to allow the F-14 to carry air-to-ground ordnance.

This is the AIM-54A Phoenix missile carriage rail on the starboard wing glove pylon. Normally the wing glove pylons are configured for either AIM-7 Sparrow or AIM-9 Sidewinder missiles.

This is the forward portion of an AIM-9 Sidewinder air-to-air missile rail on the wing glove pylon.

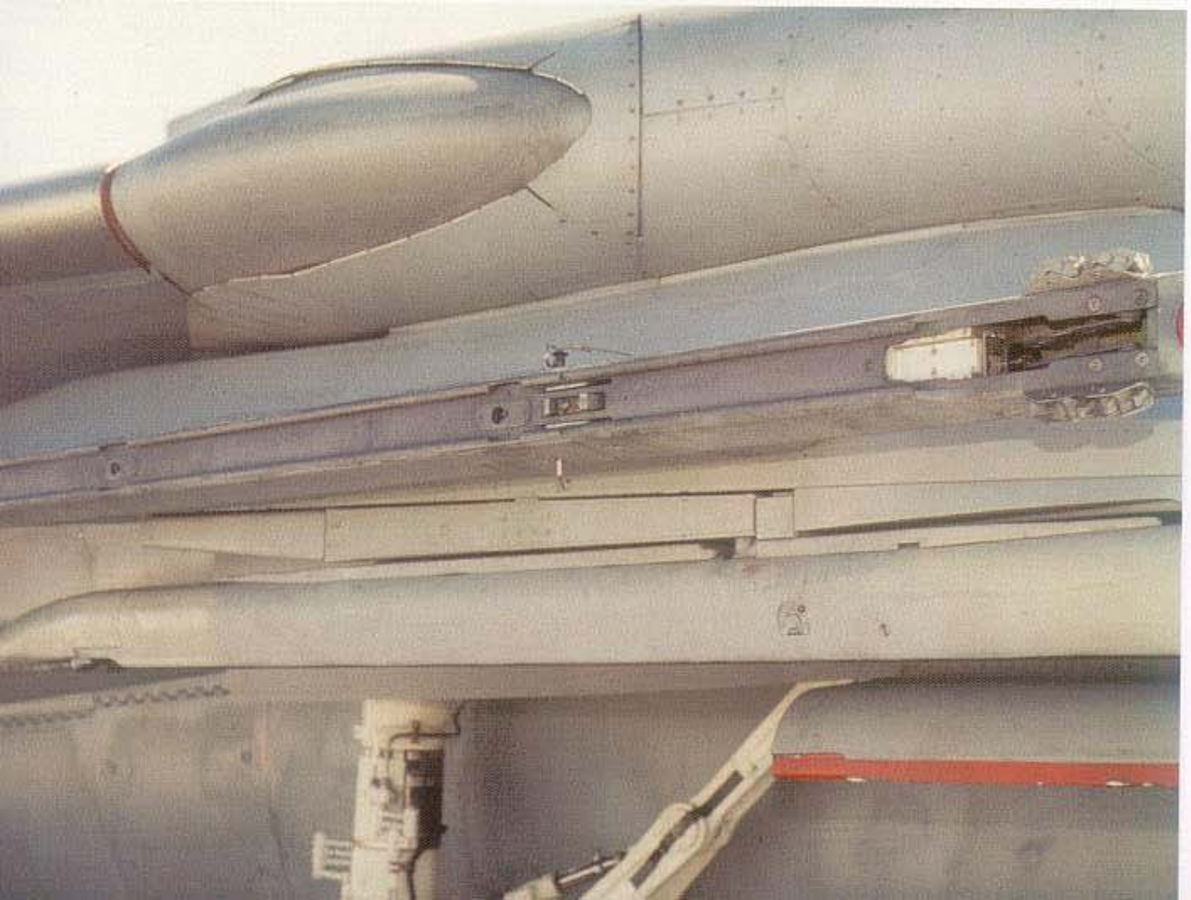
AIM-54A Phoenix air-to-air missile pylon. The AIM-54 has a range in excess of 100 miles. Fully loaded, the F-14D can carry a maximum of six AIM-54s.

This is the port wing glove pylon, configured with a pair of AIM-9 Sidewinder missile launch rails attached, one of which is loaded with an AIM-9.

A F-14A loaded with its full complement of diverse air-to-air armament. AIM-9 Sidewinders and AIM-7 Sparrows on the wing glove pylons, an AIM-54 under fuselage and a 20MM cannon in the nose.

Stars of the sci-fi movie "Final Countdown", F-14A Tomcat of Fighter Squadron Eighty-four (VF-84) Jolly Rogers and a Japanese Zero replica.

AIM-9 missile rails installed on the starboard wing glove pylon. Each wing glove pylon can carry two AIM-9 pylons, for a maximum load of four Sidewinders.

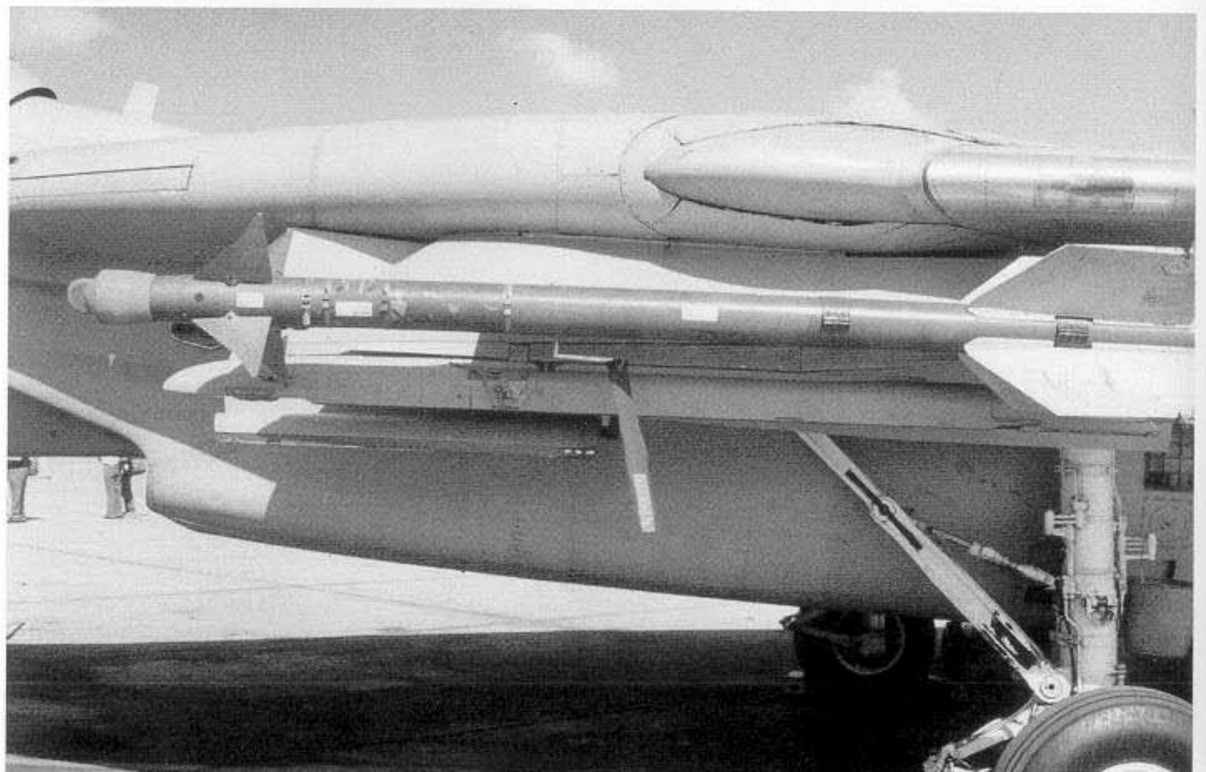


This wing glove pylon is configured with an AIM-9 rail (to the side) and an AIM-7 (bottom) missile rail. The cranked design is necessitated to make room for the operation of the outboard wing glove gear door.

A F-14A of VF-213 Black Lions with two AIM-9 Sidewinder missile rails on the starboard pylon and an AIM-9/AIM-7 combination on the port pylon. This F-14A has an ECM antenna on the boat tail. Additionally, the aircraft is carrying external fuel tanks under each engine pod.

(Below) The Yellow nose cap on the AIM-9 practice round protects the infrared seeker head from damage while on the ground. It is removed before flight.

AIM-9 practice missile loaded on a F-14A at the Top Gun School (Fighter Weapons School) NAS Miramar, San Diego, California.



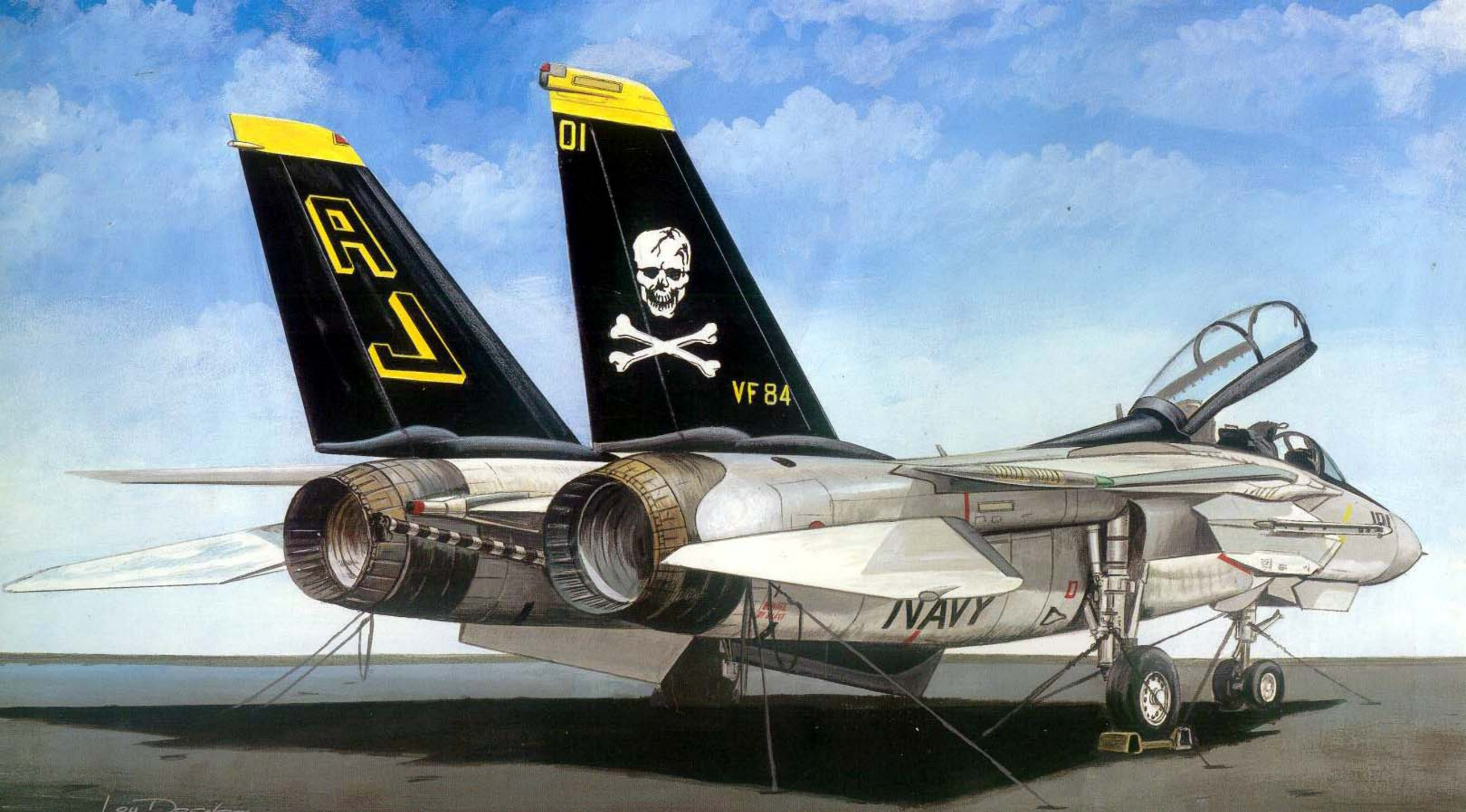
F-14 ground support equipment on the ramp at NAS Oceana, Virginia Beach, Virginia during March of 1994.

(Above/Right) A F-14B of the Top Gun School (Fighter Weapons School) at NAS Miramar, California during April of 1993. The civilian maintenance technicians are all Navy veterans.

A jet engine start cart on the ramp at NAS Miramar during April of 1993.

The skull and crossed femur bones of a WWII casualty of VF-17, the forerunner to VF-84, provides a dramatic display in the VF-84 ready room. The Corsair pilot got into a fight with two Zeros during the invasion of Okinawa. He shot down the first, but was shot down by the second. As he spun into the clouds, afire, he radioed his squadron commander; "Skipper, I can't get out! Remember me to the Jolly Rogers!". Initially, it was thought that he crashed into the ocean and was lost forever. Several years after the war, the wreckage of his plane, and his bones, were found in the jungle. The then-skipper of the squadron thought this display would be a fitting, and lasting, memorial to his memory. The family of Ensign Jack Ernie presented his remains to the squadron. His name is carried on the squadron roster, and he travels with the squadron forever.

F-14s of Fighter Squadron Thirty-two (VF-32) Swordsmen flew into Operation DESERT SHIELD/STORM from the flight deck of USS JOHN F. KENNEDY. The Tomcat with the toned down tactical markings has an extra, very unofficial, marking above the wing, the legend "Go Navy."



A F-14A of Fighter Squadron Eighty-Four (VF-84) Jolly Rogers on the flight deck of USS THEODORE ROOSEVELT.