LOCK ON N°5

AIRCRAFT PHOTO FILE

F-111 E/F AARDVARK

Willy Peeters

VERLINDEN PUBLICATIONS

(USAF photo)

DEDICATION

I would like to dedicate this book to Capt.Fernando Ribas-Domminici and Capt.Paul Lorence of the 48th TFW, who gave their lifes in the call of duty and in the fight against worldwide terrorism, when they failed to return from Libya on April 15th 1986. They will not be forgotten.

ACKNOWLEDGEMENTS

It is with great pleasure that I've compiled this book on the F-111 which wouldn't have been possible without the help of the following persons, to whom I owe a great deal: LtCol.Robert A.BRUS, Director of Public Affairs, HQ 3rd Air Force (USAFE), who granted me permission to visit Upper Heyford and Lakenheath Air Base. To LtCol.GIEMMO, who took over the moment LtCol. Brus left office as head of the PA, 3rd AF Mildenhall.
I would like to express my gratitude to Capt. Alvina K.MITCHELL, head of PA at RAF Upper Heyford and to her assistant Mrs.Sara BALL who did everything possible to make our visit a fruitful one. I also would like to thank MSgt.CRAWFORD of the Upper Heyford maintenance team for giving me the opportunity to photograph the F-111 in the hangars.
My thanks to Terry HILL, crewchief of one of the F-111's , of which most of the outside pictures were taken.

However, my most sincere thanks are due to Mr Richard COLLEY who, despite being involved in a car accident the morning of our visit, did the impossible to make sure we got all the photographs we needed and to make us remember our visit with pleasure.

Furthermore, I would like to thank Capt.Bruce C.ALEXANDER, Chief of PA at Lakenheath for providing us some of the F-111 F pictures which we, due to circumstances beyond our control, were not able to take ourselves. My thanks also to Sgt GRAHAM and Sgt HINCHER, two of his assistants.

Finally, I would like to thank my friend, Ronny MEURIS, who accompanied me on the trip to England and who proved to be not only a good companion who's presence was very inspiring, but a useful source of information.
To my other friend, Paul VAN HERCK, my sincere thanks for inkting the scale plans of the F-111 and to my Dutch friend Coen van den HEUVEL for the beautiful picture on the back cover.
To those I have forgotten to mention, my sincere apologies.

The author

20th Tactical Fighter Wing, Upper Heyford
F-111E
55th TFS, 77th TFS, 79th TFS, 42nd ECS

The 20th Tactical Fighter Wing ,located at RAF Upper Heyford in Oxfordshire, England which is approximately 15 miles north of Oxford.
It is the main operating base for the second largest tactical fighter wing in the United Kingdom, which hosts more than 20 units at six installations.
The mission of the 20th TFW is to provide long-range, all-weather tactical fighter and electronic combat sorties for the North Atlantic Treaty Organization (NATO). In the event of hostilities , operational control of the wing would be transferred directly to NATO, under the 2nd Allied Tactical Air Force, headquartered at Rheindahlen Air Base, W.Germany. The 20th maintains three squadrons of the F-111E and one squadron of EF-111A aircraft.

The wing's history began in 1927 as the US Army's 20th Balloon Group at Mather Field, California.

In November 1930, the 55th, 77th, and 79th Pursuit Squadrons became units of the 20th Pursuit Group at Mather, although these three squadrons have a much earlier beginning with the oldest, being the 55th, to be organized on Aug.9,1917 at Kelly Field, Texas. The 77th and 79th had their beginnings in Feb.1918 at Waco, Texas.

The 20th moved from Mather to Barksdale Field, Louisiana in October 1932 and became a training unit for pilots and groundcrews. December 1941 saw the group of three squadrons assembled at Hamilton Field, California. In 1942, the group then moved to King's Cliffe in England from which they flew more than 400 sorties into France, compiling an enviable wartime record, credited with destroying 211 enemy aircraft in the air and 232 on the ground. They earned their nickname 'The Locos' by destroying more than 400 locomotives and 230 freight cars.

After the war, they returned to Cape Kilmer, New Jersey over Biggs Field, Texas to Langley Air Force Base, Virginia after having converted from P-51's to the F-84 Thunderjet in 1948.

Another transfer to Wethersfield, England started in November 1951 and was completed in May 1952.

In june 1957, the wing converted from the F-84 to the F-100D, becoming the only wing in England so equipped. In December 1969 the wing again moved to it's present base at Upper Heyford. There, the wing received it's first F-111E aircraft in September 1970 and was at that time the only unit in Europe to operate the variable sweep-wing F-111.

In July 1983, the 42nd Electronic Combat Squadron was activated, receiving their brandnew EF-111A 'Raven' on February 3rd, 1984.
The 20th TFW received numerous honorary awards over the years, a list which is long and distinguished but which is to extensive to be printed here.

As written elsewhere in this introduction, there are three squadrons within the 20th TFW flying the F-111E. They all, more or less, were part of the same group throughout it's long career, and they all have had a very distinguished past as well. It may be interesting to know the 79th Sqn became the first fully-operational F-111 squadron in the world and the first F-111 squadron in Europe.

48th Tactical Fighter Wing, Lakenheath
F-111F
492nd TFS, 493rd TFS, 494th TFS, 495th TFS

The 48th Tactical Fighter Wing is based at RAF Lakenheath, which is located 70 miles northeast of London and 25 miles from Cambridge.
RAF Lakenheath is the largest U.S.Air Force operated base in England, with approximately 5,400 U.S. military personnel and 1,300 American and British civilian employees assigned to it.
The mission of the 48th TFW is to conduct tactical air operations in support of NATO and to train new pilots on the F-111. Three operational squadrons and one replacement training unit fulfill this commitment, all flying the F-111F.

The modern-day 48th TFW took root in WWII as the 48th Light Bombardment Group in November 1940 but was redesignated the 48th Dive Bombardment Group in September 1942. In August 1943 it evolved into the 48th Fighter Bomber Group . In 1944 they flew P-47 Thunderbolts from England in the pre-invasion softening of the French coastal defences. Just seven days before D-Day, it was again renamed 48th Fighter Group and as such they provided close air support with low-level bombing and strafing attacks. Then the group was inactivated for the first time in November 1945.

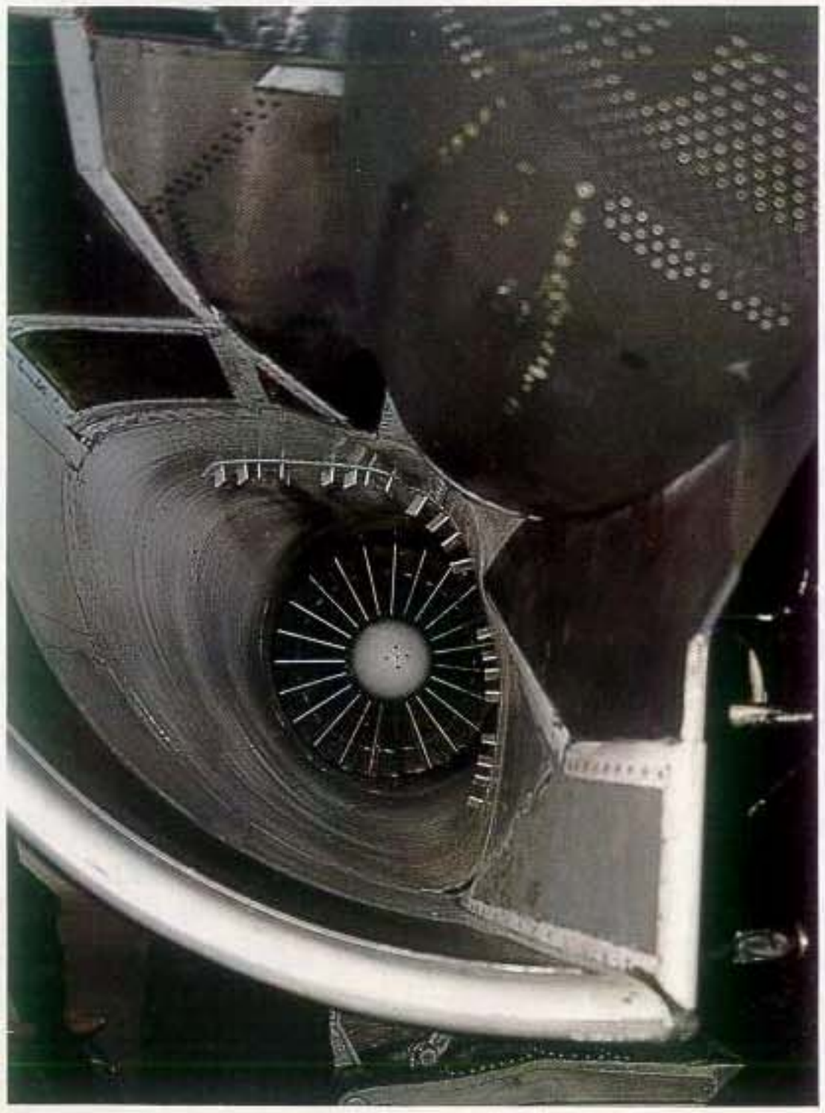
In 1952, the 48th Fighter Bomber Wing was formed at Chaumont Air Base in France. The 48th Fighter Bomber Group was reactivated as part of the wing. Both were part of the U.S. forces committed to NATO.

While based at Chaumont, France, the people of this air base petitioned to have the 48th Fighter Bomber Group named the 'Statue of Liberty Wing'. This was granted and the name became official in July 1954, making the 48th Fighter Bomber Wing the only Air Force unit with both a numerical and descriptive designation.

The 48th Fighter Bomber Group was inactivated for the second time in 1957 but the 48th Fighter Bomber Wing remained active and was finally redesignated 48th Tactical Fighter Wing in July 1958. In January 1960 it moved to RAF Lakenheath in England where they flew the F-100. This aircraft was replaced by the F-4D Phantom in 1972. This replacement of aircraft was completed in July 1975. Then in 1977 the wing received it's first F-111's.

The 48th TFW, like the other F-111 wing at Upper Heyford, received numerous achievement awards and it is a proudly five-time winner of the Air Force Outstanding Unit Award. It even received the Navy's Meritorious Unit Commendation award for it's participation in the 1986 El Dorado Canyon Operation in Libya.

The three operational squadrons are the 492nd, the 493rd and the 494th TFS, all having 'Combat in European Theater of Operations' as their main operation status. The raid on Libya in 1986 proved that the term 'European' is flexible.
The fourth squadron within the 48th TFW has the noble task of training new pilots to fly the F-111 in the different surroundings of a crowded European airspace and with totally different tactics like the low-level terrain following sorties characteristic for the F-111.



Airframe

(Top) The nose section from the right side. Note the large nose gear doors and the various Remove Before Flight tags.
The top left picture shows one part of the large folding weapons bay door in the open position. Note the particular shape of the front end of the door and the low visibility markings common on modern jets.

(Left) Close up of the air intake. Unlike the F-15 and the F-16,the F-111 intake is not very flush. To control the airflow into the turbine, vortex generators are installed halfway through the air intake. Note the intake is not painted white all over as in most cases.

(Right) The KB-18A automatic strike camera is located in front of the nose gear doors. It looks obliquely forward. Note the aerial in front of the camera window and the nose wheel door linkage arms.

A large overall view of the right side air intake area. The enormous size of the air intake cone is very apparent here. Early F-111's had a different type of air intake, the so-called Triple Plow I intake which was designed to overcome early problems of the original intake design which caused several aircraft losses.

The position well back under the wingroot and close to the fuselage was thought to be the cause of all engine problems. The whole intake was repositioned well outboard of the fuselage and separated from it by a large vertical wall to diverge the air into the intake, while a third plow was added to extract boundery layers between the top panel and the underside of the wing. This was to be the inlet used on the F-111 A, which is the most numerous variant of the 'Aardvark'.

By late 1967, GD had redesigned the Triple Plow I by increasing the wall area by 14 sq in.(±90cm²) and moving it 4 more inches (±10cm) outboard. The corner cone was subsequently reprofiled and lengthened to improve aircraft handling at higher AOA (Angle Of Attack). Three auxiliary inlet doors were installed in the outer intake walls. This inlet proved to be much better than all previous attempts but the original TF-30 engine still could not provide enough thrust to realize a Mach 2.5 number at high altitudes, one of the requirements for the F-111 program.

However, this inlet enabled the One-Eleven to be retrofitted with the more powerful TF-30-P-100 engine found in the ultimate F-111 version, the F-111 F (see page 25).

The custom-made air intake cover installed here, is to prevent any object (including birds) from entering the air intake which may cause a complete engine blow-up while starting. Modelers should note the type of wheel chocks used on all Upper Heyford F-111's.

The flight dispenser on the inboard pylon. The same dispenser is used to carry personal equipment on extended trips or TDY assignments to foreign airfields, like squadron exchanges or the famous Tiger Meet, held anually in a different NATO country by squadrons using a tiger in their emblem.

In the configuration shown here, with the lower doors removed, it can carry up to six practice bombs. Note the extensive chipping of the paint on the nose section of the dispenser. This area is very rough, as if it was sandblasted. Note the different shades of green in comparison to the aircraft's camouflage.

The MER or multiple ejector rack on the F-111 is quite different from the MER's used on other aircraft. It usually carries up to six Mk82 Snakeye bombs, and this on each side of the aircraft.

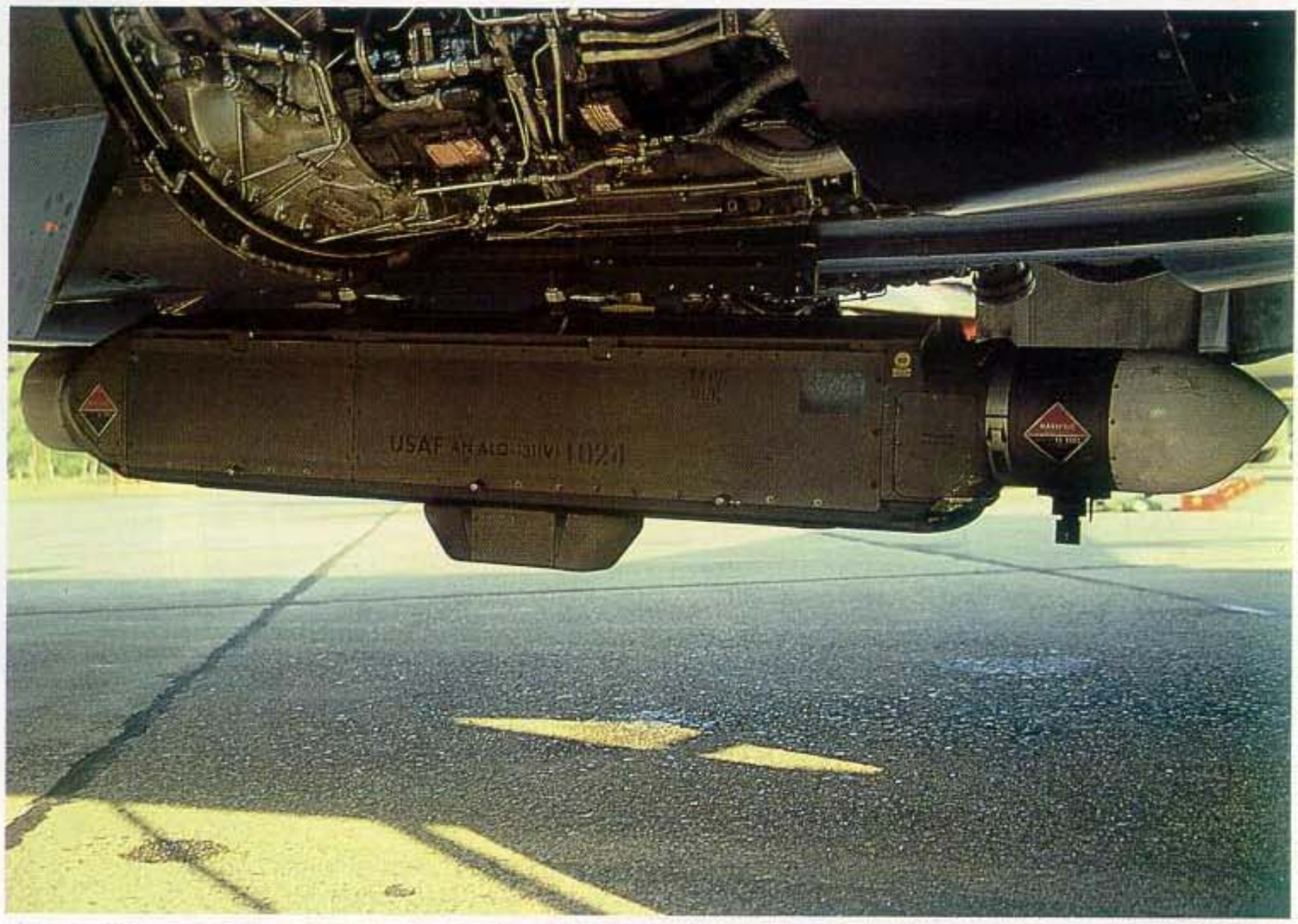
Note the ventral fin (or strake) splits where the swinging engine bay doors begin. On most kits, this ventral fin can be found as a one piece part which is definitely wrong.

The static discharge ground line is connected to the number 6 pylon in this picture, but can be fitted to any pylon on the airplane.

The aft side of the dispenser and the area behind the main wheel assembly. Note the low voltage formation strip above the ventral strake.

The same area looking aft with a view on the horizontal stabilizer servo actuator housing. Note the smooth overflow of the fuselage into the housing.
A view of the exhaust nozzle from this side which most certainly will help the modelers get their kit right.

The rear main landing gear door from behind. Note the very peculiar shape of it and that it hinges to the fuselage in an upright position, unlike the first F-111's where it was locked parallel to the fuselage on the main landing gear assembly. Also note the small aerial slightly to the right and aft of the gear door. Part of the main landing gear/wheel connection can also be seen.



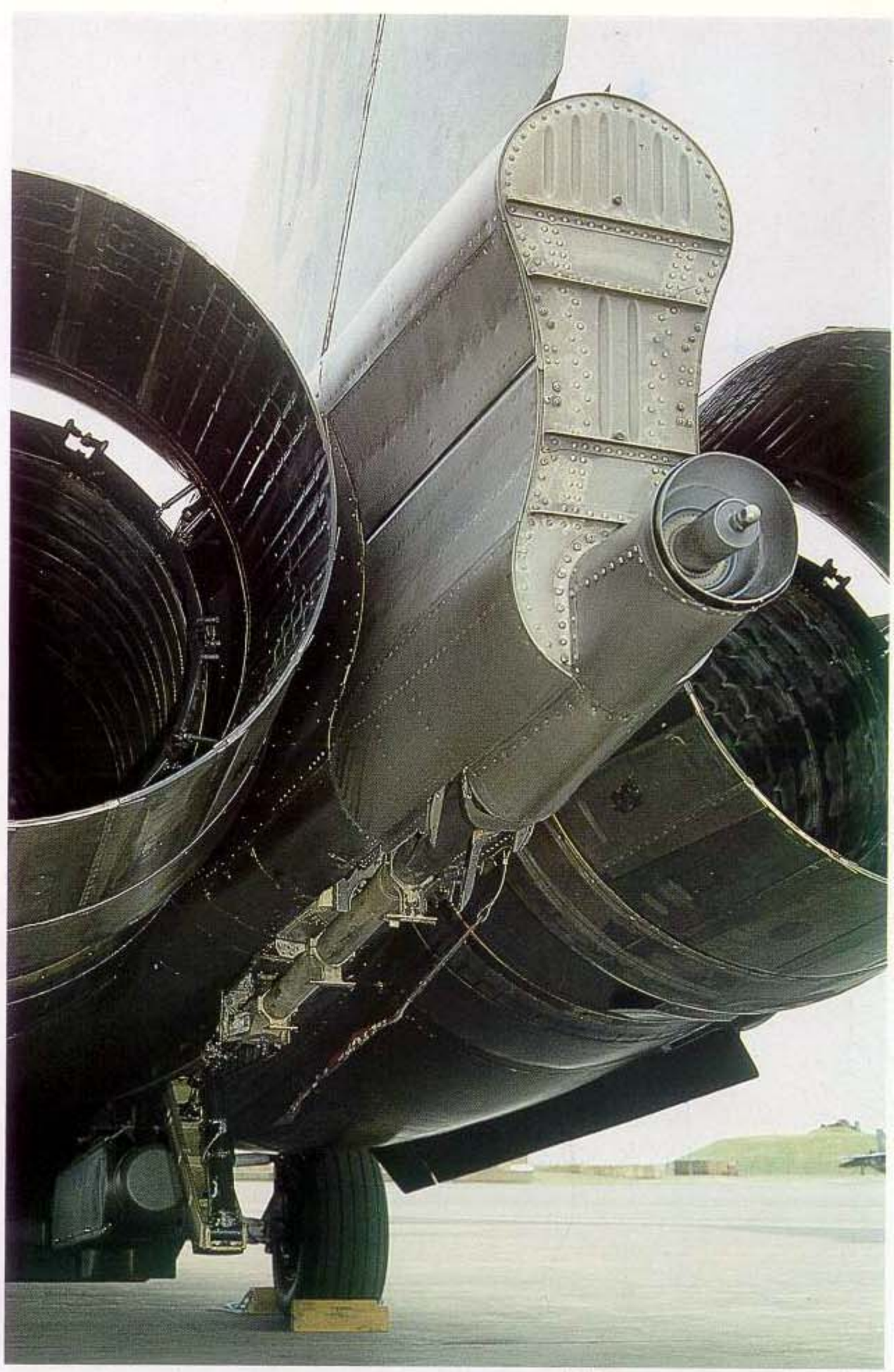
One of the main jamming devices on the F-111, the AN/ALQ131 (V). This is the newest of the ECM pods carried by tactical One-Eleven's which is of Westinghouse origin, one of the main contractors producing such equipment.
The pod is located on the aft part of the aircraft, under the fuselage and between the two strakes. This jamming pod has two hemispherical radomes emitting signals to both front and rear.

The all flying tail from behind and at full positive incidence, standard procedure on all parked F-111's. The ECM aerial (aft warning radar) and four static dischargers can also be seen. Note the latter are attached to the lower side of the tailplane.

Three views of the tail area. The largest picture gives a good idea of the overall shape of the vertical fin, the formation light and the position of the markings. These are all painted black, according to the new low visibility regulations, unlike the earlier F-111's where these codes could be found in white.

The cable and the rubber cap which can be seen below the tail section is used to pull the aircraft backwards into their protective shelters upon arrival from a mission. Clever thinking by the USAF, because operating a winch assembly is less costly than having tow tractors driving back and forth between the different shelters which are sometimes located quite some distance from each other.

(Insert) A look inside the afterburner can of the Pratt & Whitney TF30-P-3 engine, showing the variable nozzle and it's six actuators.



The blunt, peanut shaped tail section of the F-111E. In February 1961, less than a month after taking office under the newly elected president John F. Kennedy, the then Secretary of Defense, Robert McNamara, spoke these immortal words while looking at a Navy air display: 'What good are all those different kinds of airplanes?'.

The tail hook or arrestor hook seen here is the result of McNamara's failing effort to develop one aircraft which would suit every branch of the flying service and which would fulfill their various needs.

Nowadays, this hook is used only for emergency landings by means of an arresting cable crossing the runway. The tail skid device just in front of the arrestor hook housing is needed to prevent the tailpipe from hitting the ground while on take-off.

(Left) A clear view of the tail pipe from above which shows the tail feathers and the way the engine is fitted into the fuselage. Note the shape of the panel which has been removed here to execute some minor repair.

(Top right) Worth noting in this picture is the wing root with a rubberlike fabric covering the wing housing. Note the inspection door just aft of the main wheel .

(USAF photo)

(Bottom left) A close up of the tailpipe of the F-111 F. The exhaust nozzle differs from the one on the F-111 E because of the new TF30-P-100 engine with it's rotary sliding iris segments and a ring of 'tailfeathers'.

(Right) The left tailplane from above. This time the aft warning antenna is covered for protection. The static dischargers are on top of the tailplane now, which indicates that both left and right tailplane is interchangeable.

Another view of the MER, this time on the left wing pylon of which a more detailed side view can be seen on the bottom left picture.
Note the way the pylon is attached to the wing allowing free movement when the wings are folded or unfolded. Also note the distance between the pylon and the MER. Modelers should remember this when planning to have MER's installed on their kits.

(Bottom right) The 600 gallon external fuel tank on the number 3 pylon station. Total fuel capacity of the F-111 E and F is 7440 US gallons of JP-4 jet fuel. Two internal wing tanks comprise 389 gallons (1470 litres) each, the forward fuselage tank holds 2808 gallons (10638 litres) while the aft fuselage tank counts another 1429 gallons (5420 litres) of JP-4. If necessary, the F-111E or F can carry up to four external fuel tanks on it's pylons adding another 2400 gallons (8988 litres).
The 28 gallons difference is the amount of fuel in the fuel lines. The bottom right picture also shows the retracting cable being hooked up to the main landing gear assembly.

Underside view of the left wing area. To the left can be seen the leading edge slats at maximum deflection. The extended flaps on the right side of the picture are also painted red (a remainder from it's Navy predestination?) for easy spotting by ground crewmembers.

A Lakenheath F-111F with a Sidewinder missile on the outer pylon. This particular one is used for training purposes only because it lacks the rear fins.

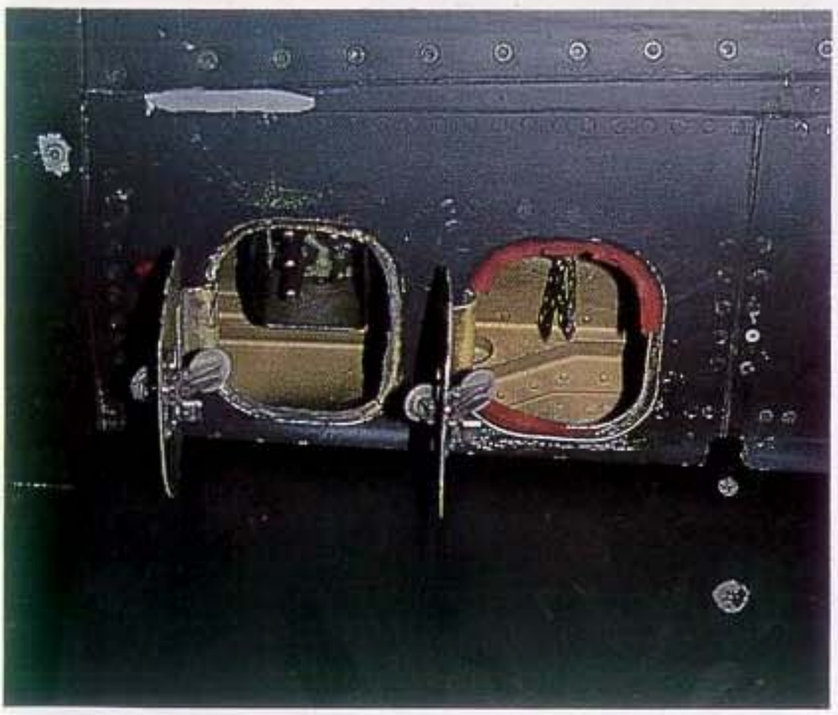
The missile itself is nevertheless connected to the onboard computer so the pilot can hear the typical humming sound of the missile as soon as it is locked on the target. This way the pilot and the WSO (Weapon System Officer) can almost be certain they have scored a kill and that's still one of the major jobs of strike fighter aircraft such as the F-111.

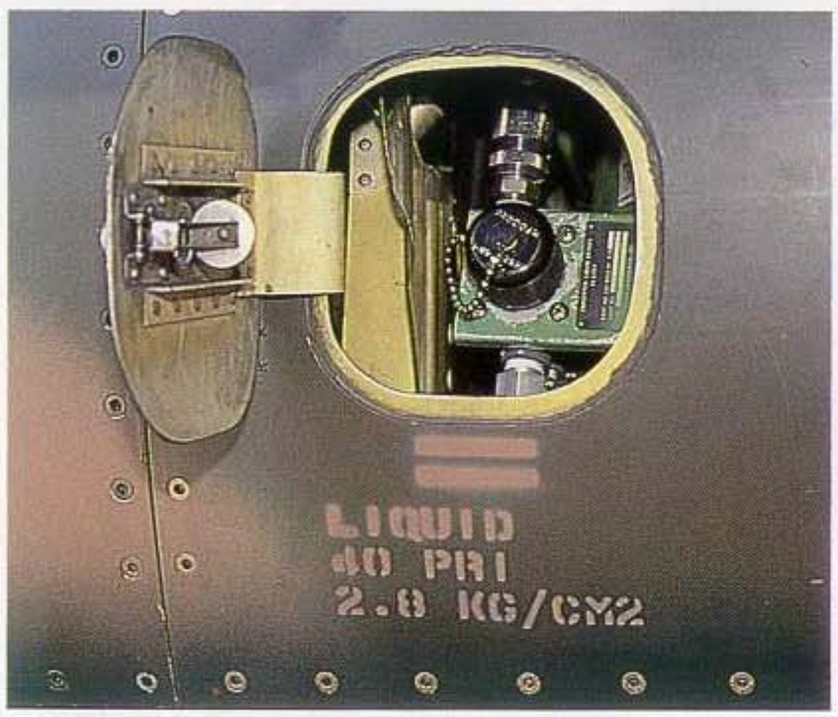
The open glove vane on the left side. To enable the leading edge slats to extend forward, a simple but ingeneous system was developed. As soon as the wings fold forward, the glove vane upper part tilts nose down while the lower part folds down.

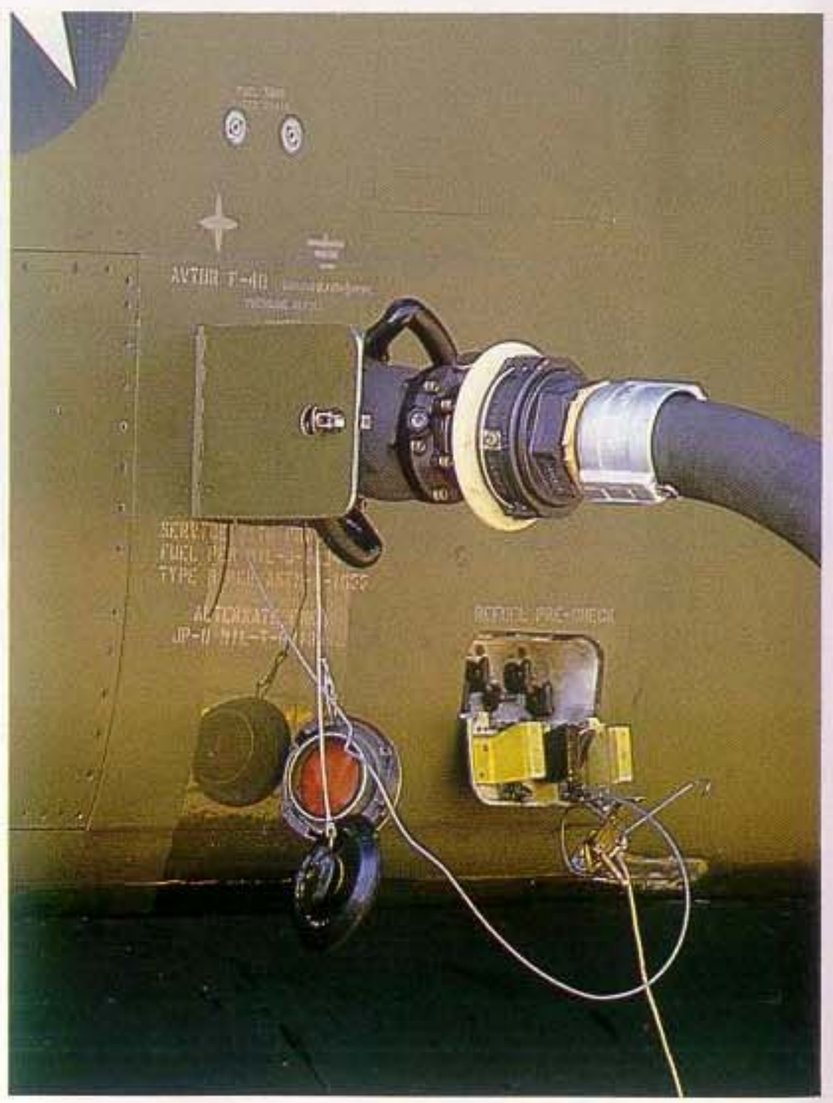
View of the left sidė air intake area which is quite similar to the right side. Note the probe next to the air intake cone.

The forward main landing gear door which also serves as a speedbrake. Note the inner shape to accomodate both main wheels which are quite large.
Again, the contour shape of this door is very distinctive as is the actual joining of the door to the fuselage.

The AN/ALQ 131(V) from the rear. The pylon to which this ECM pod is attached can be seen here. Note the various markings on both the pod and the pylon. Modelers will be all to pleased to learn that Verlinden Productions has an F-111 update set for the F-111F on 1/48th scale, comprising amongst the Pave Tack and the Paveway II laser guided bombs, an accurate AN/ALQ 131 pod.







The servicing side of the F-111. Almost all servicing is done on the left side of the aircraft. The top right picture of the nose section clearly shows how the escape module is integrated into the fuselage.
The picture above shows the external power connection and the intercom hook up station.

The liquid oxygen convertor just above the nose wheel door.
At right is a picture of the refueling point and the refueling control panel. Note the precautionary static discharge line which connects every part of the aircraft involved in refueling to the ground. Static electricity may cause sparks which could ignite the fuel.

Maintenance

Like every car has to be checked regularly, aircraft are subject to maintenance as well. All aircraft at Upper Heyford, where these photos were taken, are maintained in large hangars capable of holding four F-111's at a time. A lot of highly qualified personnel looks after the birds and their systems to keep them in flying condition, and they're doing a terrific job.

However, for major overhaul the F-111's are flown to the Weybridge-Bristol division of British Aerospace with whom the USAF has a contract to keep their One-Eleven's airworthy and to check all systems on the cockpit ejection capsules on a regular basis.

Some of the pictures in the next chapter were taken with the modeler in mind. A lot of special equipment is needed for aircraft preservation and some of it can be seen on the following pages, including the men who devote most of their servicing career keeping these defenders of the peace ready whenever they're called for. Credit must be given to these men because few F-111's have been lost ever since they reached full combat-ready status back in 1977, despite the controverse surrounding the F-111 in the early stages of it's development.

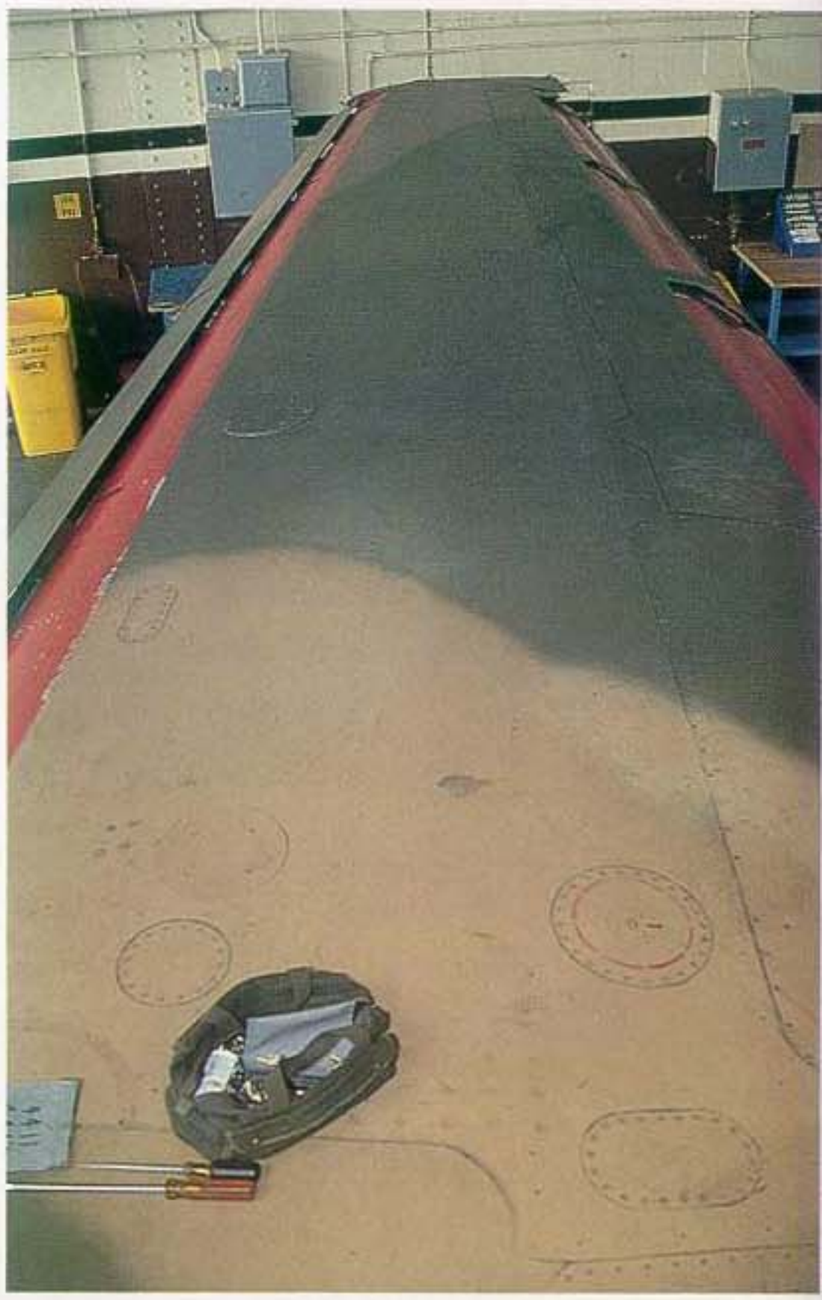
The picture on this page gives an overall impression of the way the 'Aardvarks' are taken care of.

A more detailed coverage can be found on the next eight pages.

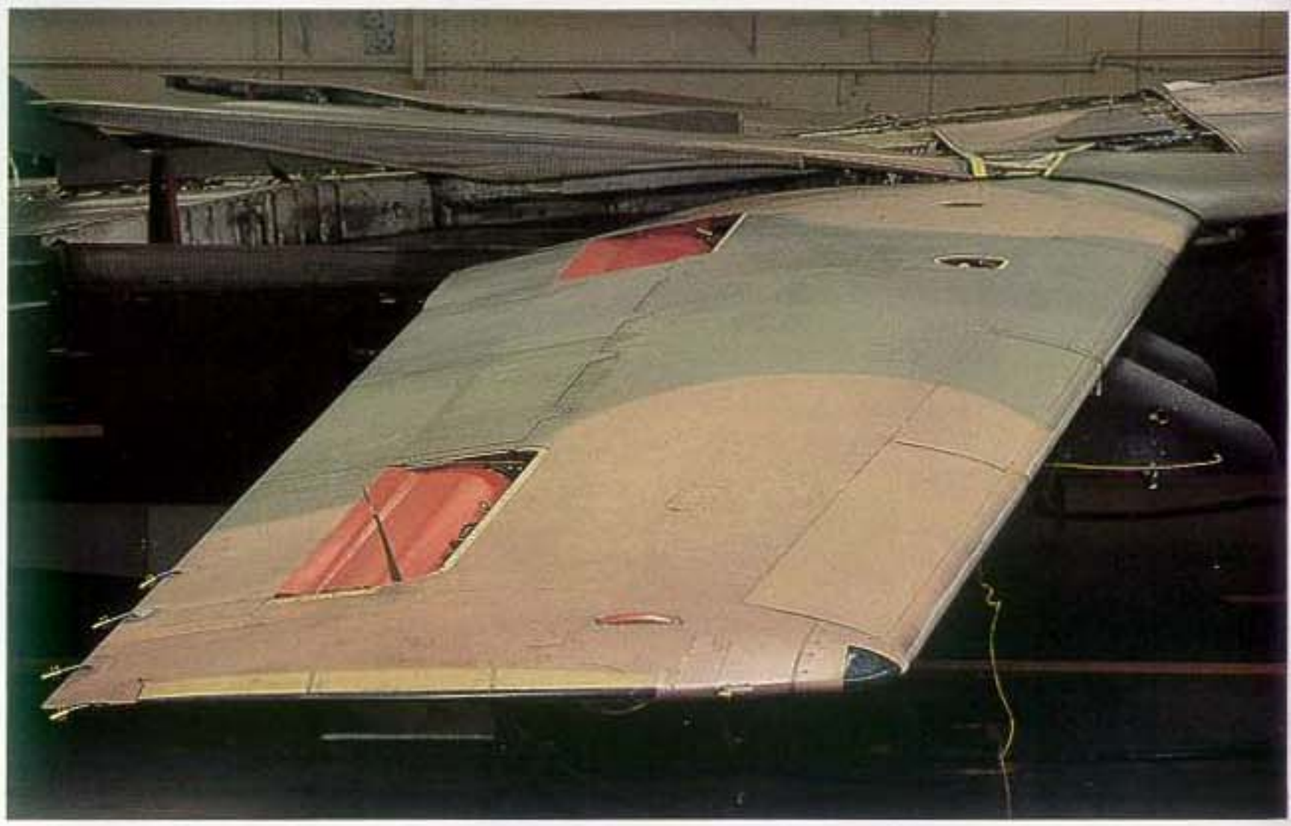
(Left & right) The left and right wing viewed from above. Apparent is the red paint on all inside surfaces of the flaps and slats. Note the tracks by which the flaps traverse up and down, and the center section of the flap.
All pictures on this page show the wings spread out to maximum span, common practice on aircraft which are being overhauled.

The swing wing design, together with the leading edge slats and the trailing edge flaps allows a take-off weight far larger than most fixed wing aircraft. Additionally, the airflow is guided over the wings and upper fuselage by means of the open glove vane described on the previous pages.

Once airborne, the wings fold back to a 26 degrees cruise setting. This is the only setting allowing maximum external load to be carried. Further sweepback is only possible if the outermost pylon is not carried. Full sweepback of the wing leaves the leading edge to a 72 degrees 30 minute angle.

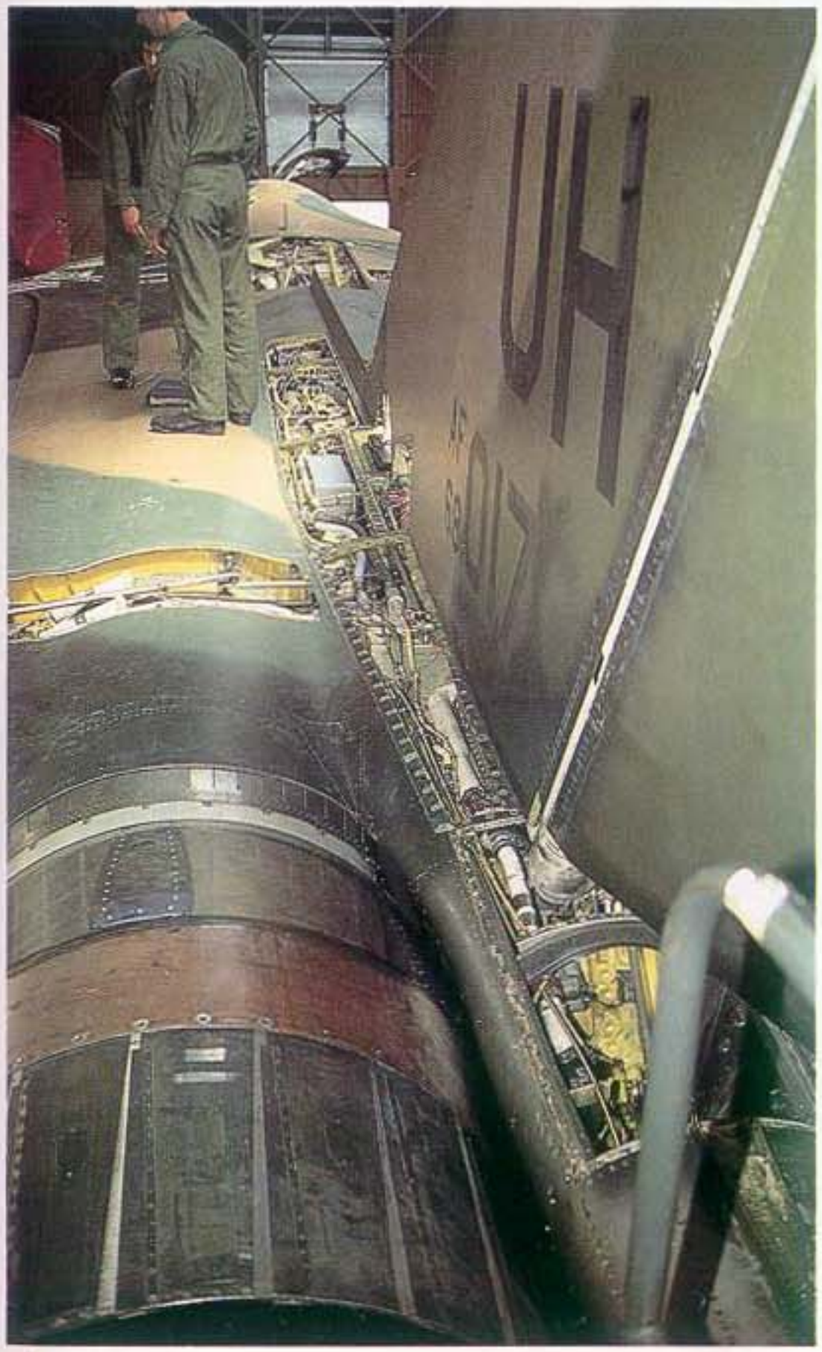


Part of the same wing as seen in the top picture but closer to the fuselage. This part is obscured when the wings are folded backwards. Note the shape of the trailing edge and the effect of the sweeping movement on the upper surface of the wing where it enters the wing housing.

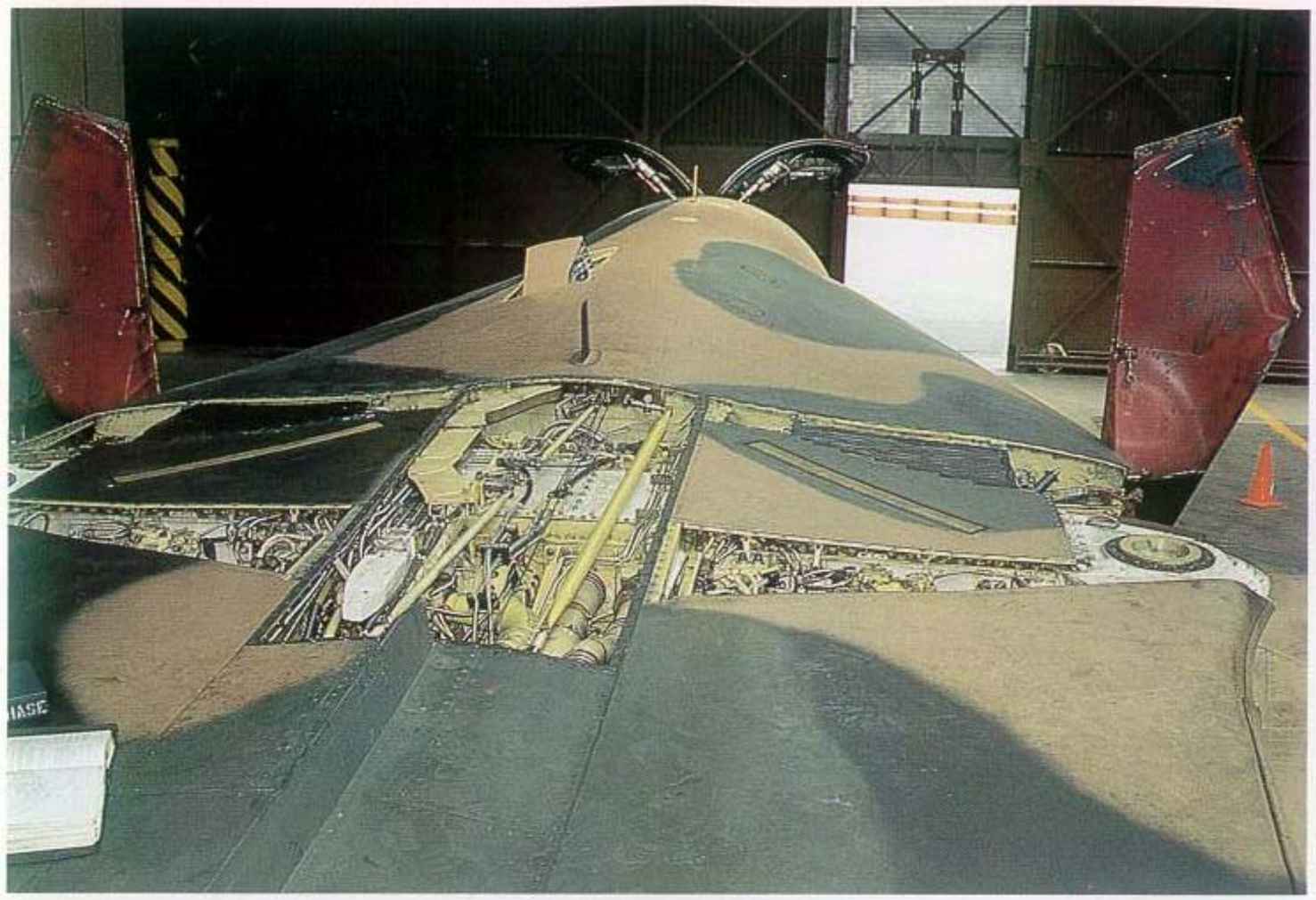


An interesting study of the right wing and it's housing area. The two upper fuselage sections covering these areas are raised and secured to allow inside inspection. The inside is painted white overall.
Further items of importance are the static dischargers on the trailing edge, the wingtip navigation lights and the low voltage formation strip.

A view of the complicated hydraulic system which operates the flaps, and the spoiler actuators. This system cannot be seen on parked aircraft because of the covers seen in this picture, which protect the system from dirt and dust.

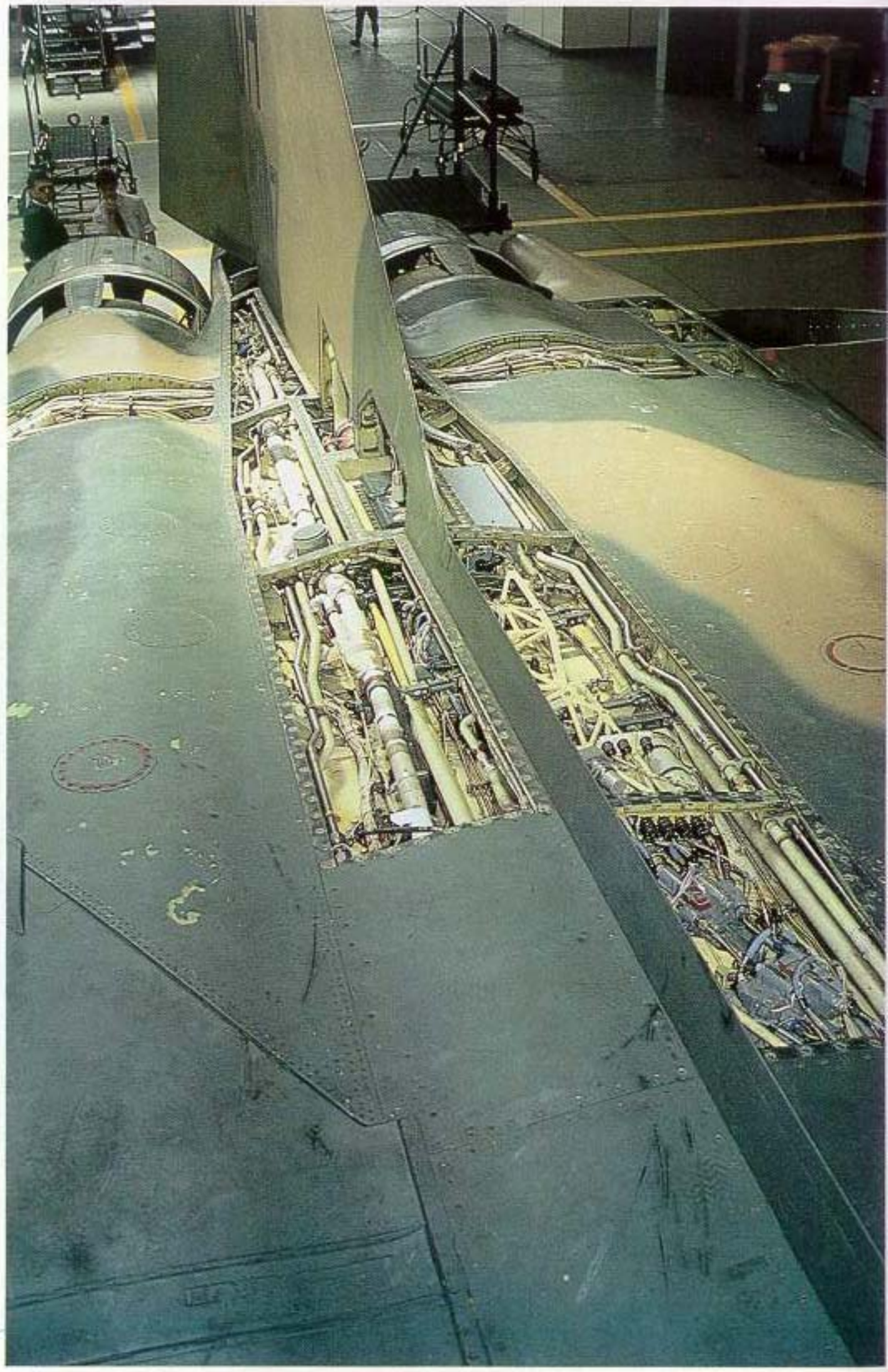


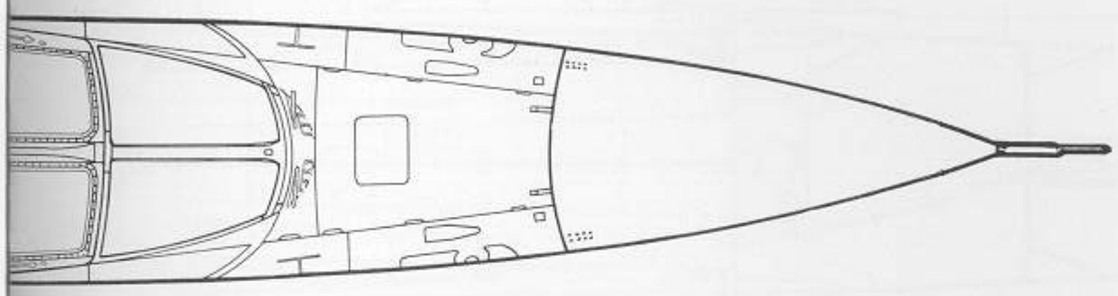
Various inspection panels have been removed here to facilitate maintenance. On the left are two mechanics at work on the servo actuator of the rudder (closest to the camera). The wing housing, first mentioned on the previous page is shown from a different angle.
Note the detector/scanner on top of the fin, the tail light and the static dischargers. Other interesting features are the aluminum 'reservoirs' to catch the oil spills.



Moving toward the nose section. The wing sweep pivot is being checked by a specialist. Yes, they go by the book, in this case two manuals describing the correct maintenance procedures.
The large panel in the top picture gives room to the wing sweep feedback and the wing sweep control box. Note the UHF antenna in front of the open panels and the two formation lights on top of the wing center-box assemblies. The inner surface of the tilted glove vanes stands out very clearly while the canopy actuators can be seen in the distance.

(Top right) The in flight refueling receptacle of which the outer panel has been removed. The receptacle is locked in the receiving position. Because of it's relative small size it must be extremely difficult to hook up the refueling boom, especially in turbulent weather conditions.
(Right) Removing these panels gives access to the pitch, yaw and roll control gear. Note the different colors.





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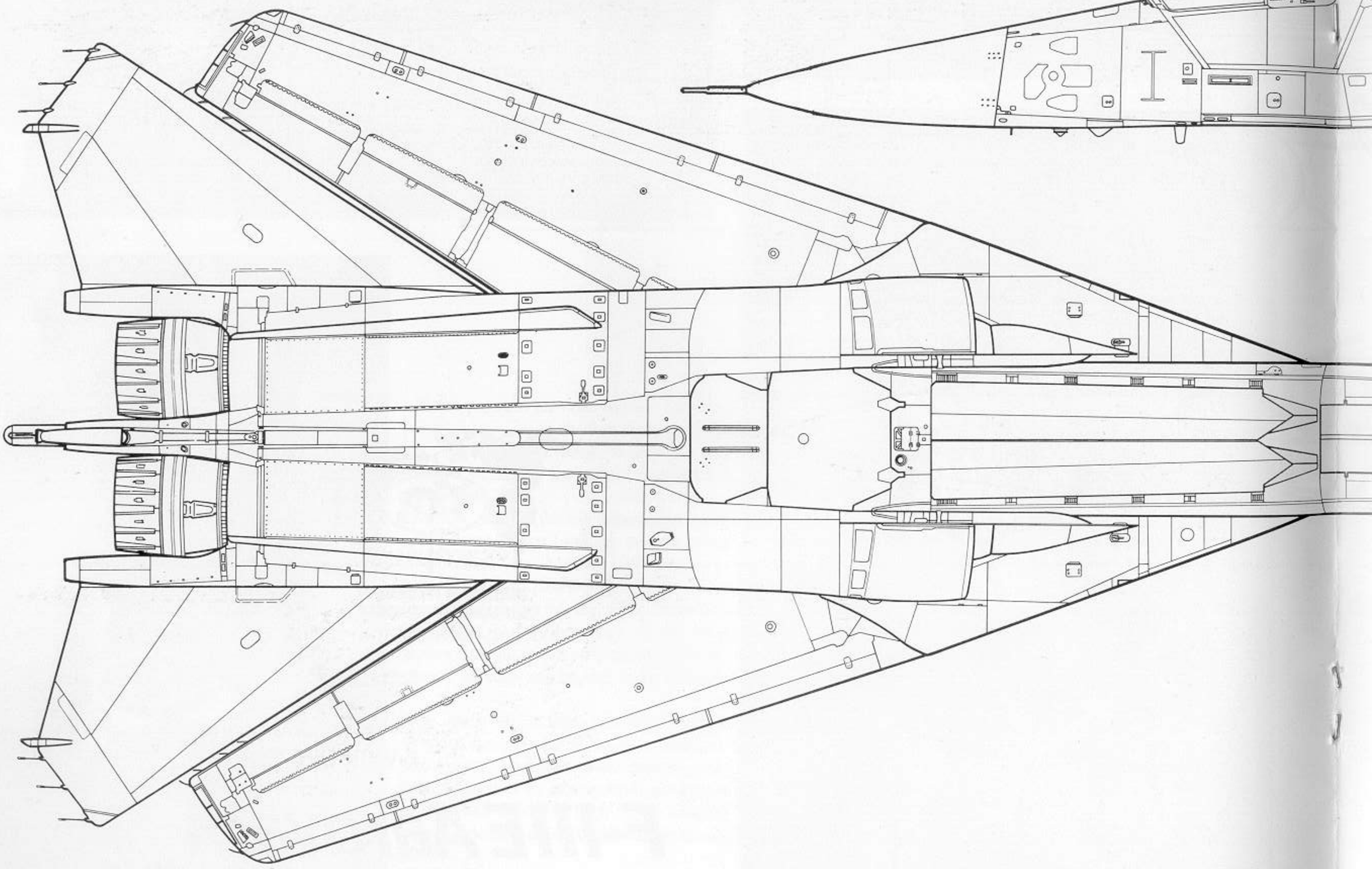
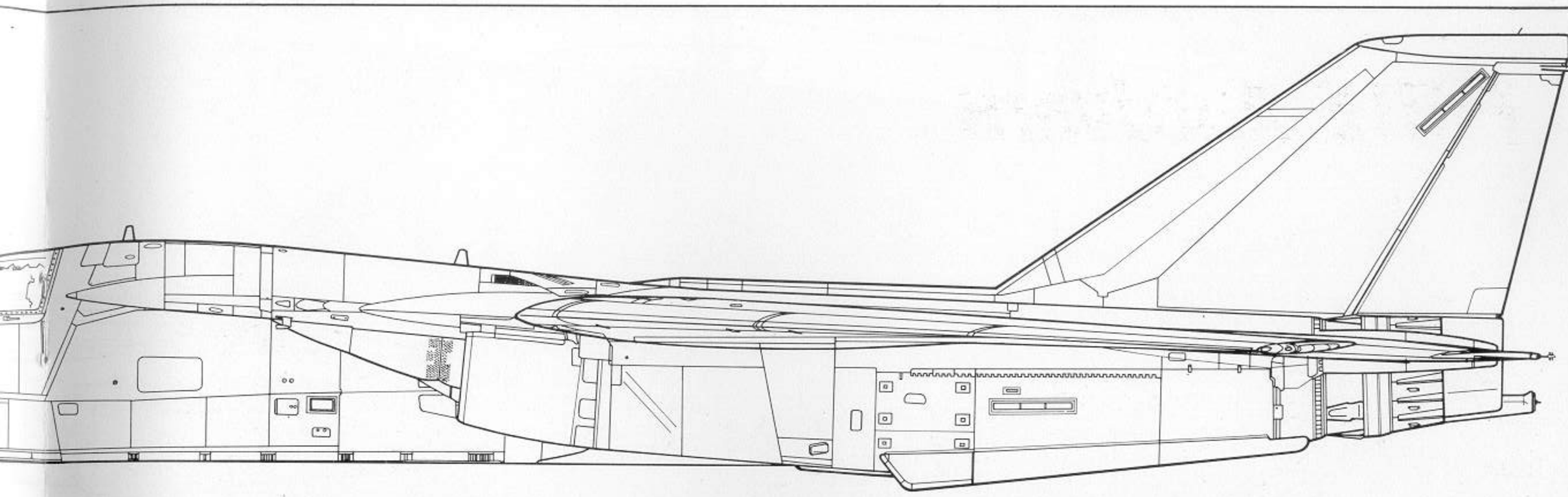
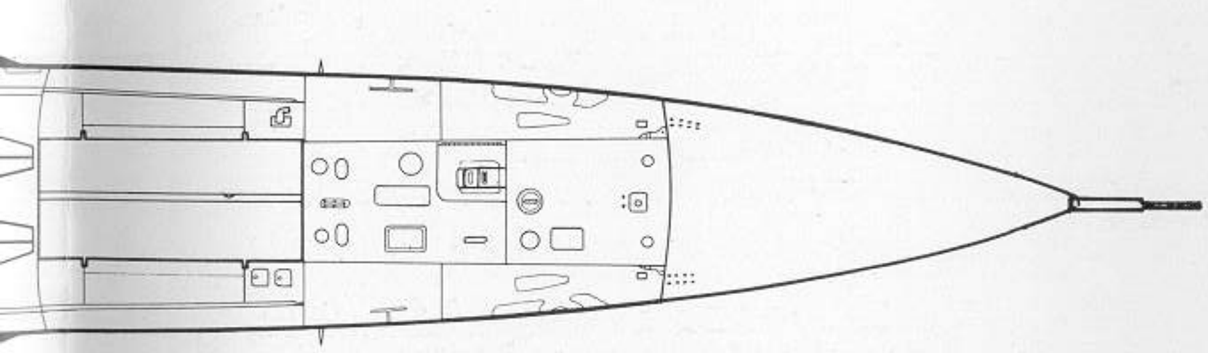
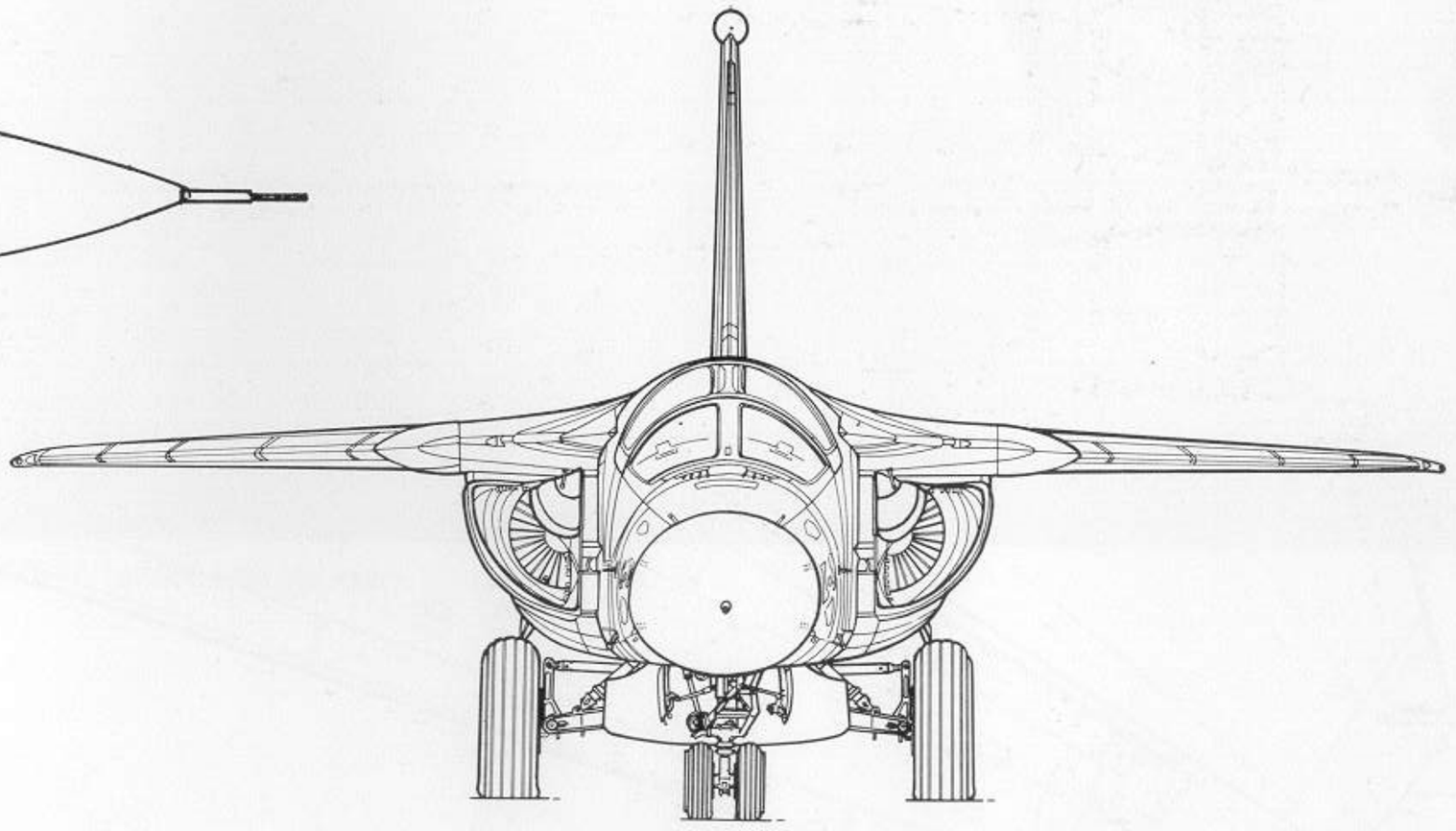
F-111E Aardvark

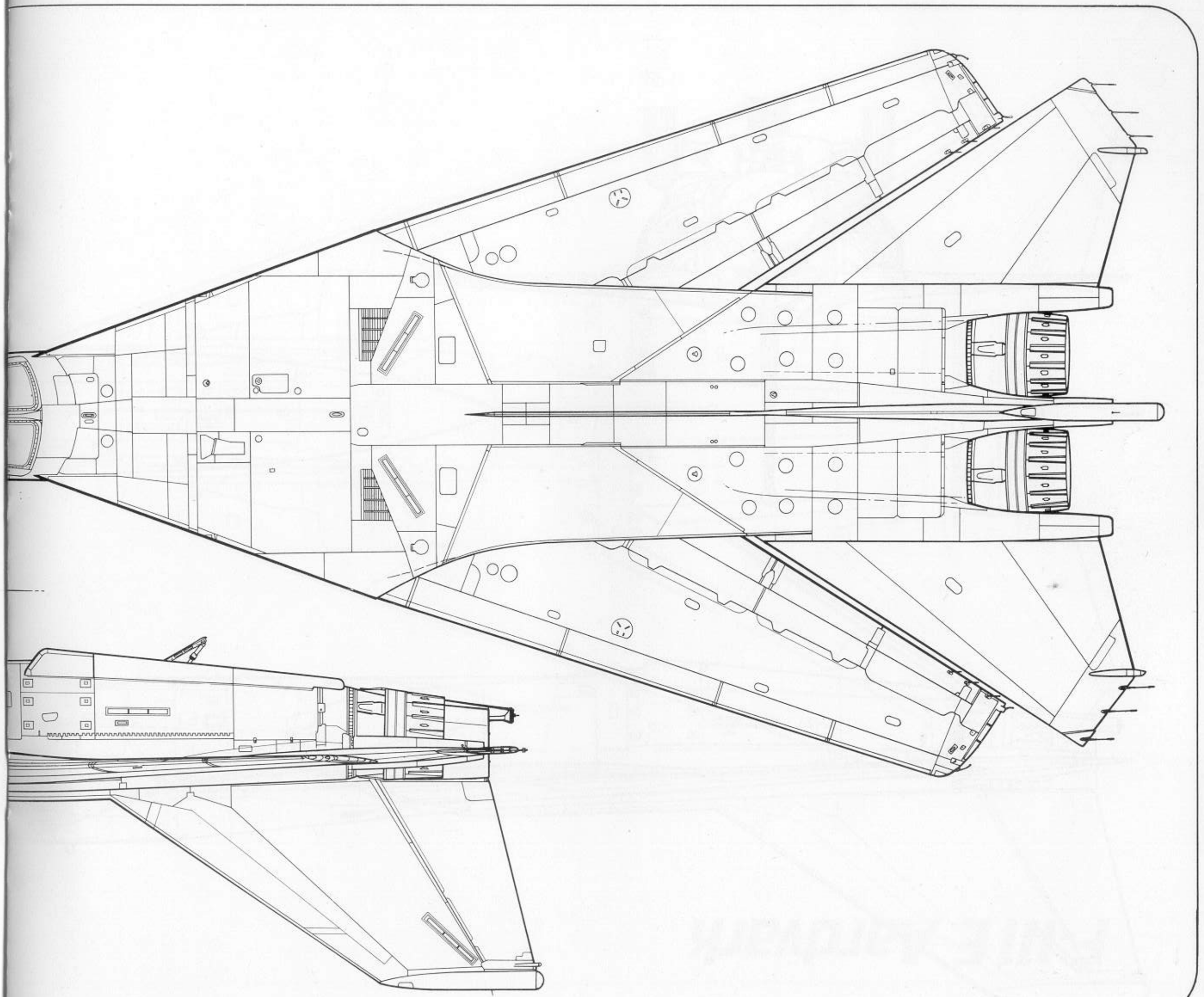
F-111E Aardvark











USAF personnel in their typical gear at work on aircraft 68017. Ladders, seats and tool-boxes are everpresent.

The avionics of the F-111E on the right side.
: differs from the bays of other F-111 types. As can be seen, all boxes can be removed within minutes and replaced by units in full working order. This reduces the io-availability of an aircraft due to computer malfunction to a minimum.

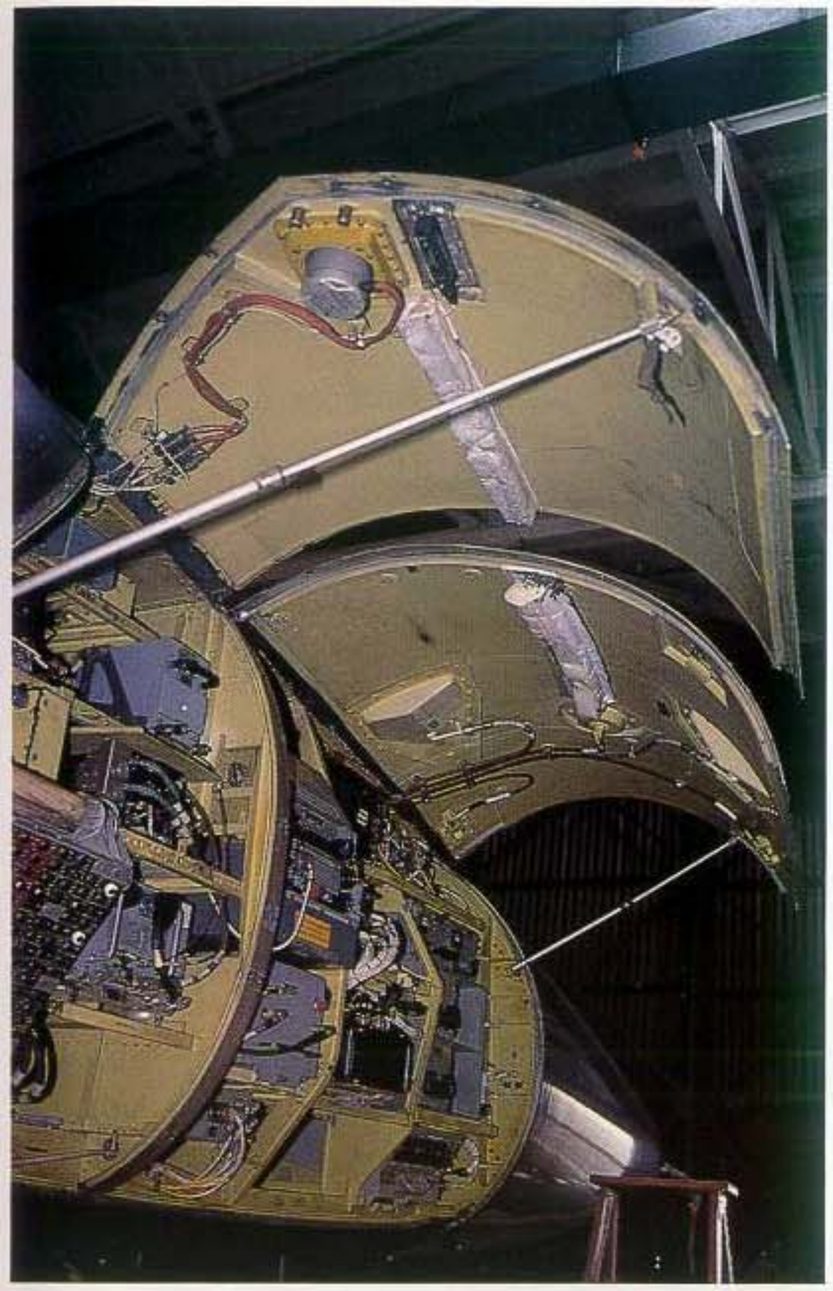
One of the unique features of the F-111 is it's capability to fly under the enemy radar ısing it's TFR (Terrain Following Radar) at high speed and in severe weather conditions, nd yet being able to avoid any obstacle ahead. A dual APQ -110 TFR system from Texas Instruments controls all flight maneuvers so the pilot and copilot can fully concen-rate on the upcoming target. This APQ-110 TFR can be seen in the most forward rack n the picture above.

In case the dual system should fail to function in any matter, it automatically com-nands a 2G pull-up maneuver and gives a warning signal to the pilot.

The other boxes in this bay and in the bay on the opposite side of the fuselage are for communications, navigation and identification such as a Singer GPL Doppler radar, ARN-52 Tacan, ARA-50 UHF transmitter and an IDF system.

Besides, the F-111 was the first to have an internal integrated warning system for all radar and IR (Infrared) wavelengths. In fact, the typical panels in the nose of the F-111 just aft of the radome are side-looking aerials which are part of the APS-109 RHAWS (Radar Homing and Warning System). These glassfibre panels were painted over from 1979 onwards.

The circuit breaker panel in the left bay is quite large, illustrating the multitude of systems on board of the F-111.



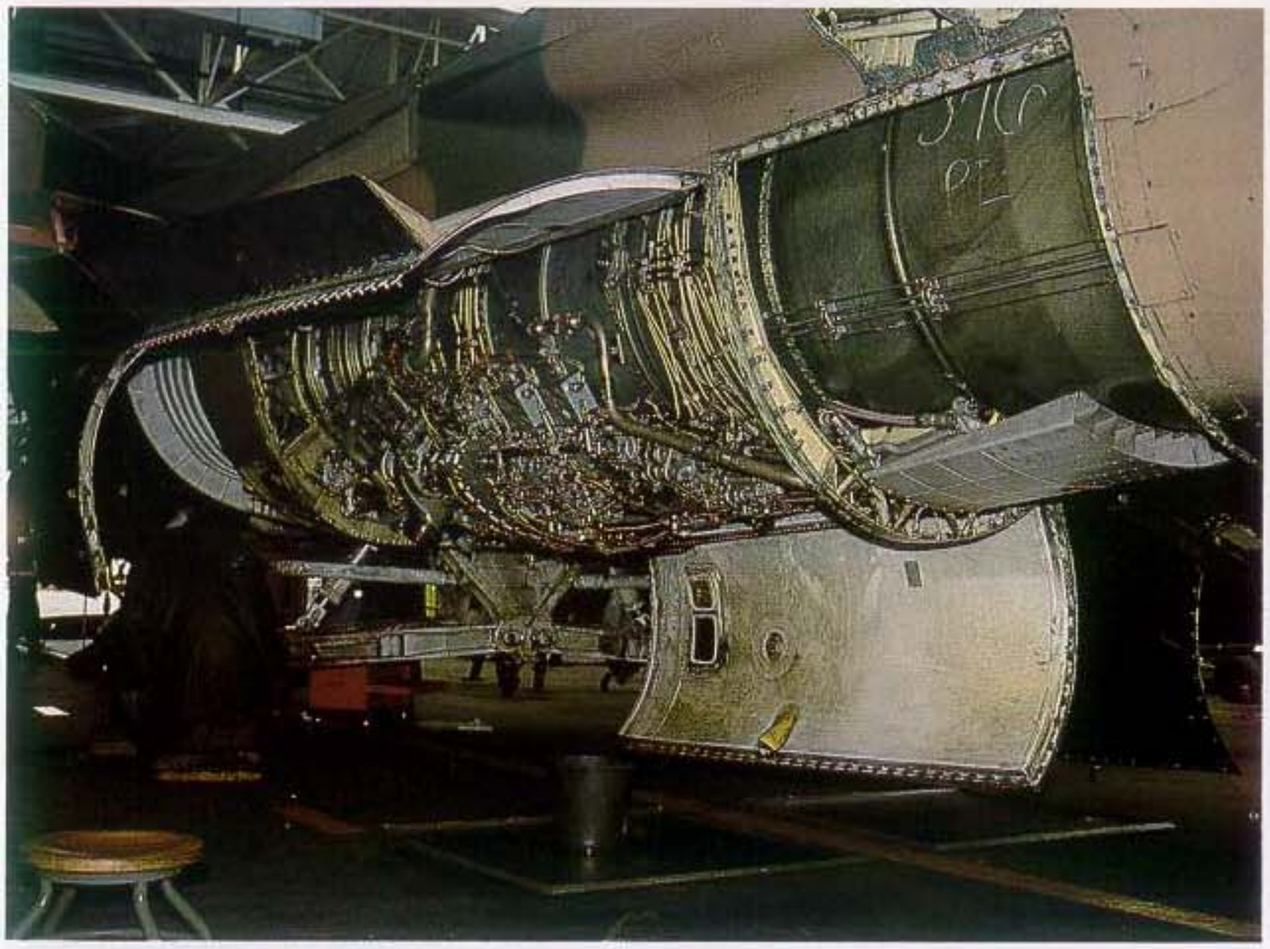
(Left) The inside of the panel covers. The device on the hatch closest to the camera is the angle-of-attack data link. Note the foam padding on both hatches.
On the front hatch is the other side of the glassfibre panels of the radar homing and warning system.
The grey avionics boxes stand out very clear against the zinchromate inside of the avionics bay. Note the gloss finish of the radome up front and the telescopic struts holding the hatches in the open position.

(Right) To be able to test the systems some have to be switched on, so external power and feed lines are needed, as well as hydraulic pressure. The connector panel is located aft of the right main wheel.

The supply cart in the bottom right picture is typical USAF and may differ in appearance from one airbase to another.
Note the protective mask the mechanic is wearing, mandatory for all personnel working with dangerous fluids like liquid oxygen and liquid nitrogen which are used quite extensively in modern day aircraft.

More electronic control boxes, including the ILS receivers are revealed on the aircraft in the background.

A final shot of the wing housing area. Note the kind of material used to seal the wing surfaces. Various systems can be found on many different airplanes, such as the Tomcat and the Tornado and no doubt, all will have their advantages and their drawbacks.



Detailed coverage of the Pratt & Whitney TF30-P-3 of wich two are used to power the F-111. The top pictures show the engine from the right side while the two bottom pictures are of the port side engine.

Only the A,E and EF-111A types of One-Eleven's use the P-3 engine who replaced the troublesome P-1 version. Other variants of the TF-30 are the P-7 used in the FB-111A and the P-9 fitted only to the F-111D. The ultimate version of the F-111, the F-111 F uses the ultimate version of this engine, the TF30-P-100. More on this one later.

From the start, the F-111 was designed to have two engines side by side, mainly for the reason of it's low level missions which enhance the dangers of a birdstrike resulting in the loss of an engine or, at least, a precautionary shut down of one of the engines.

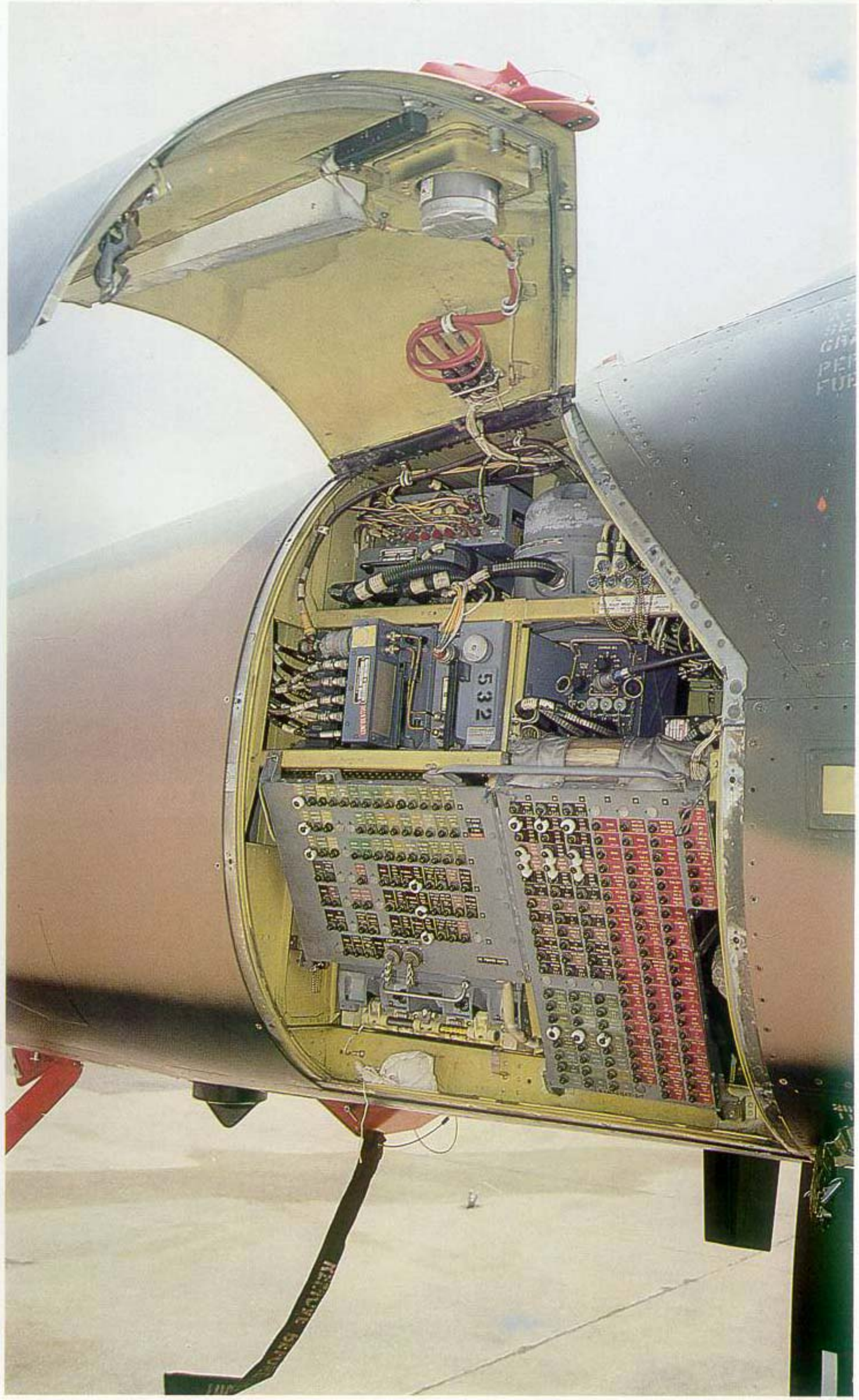
The TF30-P-3 is a turbofan which has the advantage over regular turbojets in that it extracts more power with additional turbine blades. It uses this power to drive a seperate fan at the rear or a low-pressure compressor at the front. The extra fresh air does not pass through the engine but is discharged by-pass the hot core from the engine. This way it serves as a cooler and as a noise reducer. When it passes the engine it still contains all of it's oxygen so it's possible to burn a great deal of extra fuel to give a very large thrust boost. The P-3 counts for about 18,000 lb of thrust.

It is interesting to see that part of the panels are removed completely while the rest is hinged.

The pylon on the left wing. With part of the paneling removed one has a better view on the single pivot attachment. A closer look will reveal the lower side of the pylon which has a lot of holes to allow the connector pipes for the fuel tanks or the connector wires for the MER's and other weaponry to be hooked up.

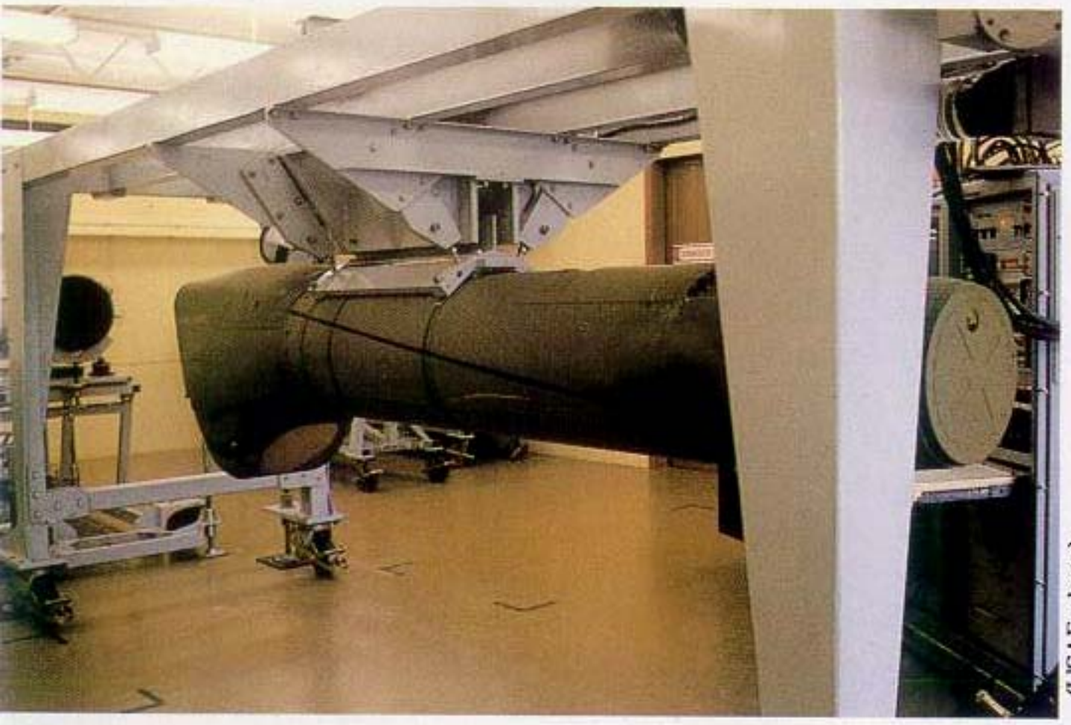
The picture above, where a friendly crewchief is holding the hatch (which is actually quite heavy to lift), shows the complete inside of the bay door.

(Right) An exellent view of the electronic bay on the port side. Two more circuit breaker panels have been installed here. Note the power lines which run from the boxes on the middle rack through the bulkhead into the nose cone where they are connected to the Attack Radar Antenna, the glideslope antenna and the terrain following radar.



(USAF photo)

The F-111 F. The 'hottest' F-111 produced so far. It differs from the other One-Eleven's in more than one way. To start with, a less expensive avionics package was installed. External differences were an improved landing gear and new exhaust nozzles because of the installation of the newest TF30-P-100 engine.



(USAF photo)

The most significant features carried by F-111 F's are the Pave Tack laser guided targeting system. The Pave Tack pod, which can be seen fitted into it's test stand in the bottom picture, is normally housed inside the weapons bay from where it is extended as soon as the target area approaches. The Pave Tack body is packed with electronics, digital computers and a cooling unit for the onboard computers. The spherical Head Unit can be rotated, even at high speed, to look in any direction below the aircraft, and this with great precision. In this head are mounted an AAQ-9 FLIR and an AV YAG (YTTRIUM/aluminum garret) laser on top of each other.

The line of sight can be either controlled by hand or automatically by various systems. Once the laser designator is set on the target (it can be used at all times of day or night and in all kinds of weather), it remains tracked despite evasive maneuvers performed by the pilot.

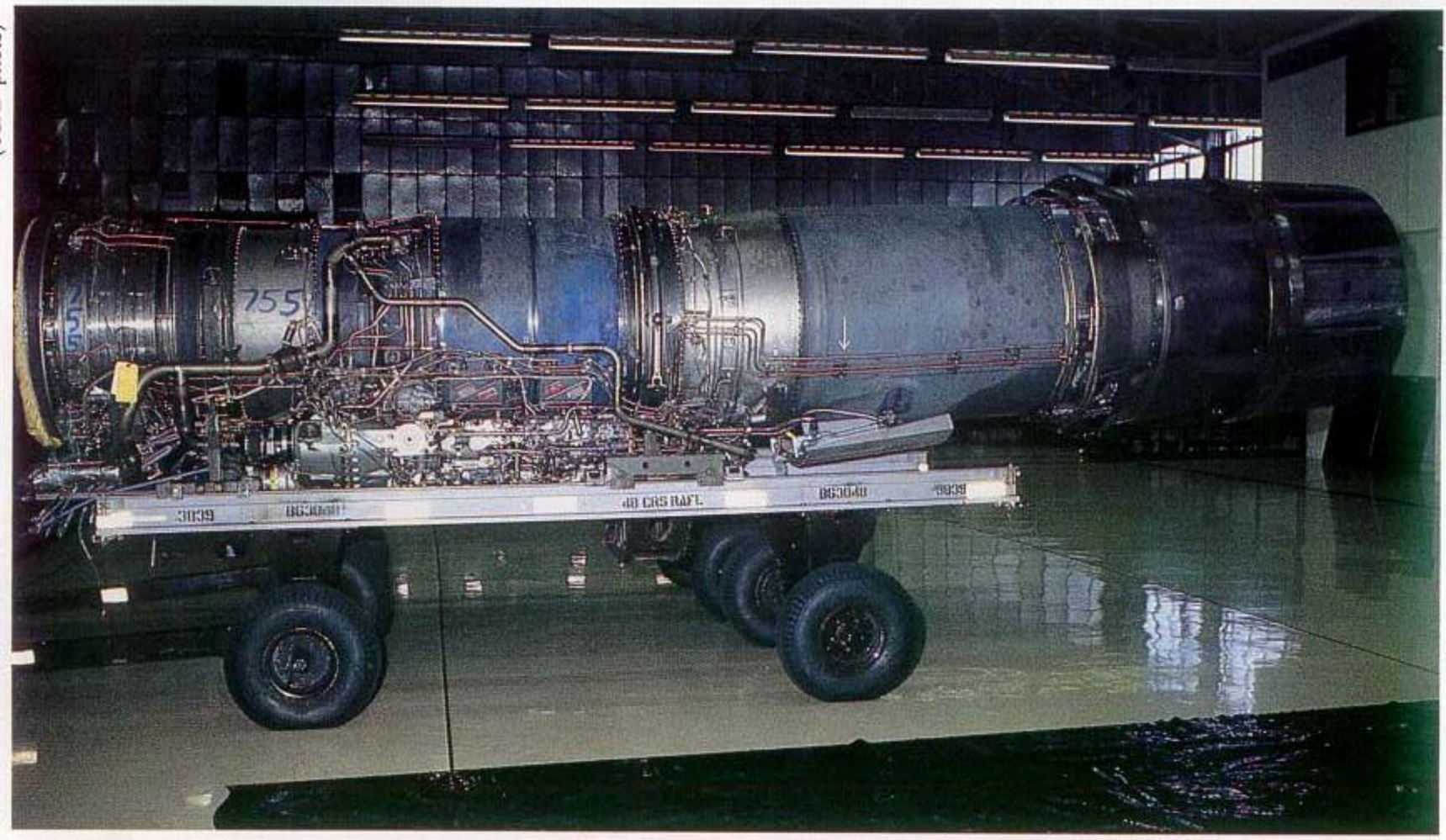
When the laser-guided Paveway II 'smart bombs' are released, they will home in on the laser illuminated target. In the meantime the AN/ALQ 131 ECM jamming pod on the aft fuselage pylon will take care of the enemy radar and other search systems, making detection of the approaching F-111 extremely difficult, if not impossible.

The successful raid on Libya in 1986 proved the accuracy of the system because the attack on Col.Khadaffi's quarters surprised friend and foe alike.

Modelers, wanting to build an accurate F-111 F on 1/48th scale can find all three devices in the Verlinden Productions F-111 F Update Set.

(USAF/ Sgt David Nolan)

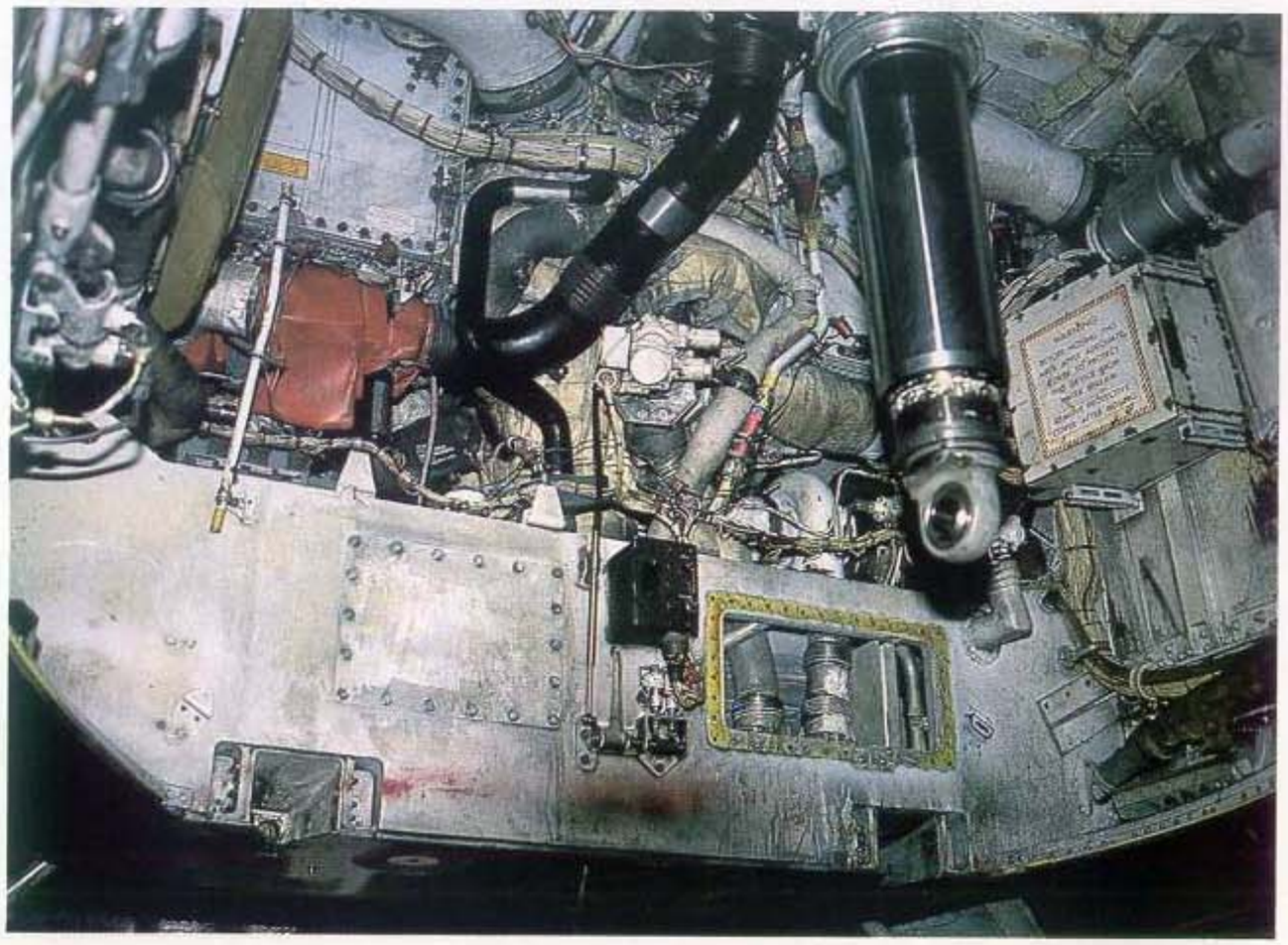
(USAF photo)

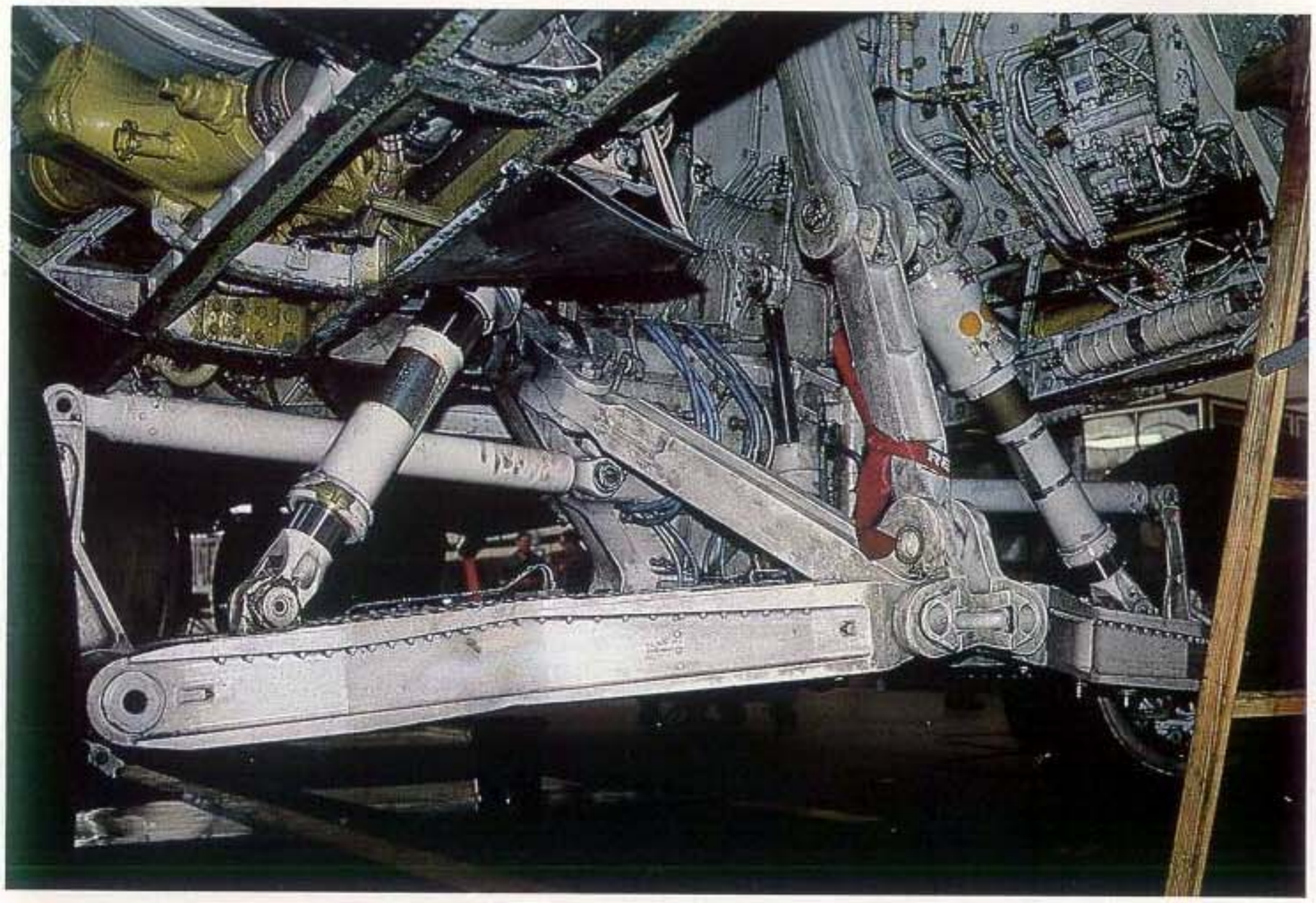


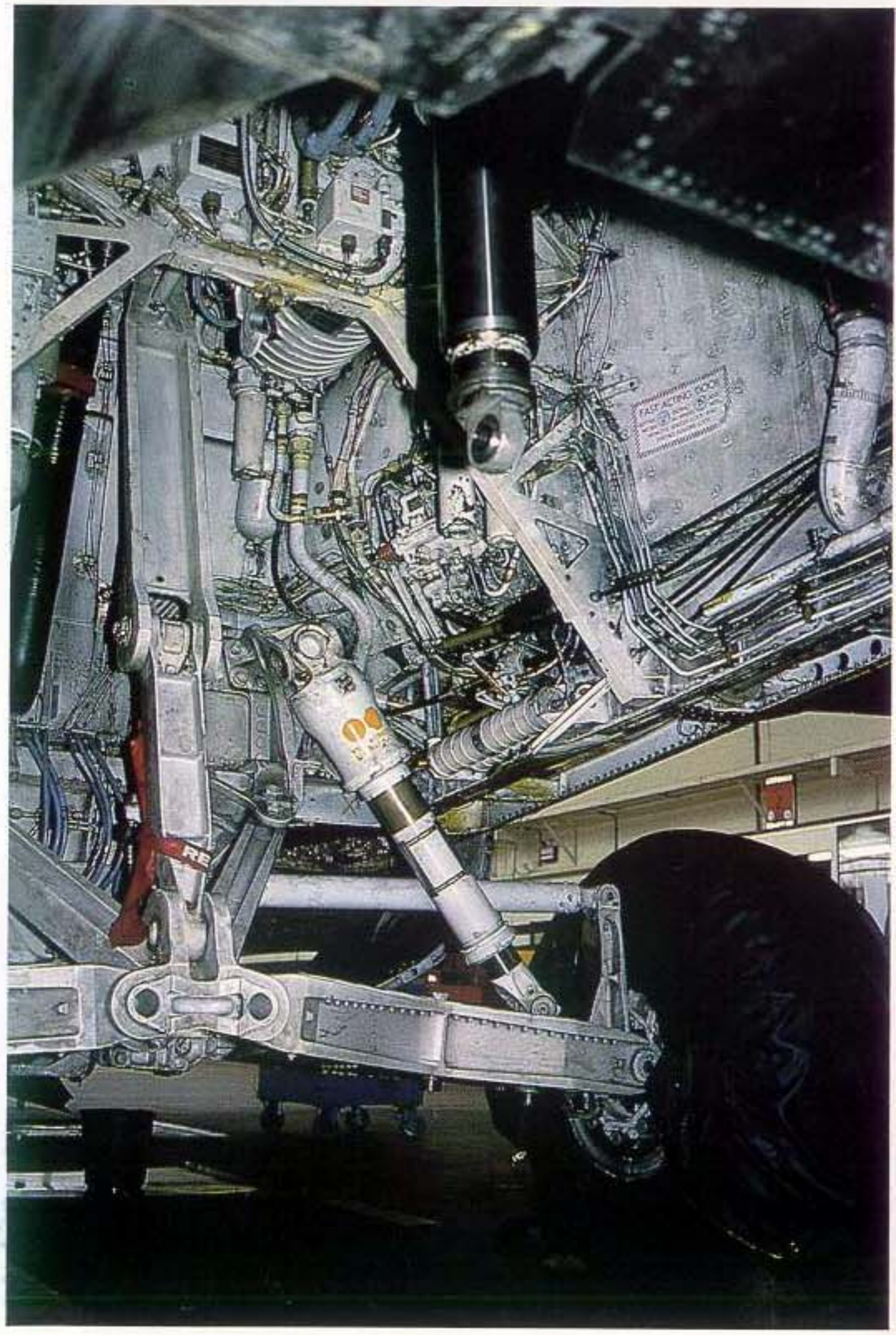
(Above) A smashing in flight shot of the F-111 F, high over the clouds of England and with it's gear down. This very attractive picture shows the Sidewinder missile carried on the outer pylon.

(Right) The powerful Pratt & Whitney TF30-P-100 engine of the F-111 F. Note the different exhaust nozzle. Most of the jet engines have all additional gear located at the bottom of the engine body where it can easily be reached for in-between maintenance repairs. Compare the immense size of the engine to the length of the support cart.
By the way, have you ever seen an engine workshop as immaculately clean as this one?

Landing gear







Another characteristic of the F-111 is it's unique main landing gear system. Figuring this out must have cost a lot of aspirin and phone calls in the morning.

Mechanically linked arms and holdback bars are connected to various attachments on the main gear assembly. One main servo is pulling the landing gear upward into the wheel well while two side servos fold the split bottom part together. Meanwhile, the wheels are rotated inwards and fit sideways in the wheel well. Note how the rotating wheels have smuttered the entire inside of the wheel well.

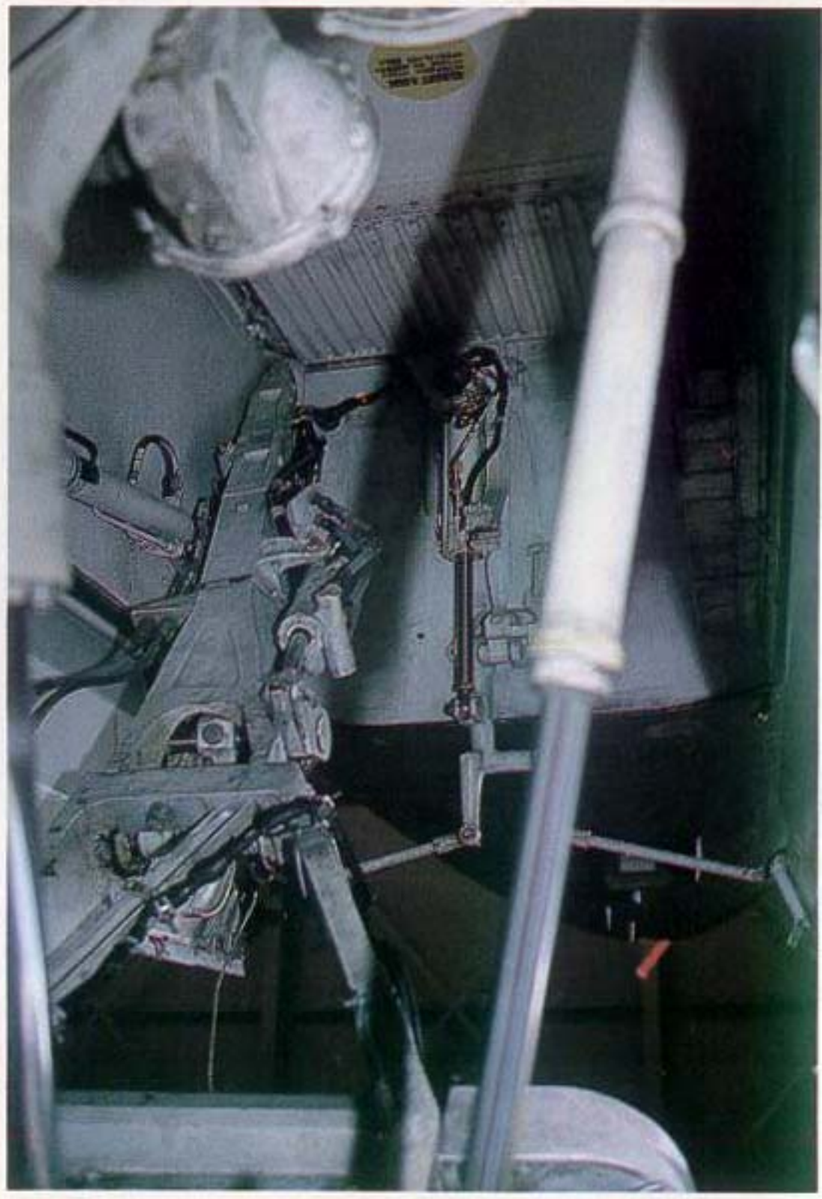
A lot of electrical wire, cooling pipe lines, hoses and other by-pass lines traverse through the main wheel well.

(Left) The inside of the main wheel where it is connected to the gear assembly.

Due to it's long and heavy nose, the F-111 has a sturdy, dual wheel nose landing gear. Again, this was probably developed with carrier landings in mind.

The nose gear is of course steerable and what is quite remarkable on F-111's coming in after landing, was the fact that the wheel on the inner side of the turning circle of the taxiing F-111 actually came of the ground during this maneuver.

The landing gear strut has three landing lights. At the center of the aft end of the well is the bottom part of the rocket motor for the crew module escape system.
Notice how the forward brace is linked to the left side of the well instead of being centered. Here you have a good view on the door retracting mechanism.



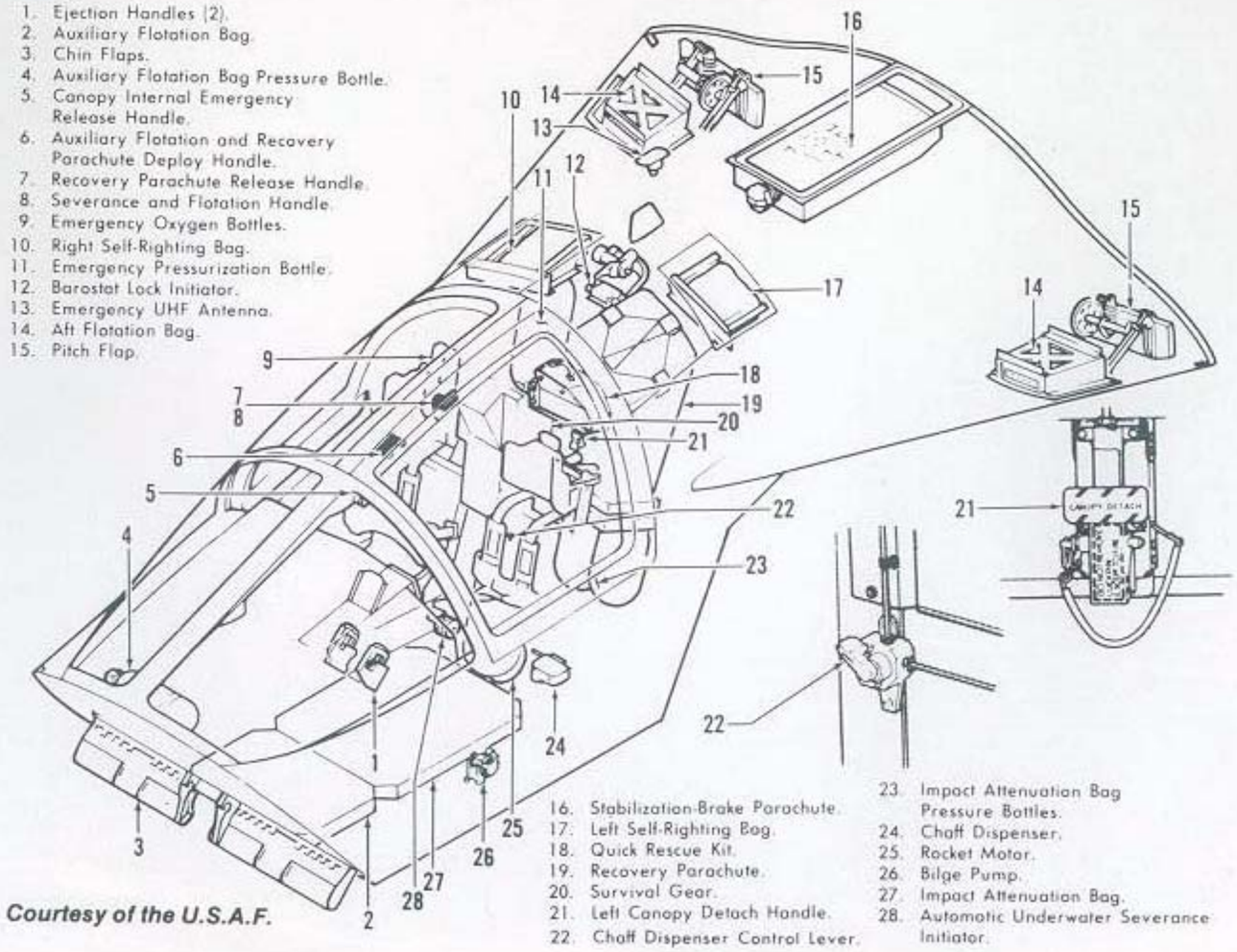
The immense weapons bay looking forward. It is very interesting to see how the bay doors are being folded outward while the most forward surfaces split in segments. This is done to give way to SRAMS carried by the bomber version of the F-111. Two of these SRAMS fit into the weapons bay, attached to the pylons seen in the center of the upper bay wall. Note the rims on the front wheel tires, they prevent splashing runway water from entering the air intakes while on take-off.

Besides these SRAMS a 20 mm cannon assembly can be installed inside this weapons bay. A large ammunition drum is secured on a previously installed platform and part of the lower door has a custom made fairing attached to it. Few F-111's have this gun installed.

Notice the bay doors are retracted by one retracting brace only on the aft side of the bay. Like the main wheel well, the inside of the weapons bay is painted white overall.

Cockpit

Instead of having ejection seats to hurl them out of the cockpit, the crew of the F-111 is ejected into the air inside a spacecraft-like capsule. Upon initiation of the jettisoning procedure by either pilot or copilot, explosive cutting cords seperate the module from the aircraft and a 40,000lb (18000 kg) thrust rocket shoots it straightup into the air, regardless of speed and height. A stabilization parachute automatically unfolds and the capsule lands on it's ventral airbags.



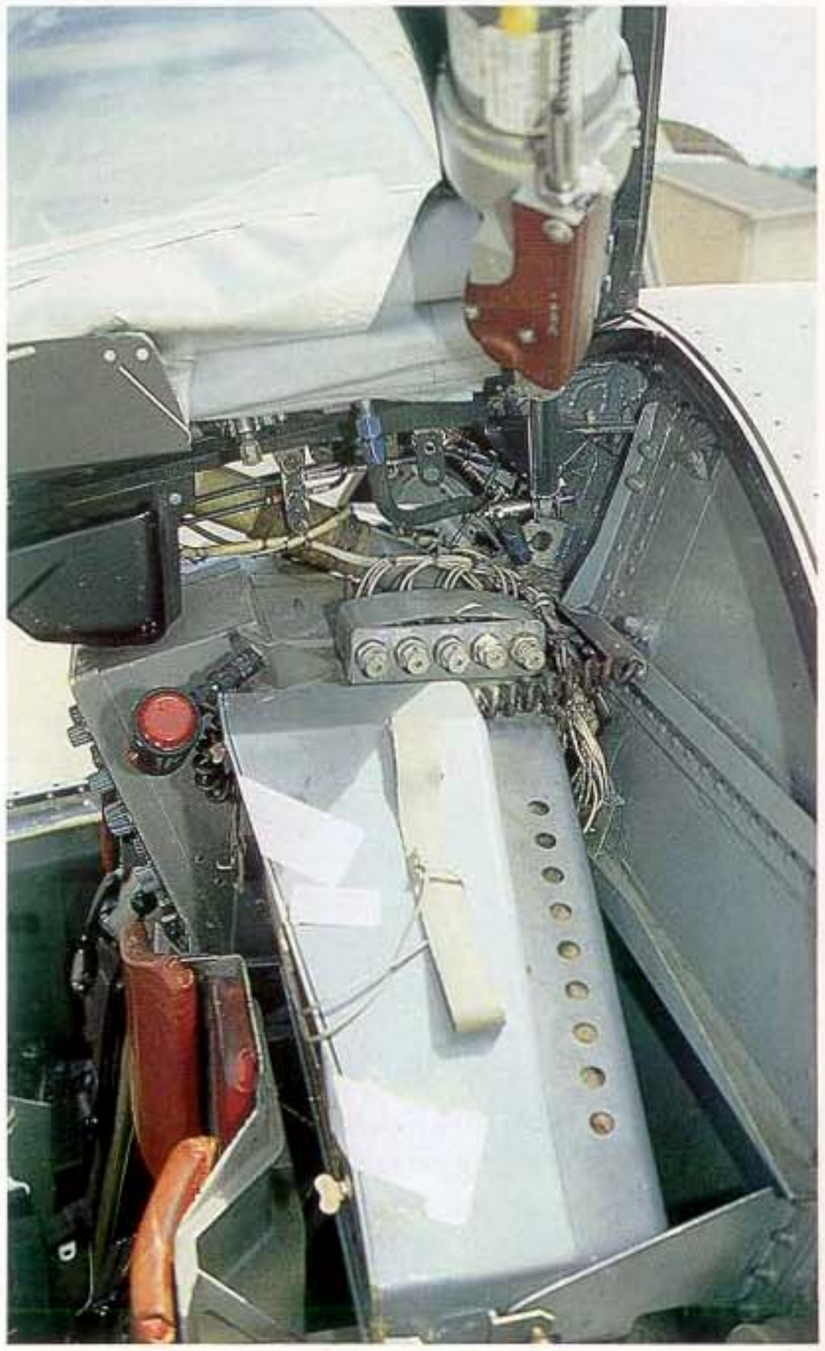
1. Ejection Handles (2).
2. Auxiliary Flotation Bag.
3. Chin Flaps.
4. Auxiliary Flotation Bag Pressure Bottle.
5. Canopy Internal Emergency Release Handle.
6. Auxiliary Flotation and Recovery Parachute Deploy Handle.
7. Recovery Parachute Release Handle.
8. Severance and Flotation Handle.
9. Emergency Oxygen Bottles.
10. Right Self-Righting Bag.
11. Emergency Pressurization Bottle.
12. Barostat Lock Initiator.
13. Emergency UHF Antenna.
14. Aft Flotation Bag.
15. Pitch Flap.
16. Stabilization-Brake Parachute.
17. Left Self-Righting Bag.
18. Quick Rescue Kit.
19. Recovery Parachute.
20. Survival Gear.
21. Left Canopy Detach Handle.
22. Chaff Dispenser Control Lever.
23. Impact Attenuation Bag Pressure Bottles.
24. Chaff Dispenser.
25. Rocket Motor.
26. Bilge Pump.
27. Impact Attenuation Bag.
28. Automatic Underwater Severance Initiator.

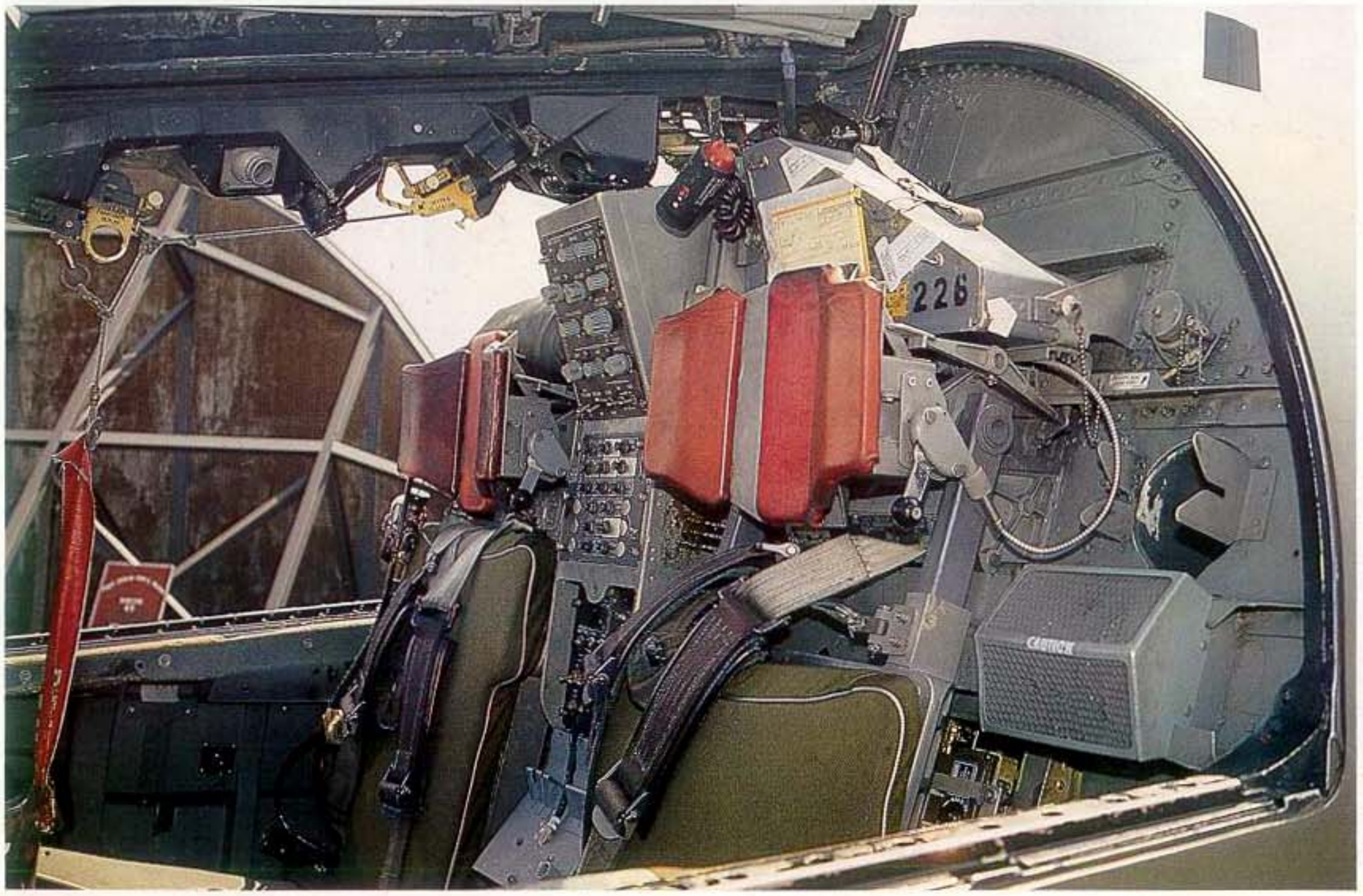
Courtesy of the U.S.A.F.

The pilot in the picture above is still wearing a colorful helmet, which becomes a rare sight with todays fighter jocks who prefer the grey colored lightweight type of helmet.

These three pictures start a chapter which covers the F-111 E cockpit up to the part where classification procedures stopped the camera from taking more pictures, which in this case is more than adequate to update a model.
The photo at the top shows the overhead control column. The yellow handles are for capsule parachute deployment and to activate the floatation bags in case the capsule lands on water. Defogging and air ventilation scoops are also located on this console. Note the safety pins and the connecting safety cord.

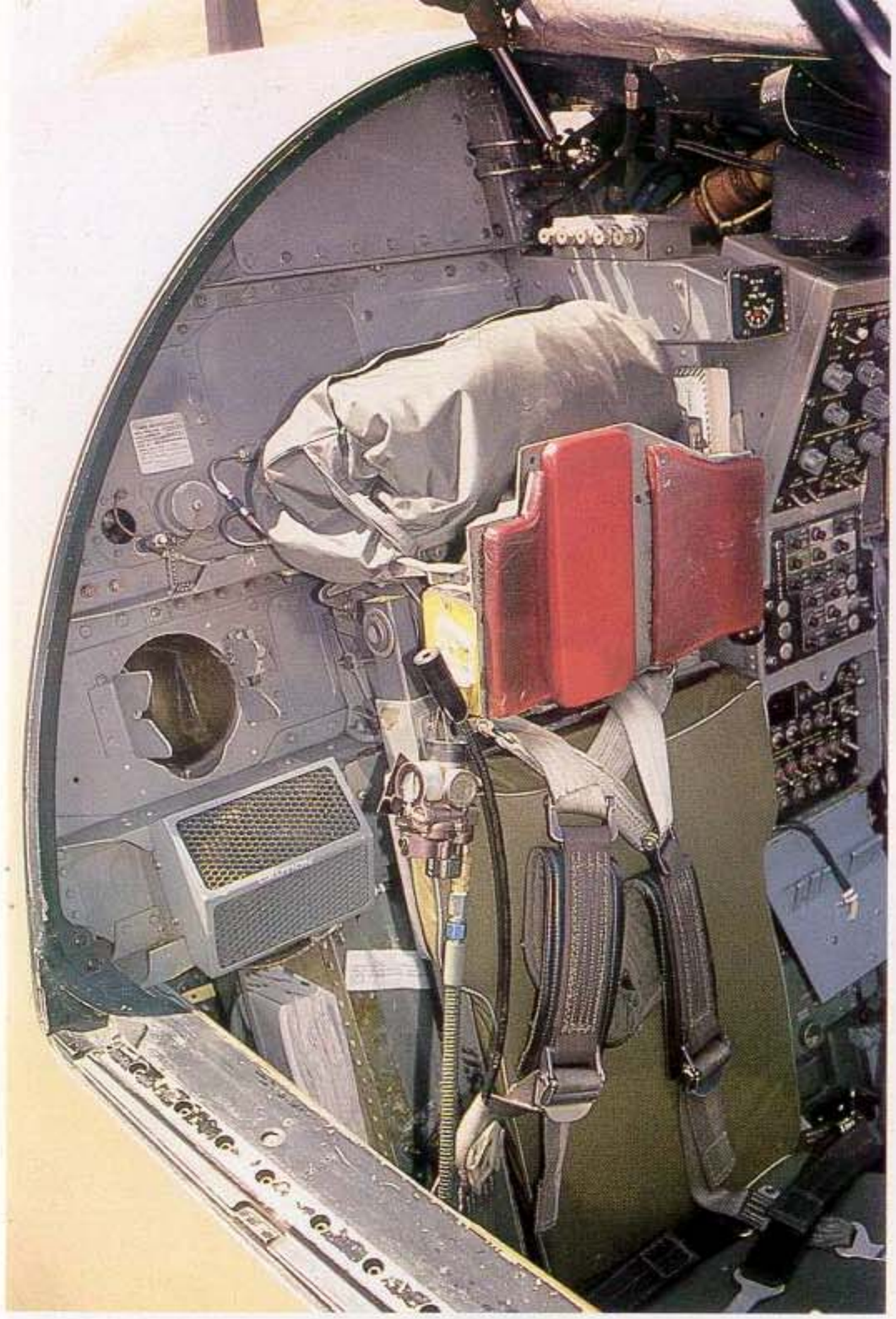
With the two bottom pictures we begin a view in and around the cockpit of the F-111 E.

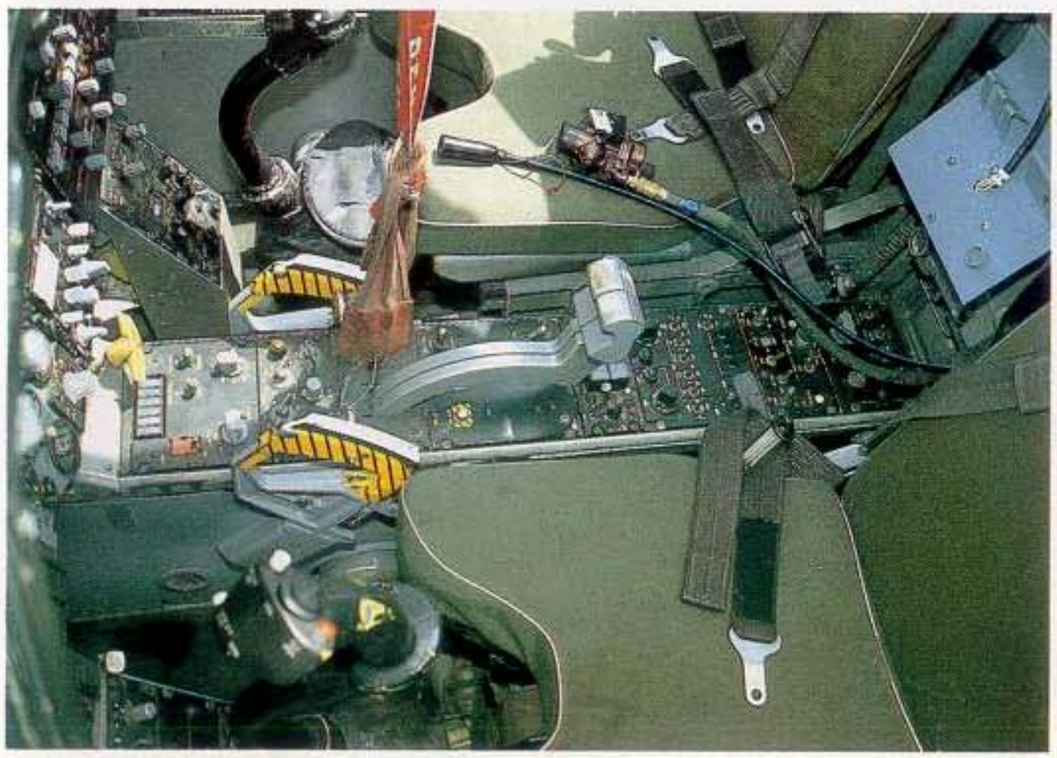




A panoramic view of the dual-seat, side by side cockpit. This set-up required a central console to store some of the panels such as the fuel control panel, ECM panel, electrical control panel and air conditioning panel. The copilot's (or WSO's) throttle quadrant is located on the same console but the most prominent features are the two ejection handles. Note that both crewmembers have a control stick at their disposal; so either one of them can take over in emergency situations.

The handle on the right sidewall allows the WSO to control the Attack Radar Tracking. The little panel with the red knob is the seat adjustment switch.
The oxygen hose/communication hook up can be seen on the seat cushion. The remove before flight tag is connected to the safety cord seen on the previous page.

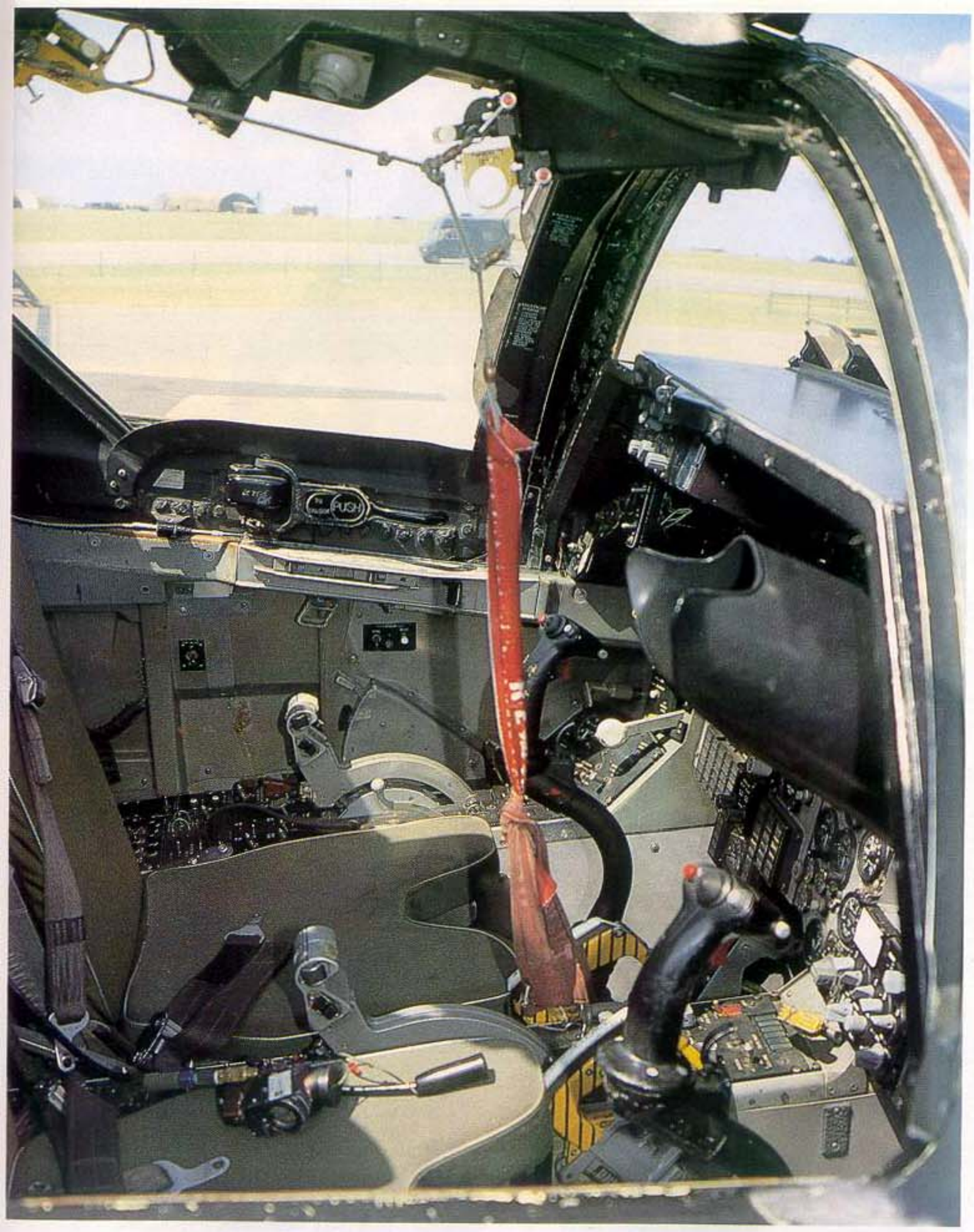




Two views of the aft cockpit wall and the bulkhead console. The seats are tightly secured to the bulkhead. They can, however, move up and down on command.

The screen covered box next to the seat is an air diffuser. Imediately below it is a map stowage compartment. The hole above the air diffuser can be used to hold liquid containers for the crew. The little box on top of the bulkhead console is the internal lighting fuse panel. The bulkhead console itself houses from top to bottom: the lighting control panel, a circuit breaker panel and the ground check panel. The bottom panel is the oxygen suit control panel.

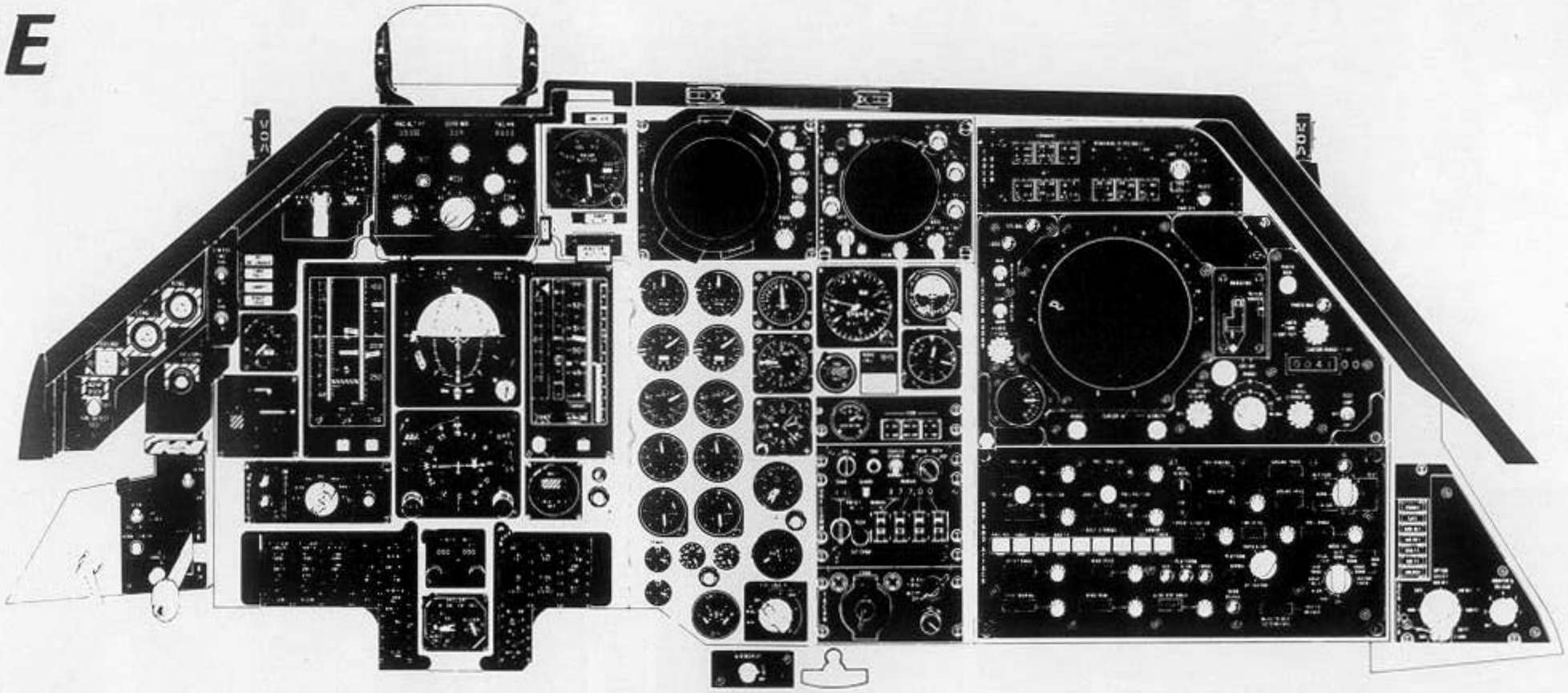
(Left) The center console holds the following control panels, from left to right (or from forward to aft) : the fuel control panel, the TFR panel, the throttle panel, the ECM pod control panel, the IFF control panel, the electrical control unit and the air conditioning monitoring panel.

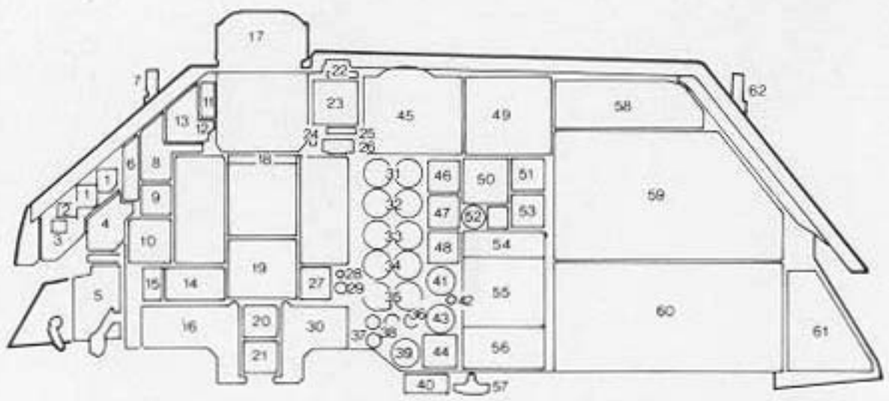


(Top) Looking in the cockpit to the pilot's office. His throttle quadrant has additional control levers such as the throttle friction lever closest to the camera and the Flap/Slat handle closest to the sidewall. It is the pilot only who controls the landing gear by the lever on the main panel. Note the scoop over the Attack Radar Scope and the wing sweep control lever on the upper part of the pilot's sidewall.

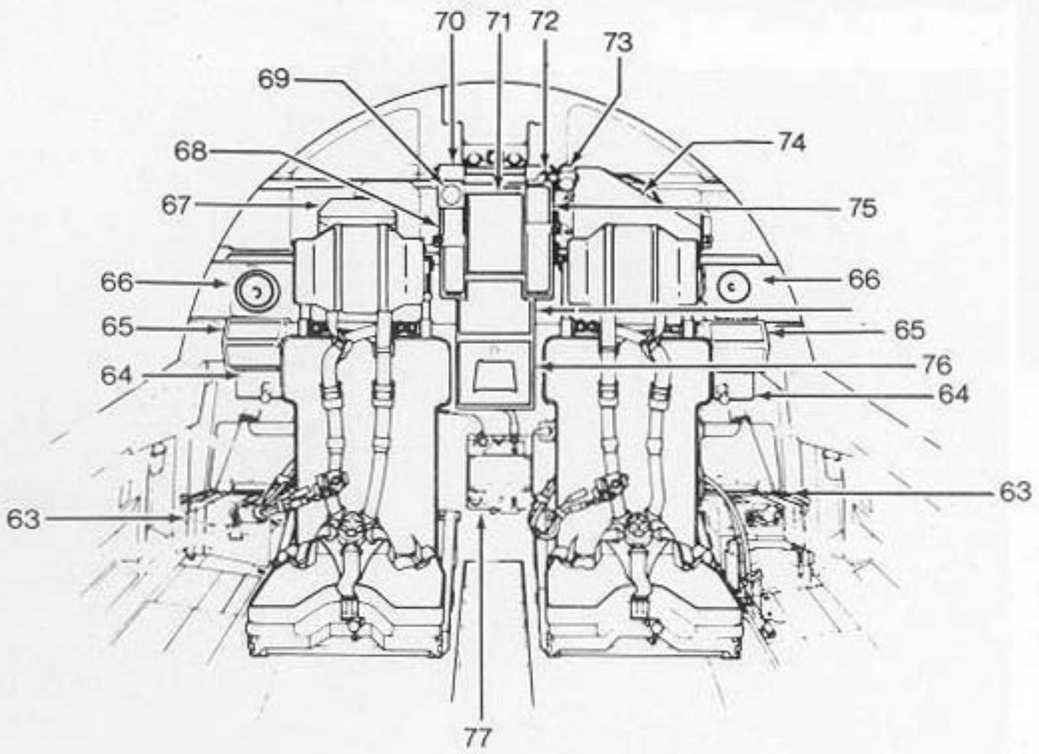
The other three pictures cover the canopy framing, inside as well as outside. The Lead Computing Optical Sight for the pilot is located on the instrument cover just beneath the windscreen.

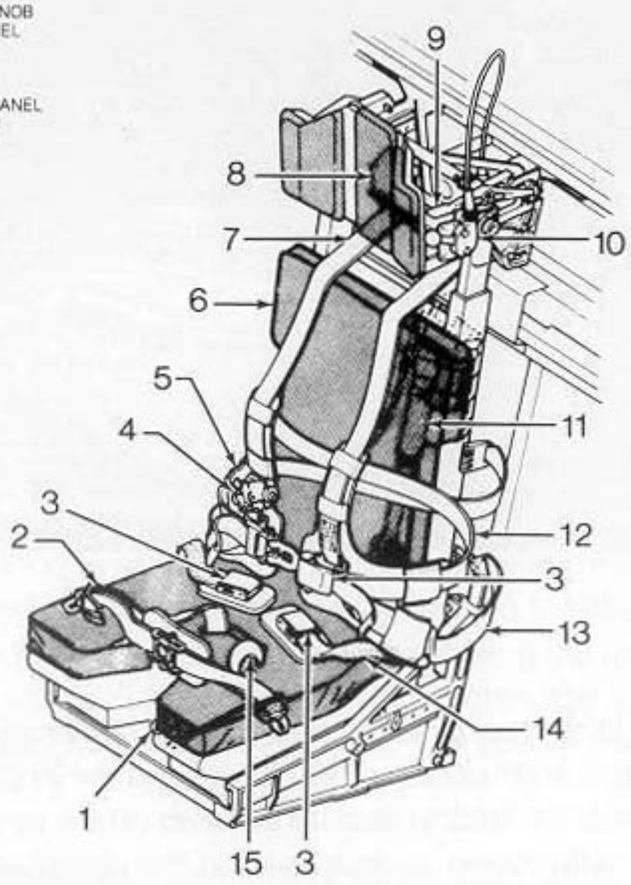
F-111E





1. ENGINE FIRE PUSHBUTTON WARNING LAMPS
2. FUSELAGE FIRE PUSHBUTTON WARNING LAMP
3. AGENT DISCHARGE/FIRE DETECT TEST SWITCH
4. EXTERNAL STORES JETTISON BUTTON
5. LANDING GEAR CONTROL PANEL
6. ECM POD TRANSMIT CONTROL SWITCHES
7. ANGLE-OF-ATTACK INDEXER
8. LEFT WARNING AND CAUTION PANEL
9. TOTAL TEMPERATURE INDICATOR
10. WING SWEEP FLAP/SLAT POSITION INDICATOR
11. UPPER WARNING & CAUTION PANEL
12. GUNICAMERA CONTROL SWITCH
13. AIR/AIR IR MISSILE SWITCH
14. INSTRUMENT SYSTEM COUPLER CONTROL SWITCH
15. LANDING GEAR POSITION INDICATOR LAMPS
16. LEFT MAIN CAUTION LAMP PANEL
17. LEAD COMPUTING OPTICAL SIGHT AND CONTROL PANEL
18. UPPER WARNING AND CAUTION LAMP PANEL
19. INTEGRATED FLIGHT INSTRUMENTS
20. DUAL BOMBING TIMER
21. CONTROL SURFACE POSITION INDICATOR
22. NOSEWHEEL STEERING/AIR REFUELING INDICATOR LAMP
23. RADAR ALTIMETER
24. STALL WARNING LAMP
25. RADAR ALTITUDE LOW WARNING LAMP
26. MASTER CAUTION LAMP
27. BOMB NAV DISTANCE TIME INDICATOR
28. TAKEOFF TRIM INDICATOR LAMP
29. TAKEOFF TRIM BUTTON
30. RIGHT MAIN CAUTION LAMP PANEL
31. ENGINE TACHOMETERS
32. ENGINE TURBINE INLET TEMPERATURE INDICATOR
33. ENGINE FUEL FLOW INDICATORS
34. ENGINE NOZZLE POSITION INDICATORS
35. ENGINE PRESSURE RATIO INDICATORS
36. ENGINE OIL PRESSURE INDICATORS
37. HYDRAULIC SYSTEM PRESSURE INDICATORS
38. OIL QUANTITY INDICATOR TEST BUTTON
39. OIL QUANTITY INDICATORS
40. AIR REFUELING RECEPTACLE LIGHTS CONTROL KNOB
41. FUSELAGE FUEL QUANTITY INDICATOR
42. FUEL QUANTITY INDICATOR TEST BUTTON
43. TOTAL/SELECT FUEL QUANTITY INDICATOR
44. FUEL QUANTITY INDICATOR SELECTOR KNOB
45. TERRAIN FOLLOWING RADAR SCOPE PANEL
46. STANDBY AIRSPEED INDICATOR
47. VERTICAL VELOCITY INDICATOR
48. CLOCK
49. RADAR HOMING AND WARNING SCOPE PANEL
50. BEARING-DISTANCE-HEADING INDICATOR
51. STANDBY ALTITUDE INDICATOR
52. TRUE AIRSPEED INDICATOR
53. STANDBY ALTIMETER
54. ECM THREAT PANEL
55. VHF RADIO CONTROL PANEL
56. TACAN CONTROL PANEL
57. LANDING GEAR EMERGENCY RELEASE HANDLE
58. RADAR HOMING AND WARNING PANEL
59. ATTACK RADAR SCOPE PANEL
60. BOMB NAV CONTROL PANEL
61. NUCLEAR WEAPONS CONTROL PANEL
62. ANGLE-OF-ATTACK INDEXER
63. RELIEF CONTAINER
64. FOOD STOWAGE
65. AIR DIFFUSERS
66. LIQUID STOWAGE
67. HOOD STOWAGE
68. LETDOWN CHART STOWAGE
69. TOTAL TEMPERATURE INDICATOR
70. INTERNAL LIGHTING FUSE PANEL
71. LIGHTING CONTROL PANEL
72. CABIN AIR DISTRIBUTION CONTROL LEVER
73. UTILITY LIGHT
74. QUICK RESCUE KIT
75. LETDOWN CHART HOLDER STOWAGE
76. GROUND CHECK PANEL
77. RIGHT STATION OXYGEN CONTROL PANEL

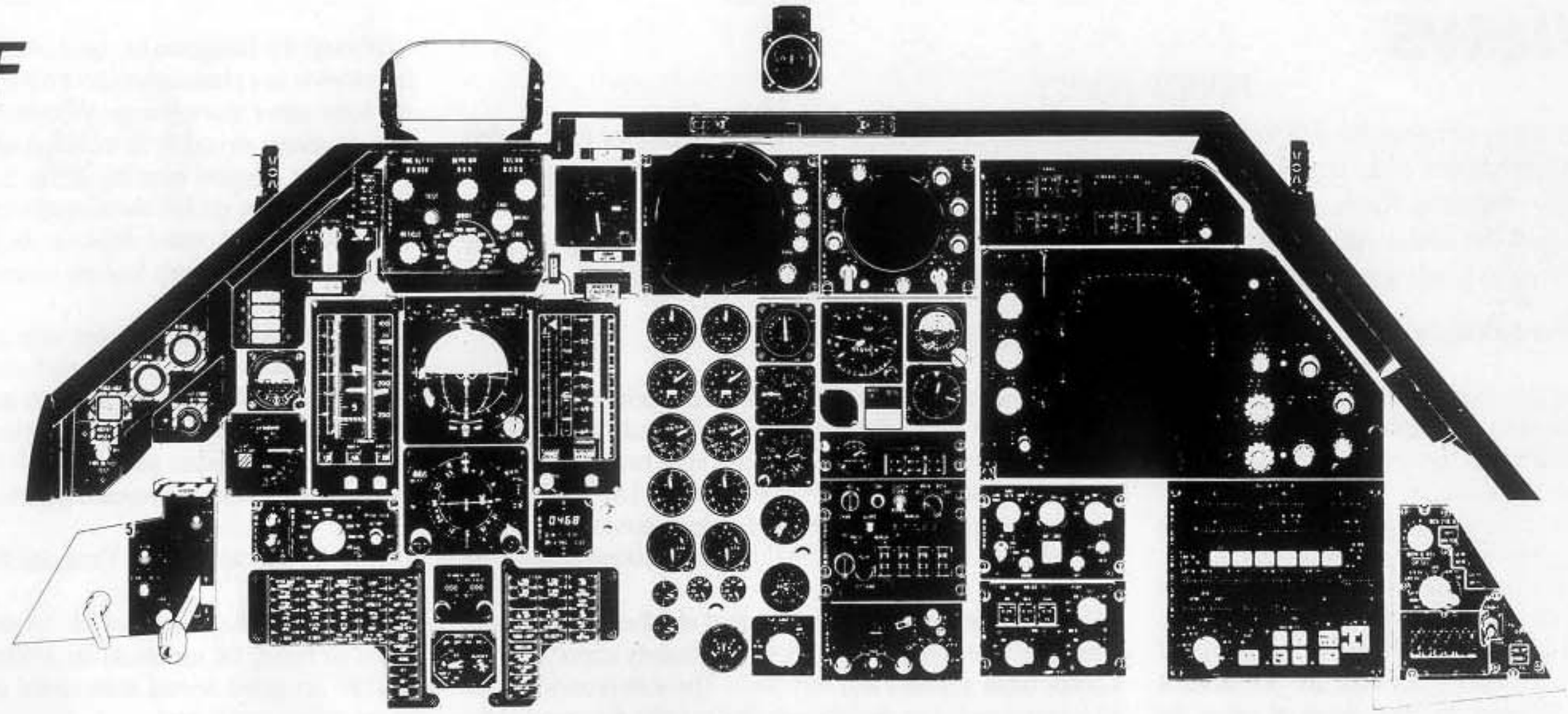




1. SEAT FORE AND AFT ADJUSTMENT LEVER
2. LOWER TORSO RESTRAINT HARNESS
3. QUICK RELEASE BUCKLE
4. OXYGEN REGULATOR
5. UPPER TORSO RESTRAINT HARNESS
6. SEAT BACK CUSHION
7. SHOULDER STRAP
8. INERTIA REEL
9. HEADREST ADJUSTMENT LEVER
10. INERTIA REEL CONTROL HANDLE
11. SEAT ADJUSTMENT ACTUATOR
12. CHEST STRAP
13. TRUNK STRAP
14. LAP BELT
15. CROTCH STRAPS

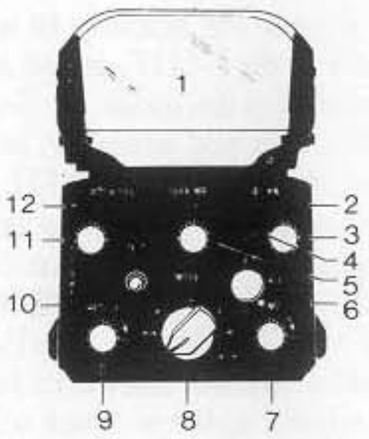
Courtesy of the U.S.A.F.

F-111 F



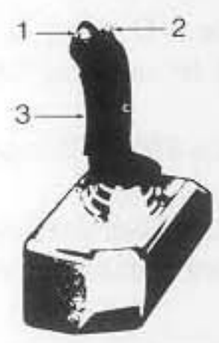
F-111 E&F

Lead Computing Optical Sight and Control Panel



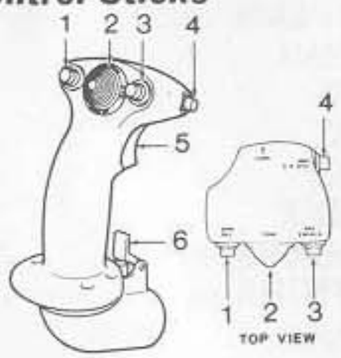
1. OPTICAL SIGHT
2. PRESET INDICATED AIRSPEED INDICATOR
3. INDICATED AIRSPEED SET KNOB
4. RETICLE DEPRESSION INDICATOR
5. RETICLE DEPRESSION SET KNOB
6. AIMING RETICLE CAGE LEVER
7. COMMAND BAR BRIGHTNESS KNOB
8. MODE SELECT KNOB
9. AIMING RETICLE BRIGHTNESS KNOB
10. TEST SWITCH
11. PITCH DEGREE SET KNOB
12. PITCH DEGREE INDICATOR

Attack Radar Tracking Control Handle



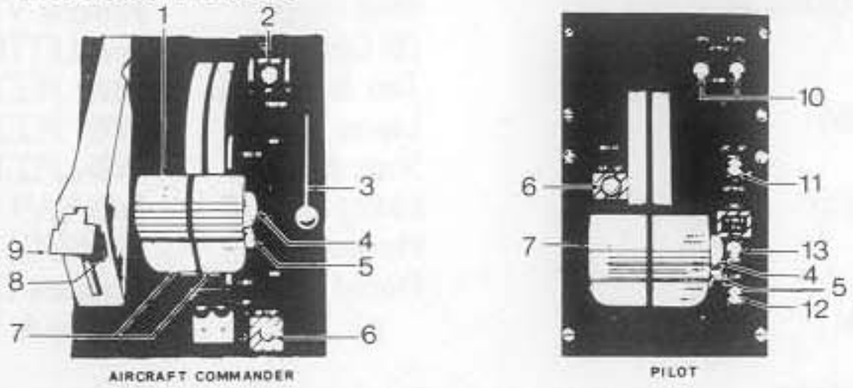
1. SECTOR SWITCH
2. RS AIR BUTTON
3. ENABLE SWITCH

Control Sticks



1. WEAPON RELEASE BUTTON
2. TRIM BUTTON
3. REFERENCE ENGAGE BUTTON
4. AERIAL REFUEL AND NOSE WHEEL STEERING BUTTON
5. GUN TRIGGER
6. AUTOPILOT RELEASE LEVER

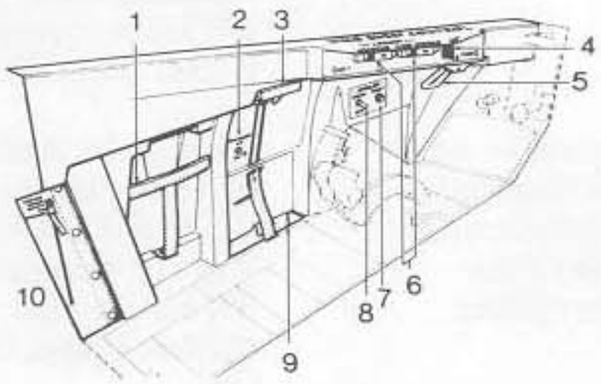
Throttle Panels



1. LCOS CAGE BUTTON
2. ANTI-SKID CONTROL SWITCH
3. THROTTLE FRICTION LEVER
4. SPEED BRAKE SWITCH
5. MICROPHONE SWITCH
6. AIR START BUTTON
7. THROTTLES
8. FLAP/SLAT HANDLE GATE RELEASE
9. FLAP/SLAT HANDLE
10. SPIKE CONTROL SWITCHES
11. ENGINE GROUND START SWITCH
12. TRANSLATING COWL SWITCHES
13. TRANSLATING COWL EMERGENCY OVERRIDE SWITCH

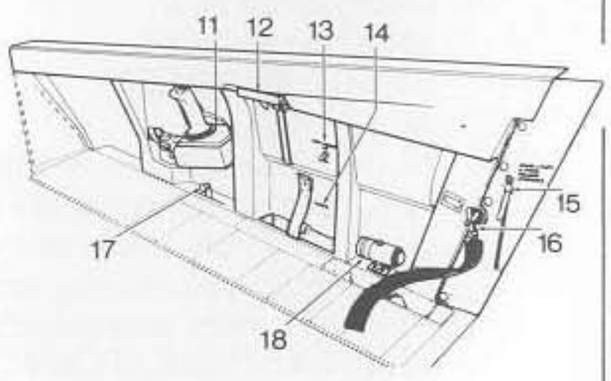
Left Sidewall

1. CHECKLIST STOWAGE
2. SEAT ADJUSTMENT SWITCH
3. ARM REST
4. WING SWEEP CONTROL HANDLE 26 DEGREE FORWARD GATE
5. WING SWEEP CONTROL HANDLE
6. WING SWEEP CONTROL HANDLE LOCKOUT CONTROLS
7. SPOILER RESET BUTTON
8. GROUND ROLL SPOILER SWITCH
9. MAP STOWAGE
10. EJECTION SYSTEM SAFETY PIN STOWAGE



Right Sidewall

11. ATTACK RADAR TRACKING CONTROL HANDLE
12. ARM REST
13. SEAT ADJUSTMENT SWITCH
14. MAP STOWAGE
15. SPARE LAMPS AND FUSES HOLDER STOWAGE
16. CANOPY EXTERNAL EMERGENCY RELEASE INITIATOR SAFETY PIN
17. CABIN AIR DISTRIBUTION CONTROL LEVER
18. UTILITY LIGHT



Courtesy of the U.S.A.F.

Kit reviews

REVIEW POLICY

Like Verlinden Productions, whose policy it is to choose only the best available kit on the model market for their update sets, we believe our policy should be to mention those plastic kits which are the most accurate and which require the least effort in assembling. Anything else is, to our opinion, a waste of time and energy.

It is no coincidence that the best available kit in both 1/48th and 1/72nd scale has been released only recently because the older kits have so much deficiencies, it would take you months to make them into decent replicas.

F-111 D/F Aardvark 1/72nd Hasegawa

Now, if there's anything a modeler could wish for we believe it is a kit like this little Hasegawa masterpiece. A delight in every aspect (with more than 120 crisply molded parts), considering the relative small scale of this plastic kit.

The overall shape looks very convincing and the kit has captured the characteristic appearance of the real F-111 very well.
The neatly engraved panel lines are almost correct and an attempt has been made to detail the inner parts of the nose wheel well, the main wheel well and the air intakes. However, the interior of the large bomb bay is not included but there are two different lower fuselage parts to represent the bay doors of either the F-111D or the F-111F.
The cockpit interior is fairly accurate with two different front panels, again, one for the F-111D and one for the F-111F. Even the upper control column is included so scratchbuilding this will not be necessary. Nevertheless, we feel it's a pity that the main panel and the side consoles have no raised detail because we hardly believe a decal is a satisfying substitute. More on this later.

In order to make the air intakes as accurate as possible they were divided into no less than five parts each, constructing these properly will need some special attention. Again on the positive side, two different tailpipes are provided, one type for the F-111D which has the Pratt & Whitney TF30-P-9 engine and the other type for the TF30-P-100 equipped F-111F.
The most noteworthy in this kit are the wings, which can only be set in either the folded or the unfolded position, but which have fully detailed flaps and slats in the unfolded position, so there's no need to try and cut the wings beyond repair for the simple reason of having a kit with it's flaps and slats down. Well done Hasegawa!

F-111F Aardvark 1/48th Academy

Although the box art and the instruction booklet want you to believe this kit has all the parts necessary to build an F-111F, it merely contains a combination of parts from two of Academy's previous releases, the FB-111A and the EF-111A. We have no objection against combining different parts of previously released kits, but to sell it as a genuine F-111F is really underestimating the modeler.

Overall shape and dimensions are good and the engraved panel lines look very convincing although not entirely correct.
Cockpit detail is limited and very basic. The seats provided in the kit look somewhat crude (although they're better than most of the seats we've seen so far), and the control sticks do not resemble the real ones.
The main landing gear on the other hand looks good but be sure not to glue the aft door(part 14) as shown in the kit instructions but according to the pictures in this book.
A complex system should take care of the wing pivoting in accordance with the pylons, but it is doubtful this will be appreciated by many modelers.

A lot of work will be needed to update the exhaust nozzles of this kit because they do not resemble the typical TF30-P-100 engine outlets of the F-111F.
The only ordnance included in this kit are four 600 gallon fuel tanks and some ECM pods which can not be used on the F-111F.

The decal sheet has a Lakenheath tailcode and a 48th TFW unit badge but that's about all.
All well considered, this F-111 is a good basic kit to start detailing and updating and there's no doubt this is the best available kit in 1/48th scale so far.

F-111 D/F Update set 1/72nd Verlinden Productions

Although the Hasegawa kit, described elsewhere on this page, is as complete as a plastic injection kit on 1/72nd can be, there were still some minor shortcomings. Who else than Verlinden Productions to release an update set including all parts to fully update the cockpit and a typical boarding ladder for the F-111.
The parts for the cockpit are a completely new cockpit tub with fully updated seats, raised detail on the front panel and the side consoles and two superb looking control columns, all in crisply moulded resin.
A photo-etched sheet is included with all the parts necessary to detail the inside of the canopy which can fairly easily be cut (or sawn) because of it's straight edges. A more accurate upper control column in resin is included to replace the kit part.
To complete this update set, a typical F-111 boarding ladder can be constructed from the remaining parts on this metal sheet.

F-111F Update set 1/48th Verlinden Productions

Contrary to the Hasegawa kit, where only few adjustments could be made, the update set on 1/48th scale for the Academy F-111F comprises several resin casted parts and a much larger photo-etched metal sheet.
The same type of cockpit tub was constructed for this kit with authentic looking seats and control columns. The upper control column is not forgotten and this has to be updated with handles from the photo-etch sheet. Complete side walls are provided.
The complete inside framing of the canopy and windshield can be constructed with two different layers of the metal sheet, which looks really fabulous on the open canopy halves.

Because the Academy kit is lacking all the important exterior parts of the F-111F, several resin casted accessories have been included in this update set. To start with, there is a nice looking Pave Tack pod which can be positioned underneath the bomb bay doors. An AN ALQ-131 ECM pod, carried on a pylon on the aft part of the fuselage between the ventral strakes, is also included as well as the pylon itself. This ECM pod differs from the one in the Hasegawa 1/48th Weapons Set which is another type of AN ALQ-131 pod. Two Paveway smart bombs (with photo-etched fins) and Sidewinder launching rails are the final parts of this useful update set which will save you a lot of time and effort in updating the Academy F-111F on 1/48th.

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Rear cover : The 'Aardvark' in the wild or an F-111E hiding in the wooden environment of Kleine Brogel airbase / Belgium. Photo by Coen van den Heuvel.

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