LOCK ON N° 12

AIRCRAFT PHOTO FILE

Willy PEETERS

PANAVIA TORNADO IDS

VP
the world in scale

627

TORNADO IDS
N° 2 SQUADRON
ROYAL AIR FORCE

VP
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The author

All the photos in this book were taken with Minolta 7000 and 7000i autofocus cameras using 28mm, 35/70mm and 70/210mm lenses.
All were loaded with Fuji 50 VELVIA Professional and Kodak 25 and 64 stock.

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Title Page: Tornado GR1 of N°2 Sqn, RAF Laarbruch, Germany on standby in front of HAS 2 at Kleine Brogel airbase. Part of a four ship detachment to fly during exercise AMPLE TRAIN it featured a sand colored Marconi Sky Shadow ECM pod on its left outboard wing.

Page 3: All trying to look like Mickey Mouse, the ground crew and some foreign aircraft mechanics are waiting patiently for the pilot to complete his preflight checks and final rollout.

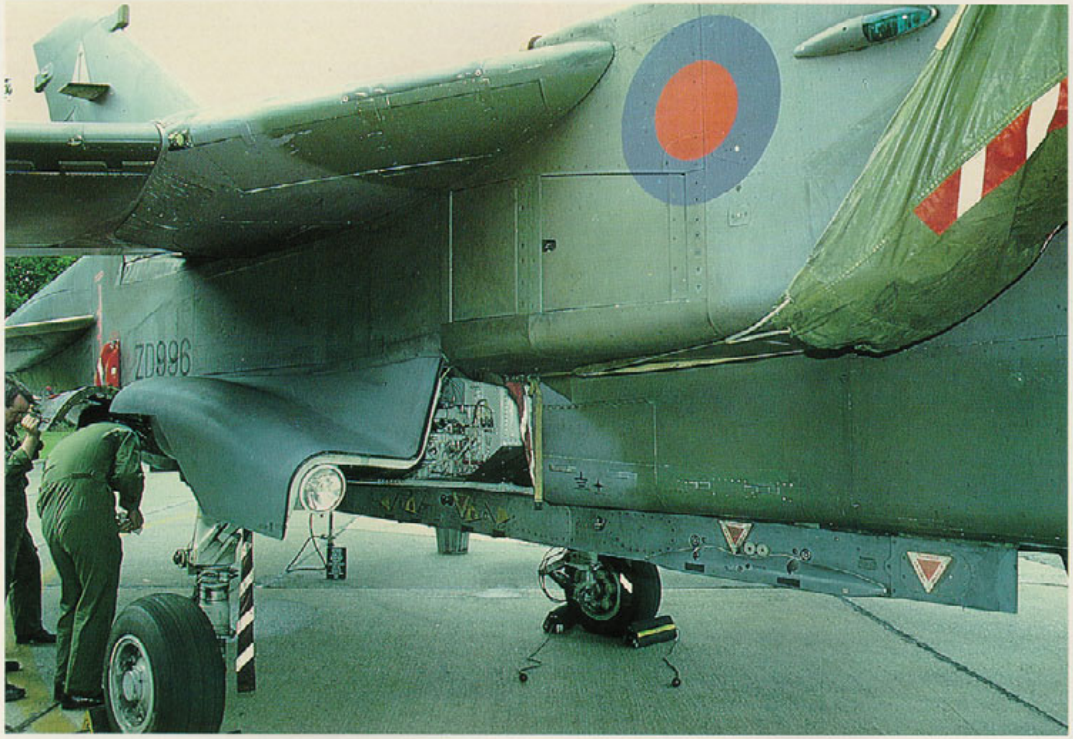
Introduction

The Panavia Tornado, a joint venture of three European independent aircraft manufacturers, will probably never win a prize as "the most beautiful aircraft ever built".
For this criteria, it can hardly compete with other of todays designs such as the F-14, F-15 and F-16 (just to name a few western-built aircraft) or even the Soviet built Mig29 and Sukhoi 27.
Nevertheless, the Tornado's combat capability and outstanding flight performance was never questioned by the RAF, Italian AMI and German Luftwaffe and Marineflieger who decided to replace several aircraft types with one version of this new design.
Today, the Tornado can be considered as the backbone of the air defense system of these three countries.
In the late 1960's design teams of BAC, England; MBB, Germany and Aeritalia, Italy combined forces to develop this aircraft which is actually a combination of various components, manufactured by a vast array of subcontractors all over the Western world, assembled in the companies mentioned above for their respective air forces.
Keeping track of all orders and sub-orders is an achievement on its own.
Continuous updating will prolong the life of this fighter well into the 21st century so we will probably see the Tornado piercing the European skies for many years to come.

The photos in this book cover the aircraft of all three nations which are generally identical except for color schemes. Structural details missing on one photo may be traced elsewhere in the book.

Study of the starboard nose section of a RAF Tornado in Dark Green/ Dark Sea Gray with Black radome. The near rectangular cross section of fuselage and air intake is very clear. The forward nose section and short nose radome seem to be taken from a different type of aircraft. Note that several panels have been taken from other aircraft, disrupting the regular camouflage scheme. The bilingual (English and German) warning triangles and squadron markings are in contrast with the low-viz national insignia.

A small IFF antenna is mounted in front of the windscreen and slightly off-centered on the anti-glare panel. The white strip across the nose radome is a lightning conductor strip.



Starboard view of the intake area with the intake suction relief doors clearly visible. Also clear is the wing root glove fairing with the wing glove Krüger flap. Note the different shades of green .

Close up of the LRMTS or Laser Range-finder and Marked-Target Seeker located on the right and in front of the nose gear door. When illuminated by the crew it provides a laser beam to guide homing weapons to the target.
Note the auxiliary power receptacle just above the LRMTS and the angle of attack probe just aft of the radome.

British ground crewmember and Italian "host" performing single point refueling. The refueling receptacle is located at ground level unlike older aircraft which had to be topped through filler caps on top of the wings and fuselage.

The wing and tail section showing the same discoloration of various panels. The wing, holding a BOZ 107 Chaff/Flare pod on the outboard pylon and a 330 Imp gallon (1500 liter) external fuel tank on the inboard hardpoint, is locked in the full-forward position. Note the difference in "NO STEP" markings on the leading edge slats.

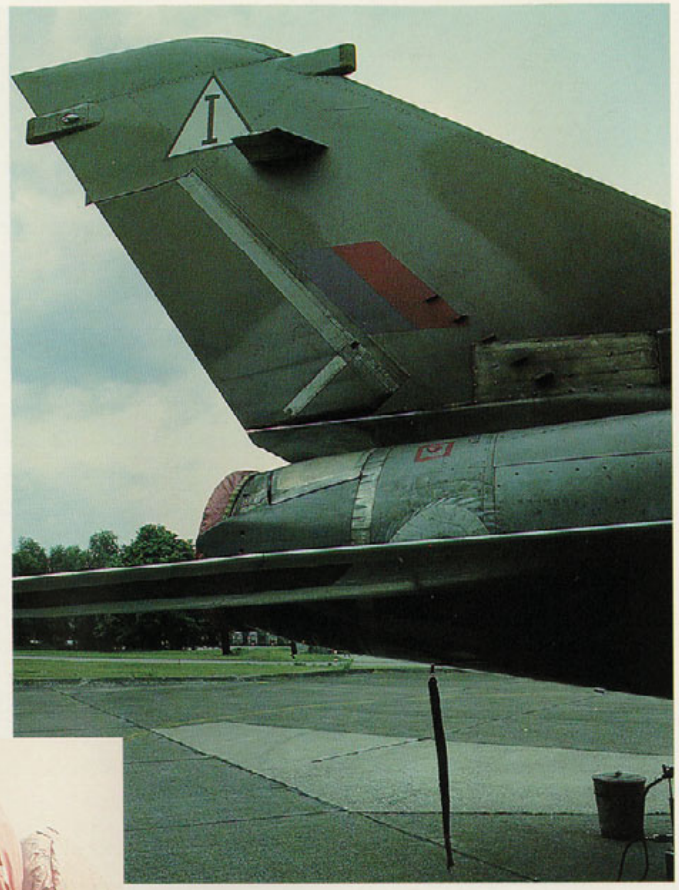
Aft view of the BOZ 107 of Swedish design providing protection against incoming radar-controlled and heat seeking missiles.
Note the "DANGER" markings on the pylon and the aft section of the pod.

Top left: Details of the solid starboard main gear strut and wide low-pressure Dunlop tires which enable the Tornado to operate from softer airstrips. Wheel strut and wheel hub is white overall.

Top middle: Inside of the same strut with ground safety pin location at left. Note the heavy stains on the oleo and the gear linkage arm. Also note the different structure of the nitrogen and hydraulic feed lines.

Top right: Crewmember closing the APU bay hatch after post flight check. Note the fairings next and inboard to the bay and the various red markings aft of the same.

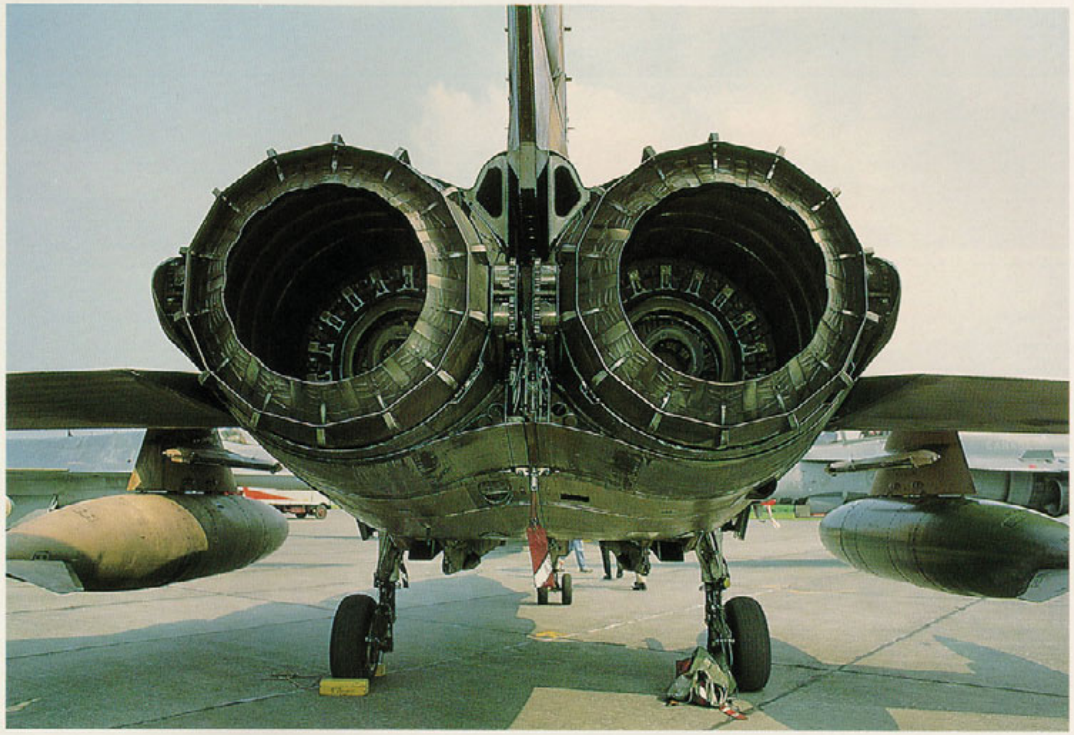
Bottom right: The flat undersurfaces of the fuselage with the left and right shoulder pylon. Note the oil stains from various holes in the bottom fuselage.



The tailplane with the heat exchanger outlet at the base of the fin (with bare metal aft plate). Two of five vortex generators are located on this plate. On top are the front and aft Radar Warning Receiver (RWR) fairings. The horizontal antenna is the ILS aerial. Just above the rudder (with bare metal parts) is the fuel jettison outlet. Note the heavy stains from the thrust reversed exhaust gases.

The bottom aft fuselage and covered exhaust nozzles. The two large sideway hinged doors give access to the lower side of the engines facilitating maintenance. Several hot air vents are located in this area as well as the emergency arresting hook with safety pin installed. Note the titanium thrust reverse bucket doors in the stowed position just in front of the nozzles. Also of interest is the tailplane pivoting point.

Tailpipe area with the afterburner eyelids in closed position. Between the engine outlets is the actuating mechanism for the thrust reverser buckets which are not only used during landing but, as shown in the bottom picture, during hold on the taxi track.
Note the missile launching rails inboard of the fuel tank pylon (top picture).

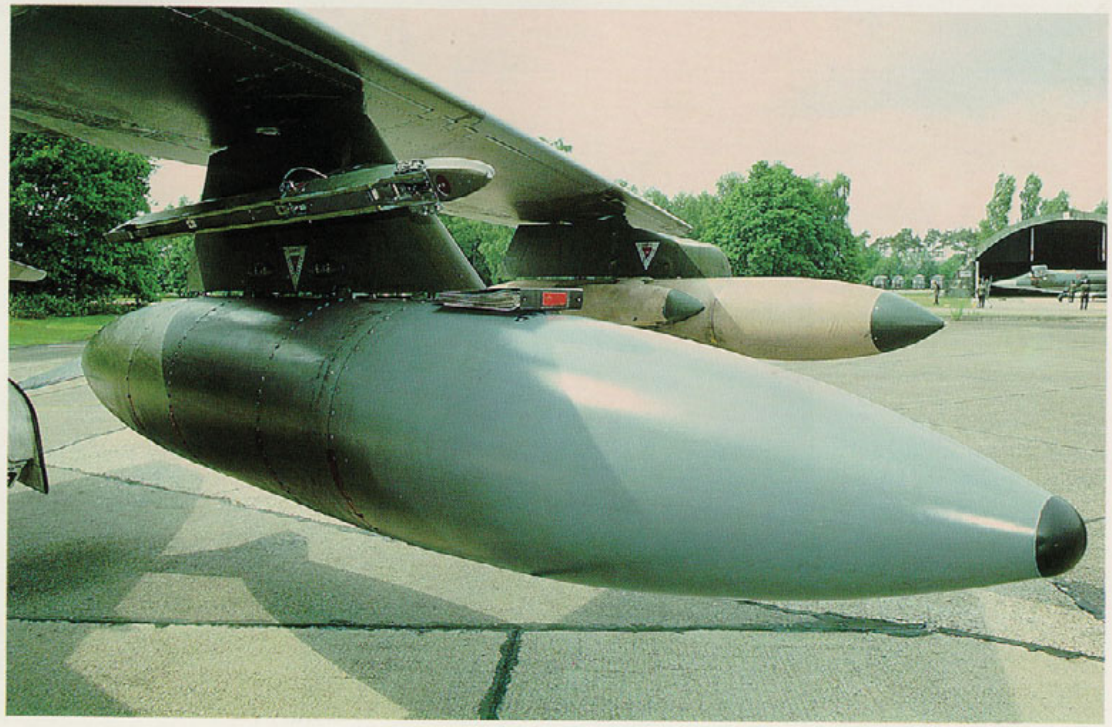


Tornado on hold with upper wing spoilers raised and Fowler type double-slotted flaps extended. Viewed from this angle, TORNADO'S resemblance with a giant insect is amazing.

Close view on the aft part of the external fuel tank and stabilizer fins. "NO STEP" markings can be found all over the aft part of the tank. Two more stabilizer fins can be mounted on top of the tank at either side of the centerline.
Note the black aircraft serial number below the flexible wing seal and the pink tailplane incidence marking on the right.

Commonly used on RAF Tornado's and heavily relied on in the Gulf War, the Marconi Sky Shadow ECM pod is shown on the outboard swiveling pylon.

The 330 gallon fuel tank on the inboard swiveling pylon with a black stencilling stating "Asbestos Phenolic Material". Note the clean appearance of the front part of the tank compared to the remainder. The leading edge of the pylon has a different color.



Sidewinder air-to-air missiles can be fired from launching rails mounted inboard of the pylon. Note the aircraft maintenance registration manual on top of the tank and inboard detail of the Sky Shadow ECM pod.

Port intake area which is virtually similar to the starboard side. The small panel covers the stores management system computer and the cabin cold air unit. Note the shape of the main landing gear door and the landing light mounted on the inside.
Navigation lights are always red on the starboard side.

Bottom pictures: inside detail of the main wheel well with the door pushing rod crossing the main gear strut.
Note how dirt has effected the inside of the bay and the lower part of the main leg while the upper part of the leg is still fairly clean.

Top left: The lower part of the boarding ladder (upper part shown on page 15). Just below the squadron markings is a small panel to which the ground earthing cable is hooked up. A similar panel can be found on the opposite side.

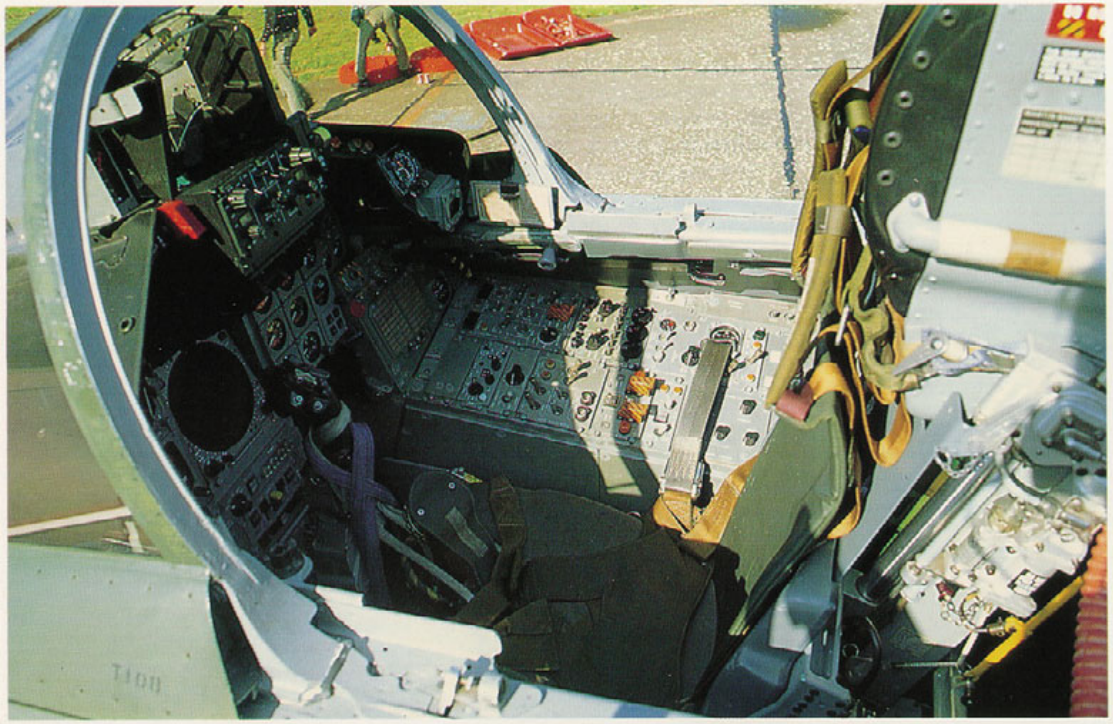
Bottom left: The compact twin-wheel nose gear leg with taxi/landing light offset to the right. Note the position of the ground safety pin and hook up point for the tow bar. Inside detail of the small panel is clear in this view.

Top right: Overhead view of the nose section looking aft.

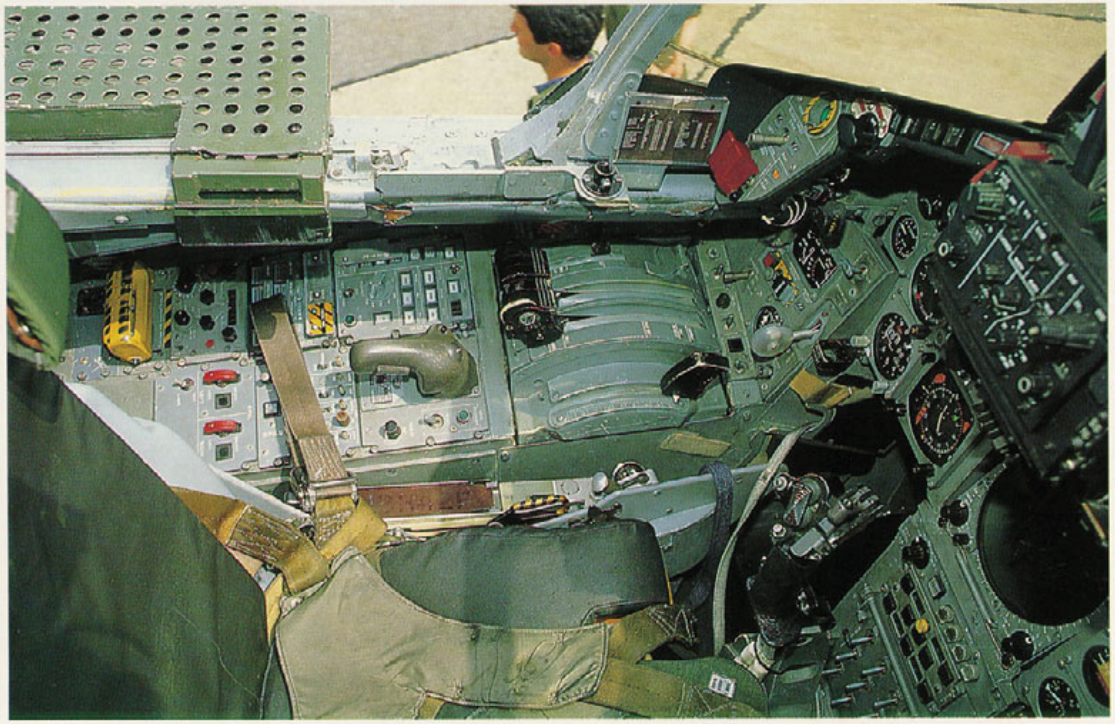
Overhead view of the starboard tailplane and airbrake. Note the bare metal leading edge of the tailplane and the hoisting point marking in the bottom right of the picture.
Again note how various panels have been replaced, indicated by the difference in color.

Above: Like most modern planes the Tornado features a single piece perspex hood to cover both canopies. As shown here the hood is kept spotless at all times by groundcrew. In case of emergency the hood can be jettisoned or, if this should fail, fragmentated.

Left: Upper port air intake and wing with wing pivoting point and flexible wing sealing plates in the center of the picture. Again, note the various shades of green and grey, and bilingual warning signs on this German based aircraft.



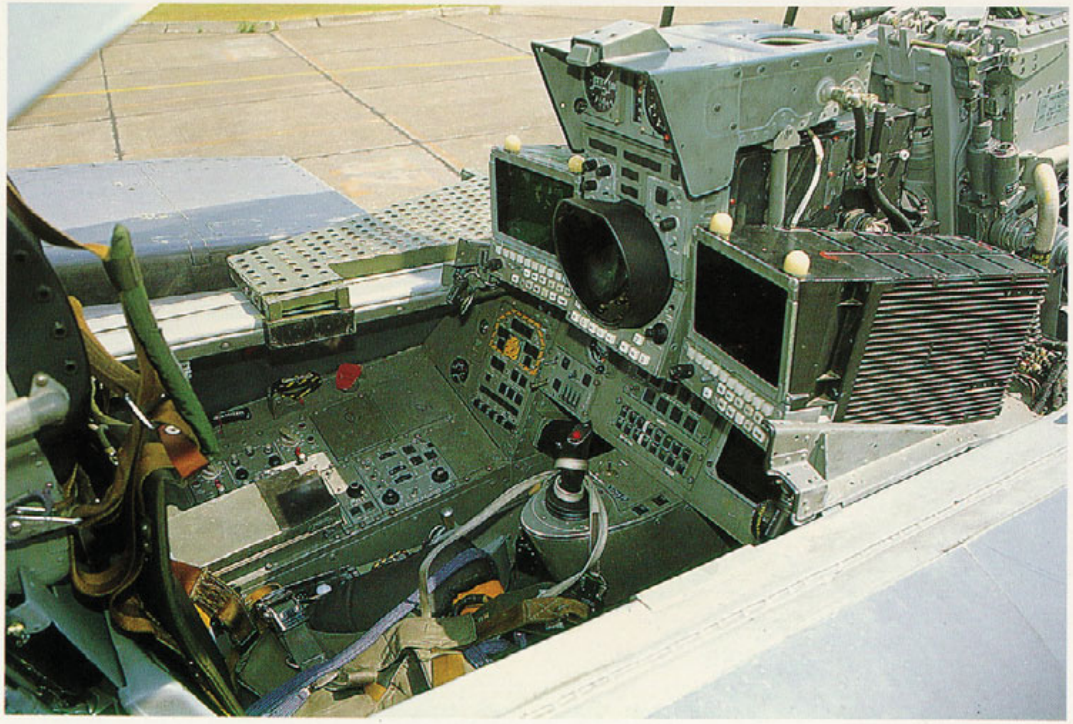
The right side console holds most of the pilot's navigation control panels, IFF and UHF control panels, engine test and fuel control panels as well as cockpit and exterior lighting control panels. The small panel immediately in front of the main instrument panel has four safety stowage pin locations.



The left console with the large throttle quadrant, the wing sweep lever and the pilot's hand control stick. All can be reached with a minimum of hand movement. The yellow handle at far left is the crash panel emergency handle. Note the complex design of the control stick and the rapid takeoff panel at the bottom of the central console.

Top left: The rear cockpit is dominated by large screens and pushbuttons with few flight monitoring instruments mounted on top of the combined radar and projected map display. The navigator's hand control stick is mounted on a central console.

Top right: Pilot and navigator in typical RAF gear after returning from a mission, waiting for the groundcrew to finish their post flight inspection.



Right: Navigator's playroom from the opposite side. The wide-bodied fuselage of the Tornado implicates a lot of room for both crewmembers, which is much appreciated during prolonged cross-country flights.

Tornado IDS, 31e Jagdbombergeschwader
Nörvenich, Luftwaffe

(Photo by Willy PEETERS)

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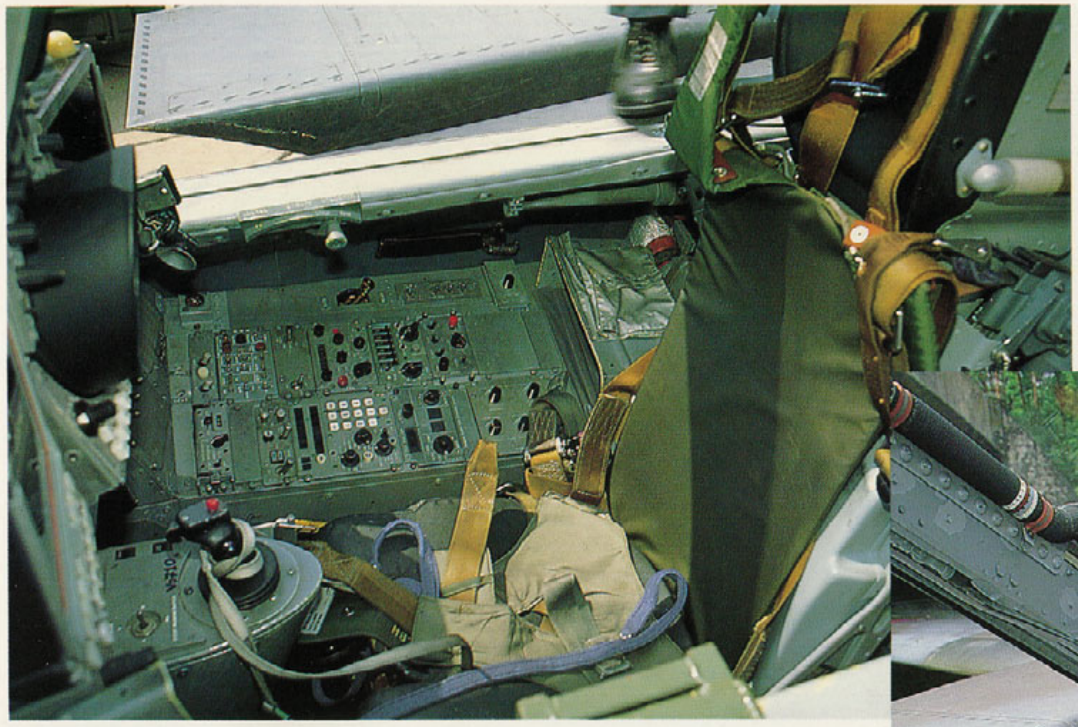
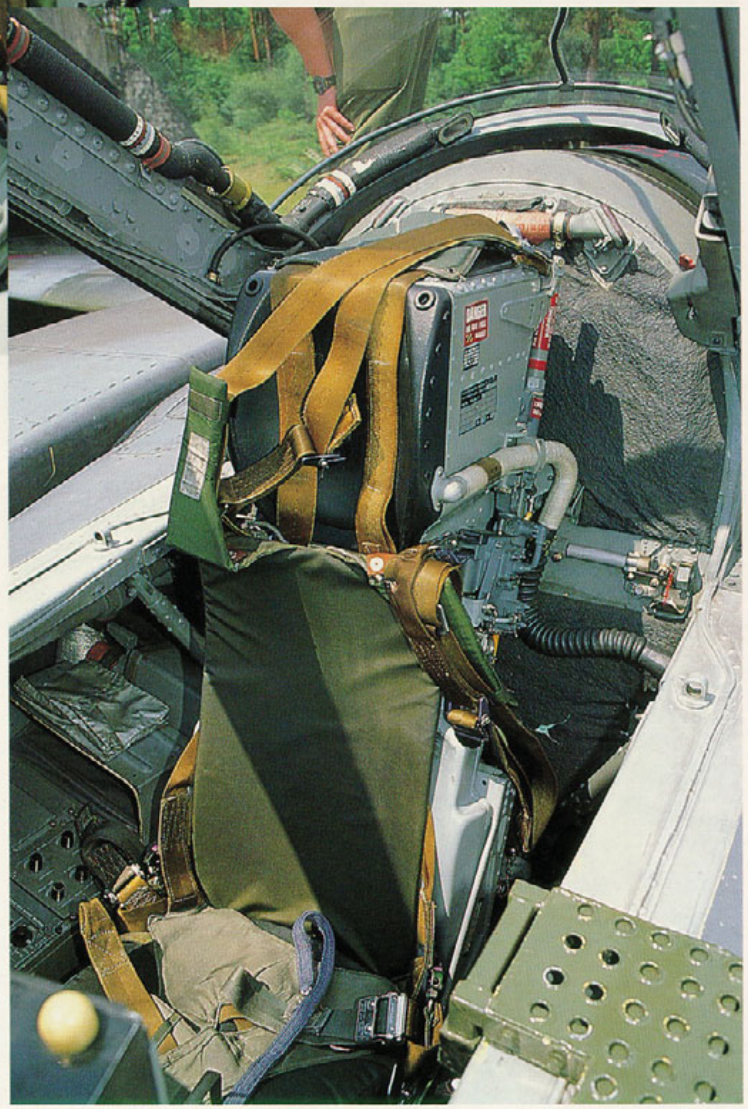
Photographed only weeks after its return from the Gulf, this Tornado ZA 371/C is heading for the runway. Note the panel in front of the air intake which has an oval window, a remainder of its operation over Iraq. It is part of the aircraft's reconnaissance equipment and covers sideway looking thermal imaging sensors. A similar window is on the opposite side.
The intake suction relief doors are open while the aircraft is taxiing.

Previous page: 44+14 of JaboG 31 dashing down the runway in full AB (Afterburner), moments before nose pull-up. It is showing a very unusual configuration of gray finished external fuel tanks and chaff/flare dispensers, obviously taken from Marineflieger Tornado's. Even the external inflight refueling probe seems to be "on loan" from the same unit.

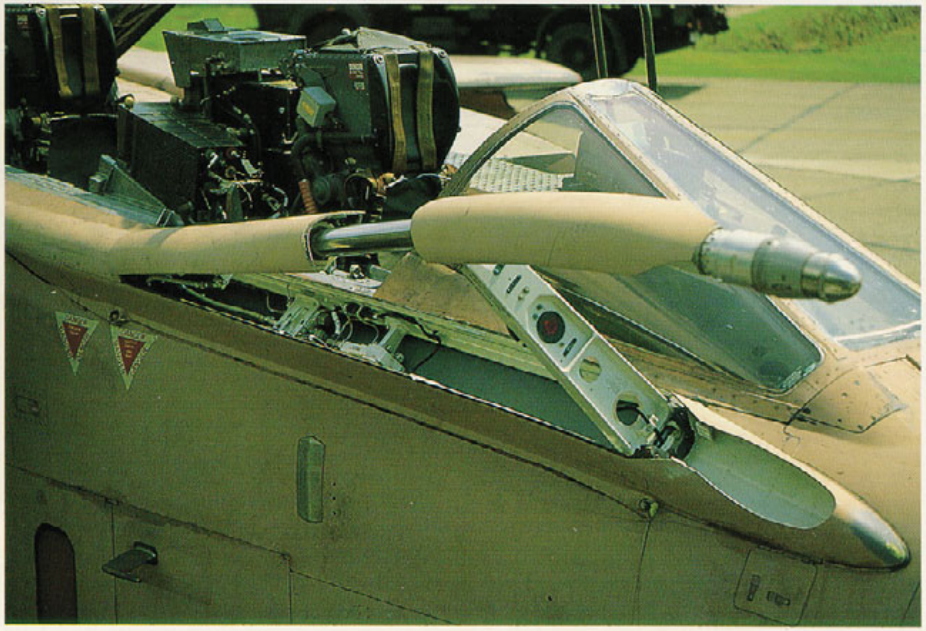


Top: Main computer control panels, communications panels and lighting switches are all located on the right side console. The lever halfway down the console and closest to the sidewall is the ejection seat command selection lever. Note the navigator's outside view is partially blocked by the air intakes.

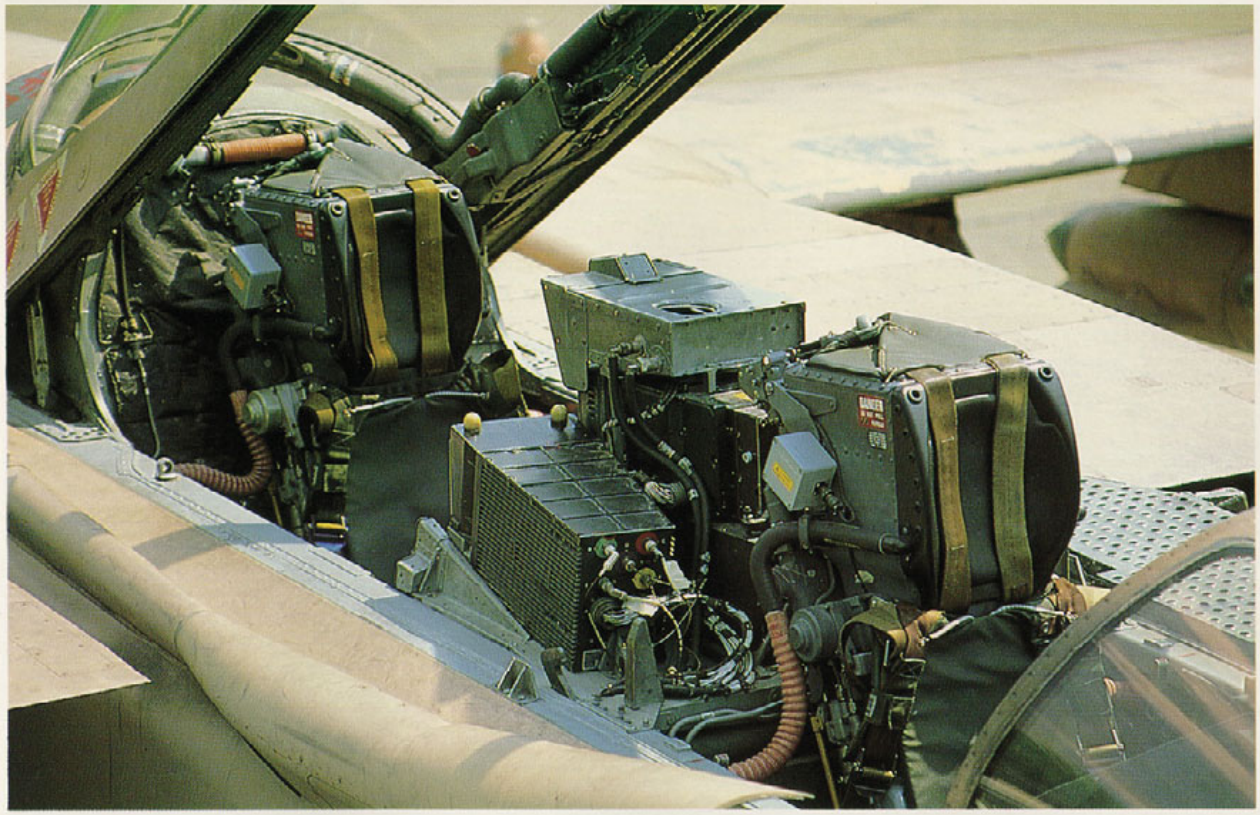


Right: The Tornado is equipped with the Martin Baker 10A ejection seat with zero-zero capabilities. It is finished in the same color as the rest of the cockpit interior with a green backrest and seat cushion. The brown harness straps are draped over the black headrest. Note the way the piping of the cockpit defogging/ climate control will hook up to the central distribution unit on the rear cockpit bulkhead.

Nose section with externally mounted inflight refueling probe. Although it is blocking the pilot's downward view it's location will facilitate monitoring inflight procedure. Finished in Desert Storm Light Sand, the aircraft is devoided of all squadron markings or nose art which probably makes it one of the few "clean" Tornado's. Panel lines can clearly be determined. Note the number of protective covers and warning flags.

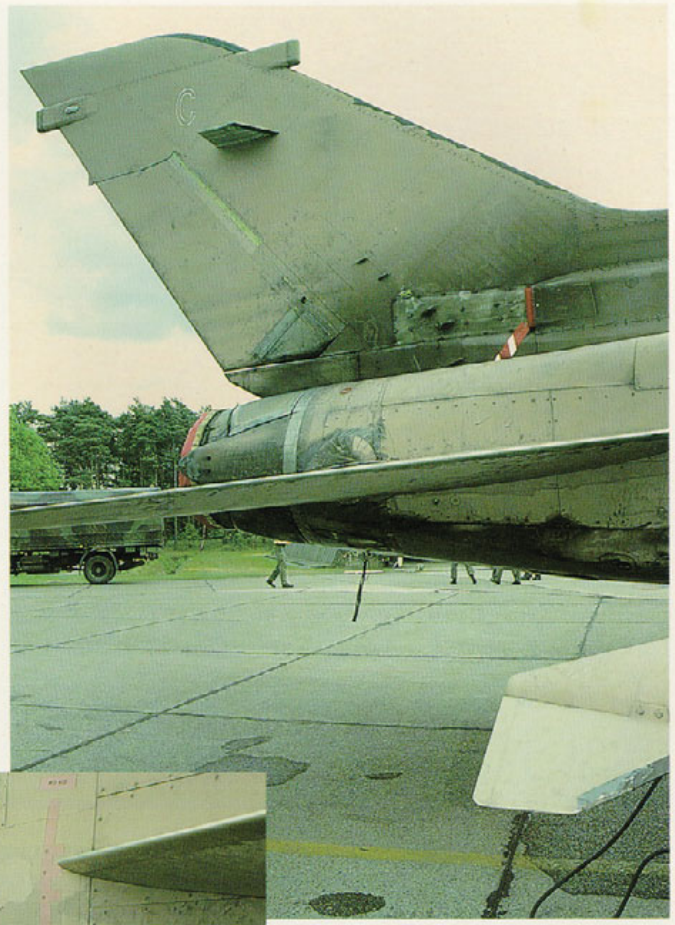


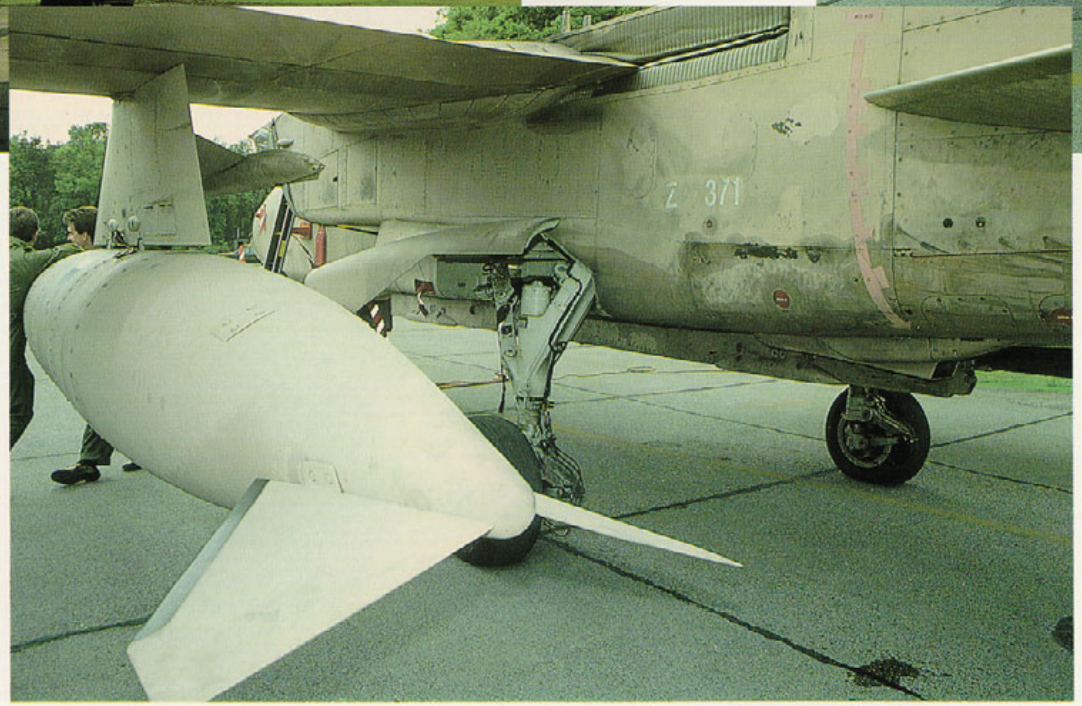
Close up of the telescopic inflight refueling probe with the bare metal intake receptacle. The probe retraction link and the inside housing area are finished in white. Note the indicator and illumination lights on the linkage arm.



Overall view of the cockpit area with a good view on the canopy framing and the right side of the ejection seats.

Heavily weathered rear of ZA371 showing the panel lines in this area. Clearly visible is the high ground clearance of the Tornado reducing the risk of engine flameout caused by FOD (Foreign Object Damage) both on concrete and unprepared runways.





Left & right: Chipped paint on the tail fin leading edge reveals the original color. Note the protective cover in the heat exchanger exhaust duct at the base of the tail. Also note the tailplane bearing sealing plates which resemble the main wing pivot sealing plates shown earlier and the heavy weathering in this area.

Bottom: Starboard tail section with a good view on the lower wing pivot sealing plates.

Top left: Exterior detail of the starboard nose section with more protective covers installed. All rescue instructions have been replaced by a single "RESCUE" in white preceeded by a white arrow. Further markings indicate 25 successful missions being flown by this crew over enemy territory in Desert Storm operations, which is quite an achievement.

Top right: Navigator dismounting the aircraft in typical RAF outfit with light blue leg restraints and black flying boots. RAF pilots used to wear light brown leather boots and some pilots still do.

Left: G-suit and oxygen mask connection is mounted on a single connector plate which is hooked up on the left side console. Also characteristic are the green helmet with white cross and the light gray leather gloves.

Right: Tornado with different color scheme and markings, belonging to 6° Stormo /154° Gruppo, "Diaboli Rossi" (Red Devils), Italian Air Force. Rescue markings are in Italian, English and German.

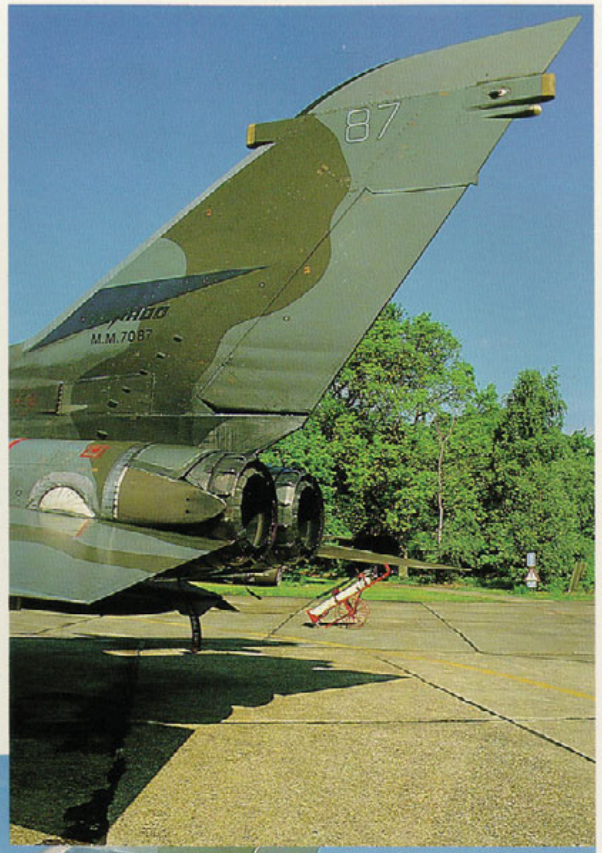
Below: Opposite side with the battery compartment and related electrical equipment revealed. Note the bare metal cover over the gun muzzle and the silver-gray undersurface color demarcation line.

Right: Looking up into the nose wheel well and a head on view of the nose gear strut with landing light. Bay interior is white. The square ventral Doppler antenna and UHF/TACAN antenna can be seen at the top of the picture.

Top: overall view of AMI Tornado with Italian style alluminum boarding ladder.

Left: Italian Tornado's have the air intakes marked in red which is in sharp contrast with the camouflage color. This aircraft is fitted with two practice bomb dispensers on the silvergray shoulder pylons. The dispensers are finished in dark green.
The front compartment slightly below and in front of the air intake holds the liquid oxygen bottle with the compartment behind it already described on page 12.
Note the cold air unit ram intake is also marked in red.

Left: Italian pilot geared up for another mission. His outfit is quite similar to the British one. Note the gun holster on his left side and the knife on his right thigh.



Right: Close up of the tail section of an Italian Tornado showing different color applications and markings. Note the rudder has no bare metal panels unlike RAF aircraft.

Pylon detail and colors on the same aircraft with the same BOZ 107 Chaff/Flare dispenser shown on page 6. The external fuel tank has forest green upper and silvergray lower surfaces.

Above: Another participant of the Gulf War was this AMI Tornado, lacking all squadron markings but featuring a low-viz fuselage roundel. Note the sand color is not applied to the bottom surfaces which is still silvergray.

Right: Italian Tornado's carry different markings in the wing sweep area. Most are bright red which are more easy to spot. Note the black wingtip antenna and the fin root antenna fairing taken from another aircraft.

The third country involved in the Tornado program was Germany which has five Jagdbombergeschwaders (Fighter Bomber Squadrons), No 31,32,33, 34 and 41; and one Weapons Training squadron, No 38, equipped with this aircraft.
Marineflieger (MFG) 1 and 2 have long traded their F-104's for the more up-to-date Tornado and use it in the anti-shipping role, illustrating the versatility of the design.
This aircraft, 44+33, belongs to JaboG 31 "Boelcke" operating from Nörvenich. It is finished in the standard Luftwaffe color scheme of Dark Gray, Olive Green and Medium Green. Nose radome is sometimes glossy while others have a more matt and weathered appearance.
Note the canopy holdback pole and the bright yellow boarding ladder of German design.

Left: Windscreen and nose cone detail with a good view on the windscreen rain dispersal ducts and the upper IFF antenna. Note the large gap between windscreen and fuselage and the discoloring of the aircraft skin.

Left: Luftwaffe version of the battery compartment and adjacent markings. Note the armament panel above the compartment.

Left: Right rear view of the nose landing gear in overall white finish. Note the spring just above the landing light.

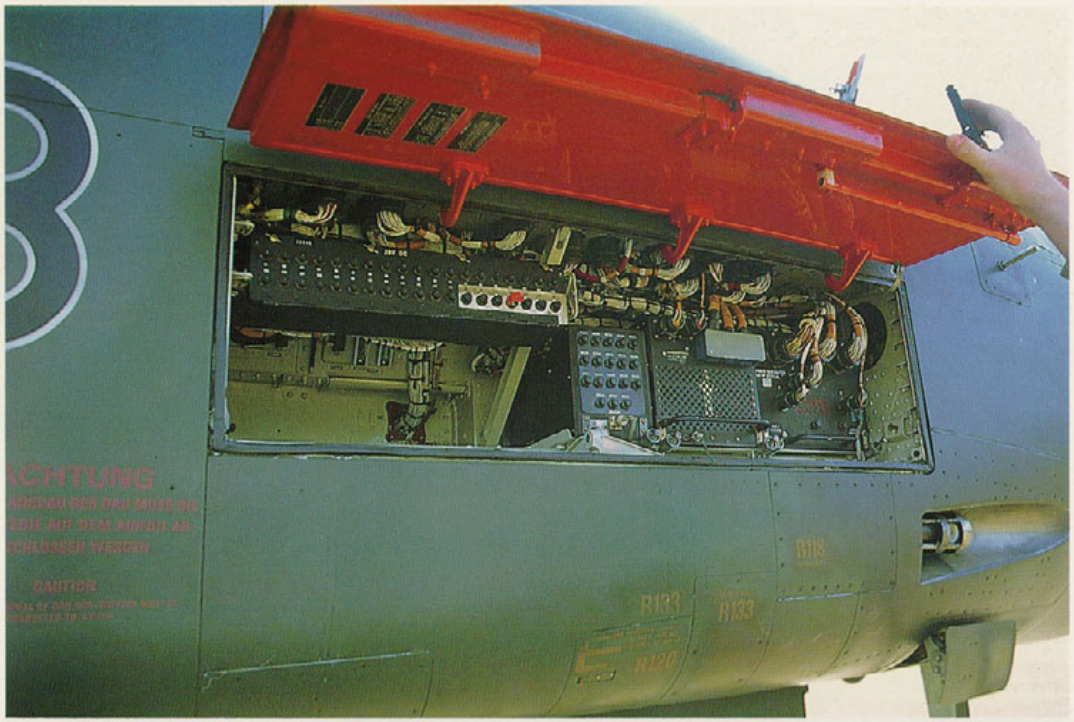
Right: Main wheel well detail on the port side with several structural strenghteners.

A familiar view, this time with Luftwaffe markings, some in black. Note the color of the wing root seal and the discoloration of the camouflage paint.

Top right: Looking up the rear end of the BOZ 107 dispenser from where chaff and flare is released. Note the natural metal finish. Other points of interest are the German national marking below the wingtip, the navigation light and the extended leading-edge slat with actuator.

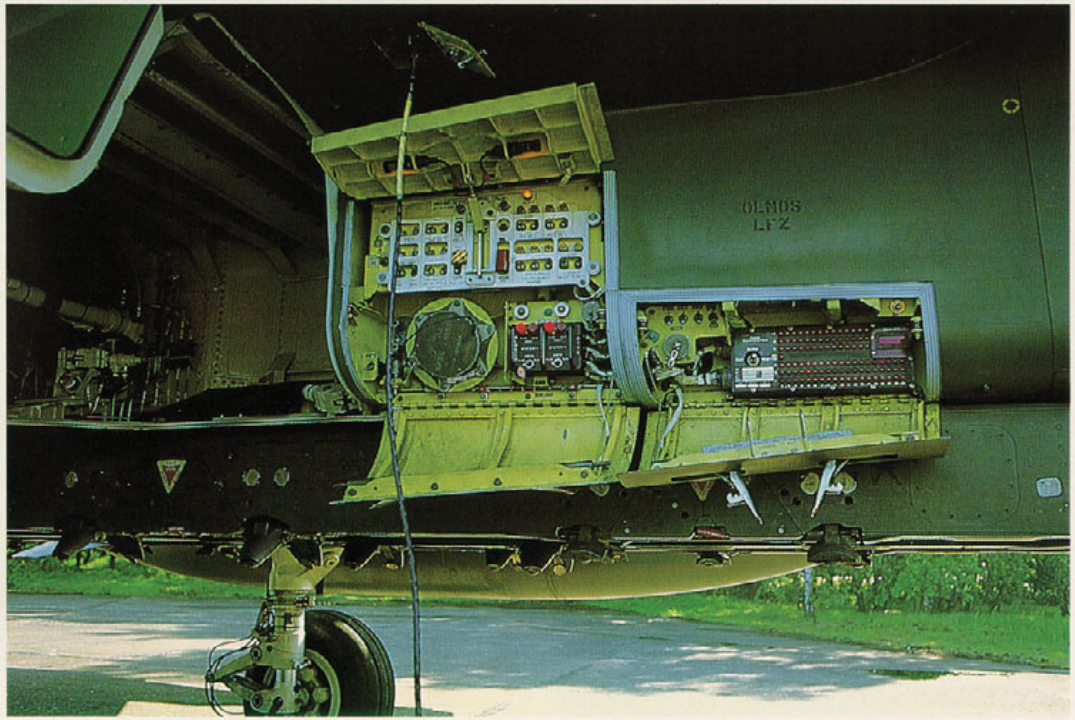
Right: Three shoulder pylons below the fuselage, the middle differing in the number of external store hook-up points. Note the black rubber seal where the pylons meet the fuselage skin.

Right: Inside view of the equipment bay holding the Control and Stability Augmentation System (CSAS) located just above the gun housing on the right side. Note the inside of the hatch is painted red.



Bottom right: Close look on the Maintenance Fault Indicator panel (right) and the main refueling receptacle and control panel. Inside of the panels is zinchromate yellow. Note the two illuminating lights in the top panel used for nighttime refueling operations.

Bottom left: Inside detail of the starboard main wheel well, almost similar to the one on the left.



German Tornado with a full load of four external fuel tanks, one each on the inboard pylon and one on the outer fuselage shoulder pylons. Dummy practice missiles are mounted on the inboard Sidewinder launching rails while chaff/flare dispensers are attached on the outermost pylons.

Top :Looking down the spine showing the replacement of the dorsal UHF antennas with a glossy disc antenna. Note the black walkway markings.

Left: Upper fuselage view showing the wings are not fully swept forward, indicated by the bare metal wing segment still visible.

Right: Same view of the port side.

Same aircraft as on centerfold page, this time with its thrust reverse bucket doors and upper wing spoilers open, considerably reducing the aircraft's roll-out speed.

RAF Tornado's are everpresent on European air shows, both on the static display and in the air, demonstrating its combat capabilities.
German based aircraft can be distinguished by the bilingual rescue markings.
(Photo by Ernest PELLENS)

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