



PANAVIA
TORNADO
SPECIAL INTEREST GROUP

PANAVIA TORNADO REVIEW



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Welcome



Welcome to the IPMS Panavia Tornado Special Interest Group Newsletter.

This is an abridged digital version of a magazine that was sold at Scale Model World 2013 to raise money for the Royal British Legion.

In this issue, profiles and painting guides are provided for the German Tornados and some theories are put forward to finding a match for the latest Italian grey scheme.

RAF profiles will follow in a future issue, but for now we have a guide on how to paint the smaller details on the RAF Tornado.

Two special schemes from the Luftwaffe and the RAF are covered in

detail and hopefully we will not have to wait too long for the decals.

In the next issue of the newsletter we will continue to look at the prototype Tornado. In fact, there are some SIG exclusive prototype decals due very soon in the major scales.

Andy Walker
Panavia Tornado SIG Leader

Italian Mid Life Update



In 2006, to ensure operational effectiveness of the Italian Tornado fleet until 2025, Alenia Aeronautica completed the first part of the Mid-Life Upgrade programme called IT MLU First Upgrade /RET 6 contract (Retro Enabling Task 6). Under this, new NAV/COM systems and new weapons were integrated onto a first tranche of 18 Tornado IDS aircraft.

The Basic IT Full MLU/ RET 7 contract was the second step of the MLU programme and involved fifteen Italian Tornado IDS aircraft (including three dual control trainers). RET 7 deliveries were completed during 2012.

The third phase of the Italian Tor-

nado upgrade programme - called IT Full MLU/ RET 8 - is now under way to cover a final batch of 25 IDS and ECR aircraft. The aircraft upgrade include several software and avionics updates. The new communication and identification system use the latest standards of secure communication capacities as well as a data transmission/reception capacity via Data-Link (MIDS).

The pilot and navigator cockpits feature new multifunction display suites to reduce crew workload; the navigator cockpit features new colour displays that replace monochromatic units and the internal and external lighting systems are compatible with night vision goggles. The electronic recce capacity

of the ECR has also been improved through new functionalities connected with the threat identification and localization (ELS multi-ship ranging).

The new software of the Tornado "IT Full MLU" allows the integration of new sensors and avionic systems and enables the use of new weapons such as the Small Diameter Bomb (a GPS precision-guided glide munition with a unique carbon fiber envelope and small wings which extend after release). and the new AGM-88E Advanced Anti Radiation Guided Missile.

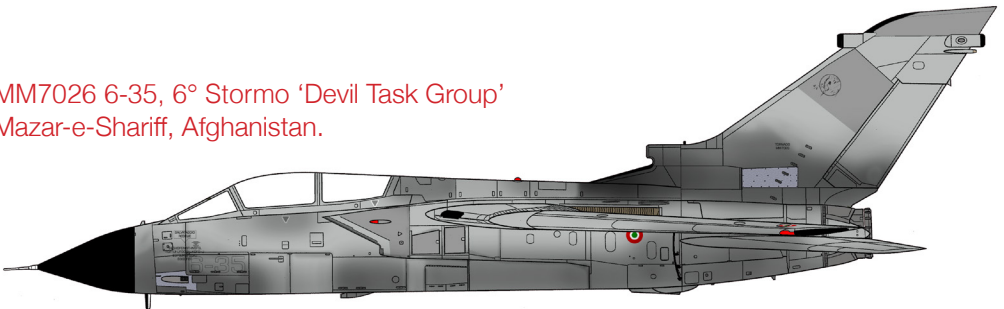
In the photograph, the IDS aircraft to the rear (MM7072) has been through the Full MLU/ RET 8 and

has LINK-16 Datalink markings under the cockpit. The key external differences for a Tornado MLU are the removal of the conical antenna on the spine and two UHF aerials on the nose in front of the canopy instead of one.

Italian Tornados are now painted in an overall Air Superiority Grey Camouflage (FS-36280). FS-36280 is a difficult colour to obtain, as none of the more readily available manufacturers include it in their paint range. The only manufacturer to include FS36320 is Lifecolor (Sky Grey 16 # UA535.) Alternatively, White Ensign Baltic Dunkelgrau (KM 15) is also a match.

Photograph: © Jerry Gunner/ via Flickr / CC-BY-SA-3.0

MM7026 6-35, 6° Stormo 'Devil Task Group'
Mazar-e-Shariff, Afghanistan.

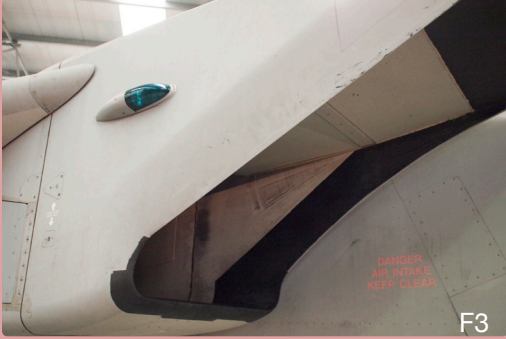


Dambusters 70th Scheme





Detail Painting: RAF



♦ **Intakes:** Intakes are a pale grey, (FS16622) The black areas to the front of the intake is an anti-icing heating mat. Refer to the 617 Squadron walk-around for a different demarcation between the camouflage colour and the pale grey on a GR4.

♦ **Airbrake:** The interior parts of the airbrake is pale grey (FS16622).

♦ **Wingroot:** The inboard area of the



wing that is retracted into the fuselage displays considerable variation in tone and colour due to weathering and wear. FS36173 Dark Grey (Gunze H82, Humbrol 156, Tamiya XF-53) is a good starting point.

♦ **Cockpit:** The best colour match for a Tornado cockpit is Humbrol140 or Tamiya XF-54 which equate to FS 36321 Dark Gull Grey. Touch ups may be in different shades of grey.



◆ Undercarriage and Undercarriage Bays:

Tornado undercarriage is very pale grey. FS16622 (Xtracrylix XA1140) is a good starting point. The same colour can be used for the undercarriage bays.



◆ **Ejector Seat:** The main colour is FS 36321 Dark Gull Grey (Gunze H57, Humbrol 140, Tamiya XF-54, Xtracolor X131).



GR4

◆ Refueling Probe

Recess: The interior portions of the refueling probe, on both the F3 and GR/ IDS variants is very pale grey (FS16622)



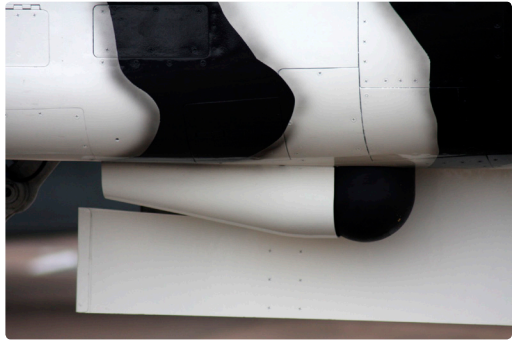
GR4



GR4

AG-51 at RIAT 2013









MRCA

Photo: Catalog #: 01_00086542 San Diego Air and Space Museum Archive, Via Flickr



P.01

The background to the development of the Panavia MRCA is a complex one which can be traced back through 20 years of politics and cancelled contracts. The RAF needed an aircraft that could fly attack missions at night, in all weathers. The TSR 2 had been cancelled, so too had an order for the American F-111 and the French

government withdrew from the BAC/ Dassault Anglo French Variable Geometry (AFVG) strike attack aircraft.

The genesis of the MRCA was the need to find a new partner for the AFVG and the parallel requirements of the F-104 Replacement group (Germany, Italy, Canada, Belgium

Photo: Catalog #: 01_00086541 San Diego Air and Space Museum Archive, Via Flickr



P.05

and the Netherlands). Six countries signed a memorandum of understanding in July 1968 which launched the conceptual phase of the MRCA project. By the end of 1968 Belgium and Canada left the project. In May 1969, Germany, Italy and the UK agreed to proceed with a 'project definition phase' and the Netherlands left the project.

Full scale development of the MRCA project was launched in July 1970. It was the first European aircraft to be wholly fly-by-wire and from the outset a great deal of consideration was given to how the aircraft would carry ordnance to meet its multi-role capability.

Moving on to 1974, P.01, the first tornado Prototype first flew on the 14th of August 1974. The aircraft climbed to 10,000 feet in take off configuration before cleaning up and carrying out handling tests. Low speed handling in landing configuration was checked. At Manching a low approach and overshoot preceded a landing. Wings were swept for the first time during the second flight.

The second prototype P.02, built at Warton flew on October 30th. It had made its first engine run on the 17th of August. P.02's principle role was to extend the clean aircraft flight envelope. P.02 has been on

display at the RAF Museum Cosford since March 2003.

P.03 (Warton) was tasked with flying with heavy loads and was the first dual control aircraft. P.04 (Manching) was the first to have a full avionics fit and was to test navigation, autopilot and ground mapping.

P.05 was the first Italian prototype and flew from Casselle in December 1975. P.06 (Warton) was fitted with two Mauser cannons, where previous prototypes carried flight test instrumentation. The test instruments on P.06 were placed in the rear cockpit so P.06 could only be flown solo.

P.07 (Manching) and P.08 (Warton) flew for the first time in 1976 and were tasked with testing the aircraft as a complete weapons system. P.09, the final prototype was built in Italy and first flew in 1979.

Six more pre-production aircraft were completed as back-up aircraft for the development programme and were earmarked, either for test flying units or squadron service upon conversion to production standard.

Tragically both P.04 and P.08 were both lost in fatal accidents.

Luftwaffe Colours

‡ **NORM 76** was used in 1982 and 1983. Silver grey RAL 7001 on the underside, with a disruptive pattern of RAL 6014, 7012 and black on the side and upper surfaces.

Aviation News reported in 1983 that “from, and including, 43+90” were to be painted in the Norm '83 Scheme and that earlier air force Tornados would be repainted. From that, it is reasonable to presume that any Luftwaffe aircraft up to and including 43+89 would, for a time, have been painted in the early scheme. Modeldecalsheet Sheet 87 slightly contradicts this, in the fact that 43+90 is shown in the initial scheme.

The initial scheme is fairly easy to identify in black and white or colour photographs because of the black area around the cockpit.

‡ **NORM 83** has a wrap-around disruptive pattern of Leaf Green, Olivegrün and Schwartzgrün. The aircraft in the photograph opposite is in the ‘B’ pattern, one of three patterns that this scheme appeared in.

‡ **NORM 95** introduced following operations over Kosovo uses American Federal Standard colours and is a partial wrap-around of Dark and Light Compass Ghost Grey and Grey Blue.

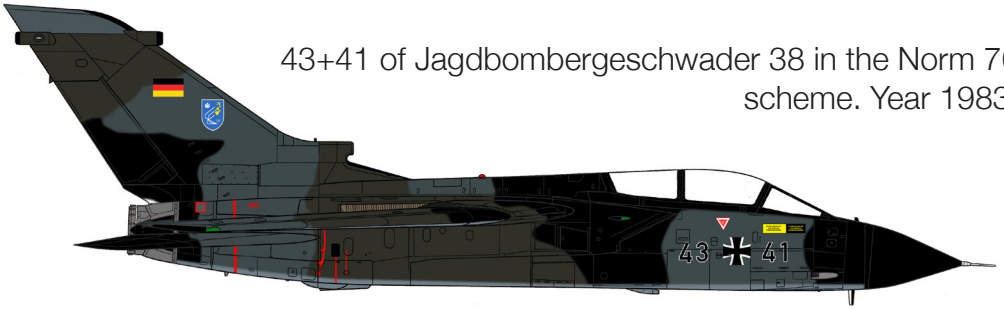
Light Compass Grey appears on the lower fuselage and undersides. Blue Grey appears on the upper surfaces and the Dark Ghost Compass grey appears on the upper side and underside wing tips.

‡ **CONTEMPORARY SCHEME** is overall FS35237; the same scheme as the German Eurofighter Typhoons.

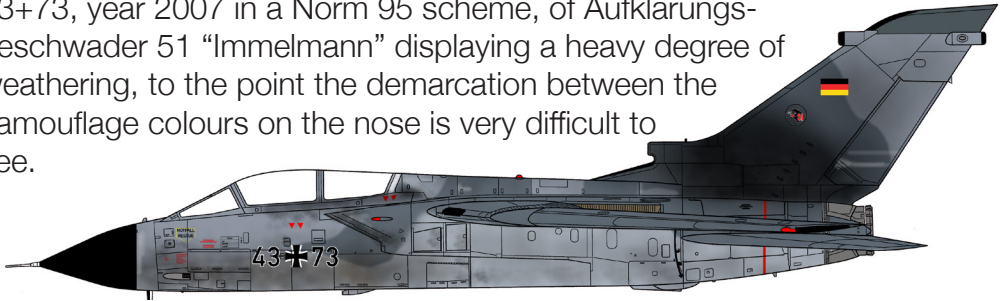
German Tornados are still flying in the latest three schemes, with plenty of opportunity for some heavy weathering on the Norm 83 and Norm 95 schemes. The uppermost portion of the tail is FS36118 Gunship Grey (Humbrol 125, Tamiya XF-24, Xtracolor X130)

Scheme	Colour Name	Humbrol	Revell	Xtracolor	Vallejo Model Colour	Gunze
Norm 76	RAL 6014 Gelboliv	155		X251		
	RAL 7001 Silbergrau		374	X255		
	RAL 7012 Basaltgrau		77	X254		
	RAL 9005 Tiefschwarz	33				
Norm 83	FS 34079 Leaf Green	116		X110	70.893	H309
	RAL 6003 Olivgrun	86	361	X261	70.890	
	RAL 7021 Schwartzgrun		9	X262		
Norm 95	FS35237 Grey Blue	145		X126		H337
	FS36320 Dark Ghost Grey	128		X135		H307
	FS36375 Light Ghost Grey	127		X136		H308
Contemporary	FS35237 Grey Blue	145		X126		

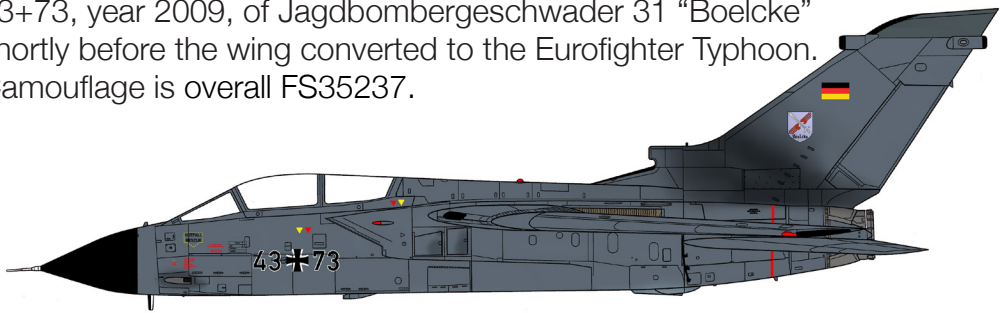
43+41 of Jagdbombergeschwader 38 in the Norm 76 scheme. Year 1983.



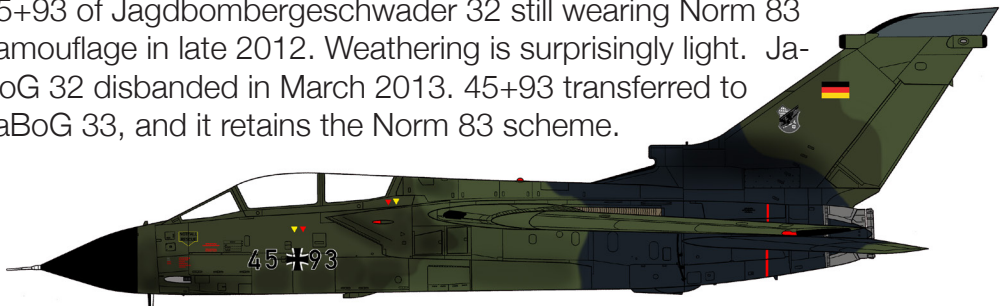
43+73, year 2007 in a Norm 95 scheme, of Aufklärungsgeschwader 51 "Immelmann" displaying a heavy degree of weathering, to the point the demarcation between the camouflage colours on the nose is very difficult to see.



43+73, year 2009, of Jagdbombergeschwader 31 "Boelcke" shortly before the wing converted to the Eurofighter Typhoon. Camouflage is overall FS35237.



45+93 of Jagdbombergeschwader 32 still wearing Norm 83 camouflage in late 2012. Weathering is surprisingly light. Ja-BoG 32 disbanded in March 2013. 45+93 transferred to JaBoG 33, and it retains the Norm 83 scheme.





Norm 83



Norm 95

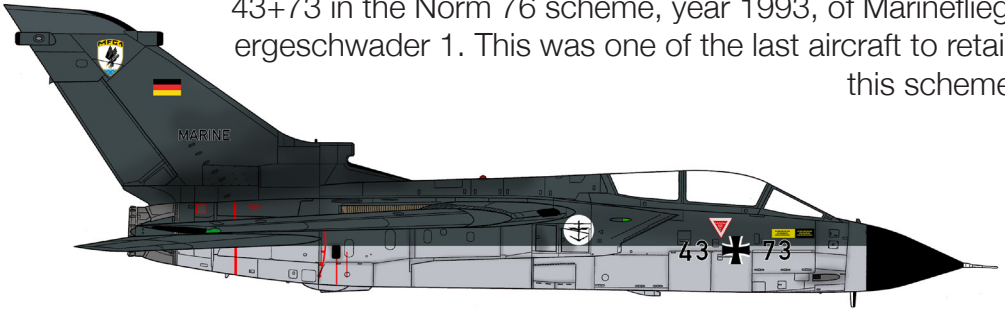
Marineflieger Colours

♦ **NORM 76** was the initial in service scheme for the Marineflieger Tornado. The upper surfaces are RAL 7012 Basaltgrau and the underside are a very pale grey RAL 7035 Lichtgrau. This should be, perhaps further lightened towards white.

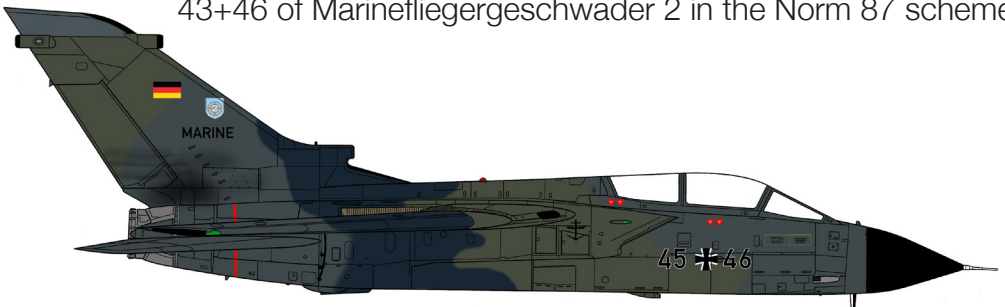
♦ **NORM 87** has a wrap-around of three colours, RAL 5008 Graublau, RAL 7009 Grüngrau and RAL 7012 Basaltgrau. Aircraft transferred to the Luftwaffe remained in this scheme for some time, with just the unit badges over painted.

Scheme	Colour Name	Humbrol	Revell	Xtracolor
Norm 76	RAL 7012 Basaltgrau		77	X254
	RAL 7035 Lichtgrau	196	371	X260
Norm 87	RAL 5008 Graublau		351	X264
	RAL 7009 Grüngrau		67	X256
	RAL 7012 Basaltgrau		77	X254

43+73 in the Norm 76 scheme, year 1993, of Marinefliegergeschwader 1. This was one of the last aircraft to retain this scheme.



43+46 of Marinefliegergeschwader 2 in the Norm 87 scheme.

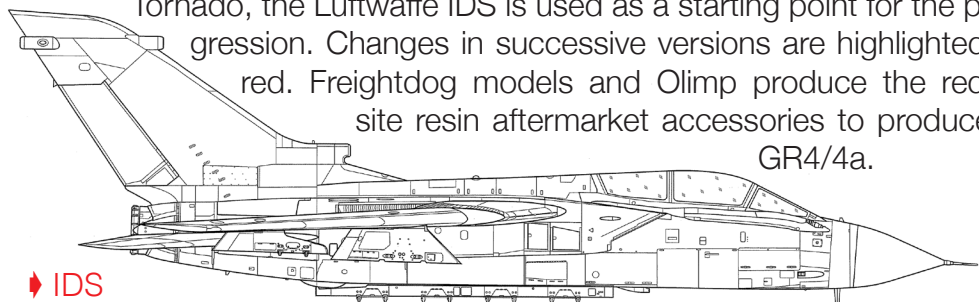


German and British Tornado Variants

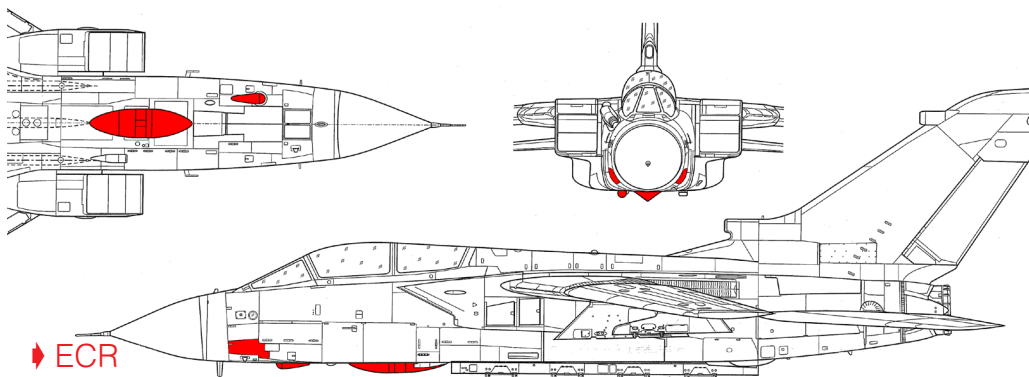
This feature has been written to highlight the key differences between the ground attack variants operated by the Royal Air Force and Luftwaffe. It should serve as a useful guide when converting one of Revell's 1/72nd scale boxings. Although not a strict chronology of the development of the

Tornado, the Luftwaffe IDS is used as a starting point for the progression. Changes in successive versions are highlighted in red. Freightdog models and Olimp produce the requisite resin aftermarket accessories to produce a

GR4/4a.



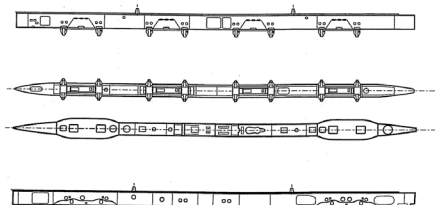
➤ IDS

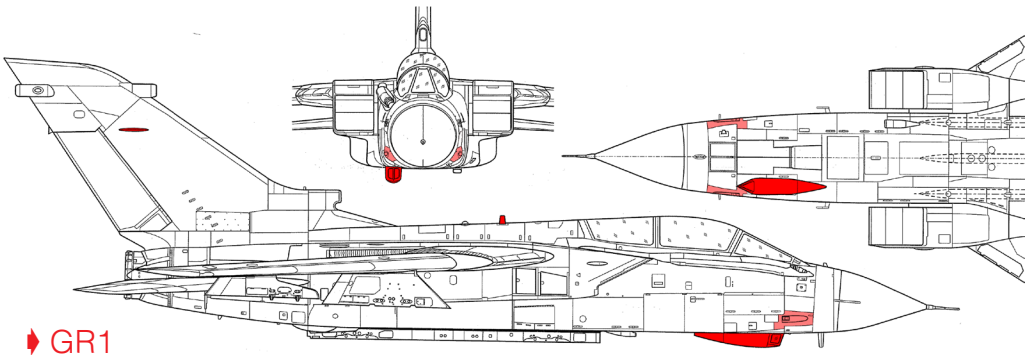


➤ ECR

The key differences between the IDS and ECR is the removal of the Mauser cannons. Under the fuselage, a IRLS (infra red line scanner) and FLIR (forward looking infra red) sensor have been added. Not shown are the ELS sensors that are fitted in the wing glove and the forward fuselage. On the ECR the black panel on the wing glove is much larger than the IDS.

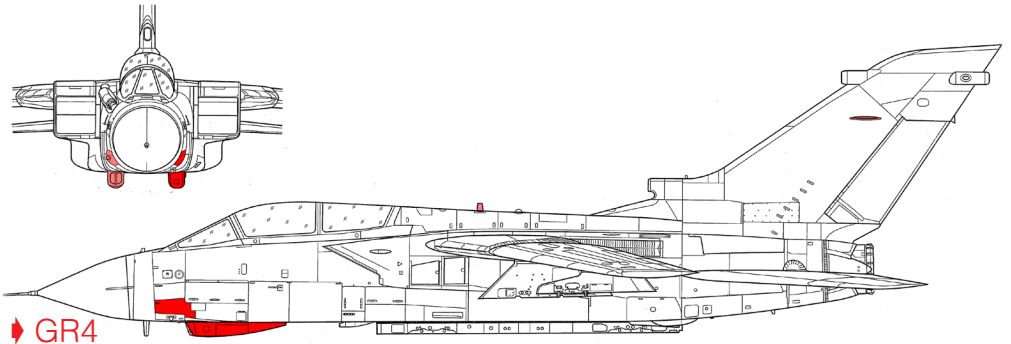
➤ The Weapon pylons fitted to the fuselage differ between the Luftwaffe (top) and RAF (bottom)





↪ GR1

In common with the German IDS, the RAF GR1 has two Mauser cannons. The aerial fit on the spine and tail differ. The key difference is the addition of a Laser Range Finder & Marked Target Seeker (LRMTS) under the forward fuselage.

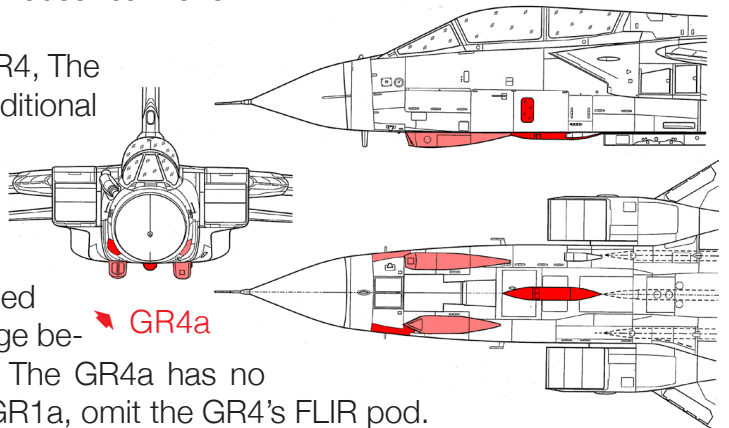


↪ GR4

The key difference between the GR4 and the GR1 is the addition of a FLIR sensor under the fuselage. Fitting the FLIR pod necessitated the removal of one of the Mauser cannons.

Moving on from the GR4, The GR4a has three additional sensors, two SLIR (sideways Looking Infra Red) on each side of the fuselage and a IRLS pod fitted underneath the fuselage behind the nose wheel.

The GR4a has no cannons. To make a GR1a, omit the GR4's FLIR pod.



↪ GR4a