

WARPAINT SERIES No. 48

FIAT G.91

WRITTEN AND ILLUSTRATED BY RICHARD J. CARUANA

A formation of Fiat G.91Ts of the 32 Stormo led by the highly colourful aircraft of the 204 Gruppo. The occasion was the last flight of this unit before disbandment. (G.Fasscarl)





FIAT G.91PAN, specially decorated for a flight to commemorate the 30th Anniversary of the type's appearance and the 200,000 flying hours clocked by the 2^o Stormo on the G.91. Red and white finish overall with black anti-dazzle panel; all national markings removed. Black/white knight's helmet and plume on both sides of fuselage; note '30' painted on the airbrake. This was the last ex-PAN G.91 to fly



**DRAWINGS BY
RICHARD J. CARUANA**





FIAT G.91

WRITTEN AND ILLUSTRATED BY
RICHARD J. CARUANA

BEST known as 'Gina' to most pilots who flew it, the FIAT G.91 was a masterpiece in economy of effort, based on a modified proven design that offered a guarantee of success. Its external resemblance to the famous F-86 Sabre was a natural consequence of the experience gained by FIAT in the building of a series of jet aircraft under licence during the immediate post-war period culminating in the F-86K. For many years the G.91 was also the mount of the Aeronautica Militare Italiana (AMI - Italian Air Force) aerobatic team, the Frece Tricolori, a familiar sight at many an airshow, having performed displays throughout most of Europe, and beyond. Unfortunately, international politics brought to an abrupt end the tremendous export potential of this diminutive Italian fighter aircraft that could have seriously threatened the lucrative United States (US) air arms on

When the second prototype appeared (bearing Construction Number 01) armament was fitted as can be clearly seen, it went through a long series of firing trials (FIAT/Aeritalia)

the international market.

Just after the end of World War 2, Britain had established a considerable margin ahead

Above: Three of the Fiat G.91Ts out of the 101 that were eventually in use by the AMI seen at Scuola Addestramento Aviogetti based at Amendola. This unit was the last to fly any G.91 version in the world with the last flight being on 30 September 1995.

of all other countries in the jet aviation field, especially in turbojet power plant design and production. The US, France and even the USSR relied on British engines on which to found their own development in this field. Likewise, Italy was keen to enter into such ventures and from the two main jet fighters then on offer, the Gloster Meteor





The assembly line at FIAT/Aeritalia, showing G.91R C/n 157 in the foreground (FIAT/Aeritalia)

and De Havilland Vampire, chose the latter mainly due to its simplicity of design. With a single engine, and a fuselage of wooden construction, the Vampire proved ideally suited and FIAT obtained a licence not only for the construction of the aircraft for the AMI, but also for its engines. In fact, the number of Vampires built by FIAT, in partnership with Macchi, was somewhat exaggerated for Italy's needs, but helped the AMI to quickly re-equip most of its fighter units then flying P-47 Thunderbolts, P-51 Mustangs and Spitfires.

The second generation of jet aircraft to see service with the AMI however came from across the Atlantic, in the shape of Republic F-84G Thunderjets under Mutual Defense Aid. This was a United States Air Force (USAF) offer to allied countries forming part of North Atlantic Treaty Organisation (NATO), the F-84Gs being followed by North American F-86 Sabres and Republic F-84F Thunderstreaks. Italy's own aviation industry ventured into indigenous designs, of which only a handful saw the light of day. These included the FIAT G.80/82 and the Ambrosini-Aerfer Sagittario and Ariete – while FIAT's G.80 and G.82 were built in small numbers, the others were never built in quantity.

One of the problems that emerged within the aviation industries of NATO countries at that time was a lack of co-ordination, where the long-sought standardisation in this field remained an illusion. Needless to say, the major players sought to protect their own aviation products and services at a time when aircraft production costs, maintenance and operations began to rise to such levels that they could even be beyond the reach of the smaller NATO members. Moreover, a massive £700 million infrastructural project had been undertaken involving the extension and construction of some 150 airfields for NATO's tactical units in Europe.



Above: One of the pre-production aircraft in NATO markings, during service trials with the 5ª Aerobrigata of the AMI (FIAT/Aeritalia) Below: Pre-series G.91s assigned to the 5ª Aerobrigata for service trials. Note the different finishes on these aircraft which also differed in construction details (FIAT/Aeritalia)

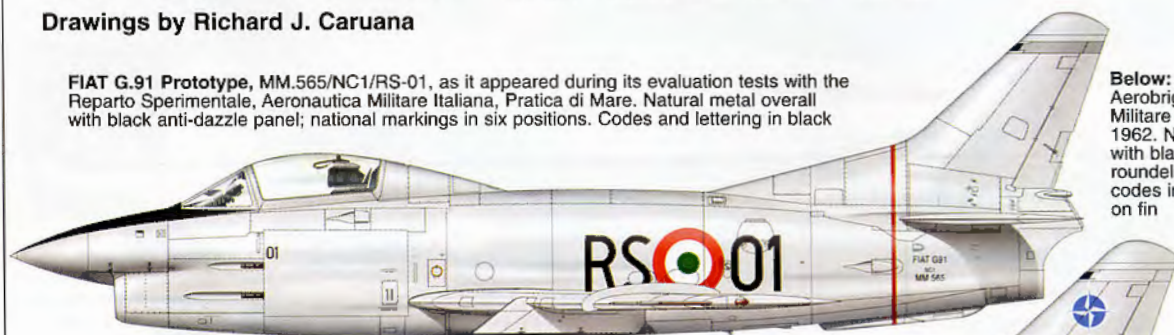


FIAT G.91 Camouflage and Markings

								
Dark Sea Grey FS.36118	Dark Green FS.34079	Light Blue	Aluminium	Ident Green	Ident Red	Freccie Tricolori Blue	Ident Yellow	Dayglo Orange
								
Basaltgrau RAL 7012	Gelboliv RAL 6014	Silbergrau RAL 7032	Port. Light Grey FS.36473	Underside Blue RAL 5014	Anti-missile Green FS.34012	Tan FS.30219	Green FS.34079	

Drawings by Richard J. Caruana

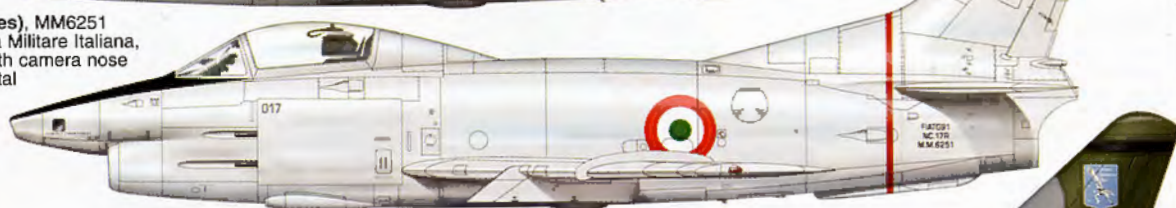
FIAT G.91 Prototype, MM.565/NC1/RS-01, as it appeared during its evaluation tests with the Reparto Sperimentale, Aeronautica Militare Italiana, Pratica di Mare. Natural metal overall with black anti-dazzle panel; national markings in six positions. Codes and lettering in black



Below: FIAT G.91 5-242, 5^a Aerobrigata, Aeronautica Militare Italiana, trials aircraft, 1962. Natural metal overall with black anti-dazzle panel; roundels in six positions and codes in black. NATO badge on fin



FIAT G.91 (Pre-Series), MM.6251 (NC.17), Aeronautica Militare Italiana, one of three fitted with camera nose for trials. Natural metal overall with black anti-dazzle panel; roundels in six positions. '017' on gun bay door



FIAT G.91 2nd Prototype, MM.566 (NC.2)/RS-5, RSV, Aeronautica Militare Italiana, 1975. Dark Grey/Dark Green uppersurfaces with Aluminium undersides; black anti-dazzle panel. Codes in white, with '5' repeated on air intake; roundels in six positions



FIAT G.91 (Pre-Series), MM.6239/5-239 (CN/2), 5^a Brigata Aerea, Aeronautica Militare Italiana, 1962. Dark Grey/Dark Green uppersurfaces with Light Blue undersides; black anti-dazzle panel. Roundels in six positions; codes in white. NATO symbol on fin



FIAT G.91R/1, MM.6252/NC45/5-279, 5^a Aerobrigata, Aeronautica Militare Italiana. Dark Grey/Dark Green upper surfaces, Aluminium undersides. White codes; construction number '45' in white on fuselage, aft of cockpit



FIAT G.91N, MM.6246 (NC.12)/G-45/4, used by Bristol Siddeley for Orpheus development. Dark Green/Dark Grey uppersurfaces with Light Blue undersides; black anti-dazzle panel. Italian roundels in six positions and temporary UK registration in white on fuselage sides; NATO badge on fin. Later passed on to 2^o Stormo, lost 15 February 1965 near Treviso



Two versions of the G.91 used by the Pattuglia Acrobatica Nazionale, Freccie Tricolori, Aeronautica Militare Italiana, based at Rivolto. Scheme of High gloss Dark Blue all upper surfaces with Aluminium fuselage undersides and green/white/red stripes under wings and tailplane; green/white/red flashes along fuselage. Standard roundels above wings and on fuselage sides; code on fin. Black anti-dazzle panel.

Below: G.91PAN flown by Cap. F. Brovedani whose name is carried under the cockpit in yellow. Further down: G.91R/1s replaced some G.91PANs as the latter ran out of flying hours



FIAT G.91PAN, 2-77, ex-Pattuglia Acrobatica Nazionale – Freccie Tricolori, passed on to the 2° Stormo, Aeronautica Militare Italiana. Scheme as per above except for deletion of fuselage flashes and yellow codes and names; badge of 2° Stormo added on a yellow band across fin and rudder

Fiat G.91R/4, 10109/109, Royal Hellenic Air Force. Dark Grey/Dark Green upper surfaces; Light Blue undersides. Nato marking on fin. Only known example in these markings, the Greek order being taken over by the Luftwaffe

One of the very last G.91Rs to see service with the Aeronautica Militare Italiana, 2-01 of the 14° Gruppo, 2° Stormo, showing the 'low-visibility' markings on the fuselage, although still carrying standard size roundels above the wings (Giuseppe Fassari)

Early in the 1950s, the US Government launched its Mutual Weapons Development Program (MWDP) with the aim of involving European aeronautical design and production facilities so as to lessen the dependence of NATO states on the US industry. This was linked to the fear that such dependence could have a negative effect in time of war.

NATO, formed in 1949, owed much to its later success to the 9th Working Session held in Lisbon in February 1952 where a number of important issues were discussed and guidelines to future NATO policy and activity drawn up. At the end of the conference, the member states approved a document that stressed the importance of arming European air forces with a lightweight strike fighter capable of operating from semi-prepared surfaces. No doubt, someone at that conference was taking stock of experience that was being learnt in Korea, where another major conflict was at its peak.

It was in this scenario that the FIAT G.91 was born: to a NATO specification formulated in December 1953 requesting a light-

Notwithstanding that their service career was coming to a close, the Italian 'Ginas' were given low visibility markings. This G.91R/1B 14° Gruppo example (2° Stormo) coded 2-12, serialled MM.6411. (Giuseppe Fassari)





Above: This 'Gina' shows signs of heavy use and recent firing of its 12.7mm Brownings. Note low visibility markings and codes and the late style raised cockpit canopy which indicates that it has been retrofitted with a zero-zero ejector seat. Below: A G.91R of the 14^o Gruppo, 2^o Stormo AMI in early style markings. Note the stencil type unit numbers on the fuselage (Giuseppe Fassari)



weight, low-cost strike fighter for use by NATO member air forces. The requirements for a Light-Weight Strike Fighter (LWSF) were formulated and transmitted to Supreme Headquarters, Allied Powers in Europe (SHAPE) based in Paris. Foremost among the requisites was the ability of this

aircraft to operate from semi-prepared airfields in a wide spectrum of ground-attack missions.

Meanwhile as a stop gap measure \$600 million (half of which was borne by the USA) were allocated to the production of North American F-86Ks, Hunters, Mystère

IVs and Sea Hawks to be supplied to NATO countries.

THE NATO SPECIFICATION

The new lightweight aircraft was required to:

- be able to strike armoured vehicles, troop concentrations, airfields, petrol, oil, lubricant (POL) stores, moving targets on the battlefield and fixed installations;
- have interdiction capabilities against trains, barges and similar troop-carrying targets;
- operate from semi-prepared airfields, highways or Pierced Steel Plate (PSP) surfaces with a take-off distance to clear 50ft (15m) of not more than 3,500ft (1100m);
- have a maximum level speed of Mach 0.95 (for at least 30 per cent of the sortie), a radius of action of 150 nautical miles (280km) and a loiter time on target area of 8 to 10 minutes;
- have good manoeuvrability and high rate of roll (100 degrees per second at a sea level speed of Mach 0.9)
- have armour protection against shell fragments and small arms fire for pilot, fuel tanks and fuel lines;
- be armed with, either four 12.7mm Browning machine guns, or two Aden 20mm cannon or two Aden 30mm cannon, with provision for 300, 200 and 120 rounds respectively;
- have underwing armament alternatively of twelve 3-in (7.5mm) rockets; two 500lb (230kg) bombs; two Napalm tanks; two machine guns; or rocket pods each of about 500lbs (230kg);
- have an empty weight of 4,400lbs (2000kg) and an all-up combat weight of not more than 10,000lbs (4700kg).
- onboard equipment had to include UHF radio, IFF and TACAN.

FIAT G.91R/1A, MM6299 coded 2-60, belonging to the 2^o Stormo on display. The yellow flash on the nose indicates that it belongs to the 103^o Gruppo, AMI (Giuseppe Fassari)





Above: A sheep in wolf's clothing - ferocious-looking G.91PAN, bearing fictitious code 32-13 and a sharkmouth motif painted in 32° Stormo colours and markings. This was an ex-Frecce aircraft which went to the 32° and placed on 'gate guarding duty' at Brindisi (Giuseppe Fassari) Below: Starboard side view of MM.6413, an R/1B previously coded 2-13, which flew the last flight of a G.91 in Aeronautica Militare Italiana service on 9 April 1992, flown by Tenente Colonnello Monesi, commander of the 14° Gruppo (Giuseppe Fassari)



All in all, even by today's technological standards, designing an aircraft within these parameters is not an easy task; obviously, it was no less difficult then! Simplicity of maintenance on the field, far away from sophisticated airfield equipment, was also emphasised. Proposals by various parties interested in the LWSF were to be submitted within two months from the issue of the specifications, and the first 30 aircraft had to be finished by the first quarter of 1957. All the details were embodied in NATO Basic Military Requirement No. 1 (NBMR-1) which was issued by SHAPE on 18 March 1954 to interested aircraft firms in Europe. All nations were also notified that \$10 million had been set aside by MWDP as financial support for this purpose.

NATO's Advisory Group for Aeronautical Research and Development (NGARD), under the presidency of Professor Theodore von Karman, set up an evaluating committee to examine ten proposals submitted by three nations. Britain offered the Folland Gnat and a lightweight version of the Hunter; France presented the Breguet 1001 and 1100 Taon, Dassault Mystere XXVI (later renamed Etendard VI) and Etendard IV, Sud-Est SE5003 Barouder and Sud-Oest Trident; Italy participated with the FIAT G.91 and the Aerfer Sagittario II.

A decision was announced on 30 June 1955 that NGARD was recommending the construction of two of the projects that had been presented, the Breguet Type 1001 Taon as their first choice, and the FIAT G.91. For some reason, however, MWDP offered to sponsor half the cost of three of the contestants, the Taon, G.91 and Mystere XXVI, the balance being equally divided between Italy

An elegant and striking scheme for the G.91, an ex-PAN, painted to commemorate the 200,000 hours flying reached with the type by the 2° Stormo at Treviso-Sant'Angelo. The occasion also recalled the 30th anniversary of the G.91's appearance in service. (Giuseppe Fassari)





Port view of the commemorative scheme sported by MM.6413 for the last G.91 flight in Italy on 9 April 1992. Note that the design on this side differs from that on the starboard side

and France. A contract for the G.91 was signed in Rome on 3 July 1955 by General Tolino and General Maris on behalf of the Italian and US Governments respectively. In a separate US-UK agreement, the British Bristol Orpheus jet engine was selected as the powerplant of the future LWSF.

THE COMPETITION

FIAT had such faith in the 'little Sabre' designed by Ing. Giuseppe Gabrielli that the company embarked on large-scale tooling as a private venture, with a formidable publicity campaign running in parallel. The company had reached such an advanced stage by this time, that only four weeks after the official contract signed in Rome it received an order for 27 pre-series examples although the fly-off by the three short-listed finalists remained scheduled for October 1957.

By 7 December 1955, FIAT was already having close discussions with Bristol to finalise the installation details of the Orpheus on the G.91; negotiations included the production of the engine under licence. Construction of NC.1 moved steadily ahead, although take-off weight was rising steadily over that specified as supplementary equipment was requested and installed, resulting in further structural strengthening. When the aircraft was ready to be rolled out, it stood at 5,800lb (2,650kg), some 20 percent 'overweight'. No armament was carried at this stage, as the gun bays were packed with test recording equipment and a Martin-Baker Mk.4 ejection seat installed. The Bristol (later Bristol-Siddeley) Orpheus BOr.01 installed provided 4,050lb thrust

(1,837kg).

First flight was performed on 9 August 1956 at Torino-Caselle with Riccardo Bignamini at the controls (winner the year before of the McKenna Trophy in the US). FIAT's LWSF had beaten its nearest rival (the Taon) into the air by nearly a year! Notwithstanding the increase in weight, performance of the G.91 still matched the required specification. Test flights continued regularly, Bignamini being joined by S. Marsan and V. Sanseverino in the development programme.

During its 24th flight, on 20 February 1957, Bignamini easily exceeded the speed of sound at 29,000ft (9,000m) four consecutive times. Seven days later, however, the Martin-Baker ejection seat saved Bignamini's life when he was forced to eject, after encountering excessive tail flutter in a high-speed run at low altitude over Cavour, near Turin. Although NC.1 was completely destroyed, all the recording equipment, that Fiat had wisely installed, was salvaged from the crash site.

This incident brought the G.91 to an abrupt halt until the flutter problem that had affected the horizontal tail surfaces could be solved. During the intensive investigation



Detail of the 2^a Stormo's motif, a knight's helmet, painted for the occasion of the last G.91 flight on the pilot's helmet

that followed FIAT engineers were assisted by colleagues from France, while NACA offered its wind tunnel facilities at Langley. This resulted in a number of modifications that were incorporated into the second prototype, NC.1bis (MM.565). These included a larger, redesigned tailplane, the addition of a ventral strake; the cockpit hood was also raised by 2.5in (6cm). Full armament was now installed, while power was provided by the 4,850 lb/st (2,200kg/s) BOr.03. It performed its maiden flight in this form on 26 July 1957, while the third prototype (MM.566) was brought up to the same standard.



Early operational experience with the G.91R was highly positive, with 100 percent efficiency being recorded in four days and over 140 sorties

Note: AMI service camouflage and markings for the G.91 were standardised and consisted of Dark Sea Grey (FS.36118) and Dark Green (FS.34079) on the upper surfaces with Aluminium (FS.17178) under-sides. National markings carried in six positions. Unless otherwise stated, codes were in white while c/n and serial under the tailplane were in black

FIAT G.91R/1B, 13-19 (serial unknown), 13° Gruppo, Aeronautica Militare Italiana. This unit flew the G.91 for a very brief period



FIAT G.91R/1, 32-3 (serial unknown), 32° Stormo, Aeronautica Militare Italiana. Unit badge on both sides of fin



FIAT G.91R/1A, MM.6299/NC.163/51-294, 51° Squadriglia, 14° Gruppo, Aeronautica Militare Italiana. Note Const. N° (163) repeated in white on gun bay door; unit badge on both sides of fin



FIAT G.91R-1, 2-04 (serial unknown), 2° Stormo, Aeronautica Militare Italiana. Unit badge superimposed on a white band, thinly outlined in black, on both sides of fin



FIAT G.91R/1B, MM6394/NC.198/2-38, 103° Gruppo (2° Stormo), Aeronautica Militare Italiana, Treviso-Sant'Angelo. Yellow air intake lip; note badge under windscreen



FIAT G.91R/1B, MM.6411/NC215/2-12, 14° Gruppo (2° Stormo), Aeronautica Militare Italiana. Light Blue-Grey codes, thinly outlined in black. White flash on fin/rudder with Stormo badge superimposed (minus shield background)



FIAT G.91R/1A, MM.6309/NC.173/2-56, 103° Gruppo (2° Stormo), Aeronautica Militare Italiana. Light Blue-Grey codes, outlined in black. Yellow lightning flash on nose with Gruppo badge (Diana) in centre





Above: On with the show... the main nine-ship formation of the Freccie Tricolori begins its display, the soloist having already left the group to perform his own routine (Richard J. Caruana)
 Right: One of the early conversions by FIAT of a pre-production machine into PAN for the Freccie Tricolori. The aircraft is awaiting delivery to the team and still lacks the individual number on the fin. Note also the all-red ballast tanks (FIAT/Aeritalia)

The 'fly-off competition' for NATO's LWSF was held at the Centre d'Essais en Vol, in Bretigny, France, when the G.91 was still under some flight restrictions. The evaluation team was made up of six test pilots and six engineers from four NATO countries. Each country was represented as follows: Lt Cdr W.R. Hart, RN, seconded from 'A' Squadron of the A&AEE Boscombe Down for Britain, Capt Bigand for France and Capt M. Colagiovanni for Italy. Maj R.B. Hippert and Capt R.F. Titus (USAF) together with Lt J.F. Lasseter (USN) appeared for the US. Générale de Brigade Brohon of the Armée de l'Air was responsible for overall supervision.



Two examples of the G.91 were taken to France for the 'fly-off', these being the third prototype (MM.567) and the first pre-production example (MM.6238). The French aircraft consisted of Taon-01 and Etendard IV-01, both powered by the Orpheus as

specified. After strong representations by the French authorities, two 'outsiders' were also evaluated. These consisted of the Sud-Est Baroudeur and the Dassault Etendard IV, both powered by SNECMA Atar turbo-jets.

The trials were centred around the capabilities of the various aircraft and their ability to complete the designated mission. Each aircraft made three flights per day, with each of the six pilots in turn flying all five aircraft. Three weeks of exhaustive tests were conducted to establish taxiing characteristics on runway and semi-prepared strips; slow-speed handling and stalls; static and dynamic longitudinal, lateral and directional stability.

Performance was carefully evaluated, including take-off, landing and overshoot qualities, stability of manoeuvres, longitudinal trim changes with power, etc. Also

Best known Italian ambassadors to the world, the Freccie Tricolori displayed their aircraft in many countries outside Italy. Number 14 sits on Park 3 at Luqa airport, Malta, between displays in September 1977 (Richard J. Caruana)



FIAT G.91 PRODUCTION

	Qty	c/n	Serial	User
G.91 Prototype	1	NC.1		FIAT
G.91 Prototype	3	NC.1b, 2, 3	MM.565-567	AMI
Pre-Series	27	NC.4-30	MM.6238-6264	AMI ¹
G.91A	1	NC.31	MM.6265	AMI
G.91R/1	22	NC.32-53	MM.6266-6287	AMI ²
G.91R/3	50	NC.54-89, 91-97, 102-108	30+01 to 30+43	Luftwaffe ³
G.91R/4	50	NC.90, 98-101 109-153	5401-5440	Luftwaffe/FAP ⁴
G.91R/1A	25	NC.154-178	MM.6290-6314	AMI ⁵
G.91R/1B	50	NC.179-228	MM.6375-6424	AMI
G.91R/3	294	NC.301-594	30+44 to 30+99 31+01 to 31+99 32+01 to 32+99 33+01 to 33+23	Luftwaffe ⁶
G.91T Prototypes	2	NC.1, 2	MM.6288-6289	AMI
G.91T/3	44	NC.1-44	34+01 to 34+41	Luftwaffe ⁷
G.91T/1 Srs.1	65	NC.45-119	MM.6315-6374 MM.6425-6438	AMI
G.91T/1 Srs.2	34	NC.120-153	MM.54392-54426	AMI
G.91T/3	22	NC.601-622	34+41 to 34+62	Luftwaffe/FAP ⁸

Summary

By FIAT:	R/1, Prototypes & Pre series:	129
	R/3 50	
	R.4 50	
	T/1 + Prototypes	101
	T.3 44	
	Total 373	

by Flugzeug-Union Sud:

R/3	294
T/3	22
Total	316

Total Production

690

Notes:

1. MM.6251, 53, 57 and 59 built as G.91R. 20 converted to G.91PAN serialised 6238-44, 6248-56, 6259-61 and 6264.
2. MM.6265 eventually converted to G.91PAN.
3. 96 R/3s and T/3s transferred to FAP between 1974 and 1982. German serials include only those airframes existing at time of change-over by Luftwaffe to new serial system on January 1, 1968.
4. NC.98 and 109 flew first with Greek markings, serialised 10098 and 10109. All R/4s subsequently transferred by Luftwaffe to FAP in 1966 except for NC.98, 99, 113, 122-125, 137, 140 and 150.
5. MM.6310, 6311 and 6314 converted to PAN. Angola claims three/four captured ex-Portuguese, but this has never been confirmed.
6. Produced by Flugzeug-Union Sud. 96 R/3s and T/3s transferred to FAP between 1974 and 1982.
7. Produced by FIAT for Luftwaffe. Part of 96 T/3s and R/3s transferred to FAP between 1974 and 1982.
8. Produced by Flugzeug-Union Sud. Part of 96 T/3s and R/3s transferred to FAP between 1974 and 1982.

important were tests on the effectiveness of controls and trim, high Mach number effects, evaluation of mechanical or electronic devices affecting flying qualities, rate of roll, measurement of static thrust, aircraft tare weight, airspeed and altimeter position errors, take-off and landing distances, climb performance and level flight performance. Great emphasis was placed on the mission profile, including turn-round times (refuelling and re-arming). Aircraft were also assessed on their cockpit layout, ease of ground handling and maintenance on the field, together with ground firing of internal weapons.

Trials came to an end on 4 October 1957 and an official result was expected by 12 November. This was delayed until January of the following year when the G.91 came out as being superior to all competitors – a bitter pill for the French aviation industry to swallow, being beaten on home ground! While Italy had won with an excellent airframe and weapon system, Britain had secured important sales of the Bristol Orpheus and Martin-Baker ejection seats.

THE G.91 DESCRIBED

A major factor that had contributed to the G.91's success in the NATO competition was its ability to operating from semi-prepared or grass fields, completely independent from permanent ground installations. Although this had resulted in the beefing-up of the structure so that it could match the rigorous operational requirements, the basic concept and design remained, in fact, quite simple. FIAT put to good use the experience it had gained in the construction of 231

An early record of the G.91PAN of the Freccia Tricolori, at the start of public display in Italy. Note that at that time the serial number, MM.6248, was carried on the nosewheel door (via Giuseppe Fassari)





An ex-G.91PAN of the Freccie Tricolori with the markings of the 2^a Stormo. After the team switched onto the Aermacchi MB.339, some of the surviving G.91s were passed on to this unit retaining their original scheme (Giuseppe Fassari)

ted, with armour plating placed in front, behind and underneath. The transparent canopy was hinged at the rear and opened up through an electric switch, or from the outside in case of an emergency and could be jettisoned through a manual command by the pilot or automatically in case the ejector seat was fired.

The centre section of the fuselage, which was eventually riveted onto the front section, was almost completely taken up by seven fuel tanks which housed a total of 375 Imp Gallons (1,600 lt), all tanks having adequate armour-protection against ground fire. Thanks to their position close the centre of the aircraft, no shift in the centre of gravity could be felt as the fuel was depleted. This section also housed the main undercarriage wheels, having low-pressure wide cross-section tyres designed by the well-known

North American F-86Ks under licence and its decision to adhere to an already proven layout and building technique saved not only time but also precious resources. The 'scaled-down Sabre' was nonetheless an engineering feat considering NATO's stringent demands.

Fuselage construction was of the conventional shell-type, broken down in three major sub-assemblies. The front section consisted of an air intake surmounted by a nose cone. This cone containing three Vinten 70mm cameras – forward, vertical and oblique – and slid forward and then hinged down for ease of access to the photographic equipment. Further back were housed the gun-bays, nose-wheel bay, UHF radio equipment, radar, radio-compass, IFF

and other equipment. Considering the size of the G.91, the cockpit was roomy and well laid-out, fully pressurised and air-conditioned (controlled automatically or manually). A Martin-Baker Mk.4 ejector seat is fit-



Right: One wheel landing for a G.91 of the 32 Stormo whilst on a visit to Malta in July 1970 from their base at Brindisi-Casale. (G.Mangion)
Below: An ex-Freccie Tricolori G.91PAN, previously an 'R' model with camera nose, coded 2-71, in service with the 2^a Stormo after the Italian national aerobatic team converted onto the Aermacchi MB.339 (Giuseppe Fassari)





Seen under the tail unit of Fiat G.91R/1 MM6323 are two of the prototypes of the G.91T and in the corner an F-86 Sabre which the G.91 replaced. (Aeritalia)

French Messier firm. Tyre pressure was 3kg/cm² for the nosewheel and 3.5kg/cm² for the main wheels. Just ahead of the main wheel wells a pair of armour-clad airbrakes was fitted.

For ease of engine maintenance or change, the rear section was completely detachable with a four-bolt pick-up. It also contained the fin and rudder, and horizontal tail surfaces as well as a brake-parachute housing at the base of the rudder.

The wings were built on two main spars with an inboard structure integral with the lower fuselage section, and covered by upper and lower skin panels with riveted spanwise stiffeners. Of box-type structure, the wing had a thickness-ratio of nine percent and a sweepback of 37 degrees at quarter chord. This moderate wing cross-section was chosen to allow for the construction of a more robust and durable structure. Single slotted flaps were fitted while ailerons were actuated by Jacottet hydraulic servo-control units, provided with manual emergency reversion.

Two 0.50in (12.7mm) Colt Browning M3 machine guns with 300 rounds each, or a 20mm cannon with 200 rounds, or a 30mm cannon with 120 rounds could be fitted on each side in the gun bay. The guns, ammunition containers and all associated equipment was mounted on the gun bay doors and could be removed as a single unit and replaced by a previously prepared pack. However, due to their weight, the DEFA 552 30mm cannon were fixed in the standard manner. External armament loads under the wing could consist of a pair of 500lb

(225kg) bombs, two napalm bombs, two launchers (housing 31x50mm rockets, or 12x76mm rockets, or 6x127mm rockets, or six 57mm exercise rockets) two AS-20 missiles, or a pair of 120-gallon (517 litre) fuel drop tanks.

Although the G.91 performed within the parameters laid down in NATO's specifications, FIAT continued with its efforts to improve the aircraft's efficiency. A series of tests was initiated using Jet Assisted Take-Off rockets (JATO) principally using the third prototype and, later on, the third



One of the G.91Ts on strength with the 32^a Gruppo, coded 32-62, based at Brindisi-Casale (Giuseppe Fassari)

G.91R/1 (MM.6292). Use was made of JATO 14-DS-1000-M8 units which provided an extra 450kg thrust. With a pair of these units fitted, the take off run at a gross weight of 5000kg was reduced to 70 percent, while this fell to 55 percent when four units were used.

FIAT had also designed and developed a range of easily transported ground equipment that could be used 'in the field'. These covered all areas of maintenance, refuelling, and periodic checking of equipment together with special toolboxes and a series of wheeled carriers for oxygen equipment, bombs, external tanks and armament.

In the air the G.91R was an extremely pleasant aircraft to fly, blessed with excellent manoeuvrability. It was designed principally for attacks on targets within 170 miles (272km) radius from base. Take-off with 100 percent power was quick, the nose-wheel being raised at 90-95 knots, and the aircraft would leave the runway at around 125 knots with external load, and at 120 knots clean, clearing a 50ft (15m) obstacle within a run of 3,600ft (1100m). Initial climb rate was 6,003ft/min (1,530m/m) reaching 29,000ft (9,000m) in three and a half minutes. Maximum speed at sea level was of Mach 0.88 (688mph/1068km/h), Mach 0.9 (675mph-1,080km/h) at 5,000ft (1520m), Mach 0.91 (637mph-1,019km/h) at 20,000ft (6,100m), normal cruising speed being 253mph (405km/h) at 35,000ft (10,700m). Landing approach was made at 138mph (220km/h) with a landing run (on hard surface) of around 1,980ft (600m) aided by its brake-chute. Combat radius was 200miles (320km) which included a 10-minute loiter time on target. Ferry range was 1,150miles (1,840km) with a ceiling of 42,980ft (13,100m).

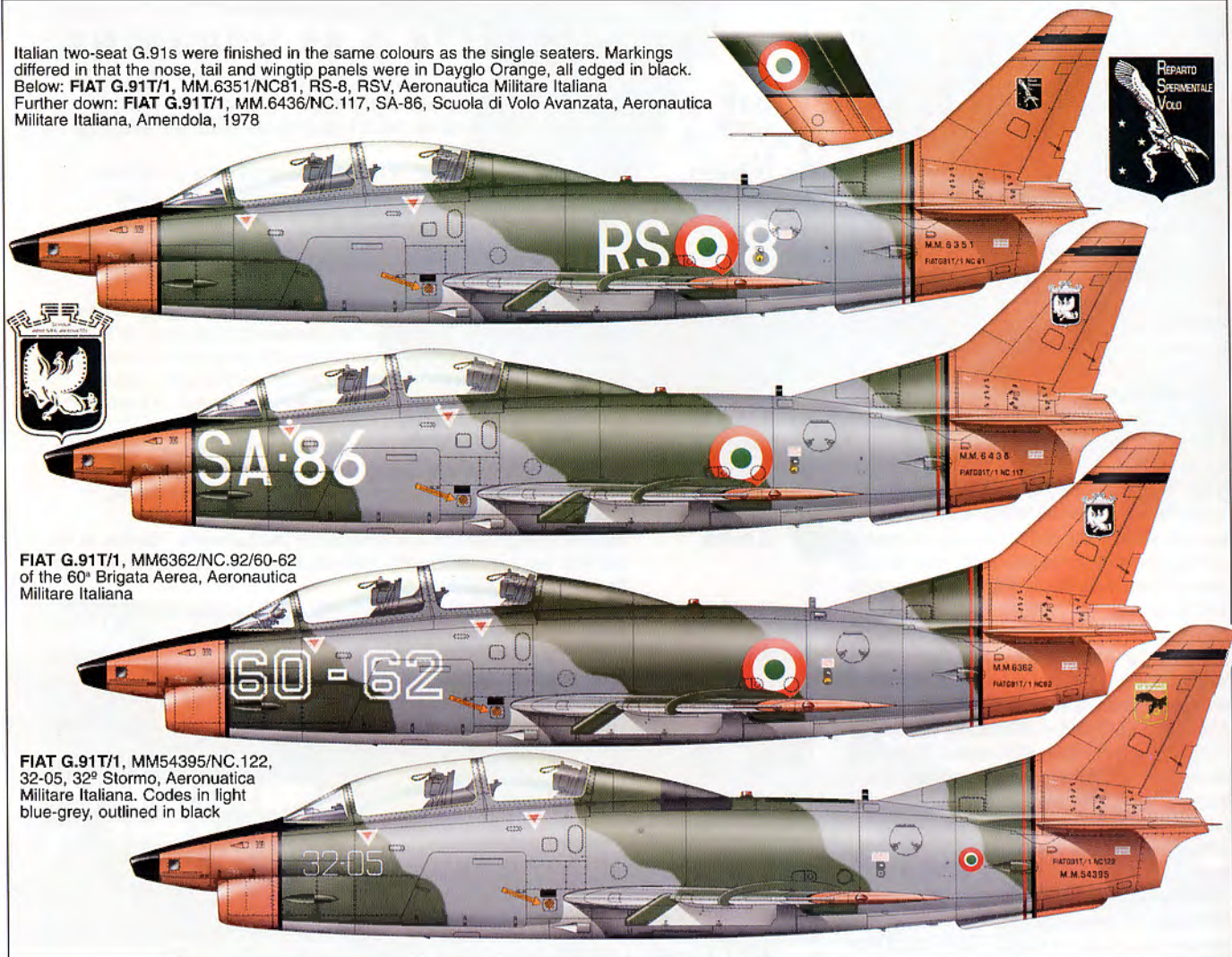
A two-seat G.91T/1, 60-62, from the 60a Brigata Aerea of the Italian Air Force photographed at Cottesmore during a visit, in the company of Tornado MM7004 of the TTTE (Giuseppe Fassari)

FIAT/AERITALIA G.91 VERSIONS

G.91	Prototypes and pre-production aircraft.
G.91A	One experimental model (NC.31) built to test slats and wing fuel tanks for longer range.
G.91BS/1	(BS-Battle Surveillance). Project derived from the G.91T with enhanced electronic and photographic equipment. Not built
G.91BS/2	Two-seat version of the G.91BS/1, also remained a project.
G.91E	Proposed version of the G.91Y for the AMI. Not built.
G.91N	One example built from pre-production model with extra navigation equipment such as Decca and Rho-Theta.
G.91PAN	Aerobatic version for Freccie Tricolori with non-photographic nose, derived mostly from pre-production models but also from R/1. The small tanks under the wing pylons are in fact balast to improve cg.
G.91R	Conversion of 4 pre-production models to photographic version.
G.91R/1	Production model for AMI, with three Vinten cameras in nose and 4 x 12.7mm machine guns.
G.91R/1A	Similar to R/1 but with R.3 standard instrumentation.
G.91R/1B	Similar to R/1A but with strengthened structure, more powerful brakes, tubeless tyres and some variation in instrumentation.
G.91R/2	Ordered by France but never built.
G.91R/3	Standard single-seat model ordered by the Luftwaffe. Similar to R/1 but with more sophisticated instrumentation, 2 x 30mm cannon and four wing pylons instead of two.
G.91R/3SATS	One Luftwaffe conversion of R/3 with JATO rockets and arrestor hook.
G.91R/4	Model ordered by Greece and Turkey but never taken up, eventually purchased by Luftwaffe. Similar to R/3 but with 4 x 12.7mm machine guns in lieu of cannon.
G.91R/5	Version studied for Norway, practically an R/1 with range increased to 940 miles (1500km). Not built.
G.91R/6	Strengthened version never built but some characteristics of which were incorporated into the R/1B.
G.91RS	Project derived from G.91A with different wing and Orpheus B.Or 12 of 7050lb/st (3200kg.s). Not built.
G.91T	Two prototypes of two-seat version derived from G.91R/1.
G.91T/1	Production two-seat version with two 12.7mm machine guns.
G.91T/2	Proposed two-seat version for French Armée de l'Air. Not built.
G.91T/3	Two-seat version for Luftwaffe with R/3 instrumentation.
G.91T/3 Logair	Luftwaffe conversion of T/3 with data acquisition probe.
G.91T/4	Projected version for AMI with NASARR and F-104 instrumentation.
G.91TS	Projected supersonic version of G.91T. Not built
G.91Y	Practically a different aircraft derived from G.91T with twin jets. Built for AMI.
G.91YT	Projected two-seater version of G.91Y. Not built.
G.91YS	Projected version of G.91Y for Switzerland. One built.



Italian two-seat G.91s were finished in the same colours as the single seaters. Markings differed in that the nose, tail and wingtip panels were in Dayglo Orange, all edged in black. Below: FIAT G.91T/1, MM.6351/NC81, RS-8, RSV, Aeronautica Militare Italiana
Further down: FIAT G.91T/1, MM.6436/NC.117, SA-86, Scuola di Volo Avanzata, Aeronautica Militare Italiana, Amendola, 1978



FIAT G.91T/1, MM6362/NC.92/60-62 of the 60^a Brigata Aerea, Aeronautica Militare Italiana

FIAT G.91T/1, MM54395/NC.122, 32-05, 32^a Stormo, Aeronautica Militare Italiana. Codes in light blue-grey, outlined in black





Facing page: A G.91T of the 204^o Gruppo based at Amendola displaying a special scheme in commemoration of the unit's 289,000 hours on the type (Giuseppe Fassari) Above: Definitely one of the most striking schemes ever to be applied to a G.91, in this case a G.91T of the 32^o Stormo. It flew in this scheme in 1995 (Giuseppe Fassari)

THE ORPHEUS ENGINE

The choice of the Orpheus for the LWSF was indeed the right one. It was probably the only engine available at that time that could power a small aircraft of the size and weight as specified by SHAPE. Bristol Aeroplane Co based at Filton, already well known for its splendid series of piston engines developed during World War 2 (Mercury, Hercules and Centaurus) set up a subsidiary in 1955 wholly devoted to aero-engines, known as Bristol Aero-Engines Ltd. Work began immediately on turbo-prop and jet engines, with the company's first pure-jet engine emerging as the Olympus, later to find fame within the success enjoyed by the Concorde.

Work on a lightweight engine of medium thrust for military aircraft had already begun in 1953 as a private venture, under the designation of BE.26. Although combat experience in Korea indicated that a 50-hour life would be adequate for such an engine, Bristol decided that its design would incorporate a full 150-hour life span. Named Orpheus, the new engine was bench-run for the first time on 17 December 1954 successfully completing the 150-hour cycle by the following summer. Power output of the B.Or.1 was 3,285 lb/st (1,490 kg/s) with a 1:4.1 thrust/weight ratio. On 18 July 1955 it was test flown in a Folland Gnat. The B.Or.2 with a 4,520 lb/st (2,050 kg/s) passed its type test in November 1956, and became the Orpheus 701 that powered the Gnat F.Mk.1.

This was soon followed by the Orpheus 801 (B.Or.3), which powered all three 'official' NATO contenders for the LWSF. It was built under licence as the FIAT 4023 and

Scrap port and starboard upper surfaces markings for early Portuguese Air Force FIAT G.91s. Note 'inverted' colours in the camouflage pattern in respect of AMI G.91s. Markings were similarly carried on the undersides of the wings, that is 'Cross of Christ' under starboard and serial under port



Scrap view showing wing markings applied to the examples tested by the U.S. Army. Star markings applied above port and underneath starboard wings only

Scrap view showing wing markings applied to the two examples finished in Greek Air Force markings

Central view shows typical upper surfaces camouflage pattern and markings of Aeronautica Militare Italiana FIAT G.91s. Upper colours consisted of standard NATO Dark Grey and Dark Green. Anti-dazzle panel in black. Note red 'no walk' markings at wing roots and red fuel tank filler cap locators aft of cockpit, offset to starboard



Interesting front view of a FIAT G.91T. Of note are the large airbrakes underneath the fuselage, here seen fully extended (Giuseppe Fassari)

with a weight of only 835lb (379kg) provided a thrust of 5,000lb/st (2268kg/s), a remarkable thrust/weight ratio of 6:1. As the 801.02 (FIAT 4023.02), the Orpheus was fitted with an automatic control device that improved performance at higher altitudes.

A TWO-SEAT G.91

Even before the first prototype of the single-seat G.91 had flown, the development of an advanced trainer was considered necessary, and finance was procured for the construction of two pre-production aircraft, MM.6288 and 6289, based on the G.91R. Both AMI and the Luftwaffe showed considerable interest in the project.

Design and build dragged for a considerable period of time, and it was not before 31 May 1960 that the G.91T made its first flight. During that 41-minute flight it was piloted by Commandante Simeone Marsan. Powered by a 4,850lb/st (2,200kg/s) Bristol Siddeley Orpheus B.Or.801-02, the G.91T maintained many of the characteristics of the G.91R, including the ability to operate from semi-prepared and grass surfaces, and full military capabilities. While flying surfaces remained practically the same, the fuselage was extensively modified, with an extension of 4ft 6ins (1.41m), enabling the addition of a second cockpit in tandem. The pupil, who sat in front, enjoyed an excellent forward view, as had the instructor, thanks to his slightly raised position. Fixed armament was reduced from four to two 12.7mm machine-guns which were not, however,

interchangeable with cannon.

FIAT was responsible for the construction of the first pair of pre-series two-seaters (MM.6288, MM. 6289) that went through most of the ground field testing previously endured by the single-seat 'Gina'. The first examples off the production line, the G.91T/3, went to the Luftwaffe that had ordered 44. These were joined by a further production batch of 22 examples built by Dornier (34+41 to 34+62), the last of which was delivered in October 1972, when the production line of the G.91 in Germany was closed. This last batch was easily recognised from the higher rear cockpit canopy due to the installation of zero-zero ejector seats of higher profile.

Apart from the first pair of pre-production T/3s, FIAT delivered 76 G.91T/1s to the AMI (MM.6315 to MM.6374, MM.6425 to MM.6374), with the production line remaining open till 1974. The G.91T/1 Srs 2 also had the 'bubble' instructor's canopy like the German T/3, this modification being effected retrospectively to all previous T/1s, R/1s

and German R/3s. Srs 2 examples totalled 34 (MM.54392 to MM.54426)

The majority of the AMI's T/1s went to the SVBAA (Scuola Volo Basico Avanzato Aviogetti - Advanced Basic Jet Flying School) at Amendola. It received its first examples in December 1964 after relinquishing the Fiat G.82, which served for only a short period, and the Lockheed T-33. The school, still flying the old faithful G.91T/1 from Amendola, was redesignated 60a Brigata Aerea (201° and 204° Gruppi), and therefore began to carry codes in the '60' series in place of the previous 'SA' prefix.

Some developments of the G.91T were also considered, particularly that designated G.91T/2 of which there is only some scarce information, possibly referring to a pair of two-seaters originally destined for the Armée de l'Air, and never built. The G.91T/4 would have been a two-seat G.91 equipped with the F-104G Starfighter's electronic suite fitted in the rear fuselage and the side armament bays. A new nose



G.91T of the 32° Stormo deploys its braking parachute after landing. These aircraft were assigned to front line units to aid in continuity and conversion training of their aircrews (Giuseppe Fassari)

radome to house radar equipment would have made the G.91T/4 some 16in (40cm) longer than the standard version. Though studies had reached an advanced stage, the project was dropped in favour of the TF-104G.

G.91S FOR SALE

Following the flight of the second prototype, a third (MM.566) was completed soon after, followed by the first pre-production aircraft (MM.6238). These were, in fact, the two machines that participated in the NATO trials of September and October 1957.

Having gambled all its stakes on the G.91 enabled Fiat to produce the pre-production series of G.91s in large numbers within a short period of time. Apart from the four prototypes (MM.565, 566, 567 – the first was not assigned a military serial), FIAT produced a pre-production batch of 27 examples (MM.6238 to MM.6265) with deliveries beginning in 1958. By August it had built enough machines to equip a unit of the Aeronautica Militare Italiana (AMI), the 5^a Aerobrigata's 103^o Gruppo CTL (Caccia Tattici Leggeri – Light Tactical Fighter) of the Reparto Sperimentale Volo (RSV – Experimental Flight Test Centre) at Pratica di Mare, near Rome, on 1 June 1958.

The aircraft were operated from outlying fields, with unprepared surfaces, by Italian and German pilots. After a 2,000-hour programme, the 103^o Gruppo became autonomous and moved to Frosinone, where a 4,500ft (1400m) grass surface was available. In May 1959 the unit was transferred to Treviso Sant'Angelo (Friuli), in Northern Italy, where the unit operated for the benefit of an international commission led by General Johannes Steinhoff of the Luftwaffe. Operating from the grass surface

SA-55 of the Scuola Addestramento Aviogetti at Amendola displaying the high visibility dayglo orange nose and tail sections; wingtips were similarly finished (Giuseppe Fassari)

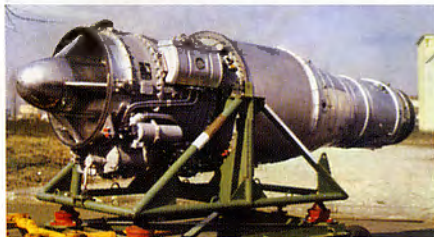


Above: Though carrying the 32^o Stormo badge, this G.91T/1 series 2 (MM.54400) lacks the usual code markings. Colour patching on the fin seems to indicate that it has just been assigned to the 32^o from another unit. Below: A gaggle of G.91Ts from the 32^o Stormo prepare for a formation landing, accompanying the specially decorated G.91T of the 204^o Gruppo (Giuseppe Fassari)





Above: A G.91R/3 of LeKG41, coded 32+20, on a sortie from its base at Husum (Giuseppe Fassari) Below: The FIAT 4023.002, licence built version of the Bristol Siddeley Orpheus 80302 contributed immensely to the success of the G.91 (FIAT/Aeritalia)



of Campoformido, mottled with patches of muddy water, the G.91 took off fully loaded, to land later on a dusty airstrip near the Maniago firing range. Experimental take-offs and landings were also performed from the Udine-Trieste highway. Ten machines made no less than 140 sorties in four days, at 100 per cent serviceability thanks also to the highly efficient ground crew who managed to turn-round an aircraft in only 10 minutes, and to change an engine in three quarters of an hour!

Meanwhile FIAT was working on a tactical reconnaissance version of the new fighter. MM.6265, the last of the pre-production series, had its pointed nose cone replaced with one of different shape, housing three cameras. Yaw dampers were also installed. Practically unannounced, the G.91R/1 made its debut in the form of four pre-series aircraft (MM.6251, 6253, 6257, 6259) of which the AMI ordered 25, followed by another order of the same quantity for G.91R/1As fitted with modified navigation-

al equipment.

France ordered 50 G.91R/2s while serious interest for the purchase of 25 R/4 aircraft each was shown by Greece and Turkey, under offshore procurement basis. Austria placed orders for 12 G.91R/3s and two trainers (development of the two-seater having already been initiated by Fiat). Interest from non-NATO countries was also displayed by Argentina and, in particular, Switzerland.

A GERMAN GINA

Luftwaffe representatives must have been truly impressed by the Friuli trials as Germany proved to be the only supporter of the SLWF, and in a big way. Originally

Germany had confirmed orders for 50 G.91R/3s and 20 G.91Ts two-seaters directly from the FIAT production lines. Soon a licence production of the G.91 was obtained for 232 (later raised to 294) machines to be produced under licence by a West German consortium, Flugzeug-Union Sud, headed by Dornier, that also including Messerschmitt, Heinkel and other sub-contractors.

This version is similar to the G.91R/1 apart from having a Bendix Doppler, and a Computing Devices of Canada Position and Homing Indicator. It also has four under-

30+93 is a G.91R/3 of LeKG 41 based at Husum. Note the additional underwing pylon and 30mm DEFA cannon on this version of the G.91 (Giuseppe Fassari)





Note: Luftwaffe G.91s were finished in a standard pattern of Dark Grey RAL7012 and Dark Green RAL6014 upper surfaces; Silver Grey RAL 7032 undersides. Black anti-dazzle panel. Cross markings in black, outlined in white, in all six positions; flash in black, red and yellow on both sides of fin

Below: FIAT G.91R/3, MC+125, LeKG43, Luftwaffe Soesterberg, 1967

Below left: FIAT G.91R/3, DG+308, LeKG 41, Luftwaffe. Note area around code has been overpainted probably cancelling some previous code



FIAT G.91R/3, LeKG44, MD+317, Luftwaffe. Several panels appear to have been replaced and are in light grey primer. Note also handpainted numbers under windscreen (454) and rear fuselage (18)



FIAT G.91R/3, 32+65, LeKG 42, Luftwaffe. White fin top

FIAT G.91R/3, 32+72, EstBw 61, Luftwaffe



Scrap view showing size and position of Luftwaffe wing marking



FIAT G.91R/3, 30+61, WaSLW 50, Luftwaffe. Dayglo bands around nose, wingtips, underwing tanks; Dayglo rudder. Badge under the windscreen

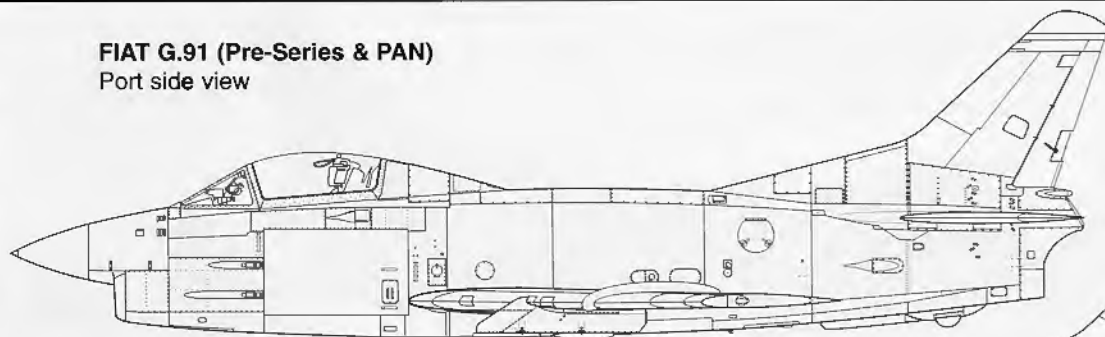


FIAT G.91R/3, LeKGT 41, 31+43, Husum, 'Bull's Eye '79'. Sharkmouth is red/white, thinly outlined in black

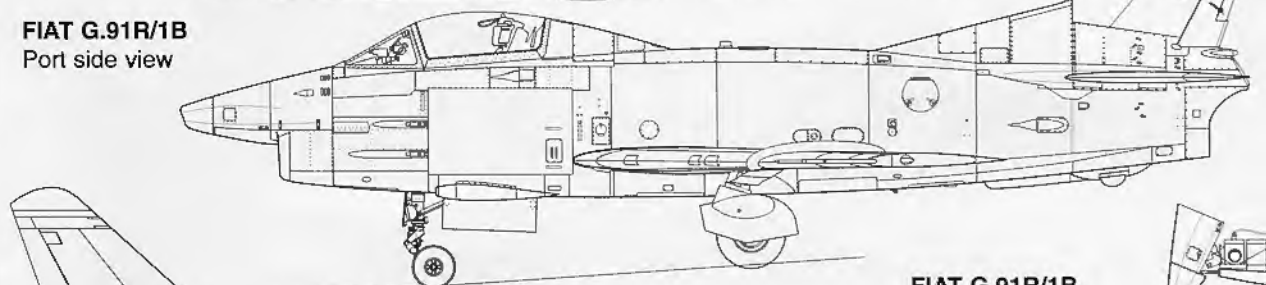
FIAT G.91R/3, 99+02, 'Condor Flug'. Dayglo Orange nose and wingtip bands, rudder. Unarmed version converted for target towing duties



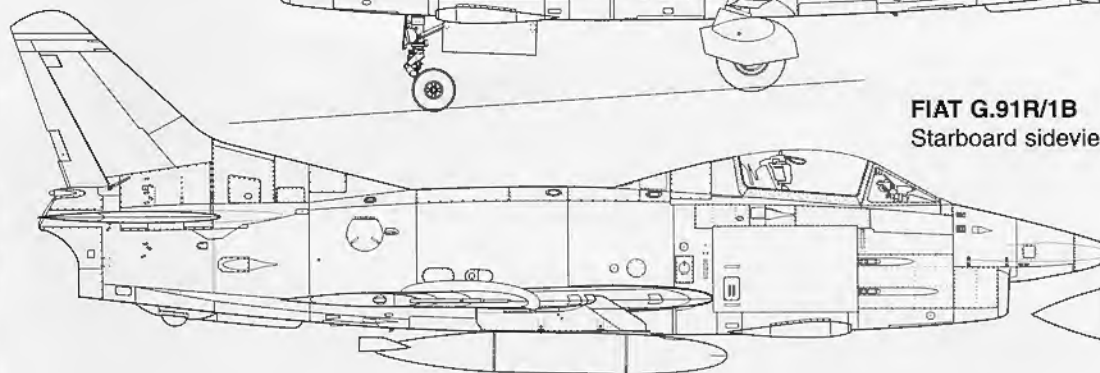
FIAT G.91 (Pre-Series & PAN)
Port side view



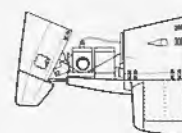
FIAT G.91R/1B
Port side view



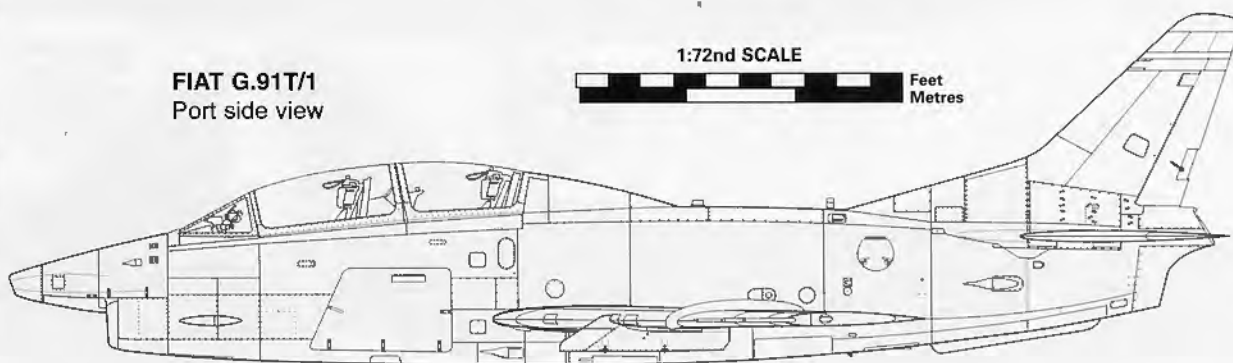
FIAT G.91R/1B
Starboard sideview



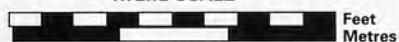
Scrap view show
camera compart
in open positio



FIAT G.91T/1
Port side view

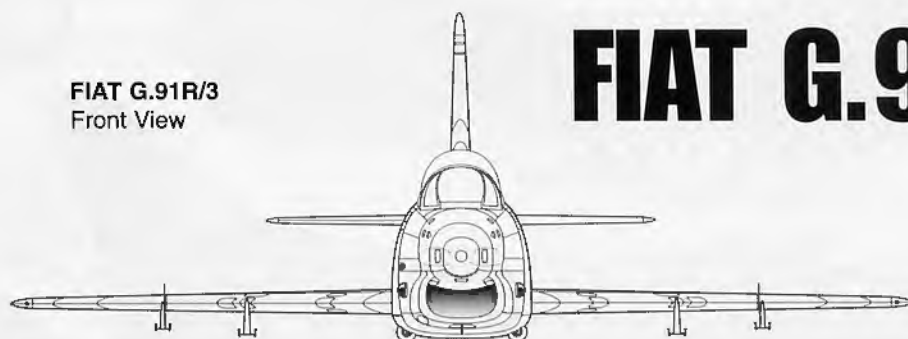


1:72nd SCALE



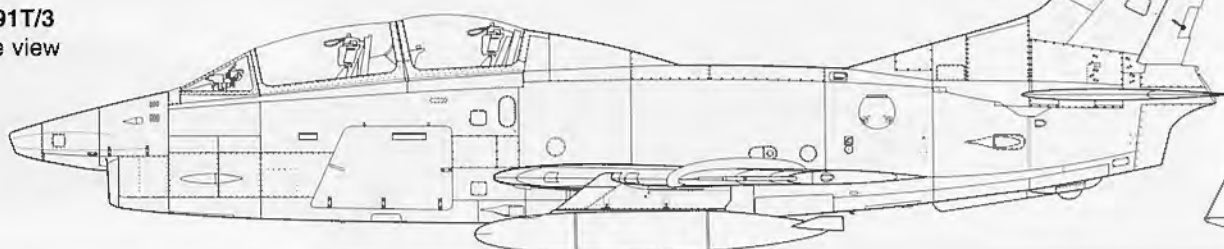
Feet
Metres

FIAT G.91R/3
Front View

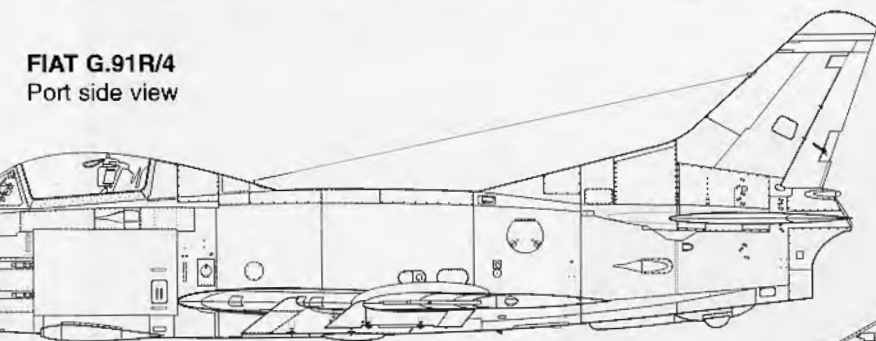


FIAT G.91

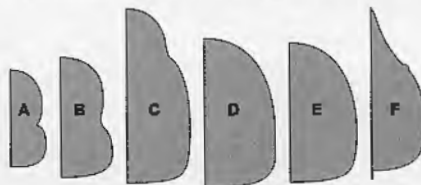
FIAT G.91T/3
Port side view



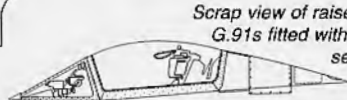
FIAT G.91R/4
Port side view



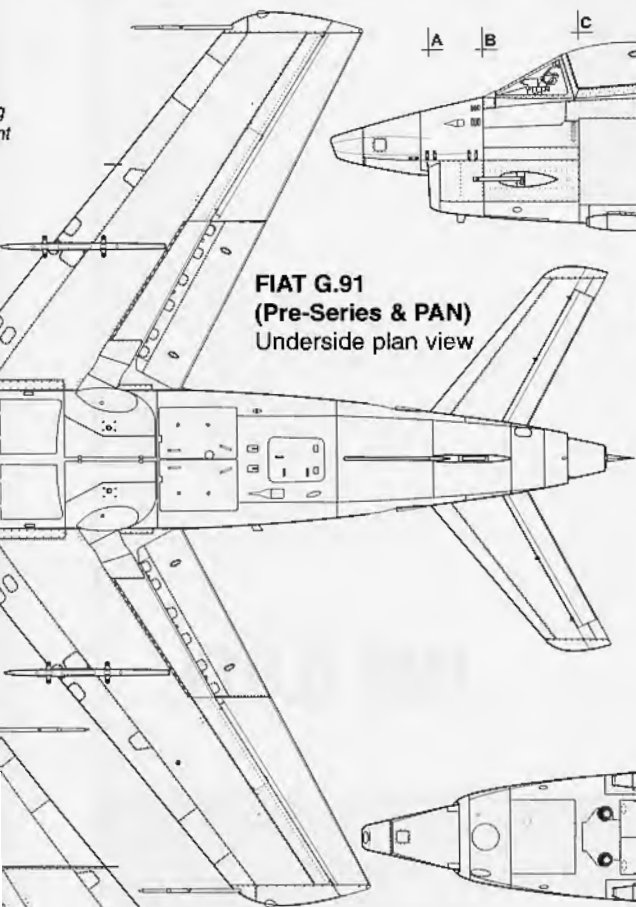
FUSELAGE CROSS-SECTIONS



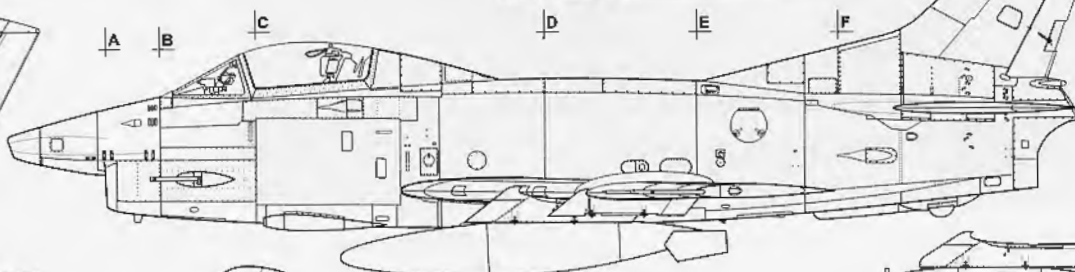
Scrap view of raised bubble canopy of G.91s fitted with zero-zero ejector seats



FIAT G.91
(Pre-Series & PAN)
Underside plan view

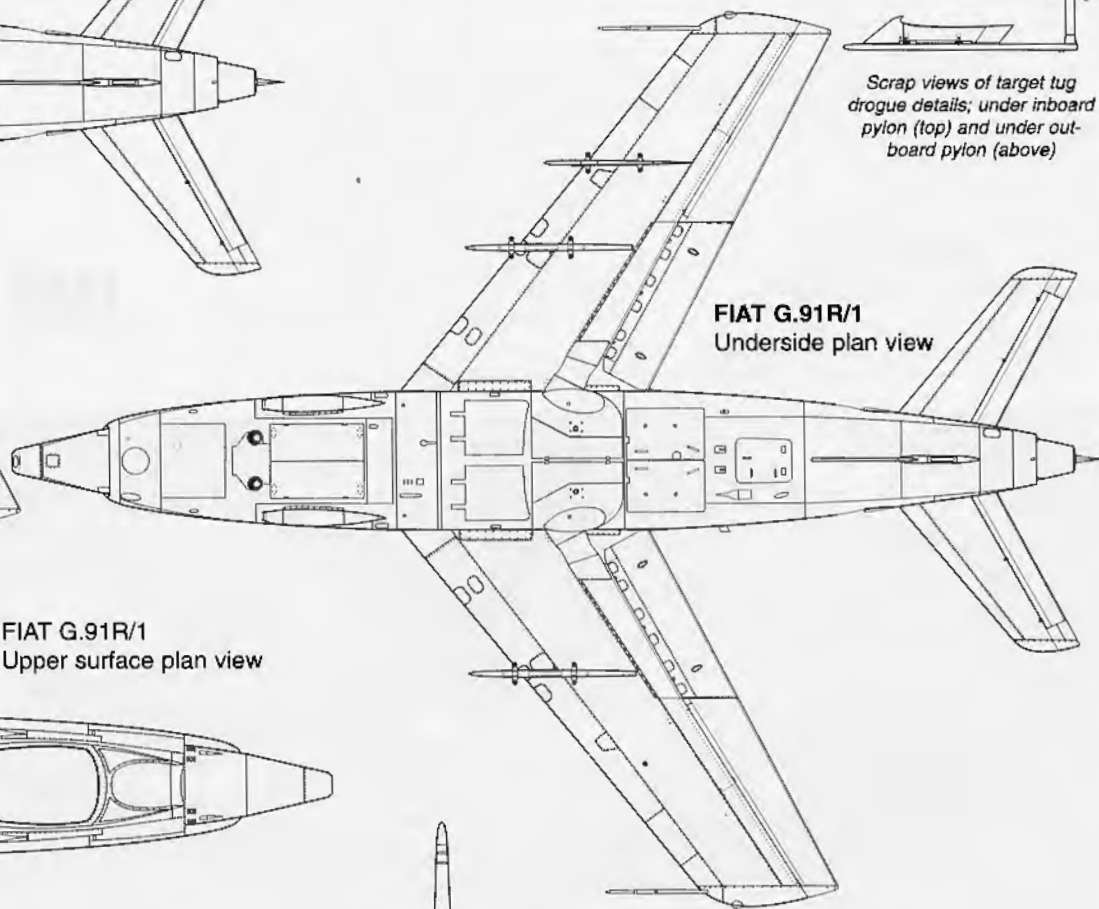


FIAT G.91R/3
Port side view

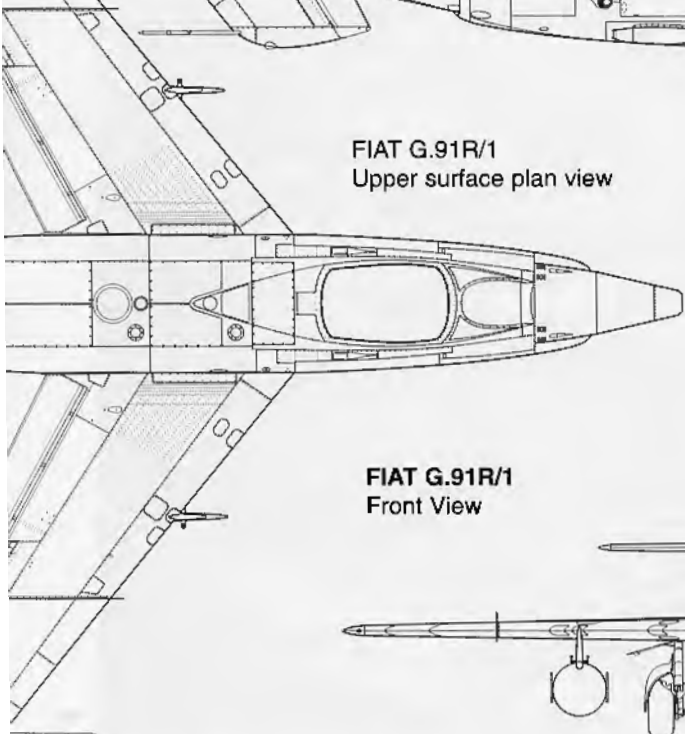


Scrap views of target tug drogue details; under inboard pylon (top) and under out-board pylon (above)

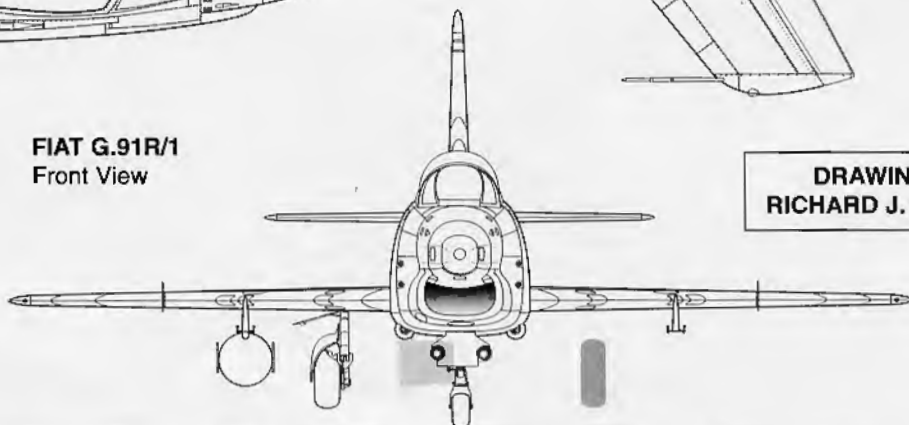
FIAT G.91R/1
Underside plan view



FIAT G.91R/1
Upper surface plan view

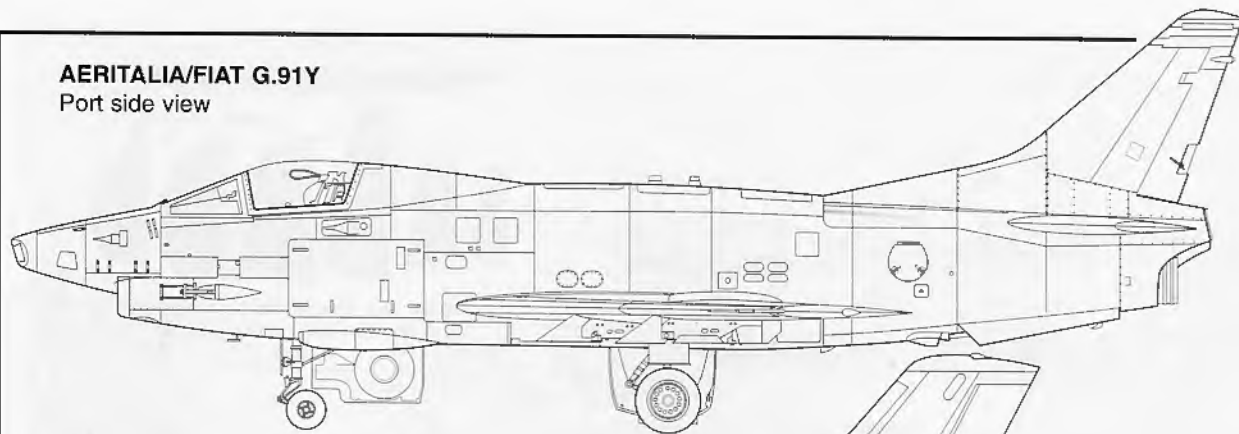


FIAT G.91R/1
Front View

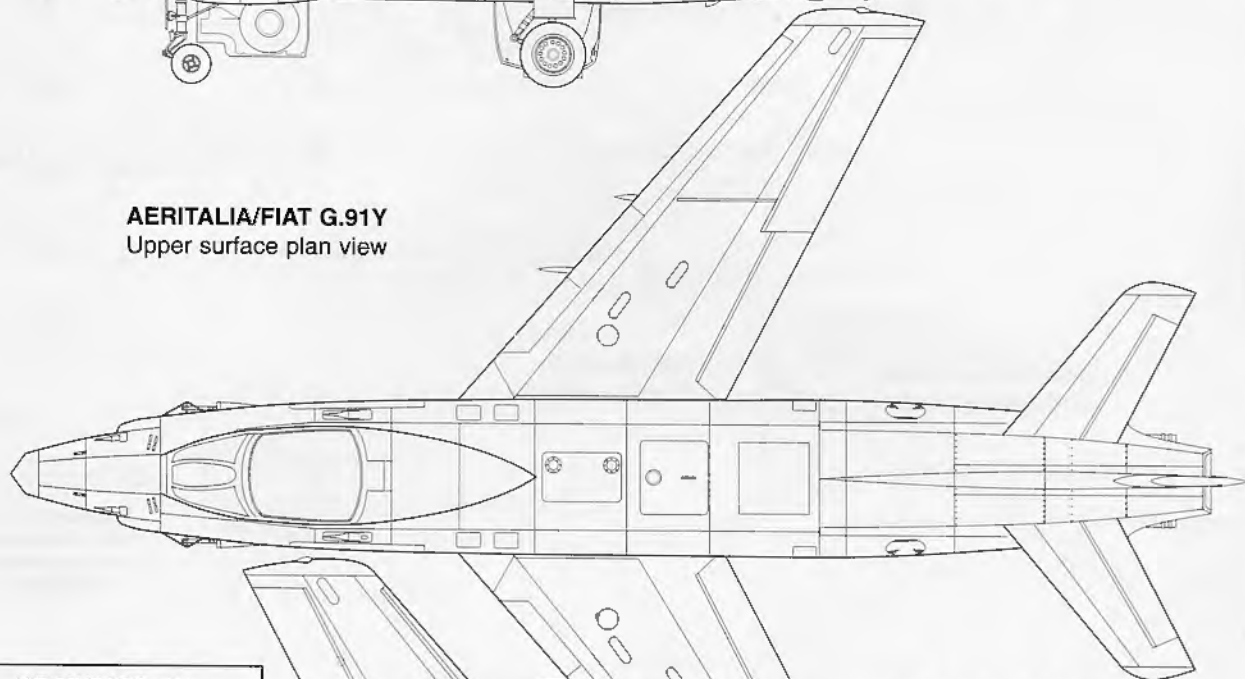


**DRAWINGS BY
RICHARD J. CARUANA**

AERITALIA/FIAT G.91Y
Port side view

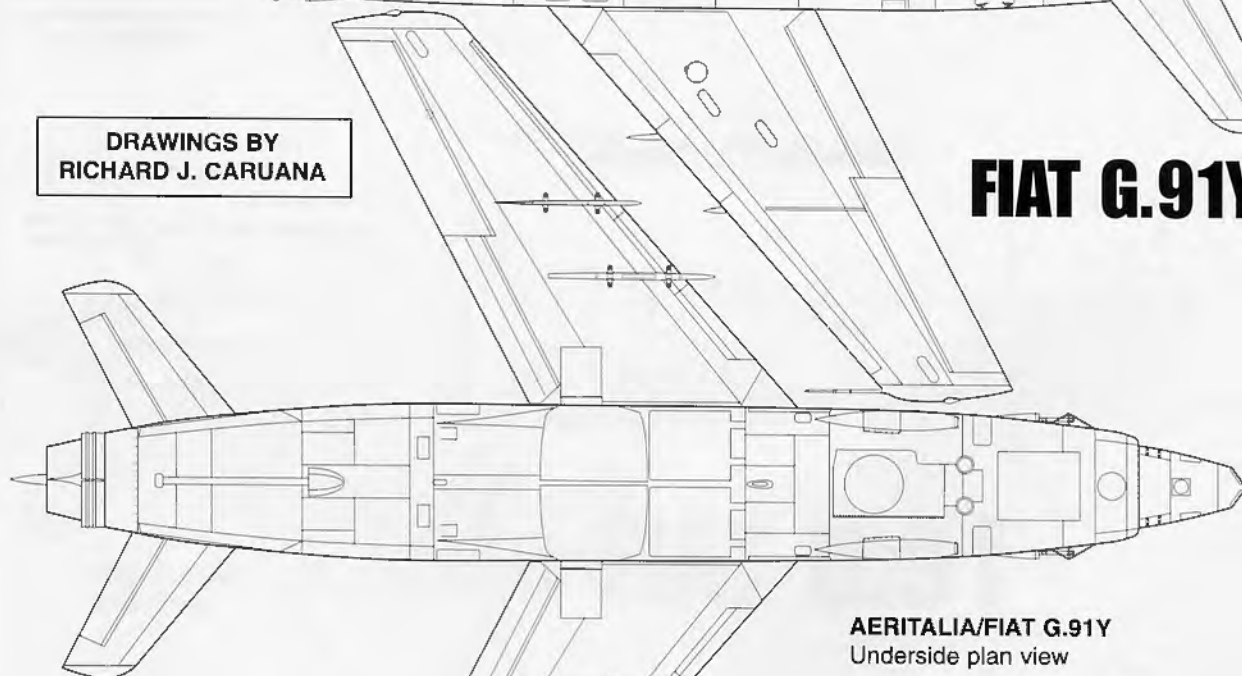


AERITALIA/FIAT G.91Y
Upper surface plan view



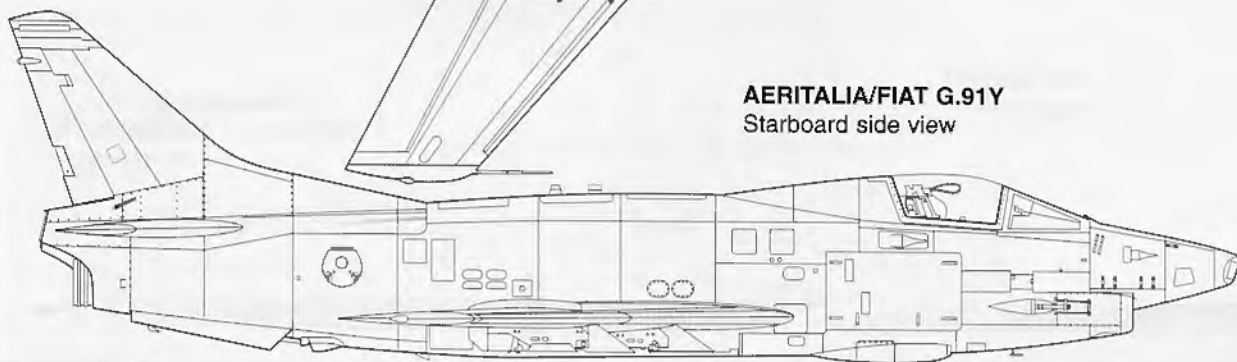
**DRAWINGS BY
RICHARD J. CARUANA**

FIAT G.91Y



AERITALIA/FIAT G.91Y
Underside plan view

AERITALIA/FIAT G.91Y
Starboard side view



G.91R/3, MC+103, of LeKG43 carrying the early style of code markings, a combination of letters and numbers, outlined in white (Richard J. Caruana Archives)

wing pylons instead of two and the installation of a 30mm DEFA cannon on either side in place of the pair of .50in (12.7mm) Colt Brownings. The first G.91R/3 performed its maiden flight on 20 July 1961 at Dornier's Oberpfaffenhofen airfield with test pilot Tuytjens at the controls. Dornier-Werke was responsible for the construction of the centre fuselage section, final assembly and test flying while Messerschmitt produced the front and tail sections. Ernst Heinkel Flugzeugbau manufactured the wings. Each aircraft had to pass through five to ten hours flight checks to test the Doppler, PHI and other systems before delivery to the Luftwaffe.

The cannon armament was to prove a source of a series of problems that had probably not been sufficiently evaluated beforehand. During firing trials of the 30mm DEFA cannon, at both ranges of Brindisi (Italy) and Siegenburg (Germany) results were hardly encouraging. The recoil was such that instruments went haywire while the cannon mounts were nearly torn apart. It took a careful and patient development programme to iron out the possibility of serious accidents in flight whenever the cannon was fired.

A higher cockpit canopy was fitted to G.91R/3 similar to that fitted over the rear seat of the G.91T/3.

AN UNEXPECTED TURN OF EVENTS

At one time, FIAT's order book was bulging with over 500 G.91s on order! The future of the 'Gina' seemed secure; however things



were to change rapidly, and for the worse. While AMI and Luftwaffe orders were substantial, international politics and jealousies left a black mark on NATO's ambitious standardisation programme. The French Government was the first to cancel their order.

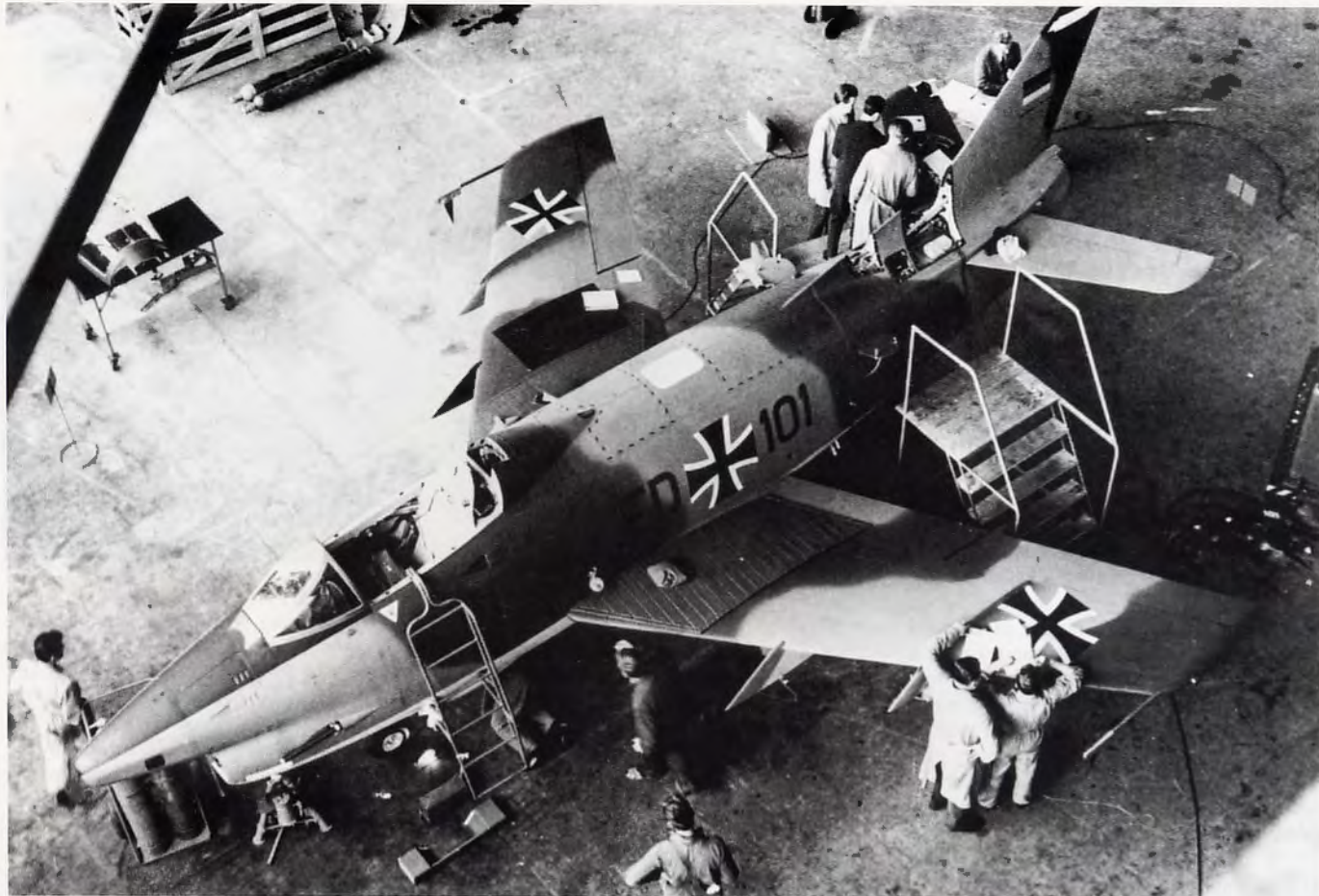
Although only two R/4s were built and finished in Royal Hellenic Air Force markings (10098/NC.98 and 10109/NC.109) the Greek order was cancelled. The G.91R/4 was practically similar to the R/1 in most respects (armed with 4x12.7mm machine guns) except that it was fitted with a pair of extra underwing pylons, similar to those of the R/3. The first R/4 had flown in 1961 and the sixth of the series, 10109, was officially handed over to the Greek Air Force on 6 September of that year. Extensive tests conducted on this machine at Larissa proved

unsatisfactory to the Greek authorities, probably having been already lured by the provision of Northrop F-5As under the Mutual Aid Program launched by the US. The Turkish Air Force soon followed the example of their Greek neighbours. The order for 50 G.91R/4s was taken over by the Luftwaffe, which seemed unable to get enough of the little Italian fighter. These were used for training purposes.

During October 1959, a military mission accompanied by interested parties from the Italian aviation industry visited Iran. Two G.91Rs formed part of the wares on offer, with the aircraft performing spectacular aerial demonstrations at Doshah-Tappeh in front of high-ranking Iranian officials,

Luftwaffe G.91R/3, MC+101, flying over the German countryside. It belongs to LeKG43 (Richard J. Caruana Archives)





An unusual hangar shot from above of a G.91R/3 undergoing service checks. The upper surface camouflage pattern of ED+101 is clearly visible (Richard J. Caruana Archives)



Above: G.91R/3, 32+48 of LeKG43, Luftwaffe. It was eventually sold to Portugal where it became 5467 of Esq. 301 (José C.C. Silva Collection) Below: Whoops... the parachute fell off! Looks like someone did not pack that chute properly, unless of course tests were being carried out on its release mechanism. 30+44 is a G.91R/3 and belongs to LeKG43 (José C.C. Silva Collection)



including the Shah Reza Pahlavi himself. Although considerable interest was shown in the G.91 a deal failed to materialise.

Another deal that was eventually withdrawn called for 12 G.91R/3s plus a pair of two-seaters for the Austrian Air Force. It would appear that political problems regarding the Tirolese border between that country and Italy brought negotiations to an end, Austria having opted for 30 reconconditioned SAAB J 39Fs from Sweden.

The G.91R/5 destined for Norway remained another paper project, and was designed for a longer range and was probably based on the G.91A. Argentina and Switzerland showed no further interest. Most unusual was the interest shown by the US Army in a European aircraft. Early in 1961, two R/1s (MM.6286, MM.6287) were ferried to the USA on board a USAF C-124 Globemaster. Evaluation of the G.91 in the close support role was carried out at Fort Rucker, Alabama, and at Kirtland AFB in New Mexico. Among the many trials that the G.91 had to endure were climatic tests of the aircraft and its engine in the climatic cell at Eglin AFB laboratory, Florida. Main objectives of these tests included the evaluation of functional starting, acceleration and operating performance of the Orpheus, air conditioning and pressurisation at low temperatures down to -65 degrees F. Also evaluated under these conditions were the airframe, hydraulic fuel and electrical systems.

A two-seat G.91T was also provided on loan for the training of Army pilots. Tragedy



struck when MM.6286 crashed during a Jet Assisted Take Off (JATO) test on 1 February 1961 killing Riccardo Bignamini, who had test flown the first G.91 prototype. Investigations concluded that the JATO rocket bottles' position was at fault, and had to be corrected by being turned 25 degrees downwards. The second machine was also lost on 27 July near Cairus (Georgia).

This did not seem to dampen American interest in the type, for another pair (this time R/3s) was despatched to US where

they went through the rigorous tests at Kirtland. At one time, some interest was also displayed by the US Marine Corps (USMC). Unfortunately for the G.91, the close-support concept was passed over to the USAF, which considered the aircraft unsuitable to its requirements.

Bristol-Siddeley Engines of Filton had at its disposal, between 1959 and 1961, a pre-production G.91 (MM.6246) and a G.91R/1 for trials of the Orpheus BOr.803. These carried British 'G' registrations G-45/4 and

G-45/5 respectively.

OTHER VERSIONS

Early 1963 a G.91BS (Battlefield Surveillance) version was proposed by FIAT based on the two-seat T/1. It was specifically designed to conduct aerial battlefield observation through the use of photo

FIAT G.91R/3, 31+43 from LeKGT 41 based at Husum carrying a distinctive 'sharkmouth' during 'Bulls Eye '79' (Giuseppe Fassari)



ITALIAN AIR FORCE UNITS

Unit	Base	Type	Example/s
2 ^o Stormo			MM6282/2-34 (R-1),
14 ^o Gruppo	Treviso	G.91R	
103 ^o Gruppo ¹	Treviso		
8 ^o Stormo			MM6444/8-01(Y)
101 ^o Gruppo	Cervia	G.91R,Y	
32 ^o Stormo			MM6442/32-14(Y)
13 ^o Gruppo	Brindisi-Casale	G.91R,T/1,Y	
5 ^a Aerobrigata	Pratica di Mare	G.91R	MM6252/5-279 (R-1)
51 ^a Aerobrigata			MM.6296/51-296 (R-1A)
103 ^o Gruppo	Treviso	G.91R	
60 ^a Aerobrigata			MM6315/60-15 (T/1)
205 ^o Gruppo	Amendola	G.91T/1	
CSV ²			MM6289/RS-8 (T)
311 ^o Gruppo	Pratica di Mare	G.91R,T/1,Y	
SAV ³			MM.6436/SA-86
201 ^o Gruppo	Amendola	G.91T/1	
204 ^o Gruppo	Amendola	G.91T/1	
205 ^o Gruppo	Amendola	G.91T/1	
PAN ⁴			MM6238, MM6240, MM6248
313 ^o Gruppo	Rimini	G.91PAN,R,T/1	
SAS ⁵	Istrana	G.91R, T/1	

Notes

- 1 As from 1964
- 2 Centro Sperimentale di Volo, later as Reparto Sperimentale di Volo (RSV)
- 3 Scuola Addestramento Aviogetti
- 4 Pattuglia Acrobatica Nazionale
- 5 Sezione Addestramento e Standardizzazione

cameras that could be used both during the day and by night, special radar equipment together with television cameras that could send images directly from the aircraft to ground control in real time. The US Army was among those parties keenly interested in this project, which was being offered both in single-seat (BS/1) and two-seat (BS/2) versions. Though at an advanced stage, studies on the G.91BS remained on paper.

Only one example of the G.91N was ever built and delivered to the AMI. This consisted of a modified pre-production example fitted with special navigational aids, including Decca, Rho-Theta, etc.

Following the first order of 23 G.91R/1s (MM.6265 to MM.6287), the AMI received 25 G.91R/1A (MM.6290 to MM.6314) with upgraded avionics, of which MM.6310, MM.6311 and MM.6314 were eventually modified to PAN standard (see later) for use by the Frecce Tricolori aerobatic team. The AMI's final version was the G.91R/1B, of which 50 (MM.6375 to MM.6424) were built with a strengthened airframe and had another upgrade to the avionics.

Far more ambitious was the development of the FIAT G.91S and TS. This was to be a supersonic version of the G.91, fitted with a pair of Orpheus BOr.12 engines of 3,200kg/s fitted with afterburner (some sources claim that it would have had only one engine). A completely new, thinner wing (eight percent thickness ratio) was also designed, with an increase of sweep to 38 degrees. It was never built.

THE G.91PAN

In Italy there are three revered untouchables: the Italian national soccer team,

Ferrari, and the Frecce Tricolori.

On 16 January 1961 the 313^o Gruppo Addestramento Acrobatico (Aerobatic Training Squadron) was formed on a permanent footing, independent of the operational squadrons which had, up to that time, provided the official AMI team each year. Based exclusively at Rivolto airport (near Campoformido, birthplace of Italian aerobatic display flying), it fell under the command of Maggiore Squarcina. The team members, were drawn from the 4^o Stormo which, on the previous rotation basis, would have formed the official team that year, and consisted of Capitano Scala (leader), Sottotenente Vianello, Sottotenente Panario, Tenente Sabattini, Sottotenente Imparato, Tenente Ferri. Their original mounts were Canadair CL-13 Sabres, specially painted blue overall with silver undersides and green/white/red stripes under the wings – a scheme that has changed very little since then. The official denomination given to the team was Pattuglia Acrobatica Nazionale delle Frecce Tricolori (National Aerobatic Team of the Tri-Colour Arrows).

In 1962, aircraft with the team were increased to nine as ex-Diavoli Rossi and Cavallino Rampante volunteers vied for the prestige of joining the Frecce. A very important innovation that year was the introduction of equipment that enabled pilots to select white or coloured smoke at will. But the most important innovation was to appear



Above: G.91R/3. 99+09, operated by Condor Flug. Target towing equipment was usually fitted to the port side of the wing (Giuseppe Fassari) Below: Port side view of an unarmed G.91R/3 operated by Condor Flug, 99+11, clearly displaying the tow-target fitted to the outer port pylon (José C.C. Silva Collection)



in 1963, when the Frece converted onto the Fiat G.91PAN. The Italian aerobatic team was flying an indigenous aircraft for the first time since 1939. A tenth member, a soloist, was added soon after.

The G.91PAN aircraft (Pattuglia Acrobatica Nazionale) were converted from the initial series of pre-production machines of FIAT's little fighter, with a specially stressed airframe to take the extra strain of display aerobatics. In all, 20 machines were converted, these being: MM.6238 to MM.6244, MM.6248 to MM.6256, MM.6259, MM. 6260, MM.6261 and MM.6264. A considerable amount of work went into the conversion at Caselle to change the characteristics of the aircraft while retaining its military capability. By the time of its delivery, the G.91PAN had been transformed into a completely different aircraft.

Most work was centred on balancing the aircraft perfectly on all axes, and the installation of the Orpheus 803.02 (FIAT 4023.02). The original pointed nose cone, later replaced by the familiar camera-nose of the G.91R, was retained. Smaller tanks, which acted as ballast, replaced the normal ferry underwing tanks. Most important of all was, of course, the installation of multi-coloured smoke-generating equipment based on experience gained through the work of Capitano Domenico Papalettera on the Sabre.

Cannon equipment on either side of the cockpit was removed and gun barrels replaced by mock wooden ones. However, this could easily be reinstalled so that the

A Luftwaffe G.91T/3, coded 34+36, comes in to land. It belongs to WaSLW50 and carries the early style of unit marking on the fin (Giuseppe Fassari)



Above: A G.91R/3, 99+39, of the Condor Flug, a company that provided the Luftwaffe with target tug services. Though flown by civilians, these aircraft retained their original military camouflage and markings; they were, however, unarmed (via Giuseppe Fassari) Below: An G.91R/4, originally destined for Greece or Turkey, on consignment to the Luftwaffe coded BD+243 (FIAT/Aeritalia)



FIAT G.91 TECHNICAL SPECIFICATIONS

	FIAT G.91R/1	FIAT G.91R/3	FIAT G.91R/4	G.91T/1 & /3	FIAT G.91Y
Dimensions:					
Span	28' 1" (8.56m)	28' 1" (8.56m)	28' 1" (8.56m)	28' 3" (8.60m)	29' 6.3" (9m)
Length	33' 9.25" (10.30m)	33' 9.25" (10.30m)	33' 9.25" (10.30m)	38' 3.75" (11.67m)	38' 7.6" (11.78m)
Height	13' 1.25" (4m)	13' 1.25" (4m)	13' 1.25" (4m)	13' 11.25" (4.26m)	14' 6.3" (4.43m)
Wing Area (18.1m ²)	176.7sq ft (16.4m ²)	176.7sq ft (16.42m ²)	176.7sq ft (16.42m ²)	176.7sq ft (16.42m ²)	195.14sqft
Power Plant:					
Type	1xOrpheus 801-02	1xOrpheus 803-02	1xOrpheus 803-02	1xOrpheus 801-02	2xJ85-GE-13A
Thrust	4,850lb (2 200kg)	5,000lb (2268kg)	5,000lb (2268kg)	4,850lb (2200kg)	2,725lb (1230kg) each
Weight/Thrust ratio	1:5.8	1:6	1:6	1:5.8	
Performance:					
Max Speed at Sea Level	668mph (1068km/h)	668mph (1068km/h)	668mph (1068km/h)	631mph (1010km/h)	690mph (1110km/h)
at 5000 ft (1520m)	675mph (1080km/h)	675mph (1080km/h)	675mph (1080km/h)	668mph (1070km/h)	
Initial climb rate	6,003ft/m (183m/min)	6,003ft/m (183m/min)	6,003ft/m (183m/min)	6,003ft/m (183m/min)	1,700ft/m (518m/min)
Ceiling	42,980ft (13 100m)	42,980ft (13 100m)	42,980ft (13 100m)	39,000ft (11,890m)	41,000ft (12,500m)
Radius	200mils (320km)	200mils (320km)	200mils (320km)	200mils (320km)	372mils (600km)
Ferry range	1,150mils (1840km)	1,150mils (1840km)	1,150mils (1840km)	1,367mils (2180km)	2110mils (3376km)
Take-off Distance	3,870ft (1180m)	3,870ft (1180m)	3,870ft (1180m)	4,100ft (1250m)	2,460ft (750m)
Armament:					
Fixed	4x 2.7mm m/guns	4x 2.7mm m/guns	2x30mm cannon	2x12.7mm m/guns	2x30mm cannon
Stores load	1,000lb (454kg)	1,000lb (454kg)	1,000lb (454kg)	1,000lb (454kg)	4,000lb (1814kg)
Weights:					
Empty	6,835lb (3100kg)	7,390lb (3360kg)	7,390lb (3360kg)	7,240lb (3290kg)	8,598lb (3900kg)
Max. take-off	1,2470lb (5670kg)	1,2470lb (5670kg)	1,2470lb (5670kg)	13,340 (6050kg)	19,180lb (7800kg)
Fuel Capacity:					
Internal	462gls (2100lt)	462gls (2100lt)	462gls (2100lt)	350gls 91600lt/	740gls (3200lt)

aircraft could be returned to full military standard. Apart from saving weight, the vacated area thus created provided valuable kit space for the crew during trips far away from base. The first G.91PAN was consigned to the team on 28 December 1963, at the time that the Frece were under the command of Tenente Roberto di Lollo, ex-leader of the Tigri Bianchi. The rest of the team, which debuted in public with the new aircraft on 1 March 1964, consisted of: Capitano Cumin, Sergente Linguini, Maresciallo Giardini, Tenente Barbini, Sergente Meacci, Maresciallo Liverani,

Maresciallo Turra, Tenente Ferrazzutti and Capitano Schievano.

Each year the team clocked some 1,500 hours of flying and more than 60 percent of the displays were performed with the full nine-jet formation, plus the tenth, a soloist. Average efficiency of the team was usually above 90 percent annually. A G.91T usually accompanied the G.91PANs during its transfers outside Italy to act as navigational aircraft, as the two-seater was equipped with more advanced instrumentation.

By the mid-seventies, the original G.91PANs began to display their age and a

small number of reconnaissance-nosed machines were modified to the team standard so that 'weary' aircraft could be replaced. These consisted of a G.91R/1 (MM.6265) and three R/1As (MM.6310, MM.6311 and MM.6314). 1981 marked the last season of display flying with the G.91. The 'Little Sabre' was exchanged for brand-new AerMacchi MB339s.

This was not the end of the line for the G.91PANs, as a small number were later

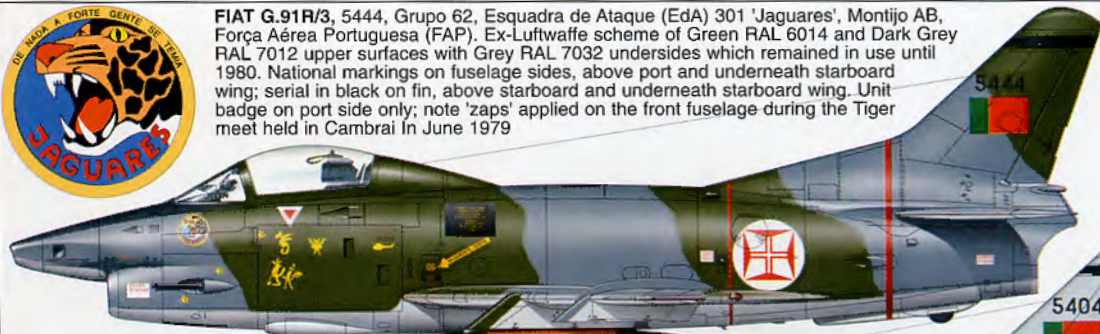
BD+133 is a G.91T/3 of Waffenschule 50, serialled 91-2-0034, seen at Luqa, Malta on 20 July 1966. (Richard J. Caruana)





FIAT G.91R/3, 5444, Grupo 62, Esquadra de Ataque (EdA) 301 'Jaguars', Montijo AB, Força Aérea Portuguesa (FAP). Ex-Luftwaffe scheme of Green RAL 6014 and Dark Grey RAL 7012 upper surfaces with Grey RAL 7032 undersides which remained in use until 1980. National markings on fuselage sides, above port and underneath starboard wing; serial in black on fin, above starboard and underneath starboard wing. Unit badge on port side only; note 'zaps' applied on the front fuselage during the Tiger meet held in Cambrai in June 1979

Below: FIAT G.91R/4, 5404 FAP, EdA 502 'Jaguars', Nacala AB, Mozambique, Circa 1970. Light Grey FS.36473 overall, natural metal gun bay doors and polished metal jet exhaust pipe; unit badge on port side only. '04' of serial repeated on airbrakes



04



30



Above: FIAT G.91R/4, EdA 702 'Escorpiões' (Scorpions), FAP, Tete (BA9), Angola, 1968. Finish and markings as example above. '30' of serial repeated on airbrakes
Below: FIAT G.91R/4, Esquadra 121 'Tigres' at Base Aérea 12 (Bissalanca - Guinea) 1966, FAP. Undersides in RAL 5014. Shark mouth motif in red and white, outlined in black; unit badge on both sides of fuselage

Below: FIAT G.91R/4, 5431, EdA 502, FAP, 1976. Anti-missile Green FS.34102 which weathered down to FS.34227 overall; reduced national markings (20cm diameter) on fuselage sides, above port and under starboard wings. Serial in black on fin, above starboard and below port wing; '31' of serial repeated on airbrakes



31



FIAT G.91R/4, 5425, EdA 301 'Jaguars', FAP. Post-1980 scheme and markings, in Green FS.34079/Tan FS.30219 upper surfaces, Light Grey FS.36622 undersides (note wavy dividing line between upper and underside colours); black anti-dazzle panel. Reduced size and design of national markings carried only on fuselage sides. Unit badge on port side only

FIAT G.91R/3, 5452, EdA 301 'Jaguars', FAP. Post-1983 scheme where the top colours (Green FS.34079 and Tan FS.30219) were painted in a wrap-around manner (see also scrap views at left); national markings on fuselage sides only. Unit badge on port side only





One of two G.91R/1s that went to the US Army plus a G.91T on loan in early 1961. They were evaluated for the close support role with extensive trials taking place at both Fort Rucker and Kirtland AFB. Both G.91s were lost in accidents and no order materialised.

handed over to the 2° Stormo, retaining the overall blue upper-surface scheme but carrying codes and tail markings of the unit.

ITALIAN AIR FORCE SERVICE

Initially the AMI had intended to use the G.91 on a large scale, with a plan to equip six gruppi in replacement of the F-84F Thunderstreaks then in service. The 311° Gruppo of the Reparto Sperimentale di Volo (RSV – Flight Experimental Unit) was given the task of testing the first and second prototypes of the G.91 (coded RS-01 and RS-02 respectively) at its base of Pratica di Mare. Meanwhile, the 103° Gruppo was formed at the same base with the intention of introducing the type into service. It had received its first aircraft in June 1958 and performed sterling service in the initial days of operations, accumulating vast experience on the type. On conclusion of its working up period, the unit moved to Treviso-Sant'Angelo in May 1959. On 1 September 1962 it became an autonomous unit and the following month became part of the 51ª Aerobrigata where it remained until October 1964.

The 14° Gruppo began to exchange its Canadair Sabre F-86E(M) for the G.91R on

FIAT G.91R/4 destined for Greece and delivered to the Royal Hellenic Air Force in September 1961. This version represented the armament of the R/1 combined to the four-station wing of the R/3 (FIAT/Aeritalia)

16 March 1961 when the unit moved from Rimini-Miramare to Treviso-Sant'Angelo. The AMI went through a restructuring period in October 1964. The 14° Gruppo (156a, 157a, 158a Squadriglie) and the 103° Gruppo (210ª, 213ª, 242ª Squadriglie) formed the 2° Stormo Caccia Tattici Ricognitori Leggeri (CTRL – Light Tactical Reconnaissance Fighter Group) 'Mario D'Agostino' at Treviso-Sant'Angelo, equipped with the G.91/R1, R/1A and R/1B. The original CTRL designation later became CBR (Caccia Bombardieri Ricognitori – Reconnaissance Fighter-Bomber), much more in keeping with the aircraft's role.

On 1 January 1989 the G.91s belonging to the 103° Gruppo were taken over by the 14° Gruppo and moved to Istrana for conversion onto the AMX. Apart from being the first unit to fly the G.91, the 14° also had the honour of performing the last flight of the

type within the AMI on 9 April 1992. On conversion to the AMX, this unit was transferred to Rivolto (Udine), and has since been disbanded.

The autonomous 13° Gruppo exchanged its Sabres for G.91R/1Bs at Treviso in March 1965, and on completion of conversion training moved to Brindisi. On 1 September 1967 it gave birth to the 32° Stormo and was destined to be the only AMI unit to operate all three major versions of the 'Gina', the R, T and Y, the last version arriving on 1 August of 1973.

In 1954, the 201° Gruppo (412ª, 413ª, 414ª Squadriglie) was born as part of the Scuola Addestramento Aviogetti (SAA) at Amendola equipped with Lockheed T-33As for advanced jet flight training instruction. Ten years later, in 1964, the two-seat version of the G.91 began to arrive. The G.91T remained in service with this unit until 30 September 1995 in the advanced training



Right: An uncoded G.91Y of the 8^o Stormo. Its serial, MM6466, makes it the last but two of its type to be produced. Lower right: A G.91Y of the 8^o Stormo taxis out for another sortie. Low visibility markings were used during the last days of the type's service with the AMI (Giuseppe Fassari)

role. Although originally it was planned that the 201^o would have become the AMX Operational Conversion Unit (OCU), it was disbanded on 31 July 1995 in favour of entrusting that task to the 101^o Gruppo.

The 204^o Gruppo (415^a, 416^a, 418^a Squadriglie) was similarly established as part of the SAA at Amendola in 1954, at first flying the two-seat Vampire passing on to the T-33 three years later. The American two-seat trainer was replaced by the G.91T in 1964 and ended its career when this unit was disbanded on 15 September 1995.

Established in April 1957, the 205^o Gruppo was another unit within the 60^a Brigata Aerea, operating G.91Ts from Amendola until disbanded on 30 September 1975.

Other units that flew G.91Ts included the 602^a, 608^a and 632^a Squadriglie Collegamenti (Liaison), the 303^o Gruppo Autonomo at Rome-Guidonia and the 512a Squadriglia Collegamenti at Bari-Palese.

WITH THE LUFTWAFFE

The Luftwaffe was eventually to receive 344 G.91R/3s and 66 G.91T/3s. Sixty-two of the R/3s were built by Fiat, 12 by Fiat but assembled by Flugzeug-Union Sud, and the remaining 270 were built outright by the German consortium between July 1965 and May 1966, together with 22 of the T/3s in 1972. Additionally, the 50 R/4s cancelled by Greece and Turkey were taken over by the Luftwaffe and used for training purposes, particularly by Waffenschule der Luftwaffe (WSLw) 50 at Erding which was to become the main training unit for this type.

First Luftwaffe unit to receive the G.91R/3 was the experimental Erprobungsstelle 61 in September 1961, consisting of five aircraft c/n NC.54-NC.58 (YA+011 to YA+015). Early in 1961, WSLw 30 (code BA), later incorporated into WSLw 50 (code BD), started the first instructor's course at Erding, near Munich with R/3s and the first T/3s, under Italian guidance. The first operational unit, Aufklärungsgeschwader (AG) 53, was formed to receive the R/3 in October 1961, also at Erding (code EC). This unit was commissioned as combat-ready on 5 May 1962. Meanwhile, the first German-built R/3s started to arrive from Dornier's works, the first examples enabling the creation of another unit, AKG 54 (codes ED) at Oldenburg, later renamed Leichtkampfgeschwader (LeKG – Light Attack Unit) 54.

From then on, units re-equipped in quick succession with the 'Gina': Jagdgeschwader (JG) 72 coded JB at Husum; JG 73 coded JC at Pferdsfeld; LeKG 43 coded MC at

Upper right: G.91Y of the 32^o Stormo in high visibility roundels and codes but low visibility unit markings. Right: The early colourful markings applied to this G.91Y contrast visibly with the later sober redoring of the same. Also note the early style of code numbers in white, later reproduced in outline only (Giuseppe Fassari)





Port side view of a highly decorated G.91Y of the 8° Stormo painted in this commemorative scheme on the occasion of the unit's disbandment in March 1995 (Giuseppe Fassari)

Oldenburg; and LeKG 44 coded MD at Leipheim. In May 1964, JG 72 and JG 73 were redesignated LeKG 41 (MA) and LeKG 42 (MB) respectively, reflecting more realistically their operational capabilities. G.91 operations with AG 53 and AG 54 were short-lived, their reconnaissance role being taken over by the newly-arrived RF-104G Starfighters.

A series of accidents during the initial period of operations with the G.91 by the Luftwaffe (and many other types of aircraft) nearly earned the little fighter a killer notoriety. The investigations that followed cleared the type from any kind of fault, laying the blame squarely on human error.

The Luftwaffe continued to test the G.91's capabilities for quite some time, including the formation of a small unit (Lehr- und Übungsschwarm G.91). Among other trials, this unit performed familiarisation take-offs and landings from stretches of highway and grass surfaces, repeated in 1963 at the Italian base of Rivolto where similar joint exercises between AG 53 and the Italian Air Force's 2a Aerobrigata were carried out. A pair of R/3s went through hot climate trials at Colomb-Bechar, in the Algerian Sahara, for two months in 1964; this also served as a good occasion to test-fire the AS.20 missile.

In April 1975, the first F-4F Phantoms arrived for LeKG 42 (re-designated JBG 35), full conversion being completed by 1978. LeKG 43 and LeKG 41 converted to the Alpha Jet in 1980 and 1982 respectively, while LeKG 44 was disbanded in March 1975 at Leipheim. The last front-line G.91 in Luftwaffe service made its final flight from Husum on 11 February 1982 with LeKG 41. Since its introduction into the



Above: Fiat G.91Y in blue and yellow stella markings. Seen during its last days in service with the AMI's 8° Stormo. The unit marking, though carried on the fin, is hardly visible. Below: Aeritalia G.91Y, MM.6194, painted like a shark, belonging to the 13° Gruppo. It was flown for no more than two days in this scheme during the unit's 70th Anniversary celebrations held at Brindisi in 1988. (Giuseppe Fassari)



Right: G.91Y 8-51, 8^o Stormo, awaiting the arrival of its pilot while it sits just outside its shelter. Lower right: A G.91Y, MM.6956/8-62 of the 8^o Stormo taxis out for another sortie. Low visibility markings were used during the last days of the type's service with the AMI (Giuseppe Fassari)

Luftwaffe in 1963 the G.91 had flown 792,000 hours, the highest utilisation rate by a single aircraft being 3,080 hours. A small number of 'unarmed' G.91R and T aircraft remained under the charge of Condor Flug for target towing duties; since they were still Luftwaffe property, they retained their original military codes and markings.

Among the units that had operated the T/3 were Waffenschule 50 at Erding (coded BD+101 to BD+132) and Erprobungsstelle 61 at Manching (YA+022, YA+023) while single examples were supplied to various the Geschwader flying G.91s for operational training and liaison purposes. These were re-coded in 1968 as numbers replaced the previous letters (34+01 to 34+40).

During 1970, Generalinspekteur Johannes Steinhoff proposed the setting up of a reserve corps, very much on the lines of the US Air National Guard. It was well known that G.91s, which had endeared themselves to Luftwaffe pilots, still had a lot of 'life' in them and could be utilised by these second-line units. It would appear that his idea came too late as sales to Portugal had already begun, and development on the proposed reserve units was never realised.

THE G.91 IN PORTUGAL

Problems, unrest and conflict in Portuguese colonies (Angola, Mozambique, Guinea) broke in to a war, that would last for some 13 years; a 'run' to arms became a reality. Portugal was caught unawares and well below the desired level of military preparedness; personnel were few, under trained and short of war material, especially aircraft, to face a guerrilla war on three different fronts, far from its mainland.

Portuguese retaliations to these colonial conflicts led to a United Nations (UN) arms embargo, apart from other sanctions on Portugal. This embargo disallowed Portugal to buy any war material from its usual lines of supply that included the US. However, France and West Germany decided not to comply with this embargo and during those years they became the major suppliers of armaments.

Pressure from the US and NATO also led to a ban on the use in Africa of those aircraft that Portugal had committed to NATO use, leading to an even greater shortage of aircraft in its inventory. The German government offered Portugal their recently retired Canadair CL-13B Sabres Mk.6. No sooner had Portuguese pilots and ground personnel arrived in Germany for their training that the deal was cancelled on the intervention of

Upper right: G.91Y MM.6956 coded 8-62 of the 101^o Grupo painted to commemorate the 50th anniversary of the unit. Note the dates 1941-1991 painted on the ventral fins. This aircraft had already been officially retired from service at that time (Giuseppe Fassari) Right: Most unusual was the 'twinning' between the 8^o Stormo and the Forlì Aero Club. This G.91Y was especially marked for this occasion



LUFTWAFFE UNITS

Unit	Date	Base	Type	Allocated Codes
JBG41 ¹	1961	Husum	G.91R/3	DG101-121, 231-251
JBG42 ²	1964	Pferdsfeld	G.91R/3	DH101-121, 251-250
LKG41	1966	Husum	G.91R/3	MA101-126, 231-256
			G.91T/3	MA373
LKG42	1967	Pferdsfeld	G.91R	MB101-126, 231-256
LKG43 ³	1966	Oldenberg	G.91R	MC101-126, 231-250
LKG44 ⁴	1966	Leipham	G.91R	MD101-126, 231-156
			G.91T/3	MD372, 373
AKG53 ⁵	1962	Leipham	G.91R	EC101-126, 231-256
AKG54 ⁶	1964	Oldenberg	G.91R	ED101-126
JG72 ⁷	1964	Oldenberg	G.91R	JB101-126
WS50	1959	Furstenfeldbruck	G.91T/3	BD101-132
			G.91R/4	BD231-259, 361-385
			G.91R/3	BD401-420
Est61		Maching	G.91R/3	YA-011-015, 018
			G.91T/3	YA022-23
LVS ⁸		Erding	G.91R/3	XB101-106

Notes:

- 1 Formed from JG35, later became LKG41
- 2 Formed from JG73
- 3 Formed from AKG54 and JG72
- 4 Formed from AKG53
- 5 Initially based at Erding, later became LKG44
- 6 Later became LKG43
- 7 Later became LKG43
- 8 Formed part of WS50

General Note: G.91s on test or on delivery were assigned the codes KD

Coding system was changed on 1 January 1969, aircraft carrying only a serial number of four digits in two pairs separated by the fuselage cross marking

Abbreviations:

JBG-Jagdbombengeschwader; LKG-Leichtenkampgeschwader; AKG-Auflarungsgeschwader, JG-Jagdgeschwader; WS-Waffenschule; Est-Erbobungstelle; LVS-Lehr und Versuchsschwarm

the US Government.

Instead of the Sabres, the German Government offered some 40 G.91R/4s (5401-5440) in 1965, that it had originally intended to be sold to Turkey and Greece under the NATO Mutual Assistance Program, as mentioned previously.

This purchase was partly offset by the offer of training facilities for the Luftwaffe at Beja, in southern Portugal. It also stipulated that the G.91s were to be used only on Portuguese territory; however the Força Aérea Portuguesa (FAP) went round this proviso by describing the African Colonies as Portuguese sovereign territory.

A decision of acceptance had to be confirmed at very short notice. Portugal could not drag its feet on its decision having already originally displayed a half-hearted acceptance of the Sabres. It was probably argued that the G.91 would be better suited for use in Africa.

A group of eight pilots from Esquadra 51, Base Aérea 5 (BA-air base), Monte Real, left in November 1965 for Germany to initiate their training on their new mount. This training was conducted on G.91R/4s of LeKG 44 at Leipheim and on 4 December 1965, the first 'Ginas' arrived in Portugal. They were brought to FAP standards, adorned with the 'Cross of Christ' national insignia and given new serial numbers. Four of these machines were attached to the Sabre-equipped Esquadra 51 'Falcões' (Falcons) at Monte Real for conversion training.

This first batch of G.91 R/4 sent to Portugal included the only ex-Hellenic Air Force G.91R/4 delivered way back in 1961. It had been returned to Italy and was later sold to West Germany; to become FAP 5401, the first FAP G.91.

The African 'adventure' began as the

Left: 5415 of the Portuguese Air Force is a G.91R/4, as evidenced by its armament of four 12.7mm guns. Of note is the all-grey finish and old style national markings (AHS-Aviation Hobby Site via João M. Vidal) Below: Portuguese Air Force Fiat G.91 R/3, 5464 at Montijo, in May 1992 (C. Boisselon via José C.C. Silva Coll.)





The first G.91R.3 of the Portuguese Air Force to be finished in a 'tiger' scheme, was 5465, for the occasion of the 35th FAP anniversary and the 1987 NATO Tiger Meet hosted by Esq. 301 'Jaguares' and held in Montijo AB. It only remained in this finish for 40 days. (Jose C.C.Silva)

FIAT G.91T/3, 1802, EdA 301 'Jaguares', FAP. Green RAL 6014 and Dark Grey RAL 7012 upper surfaces with Grey RAL 7032 undersides; black anti-dazzle panel. National markings on fuselage sides, above port and underneath starboard wing; serial in black on fin, above starboard and underneath port wing

Detail of cross design of the FAP insignia: on the left is the style used up to 1980, on the right the design in use after that date



Above: **FIAT G.91T/3, 1810, EdA 301 'Jaguares', FAP.** Tan (FS.30219) and Green (FS.34079) wrap-around scheme with yellow/black 'tiger' tail section; 1991 Nato Tiger Meet in Upper Heyford

FIAT G.91R/3, 0042, US Army. Standard NATO scheme. Dayglo Orange nose section, wingtips and most of the rear fuselage, including horizontal tail surfaces. National markings in standard positions

FIAT G.91T/1, 0022, US Army. Silver Grey overall with Dayglo nose, tail and wingtip sections. Red flash along fuselage. Standard national markings



Seen in 1986 in Esq.301 markings on this FIAT-built G.91T/3, finished in Luftwaffe RAL colours on top surfaces. It was previously 34+06 (B. Lestrade via José C.C. Silva Coll.)

G.91s were shipped from Portugal to Bissau, where they arrived in late March 1966. They were re-assembled at BA 12 Bissalanca in Portuguese Guinea, the first aircraft being flown by early July. Grupo Operacional 1201 was formed on the eight G.91s (5401, -2, -3, -5, -6, -17 and -18) joining Esquadra de Caça 121 'Tigres' (Tigers) under the command of Major Armando Santos Moreira. They were assigned the role of apoio de fogo pesado (heavy fire support) and usually operated in pairs during such missions armed with eight 2.75in (70mm) anti-vehicle rockets under the wings. Free-fall bombs or napalm containers, in conjunction with long range fuel tanks, permitted the G.91s to operate in a variety of roles and over considerable distances in a hostile environment. By the end of that year, the G.91s, together with the C-47s and T-6s, dropped a total of 13,070lb (5,930kg) of bombs.

A G.91 (5407) was lost in flight due to a bomb that exploded prematurely (the pilot ejecting to safety) on 22 February 1967, with at least a further four 'Ginas' suffering various degrees of damage during that year. 5411 was lost during 1968, a year when

operational sorties more than doubled. Between 1968 and 1970 the unit fell under the command of Major Fernando Joao de Jesus Vasquez, and the strength of the unit was brought up to 12 aircraft. His place was taken over by Lt Col José Almeida Brito, who was killed in action on 28 June 1973, when his G.91 (5419) was hit by a SAM-7; Major Fernando Vasquez returned to the unit and remained there until the end of hostilities. The Russian made surface-to-air missiles became a deadly threat to the 'Ginas', of which at least three more succumbed to the SAMs; all three pilots, however, managing to eject successfully. In an attempt to counter the SAMs, an all-green anti-radiation finish was applied to the G.91s, later adopted by other FAP aircraft operating in this theatre.

The other Portuguese colony in Africa where G.91s saw action was Mozambique. Eight of these aircraft arrived by boat at Beira Harbour toward the end of 1968 where they were reassembled by 31 December 1968. These formed Esquadra de Caça 502 'Jaguars' (Jaguars) at AB 5 at Nacala, under the command of Captain Fernandes early the following year and were

immediately pressed into action. A second delivery of eight G.91s permitted the formation of a second unit, Esquadra de Caça 702 'Escorpiões' (Scorpions) at AB 7, at Tete. Originally under the command of Captain Azambuja, the unit was commanded by Major José Armando Vizela Cardoso as from 1972. Here, too, the SAM-7s appeared in 1973 and began to take a toll on the 'Ginas'.

An amusing anecdote on the use of the Scorpion symbol by Esquadra de Caça 702 is recalled by João Vidal, ex-FAP T-6 pilot and first commander of Esquadra 702. Due to his love for racing cars and particularly FIAT's Abarth, then one of the best known in its class, he proposed to name his squadron (Esquadra 702) 'FIAT Abarth', something which the powers that be could not accept. Instead it was decided to name it Escorpiões (Scorpions) and applied Abarth's logo – a scorpion – on the mid-fuselage of the unit's G.91s. The affinity with FIAT cars did not end there; the G.91's wheel brakes were being supplied by OGMA at prohibitive prices, and after long delays. One of Esquadra 702's mechanics discovered that they were exactly the same as those used on the FIAT 125, priced at a fraction of those supplied by OGMA. From that day on, there was no more shortage of brake linings for the G.91s!

Salazar's dictatorial rule fell in April 1974, bringing Portugal's colonial policy to an end. First G.91 unit to leave the African continent was Esquadra 502, which left for Mozambique, and in October both 502 and 702's aircraft were disassembled and ferried inside Boeing 707s to Angola. On their

Line-up of G.91R/4s of Esq. 121 'Tigres' at Bissau during their African tour of operations. Note the colourful sharkmouth motifs on the air intakes and the unit badge, usually carried only on the port side (Vitor Sousa via AHS)





Portuguese Air Force G.91R/3, 5452 at BA.6 Montijo, starts up the engine for another sortie. Note white rocket pack under the starboard wing (Rembert Vornholz-VDL)

arrival at BA 9 Luanda, these aircraft were amalgamated into Esquadra 93, that had just stopped operating ageing F-84G's. The G.91 was used mainly for reconnaissance and patrol duties, since fighting in that colony had come to an end some months before.

All operations by Portuguese G.91s in Africa came to an end in January 1975. By then they had flown a total of 20,000 hours and the surviving aircraft were shipped back to Lisbon. Some reports claim that two or three G.91s were 'captured' and pressed into use in the newly-formed air force of the República Popular de Angola. There has never been any hard evidence to support this, and several eye witnesses and reports concur that all G.91s returned to Portugal.

G.91s recovered from Africa were formed into Esquadra 62 - Jaguares (Jaguars) at BA 6 Montijo, near Lisbon, later in 1978 this Esquadra 62 - Jaguares would become Esquadra 301 - 'Jaguars', due to a reorganization of FAP structure. By August 1974 it was brought up to full strength of 25 aircraft. Having for many years formed the backbone of the FAP, the G.91R/4 finally

Portuguese Air Force G.91R/3, carrying a scheme reminiscent of its previous Luftwaffe service, belonging to Esq. 301 'Jaguars'. It is here seen at the 1982 Tiger Meet (via Giuseppe Fassari)



began to languish in numbers due to attrition. It was only natural that Portugal would jump on the bargain sale by the Luftwaffe in the summer of 1974 of a number of G.91R/3s that were being retired from front-line service. Although the Luftwaffe, was willing to supply FAP with some of their surplus F-104Gs, the FAP was not prepared to risk taking on an aircraft that had earned itself such notoriety. In fact, more G.91s were acquired by the FAP as they became available. They started to arrive to Portugal in 1976, reaching a total of 85 examples when the last batch was received in 1982. This total included 34 R/3s (5441-5474) and 11 T/3s (1801-1811). Portugal also acquired a further 52 ex-Luftwaffe G.91s to use as spares or instructional airframes.

Representation in a Tiger Meet for the first time fell on the 'new' Esquadra 301, in 1978, held at Kleine-Brogel in Belgium. In August 1980, the Esquadra 301 sent a detachment to BA 4 (Lajes, Azores) that led to the official formation, in January 1981, of the short-lived Esquadra 303 'Tigres' (Tigers). At that time all existing G.91R/4s began to receive an avionics update and Martin-Baker PW6A zero-zero ejection seats. They were also armed with Sidewinder AAMs.

The 1985 NATO Tiger Meet held was again held at Kleine Brogel, FAP participation was taken over by Esquadra 301, which went on to win its second Silver Tiger

Continued on page 40

PORTUGUESE AIR FORCE SERIALS & UNITS

Serial	Ex-Luft.	Unit
G.91R/4		
5401	BD+235	121/301/303
5402	BD+240	121
5403	BD+241	121/502/303
5404	BD+243	121/502
5405	BD+244	121/OGMA
5406	BD+252	121
5407	BD+250	121
5408	BD+385	
5409	BD+231	121
5410	BD+364	301/303
5411	BD+376	121
5412	BD+381	121/702/502/OGMA
5413	BD+365	121
5414	BD+370	301/303
5415	BD+379	303
5416	BD+380	121
5417	BD+236	121/301/303
5418	BD+247	121/303
5419	BD+255	121
5420	BD+363	303/OGMA
5421	BD+367	303/OGMA
5422	BD+371	303
5423	BD+378	121/
5424	BD+384	303/OGMA
5425	BD+233	121/303/OGMA
5426	BD+234	
5427	BD+237	303
5428	BD+238	303
5429	BD+242	702
5430	BD+366	702/93/303
5431	BD+368	502/303/OGMA
5432	BD+377	502/93/303
5433	BD+245	OGMA
5434	BD+246	301/303
5435	BD+253	303
5436	BD+254	303
5437	BD+373	
5438	BD+374	303
5439	BD+375	303
5440	BD+383	303
G.91R/3		
5441	30+11	301
5442	30+21	301/OGMA
5443	30+23	301
5444	30+31	301
5445	30+32	301
5446	31+04	301
5447	31+20	301
5448	31+34	301
5449	31+36	301
5450	31+60	301
5451	31+65	301
5452	32+01	301
5453	32+51	301
5454	32+62	301
5455	31+72	301
5456	31+81	301
5457	31+96	301
5458	32+09	301
5459	32+81	301
5460	33+11	301
5461	30+37	301
5462	30+44	301
5463	31+18	301
5464	31+24	301
5465	31+82	301
5466	32+63	301
5467	32+48	301
5468	31+26	301
5469	30+50	301
5470	30+77	301
5471	32+60	301
5472	32+88	301
5473	33+19	301
5474	32+74	301
G.91T/3		
1801	34+05	301
1802	34+06	301
1803	34+09	301
1804	34+15	301
1805	34+17	301
1806	34+23	301
1807	34+28	301
1808	34+36	301
1809	34+30	303
1810	34+38	303/301
1811	34+53	303/301



1

1. The nose wheel undercarriage of the G.91R showing the width of the nose wheel tyre and large heavy duty strut. 2. The port main undercarriage wheel again emphasising the size of the tyre and struts. 3. The G.91Rs canopy and ejector seat. The top of the cockpit entry ladder is just visible. 4. The G.91 flaps were large for short field landing capability.



4



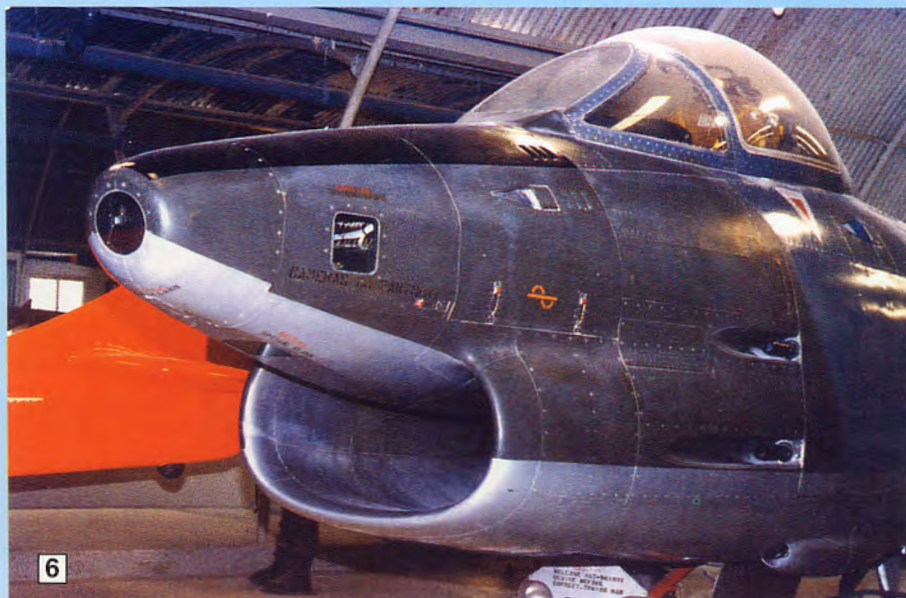
2



5

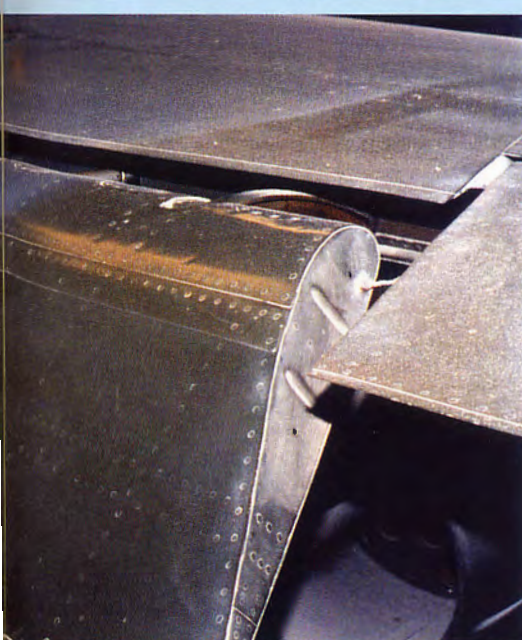


3



6

5. The starboard side long range tank on the G.91Y which appear to be rather worn and the paint eroded. Note the end fins reminiscent of the F-86 drop tanks. 6. G.91R's nose intake and ports for the four 12.7 machine guns. 7. The rubber tail bumper on the G.91T. 8. This view of the underside of the G.91T emphasises the large speed brakes, undercarriage doors and starboard wheel.



FIAT G.91

IN DETAIL

Photos by Richard J. Caruana, Godfrey Mangion and G. Fassari



7



8



Fiat G.91R/3 'Tiger' of the Portuguese Air Force, serialised 5454 seen in 1992 at the Albacete NATO Tiger Meet. Note the Red tongue hanging from the air intake...

Continued from Page 37

Trophy after their first win back in 1980 at Cameri AB, Italy.

Esquadra 301 hosted NATO's Tiger Meet at Montijo AB in June 1987. It coincided with the 35th Anniversary of the FAP and for this occasion one of the most fantastic tiger liveries was painted on G.91 (5465), a scheme that lasted exactly 40 days.

Portugal retired its Fiat G.91s with a last official flight in June 1993 after the type had clocked 75,000hrs of operational flying with the Força Aérea Portuguesa. The last operational FAP G.91s were 5441, 5443, 5444, 5445, 5446, 5447, 5448, 5451, 5454, 5458, 5463, 5467, 5468, 5471 and T/3 1806, 1807.

THE 'YANKEE'

At a time when every self-respecting air force in the world was re-equipping its units with supersonic aircraft, the AMI issued a requirement for a light reconnaissance fighter-bomber practically written around a projected twin-engined G.91. FIAT's announcement in 1965 regarding the development of an improved version of its 'Gina', a design whose origins dated back to the early 'fifties, was met with more than just a little surprise. This was a time when the SEPECAT Jaguar was already on the drawing board (as the Breguet Br 121) while the Northrop F-5 Freedom Fighter was selling like hot cakes all around the world. Though Jaguar and F-5 fall in the twin-engined, strike and reconnaissance fighter class, they had the advantage of also being able to fly faster than the speed of sound. High-ranking officials within the AMI and members of the Italian Government were also advocating the licence production of the F-5 for use by the Italian air force.

There was only one parallel, and that was the US Navy's order for the LT-Vought A-7 Corsair II, the prototype of which had just performed its maiden flight. Though much heavier than the G.91 successor being proposed, the Corsair II was required to be supersonic, greater emphasis having been placed on accuracy of weapon delivery at altitude. At that time, Italy was heavily involved in the VAK-191V/STOL fighter

together with West Germany, a project which eventually fell through. So an indigenous, and comparatively cheap, fighter felt to the AMI like a much safer investment until such time as another multi-country project – the MRCA – was launched; Italy had joined Britain and West Germany in the latter project which eventually became today's Tornado.

It is important to note, at this stage, that in 1969 FIAT merged with Italian Government-owned Finmeccanica-IRI, the merger receiving the name of Aeritalia. Derived from the two-seat G.91T, the 'Y' retained the most important element that had characterised the success of its predecessor, its ability to operate from unprepared or semi-prepared surfaces. Although externally there are some similarities between the two types, the G.91Y was, in fact, a completely new aircraft. The first major modification involved the widening of the fuselage to receive a pair of General Electric J85-GE-13 engines, each rated at 2,725lb/st dry and 4,080lb/st in afterburner. The use of two jet engines of such a high thrust/weight ratio resulted in a relatively small increase in weight of the powerplant installation versus a 60 percent increase in thrust at take-off. Flight safety and combat survivability was considerably enhanced, with practically all performance parameters being markedly improved especially in hav-

ing a shorter take-off distance and an increase in speed at all levels.

The lengthened fuselage of the G.91Y also allowed the carriage of twice the previous fuel load. Additional fuel cells were installed in the space previously provided for the second seat of the G.91T. Internal capacity increased from 462 gallons (2,100lt) to 704 gallons (3,200lt).

The wing structure was enlarged and strengthened, having full leading edge flaps that notably improved the aircraft's short field performance and increased manoeuvrability, especially at low level. Four pylons were fitted to the new wing with a capacity of carrying up to 4,000lb (1,815kg) of stores. It also featured a longer and reinforced undercarriage with larger low-pressure tyres and a more powerful braking system. The aircraft matched the USMC (SATS) concept of short airfield tactical support operations by having an arrestor hook, catapult launch points and could be fitted with JATO rockets.

Although the nose could still house only three cameras, the cone was enlarged and redesigned, enabling it to take a wide variety of photographic equipment. Whatever was installed, these could still be employed in the vertical, forward and oblique modes.

Like that of its predecessor, the cockpit was roomy, fully air-conditioned and pressurised. A zero-zero ejector seat was installed together with a host of highly improved integrated attack avionics. A revised rain-removal system provided greater safety when operating in poor weather conditions. The communications and IFF packages are similar to those on the G.91R, including UHF communication systems (primary and back up). The Spectro HUD was the first head-up display installed in an Italian aircraft. This, however, proved extremely problematic during its early days and was only resolved after a great amount of redesign and modification.

Armament installed in the G.91Y is similar to that of the R/3, that is two DEFA 552 30mm cannon, with 125 rounds per gun. The four external stores points could carry a wide variety of ordnance: up to four 500lb

FIAT G.91 KITS, DECALS AND ACCESSORIES

Scale	Version	Manufacturer	Reference	Remarks
Kits				
1:72	G.91R	Airfix	AX01026	Complete kit
1:72	G.91PAN	Airfix	AX01084	Frecce Tricolori markings. Re-issue
1:72	G.91Y	Matchbox	PK034	Complete kit
1:72	G.91R	Revell	RV4370	Complete kit
1:72	G.91R	Revell	RV4635	Tiger Meet markings
1:48	G.91R	Esca	ES4027	No decals
1:48	G.91R3	Occidental	OC0203	Portuguese markings
Decals				
1:72	G.91R3	Carpenter	CA72101	Tiger meet markings
1:72	G.91R	Modeldecals	MD013	Luftwaffe
1:72	G.91R	Santa Cruz	SZ72001	Tiger Meet markings +1:48 sheet
1:72	G.91R4	Santa Cruz	SZ72003	Scorpions +1:48 sheet
1:72	G.91R4	Santa Cruz	SZ72032	5431 Mozambique +1:48 sheet
1:72	G.91R	Superscale	SS72087	Luftwaffe + RF-4E
1:72	G.91	Tauro	TO50272	Italian code nos
1:72	G.91	Tauro	TO50972	Tiger Meet
1:72	G.91	Tauro	TO51872	Italian code letters
Accessories				
1:72	G.91R	Aeroclub	ABAE54	G.91 conversion vacuform
1:72	G.91T	Aeroclub	ABAE55	Two-seat conversion vacuform
1:72	G.91	Aeroclub	ABC074	Canopy
1:72	G.91	Eduard	EDSS167	Etched brass parts
1:72	G.91	Eduard	EDXF147	Paint mask

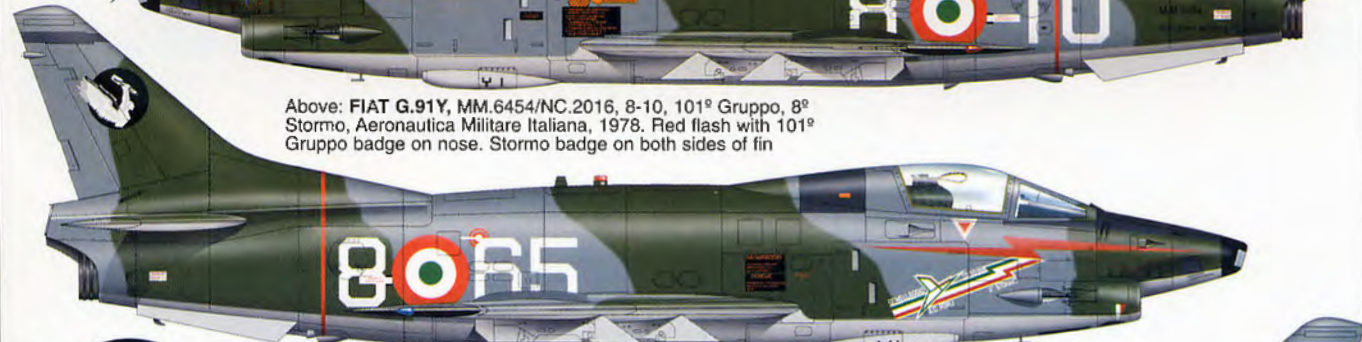


Note: Aeritalia/FIAT G.91Ys were finished in a similar colour and marking scheme to the earlier G.91Rs in AMI service. Dark Grey/Dark Green upper surfaces with Aluminium undersides; black nose, anti-dazzle panel, dorsal panel aft of cockpit and extreme wingtips. Unless otherwise stated, codes in white; NC/serial block under tailplane in black

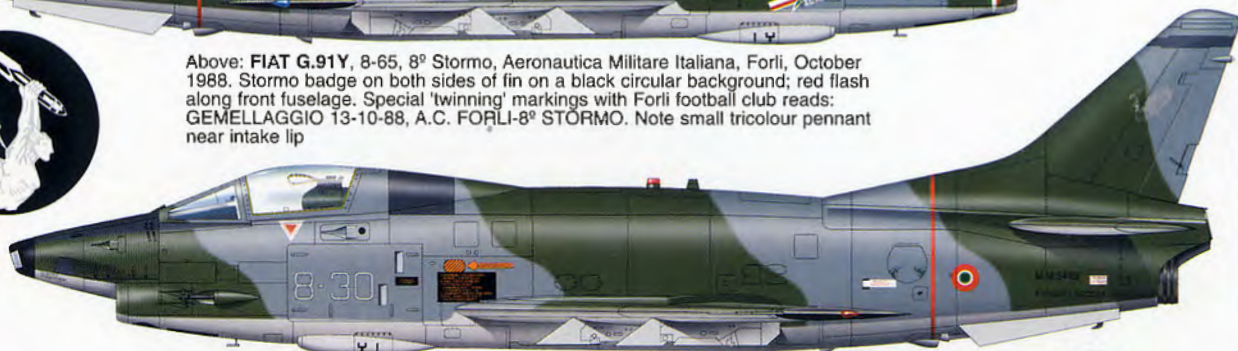
FIAT G.91Y, MM.6443/NC2005, RS-11, Reparto Sperimentale di Volo, Aeronautica Militare Italiana. RSV badge on both sides of fin



Above: **FIAT G.91Y, MM.6454/NC.2016, 8-10, 101° Gruppo, 8° Stormo, Aeronautica Militare Italiana, 1978.** Red flash with 101° Gruppo badge on nose. Stormo badge on both sides of fin



Above: **FIAT G.91Y, 8-65, 8° Stormo, Aeronautica Militare Italiana, Forlì, October 1988.** Stormo badge on both sides of fin on a black circular background; red flash along front fuselage. Special 'twinning' markings with Forlì football club reads: GEMELLAGGIO 13-10-88, A.C. FORLÌ-8° STORMO. Note small tricolour pennant near intake lip



Above: **FIAT G.91Y, 8-30 (serial unknown), 8° Stormo, Aeronautica Militare Italiana.** Codes in light blue-grey thinly outlined in black; Stormo badge on fin reduced in size and toned down in colour



Below: **FIAT G.91Y, MM.6455/NC2017, 32-8, 32° Stormo, Aeronautica Militare Italiana.** Red/white sharkmouth motif, thinly outlined in black; black/white eye. Early style code in white; unit badge on both sides of fin.



Above: **FIAT G.91Y, MM.6466/NC2028, 32-13, 32° Stormo, Aeronautica Militare Italiana.** Red and white sharkmouth motif, outlined in black; eye in black and white. Unit badge of both sides of fin

Below: **FIAT G.91Y, 32-05 (serial possibly MM.6474/NC.2036), 32° Stormo, Aeronautica Militare Italiana.** Black/white sharkmouth motif and eye; codes in white outline. Unit badge in white only on both sides of fin





(227kg) Mk.82 general purpose bombs, or a combination of these with the smaller 250lb (114kg) Mk.81 bombs, three or six HVAR, Nord AS.20/AS.30L air-to-surface missiles, napalm containers and Matra rocket packs. This meant an increase of 20 percent over the G.91R/1B. The cannon barrels, jutting out from the fuselage, caused many problems during arrester barrier trials as the wires became entangled in them. A solution was finally found when wire guards were fitted to protect them.

An order for two prototypes (MM.579, MM.580) was placed with Aeritalia toward the end of 1965 after conducting a 'paper evaluation' of the type against the F-5A. The first prototype flew for the first time at Caselle on 27 December 1966, followed by the second in September of the following year. Pleased with the results, which respected in full the air force's requirements, the AMI presented Aeritalia with an order for 20 pre-production machines (MM.6441 to MM.6460). The first of these flew in July 1968 and was passed on the Reparto Sperimentale at Pratica di Mare that same month where it underwent full military trials. Eventually the first block was brought up to 45 examples (MM.6441 to MM.6495) with a second block of ten being ordered later (MM.6951 to MM.6960). A final block of nine aircraft (MM.6961 to MM.6968) was cancelled. Deliveries of G.91Ys thus totalled 55 examples plus the second prototype (MM.580), which was brought up to full standard and re-serialled MM.6440.

At one time, Switzerland was genuinely interested in the G.91Y as a Hunter replacement and FIAT/Aeritalia produced a modified version fitted with more sophisticated avionics, an additional pair of underwing store points and provision for the use of Sidewinder air-to-air missiles. A single G.91YS was converted using MM.6441 as the prototype, this flying for the first time in October 1970. Switzerland however ordered more Hunters, and finally chose the F-5E for its requirements in 1976. MM.6441 was refitted as standard G.91Y and delivered to AMI for service with the 32° Stormo, and

later with the 8°.

First AMI unit to be equipped with the 'Yankee' was the 101° Gruppo CBR (Lampo) of the 8° Stormo based at the 'Umberto Mancini' airfield of Cervia-San Giorgio, near Rome. The 101° consisted of the 208^a, 211^a, 238^a and 243^a Squadriglie. The unit had been reformed in September 1967 flying the old F-84F Thunderstreaks until deliveries of the G.91Y began in April 1970. It became officially a full-fledged G.91Y unit on 23 January of the following year when it held an air display to celebrate the event. The transition and early service period was fraught with problems, so much so that the second major unit had to wait more than three years for their aircraft. Things eventually improved, and 8° Stormo aircraft were identified by a red flash on their forward fuselage and the insignia of a winged man holding a bomb on the fin. Most unusual was the 'twinning' of the unit with the local Aeroclub (A.C. Forlì) on 13 October 1988. The 101° Gruppo was the last AMI unit to fly the 'Yankee' with the last flight being recorded in March of 1995 when the 101° Gruppo was disbanded. It

A pair of G.91R/4s from Esq. 301 'Jaguares' for-mate on the camera ship. 5440 is in the foreground (AHS-Aviation Hobby Site via João M. Vidal)

was later revived and became the OCU for the AMX based at Amendola.

The 13° Gruppo 'Falco' of the 32° Stormo 'Armando Boetto' began to receive its G.91Ys on 1 August 1973 at Brindisi-Casale in exchange for their G.91R/1s. The unit consisted of the 76^a, 77^a and 78^a Squadriglie and found the new version far more adaptable to their role of coastal defence that frequently saw them flying for long stretches over the sea. Due to this, the G.91Ys of the 13° Gruppo sported an aggressive 'sharkmouth' motif on their air intakes. Flying with the 'Yankee' continued up to 1993 as the unit was wholly transferred to Amendola on 1 July of that year, where it replaced the 60^a Brigata Aerea. In between relinquishing the G.91Ys and the arrival of the AMX with which it was to be re-equipped, the unit was practically forced to revert onto the G.91Ts. The AMX finally arrived on 30 September 1995 when all G.91 flying came to an end.



Underside view of the first G.91R.3 of the Portuguese Air Force to be finished in a 'tiger' scheme. (Lt.Cor. António Mimoso Carvalho - FAP)