Fiat G.50 Freccia

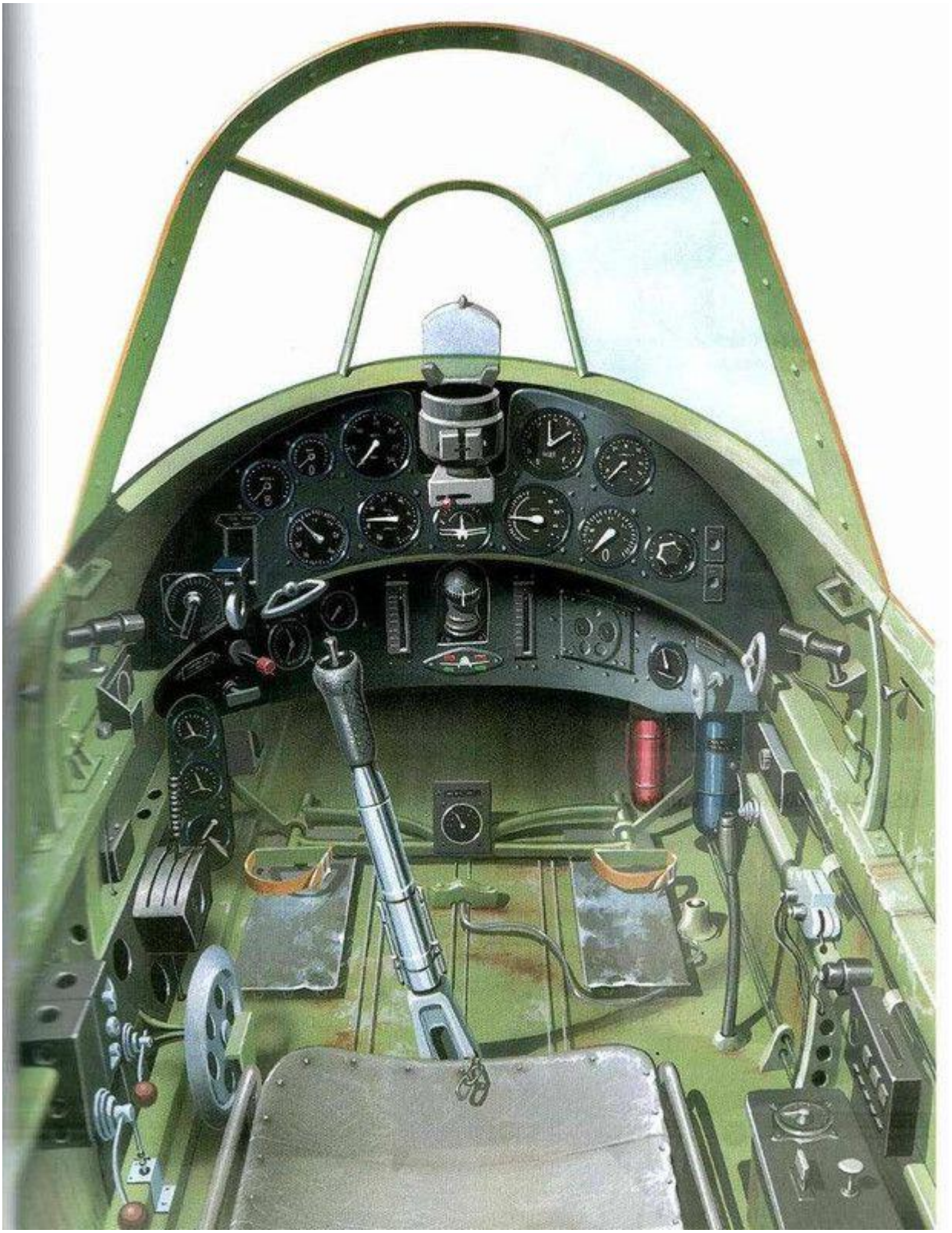
FIAT G.50

Dans les années 1930, la plupart des avions de chasse de la Regia Aeronautica italiana sont des biplans. En effet, si les biplans FIAT CR.20 conçus durant la décennie précédente sont peu à peu remplacés, c'est par des Fiat CR.30, puis CR.32… également biplans. Ces appareils compensent en grande partie leur vitesse relativement modeste par une maniabilité impressionnante, malheureusement, ils sont peu adaptés aux missions d'interception et d'attaque au sol. Par conséquent, la Regia Aeronautica demande un nouvel appareil capable d'effectuer à la fois ces deux types de missions. Fiat décide de proposer un avion pouvant embarquer des canons de 20mm et des bombes en soute. L'ingénieur Giuseppe Gabrielli travaille sur ce projet à partir d'avril 1935 et l'avant-projet est présenté en septembre. Entre temps, la Regia Aeronautica change d'avis et ne veux qu'un chasseur pur. Giuseppe Gabrielli doit alors faire un choix : reprendre à zéro son projet ou modifier l'appareil déjà conçu. Pour une question de temps, il choisit la deuxième alternative, bien que l'aérodynamisme et le poids de son appareil soient des handicaps face à des avions conçus pour la chasse pure. Le premier prototype est construit par CMASA (Costruzioni Meccaniche Aeronautiche Società Anonima), un constructeur aéronautique italien. Il effectue son premier vol le 26 février 1937, avec le pilote d'essai Giovanni De Briganti aux commandes. Le G.50, pour Gabrielli N°50, est alors le premier chasseur monoplan à voler dans le cadre du "Progetto R" qui doit désigner le nouvel avion "moderne" de la Regia Aeronautica. Un second prototype est construit pour effectuer également des essais en vol. Le G.50 "Freccia" possède une structure entièrement métallique. Le fuselage, prévu au départ pour accueillir une soute à bombe, a un aspect massif. Une sorte de bosse de chameau sur le dessus, permet d'avoir un cockpit surélevé pour une bonne visibilité vers l'avant et les côtés. Le pilote est protégé par une verrière d'assez petite taille dont la partie centrale coulisse vers l'arrière pour permettre l'accès au poste de pilotage. Les ailes, en position basse, sont en métal, excepté les surfaces de direction recouvertes de toile. Elles sont équipées de volets de courbure pour un meilleur contrôle à basse vitesse. Le train d'atterrissage classique est constitué d'un train avant escamotable, une première sur un chasseur italien, et d'une roulette de queue pouvant être dirigée. Le moteur en étoile Fiat A.74 RC.38 de 840 ch, un Pratt & Whitney R-1830-64 produit sous licence, actionne une hélice métallique tripale. Son armement est constitué de deux mitrailleuses Breda-SAFAT de 12,7mm. Rapidement, les essais montrent certaines limites à cet appareil. En effet, sa vitesse maximale de 470km/h n'est supérieure à celle du CR.42 que de d'une trentaine de kilomètres à l'heure et son armement est identique. De plus, il a tendance à se mettre en vrille, ce qui cause plusieurs accidents mortels durant des vols à basse altitude.

Le gros avantage qu'il présente par rapport au CR.42 qu'il est censé remplacer, c'est la solidité de sa structure permettant des missions d'attaque au sol et d'appuis aérien. Par rapport à ses concurrents, qui sont les M.C.200, Caproni Vizzola F.5, Reggiane Re.2000, IMAM Ro.51 et AUT.18, le G.50 fait partie des moins rapides et moins modernes. Il possède toutefois deux avantages sur ses concurrents : il est le premier à voler et il pourrait être rapidement disponible. Par conséquent, bien que ce soit le Macchi M.C.200 qui est retenu dans cette compétition, Fiat décroche également une commande pour plus d'une centaine d'exemplaires. Si les deux prototypes et les 45 premiers exemplaires de série sont équipés d'une verrière fermée, les essais effectués durant les essais en vol montrent qu'il est difficile de l'ouvrir à grande vitesse, ce qui augmente les risques pour le pilote s'il doit évacuer l'appareil. Par conséquent Fiat décide de le munir uniquement d'un parebrise et de panneaux latéraux transparents, permettant au pilote de quitter plus rapidement son appareil en cas d'urgence. Cette décision est peut-être aussi due à un goût particulier que possède Fiat pour les cabriolets en général. Début 1938, la Regia Aeronautica demande la fabrication d'un modèle biplace, permettant aux pilotes de faciliter leur passage des biplans sur ce monoplan parfois difficile à piloter. Désigné G.50/B, pour "Bicomando", ils sont construits à partir de 1939. Equipé de deux sièges en tandem, l'élève est assis sur le siège avant dans un cockpit entièrement fermé et muni de deux arceaux de sécurité renforçant la verrière en cas de retournement. Un total de 156 exemplaires de cette version est construit, les 5 premiers par Fiat et les autres par CMASA. Un de ces exemplaires a également été équipé d'appareils photographiques pour la reconnaissance aérienne. En revanche, la version G.50bis, embarquant une plus grande quantité de carburant et munie d'un empennage modifié, effectue son premier vol le 13 septembre 1940. Il en sera construit 421 exemplaires. Par la suite, le G.50ter motorisé par un moteur Fiat A.76 RC.40 de 1000 ch vole à partir de juin 1941 et atteint 530 km/h, alors que le G.50V, avec un Daimler-Benz DB 601 V lui permettant d'atteindre 580km/h effectue son premier vol le 25 août 1941. Tous deux resteront au stade de prototype, de même que la version embarquée G.50bis A/N qui vole pour la première fois le 3 octobre 1942. Au total, c'est 5 prototypes et 683 exemplaires de série des différentes versions qui sont construits. Les premiers G.50 sont livrés à partir de 1938. Les douze premiers "Freccia" sont envoyés en Espagne, afin de combattre au sein de l'Aviacion Legionaria aux côtés des nationalistes espagnols. Ces appareils sont rapidement considérés comme parmi les meilleurs chasseurs de ce conflit. Alors que plusieurs dizaines de victoires sont enregistrées, une seule perte est à déplorer, à la suite d'un problème technique durant son vol de livraison jusqu'en Espagne. À la suite de ce conflit, l'Espagne rachète les 11 appareils restants et les utilise pour la formation des jeunes pilotes, à l'Escuela de Caza. Par la suite, les G.50 espagnols sont transférés sur des bases aériennes au Maroc, où ils restent jusqu'en 1943. À la fin de l'année 1939, la Finlande commande 35 Fiat G.50 avant le déclenchement de la guerre. Un groupe de pilotes finlandais arrive à Rome pour un cours de pilotage sur le G.50 le 5 novembre 1939. Ils effectuent également un cours de spécialisation technique dans les ateliers Fiat Aviazione de Turin. Lors de ce stage, le lieutenant finlandais Tapanj Harmaja, atteint les 840 km/h lors d'une plongée de 3'500 mètres, une vitesse supérieure au maximum spécifié par le constructeur, entraînant des dommages mineurs à la cellule. Au début de janvier 1940, les avions sont prêts à être livrés, mais l'Allemagne, liée aux soviétiques par le pacte de non-agression, entrave leur transit. Les avions sont alors démontés, emballés dans des caisses de transport et embarqués sur le navire norvégien "Braga" en partance le 20 janvier pour Turku, en Finlande. Les premiers chasseurs Fiat ne peuvent être livrés qu'en février 1940 et n'ont pas été beaucoup engagés face à l'URSS avant le traité de paix entre ces deux pays. Néanmoins, deux Fiat G.50 sont perdus, un à la suite d'un combat aérien et un autre à la suite d'une panne. Au début, les pilotes finlandais n'apprécient pas le chasseur italien, principalement en raison de problèmes techniques récurrents et lui préférent, dans l'ordre, le Hawker Hurricane, le Morane-Saulnier MS.406 et même le Brewster F.2 Buffalo. Mais après l'intervention de techniciens italiens qui corrigent les erreurs de montage et instruisent le personnel au sol finlandais sur l'entretient de ces machines, les performances des G.50 finlandais s'améliorent considérablement. La première démonstration de son efficacité a lieu le 25 juin 1941, quand l'unité de chasse HLeLv 26 équipée de G.50 abat 13 des 15 bombardiers Tupolev SB qu'elle intercepte. Par la suite, les Fiat G.50 sont utilisés avec succès jusqu'à la fin de la guerre, à tel point que sur les 177 victoires aériennes confirmées par le HLeLv 26 entre le 30 novembre 1939 et le 4 septembre 1944, 99 sont obtenues par les pilotes de G.50, pour la perte de trois Fiats, soit un rapport des victoires et des pertes de 33 pour 1. L'as finlandais Oiva Tuominen obtient 22 victoires accréditées sur Fiat G.50 et un record personnel de quatre bombardiers russes Tupolev SB abattus en 4 minutes.

En 1944, les G.50 sont retirés du front et transférés aux unités d'entrainement et de formation, la situation de l'industrie militaire italienne ne permettant plus de fournir les pièces de rechange nécessaires. Lorsque l'Italie entre en guerre en juin 1940, 118 G.50 "Freccia" sont en service au sein de la Regia Aeronautica. En septembre, 48 exemplaires sont utilisés au sein du Corpo Aereo Italiano (CAI), un corps expéditionnaire de la Regia Aeronautica destiné à aider la Luftwaffe durant la Bataille d'Angleterre, en quelque sorte un signe de bonne volonté de la part de Mussolini à Hitler. Stationné en Belgique, le CAI utilise différents modèles de chasseurs, de bombardier et d'avions de reconnaissance. Les G.50 sont surtout utilisés pour effectuer des missions d'escorte, mais leur faible autonomie oblige généralement les CR.42 à escorter les bombardiers Fiat BR.20. La CAI est rapatriée en janvier 1941, après 429 missions et la perte d'un G.50 et de sept autres endommagés. Toutefois, deux escadrons italiens équipés de G.50 restent en Belgique jusqu'en avril, sous le commandement de la Luftflotte 2, pour effectuer des missions d'escorte et d'interception sur alerte. Durant ces trois mois, quatre autres "Freccia" sont abattus entraînant la mort de deux pilotes, et deux autres appareils sont endommagés par la chasse et la Flak (DCA)… allemande. Durant ces missions, il devient évident que le G.50 n'est pas aussi brillant qu'il n'en avait l'air durant la Guerre d'Espagne. En effet, il n'a pas un rayon d'action suffisant, il est lent, limité en armement et son cockpit ouvert expose ses pilotes à des températures extrêmes en altitude par grand froid. Seul point positif : une très bonne manœuvrabilité qui lui permet souvent de s'en sortir face à des appareils plus rapides et mieux armés. À partir de septembre 1940, on trouve également entre 60 et 80 G.50 italiens engagés dans la campagne de Grèce. Ils y remportent plusieurs succès, la plupart contre des bombardiers alliés et des biplans britanniques Gloster Gladiator. Après l'arrivée des chasseurs britanniques Hawker Hurricane, le rapport de force s'inverse et les combats aériens sont beaucoup plus difficiles. Bien que selon l'avis des pilotes de la RAF le G.50 ne fait pas le poids et de nombreux exemplaires sont abattus, un certain nombre de Hurricane sont également descendus par les Fiat. Au cours de la campagne de Grèce, une dizaine de G.50 italiens sont perdus, soit en combat, soit par accident. En Afrique du Nord, entre 20 et 80 "Freccia" sont déployés entre décembre 1940 et 1943. Ils sont utilisés pour couvrir les Junker Ju-87 "Stuka" allemands, mais également pour assurer la couverture aérienne. Un petit nombre de G.50bis A y sont également utilisés pour les missions d'attaque au sol. Comme durant la campagne de Grèce, les combats aériens contre des avions britanniques récents, plus rapides et mieux armés, sont souvent disputés. Si plusieurs G.50 sont abattus, ils comptent néanmoins à leur tableau de chasse un certain nombre de Bristol Blenheim, des Hawker Hurricane et même des Supermarine Spitfire. Plusieurs unités équipées de G.50 opèrent en Méditerranée pour escorter des navires, des avions de transport et des bombardiers. Elles effectuent également des missions d'appuis au sol, de reconnaissance photographique et d'attaque de navires, de 1941 jusqu'aux derniers jours de la guerre. Le G.50 participe entre autres à la couverture aérienne de la "rotta della morte" (route de la mort), qui concerne le pont aérien entre l'Italie et la Tunisie pour ravitailler les forces de l'Axe en Afrique du Nord. Il est également engagé durant les attaques aériennes des têtes de pont américaines en Sicile à partir du 25 juillet 1943, durant lesquelles les "Freccia" subissent de lourdes pertes dues à des avions adverses plus rapides et mieux armés, ainsi qu'aux tirs antiaériens massifs des navires alliés. En Calabre, ils subissent également de lourdes pertes pour les mêmes raisons, durant le bombardement des installations aéroportuaires. Le 8 septembre 1943, après l'annonce de l'armistice de Casabile, quatre G.50 encore en état de vol sont utilisés par l'Armée de l'Air Nationale Républicaine pour l'entraînement au combat aérien, les autres continuent à être utilisés par la Regia Aeronautica. Le dernier "Freccia" de l'Aeronautica Militare est retiré du service en 1947. En octobre 1941, la Hrvatska Zzrakoplovna Legija (Légion aérienne croate – HZL) demande une grande quantité de matériel militaire à l'Italie, dont un certain nombre d'avions de chasse. Après de longues négociations, l'Italie lui vend neuf Fiat G.50 et un G.50/B d'entrainement biplace, ainsi que des parachutes, des radios, quatre moteurs Fiat A.74 supplémentaires, des pièces de rechange et des munitions. Ils sont livrés en juin et prennent part de manière intensive, entre 1942 et 1944, contre les partisans yougoslaves, d'abord en Bosnie-Herzégovine, puis en Serbie, en Croatie et en Dalmatie. Après l'armistice de septembre 1943 et la capitulation de l'Italie, les forces allemandes capturent entre 20 et 25 G.50 italiens dans les Balkans. Ils les utilisent, dans un premier temps, au sein du 7° Nacht Schlacht basé en Croatie pour des missions de défense aérienne nocturne, avant de les remettre à la Légion de l'Air croate.

Les "Freccia" équipent plusieurs unités de chasse avant d'être transférés, en 1944, dans une unité de formation et d'entrainement où ils sont utilisés jusqu'à leur capture par les partisans de Tito en 1945. Après la fin de la guerre, l'armée de l'air yougoslave utilisera encore ses G.50 qui seront les derniers en service opérationnel au monde.



Source : https://aviationsmilitaires.net/v3/kb/aircraft/show/18421/fiat-g50-freccia#hl:aircraft.18424

Version anglaise Wikipédia

The **Fiat G.50** ***Freccia*** ("Arrow") was a World War II Italian fighter aircraft developed and manufactured by the aviation company Fiat. Upon entering service, the type became Italy's first single-seat, all-metal monoplane that had an enclosed cockpit and retractable undercarriage.[4] On 26 February 1937, the G.50 conducted its maiden flight. During early 1938, the *Freccias* served in the *Regia Aeronautica* (the Italian Air Force) and with its expeditionary arm, the *Aviazione Legionaria*, in Spain, where they compared well in speed and manoeuvrability with their adversaries in the theatre.[5][4] The fighter was extensively used on various fronts by Italy, including in Northern Europe, North Africa, the Balkans, and the Italian mainland. The G.50 commonly came up against the British Hawker Hurricane, which was fast enough to frequently outrun the Italian opponent, and could also outrange it. In addition, early in the Second World War it became apparent that the G.50 possessed inadequate armament, comprising a pair of Breda-SAFAT 12.7-mm machine guns.[6] Later models of the fighter incorporated improvements, including an increase in fuel capacity that gave rise to a substantial increase in range. The G.50 was exported to several overseas customers, small numbers being flown by the Croatian Air Force while 35 G.50 fighters were shipped to Finland, where they served with distinction during both the Winter War of 1939–1940 and the Continuation War of 1941–1944 against the Soviet Union.[6] In Finnish service, the type reportedly achieved an unprecedented kill/loss ratio of 33/1.[7]

Development

Background

The Fiat G.50 had its origins in a design produced by Italian aeronautics engineer Giuseppe Gabrielli. This represented a major change for Fiat, who previously relied on chief engineer Celestino Rosatelli.[1] External to Gabrielli's influence, the fighter's design was also shaped by the issuing of a specification during 1936 which sought a modern interceptor aircraft for the *Regia Aeronautica* (the Italian Air Force).[1] Gabrielli started work on the design in April 1935.[8][9] The design was state-of-the-art for the era; on its introduction, it would become the most advanced fighter to be produced in Italy.[1] Construction of two prototypes began mid-summer 1936. Manufacturing was turned over to CMASA (Costruzioni Meccaniche Aeronautiche S.A.), a subsidiary of Fiat at Marina di Pisa.[9] On 26 February 1937, the first prototype performed its maiden flight. Flown by Comandante Giovanni de Briganti, the chief test pilot for the G.50 program, it took off from Caselle airfield, Turin.[1] During this flight, the prototype was recorded as having attained a top speed of 472 km/h (255 kn; 293 mph) as well as having climbed to an altitude of 6,000 m (19,700 ft) in the space of six minutes, 40 seconds.[9][10] During October 1937, it was officially unveiled to the public at the Milan International Aeronautical Show.[1] As a consequence of its new design, it was decided to conduct an extended flight evaluation program in order to validate its performance.[1] During 1937, along with the first pre-series machines, a *gruppo sperimentale* (experimental group) was formed. Early flying experiences with the G.50 revealed it to possess relatively light controls and to be extremely maneuverable for a monoplane in comparison with prior designs. However, two separate issues were also identified, the limited power output of its radial engine and the lack of firepower, consisting of only a pair of machine guns.[1]

Initial orders

During September 1937, Fiat received an order for an additional batch of 45 aircraft. In advance of the placement of a larger order, the Italian Air Ministry decided to hold a round of comparative 'fly-off' test flight between the type and the newly developed Macchi MC.200. On 8 November 1937, de Briganti was killed during the sixth evaluation flight of the second prototype (M.M.335), when the fighter failed to pull out of a high-speed dive.[11] Flight tests conducted at Guidonia showed that the aircraft went too readily into an uncontrolled spin, a highly dangerous trait, especially at low level where recovery was impossible. During a visit by the Italian King Victor Emmanuel III and Prime Minister Benito Mussolini, another tragedy occurred at Guidonia. While performing a low, fast pass, three G.50s flown by experienced pilots, *Maggiore* (Squadron Leader) Mario Bonzano and Lieutenants Beretta and Marasco, got into difficulty. Beretta's aircraft spun uncontrollably and crashed into the ammunition laboratory, killing the pilot.[12] Despite the crashes, overall results from the flight test programme were deemed to be satisfactory and the *Freccia* proved to be more manoeuvrable than the faster Macchi MC.200, and the G.50 was declared the winner of the *Caccia I* ("Fighter One") competition on 9 June 1938.

On account of its manoeuvrability, the *Regia Aeronautica* Commission decided to order the G.50 as well, rejecting the competition's third contender, the IMAM Ro.51.[13] The first production aircraft were delivered to the *Regia Aeronautica* in early 1939. Reportedly, Italian pilots did not like the enclosed canopy because it could not be opened quickly and, being constructed from plexiglas of relatively poor quality, was prone to cracking or abrasion by sand or dust, limiting visibility. In addition, exhaust fumes tended to accumulate in the cockpit, so pilots would often fly the fighter with the canopy locked open.[14][15] Consequently, an open cockpit was installed in the second batch of 200 machines.[16] After 1939, the bulk of production for the G.50 was transferred to the CMASA factory in Marina di Pisa, Tuscany.[16] The first versions of the G.50 could be outfitted with several different configurations of armaments: either a single, or a pair of, 12.7-mm (.5 in) Breda-SAFAT machine guns in the nose and an additional pair of 7.7-mm (.303 in) Breda-SAFAT in the wings. Later versions of the aircraft could be distinguished by the addition of a larger rudder.[17]

Further development

During 1938, the *Regia Aeronautica* requested that two-seat trainer variant of the G.50 be developed, designated *G.50/B* (*Bicomando* – dual control). The first of these were constructed during the second half of 1939. The student pilot sat in the front in a closed cockpit with two roll bars. The first five aircraft were part of the *1a serie* ("first series"). Further production was entrusted to CMASA, who completed 106 G.50/Bs.[18] A single G.50/B was later transformed into a reconnaissance aircraft, which was equipped with a planimetric camera. Another G.50/B was adapted with a tailhook for the purpose of operating as a naval reconnaissance aircraft from the aircraft carrier *Aquila*, but this vessel was never completed.[19] During September 1940, a slightly improved version, designated as the *G.50 bis*. The primary advantage was the extended combat range, which was provided by an additional 104 litres (27 US gal) tank, increasing its range from 645 kilometres (401 mi) to 1,000 kilometres (620 mi).[19] The ultimate version of the fighter was the *G.50/V* (*Veloce* – fast) built in mid-1941 by CMASA and equipped with a Daimler-Benz DB 601 engine of 1,075 CV. During tests at Fiat Aviazione's airfield in Turin, it reached a top speed of 570 km/h (350 mph) in level flight and climbed to 6,000 m (20,000 ft) in five minutes 30 seconds. By this time, however, Gabrielli had already designed the Fiat G.55, and Fiat had obtained the licence to build the 1,475 CV Daimler Benz 605, so the G.50/V was used to test new equipment and then scrapped.[20] In total, production of the G.50 reached 784 aircraft; 426 of which having been manufactured by Fiat Aviazione and another 358 being built by CMASA. There were 58 fighters that were recorded as export sales: 13 G.50s had been sold to Spain, along with 35 aircraft to Finland and a final 10 to Croatia.[21] Two of the G.50 aircraft to be delivered were destroyed due to a lack of fuel before arriving in Finland. On 7 March, sergeant Asser Wallius forgot to switch the fuel pump to the main tank and the G.50 (FA-8) crashed, injuring the pilot. On 8 March, a Hungarian volunteer pilot, 2nd lieutenant Wilmos Belassy, apparently dived into the Baltic sea, after running out of fuel and failing to cross it from Sweden to Finland. The FA-7 and pilot have not been found. His fellow pilot, 2nd lieutenant Matias Pirity, had turned back and saved both the G.50 and himself.

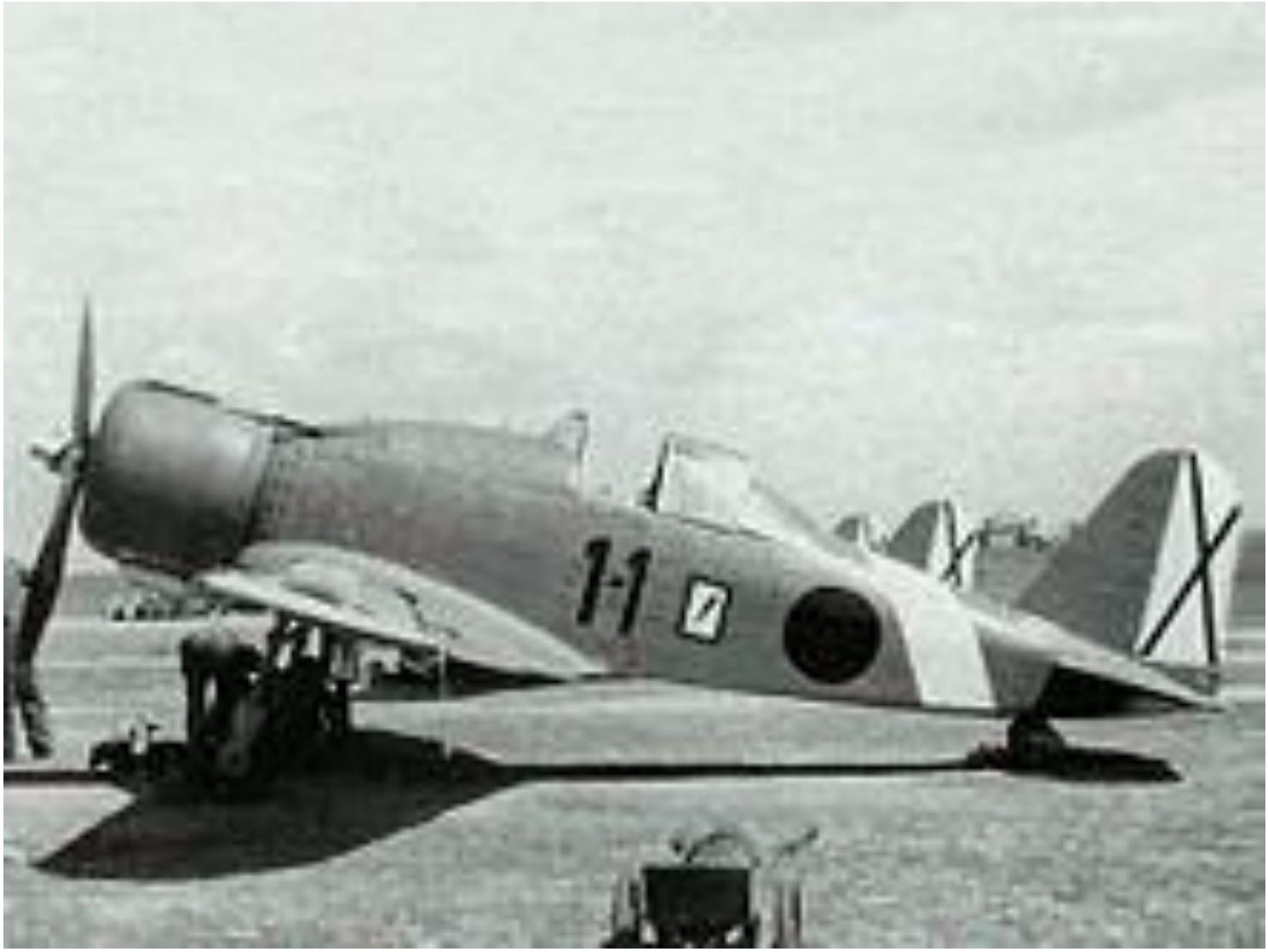
Design

The Fiat G.50 was a low-wing single-engine monoplane fighter interceptor aircraft.[22] It featured all-metal construction, comprising a semi-monocoque fuselage with an exterior skin composed of light alloys. The structure of the fuselage was formed from four main longerons and 17 formers, closing into a load-bearing bulkhead forming the rear of the fuselage.[23] The wings were divided into three separate sections, composed of a steel tube centre-section structure that was paired with duralumin outer wings and an alloy skin. The ailerons, which were both statically and aerodynamically balanced, had a metal structure covered by fabric.[24] Hydraulically-actuated four-piece slotted-flaps were fitted to the aircraft's wings to improve its take-off and landing performance; these would automatically retract upon attaining a certain airspeed.[24] The G.50 was equipped with retractable landing gear, consisting of inwardly-retracting mainwheels and a fixed, castoring tailwheel.[25][24] It was the first front-line Italian fighter to be fitted with a retractable undercarriage, an enclosed cockpit, and a constant speed propeller;[26] these improvements have been credited with enabling the G.50 to achieve a maximum speed that was 33 km/h (21 mph) faster than its contemporary, the Fiat CR.42 biplane. According to aviation author Gianni Cattaneo, the G.50 was a "robust and viceless aircraft which marked the introduction of new concepts and techniques, of design and manufacture".[24]

Powered by a single Fiat A.74 R.C.38 14-cylinder air-cooled supercharged radial engine, rated at 870 hp (650 kW) for take-off and 960 hp (720 kW) at 3,800 m (12,500 ft),[22] enclosed in a NACA cowling and mounted upon a chrome-molybdenum steel tubular structure attached with flexible mounts. Access for maintenance of the engine was provided via large cowling doors and panels on the fuselage aft of the firewall gave access for fuel tanks and armament. The engine incorporated a reduction gear which drove the Hamilton-Fiat 3-bladed all-metal constant speed propeller.[22] The pilot sat in an enclosed cockpit under a sliding transparent canopy; the seat was adjustable both in height and angle of inclination to suit the pilot's preferences.[23] Despite the canopy possessing favourable transparency, including a relatively unobstructed rearward view, pilots were unenthusiastic about the enclosed arrangement, leading to various types of open canopies being trialled and eventually a set of hinged transparent side-flaps were standardised upon.[24] A reflector sight was present for the purpose of aiming the fighter's armament, which comprised a pair of 12.7 mm (.5 in) Breda-SAFAT machine guns with 300 rounds of ammunition per gun.[27] The machine guns, fitted directly forward of the cockpit, were fired using synchronisation gear to fire through the propeller arc; both single-shot and salvo-fire modes were available.[22]

Operational history

Introduction



Mario Bonzano's personal Fiat G.50 "1-1", in Spain, January 1939.

During 1938, the first operational Fiat G.50 fighters were delivered to the *Regia Aeronautica*. During the Spanish Civil War, about a dozen G.50s were dispatched to Spain to reinforce the *Aviazione Legionaria*, Italy's contribution to the conflict. The first of these were delivered to the theatre during January 1939.[22] The value of its presence in the Spanish theatre is questionable as none of the fighters sent saw actual combat.

At the civil war's end, the G.50s in the region were handed over to Spanish pilots and subsequently saw action in Morocco.[22] Cattaneo summarised of the experience: "Little seems to have been learnt as nothing was done to increase the armament".[22] Upon the G.50's entry to service, it was widely regarded as being an extremely manoeuvrable aircraft and was often considered to be one of Italy's best fighters. However, by the time of the outbreak of the Second World War, rapid advancements in the field of aviation had contributed to the type being considered to be both underpowered and underarmed in comparison to competing frontline fighters then in use by the main powers.[16][18] In spite of this, in the buildup to the Second World War, further units of the *Regia Aeronautica* were equipped with newly delivered G.50s; these were heavily used in various exercises and war-games from November 1939 onwards as it became increasingly clear that Italy would likely soon be at war with the Western democracies.[24] Upon Italy's entry into the Second World War in June 1940, the *Regia Aeronautica* possessed a total of 118 G.50s that were available for operations; of these, 97 aircraft were available to perform front line duties while others were either in maintenance or awaiting delivery.[24] The majority of these were assigned to 51° *Stormo*, (group[N 1]) which was based at Ciampino Airport (just outside Rome) and at Pontedera, with 22° *Gruppo* (wing[N 1]) of 52° *Stormo*. On 10 June 1940, when Italy issued its declaration of war against both France and Great Britain, the G.50s of 22° *Gruppo* went into action, followed by the 48 aircraft of 20° *Gruppo*.[8] Operations during the first few days were sporadic and varied, often serving as escorts for Savoia-Marchetti SM.79 bombers on attack missions against harbours and airfields on the island of Corsica.[28] These operations were quickly brought to an end when France signed the Armistice of 22 June 1940, officially capitulating to the Axis powers.[29]

Belgian deployment and the Battle of Britain

During September 1940, the 20° *Gruppo* (351/352/353 Squadrons), commanded by *Maggiore* Bonzano and equipped with Fiat G.50, was part of 56° *Stormo*, formed to operate during the Battle of Britain as part of the *Corpo Aereo Italiano* (Italian Air Corps, CAI) based in Belgium, together with the 18° *Gruppo* flying Fiat CR.42s. According to Cattaneo, the Italian government had decided to participate in the German air offensive against the British mainland due to political opportunism and in pursuit of prestige; he alleged that the Air Staff would have rather directed those aircraft towards other fronts where they would have stood a better chance of making a meaningful contribution.[29] In this theatre, the G.50 was normally hampered by its relatively slow speed, open cockpits and short range. Cattaneo also noted that the presence of poor weather conditions and the use of relatively unprepared personnel were additional factors that undermined the fighter's effectiveness.[29] Those G.50s that were deployed were early models and thus furnished with an open canopy, which was useful in a typical Mediterranean climate but led to the pilots suffer heavily in the colder weather of northern Europe. The aircraft was also under-equipped, provided with a mediocre radio set (powered by batteries that were prone to freeze at altitude) and lacking any armour protection. [N 2] The experiences of the early G.50s over Britain soon showed their inadequacies in combat. Their operations were considered to be next to useless during the campaign, in part because they were too short-ranged and stationed too far from enemy territory. The G.50 possessed relatively limited endurance, thus missions rarely exceeded one hour. The G.50 bis, which was equipped with larger fuel tanks, was already in production, but it was not sent to 20° *Gruppo* in time to participate. Its performance was also lacking: during one incident on 5 November 1940, a formation of 22 G.50s intercepted several British Hawker Hurricanes, resulting in the RAF fighters escaping with ease. On 21 November 1940, when a Bristol Blenheim attacked the airfield at Maldegem, Belgium, a pair of G.50s were scrambled, but they lost the bomber in the clouds. On 23 November, several G.50s followed a flight of four Hurricanes, but were unable to close on them. On 31 January 1941, another fruitless interception occurred when a number of G.50s were evaded by a single Blenheim that escaped into the clouds. At the beginning of 1941, the CAI were redeployed back to Italy, leaving behind a pair of G.50 squadrons that stayed in Belgium alongside *Luftflotte 2* until April 1941. Overall, the G.50s flew a total of 429 missions, 34 escorts and 26 scrambles for the CAI, but failed to engage any enemy aircraft during these actions. A single aeroplane was lost and seven more were damaged during the deployment. While operating with *Luftflotte 2*, 20° *Gruppo* lost four additional fighters and two pilots were killed. A pair of G.50s were recorded as having been damaged by friendly fire from German fighters and flak.[30][N 3] In Belgium, 20° *Gruppo* had the opportunity to see the German Messerschmitt Bf 109 in action; several G.50 pilots are known to have been trained to fly the type as well. Around the same time, a pair of Bf 109E pilots were attached to the *Gruppo* in mid-January 1941.[32]

On 8 April 1941, the last sighting of enemy aircraft by the G.50 occurred, during which the targets, identified as fighters, eluded them yet again.

The North African campaign

On 27 December 1940, the first 27 G.50s, belonging to 150ª and 152ª *Squadriglia*, 2° *Gruppo Autonomo C.T.*, arrived in Libya, where they operated out of Brindisi and Grottaglie airfields. On 9 January 1941, these fighters performed their first combat mission in the theatre when *Capitano Pilota* (Flight Lieutenant) Tullio De Prato, commander of 150ª *Squadriglia*, was attacked by a Hawker Hurricane Mk I on the front line, forcing him to crash-land in the desert.[33] On 31 January 1941, a new G.50-equipped unit, 155° *Gruppo Autonomo C.T.*, consisting of 351ª, 360ª and 378ª Squadrons, commanded by *Maggiore* Luigi Bianchi, arrived in Libya. Caught up in the chaotic retreat of the Italian Army during the winter of 1940–41, however, the G.50s saw relatively little actual action.[34] One of the few initial claims of enemy aircraft being downed by *Freccia* pilots occurred on 9 April 1941, when *Tenente Pilota* Carlo Cugnasca (an expert pilot, and the first to deliver a G.50 to Finland), attacked a flight of three British Hurricane Mk Is from No. 73 Squadron and claimed to have downed one, although this loss was not confirmed.[35] On his return, he was forced to crash-land his G.50, flipping the aircraft over on the airstrip but remaining unharmed. At low level, the aerial clashes were often confused and had unpredictable effects. Tactical surprise was often a decisive factor in a given engagement, as shown on 14 April when a formation of 66 Axis aircraft, including eight G.50s from 351ª *Squadriglia*, attacked British forces stationed in the vicinity of Tobruk. The RAF defenders of No. 73 Squadron were outnumbered in this engagement, resulting in the Hurricanes, which were only marginally faster than the G.50, having to ignore the Axis fighters and concentrate their efforts upon attacking incoming bombers, which posed the greatest threat. Flying their G.50s, both Cugnasca and Marinelli attacked H.G. Webster's Hurricane while he was shooting at a Stuka dive bomber, resulting in Webster being finally shot down and killed over Tobruk. A Canadian pilot, ace Flight Lieutenant James Duncan ‘Smudger’ Smith (P2652), saw the engagement and subsequently shot down and killed both Cugnasca and Marinelli as well as damaging another G.50 before being shot down himself by the 351ª *Squadriglia* commander, *Capitano* Angelo Fanello.[36] On 27 May, 20° *Gruppo* was reinforced by 151ª *Squadriglia*, which was equipped with the new Fiat G.50 bis.[*citation needed*] This new version had almost two hours of flight endurance, due to the addition of an extra fuel tank in the internal fuselage section (which had been originally configured as a bomb bay). The normal tactic with the G.50 was to dive from 1,500 m (4,900 ft), but they never flew very high over North Africa, usually not exceeding 4,500 m (14,800 ft). The aircraft still lacked radio sets and, despite their air filters, the desert sand could reduce the engine's lifespan to only 70–80 hours.[37] Although the G.50s were mainly outperformed by Desert Air Force fighters, their pilots sometimes managed to shoot down the faster and better-armed Hurricanes and P-40s. In the hands of expert pilots, the G.50 was even capable of scoring multiple kills during a single sortie. For instance, on the evening of 9 July 1941, *Sergente Maggiore* Aldo Buvoli of 378ª *Squadriglia*, 155° *Gruppo Autonomo*, took off from Castel Benito airfield to patrol Tripoli harbour and intercepted a flight of seven Blenheim light bombers, which had been engaged in a low-level attack on the ships. Two Fiat CR.42 biplanes from 151° *Gruppo* were already pursuing the Blenheims when Buvoli attacked, shooting at each bomber in sequence. One Blenheim ditched in the sea while another was shot down a few miles north of Tripoli. Two more failed to return to Luqa airfield in Malta and were posted as missing. For these successes, Buvoli was awarded the Silver Medal of Military Valor and subsequently credited with four kills. No. 110 Squadron reported the loss of a similar number of Blenheim IVs on its first mission since arriving in Malta from the British mainland during early July.[38][39]

An Italian Fiat G.50 captured by the British at Sidi Rezegh airfield in North Africa. An RAF Hawker Hurricane is landing (left) and another is in the background on the right.

During the Battle of Sidi Barrani, the first major British offensive of the Western Desert Campaign, a number of G.50s operating out of Martuba Airbase, Derna District, attacked the British-held airfield at Sidi Barrani. On 18 November 1941, during Operation Crusader, the Desert Air Force was responsible for destroying 13 aircraft on the Ain el Gazala airfields, 10 of these being G.50s. On 19 November 20° *Gruppo*, based at Sid el Rezegh, suffered heavy losses when British armoured forces suddenly attacked the airfield. Of the 19 G.50s, only three escaped, with 80 pilots and ground crew taken prisoner. Altogether, 26 G.50s were lost and 20° *Gruppo* was left with only 36 G.50s, of which 27 were serviceable. Mario Bonzano, now a *Tenente Colonnello* and commander of 20° *Gruppo*, was among the captured, and his deputy, Furio Niclot Doglio, was almost shot down, since he was unaware of the British operation. Several G.50s were captured almost intact, and at least one was taken by No. 260 Squadron and later passed to No. 272 Squadron.[40] After 1941, the G.50 played only a minor role in the *Regia Aeronautica*. During June 1942, British intelligence estimated that *12 Gruppo* had a total of 26 G.50s (10 of these being of a serviceable condition), while the backbone of 5a *Squadra Aerea* was estimated to have comprised a mixture of 104 C.202s, 63 C.200s, 32 Z.1007 and 31 S.79s.[41]

Aegean theatre

After Italy declared war on Greece in October 1940, the *Freccia* commenced offensive operations against Greek and Allied forces over the Balkans and the Aegean Sea on 28 October, typically operating from airfields at Berat, Devoli and Grottaglie.[42] During the Greek campaign, adverse weather conditions was often responsible for hampering Axis air operations, however, a number of fiercely-fought aerial engagements were fought on several days, often accompanied by a large amount of overclaiming by personnel on both sides of the conflict. Early on 20 February 1941, a flight of Hawker Hurricane fighters were engaged in their first aerial combat over the Balkans when seven G.50s of *54 Gruppo* were scrambled from Devoli to intercept a formation of RAF bombers with their Hurricane escorts. A few days earlier, a British cargo ship had delivered six Hurricanes and several Wellington bombers to Paramythia, Greece, boosting RAF power in the region. *Freccias* claimed to have downed both bomber and a fighter, while the British claimed responsibility for downing four G.50s. That afternoon, 15 G.50s engaged a large mixed formation of RAF Gloster Gladiators, claiming the downing of 10 aircraft for the loss of one G.50.[43] The RAF claimed three G.50s with no loss. Postwar records showed one Bristol Blenheim and a single G.50 being lost on that day. On 28 February 1941, RAF units intercepted a formation of Italian bombers and their escorts, claiming 27 aircraft shot down and several others damaged in the ensuing battle.

The Italians claimed to have downed six Gladiators and a single Supermarine Spitfire. The recorded losses were one Gladiator and eight Italian aircraft; many more were damaged. After this battle, the *Regia Aeronautica* was no longer an effective force within the theatre.[44][45] On 4 March 1941, a single G.50 bis was responsible for the shooting down of Hurricane *V7288*, piloted by Australian RAF ace Flight Lieutenant Nigel Cullen (who was credited with 15 or 16 victories) off Valona coast (Albania), while he was flying as wing-man for ace Pat Pattle.[46][44] During the course of the Greek campaign, a flight of 10 G.50 fighters were recorded as having been lost, including both combat losses and others that had been destroyed by a combination of accidents and as a consequence of Allied bombing missions against Italian airfields.[43]

Sicilian and Italian campaigns

During the second half of the war, the G.50 was typically operated as a multi-role fighter and ground attack aircraft, equipped only with external bombs.[47] During the opening phase of the Allied invasion of Sicily, the G.50 was the most numerous aircraft used by the *Regia Aeronautica* to counterattack the Allied landings.[48] Just prior to the start of the invasion, a specialised ground attack unit of the *Regia Aeronautica*, 50° *Stormo Assalto*, was repositioned to Southern Italy; this unit was equipped with G.50 bis fighter-bombers. As soon the invasion started, on 10 July 1943, additional units were rushed to the area to participate in the Axis counter-attack.[49] Alongside various other Italian and German ground attack units, 45 G.50 bis of 158 and 159 *Gruppi Assalto* from Pistoia[48] were committed to attack Allied naval assets, landing craft and troops. Ten of these saw action on 11 July in conjunction with several Re.2002s and escorted by five Re.2005s of 362a Squadron, when they were intercepted by an overwhelming fighter "umbrella". In the ensuing engagement, three G.50s were shot down, including *Tenente Colonnello* (Wing Commander) Guido Nobili, commander of 5 *Stormo Assalto*.[50] The remainder of the Italian air forces returned to their base where, after landing, the fighters were mostly destroyed on the ground by a follow-up air attack. By the time of the Italian Armistice with the Allies, only a handful of G.50 fighters were left in service in Italy. A number of these continued to be operated as part of the Italian Co-Belligerent Air Force, while at least four G.50s were used by the *Aeronautica Nazionale Repubblicana* as fighter trainers.The top-scoring Italian pilot to use the G.50 was Furio Lauri, who was credited with 11 "kills" prior to the end of 1941, eventually achieving a final score of 18 enemy aircraft downed.[46]

In Finnish service

Fiat G.50 in Finnish markings, c. 1940

The G.50 saw its longest and most successful service in the two Finnish wars against the Soviet Union, the Winter War of 1939–1940 and the Continuation War of 1941–1944. At the end of 1939, before the outbreak of hostilities, Finland ordered 35 Fiat G.50s. The first 10 aircraft were to be delivered before February 1940. A group of Finnish pilots attended a 10-hour training course at Guidonia airport and later at Fiat Aviazione in Turin. On a training flight, during a dive from 3,500 m (11,500 ft), Lieutenant Tapani Harmaja reached an estimated speed of 780 km/h (480 mph), which was considered excessive for the structural integrity of the aircraft. The windscreen was damaged.[51][52] Germany hindered the transit of the aircraft, so they were dismantled and embarked in La Spezia on the Norwegian ship *Braga*, which set sail for Turku, Finland, on 20 January.[53] Because of this delay, the first G.50s did not reach No. 26 Squadron, Finnish Air Force (*HLeLv 26*) at Utti until February 1940.[54] The G.50s were numbered from FA-1 to FA-35, but it seems that only 33 were delivered. Squadron No 26 received from material command G.50 fighters according to the table below. A day before the truce after the Winter War, they had received 30 Fiat G.50s of the 35 purchased and 33 not damaged during the procurement. Fiat G.50 FA-8 was destroyed during take-off when the pilot, a Hungarian volunteer, second lieutenant Wilhelm Bekasy, in bad flying weather, lost contact with his countryman, lieutenant Matias Pirity, who turned back. The next day sergeant Asser Wallenius took-off with FA-7, having forgotten to switch on the fuel pump of the main tank and as the extra fuel tanks emptied, FA-7 crashed and was damaged. Wallenius survived but he was injured. Because of technical problems in the Finnish airforce itself, only 33 of the 35 Fiat G.50s were delivered to Finland. The Italian fighters had arrived too late to affect the course of that year's winter battles,[52] however, most of them were soon sent to the front. The Fiat pilots found themselves involved in the heavy fighting over the bay of Vyborg in late February and early March. According to some sources, the first kill was achieved on 26 February. The following day, Second Lieutenant Malmivuo became the first Finnish pilot to be killed in a G.50, when his fighter FA-12 crashed after a battle with Soviet aircraft.[55] And on 11 March, the Italian volunteer *Sergente* Diego Manzocchi crashed to his death while returning from a combat sortie.[53] The Fiat bases were under constant attack. The Utti airfield was bombed by the Soviet airforce. Consequently, the Fiats were transferred two kilometres to the northwest of Utti proper, onto the ice at Haukkajärvi (*Falcon lake*). As Haukkajärvi became bombed and attacked by fighters, another lake-side base was established near the city of Lahti, Hollola, also on the ice of Vesijärvi near Pyhäniemi manor. Overall, *HLeLv 26* achieved 11 kills, against one loss in combat and one pilot killed in an accident (the aircraft was repaired and returned to service in 1941). The Finnish G.50 y were taken from the 235 built by CMASA, both *Serie I* and *Serie II*, but all but seven had the open cockpit of the *Serie II*, a feature that Finnish pilots disliked, especially in winter. There were some attempts to improve the aircraft – one was tested with an enclosed cockpit, another with a D.XXI ski-undercarriage – but none of the modifications were put into service. Better protection for the propeller, which had problems at extremely low temperatures, and a few other changes were introduced. The speed of the Finnish G.50s was around 430–450 km/h (270–280 mph), much lower than the standard series could achieve.[56] At this stage, Finnish pilots preferred the Hawker Hurricane, the French Morane-Saulnier M.S.406 and the Brewster F2A Buffalo to the G.50.[55]

Source : https://en.wikipedia.org/wiki/Fiat_G.50_Freccia