

## HISTORY



(via 604 Squadron Archive)

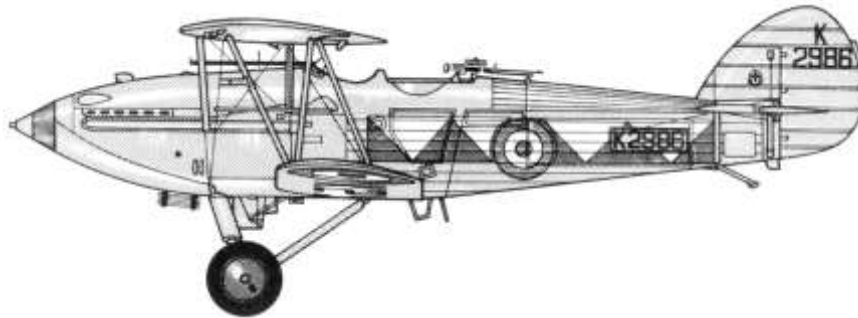
Early series Hawker Demon 'A' of 604 Squadron in the post-Munich camouflage scheme and carrying the squadron code 'QW'. This aircraft also carries light bomb racks under its wings.

The origins of the Hawker Demon, two-seat fighter, are synonymous with the development of the Hart day-bomber that was built between the two World Wars in greater numbers than any other aircraft in peace time. Designed in response to Air Ministry Specification 12/26, which called for a single-engined day-bomber with a maximum speed of 160 mph (257 km/hr), the Hart and its descendants represented the pinnacle of military aircraft achievement in the early 1930s. With the active participation of the Roll-Royce (R-R) Company, the Hart design was drafted around the 450-hp R-R Falcon F.I liquid-cooled, supercharged, in-line engine, that was matched to Hawker's steel tube primary structure, single bay wings and a pneumatically shock absorbed, split-axle, undercarriage. Hawker's tender was duly accepted by the Air Ministry and work on a mock-up began during the early months of 1927.

In his design, Sydney Camm (later Sir Sydney Camm, CBE, FRAeS), H.G.Hawker Engineering's Chief Designer, produced a wing of light construction based around a spar with top and bottom rolled steel booms interconnected by light gauge steel webs. This form of construction, which was new for its time, produced a spar of maximum strength at a minimum weight, to provide a wing structure that was operating near its permissible stress when fully loaded. Each of the biplane's fabric-covered wings were connected by 'N' struts that were both lighter and stronger than conventional I-section struts and the undercarriage was changed to one of cross-axle form and equipped with Vicker's oleo-pneumatic shock absorbers. The original gravity fed fuel system was exchanged for one that was pump driven to provide a steady flow to the R-R F.XIB in-line engine (better known later as the 'Kestrel'). This Kestrel differed considerably from the World War One vintage Falcon by having its cylinder block cast as a single unit, as opposed to one where the cylinders were cast individually, which saved some 60-lbs (27 kg) in weight and reduced the engine's complexity.

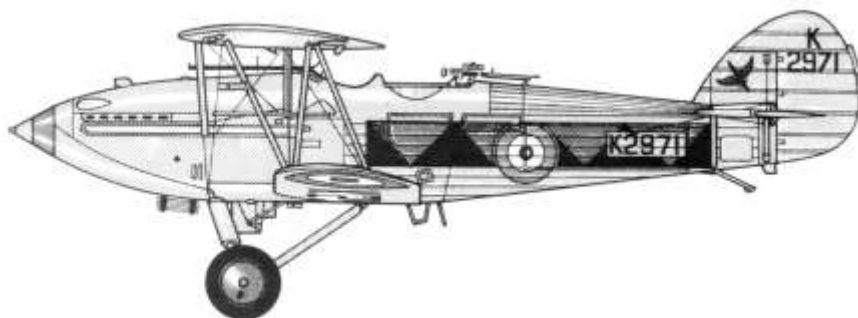
The first flight of the Hart prototype, J9052, took place at Brooklands during June 1928 in the capable hands of 'George' Bulman (later Group Captain P.W.S.Bulman, CBE, MC, AFC, FRAeS), Hawkers Chief Test Pilot. Bulman's first flight and the six months of trials that

followed, confirmed the high performance that was expected from the type. Detailed service trials of the Hart and its competitors in the 12/26 evaluation (the Avro Antelope and Fairey Fox Mk.II) that were undertaken at the Aeroplane & Armament Experimental Establishment (A&AEE), Martlesham Heath, Suffolk, between November 1928 and May 1929, showed the Hart to be superior in terms of its performance, handling and maintenance to its competitors. This resulted in a re-drafted requirement, Specification 9/29, around which a contract was placed for a batch of fifteen pre-production Mk.I aircraft powered by the 485-hp Kestrel IB or IS engine (J9933 - J9947).



(the late Mike Keep)  
Hawker Hart K2986 of 'A' Flight, No.600 Squadron, Hendon, in the all-over aluminium dope finish, with the Squadron's red and white triangle markings.

Much anticipated by the RAF, the first of twelve Hart Mk.I light-bombers was delivered to No.33 Squadron at Eastchurch, Hants, during January 1930. Commanded by Squadron Leader J.J.Breen, the Squadron quickly became familiar with their new machines and within three months were sufficiently accomplished on them to come second in the RAF's annual inter-unit bombing competition. Whilst No.33 Squadron was working-up, the Air Ministry placed further orders for a second batch of thirty-two aircraft during 1930 (K1416 - K1447) which were used to equip Nos.12 & 18 Squadrons. Production of the Hart at Hawker's Kingston and Brookland's works was later extended to Vicker's, Weybridge, and Armstrong Whitworth Aircraft, Coventry, to cope with the demand for airframes in the UK and abroad. Sub-variants of the Hart were later adapted for use in the Army Co-operation role in India and in the Middle East.



(the late Mike Keep)  
Hawker Hart K2971 of 'A' Flight, No.601 Squadron, Hendon, in the standard overall aluminium finish with the Squadron's red and blue triangular markings.

In service the Hart was armed with a 0.303-inch (7.69mm) forward firing Vickers machine-gun operated by the pilot and synchronised to fire through the propeller arc, with a 0.303-inch Lewis-gun being provided for the observer/gunner. A bomb load of up to 500-lbs (227 kg) could be carried on wing-mounted racks.

In service the high performance of the Hart presented some problems in the training field, such that in February 1932 Hawker's received a copy of Specification 8/32 that called for a Hart bomber to be equipped for the training role. With all armament deleted and full dual controls provided in the former observer/gunner's cockpit, along with a small windscreen, the prototype Hart Trainer, K1996 (in reality the second production Hawker Audax), made its first flight on 20<sup>th</sup> April 1932 with Hawker test pilot Gerry Sayer at the controls. The design at first appeared to fly very similarly to the Hart bomber, however, when two further airframes, K2474 and K2475, were converted they demonstrated that the tailplane incident angle was inadequate to deal with the movement of the centre of gravity (CG) brought about by the removal of the bombing equipment and the gun-ring in the rear cockpit. It should be noted that both for these aircraft were former Harts built to the same standard as the third production batch of bombers. The problem was overcome by reducing the sweep-back of the top wings of the trainer version to 2½ degrees, compared to 5 degrees on the bomber.

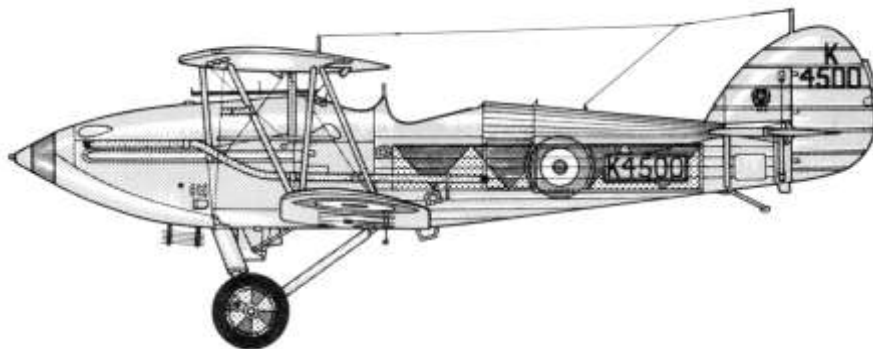
A contract for the production of thirteen Hart Trainers (K3146 - K3158) powered by Kestrel IB engines was raised in 1933, followed closely by a second for twenty-one aircraft (K3743 - K3763) fitted with 584-hp Kestrel V DRs. These orders were followed by others for the re-equipment of the Elementary & Reserve Flying Training Schools (E&RFTS) and the RAF College, Cranwell. The Hart bomber and trainer versions were issued to the Auxiliary Air Force (AAF) and Special Reserve (SR) squadrons from 1934, with the following being thus equipped: Nos.500 (Manston), 501 (Filton), 503 (Waddington), 600 (Hendon), 601 (Hendon), 602 (Abbotsinch), 603 (Turnhouse), 604 (Hendon), 605 (Castle Bromwich), 609 (Yeadon), 610 (Hooton Park) & 611 (Speke).

When the Hart entered service during January 1930, it proved to be significantly faster than the RAF's current generation of fighters (the Bristol Bulldog IIA and Siskin IIIA), with the exception of the Fury, which was itself a Hart derivative. This situation encouraged the Air Ministry to institute the development of a two-seat fighter version under the name 'Hart Fighter', around which Specification 15/30 was written. This was based on the performance that had been measured on the first production Hart, J9933, which had been fitted with a fully supercharged Kestrel IIS engine, twin forward-firing Vickers machine-guns, a lowered rear cockpit combing to provide the observer/gunner with a better field of fire and the deletion of bombing equipment. Similar modifications were also applied to Hart J9937, which accompanied J9933 to Martlesham Heath for trials and evaluation. The Martlesham trials showed the Hart Fighter to have approximately the same performance as the standard Hart bomber.

Representing something of a throwback to the Bristol F.2B Fighter concept of the First World War, the Air Ministry nevertheless ordered a small batch of Hart Fighters at the end of March 1931 to equip a single flight of No.23 Squadron at Kenley. During the air defence exercises of July 1931, the Hart Fighters easily outperformed the Squadron's Bulldogs and successfully intercepted Hart bomber formations.

Whilst the relatively high performance of the Hart Fighter was welcomed by the RAF and the pilots of 23 Squadron, the gunners in the rear cockpit were not so enthusiastic. The icy slipstream generated over their cockpit and the consequent difficulty they had in sighting the Lewis-gun under those conditions, rendered their task very difficult. A number of modifications, including the introduction of inter-cockpit flaps, a rudimentary hood that covered the pilot and partly covered his gunner, were tried, but these proved either ineffective or restricted his view. Nevertheless, based on 23 Squadron's operations with the Hart Fighter, the Air Ministry ordered a batch of seventeen fighters under the name 'Demon' (K2842 - K2858) early in 1932, in compliance with Specification 6/32. The first production Demon, K2842, was flown by test pilots P.G.Lucas and George Bulman on the 10<sup>th</sup> February 1933, with the remainder of the batch being delivered during the following April. Power for these aircraft was provided by the 485-hp Kestrel IIS.

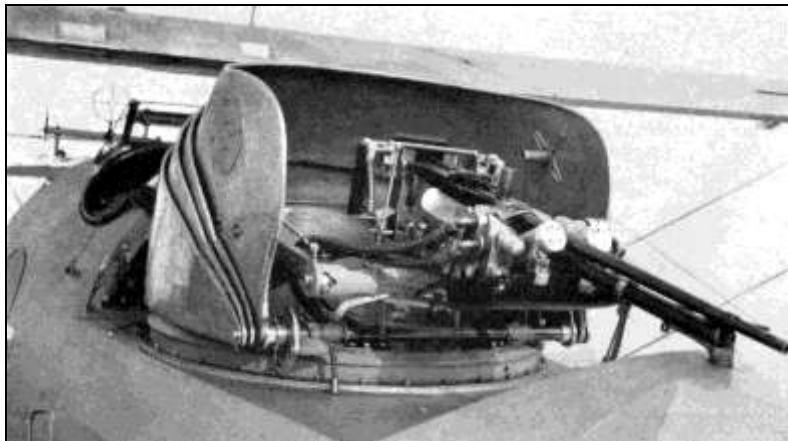
During April 1933, the remaining Bulldogs on 23 Squadron's establishment were exchanged for Demons, with further orders for sixty-two Demons powered by Kestrel IIS engines (K2904 - K2908, K3764 - K3807 & K3974 - K3985) being placed with Hawkers to re-equip a number of regular RAF and AAF squadrons. During July 1934, No.41 Squadron at Catterick exchanged its Bulldogs for Demons, followed later that year by No.64 Squadron at Heliopolis, Egypt. Both squadrons had aircraft powered by the 600-hp Kestrel V engine. The re-equipment of the Auxiliaries with 584-hp Kestrel V DR-powered Demons began in June 1935 with 604 (County of Middlesex) Squadron, followed by 600 (City of London) Squadron in February 1937 and 601 (County of London) Squadron in August. In addition to the Hendon Wing, No.607 Squadron (County of Durham) at Usworth and 608 (North Riding) Squadron at Thornaby, were issued with Demons in September 1936 and January 1937 respectively.



(the late Mike Keep)

Hawker Demon K4500 of No.604 Squadron in the pre-Munich overall aluminium dope finish with the Squadron's red and yellow triangular markings. This aircraft also served with No.601 Squadron at Hendon.

Whilst the Hawker's Kingston factory was busy building Demons, the Company continued to tackle the problem of the over-ventilated gunner's cockpit. By the end of 1934 Hart J9933 had been fitted with the prototype of a hydraulically operated turret, built by the Frazer-Nash Company, which was fitted with a segmented folding shield that was not dissimilar to the rear end of a lobster's back. Whilst the weight of the turret moved the aircraft's CG close to its aft limit, it did not appear to effect the Demon's overall stability. Trials at Martlesham Heath and at Brooklands cleared the Turret Demon for spinning and service use, such that by mid-1936 all Demons built by Boulton-Paul Ltd at Norwich and Wolverhampton (K5683 - K5741, K5898 - K5907 & K8181 - K8217) were fitted with the turret, whilst others were retrospectively modified.



Frazer-Nash Turret fitted to late model Hawker Demons.

No.65 Squadron at Hornchurch received Demons during August 1934, as did No.29 at North Weald during March 1935 and No.74 Squadron in September. Referred to initially as the 'Demon Flights' when No.74 was reformed at Hornchurch on the 1<sup>st</sup> September 1935, the Squadron was despatched to Malta later that month to provide air cover for the island during the Abyssinian Crisis, when the potential existed for war with Italy. In a similar vein No.41 Squadron was sent to Aden during October 1935, to defend the Protectorate from intrusions by Italian aircraft based in the Horn of Africa. The final unit to re-equip with Demons, No.25 Squadron at Hawkinge, surrendered its Hawker Fury IIs during October 1937 and operated with a mixture of Demons and Gloster Gladiators.

Back home the Munich Crisis of September 1938, brought the possibility of war in Europe a step closer. The home-based fighters of what was by now Fighter Command were mobilised and camouflaged and the AAF embodied into the regular RAF. Fortunately, the crisis passed and the air crews were stood down. By then (1938) the Demon was approaching obsolescence (it was formally declared obsolete in September 1939) and the regular squadrons began their transition to more modern equipment. The first to go was No.65 who replaced their Demons with Gloster Gauntlets during July 1936 and thus became a single-seat fighter squadron, followed by No.74 in April 1937 (Gauntlet II), No.41 in October 1937 (Fury II), No.25 in June 1938 (Gladiator) and No.23 in December 1938 (Blenheim If).

The Auxiliaries, however, continued to remain operational on the Demon until 1939, when obsolescence finally overcame them. The Hendon Wing's 601 Squadron was the first to hand-in its Demons during December 1938, when they were replaced with single-seat Gauntlet IIs, only to have them replaced a year later by Blenheim If fighters. Nos.600 and 604 Squadrons exchanged their Demons for Blenheims during January 1939, closely followed by 608 in March. The honour of being the last Demon unit fell to 607 Squadron, who relinquished their aircraft at Usworth during August 1939, before converting to Gladiators.

It is known that the following Harts and Demons served with the London Auxiliaries:

	Hart	Demon
600 Squadron:	K2984, K2985 & K2987.	K4503, K5700, K5701 & K5703.
601 Squadron:	K2974, K2976 & K2989.	K3799, K4496, K4500, K4504, K4513, K4522, K5699, K5713, K5720 & K8191.
604 Squadron:	Not known*	K3985, K3789, K4498, K4503, K4523, K4523, K4534, K5715, K5721, K5727 & K8192.

\* The record shows that 604 operated Harts between September 1934 and June 1935.

#### DESCRIPTION & TECHNICAL DETAILS

The Hawker Demon was a two-seat interceptor day-fighter, of all-metal construction with fabric covering and wire bracing and powered by a 485-hp R-R Kestrel IIS, 600-hp Kestrel V or 584-hp Kestrel V DR in-line engine driving a 10 feet 9-inch ( 3.28 metre) diameter, two-bladed Watts propeller. The crew of two comprised a pilot and observer/gunner in the rear cockpit, with the former having a 0.303-inch (7.69mm) Vickers machine-gun firing through the propeller arc by means of synchronised interrupter gear and the latter a 0.303-inch (7.69mm) Lewis machine-gun mounted on a Scarf Ring, or in a Frazer Nash hydraulically powered turret with 'lobster-back' shield. The Demon had the following dimensions, weights and performance:

Length:	29 ft 7-ins (9.02 metres)	Empty Weight (early):	3,067-lbs (1,391 kg)
Height:	10 ft 5-ins (3.17 metres)	(turret):	4,460-lbs (2,023 kg)

Wing Span:	37 ft 2-ins (11.33 metres)	Loaded Weight (early):	3,336-lbs (1,513 kg)
Wing Area:	347 sq ft (32.24 sq m)	(turret):	4,668-lbs (2117 kg)

	Kestrel IIS	Kestrel V DR
Max Speed at 16,000 ft (4,877 metres):	182 mph	-
at 13,000 ft (3,962 metres):	-	182 mph
Initial rate of climb:	Not known	Not known
Time to 10,000 ft (4,572 m):	7 mins 25 secs	7 mins 55 secs
Service Ceiling:	24,500 ft (7,468 metres)	27,800 ft (8,473 metres)
Endurance:	2½ hours	2½ hours

