

Arado Ar 79

When the Messerschmitt Bf.108 first appeared on the European general aviation scene in the mid-30s, it had created something of a "Porsche moment": here was a small and tight tourer, astoundingly fast yet relatively low powered, agile but quite docile, so left-field in design that it had shocked in the same measure it had fascinated. More than anything else, it had finally dispelled most of the skepticism and antagonism toward the low-wing monoplane configuration for light aircraft (at least in Germany), showing just what could be done with this novel idea once you've put your mind to it.

Pretty soon, this success had kicked off something of a "VW Beetle moment" 😊. Seeing that the mentioned configuration does indeed work – and rather well at that – several manufacturers began seeing its potential to replace the lumbering open-cockpit biplanes then used for common day-to-day operations. What was needed here was a simple, cheap, robust and versatile no-frills machine that would efficiently go about its training and liaison duties, while still retaining that quantum leap in performance (and comfort!) over existing aircraft.

At the Arado works, the engineers, having too caught the bug, had rolled up their sleeves and set to work. The end result, intended like the Bf.108 to combine these new technologies into a single purpose-built design, was the diminutive, unimposing – and today unjustly forgotten – Ar 79...



A rare sight back then as it is today: two Ar 79s in formation shortly before the start of WW2 (photo from: www.eichhorn.ws)

1. Willy-nilly:

A very advanced design for its time – just a notch below the technical level of the production-standard Bf.108 – the Ar 79 was somewhat of a logical outcome for Arado. An innovative company that is today much overshadowed by the more famous names of 30s/40s German aviation, it had been around in one form or another since WW1, but rose to prominence as an independent manufacturer in 1924 when it was bought by a Fokker engineer, Mr. Heinrich Lübbe. While you'll be hard pressed to find someone who's heard of him, Mr. Lübbe has nevertheless left a lasting mark on military aviation as the inventor of the mechanical interrupter gear that had allowed machine guns to fire harmlessly through the propeller disc without clipping the blades. He had also left a significant mark on Yugoslav aviation, I was amazed to find out, when in the same 1924 he had opened an Arado subsidiary in Yugoslavia called – Ikarus! 😊

Under various design heads, including fellow Fokker veteran Walter Rethel – who would later go on to become the chief

engineer on the Bf.109 – the young company had soon gained a solid reputation in Germany for its advanced, mostly metal light biplane fighters and trainers. Indeed, the company's Ar 64 and Ar 68 were among the first combat aircraft produced in Germany after the Versailles Treaty was... ignored, and were the first front-line fighter aircraft to equip the new Luftwaffe. The majority of its pilots too were already familiar with Arado, having trained – in secrecy, under the guise of civilian aeroclubs – on the widespread civilian Ar 66 biplane trainer.

Despite these successes however, by the time the Luftwaffe was firmly on its feet Arado was already beginning to suffer from a slight case of "Messerschmittitis". The animosity of several high-ranking German officials (most notably Erhard Milch) towards Willy Messerschmitt is well documented, having been a significant factor in undermining *Bayerische Flugzeugwerke* during the pre-war years, despite the demonstrated ingenuity – and outright superiority – of several Messerschmitt designs. Heinrich Lübke's refusal to join the Nazi Party had had a similar effect, though in the end far more reaching: with the Party's patience finally running out in 1936, Lübke was removed from his position and Arado promptly nationalized.

2. A Diet 108:

Back in more successful pre-war times, the Ar 79 had – as mentioned – represented the company's attempt to design a cheap & cheerful modern light aircraft that would lend itself well to common, non-utility tasks. Unusually, despite it being 1938, it was designed for the civil market only and very few were actually used in military roles – odd given the many aircraft of all types then being pressed into Luftwaffe service (more so when you consider that a majority of early German transports and bombers were designs that had started out as passenger aircraft for Lufthansa).

At a glance from a distance, the Ar 79 looked very much like a Bf.108 – and keeping in mind that there is only a number ways you can design a low-wing monoplane taildragger, we can't hold that against it. Up close however, there were some notable differences, the biggest being the odd vertical stabilizer. Introduced on the Ar 68 in 1934, it would become the trademark of all subsequent Arado piston singles – however, I've not been able to find out exactly what advantages did the design give. But – using a bit of Eyeball Mk.I extrapolation – its near-vertical leading edge reminds me of the stabilizers on Mooneys, which are designed to give better control response in stall and near-stall situations. And given that most Arado singles were trainers likely to be spending quite some time there, it does sound plausible.



The Ar 79V2 (second prototype) showing off its unusual vertical stabilizer and diminutive size (photo from: 1000aircraftphotos.com)

Weighing in at just 760 kg MTOW – round about your average Cessna 150 – the Ar 79 did not really need much power, making do with a 105 HP Hirth HM 504A-2 inverted inline four cyl turning a two-blade fixed pitch prop – noticeably less exciting than the Bf.108's inverted V8 😊. However, its clean

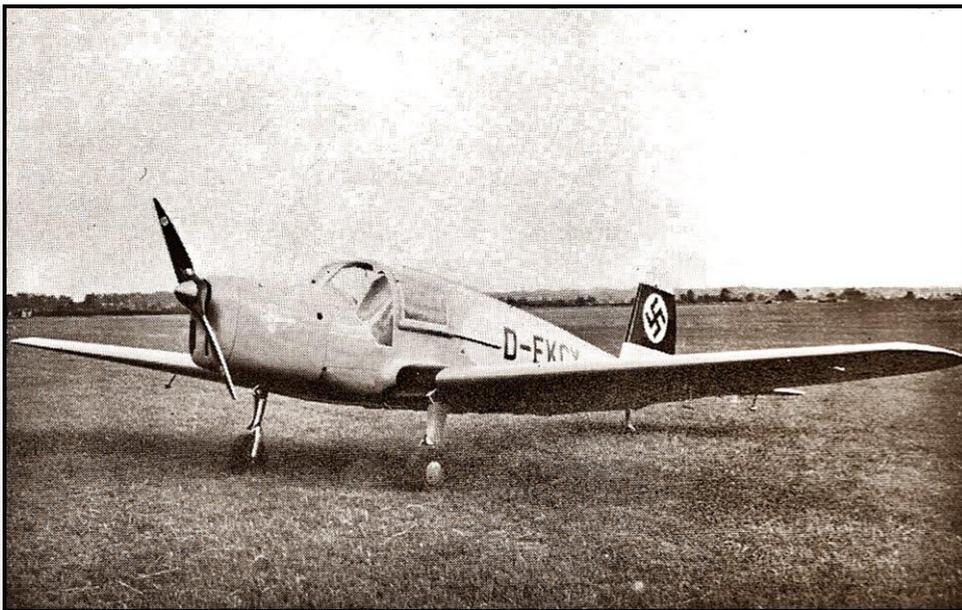
lines and – unusually for such a small aircraft – retractable main gear meant it could squeeze a lot out of the power available, with a respectable cruise speed of 110 kn and a service ceiling of about 18,000 ft – all while burning just 10 l of avgas per 100 km. If we convert that to the more usual gallons per hour, we get a very low 5.2 (US) GPH at 110 kts...

So far, so Bf.108-ish. However, once you look below the skin – or at it for that matter – things start to go awry. Unlike the all-metal 108, the Ar 79 was a somewhat unusual mix of metal, wood and fabric, everything from the modern to the utterly conventional. Starting out back, the rear fuselage was an advanced magnesium alloy (!) (or “electron casting”) *monocoque* structure. In this type of construction, pioneered during the first decade of flight, the skin itself is the only load-bearing element – it is the only thing making up the structure, without any form of internal support. Contrary to what I had assumed, this had made the Ar 79’s rear end very light, much lighter than it would have been had more commonplace solutions been used. In addition, this type of construction had also paid off in simplicity and strength, with its oval shape spreading the load evenly around the fuselage and the (predominantly) one-piece structure removing the need for rivets, joints, welds or other such structural weak points (in later years, in an effort to reduce weight when applied to larger aircraft, this structure would evolve into what’s known as the *semi-monocoque*, which combines the load-bearing skin with an internal bracing frame, permitting the metal to be thinner and thus lighter, while still keeping many of the *monocoque*’s qualities. In this form it has been used on airliners since the 50s, where it’s load bearing characteristics have been put to good use at battling the stress of pressurization 😊).

Progressing forward however, things were starting to become more agricultural. The forward fuselage was a simple welded steel tube cage covered with fabric, while the wing – single spar, like the 108, but without slats and flaps – was a plywood

affair again covered with fabric (and don't laugh at the plywood! Just ask De Havilland and it's Mosquito light bomber about what could be done with that fascinating material 😊). The only other bit of metal up front was the cowling covering the engine...

Everything considered, one could deduce that the Ar 79 had quite an interesting weight distribution: almost evenly balanced fore and aft, something rare in most aircraft 😊. This would have located the center of gravity somewhat more aft than normally found on similar aircraft – not that far aft that it became tricky to fly, but enough to make it stable and maneuverable in equal measure. And being otherwise fully aerobatic – equipped with an aerobatic carburettor, permitting inverted flight – this would have made the Ar 79 quite agile 😊.



Pretty conventional today, but back in the late 30s this configuration was still a relative rarity on small non-combat aircraft (photo from: alasvirtuales.blogspot.com)

3. Fuel for thought:

While from today's perspective the performance specs may seem a bit average – they're hardly better than those of the

Cessna 152 Aerobat (apart from the acro carburettor and retractable gear) – in its time the Ar 79 was quite a good performer and, like the Bf.108, was used on its fair share of record-breaking flights. The more “usual” ones were the 1000 and 2000 km solo class speeds records of 229.04 km/h (123.67 kn) and 227.028 km/h (122.58 kn) respectively, both set in 1938. While all very good for a light 105 HP aircraft, they were not nearly in the same league as what was done between 29 and 31 December of the same year...

It had always been said that the true test of an aircraft was a long distance record flight. The Arado team had apparently taken this a bit close to heart, for when they rolled the above pictured D-EHCR back into the hangar, they decided they could just up its fuel capacity a bit... now, I couldn't find the exact capacity of the standard tanks, but with a range of 553 NM at 110 kn and 5.2 GPH, it works out to 26 gallons, or 99 liters. This was felt to be somewhat inadequate, so what the engineers did was bolt a jettisonable 106 liter fuel tank under the fuselage and screw in a whopping 520 liter tank behind the cabin. In total, this gave 725 liters (!) to burn, which – at avgas' standard specific gravity of 0.7 kg/l – weighed in at 508 kg and was 48 kg more than the empty weight of the plane 😊.

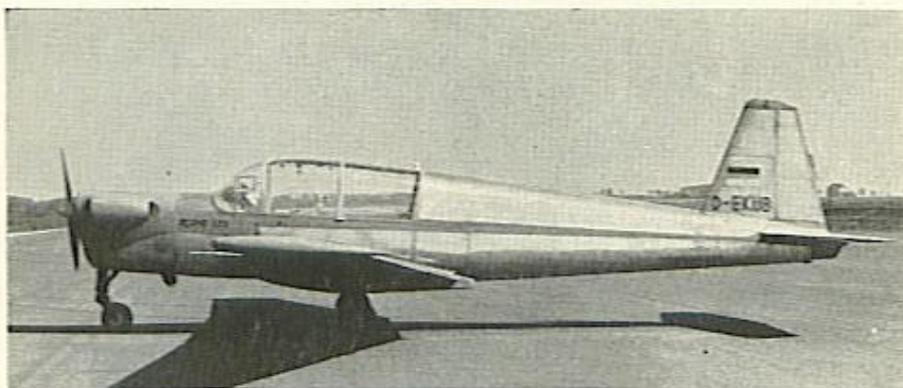
This was deemed enough to give good record-breaking range and was put to good use between 29 and 31 December when a two man crew flew non-stop from Benghazi in Libya to Gaya in India – a distance of 6,303 km (3403 NM)! At an average cruise speed of 160 km/h (86 kn) that would have taken a tad more than 39 hours, quite a feat for an understated two-seat trainer groaning under its own weight in fuel 😊(though this fuel to weight ratio would certainly not be unique; the Rutan Voyager, which flew non-stop around the world in 1984 without refuelling, could carry more than 3 times its weight in avgas!).

4. From here to... obscurity?

Apart from its record-breaking flights – flown mostly by the second prototype, which crashed in India about two months into 1939 – the Ar 79's regular service life was quite uneventful. Its versions were even scantier than those of the Bf.108, with only the **Ar 79B**, **Ar 79D** and **Ar 79E** seeing the light of day – and these differed only in minor equipment changes. Some sources do state that the production models were fitted with Hirth HM 500A1 engines, rated at the same 105 HP, and that the 504 was used on the prototypes only.

But, despite its flying qualities and proven performance over longer distances, in the end the Ar 79 was not really a sales success (though WW2 had much to do with it, the civilian general aviation sector virtually disappearing overnight): not counting the two prototypes, only 48 production models were built when production ceased after just three years, in 1941.

Interestingly though, the basic design was still considered advanced in the 50s, and in East Germany plans were made in 1952 to return the aircraft into production in an all-metal form; however, the 17 July 1953 uprising had put an end to that for good. West Germany too had similar ideas, when in 1957 the Ar 79 was used as the basis for the all-metal **Blume BI 500**, designed and built the man behind the original Ar 79, Walter Blume 😊. Its high price of DEM 63,000 however meant the entire project never made it beyond the two prototypes...



BLUME BL 502

It's Ar 79 heritage evident, the BI 500 was conceived as a stretched, tricycle gear four-seater, powered by a 150 HP Lycoming O-320 engine. Modified and improved to achieve German certification, the prototype became the BI 502, pictured here, while the generally similar BI 503 - sporting a more powerful Lycoming O-360 - was the only other aircraft built. With the economy still recovering from WW2, these expensive aircraft were not greeted with open arms...
(photo from: www.pprune.org)

Today, only one Ar 79 is known to have survived – thanks once more to the sterling efforts of Lufthansa's historic flight, the *Deutsche Lufthansa Berlin Stiftung*. D-EMVT – an Ar 79B-1 and the next-to-last Ar 79 built – was meticulously restored in 1996 and kept in flying condition up till 2001, when it was put up as a permanent exhibit in the *Deutsches Technikmuseum* in Berlin, where it now hangs out for most of its days 😊.



Looking beautiful during an engine run up (note also the modern propeller). The 47th Ar 79 off the production line, D-EMVT - previously also known as D-ECUV - was one of the

busiest of its type, including serving as the personal aircraft of the French High Commissioner to the Saarland province in 1945 (which was in the French occupation zone) (photo from: www.dlbs.de)

[D-EMVT in the Technikmuseum @ Airlines.net](#)

[D-EMVT @ Airlines.net \(Photo 1\)](#)

[D-EMVT @ Airlines.net \(Photo 2\)](#)

5. Specifications (Ar 79B):

Given that the Internet is not awash with precise specifications of obscure planes, I naturally had some issues in determining which sets of performance numbers to believe. In the end, I opted for the most reliable source – Lufthansa 😊 – which gave the specs on the most widespread Ar 79, the B model:

- **Engine:** Hirth HM 500A-1, 105 HP
- **Stall speed:** 78 km/h (42 kn)
- **Cruise speed:** 205 km/h (111 kn)
- **Maximum speed:** 230 km/h (124 kn)
- **Range:** 1024 km (553 NM)
- **Ceiling:** 4,500 m (14,760 ft)**

- **Length:** 7.6 m
- **Height:** 2.1 m
- **Wingspan:** 10 m
- **Wing area:** 14 m²

- **Empty weight:** 526 kg (1,160 lbs)*
- **Max. take-off weight:** 850 kg (1.874 lbs)*