

# Flying the Bf 109: Two experts give their reports

By Mark Hanna and Eric Brown – Flight Journal, December 1999

**MARK HANNA:** The Bf 109 is, without a doubt, the most satisfying and challenging aircraft I 11ve ever flown. So how does it fly and how does it compare with other WW II fighters? To my eye, the aircraft looks dangerous, both to the enemy and to its own pilots. Its "difficult" reputation is well-known, and right from the outset, you are aware that it needs to be treated with a great deal of respect. When you talk to people about the 109, all you hear is how you are going to wrap it up on takeoff or landing!

As you walk up to the 109, you are at first struck by its small size, particularly if it is parked next to a contemporary American fighter. Closer examination reveals a crazy-looking, knock-kneed undercarriage, a very heavily framed, sideways-opening canopy with almost no forward view in the three-point attitude, a long rear fuselage and tiny tail surfaces.

A walk around reveals ingenious split radiator flaps and ailerons with a lot of movement and rather odd-- looking external mass balances. It also has independently operating leading-edge slats. These devices should glide open and shut on the ground with the pressure of a single finger. Other unusual features include the horizontal stabilizer that doubles as the elevator trimmer and the complete absence of a rudder-trim system. Overall, the finish is a strange mix of the innovative and archaic.

## Entering the cockpit

To enter the cockpit, you climb on board and gently lower yourself downward and forward while holding on to the windscreen. Once inside, you are almost lying down as you would be if driving a racecar. The cockpit is narrow, and if you have broad shoulders (don't all fighter pilots?), it is a tight squeeze. Once strapped in-itself a knuckle-rapping affair-you can take stock.

First impressions are of its simplicity. From left to right, the co-located elevator-trim and flap-trim wheels fall easily to hand. You need several turns to get the flaps fully down to 10 degrees, and the idea is that you can crank both together. In practice, this is a little difficult, and I tend to operate them independently.

Coming forward, you see the tailwheel locking lever. This either allows the tailwheel to caster or it locks it dead ahead. Next is the throttle quadrant, which consists of a huge throttle handle and the manual propeller pitch control. Forward and down on the floor is an enormous and very effective ki-gas primer with a T-shaped handle. Directly above this and in line with the canopy seal is the red hood-jettison lever. Pulling this releases two very strong springs in the rear part of the canopy and causes the rear section to come loose and, therefore, the whole main part of the hood is unhinged and can be pushed away into the airflow. Looking directly forward you see, clustered together, the standard instrument panel with the vertical-select magnetos on the left, starter and booster coil slightly right of center and engine instruments all grouped on the right-hand side. This aircraft's instrumentation is all German apart from the altimeter.

The center console under the main instrument panel consists of a 720 channel radio, VOR, ADF and E2B compass. Just to the left of the center console, close to your left knee, is the undercarriage up/down selector and the mechanical and electrical undercarriage position indicator. On D-FEHD, this is a two-- button selector. Select the undercarriage up or down position by lifting the guard and simply pushing the relevant button. Radiator flaps are controlled by a four-position selector-"Zu," "Auf," "Auto" and "Ruhe" (rest).

The right side of the cockpit has the electrical switches, battery master, boost pumps, pitot heat, and that's it! There is no rudder trim or rudder-pedal adjust; also, the seat can be adjusted only during preflight and offers a choice of only three settings. If you are any bigger than me (six feet tall), it all starts to get a bit confined. Once you are strapped in and comfortable, close the canopy to check your seating position. If you haven't flown the 109 before, you usually get a clout on the head as you swing the heavy lid over and down. Nobody sits that low in a fighter!

D-FEHD has a beautiful "Galland hood" that offers a much improved view compared with the earlier, heavier-frame canopy.

### **Up,up and away, almost**

I'm sitting as high as I can, and my head is touching the canopy. I am not wearing goggles, as they scratch and catch the hood if they are up on your head. A large bone dome is out of the question and, in my opinion, is a flight-safety hazard in this aircraft. Hood positively locked-push up on it to check. Oil temperature is 50 degrees, coolant temperature is greater than or at 70 degrees. Brakes ON (there is no parking brake), stick back, and power gently up to 30 inches and 2,100rpm. Exercise the prop at least twice, with the rpm falling back to 1,800 each time; keep an eye on the oil pressure. The noise and vibration levels have now increased dramatically. Power back to 1,800rpm and check the mags. Insignificant drop on each side. You must hurry, as the coolant temperature is at 98 degrees C and going up; you have to get rolling to get some cooling air through the radiators. Pre-takeoff checks: elevator trim set to +1 degree, no rudder trim, throttle friction tight. This is vital, as you will need your left hand for various services immediately after takeoff. Mixture is automatic, pitch to fine. Fuel cock is ON, both boost pumps are ON, pressure is good, primer is locked. Flaps crank down to 20 degrees for takeoff. Radiator flaps checked at full open; if you take off with them closed, you will certainly boil the engine and are guaranteed to crack a head. Gyros set to Duxford's runway. Instruments: temps and pressures all in the green for takeoff. Radiator is now 102 degrees. Oxygen, you don't have; hood rechecked down and locked; harness tight and secure; hydraulics, no check. Controls full and free, tailwheel locked. Got to go-105 degrees. There's no time to hang around and worry about the takeoff. Here you go!

### **Airborne**

Power gently up and keep it coming smoothly up to 40 inches. Keep the tail down initially, and keep it straight by feel rather than any positive technique. Tail is coming up now, and the rudder is becoming effective. Unconscious corrections to the rudder are happening all the time. It's incredibly entertaining to watch the 109 lift off the ground; the rudder literally flashes around!

This little fighter is now bucketing along, accelerating rapidly. As the tail lifts, there is a positive tendency to swing left. This can easily be checked; however, if you are really aggressive in lifting the tail, the left swing tendency is difficult to stop and happens very quickly. Now the tail is up, and you can vaguely see where you are going. It's a wild, rough ride on grass, and with all the noise and the smoke from the stacks, it's exciting. Quick glance at the airspeed indicator (ASI): 160km/h, a light pull-back on the stick, and you're flying!

Hand off the throttle, select FLUG on the undercarriage selector. The mechanical indicators motor up very quickly, and you feel and hear a "clonk, clonk" as the gear comes home. A quick look out at the wings, and you can see that the slats-fully out-are starting to creep in as the airspeed increases and the angle of attack reduces. With 230km/h and an immediate climbing turn-up, you enter the downwind leg just in case you need to put the airplane down in a hurry. The Old Flying Machine Company's SOP is always to fly an orbit overhead of the field to allow everything to stabilize before venturing off-this has saved at least one of our airplanes.

Start to frantically crank up the flaps and increase the airspeed through 250km/h; power back to 33 inches and 2,300rpm for the climb. Plenty of airflow through the narrow radiators now, so close them and remember to keep a watchful eye on the coolant gauge for the next few minutes until the temperature has settled down. With the radiator flaps closed, the aeroplane accelerates positively. As you climb, you're aware of holding in a little right rudder to keep the ball in the middle, but the foot loads are light, and it's no problem. Level off and power back to 30 inches and 2,100rpm. The speed has picked up to the 109's cruise of about 400km/h, and now the ball is right in the middle, and no rudder input is necessary.

## **Handling**

Once settled down, with your adrenaline level back down to just plain high, you can take stock of the situation. The initial reaction is of delight to be flying a classic airplane, and the next is the realization that this is a real fighter. You feel aggressive flying it. The urge is to go looking for something to bounce and shoot down!

The roll rate is very good and very positive below about 400 km/h, and the amount of effort needed to produce the relevant nose movement seems exactly right. As the stall is reached, the leading-edge slats deploy-together, if the ball is in the middle; slightly asymmetrically, if you have any slip on. The aircraft delights in being pulled into hard manoeuvring turns at these slower speeds. As the slats pop out, you feel a slight "notching" on the stick, and you can pull more until the whole airframe is buffeting quite hard. A little more and you will drop a wing, but you have to be crass to do it unintentionally.

Pitch tends to be heavy above 400km/h, but it is still easy to manage up to 500km/h, and the aircraft is perfectly happy carrying out low-level looping manoeuvres from 550km/h and below. Above 550km/h, one peculiarity is a slight nose-down trim change as you accelerate. This means that when you run in for an airshow above 500km/h, the airplane has a slight tucking sensation-a sort of desire to get down to ground level. This is easily held on the stick, or it can be trimmed out, but it is slightly surprising initially.

When you maneuver above 500km/h, two hands are required for a more aggressive performance. Either that or get on the trimmer to help. Despite this heavying up, it is still quite easy to get 5G at these speeds.

The rudder is effective and of medium feel up to 500km/h. It becomes heavier above this speed, but regardless, the lack of rudder trim is not a problem for the type of operations we carry out with this airplane.

Initial acceleration is rapid up to about 560km/h-particularly with nose down. After that, the 109 starts to become a little reluctant, and you have to be fairly determined to get over 600 km/h.

## **Contemporary comparisons**

First, let me say that all my comments are based on operations below 10,000 feet and at power settings not exceeding 40 inches and 2,600rpm. I like the airplane, and with familiarity, I think it will give most of the Allied fighters I have flown a hard time-particularly in a close, hard-turning, low-speed dogfight. It will definitely out-maneuver a P-51 in this type of fight because the roll rate and slow-speed characteristics are much better. The Spitfire, on the other hand, is more of a problem for the 109, and I feel it is a superior close-in fighter. Having said that, the aircraft are sufficiently closely matched that pilot ability would probably be the deciding factor.

At higher speeds, the P-51 is definitely superior, and provided the Mustang kept its energy up and refused to dogfight, it would be relatively safe against the 109.

Other factors affecting the 109 as a combat aircraft include the cramped cockpit. Although the view out (in flight) is better than you might expect, this is quite a tiring working environment. The profusion of canopy struts is not a problem. In addition, the small cockpit makes you feel more a part of the airplane, and the overall smaller dimensions make you more difficult to spot. There's no doubt that when you are flying the 109 and you see the crosses on the wings, you feel aggressive. If you are in an Allied fighter, it is very intimidating to see this dangerous little airplane turning in on you!

## **Landing**

Returning to the circuit, it is almost essential to join for a run and break. Over the field, break from 50 feet, up and over with 4G onto the downwind leg. Speed at 250km/h or less, gear select to DOWN and activate the button and feel the gear come down asymmetrically. Check the mechanical indicators (ignore the electric position indicators), set the pitch to 11:30; fuel, both boost pumps ON. If you have less than half a tank of fuel and the rear pump is not on, the engine may stop in the three-- point attitude.

Radiator flaps to full open, and wing flaps to 10 or 15 degrees. As the wing passes the threshold downwind, take all the power off and roll into the final turn, cranking the flap like mad as you go. It is important to set up a high rate of descent and a curved approach.

The aircraft is reluctant to lose speed around finals, so ideally, you should initiate the turn quite slowly at about 190 to 200km/h. Slats normally deploy halfway around the final, but you, the pilot, are not aware that they have come out. The idea is to keep turning with the speed slowly bleeding and roll the wings level at about 10 feet at the right speed and just

starting to transition to the three-- point attitude. The last speed I usually see is just about 180; I'm normally too busy after that!

The 109 is one of the most controllable aircraft that I have flown at slow speed around finals, and provided you don't get too slow, it is one of the easiest to three point. It just feels right. The only problem is getting too slow. If this happens, you very quickly end up with a high sink rate and with absolutely no ability to check or flare to round out. It literally falls out of your hands!

Once down on three points, it tends to stay down, but be careful; the forward view has gone to hell, and you cannot allow any swing to develop. Initial detection is more difficult-- the aircraft being completely unpredictable--and can diverge in any direction. Sometimes the most immaculate three-pointer will turn into a potential disaster halfway through the landing roll. Other times, a ropy landing will roll straight as an arrow!

### **FLYING THE Bf 109**

When we started flying the 109, both my father and I did a lot of practice circuits on the grass before we tried a paved strip. Operating off grass is preferred. Although it is a much smoother ride on the hard surface--directionally-- the aircraft is definitely more sensitive. Without doubt, you cannot afford to relax until you are stationary. You would never make a rolling exit from a runway in the 109.

To summarize, I like the airplane very much, and I can understand why many Luftwaffe aces had such a high regard and preference for it. Hans Dittes has completed a fantastic restoration and should be complimented on returning "Black 2" to the air.

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