

A long-held ambition on the part of the Air Fighter Academy/Hangar 10 at Heringsdorf, Germany, was realised when its Messerschmitt Bf 109G-6 and G-12 flew together for the first time — aided by some very cutting-edge engine monitoring equipment

WORDS AND PHOTOGRAPHY: RICHARD PAVER



Messerschmitt Bf 109G-6 D-FMGS leads its Air Fighter Academy/Hangar 10 stablemate, Bf 109G-12 D-FMGZ, over northern Germany's Baltic coast. Klaus Plasa and Cliff Spink are at their respective controls.

EXCLUSIVE!



The 'GUSTAVS' of HANGAR 10



ABOVE:
The newly rebuilt Bf 109G-6, finished as 'Black 8', made its maiden flight on 26 April this year.

Not for some years had two Messerschmitt Bf 109s flown together in German skies, but that changed this spring. During the two weeks from 23 April to 5 May, the Air Fighter Academy/Hangar 10 collection at Heringsdorf on the northern island of Usedom arranged a number of test flights for both its newly rebuilt single-seat Bf 109G-6, Werknummer 440738/D-FMGZ, and its two-seat Bf 109G-12, D-FMGZ. The result was a very special formation.

The G-6 was built by the Wiener Neustädter Flugzeugwerke in the Austrian city of Wiener Neustadt and was delivered to the Luftwaffe in 1944. Leutnant Schulte of I./Jagdgeschwader 27 was at the controls when the fighter crashed near the village of Matzleinsdorf, also in Austria, on 29 May 1944. Later the airframe's original dataplates were recovered along with the Bf 109's wreckage and used in the restoration, which Michael Rinner started in Austria during 2007. Sufficient documentation existed for the relevant authorities to class the project as a rebuild. Rinner had completed a significant amount of work before the Air Fighter Academy purchased the G-6 in November 2013 and continued its restoration to airworthiness.

The Hangar 10 fleet also now includes Bf 109G-14 Werknummer 462707 'Black 2', which is ready

to fly but awaits the issue of a permit to test from the German Luftfahrtbundesamt (LBA, the country's CAA). The G-14 has recently been completed by Rare Bird Aviation at Meidl airport in Hungary, near the border with Austria.

A flight test programme for the G-6 and G-12 was planned for April 2018 in order to gain LBA approval for both to be awarded permits to fly. Leading German warbird pilot Klaus Plasa came to Heringsdorf specifically to carry it out. Meanwhile, the process of obtaining LBA certification for passenger flights in the G-12 led to a very detailed and comprehensive digital flight data recording system being installed in the two-seater, designed and built by Michael Stock of Stock Flight Systems. A data probe was fitted to the starboard wing which recorded angle of attack, air speed, altitude, air temperature and yaw in different phases of flight and manoeuvres. In addition, sensors were attached to all the flight controls to record control inputs, and cameras were placed inside both cockpits to capture all the instruments.

Prior to the flight test effort the Hangar 10 team spent a great deal

of time developing a new engine monitoring system to improve the safety and reliability of newly rebuilt Daimler-Benz DB605 powerplants. In respect of World War Two German aircraft engines, huge quantities of documentation, plans, specifications and spare parts were destroyed at the end of the war. Consequently, the available documentation and knowledge able to be passed down to new generations is considerably less for these engines than is the case for their Allied counterparts.

“ Hangar 10 now has far more involvement in engine overhauls and has built up a team to manage this ”

Hangar 10 has been seeking to address this. Having had some poor experiences with the quality of engine rebuilds through traditional routes, it decided to have far more involvement in

powerplant overhauls and proactively built up a new team to manage this process directly. It currently specialises in the DB601 and DB605 as fitted to the Bf 109. Those involved are Hangar 10's Volker and Johannes Schülke, Rinner Performance Engines led by Michael Rinner, and Flugmotoren-Reparatur Dachsel headed up by Heinz Dachsel. Based near Munich, Dachsel specialises in bench-testing aircraft engines. He acquired the engine test facilities

of the former Flugmotoren-Reparaturwerk Hanns Häusler, which established a specialist facility for this purpose in 1936. It boasts nine specialist test rings on which Daimler-Benz, Junkers Jumo, Argus and BMW units were tested during the war. The biggest test rig there was built from the conning tower of a World War One submarine. Heinz Dachsel started at Häusler as an apprentice in January 1966 and worked directly for the firm's founder for many years, before eventually taking over the business.



The Hangar 10 collection is now deliberately focusing on the restoration and operation of German wartime and pre-war aircraft due to the relative rarity of these types compared to Allied machines such as the Spitfire and Mustang. A key element of this relates to German World War Two engines and how genuine units can be restored to provide reliable, safe and authentic examples from this key period of development. Much time and effort has been invested in preserving and documenting such powerplants, and a modern digital engine monitoring system has been developed to assist in this. This tool is purpose-designed to be used when freshly overhauled engines are being bench-tested, collecting a huge amount of data in real time and performing multiple analyses of it. The system is intended to be far more effective and detailed than traditional monitoring methods, which depend on simply observing analogue gauges that often do not provide accurate data.

Johannes Schülke has led the digital monitoring project, using his extensive experience from performance development work on car engines with Mercedes-AMG. The system monitors and records key performance data whenever an engine is bench-tested: the time and ID of the measurement point; engine rpm, throttle setting and propeller pitch angle; exhaust gas temperatures from all exhaust ports; water coolant temperatures, both going into and out of the engine; oil temperatures, likewise going in and out; ambient surrounding air temperature, fuel tank temperature and fuel intake temperature; fuel pressure in front of and behind the fuel pre-pump; surrounding air pressure, deck pressure behind the supercharger, and manifold pressure both left and right; oil pressure; real-time fuel



TOP: During his recent time at Heringsdorf, Cliff Spink flew the two-seat Bf 109G-12 — currently using Rolls-Royce Merlin power — with Klaus Plasa in the rear seat. Crouching on the wing here is Hangar 10 general manager Martin Glockner, with Michael Rinner's son standing behind him.

MIDDLE LEFT: Undercarriage retraction tests, here being overseen by Michael Rinner (foreground), were completed before the G-6 took to the air.

MIDDLE RIGHT: Klaus Plasa details the flight test plan to Hangar 10's Volker Schülke (in the green overalls), Elmar Meier of MeierMotors, Martin Glockner, Michael Rinner and other members of the team.

ABOVE: A trio of 'Gustavs' outside at Heringsdorf for the first time: G-12, G-14 and G-6.



ABOVE: The two Bf 109s above the famous airfield at Peenemünde, which now houses the very impressive Historisch-Technisches Museum that charts the site's history.

consumption and a running total of the fuel consumed as the engine run proceeds; and the volume of fuel injected into each cylinder per stroke.

Key data is recorded at a sample rate of 10Hz, so for example 10 times per second a measurement point will be made and collected for all the data channels. In addition, the system automatically controls the throttle settings and the flow through the radiators and valves supplying oil and cooling water. With this it is possible to get the engine running as quickly as possible at its most efficient operating temperature no matter what the surrounding conditions might be. It also governs propeller pitch and automatic engine rpm.

Once a newly rebuilt engine is on the bench test rig, the initial 10 hours of running are set to very carefully run the engine in, allowing all the bearings and metal component faces to bed in gradually. Throughout this the engine rpm and loading are progressively increased. The oil is checked regularly for any metal filings, the spark plugs are pulled and inspected, and the cylinders inspected for cracking using an endoscope. Any changes are

“ It was probably the first occasion on which two Bf 109s had flown together over Peenemünde since 1945 ”

recorded in the measurement system, as are all engine running adjustments so that lessons can be learned for the set-up of future powerplants.

After the initial running-in period the engine is fine-tuned and then run at higher power settings. Once a total of approximately 12 hours' running has been attained it is considered ready for fitting into the aircraft. Before this happens, the team carries out a detailed inspection of all components, and the valve clearances are adjusted. During bench-testing a

DB605 consumes some 2,000 litres of Avgas and more than half a million measurement data points will have been recorded across 40 separate channels on the engine

monitoring system.

Given such attention to detail, it was no surprise that the Bf 109G-6's maiden flight, on 26 April, went well. Upon completion of full-power tethered ground runs and undercarriage retraction tests in the hangar, Klaus Plasa took the fighter for some general handling and circuits in the local area. On the same day he flew the G-12 (currently fitted with a Rolls-Royce Merlin engine — see

Aeroplane November 2017) on a general handling and proving sortie prior to its planned initial trip with two crew, which took place on 28 April. The rear-seat crew member was flight engineer Michael Stock, who managed the flight test data recording system from the cockpit. It is believed that this was the first time a two-seat Bf 109 variant had flown with two aboard since the HA-1112-M4L Buchón involved in the *Battle of Britain* film did so in 1968.

When Cliff Spink arrived from the UK to take the controls of the G-12, it was possible on the afternoon of 30 April to carry out a dedicated photo sortie with the two Bf 109s over the famous wartime trials site at Peenemünde on the Baltic coast, about 15 minutes' flying time away from Heringsdorf. This was probably the first occasion on which two Bf 109s had flown together above Peenemünde since 1945. With the G-14 waiting in the wings, the area will hopefully see an even larger Messerschmitt formation in the not-too-distant future. **A**

ACKNOWLEDGEMENTS:

The author extends his sincere thanks to Volker and Johannes Schülke, Martin Glockner, Michael Stock and all the team at Heringsdorf plus Klaus Plasa, Cliff Spink and Rob Davies, who flew the camera aircraft for the Bf 109 photo sorties.