



## Monthly Features

# New Power For Old Motorgliders

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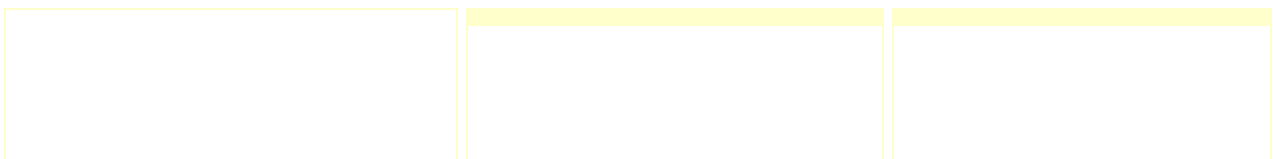
Jochen Ewald concentrates on the exciting possibilities now that a powerful engine has been developed for the heavier, and older, range of touring motorgliders



**M**otorglider owners who want to upgrade their aircraft with more powerful engines may well know of the Aircraft Technology's factory, Korff & Co, based on Mainbullau Airfield near Miltenberg, south-east of Frankfurt, Germany. The factory has worked on a number of motorgliders and light aircraft, upgrading and certifying their engines to give a much better overall performance. The extra power has also meant they can take-off with less runway, which is an important safety factor.

Fournier RF-5s and the Pützer RF-5B (Sperbers) were fitted with the Limbach L-2000 80hp twin carburettor engines, which brings their performance up to the level of modern GRP motorgliders. Later, Korff put the big air-cooled 92hp Limbach L-2400 EB1 into H-36 Dimonas, Grob G-109s and Valentin Taifuns. The Taifun was also equipped with the 115hp Turbo-Rotax 914.

Now the factory has finalised the certification of the water-cooled Limbach L-2400 EFI engine being used in the Valentin/TWI Taifun motorgliders. The engine was developed by Limbach Aircraft Engines in Germany, with the help of Korff and in line with their factory's requirements.

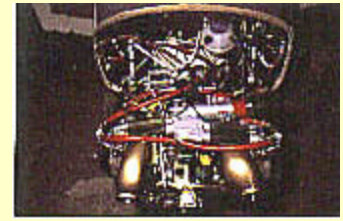




The D-KRRK's instrument panel shows that it is a large touring motor glider.



The air inlet and water-cooler can be seen from the front.



The Limbach L-2400 EFI in a Valentin Taifun.

The water-cooled version reduces noise pollution and avoids stressing the engine by sharp rises or falls in temperature when operated intermittently. Computer controlled electronic ignition and the fuel injection system gives the L-2400 EFI 100hp at 3000rpm and 90hp at 2700rpm. With these performances, the engine doesn't need a reduction drive. This saves money, weight and maintenance. And high frequency vibrations caused by reduction drives are avoided.

The higher cubic capacity engine weighs a little more, giving the 2.4 litre L-2400 EFI in the Taifun an AUW of 91kg, including the mountings, exhaust system, water and oil - just 7kg more than the comparable 81hp Rotax 912 engine.

So that I could assess this new engine, Rainer Korff offered me a test flight in the first modified Taifun 2, D-KRRK. With a maximum take-off weight of 850kg, the upper limit for this class of aircraft, the Taifun is among the heaviest motor gliders.

When designed, she was probably the best touring motor glider in the world and well ahead of her time. But being so heavy and with a tricycle retractable undercarriage, she doesn't have enough power for a safe, short take-off on small or muddy airfields. So she certainly seemed the right aircraft to test the new engine's performance.

The engine, covered by new, elegant cowling, is carefully built in so that it doesn't obscure the view from the cockpit. There are some interesting new features. Electronic ignition and the injection system have less parts, so reducing the risk of damage or working loose. This simplifies the operation as there is no choke or mixture control and the fuel pump switch is the master switch.



The Valentin Taifun 2 equipped with the Limbach L-2400 EFI engine has a smoother, more aerodynamic cowling than the original Taifuns. All photos by Jochen.

The fuel injection system is produced by two pumps which, in the Taifun, are placed in the right side of the cockpit floor. But only one is operated permanently, the second starting automatically if the first fails. Without the fuel pressure, the engine doesn't run.

The L-2400 EFI in the D-KRRK has a single spark ignition which has proved to be perfectly adequate for motorgliders. But the engine has been designed for dual ignition for motorglider pilots and for light aircraft.

In the case of problems, there is an emergency switch on the instrument panel which turns off the computer controlled system and activates a simple emergency ignition setting. The engine will lose some power and take more fuel, but it will bring you home safely.

Another safety feature is the second battery. A lamp warns the pilot if there are problems with the main battery and the second kicks into action, giving at least twenty minutes in which to look for a safe landing place.

D-KRRK hadn't been moved for four months and Rainer was doubtful whether it would start with the new engine. But after a few bursts, it sprung into life and immediately ran very smoothly.

When the engine modifications were being done, the factory fitted the more expensive lead-gel starter batteries. It seems to be a good decision - just think how often in winter your motor glider doesn't start due to weak batteries.

The engine has a Mühlbauer electric controlled constant speed propeller which is adjusted to reach a maximum at take-off of 3000rpm. The Mainbullau runway is on an upslope, but the acceleration is excellent. In spite of light rain, we were airborne after a relatively short ground run and climbed at 3.5m/sec.

I left the throttle on full and reduced the rpm to 2700 with little reduction in performance. Five

minutes after take-off I was 1000m above the airfield. The engine ran at the right temperature and all indications are that it would continue to do so, even on hot days. Once the engine goes into production one small problem, the engine being too cool during cruise flight, will be overcome by a thermostatic valve.

This is the first motorglider I have flown where the noise level is not just low, it is really low! You can carry on a conversation in a normal voice and operate the radio without a headset. And you can't feel the engine vibrating. But it isn't just in the cockpit. The noise measurement for the German certification, which is always severe, was 11dB below the required level.

To cruise, I dropped the prop and throttled to 2600rpm/26in Hg. Although travelling at 110kts, there just wasn't a feeling of speed. During the certification flights a maximum cruise of 127kts was measured at 8000ft at 75% power setting. I don't know of many aircraft that give such comfort at this speed and certainly not a motorglider.

The fuel consumption is relatively low due to the computer controlled ignition and injection. I found it was using 12 to 18 litres an hour, depending on the power setting.

The touring motorgliding scene used to be dominated by small cubic capacity water-cooled engines with reduction drives, replacing the Limbach and Limbach-like air-cooled Volkswagen-type engine. But with the L-2400 EFI, Korff and Limbach have caught up in performance, the power/weight factor and the torque curve. The larger engine gives a degree of comfort unknown until now.

This also influences the overhaul period. At the moment this is 1000 hours and it is hoped very shortly to be up to 2000 hours. An Upgraded Taifun

Rainer has been in charge of the Valentin/TWI Taifun motorgliders since the TWI factory closed. Originally, although advanced in design, they didn't sell well because there wasn't an adequate engine. But with the certification of the L-2400 EFI engine in the Taifun 1 and 2 series these upgraded motorgliders will become attractive.

About 130 were built and Rainer has bought some secondhand ones which he hopes to modify and equip to the specification of the new owners.

During my visit to Mainbullau and Dietzenbach, where Korff & Co have their main factory, I saw Korff's Grob G-109B being prepared for her second flight. This time with a new turbo charged variant of the L-2400 called the L-2400 EFIT.

With 130hp at 3000rpm and an all up mounted engine weight of 104kg, this engine seems to be very effective. Even at 2600rpm it gives 120hp.

It will give the G-109B a far better performance and a greater degree of comfort - and make her a strong and safe glider tug.

This will be of interest to G-109B owners. A lot of these motorgliders were given the rather heavy 90hp 2.5 litre engine, including those bought for the British RAF Air Cadets who renamed them the Vigilant T-1. Also, it will be good news for light aircraft owners with the old fashioned American-

type engines. This is an efficient, cheap, powerful, light and ecologically friendly alternative.

For more information about the new Limbach engine series and Korff modifications, contact Rainer Korff, Korff & Co, Dieselstrasse 6, D-63128 Dietzenbach, Germany, tel +49 6074 400631 fax +49 6074 400637, [email](mailto:)

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