

I really wanted to find out why five military airforces ordered the DG1001 for their basic youth trainers. Airforces don't buy at the drop of a hat or the whim of their C.O. They examine every nut and bolt and they can do hours of test flying. One man doesn't make the decision to buy either. Often a committee of dozen or more are in the act, not to mention the political involvement as the purchase money comes out of some pre-determined budget. They argue about price and when they talk 'maybe' the manufacturer knows he has to be price competitive and work out the best possible discount deal he can afford. And after all that, the harassed manufacturer knows they are going to screw him on a bulk purchase deal.

There has to be a reason why DG Flugzeugbau are having the success they are currently enjoying on their DG1001 Club. **There has to be a reason** why the U.S. Airforce Academy deal was for 19 sailplanes, Brazil's Airforce Academy 10, Australia 11, Indonesia 6 and one more country I can't recall. The DG 1001 Club was certainly flavour of the month (read years). With these endorsements, clubs considering a new trainer can certainly order knowing they are doing the right thing with a large degree of comfort. Nothing speaks (shouts) better (louder) than all those bulk purchases.

The basic DG-1001 Club has a 18m wingspan and a fixed landing gear which complements basic training as well as advanced aerobatics and cross country



training. There are many owners who will say that the DG-1001 Club is the most advanced training sailplane available on the market. The DG 1001 series comes in several versions - including a 20 metre version, a self launcher with either fixed or retractable under carriage.

With the new wingtips designed in-house by DG-Flugzeugbau has improved even further the flight characteristics of the Club. The winglets make the trainer an advanced entry-level version from the DG stable. As a military trainer, the DG-1001 Club comes with the right military inventory. For budding military pilots it is their initial training aircraft. On it they learn the basics of flying, before continuing with the much more expensive operation of turbo props and Jet trainers.

In the purely sport gliding environment in Germany the Club version of the DG-1001 is building a reputation as a desirable coaching medium in which students can experience advancing into turbo self

launching, or a pure sailplane that caters for some serious aerobatics.

With the 20 metre version wingspan tips, the new winglets and the very large main wheel, the DG-1001 takes on a whole new experience for clubs, almost a totally different sailplane. It is now in a high performer class ready for advanced tuition. Many of features of the DG's earlier two seater, the DG500 have been embodied in the 1001.

The impressive winglets have fundamentally changed the Club's appearance - it is a real elegant looker.

I enjoyed two test flights in the DG-1001 Club, one the model with winglets and the second simply a 17.4 metre wing with no add-ons.

It behaved above expectations but the aerobatics was something else. Coaching aerobatics would be a dream for any instructor.

The DG-1001 is open to nearly all the design variants. By purchasing a club variant, a school or a club can add features as time and finances permit. There is firstly the large outer wing extensions. Then you can retrofit water ballast tanks. The fixed gear can be exchanged for retractable. Thus with these conversion options available, the DG-1001 is extremely versatile. The change between trainer aircraft to a performance 20 m sailplane with larger wings can be completed in a few minutes.

But I was shown something more. With the

## The DG 1001 Club



# There has to be a reason

Myles Hynde



trim box in the fin you can have very different loadings so as to compensate pilot/passenger weights and adjust the centre of gravity. A unique option. A small, well-arranged table helps the pilot find the right choice of balancing weights.

Nevertheless the DG flies well with an empty weight box in the rear. The factory has made a case for the flight school to train with the box empty. It is evident that there are some pilots who consider the gravity optimisation a debilitating complication, hence the training organisation can easily do without it. The flight instructor will certainly appreciate the gravity feature in thermalling mode.

In the DG-1001, there is an acoustic warning, that ensures that the front canopy is closed before the rear. In the cockpit, the DG-1001 Club crew finds little difference to any big sister models. The front pilot can alter his position with adjustable pedals and back cushions. With my 1.75 metre height and a back parachute I did not need a cushion and I still had plenty of adjustment left to further position the rudder pedals. The rear seat has height adjustments.

The instrument panel has all the room needed to adequately fit all basic instruments and a Flarm. The tow hook is fitted in the nose which is a safety plus feature.

My first test flight of the DG-1001 Club was on a hot summer's day with the temperature around 30 degrees Celsius. After tightening the rope the airbrake lever is moved from its parking brake position for the rolling start. Full elevator movement is available and comfortable. The large, well-sprung wheel smooths the takeoff run on a surface with some irregularities. The two-seater lifted off at around 80 km/h from the grass runway. Already the tow was making a positive impression.

Noticeable was the effective sealing of this sailplane. In high-speed flight, the Club remained convincingly quiet, in the warm summer air with all the vents open. The air vents in the right cockpit wall were aimed pleasantly at my torso.

At 600 metres, the first thermal drives the vario needle to the stop - time to release. I had to reverse my course and go back a little in order to turn into the core of the narrow thermal. The wing told me when I had centred. In tight spirals things were looking up. With a fully aft trim I was thermalling at 90 km/h. It was fun to be manoeuvring the Club like this. The vigorous climb was exciting - we reached cloud base following the enjoyment of experiencing the harmonious and smooth well balanced con-

trols. Students should not find it hard work learning the art of thermalling.

And how does the DG-1001 Club perform with the winglets? Our forward centre of gravity did not create a negative impact with a completely aft stick. The club was exceptionally steady even when turning. Like going round on rails. With the nose high above the horizon, we started to feel a gentle shaking which was the signal indicating that we were at the beginning of a stall. It could still be controlled with slight aileron deflections. Fully developed stalls are easily recoverable. In straight flight stall onset starts to show up at around 70 km/h.

The ex factory price of a basic Club is €88,000.

### WEIGHTS IN THE REAR

During the second flight (rigged for aerobatics) - you have an increased wing loading which reveals a not-so-good-natured behaviour. On this flight we had a full weight box in the rear giving a rear centre of gravity. After steadily reducing speed we experienced a tailspin. The spin was quite steep. With opposite rudder to stop the rotation the sailplane is quickly brought back under control. Students should be well tested on flying manoeuvres with a rear centre of gravity and the behaviour of the tailspin.

The view from the front seat is excellent. The visibility from the rear seat is limited by the canopy frame. The front headrest has been reduced with the latest 1001 update. The landing is well controlled by the effective airbrakes. The disc brake on the main wheel works particularly well.

My conclusion: With the new winglets the DG-1001 Club WL provides better slow flight characteristics. The upgrade options are desirable as it expands the use of a mere training aircraft way beyond circuit bashing. The sailplane can thus be a highly variable acquisition for use in a club environment.

### THE DG 1000 WAS THE START OF THE SERIES

The glider has been in production for over twelve years. Five years ago the first sustainer engine DG1000 was produced. At the same time it was the factory's wish to offer its fans a self launching sailplane but a sufficiently powerful engine was not available. In the meantime SOLO developed an electronic injection for its 2625 engine which increases the performance to 67

Data DG-1001 Club WL	
<b>Manufacturer:</b>	<b>DG-Flugzeugbau, Bruchsal</b>
<b>Crew:</b>	<b>1 + 1</b>
<b>Construction:</b>	<b>Composite</b>
<b>Use:</b>	<b>Training, X Countries Aerobatics</b>
Dimensions	
<b>Wingspan:</b>	<b>18 m</b>
<b>Wing area:</b>	<b>16.72 m<sup>2</sup></b>
<b>Stretching:</b>	<b>19.38</b>
<b>Length:</b>	<b>8.57 m</b>
<b>Body height:</b>	<b>1.0 m</b>
<b>Hull width:</b>	<b>0.73 m</b>
<b>Max. Mass Kat U:</b>	<b>750 kg</b>
<b>Max. Wing loading</b>	<b>44.9 kg /m<sup>2</sup></b>
<b>Max. Mass Kat. A:</b>	<b>630 kg</b>
<b>Empty weight:</b>	<b>411 kg approx</b>
<b>Wing loading (80 kg payload):</b>	<b>29.4 kg/m<sup>2</sup> approx</b>
<b>Stall speed at 550 kg:</b>	<b>67 km / h</b>
<b>Best glide ratio at 750 kg &amp; 100 km/h</b>	<b>41</b>
<b>Top speed:</b>	<b>270 km / h</b>

HP. This amount of horsepower is more than enough for self launching (the factory do their test flying by taking off at Bruchsal on the grass runway - an airstrip adjacent to their factory in Germany). The plane at a weight of 780kg, lifts off the ground after a short take off run and thereafter achieves an excellent climb rate. The sailplane, with a not completely filled fuel tank and with reserves for the cockpit payload (40 kg below its maximum take off weight), lifted off the ground before reaching half the length of the grass runway and continued climbing at 95 km/hr with a climb rate of 2.5m/s. The engine controls are simple. Turning the ignition key initiates the rising of the mast mounted propeller. Only after the propeller is locked and the propeller stop is released is the start button ready to start the engine. With the steerable tail wheel and the small wing wheels the DG-1001M is easily controllable to taxi even on the grass field at Bruchsal. The large spring mounted main wheel absorbs without problems even deep ruts in the surface. The DG-1001M is standard equipped with an electrically operated gear retraction system.

For take off, I was told to initiate power gradually to prevent the plane dipping onto its nose. But I could not find any tendency of the plane to tip forward. The DG accelerated rapidly and after a few metres I could level the wings and the initially fully



*The genetic foundation of the DG1000*

backed stick could be relaxed into its neutral position. At a speed of about 80km/hr the plane lifted off the ground.

The DG-1001M, trimmed to a speed of 95km/hr, continued its climb and turned freely. If one pulls the stick back during climb onto its rear stop, the DG does not stall but allows one even in this position to move the controls without breaking away. The plane's behaviour was good natured when an engine failure was simulated. The pilot has in the normal climb sufficient time to lower the nose and bring the plane into a normal glide position. If an engine failure occurs in a critical position just outside the boundary of the airfield, it is a simple procedure restarts the engine. Moving the emergency switch to an independent secondary electronic injection system which initiates an engine restart.

The engine system is almost vibration free because of a newly developed engine mount. The power transmission and reduction transmission is made using 5 V belts which permits an engine mount similar to the mounts used in a power aircraft. This prevents load reversal back strikes of the propeller. The slip of the V belt which is used for this, on the other hand, causes a minimal but not measurable performance loss.

The noise level in the cockpit in the climb as in level flight is within acceptable limits. During cruising flight, an average speed of 80km/hr can be maintained with reduced power at about 6500 rev/min.

The stopping of the engine and the retraction of the motor mast is controlled with the digital engine control DEI-NT: Power to idling and switching off of the ignition initiates the automatic retraction of the

system. In case the propeller needs to be moved into the vertical position, this is done by the autogyro effect or by actuating the starter.

During my flight in the subtropical airmass and below a cover of cirrus, I had several opportunities to practice the re-start and the shut off procedure. The engine started on every attempt without problems which is the advantage of the electronic controlled fuel injection. Another advantage of electronic injection is an always correct fuel mixture. Because of this, the engine is always independent of altitude and continues to provide maximum possible performance.

DG ran the engine in the 1001M on test for about 43 hours, (engine time) which in normal operation of self launchers would not be used over several years. Five minutes is normally sufficient to enter thermals. The high run time performance speaks for the SOLO engine with the injection system.

With the engine stowed the DG-1001M flies like a sailplane, but due to the higher wingloading the minimum speeds are increased. The "M" version has not lost any of its manoeuvrability. The changing cores of the sporadic warm air thermals were easy to follow. A speed of about 90 km/hr was sufficient for medium bank rates.

At steeper bank rates, an airspeed of about 100

km/hr is required, as with two persons in the plane the wing loading is between 42 to 44 kg/sq m. The M version is fairly forgiving, if pressure on the stick is increased at too low an airspeed it only tends to slide off slightly and immediately recovers as soon as the pressure on the stick is released with only a small height loss.

The DG-1001M with its performance and handling characteristics is a Two Seater which is a pleasure to fly and can certainly be recommended for club operation.

## AND TODAY There are five models in the DG-1000 family

### DG-1001S

This is the standard model with a 20 m span, winglets, retractable main gear (optional electrically operated), trim box, and water ballast. Additionally there is an option to fit the landing gear of the well known DG-505 Orion.

### DG-1001S-18/20

For this variation wing tips for an 18 m wingspan are available. The 1.4 metre extensions, including winglets are available as options. The 18 configuration is ideal for clubs that want to teach. And in this version the DG-1001 is a very good aerobatic trainer. The extensions transform the ship into a high-performance cross-country sailplane.

### DG-1001S CLUB

This version is intended for clubs wanting a less expensive entry model. The span is fixed at 18 m, the gear is non retractable, and there is no water ballast system.

Although the price is higher than that of

x = Standard o = Option • = Not possible	DG-1001S	DG-1001S-18/20	DG-1001 Club	DG-1001M	DG-1001T
retractable gear without front wheel	x	x	o	o	x
retractable and electrical gear without front wheel	x	x	o	x	x
retractable gear with front wheel	o	o	o	-	o
fixed gear	-	-	x	-	-
wing parting	x	x	o	x	x
18 m Wingtips	o	x	x	-	o
20 m tips	x	x	o	x	x
water ballast system	x	x	o	o	x
aerobatic capability	x	x	x	-	x



the competition model ASK-21, the 1000 series has an airfoil which is newer in design by about 20 years, has a trim box in the fin, and carbon wings which make rigging considerably easier, especially with the automatic control system connectors.

As an extra, the Club Model can be ordered with "normal" retractable gear, water ballast system, and with removable tips. This gives the option of later adding the wing extensions, including winglets thus giving the buyer a complete DG-1001S-18/20m. If your club wants to retrofit the wing parting or retractable gear later, there would be additional costs.

### DG-1001T

This motorised version has a Turbo and a wing span of 18 or 20 m. It has been available since the spring of 2005.

Another possibility that might interest instructors is that they often field complaints that fibre glass two seaters cannot be used for spin training. Often students when later flying a single place glider, too easily get into an unintended spin and regrettably have not been taught the correct recovery techniques.

The DG-1001, with the help of the trim box and fin tank, can be set up with a suitably rearward C. of G. for proper spin training.

### DG-1001M

This is the motorised version - a Self Launcher with a wing span of 20 metre which was first offered in 2009.

DG-Flugzeugbau have set out to meet the market with all the options they are offering.



*This version designed especially for teaching aerobatics*

### OPTIMISTIC ABOUT THE FUTURE

"More than just gliding" is the company's slogan. Located in Bruchsal near Karlsruhe in Southwestern Germany their principle operation involves sailplane manufacturing which is still a huge part of their successful history. They maintain a service and maintenance division which is one of the biggest in Germany.

In 2003, they introduced "DG Kunststofftechnik", a composite department, to which they have since added an engineering division. As of today, it has become an integral part of the company's profile. DG Flugzeugbau has four different market segments.

DG has been deeply involved in the development of the "VoloCopter" which has been supported by the German Government. There are six partners - including two universities associated in the VoloCopter project which may be ready for serial production by 2017. This futuristic aircraft uses a propulsion system with 18 electric motors. DG management confirm that the building of this aircraft takes advantage of the practical skills, the knowledge and the huge experience of their staff. The project

has opened up the way for new future opportunities but the DG 1001 is the company's top seller and sailplane manufacturing is the company's most important product.

Additionally up to ten DG 808 C's are built in Bruchsal and shipped world wide each year.

A new sailplane order today could mean a 9 -12 months lead time on delivery.

The composite segment is becoming more and more important in Bruchsal. The employees design special components for aircraft up to Airbus A320. A special add-on division is the production and development of racks and brackets for ambulance aircraft. Modern composite solutions offer a significantly lower weight and are highly stable and rigid. Custom made special attachments for research and weather monitoring aircraft represent another field of work. For Italian customers, DG Flugzeugbau has developed 6-metre rotor blades for wind turbines. The composite department has so far produced almost 200 blades. Thanks to their design staff ideas, DG Flugzeugbau is ready to help and support partners who are looking for smaller wind turbines.

At present, 70 "trades persons" work at DG Flugzeugbau. Six are trained during a three year apprenticeship to become skilled aircraft engineers, still a sought-after profession. Ownership of the company remains with Friedel Weber, but he is no longer active in the daily work. Director Holger Back leads the company as its director. The former chief designer Wilhelm Dirks has retired and now Jelmer Wassenaar has taken over his duties. Wilhelm Dirks, is now free lancing and supports the DG team three days a week. Stefan Göldner is the head of marketing and sales, whilst Ilka Elster-Back takes care of the company's personnel and administration. Dirk Stroebel is responsible for the composite section.