

Duo Discus X



On April 24th, 2005, Dipl.-Ing. H. Treiber und Dipl.-Ing. C. Wannemacher on the backseat made the first flight with the new Duo Discus "x". So one of the most successful sailplanes of the last ten years received an impressive and highly anticipated upgrade which completely fulfilled our expectations in flight. The well known harmonised and impressive flight characteristics were the basis for the improvements and modifications. Our ambition was to top these attributes with the new Duo Discus "x". The following features were realized in this aircraft.

Undercarriage

A new undercarriage was designed, incorporating a total shock distance of about 100 mm (3.94 in.) which significantly increases the energy absorption of the undercarriage. The **roll comfort is greatly increased** through the soft cushioning and the **touchdown shock on landing is remarkably reduced**. The total construction height is however still low so that a comfortable entry into the cockpit is possible furthermore. Further advantages of the new undercarriage are:

- Lower lift-off airspeed due to increased angle of attack during take-off roll.
- Light operational force during extension/retraction due to gas strut assistance.
- Undercarriage can be operated and locked from the rear seat.
- Further ease of ground handling due to light tail weights.
- Improved off field landings due to higher undercarriage and wider opening doors.
- Robust and maintenance friendly undercarriage construction.



Airbrake System

Because of an aerodynamic work of art - with extension of the airbrakes, a trailing edge flap extends downwards simultaneously - there are multiple advantages during practical flight:

- The loss of aerodynamic lift when the airbrakes are extended is partly retained with the trailing edge flap (so that the lift coefficient practically remains unchanged) though at the same time the total drag of the aircraft is increased. This allows a **steeper approach angle** and also - which is very important - a **slower landing speed** with extended airbrakes and trailing edge flaps.
- The extended trailing edge flaps increase the longitudinal pitch which results in even better visibility to the landing point.
- At higher speeds (more than 200 km/h - 108 kt - 124 mph) the trailing edge flaps, which are coupled by a gas strut with the airbrake control system, slowly retract due to increased aerodynamic force. Therefore the trailing edge flaps do not extend at higher speeds because the aerodynamic forces hold them to the wing profile. The pilot does not notice that trailing edge brakes are even installed when extending airbrakes at speed.
- As the trailing edge flaps and airbrakes are mechanically coupled via a gas strut, the trailing edge flaps react in opposition to the airbrakes upon extension. A non locked airbrake can therefore not extend itself which **prevents** the situation of **taking off with extended airbrakes unintendedly**.



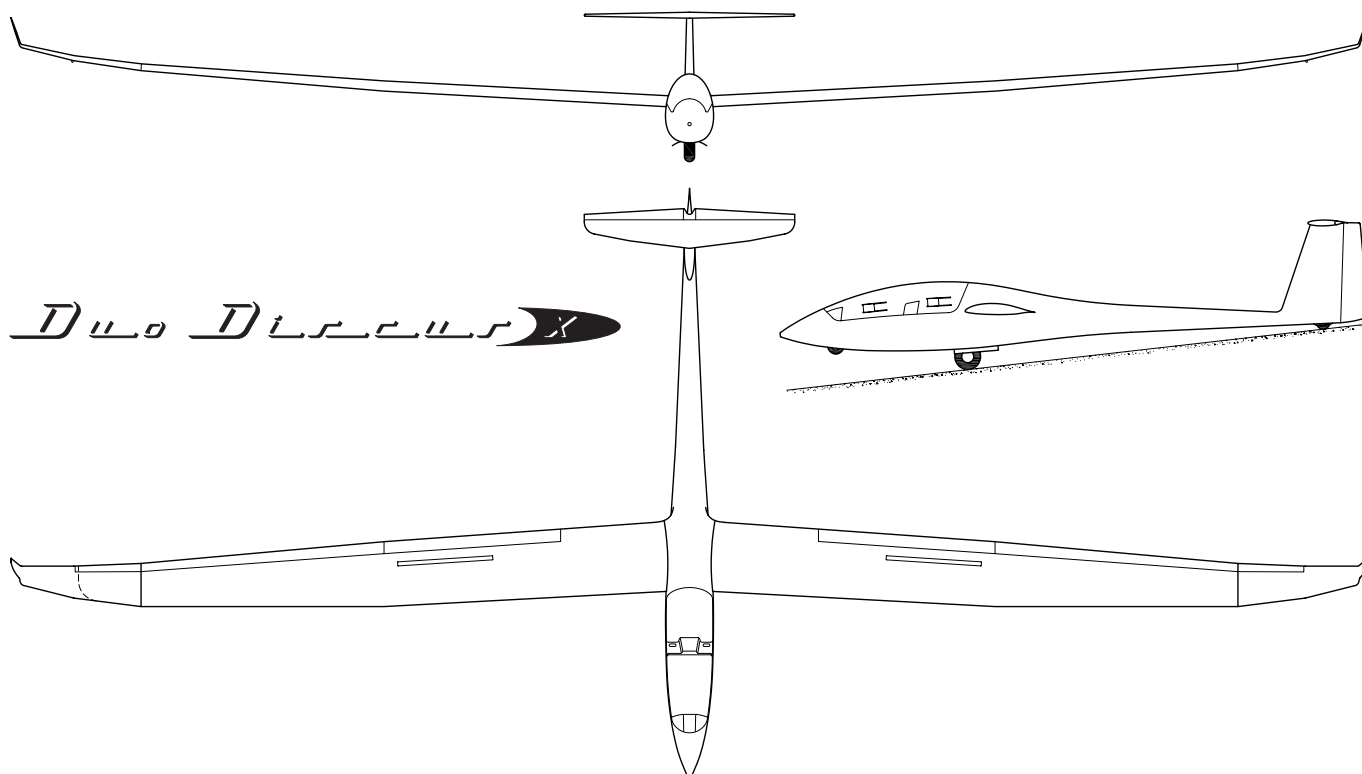
- No additional work load for the pilot as there is no extra lever needed to operate the trailing edge flaps - they work in unison with the air brakes.

Winglets

The high class aerodynamic wing of the Duo Discus "x" was further improved through the most advanced calculations by Prof. Dr. Karl-Heinz Horstmann and Prof. Dr. M. Maughmer. The performance improvements stretch across the entire usable cross country range though the reduction of the minimum sink rate shows the greatest improvement. This is also evident in increased cruise speeds at all thermal strengths. The harmonic shape of the winglets added to the already optimal wing planform, further increase the elegant silhouette of the Duo Discus "x".



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TECHNICAL DATA

Wing span	20 m	65.62 ft
Wing area	16.4 m ²	176.53 ft ²
Aspect ratio	24.4	24.4
Empty mass approx.	420 kg	926 lb
Maximum all-up mass	700 kg	1543 lb
Wing loading	29.9 - 42.7 kg/m ²	6.1 - 8.7 lb/ft ²
Maximum permitted speed	250 km/h	135 kt (155 mph)
Maximum L/D approx.	46	46

Subject to change without notice



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