

PROPELLERS COMPARATIVE TESTS on WT9 Dynamic tow aircraft

December 2006 : the WT9 Dynamic ultralight is tested and validated by DGAC (Direction Générale de l'Aviation Civile = French Civil Aviation Authority) as tow aircraft. Test pilot : Mr Daniel Serres.
=> see the test report dated 17/01/2007

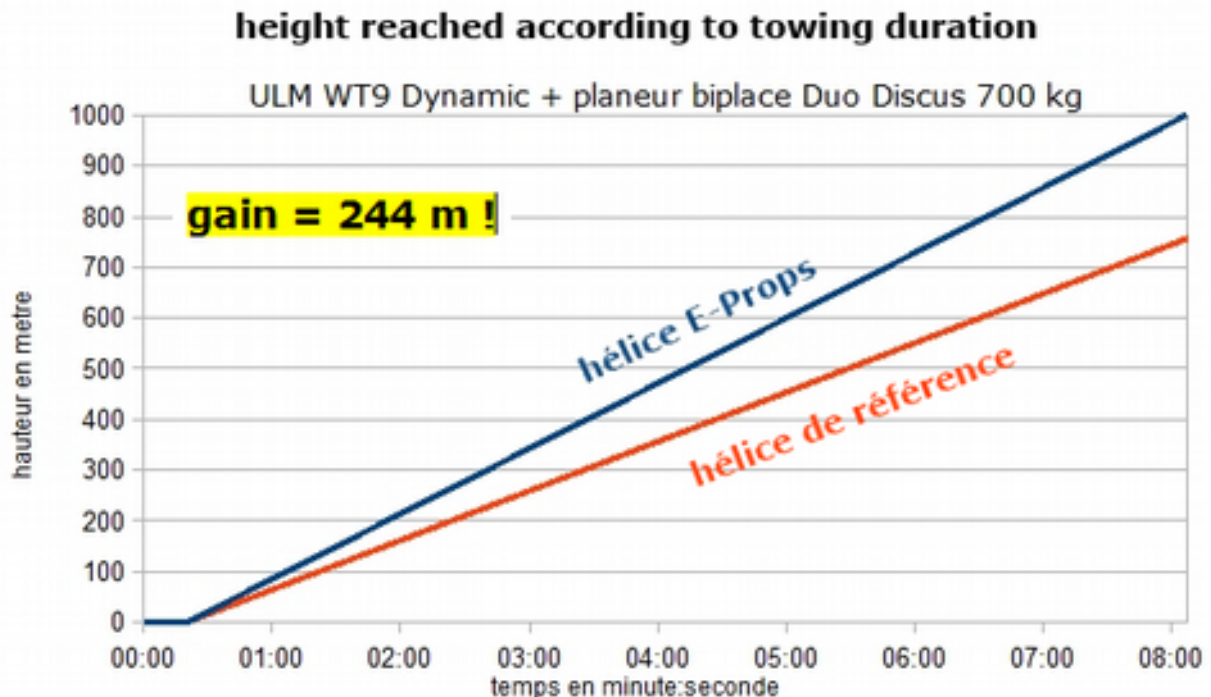
May 2014 : the WT9 Dynamic is equipped with a new propeller (E-Props Durandal 100-R). A test campaign is done to validate the performances with this new propeller. Same test pilot.
=> see the test report dated 20/05/2014

The ultralight is the same : WT9 Dynamic Club SD with Rotax 912S engine (100 hp). Only the propellers are different :

- reference propeller : composite 3-blades ground adjustable pitch
- E-Props Durandal 100-R propeller : carbon 3-blades ground adjustable pitch

1- WT9 towing a 2-seater glider Duo Discus (700 kg)

WT9 Dynamic + 2-seater Duo Discus 700 kg	reference propeller	E-Props Durandal 100-R propeller	Gap between Ref / E-Props
Take-off distance to 50 ft	896 m	748 m	gain : 148 m 16,5 %
Average vertical speed	1,55 m/s	2,05 m/s	gain : 0,5 m/s + 32 %



2- WT9 towing a 1-seater glider Pegase (455 kg)

WT9 Dynamic + 1-seater Pegase	reference propeller	E-Props Durandal 100-R propeller	Gap between Ref / E-Props
Take-off distance to 50 ft	496 m	348 m	gain : 148 m 30 %
Average vertical speed	2,55 m/s	3,21 m/s	gain : 0,66 m/s + 26 %

3- Propellers weights

	reference propeller	E-Props Durandal 100-R propeller	Gap between Ref / E-Props
weight	4,1 kg	2,8 kg	- 1,3 kg

Conclusions of the tests :

The propeller E-Props Durandal 100-R is agreed for use on WT9 Dynamic tow aircraft.

The E-Props Durandal 100-R propeller allows to obtain better performances than the reference propeller on the towing aircraft WT9 Dynamic.

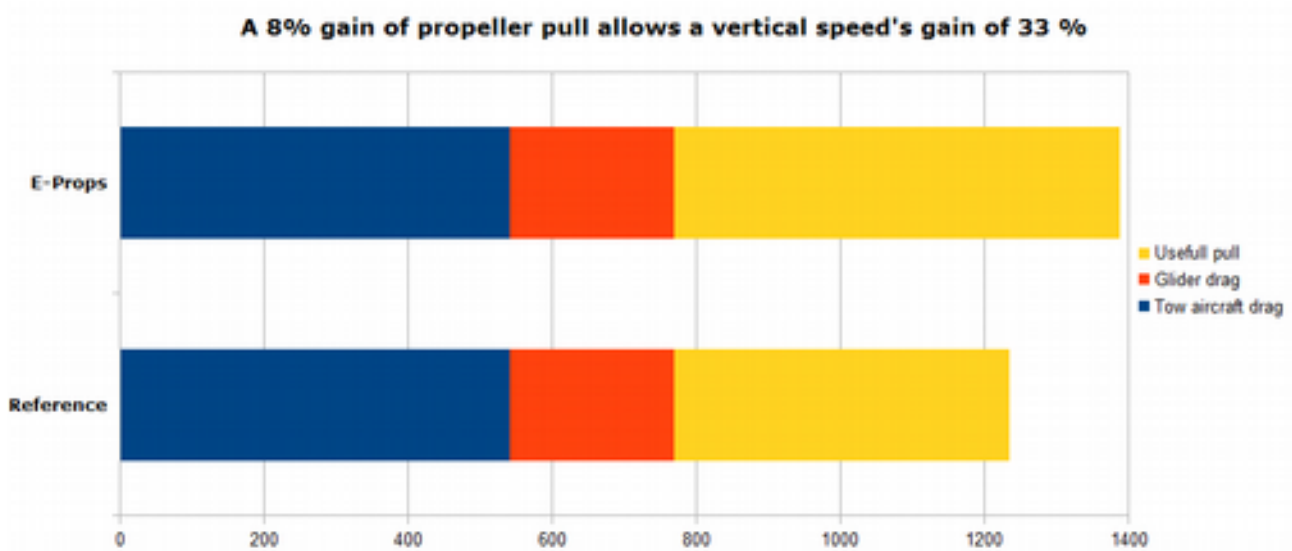
Tests of the E-Props on the tow ultralight WT9 Dynamic have been realized on the request of the French Flying Center : **Centre de Vol à Voile Bressan**. This center is now "referent" of E-Props propellers used on tow aircraft.

Centre de Vol à Voile Bressan
Aérodrome de Bourg-en-Bresse, "Terre des Hommes"
01250 Jasseron - France
Phone : +33 4 74 22 57 35
Email : cvv.bressan@free.fr
Website : cvvbressan.fr



How such a performance gain is possible ?

The drag of the tow aircraft + glider cancels the most of the propeller pull => a small pull gain allows a big vertical speed gain.



Thanks to their geometries and their profiles, the E-Props propellers have a very strong ESR effect, which allows to improve the performances of the aircraft at take-off and in cruise, in comparison with a standard fixed pitch propeller.

This ESR effect has the following characteristics : it causes very small gap between the static RPM and the flight RPM, and this allows to keep a strong power at take-off.





7 reasons to use a E-Props on tow ultralights

1- more security

Higher faster = more time to react in case of problem

E-Props = Security

2- best capacity to tow

With a E-Props, the rate of climb is 2,05 m/s with a 700 kg glider.

While keeping a 1,5 m/s rate of climb (minimum imposed by regulations), it will be possible for the WT9 to tow heavier gliders.

3- higher cruise speed

Thanks to the " *constant speed* " effect of the E-Props propellers, the cruise speed at 5.500 RPM increases to 20 km/h against the same ultralight equipped with the reference propeller (keeping the same towing pitch).

4- reduction of noise

Higher faster = less noise for the residents.

The test report dated 20/05/2014 indicates that the WT9 Dynamic with the E-Props is as silent as with the reference propeller.

5- fuel economy

Climb time of the tow aircraft reduced by 30 % = less fuel consumption by tow flight

6- weight reduction

Weight gain between the two propellers : 1,3 kg. This allows :

- to move back the centre of gravity position. The aircraft is then more pleasant to fly at landing (see test report dated 20/05/2014).
- to have 1,3 kg (1,8 liter) more fuel, it means flying 5mn30 more on the same fuel tank. Towing WT9 Dynamic consumption is 19,8 liters/h (see test report dated 17/01/2007).

7- higher MTBO

reference propeller MTBO : 800 hours

E-Props MTBO : 2000 hours

Less costs and less interruption for the ultralight



towing ultralight WT9 Dynamic, Rotax 912S, reference propeller



towing ultralight WT9 Dynamic, Rotax 912S, E-Props Durandal 100-R propeller