

# ***Aviad MG-12 "Zigolo" - test flight FTE***

***After making contact with the prototype and the first impressions of flight, and after some changes to the controls and aerodynamics, we organized a full test not so much FTE to evaluate the behavior that is substantially the same as for evaluating the performance data and precise numbers***

At "Heaven and Flight", the small glider minimal Aviad the place of honor on the square of the hangar was a bit the mascot of all, always surrounded by pilots and passionate, with the first requests for information about the kit and on time delivery. But I was surprised that all is that the small motor glider arrived in Ozzano as normally as possible: in flight. Took off from "Bore Chienti", with some intermediate stop to refuel and stretch his legs, Francesco Martino, the young manufacturer, has quietly flown more than 230 km to the stratospheric average of 60 km / h in less than four hours leg and the same return. This just to say that even with minimal aircraft can make way, not a lot, but with great satisfaction. Obviously using the engine, because most of the flights that were made straddling June and July have been made with the engine off, both in conditions of the soul to evaluate the behavior and performance, both in conditions of lift coming to share gains of about 500 meters with thermal plain and more than an hour and a half of soaring flight. Structure already know everything and we refer to a description and measures the impressions of flight in June, but compared to our resenatation many things have changed, at our suggestion, let's see in detail.

**Aerodynamics.** Two major aerodynamic changes, the first is the cleaning of structure with the hull and coatings, the second is a change in the fitting of the tail plane. The lower part of the fuselage fairing is now in a simple and highly effective, with sheets of Mylar shaped and glued on the structure, the appearance gains much, visually emphasizing the bottom line curve of the skid and no doubt gains aerodynamicaly, although the fact that this shell is open at the top for depression probably creates some micro turbulence at the rear, the propeller. For the journey in Ozzano were also applied to the uprights of the coatings aerodynamic and to the struts of the tailplane that have earned something, but which were then eliminated, both to conduct surveys on the structure base (remember that it is a kit easily assembled), and because the ratio width / length of the fairing was not correct, for example, struts-tail you are thinking of adopting the aerodynamically profiled extruded, although more expensive. Changing the keying angle of the tail plane dropped slightly, serves instead to optimize the trim speed with the best compromise between powered flight and gliding with the engine off. The lift does not have a trim, there is a system in elastic directly on the chain of command, but it is said that you decide to install a small trim tab controlled by the pilot.

**Controls.** The first concerns the entire chain of command of the ailerons, as we suggested at the first trial, has been replaced with steel cables harmonic Bowden teleflex. Originally, in fact, the command was a steel cable, with pulleys rather small they inserted considerable friction on the chain itself and that not a little complicated, however, all from the mechanical point of view and therefore constructive, between brackets drive, return cable and double control cam sull'alettone. Now the two steel cables sheathed flexible working in push-pull are totally external, run along the upright rear wing, and is also outside the control bracket with the threaded rod for fine adjustment. The whole weighs a few hundred grams more, but have disappeared completely friction operation and from the mechanical point of view it is greatly simplified the construction; among others have been eliminated the two compensating anti-tab which were adopted precisely for reduce the efforts of commandos on the long ailerons. Other changes in the system of command was the adoption of two springs of centralization of the pedals to help the return, but on the production model has already decided to reduce the aerodynamic steering compensator, whose efforts drive is still light, improving thus directional stability. Even the elevator will be finally provided with two small tabs, mass balance to reduce the efforts of command.

**Parachute.** The position has not changed, but you have changed the position of the handle eliminating the control cable and adopting an angle that allows a perfect grip simply by raising his arm. The position is also set back about 20 cm and in the event of drive traction on the front pipe, which supports handle and parachute, is carried out closer to the upper fastening point of the tube, with a smaller arm and more favorable.

**Engine.** The main change is the optimization of the propeller, the new adopted is a two-bladed GT 130 cm step that still has quite exhaust and raises the engine speed too much, over the 8,400 compared to 7,800 given by the manufacturer, but unfortunately we are not were able to try a new propeller that returning the optimal parameters should significantly improve the performance on a cruise without affecting the rate of climb. A second modification, we did not try, but we saw at the factory, is a conveyor dynamic carbon for the head was installed shortly after our test and has drastically lowered temperatures CHT, so it will be adopted as standard all engines, allowing intensive use without problems (we have often reached during the test timed up on sixty seconds 250 ° C CHT, operating limit specified by the manufacturer)

**Centering.** Have been tested and evaluated all the possible positions of centering, thanks to the possibility to move the seat, with particular attention to situations centering backward, without any problem of controllability and response stall, even if it is seen that the best performance and behavior can be obtained with a centering slightly forward, that we have adopted for the flight tests.

## IN FLIGHT

Ground temperature 26 ° C, take-off weight 192 kg (with aircraft instrumentation and extra battery kg 105 pilot and equipped with helmet kg 87), makes aircraft I-X019 Evaluate an aircraft with a range of very slow rate, with important resistances and with a low wing loading (16.7 kg / sqm) entails numerous problems, the first of which own "air" in which it flies, which must be as much as possible "and stops standard". In early July, with warm African and moisture that can be cut with a knife, just go to hope to get closer to the classic 15 °, zero humidity and pressure 1 atm air standard is utopia, but you can still choose the conditions favorable and that is why we have made flights almost at dawn in much calm, at least for the first hour of flight, albeit with abnormal temperature simply by equipping the plane of the data collection systems to complement the simple instrumentation, in particular altimeter and airspeed indicator, in addition to three-dimensional GPS track.

**Taxiing and takeoff.** With the position of centering middle and with that slightly advanced control taxiing is easy even at low speeds, despite the reduced track of the main carriage: just a stroke engine with stick throughout forward to lift the tail and having total controllability with the pedals even you can do a complete 180 on the track as long as you do not go overboard with the speed, but also with the rear wheel on the ground (it will probably be pivoting) control is acceptable. With the centering position backward, instead, the load on the wheel increases a bit too much and is more difficult to immediately raise the tail. The takeoff takes place in calm air in just eight seconds and 60 meters of ground run with an initial climb rate of approximately 1.7 m / s. At all stages of take-off, acceleration, rotation, the factor of the propeller is absolutely negligible. To properly assess the rate of climb, for which the signs of the variometer free flight are a bit "dancers", we performed a series of timed climbs on the 30 and 60 seconds, with results completely coincide: gain of 46 m in 30 sec and 91 m in 60, that is to say 1.5 m / s rate stabilized at 55 km / h. Let's say that the propeller has still too much rpm (8,400) and that the environmental conditions are not optimal because of the heat, excessive already 5 in the morning, but the data is still acceptable. Only known to the temperature in the CHT that go up to the maximum approached too close to 250 ° C, the limit set by the manufacturer, after about 45 seconds at maximum power.

**Level flight.** The new propeller has brought a minimum improvement in flight characteristics, the cruising speed recorded are shown in Table I nevertheless remain too high rpm and with a better setting step can greatly improve performance on a cruise, it is considered that the propellers taken, all rather short wheelbase, are optimized for the paramotor and trikes who need to pull down and flying at speeds well below average. We are still at acceptable levels given the type of aircraft. The stability of the longitudinal assess only commands being blocked adjusting trim slightly to beat the phugoid fades in 20 seconds after 2.5 cycles. Directional stability is still poor, with a hint of the return following a command of pedals, and the springs do something, but are inconclusive.

**Maneuverability and effects controls.** The only real difference is substantial and aileron, much more fluid and good accuracy. The primary effect of roll is good, and fairly proportional to the command prompt, always considering the speed, aperture, and the wing loading, the secondary effect of yaw is sensitive and requires a good coordination of

the rudder, which is also very easy to see that the primary effect of yaw is immediate, followed by a moment of delay by a secondary effect dihedral well coordinated. So very good lateral stability, while stability is neutral spiral turn both left and right, the propeller effect is negligible

**Slow flight and stalls.** Something has changed, and for the presence of the front frame, for both the new keying of the horizontal plane, both for the environmental conditions of the test, and the stall speed detected are slightly higher: 45 km / h with the engine idle and 47 km / h with the engine switched off, but in both cases is not reached the stall the wing for the loss of authority control of the elevator. A choice that we share because even going slow and not centered in the thermal wing does not stall ever, at least in this setting. Talk about slow flight is perhaps superfluous given the speeds involved, but the 50 km / h without problems remain with authority control virtually unchanged

**Approach and landing.** With the engine idle and neutral stick at 55 km / h comes down to 2 m / s with exact efficiency of just over 7 and a glide angle acceptable, the authority of command is unchanged and crossing the commands you can slip straight to read 3 m / s on the variometer always at 55 km / h. The authority control of the elevator during the flare is enough and stop landing on three points in twenty yards little, worthy of the best STOL performance.

**Soaring flight.** With the engine off the Aviad is a real treat, and because the wind noise surrounds you and is the "music" that accompanies you, and because of all the commands authority remains unchanged, with the exception of the horizontal plane while maintaining efforts to drive and hike almost coincident, demonstrating a good longitudinal static stability, appear sees a dead band of about 3-4 cm in trim position. The piloting allows you to easily center the thermal and brush the ridges in dynamics with absolute accuracy, efficiency, maximum weight of 192 kg was determined to be 10:41 to 59 km / h and 10:18 to 55 km / h, the rate fall minimum is 1.4 m / s to 53 km / h. These data are certainly not exciting, but consistent with a glider completely open, which can improve lightening the aircraft (for example, with the sole covering Dacron without painting) and still make this little motolibratore a close relative (and modern) of the mythical SG 38 with whom they have learned to fly and with whom we have enjoyed thousands of pilots. That, ultimately, is the goal.

## CONCLUSIONS

Fully confirm the conclusions already made last June: half easy and pleasant, with performances that once optimized (efficiency with the engine off between 11:12 and cruising speed 70 km / h) let you fly effectively motor on or off, with ability to soarings discrete and with a unique entertainment. The general behavior is healthy and safe, price, 7,500 for the complete kit of everything (engine and fuel tank including safety) is a small Italian miracle. Last note for the name: MG-12 stands for Mini Glider 2012 and the name "Zigolo" was chosen because it is reminiscent of the similarity Zoegling, either because Zigolo is a migratory bird that lives on the Italian coast, about 30 gr with 30 cm wingspan, stylish and a great flier, he is a true "minimal".

## SCHEDA DI VALUTAZIONE - PROTOCOLLO

FTE - Flight Test Eval

CONSTRUCTION NOT CONSIDERED	It is a kit and the construction of the prototype is not a reference. Probably the ones made by individual pilots will be more clean and refined, but the structure of the project is to test everything, far too oversized.
STRUCTURE EXCELLENT	There is little to judge because the facilities are brilliant and simple at the same time: all controls are grouped on the bar, very comfortable, there is a tank and ballistic parachute. Many super aircraft should follow the example of this "featherweight".
CONTROLS EXCELLENT	Absolutely everything in sight, the simplicity of equipment and excellent engine helps further.
COCKPIT GOOD	The fully open position for some it is pure pleasure, others disturbing, but seat belts and are well made, the pedals are adjustable and comfortable.
TAXI AND TAKEOFF EXCELLENT	Excellent controllability, area of takeoff content.
SLOW FLIGHT AND STALLS EXCELLENT	Difficult to find a multi-axis flying slower than this, stalling the wing is not reached with the independent settings.
FLIGHT LEVEL ADEQUATE	The judgment is affected by the characteristics of the propeller, still too short which causes the motor to cruise at high speeds. Can greatly improve and just 5 km / h more make the difference in consumption and travel time.
HANDLING GOOD	Authoritative commands the engine either on or off, requires good coordination, but the piloting is easy, fun and educational.
APPROACH AND LANDING GOOD	There are no flaps and achieve ramps can not be marked, but it does given the lower speeds, the landing is at historic lows. With the engine off does not change anything even if it is good to slightly increase the speed on short final to have surplus energy being invoked.

**« The Zigolo in nature is a small migratory bird, stylish, lightweight, just like this mini glider that offers a new way to go for air»**

**« With the engine off the Zigolo flies with decent performance that allow it to rise in temperature reading from 2 m / s with an excellent command authority»**

# AVIAD MG-12 "ZIGOLO"



The mylar hull emphasizes the line of the fuselage and the front skid





**Perfect the new position of the handle of the parachute, just raise your hand 20 cm above the head**



**In still air, and under unfavorable conditions, the Zigolo takes off after 8 seconds of acceleration**

## Tutto iniziò con le minimoto



**Since 2010 Vittorazi has a new place of 600 square meters which assembles the single-cylinder light flight**

The Vittorazi is the company founded, just for fun, by Vittoriano Orazi, expert models of RC cars, which began in 1987 to produce minibikes and made an effort to promote them also by the players. With what results? Judge ye, as the team Vittorazi ran there were, among others, a certain Valentino Rossi and a certain Marco Melandri. In the mid-90s Vittoriano paramotor pilot, decided to produce engines specific to this usage, preferring the simplicity and reliability resulting in a complete family of single-cylinders that has won everything there was to win in national and international championship up to 1999. Today there is no more Victorian and in his honor in 2009 was held the "Vittorazi Day" and the company is carried out by his children in the new premises of Morrovalle, a stone's throw away from the track of Bore Chienti where the Zigolo was born. The Moster 185 engine with aluminum cylinder Nicasil treated and a capacity of 184.7 cc, is the top of the range, it weighs just 12.9 kg in the version with manual start, and offers shaft 25 hp at 7,800 rpm (20 hp actual propeller) with a propeller on the static thrust reaches 130 cm 75 kg. Particularly cured the appearance of noise, the diaphragm carburettor Walbro, with induction in the crankcase, is in fact equipped with a special air box and the exhaust silencer, the same belt drive (with various types of relationship to second propeller installed, the standard is 1:2.7) contributes to the overall simplicity and quietness. Consumption in cruise is 3.5 l / h, comes to 5 l / h using intensive.

**For the skeptics Matthew Orazi demonstrates how heavy the Monster 185 is, the most powerful engine in the range**



<b>Regime motore</b>	<b>Velocità km/h</b>
6800	55
7000	58
7600	63
7800	65
8000	68
Max > 8.400	78,9

Stick in the belly, the engine is idling at 45 km / the elevator loses authority, but the wing, however, does not reach the critical angle of stall



The Zigolo is a small and elegant migratory bird that often lives along the Italian coast, just like this glider born in 10 km from the Adriatic