FANTASY AIR

Aircraft Flight Test Review - By Mario Mayerhofer - Australia

The FANTASY AIR **ALLEGRO 2000** tested May 2004

The new Allegro 2007 over the Czech Republic

Following an invitation to test fly the latest addition to the range of high quality, high performance microlight aircraft, or more appropriately, very light aircraft, I headed south to the privately owned Heckfield Aerodrome

The weather on this morning was perfect for flight testing. A crisp 18 degrees Celsius, a QNH of 1009 and a light and variable wind of 4-5 knots. The wind was predicted to increase during the morning which would enable me to fully explore the Allegro's cross wind capabilities and handling, as well as anything else we could think of within the aircraft's performance envelope.

Arriving at the hangar, I was presented with a set of excellent and very detailed manuals to browse and become familiar with the aircraft before we took to the skies. The manuals contained everything - standard handling and technical data, complete operating checklists, general instructions, maintenance and rigging instructions - right down to explanations of how to anchor and clean the aircraft and carry out minor repairs. I found the documentation supplied with the Allegro very impressive and would even say they are probably the best manuals that I have seen for a microlight aircraft in this category.

The first walk-around and introduction to the Allegro showed the sleek, and relatively big, composite aircraft with large ailerons, generous flaps and a gorgeous T-tail empennage.

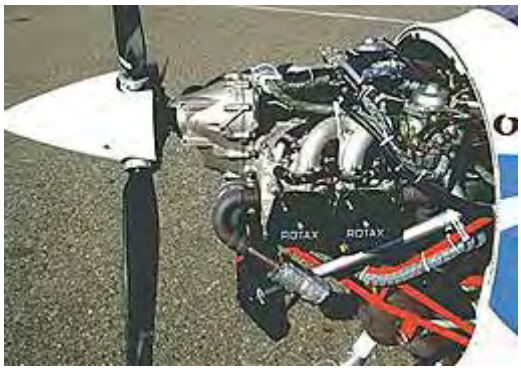
When walking around this aircraft, your attention is immediately drawn to the superb workmanship of both the metalwork and composite components. I guess the build quality is no real surprise since the Allegro composites come from the same factory in that Walter Extra's range of thoroughbred aerobatic planes, such as the Extra 300, 400 and other variants are manufactured.

Although the Allegro's configuration as a 2-seat, side-by-side, high wing aircraft is quite conventional, I was surprised to see conventional metal wings in conjunction with an all-composite fuselage. Also, the strut-braced wing assembly, which has a very similar geometry to a Cessna 152, shows exceptional workmanship throughout the entire metal construction and metal/composite joints. The attention to detail puts many western-world manufactured, factory built aircraft to utter shame.

Contents of the Allegro **Q**uick **B**uild **K**it – Microlight SW version shown

The presence of a complete Allegro kit in the hangar, as well as the new factory built demonstration aircraft provided a great opportunity to see what was actually inside the airframe. Upon closer inspection, the entire airframe assembly appears to be very rugged and strong despite its sleekness and light weight. The undercarriage was the first area I wanted to inspect and I was very impressed by the main undercarriage mounting assembly and nose wheel design which will prove rugged enough for the roughest of strips.

Removing the 2-piece composite engine cowling to have a closer look at the engine installation, revealed a very neat installation of a Rotax 912 engine, swinging a ground adjustable, 3-blade Woodcomp carbon composite propeller.



There is a lot of attention to detail in the engine compartment, not only for looks but also for safety, with every lead, cable and wire meticulously and firmly secured. Somewhat unusual is the radiator mounting position and configuration. Normally the radiator is located at the front of the plane in the clean airflow. The Allegro is different, being mounted horizontally at the rear and bottom of the engine compartment. I first thought that's a rather silly place to put it, but it's actually highly effective and close to optimum position to ensure a constant and non-turbulent airflow through the radiator system.

During my first walk-around of the aircraft, I was not quite sure whether the nose wheel assembly was slightly offset from the centre line but it indeed is mounted off centre to allow the optional use of different engines some of which have a rear mounted electric starter motor. The nose wheel-assembly is also a very well designed unit without any slop in its operation or obvious weak points.

Inspecting the cockpit and interior sections of the Allegro, one of the first things which are quite impressive are the cabin doors which show an exceptional fit and trouble free operation of the locking mechanism. Held open with a firm strut, they show no unwanted play or slop in any component. Ruggedly built, they can even be opened in flight.

Getting in and out of the aircraft is a breeze, even for a bigger and somewhat not so flexible guy like myself. The cockpit is very roomy in all aspects with plenty of leg room. There is ample room in the cabin for two, not really anorexic, fellows like Michael and myself. Looking at Michael, seated in the aircraft, I noticed good head clearance for a 6'2" pilot wearing a headset.

Both seats are fully adjustable, sporting an unusual but ingenious design which uses a seat belt like harness system to adjust the seat backwards, forwards and also in height. The system is very effective and easy to use, therefore eliminating the need for the more complicated adjustable rudder pedals.

The instrument panel is positioned at a comfortable distance even with the seats all the way back and all the switches are within reach when seated and firmly strapped in. The primary control system is a conventional centre-stick configuration. It is ergonomic to use and well positioned in all seating configurations. A special Y shaped control stick is available if the aircraft is to be used for training.

Latest panel showing optional Dynon D -100 EFIS and TL Electronics EMS systems

The dual throttle levers, which are located on either side of the seats, are comfortable but could be mounted a little further back especially in the full throttle position. If you were a little shorter or had your seat further forward then they would be perfectly placed. It really is a case of making an aircraft to fit a wide variety of pilots' shapes and sizes. The elevator trim is located in an easy to reach overhead position utilizing a choke-like lever which proved to be very effective and simple to use. The actual choke for the engine is located just in front of the door and also easy to reach.

The Allegro does not have the usual toe-brake system but is fitted with a very effective and easy to use control stick mounted brake lever as used on Yaks and other high performance aerobatic machines. The brakes are hydraulic disks, which look to be of very high quality and I found them to be very effective. I really liked the parking brake which is very easy to use. My initial concerns of a possible deficiency in ground handling, i.e. turning radius like a school bus, did not eventuate during the first taxi when the Allegro not only showed a firm but very good suspension and excellent tracking, but also an excellent turning radius.

Fuel management for the 55 litre fuselage tank (now 63 litres on 2007 model) is almost fool-proof incorporating a simple on/off lever mounted on the instrument panel in an easy to see position. The system is also very safe with all the fuel lines being either under the floor or in front of the firewall, eliminating the possibility of fumes or fuel leaking into the cockpit area. There is also a long-range fuel system available as an option, on the GA version which consists of two wing tanks boosting the fuel capacity to 105 litres. The wing tanks gravity feed into the main tank as required.

Instrument layout is conventional and the reviewed Allegro was well equipped with standard, good quality, day-VFR instruments on the left side of the panel, VHF radio and intercom in the centre and engine monitoring gauges arranged on the right side of the instrument panel, all were in easy view of the pilot and passenger.

There is a very large luggage compartment behind the seats, which is capable of storing 20 kg of luggage (subject to MTOW and balance) and has been neatly fitted with a recessed storage compartment for the flight manuals. The area is really well thought out and large enough for some serious camping trips. There is also some additional storage under the seats, a perfect place for the heavier items like tie downs, oil etc as it's right on the CofG. I would guess there is more than a cubic meter of storage in the rear of the plane

An earlier development aircraft showing old type engine cowl with external radiator (now internal for low drag)

FLYING THE ALLEGRO 2000

After another thorough inspection of the airframe and engine compartment, I could find no more excuses not to take this very appealing aircraft where it belongs – into the air.

All of the flight checks are straight forward with only a handful of well-labelled circuit breaker like push buttons and easy to read instruments to review. After running through the pre-start checklist with Michael, we started the engine, set trim to neutral and, using a conveniently located selector in front of the control stick, checked the electrically actuated flaps in all positions before setting them to stage one, 15 degrees, for take-off.

A large and bright gauge displays the flap positions of 0, 1 or 2 and flashing LEDs indicate flap movement until the selected position is reached. As the flap traverses down, a red flashing LED lights and while moving up, a green LED flashes. It is a very simple system, which is basically foolproof. I really like it.

During taxi, the Allegro tracks straight with very effective and comfortable nose-wheel steering. A brief application of the brakes every now and then keeps the taxi speed within a comfortable pace. The hydraulic brake system is very effective, holding the aircraft in position to almost full throttle during an engine run-up following the normal thorough warm up and standard engine/magneto checks.

Opening the throttle fully at the MTOW of 520 kg (Australia spec) with two people and full fuel on board, the Allegro, which is Italian for “happiness”, certainly does put a grin from ear to ear on ones’ face. The Allegro has very brisk acceleration and, following a short take-off run to approx. 55 knots IAS, a light backwards pressure on the control stick has the plane settling at 1300 fpm climb with full throttle.

After getting the performance details I wanted at full weight, and after a thorough rundown by Michael on the aircrafts performance envelope, we returned to the airfield where I jettisoned about 100kgs of ballast at the edge of the runway by sending the proud owner for a relaxing walk back to the hangar (Was there a slightly concerned look in Michaels face?). I headed off to conduct some thorough flight testing in the local area following the 5 page check list which I had prepared earlier to explore the aircraft’s characteristics throughout its entire performance envelope.

Initial attention was paid to the aircraft’s climb performance. Based on the recorded empty weight plus an 86 kg pilot and approx. 40 kg of fuel, I calculated that my take-off weight throughout the testing was between 382 kg and 401 kg. The initial rate of climb was in excess of 2000fpm immediately after take-off, settling in at an average of 1850fpm indicated at 55 knots IAS. This rate of climb appeared to be very accurate when cross-checked with ALT and time to climb. A cruise climb of 70 knots, in the above weight range, showed a sustained climb of 1400 fpm. Impressive!

Visibility during these operations (including ground operations) can be classed as excellent all round. As with almost any fixed wing aircraft, forward visibility at excessive nose-up attitudes or high angle of attack situations is somewhat limited however, in normal flight situations, the Allegro's visibility can be classed as being excellent with the only blind spot directly to the rear of the aircraft. I would guess that the shadow zone extends from approx. 25 degrees on the pilots side to around 45 degrees on the passenger side. The large lexan roof panel also provides excellent visibility in tighter turns which is a welcome feature in the circuit area. The demonstrator aircraft had tinting on the roof panel which could also be painted to completely cover the roof if preferred.

Although the Allegro is a very responsive aircraft in all three axis, it is also a very stable aircraft throughout its flight speed envelope. No adverse characteristics concerning the aircraft's stability were encountered throughout the normal operating envelope. Turbulence penetration was good without any tendency to require excessive control input.

Following another touch-and-go and confirming the Allegro's climb performance, the aircraft was levelled out at 2500ft to explore its speed envelope and this is where the Woodcomp 3-blade ground adjustable propeller that Michael was raving about really did show its exceptional qualities.

Allegro 2007 with latest low drag cowl – Note lack of opening for radiator – air is now drawn in around spinner and exits behind nose leg

At an estimated weight of just under 400 kg, I was **not** able to maintain a 75% power setting (5400RPM) at straight and level flight without exceeding the aircrafts max cruise speed of 118kts IAS!

Throttling back the Rotax to 5200 RPM the IAS settled in at 107kts. A further reduction to 5000 RPM still showed a respectable indicated airspeed of 101kts. Going back further to reduce fuel burn, a power setting of 4800 RPM produced 95kts and a mere 4600 RPM still maintained 91kts.

Although there is no electronic stall-warning device fitted to the reviewed aircraft, the Allegro shows adequate aerodynamic stall warning, with a brief but pronounced stick shaker at approx. 2-3 knots above the stall. Clean and at idle power the aircraft briefly shakes at 44 knots IAS, followed by gentle simultaneous drop of the nose and right wing at 41kts, which is easily recovered without significant loss of altitude by releasing back pressure and applying a little left rudder. By releasing stick pressure alone, and without the use of rudder, the aircraft recovered itself to trimmed position with a loss of approximately 100 feet of height.

Please note that flaps in clean cruise configuration are actually set at –4.5 degrees (negative), similar to the systems used on high performance competition gliders.

With flaps set either to 15 degrees (stage 1) or 48 degrees (stage 2), there is no notable difference in stall characteristics except for a further reduced stall speed to 39kts and 36kts IAS respectively. Similar to the clean configuration, a pronounced buffeting is felt at about 3 knots above the actual stall.

Stall characteristics in the configurations above are docile and without any unusual characteristics but I still considered the aircraft showed enough movement to be suitable for training and give students the feelings of stalling without entering heart stopping and in some aircraft life threatening manoeuvres.

Stalling the aircraft at 5400 RPM, or approx. 75% power, is slightly more exciting. The Allegro requires a frightening, near vertical, angle of climb at this power setting to reach a fully stalled condition, which occurs at approx. 37 knots. In this highly unusual situation, there is no noticeable warning and as soon as the aircraft is stalled a rather pronounced wing drop is encountered. This is followed by a roll almost to the inverted position before dropping the nose through the horizon. As soon as the nose drops, with instant reduction of power to avoid over-speeding the green arc on the ASI, the aircraft is easily recovered without entering the yellow arc on the ASI.

It may sound like a rather nasty characteristic of the aircraft but be rest assured that you will never enter this situation unless it is done on purpose. During normal operation, there is no possibility that the average / normal pilot will reach such a critical attitude. Although it is arguably the most popular aircraft for student training and club operations alike, the fully certified Cessna 150/152 will display similar characteristics if such a severe flight profile is attempted.

While trying out the characteristics at unusual attitudes, and as I still had sufficient altitude, I was keen to see how the Allegro would respond in a sideslip in various configurations of flap settings.

The aircraft is very easily brought into a steady sideslip due to its highly effective and large rudder. Even in a severe sideslip, there is plenty of control deflection on the ailerons left to manoeuvre the aircraft directionally. Staying within the green arc on the ASI (78kts) a stable rate of decent of 1400 fpm can be achieved with ease. Maintaining the max. flap extension speed of 60kts, the aircraft will achieve a 1000 fpm rate of decent with flaps set to stage one and 1100 fpm at stage two. During these manoeuvres, the Allegro does not show any sub-standard characteristics, maintaining very stable and controllable flight throughout.

Exploring the aircraft's roll rate with ailerons only it is noted that there is some adverse yaw tendency which is easily compensated for with a bit of rudder. Although this is noticeable when purposely entering an uncoordinated turn, the aircraft settles itself with the ball almost back in the middle within about 2-3 seconds maintaining a steady, stable and coordinated rate of turn. The Allegro likes a little rudder to be used with aileron to maintain a perfectly balanced and stable turn, which again a useful characteristic for a trainer.

The Allegro's rate of roll from 45 to 45 degrees bank with no flap is approx. 2 seconds. There is little change when the flaps are set to stage one. At full flaps the roll rate from 45-45 degrees increases to approx. 3.5 seconds.

Another often neglected but important feature is the cockpit noise levels, especially for long, touring trips. Removing the headset in normal 95 knot cruise I noted the noise level is extremely low, so low in fact it would be possible for a normal conversation to be maintained without the use of the intercom. There are also no noticeable vibrations throughout the aircraft, adding greatly to the comfort of flying this remarkable machine.

The cockpit ventilation is excellent without any noticeable fumes or other running gear related smells. With the vents shut there are no drafts in the cockpit and the doors fit and seal extremely well. The fresh air vents located in the doors and floor of the cockpit offer full controllability of the airflow on either the pilot or passenger. There is a fresh air vent at the base of the windscreen, to minimize fogging, which is always on in flight but you don't get any draft in the face because the flow is not that strong. Our test aircraft was not fitted with a heater but Michael assures me that they work well, having spent several hours flying the plane in the Czech Republic in below zero temperatures.

Unfortunately, the only thing left to do was to see how this little beauty performed in the all-important "engine out" situation. At 1500 ft above the airfield the throttle was cut to just enough increased idle RPM to neutralize the drag of the super-smooth and highly efficient propeller (yes, I really do like that engine/prop combination) in order to perform, or more appropriately "attempt", a simulated forced landing. That's where the Allegro really surprised me ! It has a superb glide ratio at around 55-60 knots, which I believe could be close to optimum glide-speed in a clean configuration.

During the glide approach while trying to hit the threshold I would have preferred manually operated flaps, which I am more familiar with, but the electric flaps can be easily fed in as needed by working the switch. Overshooting the threshold by about 150 feet I decided to try again, now knowing the excellent glide ratio of the aircraft. Once the aerodynamic quality of the aircraft is considered, it's a breeze to put it exactly where you want it.

A very early Allegro with old type tubular main landing gear – now replaced with ultra tough Kevlar/Carbon composite

It was then time for a few landings with different flap settings before bringing Michael his pride and joy back to the hangar. It was a brand new aircraft with unmarked wheel spats and a very good prop without a chip in it, and I wanted to keep it that way. The following landing distance figures are achieved without slamming the aircraft onto the deck or braking violently on the relatively rough runway.. However, if the need to reduce the landing distance arises, for whatever reason, there is still plenty of margin to bring the aircraft to a rapid halt using the efficient hydraulic braking system.

After playing with the elevator trim, which is very effective and easy to use, the aircraft was trimmed out in landing configuration by setting the flaps to 48 degrees at the maximum flap extension speed of 60 knots. The flaps are so effective that it initially feels like flying into a wall with the airspeed rapidly decaying upon application of full flap. Considerable power is needed to maintain an approach speed of 44 knots, which feels very stable and comfortable without any instability or tendency to wallow. The flap system is highly effective and with full flaps attention must be paid to the ASI not to allow the airspeed to decay, you need to use a steep approach angle or a little power to keep the plane above the stall.

Touch down is very easy with no tendency to balloon or bounce. Once on the runway, the undercarriage proved to be sturdy without any rattling or vibration, it has a firm but comfortable ride with the aircraft tracking absolutely straight thanks to the steerable nose wheel. Landing roll with light braking and approx. 4 knots of wind on the nose was estimated to be about 130 metres.

The next approach was conducted with flaps at 15 degrees, or stage one, and resulted in a very easy 48 knots approach while still maintaining the Allegro's excellent visibility. As with full flaps during approach the landing roll is not considerably longer, however a lot less power is required to maintain a steady approach speed and flap position 1 would be my choice for all but the shortest of strips.

Flapless landings are very easy, maintaining a stable, but very shallow 56 knots approach due to the clean aerodynamics and low drag of the aircraft. Roll out distance in a flapless configuration with no brakes is approx. 200 metres. Not bad, considering the light wind and runway conditions.

Cross wind characteristics could only be established to a certain degree due to light and variable winds, however the experienced cross wind component of approx. 5-6 knots was hardly noticeable and did not require any considerable measure or compensation. I would consider the plane to be fully controllable in much higher cross wind situations.

Now on the final extended circuit I opened the left door in flight to see the potential for using the aircraft to take photos or filming. With only the left door open and the strut locked securely in place there was no sign of flutter or vibration at the tested airspeed of 78 knots IAS. To shut the door safely, I unlocked the strut and applied a bit of right rudder. The door shut slowly and steadily, allowing closing of the locking mechanism with ease.

A final text book landing and taxi back to the hangar concluded a very pleasant flight in this remarkable aircraft which not only looks great, but also lives up to what the manufacturer claims. I found that the Allegro actually exceeds the factory figures in some cases which is pleasantly refreshing because a lot of aircraft that I have tested don't meet the factory printed figures.

Even without the optional long range fuel system, the Allegro has more than enough range and endurance to be a safe and comfortable touring aircraft which is not only a lot of fun to fly, but also very economical to operate and maintain. Fuel consumption testing done the week following my flight test report confirmed consumption of around 12 litres/hr at 90kts cruise. This gives the Allegro performance and economy which is hard to beat and with the 4 cylinder Rotax engine you also have low maintenance and exceptional reliability.

Although the Allegro likes to be flown a little bit less ham-fisted than some other classic trainers, it is most definitely a good aircraft for student training, not only because of its safe and good handling, but also, despite its sleek looks - its ruggedness, almost fool proof systems, very good range on cross country operations and easy entry and exit, which are all welcome features by busy flying schools.

Although looking very hard, there is nothing I could really fault on this aircraft throughout its flight envelope and features, and, as its name Allegro suggests, it certainly does put a big smile on your face when privileged to fly this remarkable machine.

Shown above is one of the more noticeable differences between the "Old" 2000 and "New" 2007 Allegro. The larger fin and rudder with blended dorsal fin have enhanced the directional stability and the Allegro now needs much less rudder to keep the turns in balance and the ball in the middle. Using a little rudder is still useful for really balanced turns, making the Allegro great for pilot training and is also good for maintaining piloting skills by remembering what your feet are for.

Allegro 2000 over the Snowy Mountain Range in Australia

New 2007 Allegro showing Lexan roof panel that gives great visibility in tight turns and the circuit

New Allegro 2007 Technical Specifications (UK 450kg MTOW Model)

Also available as a VLA 520kg version (Group "A" licence.

Wing	SM 701 profile, (Tapered wing on 2007 VLA version)
Engine	Jabiru 2200, Rotax 912 80hp or Rotax 912S 100hp
Fuel Tank Capacity	55 litres (Now 63 litres on 2007 model)
Propeller	Woodcomp – Carbon Composite - Ground adjustable
Dimensions	
Wing span	9.6m on SW model or 10.8m on 2007 VLA model
Overall Length	6.1m
Overall Height	2.0m
Wing Area	11.4m^2
Gliding ratio	1:12
Weights	
Max Take Off Weight	450kg
Max Empty Weight (Depending on equipment)	262kg with Jabiru 2200 267kg with Rotax 912 265kg with Rotax 912 S
Load factors	+4,0g -2,0g
Performance (with Rotax 912 80hp @ MTOW)	
Max speed (Vne)	120kts
Cruise speed	90kts (≈12litres/hour)
Stall speed	35kts
Rate of climb	1,000 ft/min
Max duration	4.5 hours with reserves @75% power
Take off run	150m
Take off to clear 15 m	250m
Landing run	100m
Landing over 15 m obstacle	220m

Specifications may change pending British approval

FANTASYAIR UK

The Penthouse, Bosworth Hall, Husbands Bosworth, Leics. LE17 6LZ
Tel: 01858 880533 Fax: 01858 881335 Mobile 07790 045959
Email: sales@fantasyairuk.com Web: www.fantasyairuk.com