



Flying for Freedom update
New European Service Centre
Mardi Gras Parade
Tech Topics
The Wing is the Thing

Ian Bruce landing on the numbers at Dunkeswell in his GT450



Credit: mikenelsonphotography.co.uk

Welcome to the Spring edition of the P&M Newsletter. Whilst we continue to operate in a tough market place, P&M are making every effort to respond to customers needs by improving products and accessories. We also now consider the part exchange of older Pegasus and Mainair aircraft against the sale of a new aircraft.

With SDDR now firmly in place, we responded at the end of last year by producing the Quik Lite which hosts the Rotax 582 two stroke engine and the original small Quik wing. This aircraft is an absolute delight to fly and not only being considerably cheaper to purchase, the Quik Lite is no more expensive to operate than the 912 for the average trike pilot. This SDR trike is now available in two models, the 'Quik Lite' (Basis version) and the 'Quik Lite Executive' which hosts the Explorer option with wheels and spats.

As we go to press, we will have another version to add to the Quik Lite stable. Being launched at the Popham Trade show on 2/3 May, the 'Quik GT Lite' (a two seat Permit to fly trike) featuring the popular 13sqm GT450 wing will be available for sale.

For those who have been flying microlight aircraft for many years, will be well aware of the continuing rise in prices for new aircraft. This year we made the decision to freeze all our prices, but sadly due to a substantial hike in the costs of obtaining the Rotax 912 engine, we are having to pass these costs on to customers. As a result all new aircraft with a 912 engine will have a price increase of £1300 (912) and £1400 (912S) with immediate effect.

Finally, following the departure of Roger Patrick (MD) at the beginning of the year to the BMAA, and the return of Jim Cunliffe for just a six month period, who has been holding the reins, P&M is now keen to speak to anyone who has microlighting experience and with managerial /administrative skills who might be interested in joining us to help take the company forward. In first instance please write enclosing your CV to Julia Anderson at P&M Aviation, Unit B Crawford Street, Rochdale, Lancashire OL16 5NU

Its not that easy being Green...



By way of a quick update, the Flying for Freedom team are still on course for the South Pole. The attempt will now be taking place in 2016 to correspond with the next Airbus Trade mission trip to New Zealand. Word on the ground says they have some significant support in New Zealand, of which the details are still under wraps, but they hope to be able to make an announcement in due course, along with the updated expedition plan.

Meanwhile this year the F4F team have got another challenge. Luke Sinnott (Double above the knee amputee) has put together a plan for the team to fly round Britain Clockwise to raise some PR. This plan is underway, but they are short of Aircraft. They currently have three Aircraft in the fleet (GTR, PulsR and a Quantum 582) and Cpl Alan Robinson will be flying his Quasar but they would like to field a few more aircraft if they can. If you are interested in meeting up on route, let them know. They will be publishing their confirmed route soon, although some of their landing points will be restricted as they are MOD (RAF Brize Norton, Odiham, Scampton, Cranfield, to name a few) www.flyingforfreedom.org



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The Flying Show



The Flying Show which returned to its old site in Telford at the end of last year was a huge success for all. P&M had a central position showing a Kermit Green Quik GTR, a Tango Orange Quik Lite Executive and a PulsR destined for Canada. On the GASCO stand they also used a QuikR as their trike to spot the faults in their Pre-Flight Inspection competition. The return to Telford was well recieved with the exhibition organisers doing an excellent job and having superb facilities readily available. The only moment of panic was when Kermit, who was strapped into our green Quik GTR went walkabout. The frog was eventually spotted hanging around on the Flylight stand found swinging from one of their trikes.! Frogs eh!

New Authorised European Service Centre

P&M are proud to announce that they have appointed Wanafly Airports in mid France as an Authorised Service Centre for Europe. Located centrally between Poitier and Limoges, Wanafly Airports are ideally positioned to look after P&M aircraft in this part of Europe.

Dave Lord has many years experience of permitting, flying, and servicing P&M aircraft, and along with his past experience as an engineer and an aerospace welder, he is well qualified for the job, plus the added bonus of speaking French.

Pilots wanting their aircraft serviced can simply fly in to Dave and Amanda Lord using their own private 650m runway which sits beside their renovated farmhouse. With 3 guest bedrooms and additional accomodation, Wanafly can offer the whole package including flight training, conversion courses and more. For more information Telephone: 0033 555 602112 or email: info@wanafly.co.uk. Web: www.wanafly.co.uk.



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Microlight Promotion USA style



When you want to promote a sport then turn to the USA. P&M USA seen here promoting microlight flying at the Mardi Gras Parades in Gulf Shores, Alabama featuring a GT450 on the back of a trailer being towed by their beautifully branded truck.



Flying Suits - Jackets - Accessories - Footware - Gloves

OZEE suits have been used over the years for countless records and expeditions. They are currently carrying a large range of soft shell jackets and fleeces ranging from £35 for the soft shell and £20 for the fleece jackets. Contact: 01268 565307



Tech Topics

Undersurface Venting of the QuikR & GT450 sail Modification M279 (QuikR) & M290 (GT450)

Reason:

The development of the GTR wing showed a marked improvement in pitch stability and lateral/directional stability at the top of the speed range (over 75mph) with undersurface venting. The venting stabilizes the wing so that it can be fully compliant with BCAR-S without tip fins, thereby reducing roll inertia, increasing roll response, reducing cost and weight. Removal of the fins is treated as a separate modification M281.

The problem:

At high speed/low angle of attack, a low pressure peak develops on the undersurface behind the leading edge tube, causing the undersurface to inflate. In general, this causes the affected wing to drop. Also at high speed/low alpha, the directional stability is at a minimum because the directional stability of swept wings is partly proportional to angle of attack.

If there is any yaw, then one side tends to inflate before the other, causing uncommanded rolling leading to Dutch roll oscillations. Behaviour in pitch in turbulence at speed is also adversely affected by undersurface inflation.

Solutions:

The original solution was to stabilize the wing directionally by tip fins, first introduced for the GT450. The GT450 is unstable in Dutch roll above 75mph without them.

For the GTR wing, even tip fins were not enough to prevent high speed handling problems because of the increased extent of undersurface. To combat the problem, the sail is vented on the undersurface just behind the leading edge.

The effect of venting the sail undersurface is to damp lateral/directional oscillations. It also drops the trim speed by a few mph therefore pitch stability is increased. If the tips are turned down at the trailing edges to recover trim speed, pitch stability will be similar to the original set up.

In roll, the roll response with the vented sail is much less nonlinear vs airspeed. Without vents, high speed roll handling becomes "squirrely" at high speed.



Fournales Shock Absorbers on Quik Range of Trikes - Modification 282

This mod replaces the current aerofoil side strut and suspension with a round side strut with a Fournales Shock Absorber.

Description

The Quik and Quantum range of aircraft have always had polyurethane suspension blocks incorporated into the side strut to act as a suspension. This has proved effective in helping to reduce the bumps but has always been considered a bit harsh and not as effective as a dedicated shock absorber.

Modification 282 replaces the polyurethane block with a specific shock absorber made by the French manufacturer Fournales. This same shock absorber had been used successfully for well over 20 years on the Air Creation range of trikes, and is also to be found on the Airborne Aviation trikes and the Ikarus C42 range of aircraft to name just a few. The fitting of the shock is such that it cannot be incorporated into the Aerofoil shaped side strut, however with the correct end fittings it fits into the original 1.3/4" diameter tube side strut as originally fitted on the Quantum, Quik and some GT450 aircraft.

The lower fitting of the side strut is unchanged from the original, ie a rose joint screwed into an aluminium socket, and the top fitting is also unchanged in that the top part of the shock absorber is also screw threaded to accept the original rose joint fitting.



Tech Topics

High Camber Battens for Quik - Modification M263

The Quik, particularly with the original "180prof" aramid trailing edge material, can develop increased washout over its life which results in a slower trim speed. The 180 Prof material has parallel strips of aramid material without diagonal fibres.

If the wing fast trim speed drops below 70mph despite turning the tip adjusters down to the maximum on the adjustment scale, then mod M263 hi camber battens will bring the trim speed back up by 7-10mph.

The fast trim speed on the Quik wing should NOT be set greater than 80mph or directional stability starts to degrade. The sail must be checked against service bulletin SB133 before embodying this modification.

For further details contact P&M Aviation



Pilot Operators Handbook Supplement for flying without Wing Tip fins

Modification M281

Applicability

QuikR, Quik GTR, Quik GT450

General: Wing Tip fins were added during the development of the GT450 wing to stabilise it against uncommanded yawing/rolling at over 75mph. More recently it has been found that the under surface venting of the GTR wing stabilise it so that the fins are no longer required. A similar modification M279 is now available for the QuikR wing and modification M290 for the GT450 wing. The tip fins increase lift at the tips so that removing them tends to reduce the trim speed by approximately 7mph. Trim speed can be recovered by turning the wingtip adjusters down and/or a combination of either the high / low wing camber settings. There is no effect on stall speed. If desired, fins can be fitted for stability and speed on long cross country trips or removed for slower local flying and better manoeuvrability.

QuikR: The QuikR must NOT be flown without tip fins fitted unless modification M279 (under surface venting) is carried out. The effect of under surface venting is to increase stability in pitch and roll especially at high speed.

The combined effect of removing the tip fins and the under surface venting is to reduce the fast trim speed by approximately 12mph. Trim speed can be regained by rotating the wingtip adjusters down by approximately 4 divisions provided the scale adjustment is not exceeded and/or a combination of either the high / low wing camber settings. The fast trim speed should be set within the range 90-95 mph.

Quik GTR: This wing has under surface vents as standard and no modification is necessary to fly without tip fins, throughout the placarded speed range.

Removal of the fins improves roll response by approximately 30% and also reduces the fast trim speed by approximately 7mph. The fast trim speed can be recovered if desired by turning both tip adjusters down approximately 2 divisions provided the scale adjustment is not exceeded and/or a combination of either the high / low wing camber settings. The fast trim speed should be set at 85-90mph.

GT450: The GT450 must NOT be flown without tip fins fitted unless modification M290 (under surface venting) is carried out. The GT450 is not stable in yaw/roll above 75mph without tip fins. Once modification M290 has been carried out there will be a reduction in the fast trim speed however this can be recovered by wing tuning as described for the QuikR and Quik GTR.





Single Seat De-Regulated Microlight

The Quik Lite

The Quik Lite 'Basic' is P&M's entry level single seat de-regulated microlight, combining the same power and performance as the Quik Lite 'Executive' which benefits from the superb handling of the 10.6sqm Quik wing with the smooth performing Rotax 582 engine. This aircraft comes with a manual trimmer, Rear wheel brakes and Grimeca wheels giving a truly serious single seat microlight to enjoy the skies.

Specification

Max Straight & Level Speed: 95mph
 Cruise Speed: 55 – 80 mph
 Typical Empty Weight: 180kg
 Tank Capacity 65 litres
 Overall Length 3.7m
 Wing Span 8.35m

Stall Speed: 36mph
 Climb Rate 1100 ft/min

Max All Up Weight 300kg
 Overall Height 3.74m
 Wing Area 10.6 sqm



Price	Exc VAT	Inc VAT
Quik Lite	£17,667.00	£21,200.00

(PART EXCHANGE ON PEGASUS / MAINAIR AIRCRAFT CONSIDERED)

Equipment

Rotax 582 (65hp) E-Type Gearbox (3.47/1) Electric Starter, Oil injection
 Warp Drive 3 Blade Propeller
 65 Litre Tank
 ASI, Alti, VSI, Tacho, Voltmeter, WTG, Fuel Gauge, Silva Compass
 Manual Trimmer
 Grimeca Wheels
 Rear Wheel Brakes
 Prop Covers



For Rotax Engine Warranty minimum engine instrument requirements as per specifications. Aircraft registration not included. Aircraft sold as a de-regulated single seat microlight for operation in the United Kingdom under the rules published by the CAA.



The Quik Lite 'Executive'

The Quik Lite 'Executive' is a single seat de-regulated microlight with maximum equipment and performance combining the superb handling of the original 10.6sqm Quik wing with the smooth performing Rotax 582 engine. This is a truly serious all round single seat microlight which comes with the 'Explorer' wide wheels and Spats, electric trimmer with trim indicator, front brake and landing light, giving you everything you need to enjoy the skies.

Specification

Max Straight & Level Speed: 95mph	Stall Speed: 36mph
Cruise Speed: 55 – 80 mph	Climb Rate 1100 ft/min
Typical Empty Weight: 190kg	
Tank Capacity 65 litres	Max All Up Weight 300kg
Overall Length 3.7m	Overall Height 3.74m
Wing Span 8.35m	Wing Area 10.6 sqm



Price	Exc VAT	Inc VAT
Quik Lite Executive	£19,317.00	£23,180.00

(PART EXCHANGE ON PEGASUS / MAINAIR AIRCRAFT CONSIDERED)

Equipment

Rotax 582 (65hp) E-Type Gearbox (3.47/1) Electric Starter, Oil Injection
 Warp Drive 3 Blade Propeller
 65 Litre Tank
 ASI, Alti, VSI, Tacho, Voltmeter, WTG, Fuel Gauge, Silva Compass
 Explorer wide Wheels and Spats
 Electric Trimmer with Trim Indicator
 Gas strut
 Front Brake
 Prop Covers
 Landing Light



For Rotax Engine Warranty minimum engine instrument requirements as specified. Aircraft registration not included. Aircraft sold as a de-regulated single seat microlight for operation in the United Kingdom under the rules published by the CAA.



The Quik GT Lite

A new permit to fly 2 seat aircraft

The Quik GT Lite is a two seat 'Permit to fly' microlight with maximum performance. Combining the popular 13sqm GT450 wing with the smooth performing Rotax 582 engine, this aircraft is a true high performance entry level two seat 'Quik' with total freedom to enjoy the skies. Featuring a new vented under surface wing this aircraft is supplied without the wing tip fins normally found on a GT450, however tip fins are available as an optional extra for cross country flying. The Quik GT Lite comes with everything you need to go flying including the 'Explorer' wide wheels and Spats.

Specification

Max Straight & Level Speed: 85mph (VNe 110mph)

Cruise Speed: 45 - 75 mph (Hands off trim)

Climb Rate: 550 ft/min @ 450kg vs 1100 ft/min @ 300kg

Stall Speed: 38mph @ 450kg vs 32mph @ 300kg

Typical Empty Weight: 200kg

Tank Capacity: 65 litres

Overall Length: 3.7m

Wing Span: 9.25m

Overall Height: 3.74m

Max All Up Weight 450kg

Wing Area: 13 sqm



Price	Exc VAT	Inc VAT
Quik GT Lite	£19,958	£23,950

(PART EXCHANGE ON PEGASUS / MAINAIR AIRCRAFT CONSIDERED)

Equipment

Rotax 582 (65hp) E-Type Gearbox (3.47/1) Electric Starter, Oil Injection

Warp Drive 3 Blade Propeller

ASI, Alti, VSI, Tacho, Voltmeter, WTG, Fuel Gauge, Silva Compass

Explorer wide Wheels and Spats

Electric Trimmer with Trim Indicator

Gas strut

Front Brake

Prop Covers

Landing Light

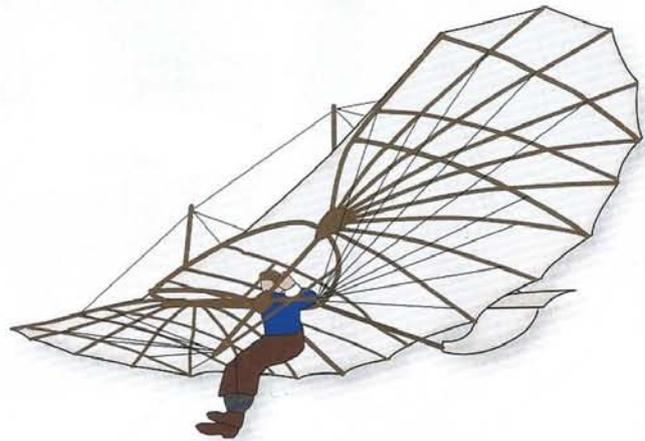


For Rotax Engine Warranty minimum engine instrument requirements as specified.
Aircraft registration not included. Aircraft sold as a Permit to Fly two seat microlight.

BY MIKE HUDETZ FEATURING DARREN ARKWRIGHT AND DR. BILL BROOKS

The Wing is the Thing Part 2

Mike Hudetz introduces Darren Arkwright and Bill Brooks of P&M Aviation who share their thoughts on trike wing design



The trike carriage and engine have a lot to do with the power and comfort of a trike, but when it comes to feeling safe and confident in the air “the wing is the thing.” Most any wing can handle calm air and fly smoothly without much effort, but add speed and turbulence, and you’ll start to separate the pros from the beginners.

There are still about 50 trike companies world-wide, but only about a half dozen still active in the US market. Of those, there are only four companies that are actively sold here, and world-wide, who also continue to improve on the trike wing/flex-wing technology. These are: Air Creation (France), Airborne Windsports (Australia), P&M Aviation (UK) and Evolution Trikes (Florida, USA).

There are many aspects to improving a trike wing, and all must be considered on each step of the evolutionary path. The trike came on the scene in the mid-eighties as a simple, inexpensive, fun flying machine. Evolving the wing technology does not only mean more speed and maneuverability, but also remaining true to the original mission of the trike—simplicity, easy set up and take down, easy to transport, low price, and easy for the average guy to fly, maintain, and repair.

To take a deeper look at where we’ve been, the capabilities of the newest wing designs, what’s happening in the market, and where things may go from here, we asked wing designers at the ‘Big 4’ to give us some of their insight and a brief assessment.

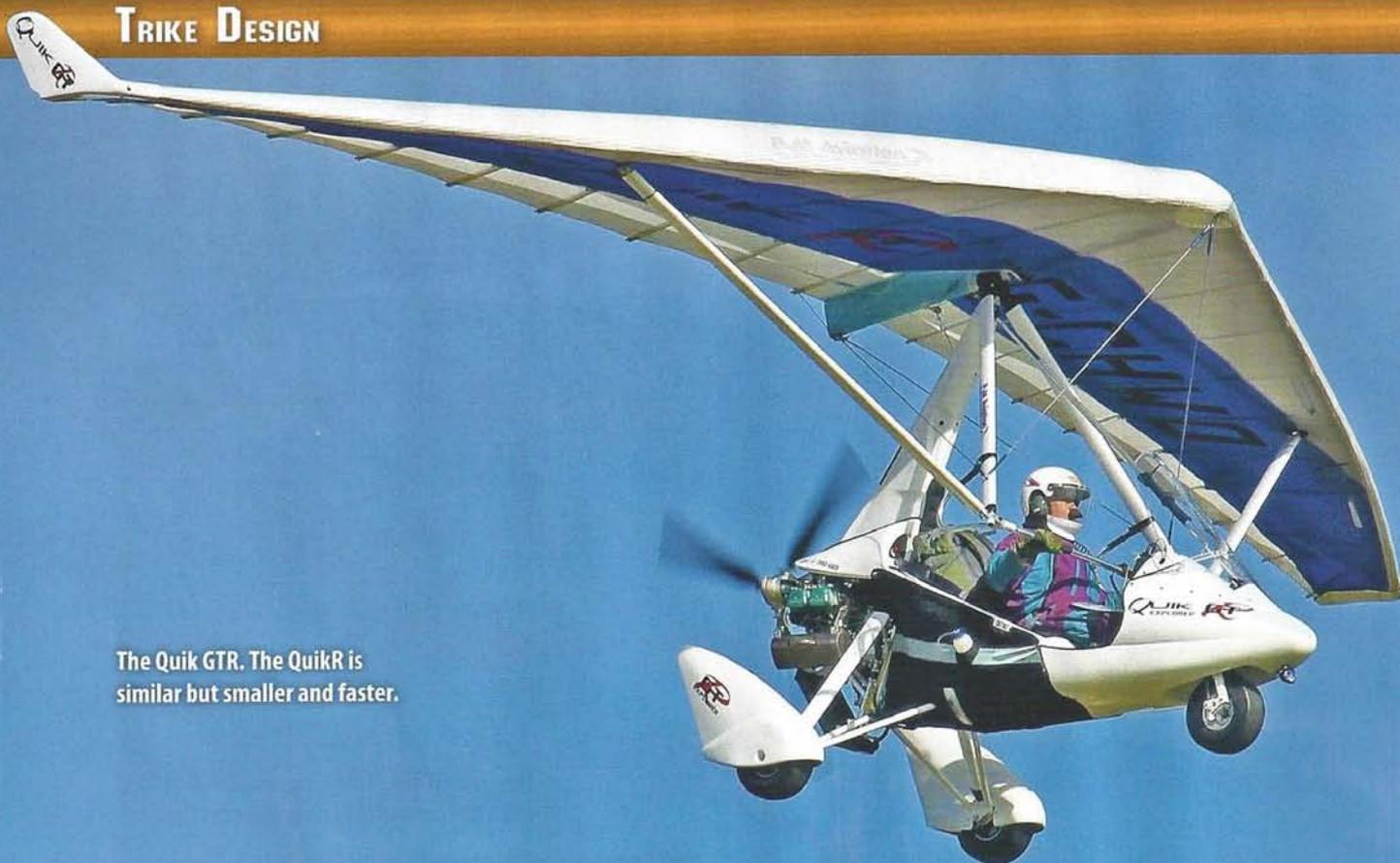
Our second report comes from Dr. Billy Brooks and Darren Arkwright at Pegasus:

Recent and Future Developments of P&M Flex Wings

by Dr. Billy Brooks and Darren Arkwright

In the early years of microlighting, manufacturers were making the lightest and most inexpensive aircraft they could. Within a few years, most were building right up to the limit of what the regulations would allow, in terms of weight, wing area and speed. Most of the developments of our flex wings over the last 20 years have been influenced, if not driven by, changes in the regulations.

At the start of the 1990s, we were building aircraft to a 390kg (860lb) weight limit and a maximum wing loading limit of 25kg/m² which resulted in two-seat wings, having areas of about 15 square meters. In 1996 we managed to squeeze a Rotax 912 engine into this weight limit, giving much improved economy and reliability. We also had a single-seat wing called the Bandit, which at 10.6 square meters was much smaller than most wings, but being single-seat, still satisfied the wing loading regulations. When the wing loading regulation and all up-weight was changed, around 1999, to a maximum stall speed requirement of 40MPH and 450kg (992lb) MAUW (Maximum All Up Weight), it was obvious to Bill Brooks that with modifications, the Bandit wing, modified to carry two people, would be the smallest wing that would stall below 65KPH (40MPH). As well as a stiffer airframe, Kevlar bands were introduced in the sail to maintain low twist at dual loading. This super small two-seater was called the Quik and its small size and light weight gave it light handling and a step change in maximum



The Quik GTR. The QuikR is similar but smaller and faster.

cruise speed. The Quik sold well, is still in production and was the starting point from which all our current aircraft stem. The Quik had a much bigger speed range and required a pitch trimmer to make it useable. This was initially done by lifting the luff lines up and down. This was simple and worked, made the wing very pitch stable at low speed, but had an adverse effect on lift and roll handling.

Yaw stability of swept wings reduces at high speed/low angle of attack. We were the first to use large spat fins on the trike to stabilize it without resorting to a tail boom.

Having produced a 'pocket rocket,' the next step was to design a 450kg touring aircraft which could also be used for training and replace the 15 sq m Q2 wing. The 13 sq m Quik GT450 was the result, which features an electric pitch trimmer. This works by setting the hang point well forward for high speed and applying increasing nose-up spring bias when flying slow. This system has no adverse handling or lift effects and also provides some gust alleviation. Tip fins were introduced primarily to stabilize the wing in yaw at speed, though they improve glide a little and look cool! The weight increase allowed our aircraft to become more comfortable and more

sophisticated. Over this decade, as well as the pitch trim we introduced bigger fuel tanks, better windscreens, disc brakes, 912S engine, more comprehensive instrument packages and increased storage. The old weight limit allowed one or two of these features; now you could have all of them. The GT450 carries its own weight in payload allowing two people, some baggage and max fuel to be carried.

Our most recent developments have not been inspired by regulation change, but by the constant desire to be more efficient, faster and more practical. We now have strutted wings developed from the Quik and GT 450. The Quik development is called the QuikR, and at 11.43 square meters, it is a little bigger than the Quik, but it can carry 450 kg. With the addition of side struts that can take the negative loads, the top rigging has been removed. The aircraft is quieter (no shrieking wires) and faster. It has a trimable speed range of 60-100MPH. The strutted wings also come into their own when it comes to storage. Without a kingpost, the trike and wing will go through a much lower door, but more importantly with most of the battens still in the wing, it can be folded while still on the trike and rolled into a standard 20 foot container.



Wing folded QuikR ready to roll into a 20 foot container.



The Roll Trim Control on a Quik

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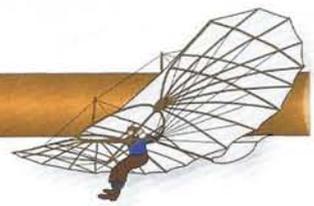
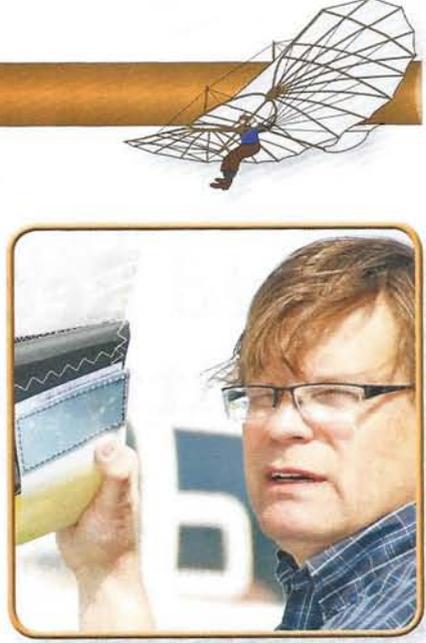
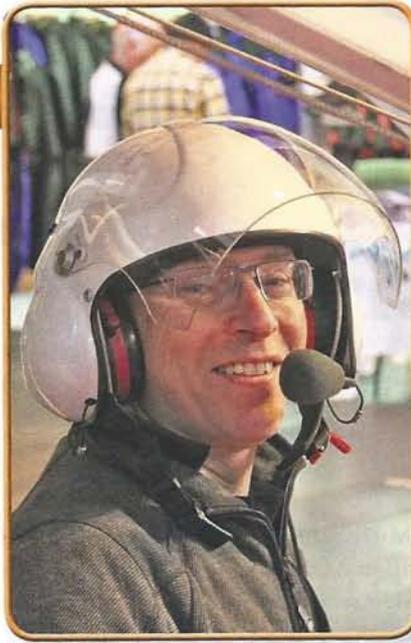


Above: The monocoque carbon PulsR with GTR wing

Right: Pegasus Q Wing

In the last two years, the weight limit has been raised again to 472.5 kg for aircraft fitted with a recovery parachute. The new PulsR monocoque carbon trike was designed to this limit and required a new 13 sq m wing, called the GTR. The strutted development of the GT 450, the Quik GTR will carry 472.5 kg and has all the features of the QuikR. In addition, it has new vents in the undersurface of the wing, which control the pressure in the wing and maintain the wing shape and improve stability. Normally, flexwing roll response is faster at high speed and tends to get stiff at approach speeds. Control has been improved by a system called STARS, which warps the wing in response to roll inputs, improving roll rate particularly at low speed. The latest development of this is in-flight roll trim, which varies the twist on one wing, allowing annoying hands-off turns to be eliminated no matter what speed, power or loading.





From Left to Right: Darren Arkwright, Dr. Bill Brooks, Mike Hudetz

And what of the future?

The trike is fundamentally a simple machine which delivers so much. It is the motorcycle of the air which delivers a unique open-air experience, the wing being an extension of the pilot's arms, like a dream of flight. The comfortable PulsR still gives this feeling and pilots love it, but it may represent a limit in sophistication. Totally enclosing a trike would probably be self-defeating as three-axis aircraft like the Flight Design CT range are a better solution. The trike also has competition these days from the new generation of gyroplanes, though they burn more fuel and ballistic parachute operation looks tricky.

So perhaps the future is to go back to simplicity, economy and purity. A new regulation change in the UK allows for deregulated, single seat aircraft, of less than 300 kg all up-weight. That looks like an invitation to build a lightweight microlight of old, but with 30 years experience, a better build standard and a bigger speed range.

To be continued... 🌟

For further information on Pegasus, contact Mike Hudetz, A&M Airsports Ltd. www.airsportster.com (630) 664-1892 mikeh@airsportster.com

The Quik Lite





Chris Kyne flying his GT450 in Kenya

1st PulsR arrives in the USA along with two Quik GTR's



P&M Aviation, Unit B, Crawford Street, Rochdale, Lancashire. OL16 5NU
Tel: +44(0)1706 655134 Fax: +44(0)1706 631561 or Manton Tel: +44 (0)1672 861350
Email: flying@pmaviation.co.uk Web: www.pmaviation.co.uk