A Tail of Two Legends

The editors update the G.M.P. Legend review

We left the Legend review in the last issue with a fleeting impression of considerable potential, but little actual flight time. In the review we commented that there seemed to be a need for more tail pitch in the hover and that the fuel tank was a bit small for a 'sixty' but probably fully adequate for a 'fifty'. The situation has moved on since then with considerable time being put in with the review machine, and co-editor Briggs acquiring one of his own — a sucker for anything without a flybar, that man! We have also received various relevant bits and pieces, so, without more ado, let's look at the status quo.

Mor Fun Per Run

The fuel tank supplied with the Legend kit looks a trifle lost in the space provided. The result is that endurance with a 'sixty' is a bit short at around 13 minutes to "Oh b....., it's gone very quiet!" In the review we mentioned an alternative tank that can be obtained in the U.S.A. that was brought to our attention by reader Chris Anson. In the interest of our European readers (and us!) we set about finding another source. A few moments with a ruler, trying the patience of the long-suffering staff at Cotswold Models, produced a Graupner 415cc tank, part no. 263. It was clear that this would give a good long run if it could be shoe-horned in. In fact, the tank itself slides in between the servo module and the pod floor as a perfect fit. However, (ain't there always a however?) the large cap has to be left out in the breeze by cutting away the canopy. Done with care, to ensure a snug fit, this doesn't look too bad — you could even use it as a quick-fill feature if it makes you feel better about the hole! The fittings that come with the tank can be used, with soldered-in brass tubes, to make a very neat package, with side mounted vent and feed lines. JD thought the clunk was a little light for this sort of use, however, and substituted one of his own and used some, more flexible, silicon tube to attach it. With this tank, people comment on how long the model runs — 'nuff said.

New Clothes

We would imagine that the original equipment canopy is man enough to take the sort of abuse suggested above. We did not, in fact, modify the original canopy, as, if you recall, JD severely modified that canopy by the rather less subtle method of thumping the ground with it! In fact, the model flew again with the original refitted, having received a gluing job worthy of Humpty Dumpty, but roughly coincident with locating the new tank, we received a replacement canopy from Len Mount, or to be more precise, L & O Models, in fibre glass. This came complete with the runners installed, in white gell-coat. The location of the cam-lock is indicated with a dimple, so fitting is simplicity itself. The join line is horizontal rather than vertical and is coincident with the body line just below the 'windscreen'. The idea is that no finishing is required and ours was certainly good enough for that. We simply painted the 'windscreen' black and applied a new set of Legend decals. Some minor file work was needed on the runners and the cabin floor and it was all in place.

With the canopy, which is available now, we also received, from the same source, a new set of tail surfaces. These are in balsa but have a glass skin added. This has a very high surface finish and they are very light. Check the L & O ads. for availability on these.

Having looked at a couple of bits and pieces in the 'after market' now let's see what's happening on the GMP front.

Update

First, we have received an engine mount for a fifty size motor.

Canopy requires cut-out to clear bigger tank. L & O Models replacement canopy shown here.

This is very similar to the Cobra unit, but has a machined flat on one of the cross pieces, which has a tapped hole to take the cooling shroud stay.

Secondly, and moving toward the flying side of things, we have also received a service bulletin concerning lack of right tail rotor movement. We experienced this with the review model, and arrived at the official fix independently. To cut a long story short, for the benefit of those who have not received the bulletin, if you have to have tail pitch lever well forward in its slot to hover stably, you have the later pitch plate (No. 9491) and need to modify the tail pitch bracket or obtain a later version. A drawing of the necessary mod should have crept into this piece somewhere.

Now for what you have been waiting for, here is a pilot's report drawn from a decent bit of flying, using two models.

In the Air

The looming horror of a press date and the general delights of a British winter meant that little flying had been possible with the review Legend before we closed for press, last time. However, it is clear that you can't call any review complete until you have given a decent report on the subject's flying characteristics. So, like General MacArthur we promised to return, and here we are! Since last time the two models we are flying have been subjected to some pretty awful weather and some serious flying, so we can get on with it with a clear conscience. Both models are turning at between 1400 and 1500rpm and are very comfortable at that speed. So, without more ado, over to Martin for the pilot's notes. (To get this in first, since Martin wrote the following, I got a courage transplant and looped mine — just like he says:- just cruise in and loop — don't know what took me so long really — JD.)

Pilot's Notes

It used to be a constant source of amazement to me that two so different characters, such as we are, with only one thing in common — an addiction to mechanical things that rotate — always seem to favour the same kind of models.

One thing we both share is an affinity for a well behaved flybarless model, so it came as no surprise to me that when JD invited me over to witness one of the early flying sessions of our review GMP Legend, I immediately felt a strong desire to acquire another one so that we could both appreciate its qualities fully.

That particular flying session didn't last long due to a minor engine problem but it was enough to inspire me. Prior to this I had seen two other fliers demonstrating their Legends in the 'super-swoop' fashion but had seen no clear indication of the models hovering or autorotation qualities, and these are the two most important characteristics to me.

In one short flight JD had convinced me that the Legend would certainly live up to its name. It was clearly a good hovering machine and it didn't need to have anything more than what could only be described as a leisurely R.P.M. at the rotor head to achieve this.

Thus convinced, I had my Legend a week later and test flew it another week after that. The first flight was totally uneventful, even the blade tracking was spot-on. Proving that the comprehensive setting up instructions had been well thought out and the blade quality was beyond criticism. In fact I have inadvertantly fitted — and flown — these blades in a transposed position (if you see what I mean), and found no need to retrim the tracking.

The only trim adjustment I have subsequently made since that first flight is to expand the collective pitch range, to improve the autos. This expansion is only effective when the hold switch is on, the extra movement is programmed out on the normal pitch curves.

Building the Legend was just as uneventful as the test flight. Like JD, I used a Webra .61 with a large expansion type silencer. I finished the model in silver/grey Solarfilm and Solarlac to contrast nicely with the gunmetal grey anodised airframe but the only appreciable difference is that whereas I used the recommended Futaba 131 type servos, JD is proving that the standard JR 507 will also do the job — this could explain his uncharacteristic reluctance to loop and roll his Legend. (No — just lack of 'bottle' — J.D.)

Back to the Test Flights

With any flybarless model there is usually a strong contrast between control responses in the hover and in aerobatics. Although this is less definable with the Legend I will still try to describe the control reactions in both areas.

In the Hover

Not unnaturally the cyclic controls are powerful. By that I mean it responds like a good competition machine and not like a docile trainer. However I didn't feel the need to use the rate switches, the controls were 'nicely' powerful. As set both controls were well balanced relative to each other.

The collective pitch response was just right — except where previously mentioned — providing immediate response but without being ovesensitive at all.

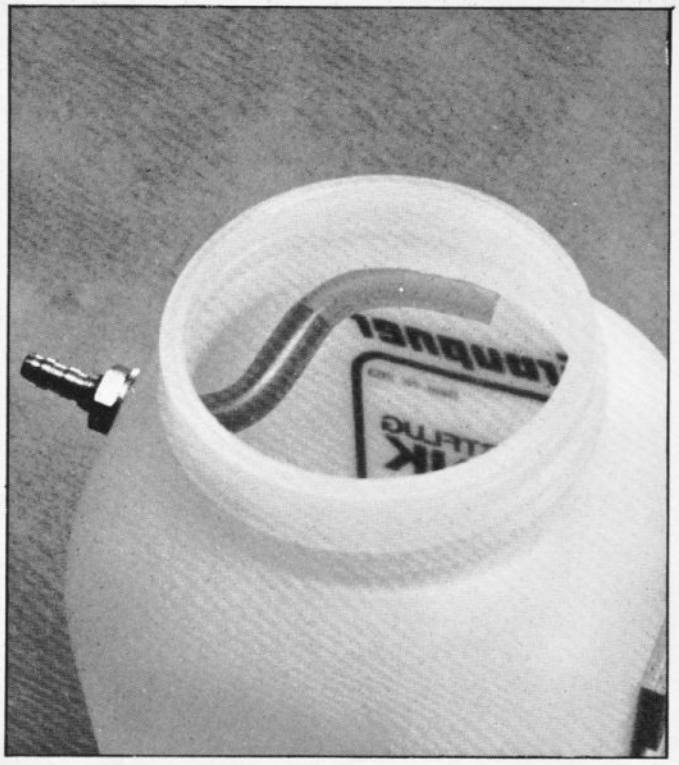
With a head to tail ratio of 4.75 to 1, GMP have been able to use a smaller than usual tail rotor disc. In this case 10.25 inches in diameter and with a triple bearing hub on each blade it's no surprise that the tail response is not only powerful but linear too.

Early tail wagging problems in fast forward flight, even with the gyro switched to low rate, were alleviated by installing a new gyro, although oddly enough the original unit is now working perfectly in another model.

Out of the Hover

I felt that the Legend was happiest at a rotor speed of about 1450rpm in the hover and I have tried to keep to this rotor speed at all times during translational flight as well. This could explain the perceived comparatively minimal change in control response in and out of the hover.

Just cruising about shows very little change except the usual flybarless trait of having to hold in forward cyclic but this is very predictable, as forward speed is increased so is a proportional amount of forward cyclic pitch. Once the technique is acquired the Legend feels quite normal.



Inside the tank showing how the side mounted vent actually reaches the top of the tank.

The available tail rotor power is more than that required to keep the tightest of circuits tidy but obviously if a dual rate gyro is on board, selecting low gain will save having to use extreme rudder stick movements and this will also help to reduce the gyro effect during aerobatics.

Aerobatics

Before exploring the aerobatic potential of any model (except fixed pitch types), I always like to get to grips with autorotations. Again, with the Legend it feels quite normal but if you 'snap' into this manoeuvre, watch out for the tuck under. If you go into it smoothly, no problem. Don't do it from a high hover, I cruise into it gently reducing collective pitch and then switch to hold at about –1 then progressively reduce pitch to get the required rate of descent.

Any coarse collective changes will precipitate equally coarse fore/aft cyclic movements and the whole thing gets untidy.

Just keep it smooth and it doesn't feel any different. This is one of the few flybarless models that I have felt confident with in autos and rates as the best of those.

Aerobatics

If we stick to the three basic manoeuvres i.e., stall turn, loop and roll, I should be able to convey any differences between the Legend and a flybar model with good aerobatic capabilities.

The stall turn is pretty much the same except that you have to remember, as the speed decreases forward cyclic needs to be reduced and vice versa.

Tidy loops and rolls eluded me for a while until I realised that a slightly different technique was required.

With a flybar equipped model I would normally come out of a stall turn at the edge of the field, then build up more speed using about 70% power and as the model gets level with the helipad, pull up into a loop or start a roll — whichever.

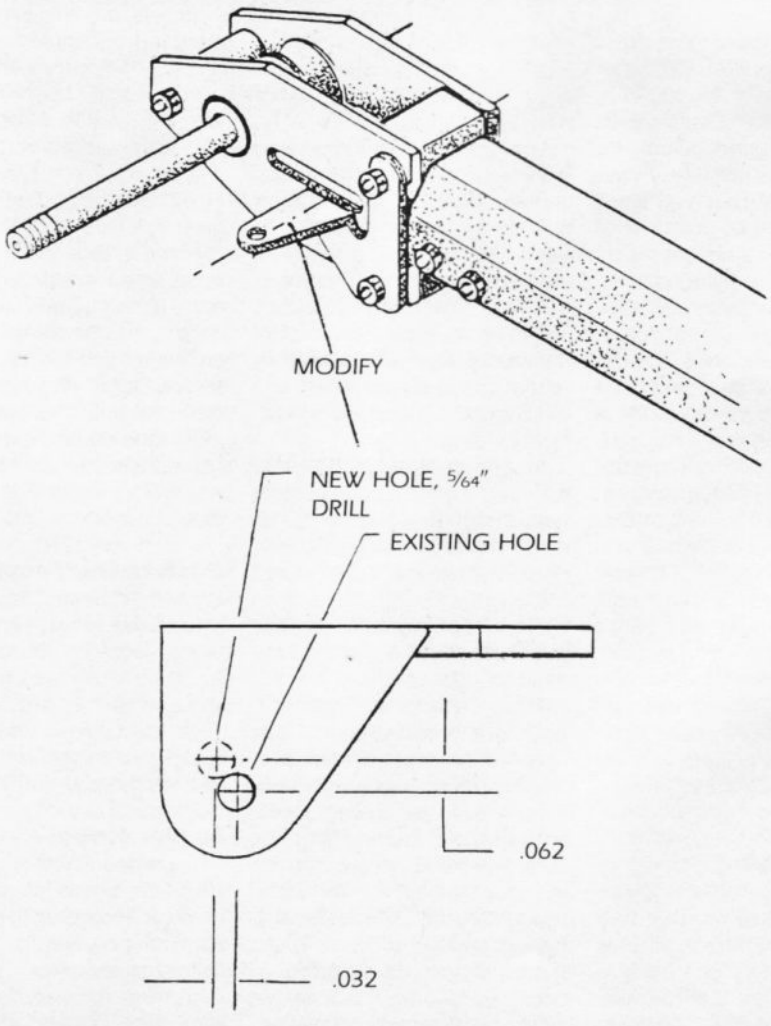
This didn't seem to work with the Legend, the loops were very dodgy and even worse, for some reason during the inverted part of a roll, the model was going so fast that I couldn't co-ordinate things quick enough to stop the nose from tucking up. I began to feel that for aerobatics the roll rate was too quick and the pitch (f&a) rate was inadequate.

Fortunately before I started reprogramming the cyclic controls, I tried another tack.

First I climbed to a safe height and tried a hovering roll — no problem. I then tried looping off the top of a vertical climb — again, no problem.

I then went back into 'cruise' mode and executed loops and rolls at a more leisurely speed. Everything was OK now even the real acid test of consecutive loops.

The difference appears to be that the Legend has enough power to aerobat at any speed but the slower it's done the easier it is to co-ordinate the cyclic and collective inputs. It's



Completed tank ready to fit into the machine.

obvious when you think about it.

Summarising

I've always been of the opinion that to get the best from a flybarless model, you really shouldn't fly a flybar type as well — no not both at once, you know what I mean — but with the Legend I don't think that there is sufficient difference to worry about it. It's only when the wind really gets up that the 'Smart Alec' hovering manoeuvres start to look ragged, but then those same conditions favour 'Smarty' autos so I do them instead.

It's possible that the whole characteristics of the Legend could be changed by increasing the rotor speed but I'm not sure if the change would be for the better or worse.

We are both convinced that at about 9 pounds in weight, for us the Legend is overpowered with a good .61 engine and in view of this JD is considering fitting a .50 while I will try a different slant by fitting mine into a Jet Ranger fuselage from the G-blades stable.

We'll keep you posted.

The two editorial Legends discussing the relative merits of their pilots. Replacement canopy on J.D.'s model closely follows lines of original.