

Tales from the Swamp

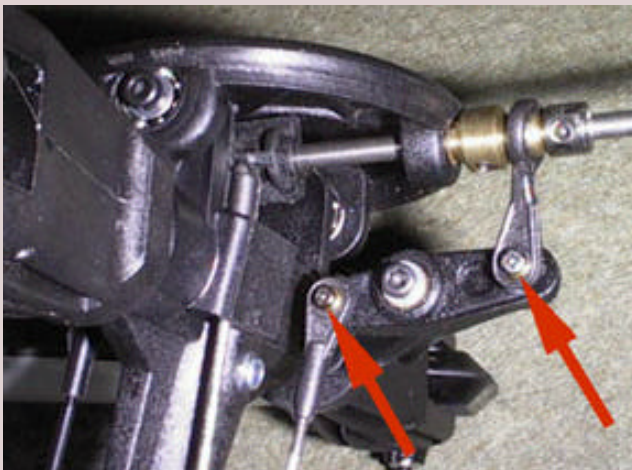
David Parnham

The F1 has finally flown

During a very unexpected break in the weather, I managed to get out for just long enough to burn 2 tanks of fuel, before the weather returned. It wasn't long, but it was more than enough to throw quite a few surprises my way. First off, the Morley tuned pipe proved to be a lot quieter than I had expected. That was a pleasant surprise. Secondly, running 10% nitro and 16% Klotz oil, the OS61RX showed no signs at all of the dreaded mid range throttle problems. Admittedly, the motor is not fully 'optimised' to the pipe / blades / head speed yet, but I did lean it out as much as possible in the time available, so it can't be far off. It also showed itself to have lots and lots of power. Even in this untrimmed state, the model climbs like the proverbial rocket, and fairly scorches round the sky. This could be a lot of fun.

However, two problems were immediately apparent. Firstly, the tail control proved a rather less pleasant surprise. I needed to hold in almost full left stick just to get the model to hang straight in the air. Even changing the gyro gain and revo mix didn't help much. This is not acceptable to me, as I want a model that will pirouette left and right at the same speed, so something will have to be done .

The second problem was that the M2 screws holding the balls onto the blade holder mixing arms keep coming loose. I retightened them several times, but it didn't help. The arrows on the picture point to the parts in question. No amount of subsequent retightening or



loctite-ing would stop them coming loose, so once I got home, the nuts were replaced for locknuts. If that doesn't hold, then nothing will. I am not sure why they keep coming loose, as that is normally a sign of vibration somewhere, but I have not noticed any obvious signs yet. Next time out I will watch more closely for the cause.

Back to the drawing board

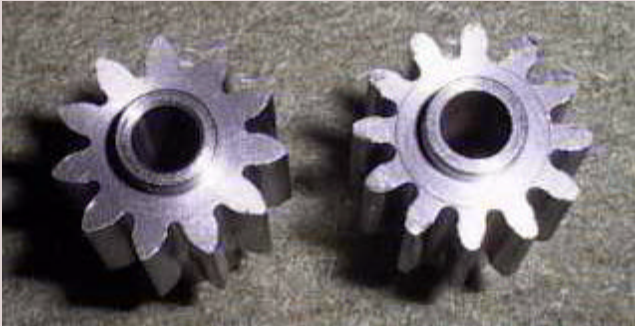
Back on the bench, I started checking the gear ratios, and found that the clutch to primary idler gear is 23:52, and the pinion to main drive gear is 12: 50. This gives an overall reduction of 9.42:1. In other words, for a motor speed of 15000 rpm, the head will turn at 1592 rpm, which is quite acceptable. However, the tail drive is taken off the idler shaft, and all the 90 degree gears have the same number of teeth, so the speed of the idler shaft is the same as the speed of the tail. This means that the ratio 23:52 is all that matters. 23:52 equates to a reduction ratio of 1:2.26, which for the same 15000 rpm motor speed gives a tail speed of 6637 rpm., which I consider to be too slow. Add to this the fact that the standard tail blades are the same as previously used on the Maverick, and it's no wonder that the tail response is no good. It needs more power, which can be done in two ways: Either fit larger tail blades, or change the gear ratios to speed up the drive (both options together is also a possibility).

The problem is, how to easily change the ratios? Morley do supply replacement pinions with 11, 12, or 13 teeth, but this is intended for people who want to experiment with 4 stroke motors and the like. So on its own this would not be an acceptable solution, as it would only change the ratio of motor to head speed, producing a reduction ratio of 23:52 / 11:50, or 23:52 / 13:50, giving 1:10.27 or 1:8.7 respectively. This would increase or decrease the head speed for the same motor speed, but would have no effect at all on the tail. What is needed is a way of changing the primary reduction ratio to increase the tail speed, and then reduce the pinion gear to 11 teeth, to maintain the same head speed. Still following this? O.K, after some more

The arrows point to the ever loosening screws

calculations, I worked out that by changing the primary idler gear from 52 teeth down to 48 teeth, and fitting the Morley 11 tooth pinion, the overall reduction ratio would change from 9.42:1 to 9.5:1 This then keeps the head speed more or less the same (1578 rpm instead of 1592 rpm), but increases the tail speed from 6637 rpm to 7177 rpm - an increase of 8%. It isn't a lot, but in combination with bigger tail blades, it might be enough to at least allow the model to turn left!

Let battle commence



On the left is the 11 tooth option pinion from Morley. On the right is the original 12 tooth item

Of course, the big question is, where to find a 48 tooth gear that will fit the F1. Luckily, that was the easy part. My old friends at Vario produce a range of alternative gears for their range of models, including one with 48 teeth. The pitch of the gears is also the same, so it should fit quite nicely with the Morley clutch. If this reduction isn't enough, with a bit more modification it is possible to fit a Vario clutch as well, which can also be bought with a variety of different teeth, thus allowing even more variation in the ratios. The only limitation is that the Morley main gear is unique, so I can't find an alternative with more teeth.

Anyway, back to the plot. The Vario gear is not quite



Here's the original idler gear next to the Vario replacement. The red part on the Vario gear is the separate hub

the same as the Morley, not least because it has a

separate metal hub. This is useful, because any further gear changes would be easier, as the hub stays on the shaft, and only the nylon gear part is removed. However, the hub itself is not a direct fit on the F1 shaft. Because the shape is slightly different, the holes in the hub do not line up with the locating hole in the shaft, and the gear sits slightly higher on the hub. The solution is to drill a new hole in the hub, and to relieve some of the plastic reinforcement around the shaft bearing, to allow the gear to sit lower down. This done, and the gear lines up with the clutch. The only problem is that the position of the new hole is partially below the surface of the gear, which means that the roll pin that is normally used to secure the hub is too long, and would foul on the gear. The solution is to fit a slightly shorter roll pin, or use the Vario method of tapping the holes to M4, and locking the hub to the shaft using two M4 grub screws.

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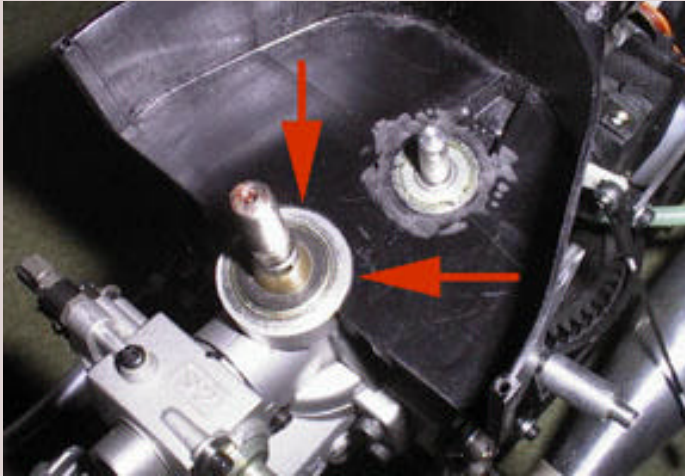


This shot shows the original mounting hole (on the left) next to the newly drilled hole. The new hole is partially hidden by the white gear wheel

physically smaller than the original gear, so the clutch gear no longer meshes properly - in fact there is no contact at all. This means that the motor has to be repositioned, requiring slotting of the motor mount holes on the side frames, and some plastic has to be cleared away from the upper gearbox / cooling shroud unit to allow the motor to move closer to the gear. Time rushing by, as it does, means that I've not managed to get this part done yet, but the accompanying photos should make clear what is involved.

While I was in the hobby shop I also bought a new pair of Vario main tail blades, so that the next time the F1 flies I can experiment to find the best set. I also have a set of NHP tail blades to play with, so it should be interesting to see what the difference is. The first flights were made using the NHP sport main blades, and although I didn't fly for long, I got the definite

impression that they were making the model very twitchy in flight. My style of flying normally favours a more flexible blade, which can tend to make the model slightly more stable in the hover, where as the very stiff NHP's do the



The arrows point to the area that needs to be relieved to allow the motor to move towards the gear. You can also see the area where material has been removed around the idler shaft to allow the gear to sit lower down

opposite. For the 3D hooligans this is exactly the sort of response that they want, but I prefer something less wild. I have always had a lot of success in the past with the Vario 'Jawo' blades, and I expect the same to apply here. The reflex section and extra weight of these blades also makes autorotations - my favourite manoeuvre - much more fun as well. Hopefully all the modifications will be complete in time for the next break in the weather, and I will be able to see just what difference it all makes in time for next month.

And finally .

As this is the December issue, I would like to wish you all a Merry Christmas, and a happy new year. May Santa bring you all that you desire (within socially acceptable limits, of course). I'm still trying to work out if Santa will know what an X-Cell Graphite Pro Gas actually is, and whether it will fit down our chimney.

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David's collecting the Editorial Moskito Expert at Christmas, so I'm sure he'll have plenty to say about that and the F1 in the coming months....



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