

TURN AROUND

by Clive Weller

AEROBATICS

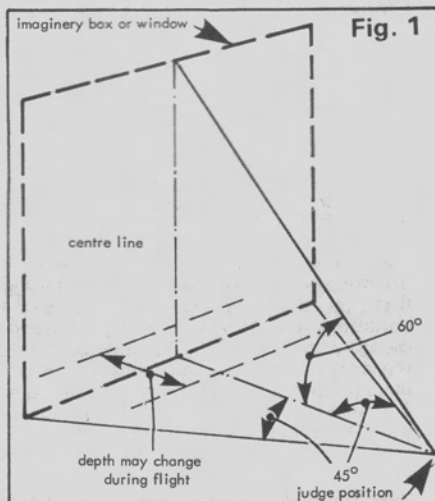
THERE IS NO doubt that over the past few years the problem of noise has been many club's main headache, with the introduction by the government of stringent noise pollution laws making the defence of flying sites very much harder.

An aerobatic model being flown through the present schedule of manoeuvres can cause problems because of the long 'ground cover footprint' currently required for the turn after each manoeuvre is performed. As more difficult manoeuvres have been introduced over the year, the models' performance and the power output of the engines has improved, not helping the problem. I would like to say at this point that the serious competitor's model is probably one of the best engineered, built and maintained models flying, because one is after the best flight performance and nothing is left to chance.

The noise problem was recognised by the FAI and SMAE some three years ago and a noise limit of 82db at 7 metres was introduced. This proved to be a bit impractical at contests and a check of 105Bb at one metre which is done just before take-off was introduced. This then is the rule governing noise control at this time.

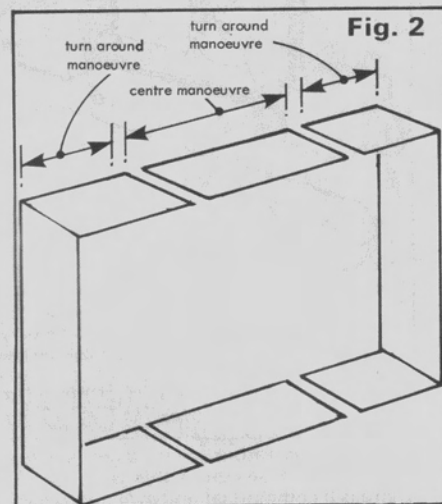
At the FAI (CIAM) meeting in 1981 some changes were made to the rules for R/C F3A Aerobatics which should help the noise problem. The 'K', or difficulty, factor on vertical manoeuvres — those which require maximum engine power — have been reduced and other manoeuvres where less power is required have had their K factor increased to try and promote the less powerful motors and therefore reduce the noise. In addition the permissible capacity for 4 strokes has been raised to 20cc to allow for the power difference, these rules come into being on January 1st 1983.

Under the latest SMAE rules, noise limits are 82db at 7 metres with the model about 1.3 metres from the ground, spot checks are 98db at 2 metres. Also at the FAI (CIAM) a



new schedule was introduced which came into effect in 1984. This is of the 'Turn around type', often known as 'Aresti' although the latter is not actually a form of aerobatics at all. 'Turn around' schedules should cut down the ground cover footprint as with this type of aerobatics the model enters a 'window' or 'box' which is a 45° angle each side of a centre and a max. height dictated by a line 60° upwards (Fig. 1). The model is judged throughout the flight, flying a manoeuvre about the centre line followed by a manoeuvre at either end which should enable the model to turn into the correct approach for the next manoeuvre without going out of the 'box'. As can be seen from the list and sketches the manoeuvres themselves are not new.

The introduction of this schedule is causing a lot of interest and some controversy. It should reduce the noise nuisance to non-modellers so is generally favoured in the UK and other densely populated countries where noise is a problem. Most of the objection

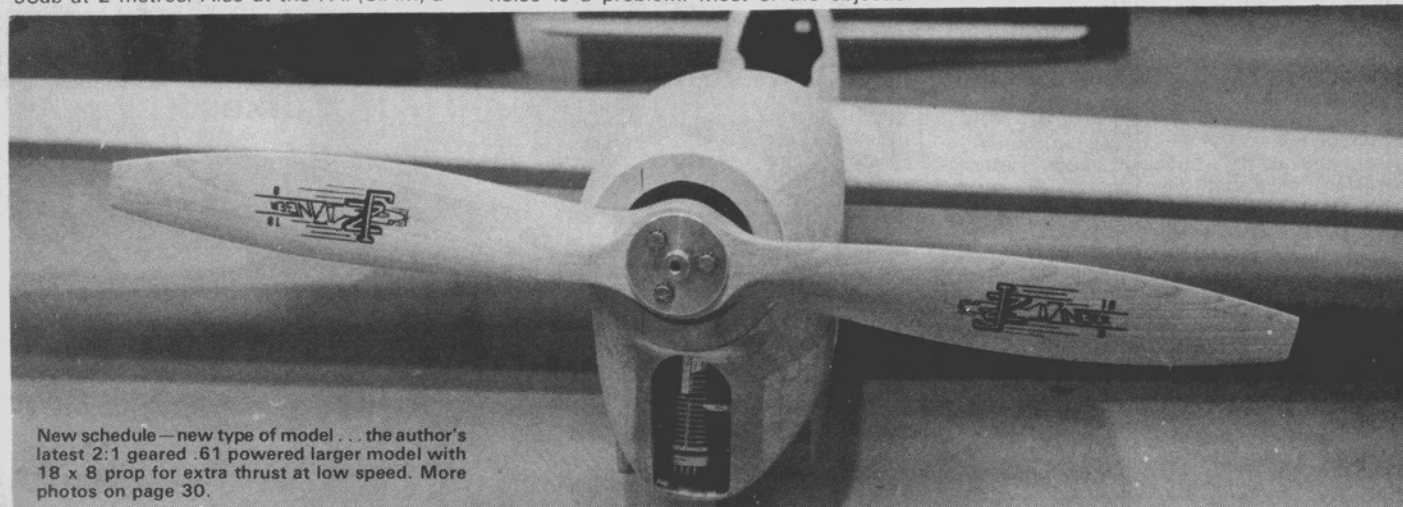


against the change have come from countries where they have no noise problem.

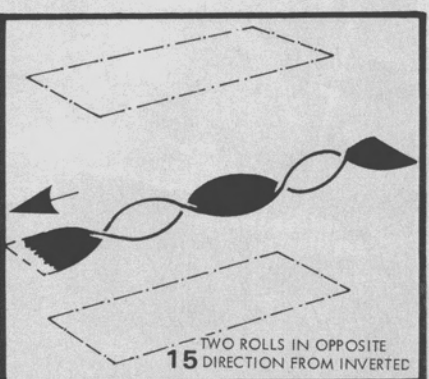
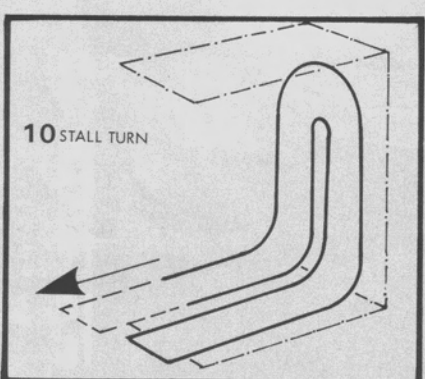
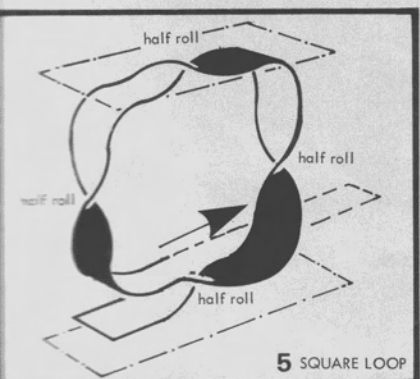
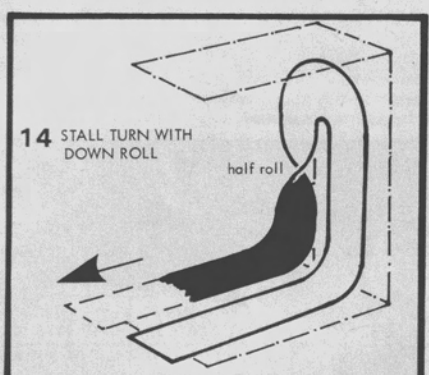
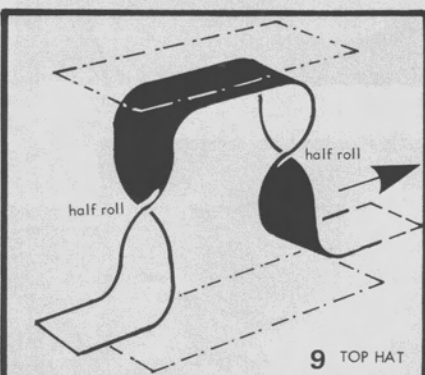
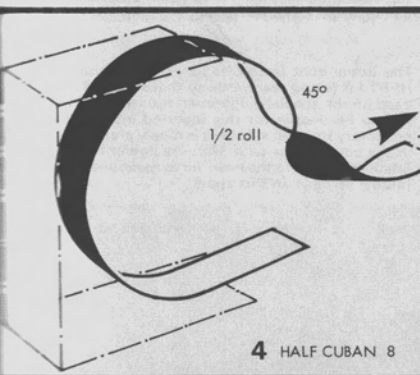
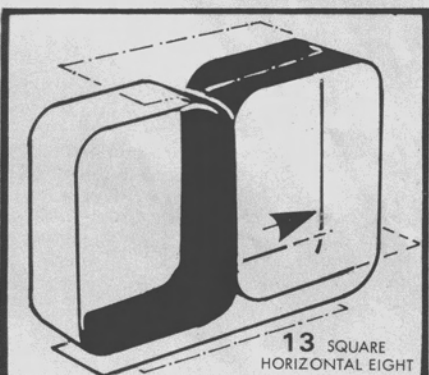
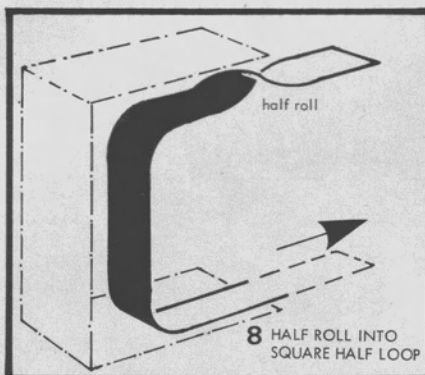
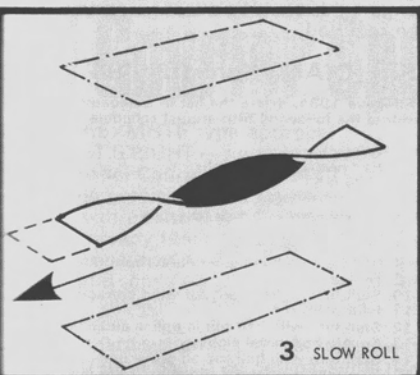
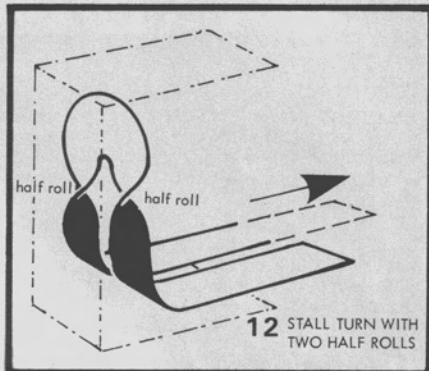
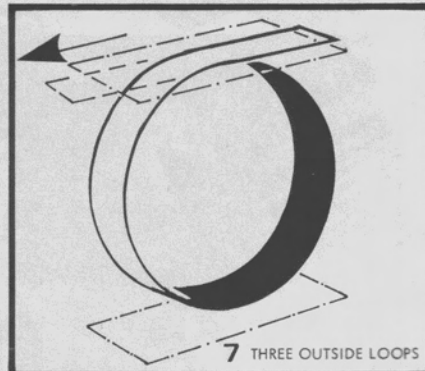
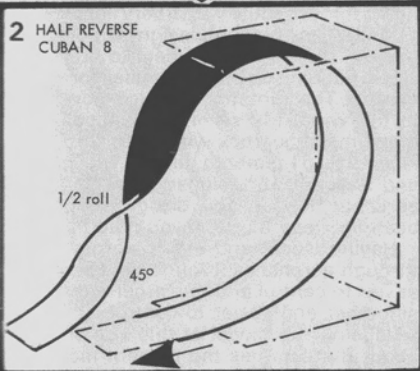
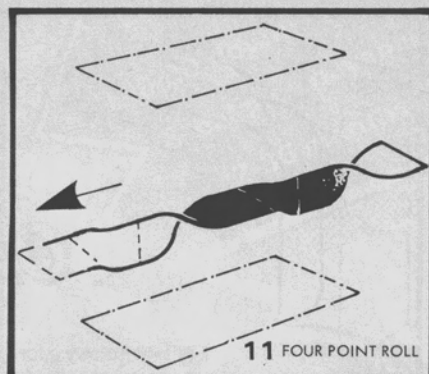
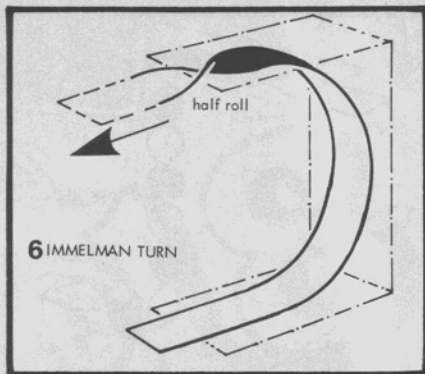
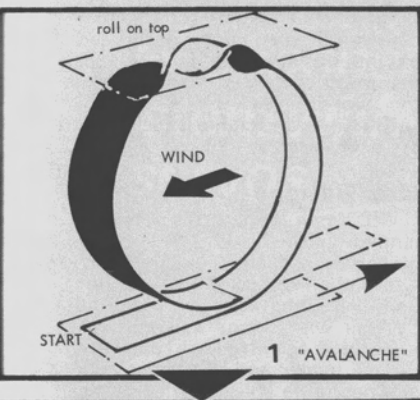
Flying the schedule

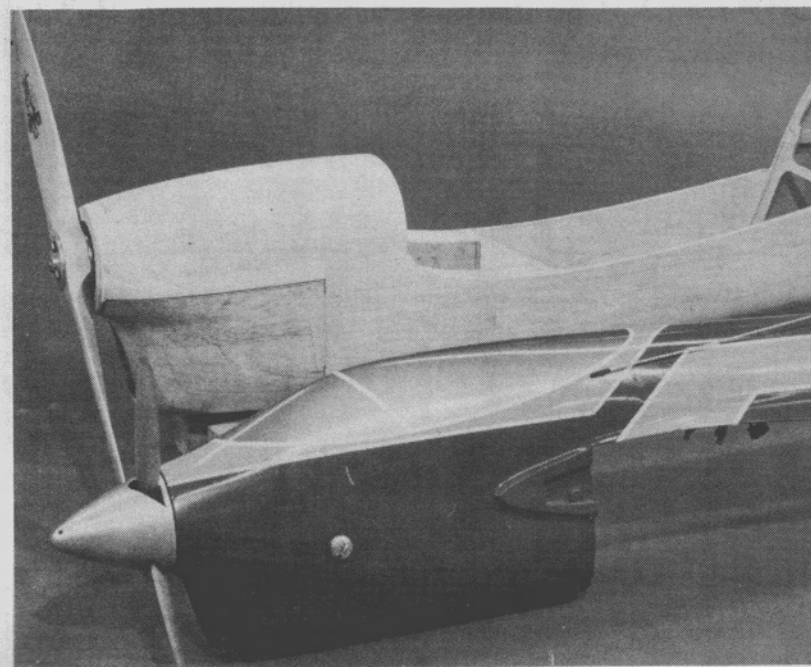
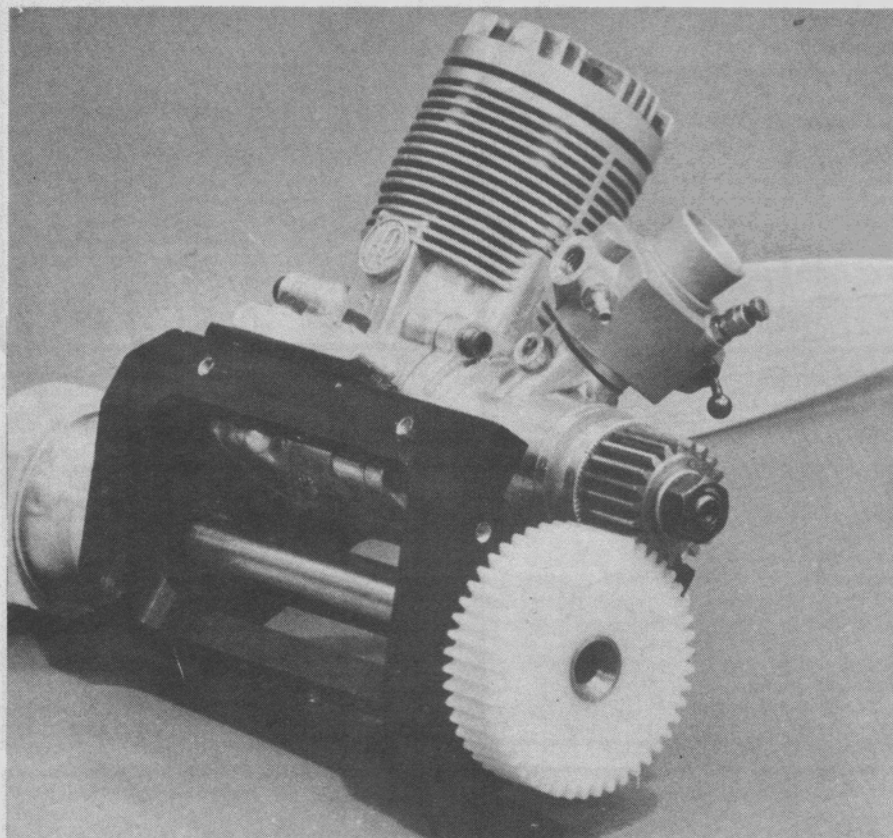
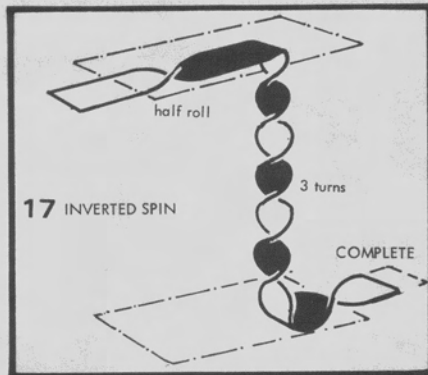
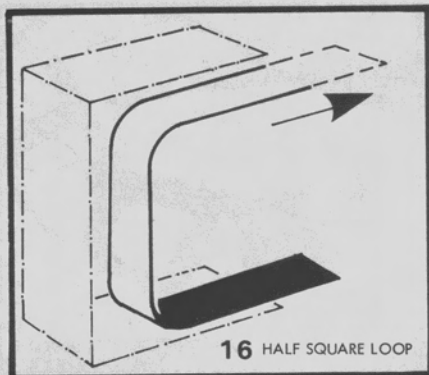
The changes should improve the image of aerobatics for the model will be more attractive and the schedule should be more pleasing to spectators. I find flying the manoeuvres much more satisfying, it is more like full size.

At the start of the flight, the first manoeuvre is the 'avalanche' in the centre of the box, from which you pull into 'half a reverse cuban eight' which turns the model for the 'slow roll' and so on. During the flight the model will tend to move in and out from its flight line, the 'stall turn' No. 10 is used to correct the flight line by the direction of the turn, some correction can be made on Nos. 12 and 14, and the final manoeuvre is the inverted spin, when this is completed the model leaves the box and the flight is finished.



New schedule — new type of model... the author's latest 2:1 geared .61 powered larger model with 18 x 8 prop for extra thrust at low speed. More photos on page 30.





The F3A aerobatics sub-committee are to be congratulated on the design and thought put into this schedule, for F3A appears to be the only model class doing something about the level of noise.

The views and comments of readers would be appreciated.

New designs

When one looks at the schedule and the limited space in which it is performed the models have to change, although the engine size and all up weight still remains at 10cc and 5kg. I have asked many pilots how designs will change and most seem a bit undecided. Some feel, as I do, that the model will be bigger and go slower although one still has to be able to go up vertical. I have flown this schedule with a very light *Mercura* (RM 255), my present design, but one has to use the throttle a great deal to prevent the speed building up and the model going out of the box. The light model is also moved about in the wind. My second test model has a home made gearbox which has 2 to 1 ratio, allowing a 61 motor to turn an 18x8in. prop, and is about 15% bigger than the average aerobatic model. The design should have been flown by the time you read this.

Having seen and flown larger models through aerobatics, I found the speed much easier to control and the larger model much smoother and easier to control. The cost of producing the model of this size should be about the same as the present models, for although one has to add a gearbox to the engine this could be offset as retracts will not be required.

FAI (CIAM) Schedule '84

Effective 1984, delete the list of manoeuvres and substitute the following turn-around schedule.

	K Factor
1. Avalanche	3
2. Half reverse cuban eight	1
3. Slow roll	3
4. Half cuban eight	1
5. Square loop with four half rolls	5
6. Immelman	1
7. Three outside loops	3
8. Half roll into half square loop (from the top)	1
9. Top hat	3
10. Stall turn (right or left for wind correction)	2
11. Four point roll	4
12. Stall turn with half roll in upline and downline	2
13. Square horizontal eight	5
14. Stall turn with half roll on down line	2
15. Two rolls in opposite direction (from inverted)	4
16. Half square outside loop (from bottom)	1
17. Inverted three turn spin	4
Total K =	45

The home-built bearer/reducer unit carries a standard HP61 FR facing rearwards so that standard props can be used on the specially lightened return shaft. The cowling has to be deeper for this inverted installation, but the necessary forward side area is nicely preserved — as seen in the comparison with *Mercura* (lower left). Below: ply brackets built into the nose servo to mount the bearer unit (model inverted in this shot).

