



Fig. 1 The author launching his distinctive “Kanga” flying carpet model, one that has obtained many triumphs in this event. More details in text, page xx.

**Power Scramble, a unique Free Flight Event**

We fly a free flight event in Australia called "Power Scramble" which in New Zealand is called "Aggregate". Apparently the Kiwis invented this event. However as with most good things to come out from New Zealand, we (Aussies) claim them our own. I do not believe it is flown anywhere else in the world, which is a great shame because it is a truly amazing contest both for the participants and any spectators. Unlike any other Free Flight event Power Scramble is unique for many reasons. In fact it is the only Free Flight event :

- that involves a “helper” or “runner” as well as the flyer.
- where all flyers participate in a “Le Mans” start.
- where maximum flight times do not guarantee a win.
- where fast engine starting is crucial to the result.
- where an aerodynamically inefficient model is not a handicap.
- where the flyer decides the duration of each flight.
- where retrieval time is as important as flight time.
- where the number of flights is determined by each flyer.
- where the only model limitation is the motor capacity,(1.00 cc).
- where only the fuselage cannot be replaced.
- where all stop watches are stopped at the end of the hour,
- even though models are still airborne.

For all of these reasons Power Scramble is one of the most physically and mentally challenging Free Flight events.

**The Australian Scramble event**

**HOW TO COMPETE IN AND WIN A POWER SCRAMBLE**

**Tahn Stowe, Coogee Beach, NSW, Australia**

**Description of the Event**

Model design is unlimited with several approaches being equally successful. Experimentation leading to unorthodox designs have been very successful in some hands.

Tactics, dependent on recovery terrain and wind speed are of great importance and need to be reassessed throughout the hour. All this while constantly returning the model to the flight line, refueling and launching.

The event involves any number of entrants (we used to get 40-50 back in the day) and lasts exactly one hour. The object is to amass the most time in the air within the hour. The max is 120 sec and the minimum flight time is 15 sec. You are allowed one helper (usually a good runner) to help retrieve the model. The rules state that you are allowed to use any free flight model with a maximum en-



Fig. 2 Wally Bolliger and his Ballerina Scramble model



Fig. 3 Anthony Groenewegen from NZ tries Oz Scramble at Narrandera, NSW. His choice of model is quite different from that of Figs. 1 or 2. Timer at left starts the clock.

gine capacity of 1 cc. The most popular motor is a Mills .75cc in all its variants. There are many different types of models used from Tomboys, Gauchos, Hatchet Man and Flying Carpets. ( Figs 1, 2 and 3)

All competitors must form a line at right angles to the wind with their timekeeper at a "pole" or marker approximately 3-4 metres apart. The Contest Director moves all pilots upwind by some 20-30 metres (in front of the spectator area) and at the start of the hour says "Go" (a Le Mans start).

Each pilot runs to his model, starts the engine and launches the model. I usually do not have a runner, although at 62 years of age I should always make sure I have one, as I am not as fast as I used to be. You must return to the flight line after each flight and the engine must be restarted. (Fig. 4)

This "relay race" continues for one hour with each flight recorded and depending on the wind speed usually involves some mid-air collisions and the occasional need for the timekeepers to duck out of the way of a low flying model. At the end of the hour the CD calls out "Stop all watches" and even if your model is in the air the flight timing stops and the reading on the watch is recorded.

Obviously to win this event you need a very consistent model and an instant starting engine and an ability to run. What you try to achieve is the maximum time in the air (and much like CL Team Racing) the minimum time on the ground. If the wind speed is great then there is very little point in trying to get 120 seconds on each flight. At approximately 5 metres per second, the model will travel some 600-700 metres downwind. Even with a good "helper" who is positioned downwind under the model, you would be lucky to be back to the flight line and in the air in less than 4 minutes from the time the model lands. This means you will finish with a score of about 1200 seconds in about 10 flights. Of course this assumes that your runner is able or willing to keep up the pace.

If you can get your model to do a wide turn (travelling up wind) before coming back over the flight line for a flight of 40 seconds you may only take 60 seconds to have it back in the air again. This if repeated for the hour will give a score of about 1400 seconds (you win). You will have had to make almost 40 flights but you will not have run too far. We usually fly this event in the early morning because it is calm and we do not like inflicting too much pain on each other. In the calm, you need to aim for flights of about 110 seconds duration. If you fly more than 120 sec, the extra flight time is lost. I usually try to catch the Flying Carpet as it is gliding in, tuck it under my arm, make a quick sprint (ok, gallop) to the flight line, a squirt of fuel and a one flick start and launch. I have done this at an average of less than 20 seconds.

At the end of the hour most pilots are happy to hear the CD call "Stop all watches". If you have been trying to win, you will be very exhausted. There is usually a wait while the CD adds up the scores of each contestant and the models are returned to the line and runners are able to relax. The places are then announced from last to first, and



Fig. 4 Le Mans start of the Scrambles event!



Fig. 5 Des Slattery quickly averts a glancing blow by Wally Bolliker's Ballerina, slowly circling the field.

it is not uncommon for places to be separated by just a few seconds.

### Scramble records

The current Australian record score for the 1 hour Power Scramble stands at 3,040 seconds set by NSW free flyer Terry Bond. I have been trying for many years to break this record however my best score is 2,960 seconds (about 3 seconds per flight off the pace). The record was set in dead calm, slight fog with a Mills-powered Gaucho which was cruising around at just above head height. I am hopeful that I will get another perfect day and everything will go right as I believe 3,100+ is possible.

### Successful Scramble Models

The "Flying Carpet" (Fig. 1) is a free flight model that I first started to develop way back in 1972. I am now designing my next carpet Mk29 complete with diagonal carbon kite tubes and silicone rubber mounted fins in an attempt to overcome some of the structural failures of previous versions. The planform, engine mount, centre rib and airfoil have remained unchanged since Mk 1 back in 1972, after an article from a 1959 Aeromodeller magazine (see Figs 8 and 9) However, the various materials and construction techniques employed have traversed the spectrum from balsa and tissue to Styrene foam, Depron, Coreflute, Kevlar and epoxy resin.



Fig. 6 Stowe's Kanga, showing (above), its robust wing structure and (above right) unique "Australian" profile: 'roos and beer. Note the thin, reflexed airfoil of this flying wing model, quite stable in spite of lack of dihedral. (right) Mills 0.75 is side-mounted on the kangaroo pylon, adjustable for downthrust.



Fig. 7 (above) Modified Mills 0.75 cc used by author, note special BB front end. (below) New induction and tank system, with peripheral jet carburetor (a la Cox) and quick filling device.



give you reliable fast starting and consistent running is going to be OK . Some opt for "equal parts" of Kerosene, Ether and Castor Oil with no additives. Personally I use a lower oil content (25%) and also add 1.5 % ignition improver. This mixture allows the use of a lower compression setting, whilst still starting instantly♦.

## Scramble Motors

### Motor choice:

Various motors including Cox 049's have been used in this event. The disadvantage of a glow motor is in the added complication (lost time) of having to connect a plug lead and the possibility that the plug burns out, again causing loss of time.

Any reliable diesel of 1cc or less is a better candidate for a Scramble motor, however one that will start "first flick" and maintain a tune for an hour (45 minutes total intermittent running time) is going to be the best choice.

The Mills 0.75 in almost all its variants is such a motor. The "original" Mk 1 or the later P 75, the Doonside Mk1 and 2, the Irvine, Boddington and now the CS VTE (a copy of a copy) are all suitable motors as long as the piston and cylinder fit are good and there is not excessive wear in the conrod.

The MP Jet 0.6 is also a good choice, being a slow revving, easy starting, side port diesel and is generally cheaper than any of the Mills mentioned above, being in current limited production.

Having worn out several Mills motors both original and Doonside over the last 42 years, my current motor is a hybrid built by Andrew Heath of F2A fame, one of six. The crankcase is a Russian copy of the Doonside Mk 2 (identified by a "Z" on the underside of one lug), the front section having been machined off. The piston, cylinder and rod are Doonside Mk 2. The carburetor/tank assembly with Cox-type needle valve, peripheral jet and funnel fuel filler was manufactured for me by Stan Pilgrim some time back in the 80's. The screw in, twin ball race front housing was machined from aluminium bar stock by Andrew Heath and supports a Russian shaft with threaded stud prop driver and custom nut.

### Fuel:

There is no restriction on the type of fuel allowed, however since this is essentially a "low performance" event as far as the motor is concerned, any mix that will

# ARABIAN KNIGHT

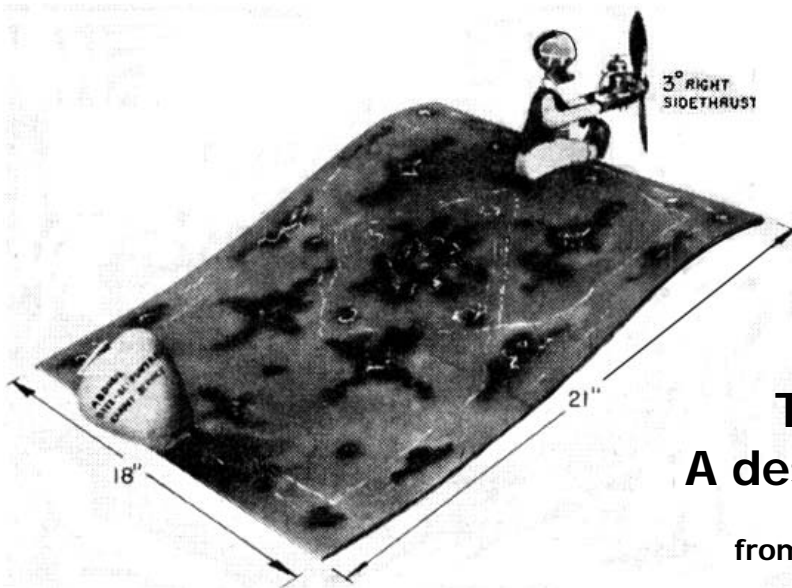
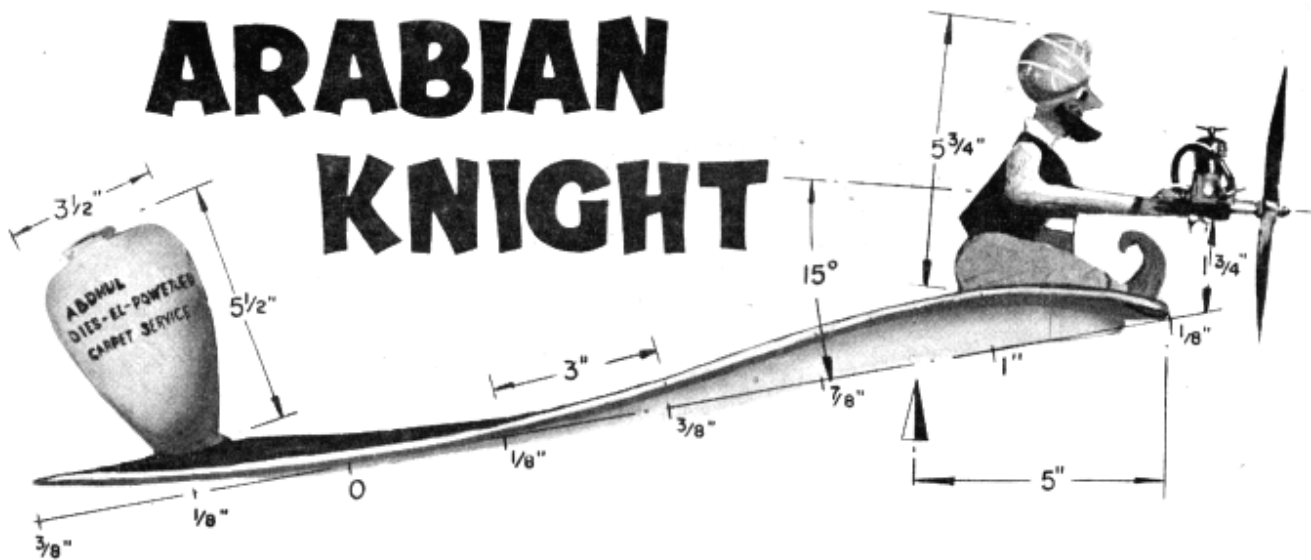


Fig. 8 Tahn Stowe's "Kanga" was derived from this rather radical model, from the pen of the well-known English modeller, Peter Holland.

Tahn's model has a different structure and materials, but the size and airfoil remain the same. The above figure should help prospective builders of this model as it contains the airfoil profile and basic dimensions.

## The Flying Carpet A design by P.W. Holland

from Aeromodeller, January 1959

### A few building instructions for the 1959 model

To make the wing select seven pieces of 3-in. wide, 1/8-in. balsa sheet, 3 in. wide and 18-in. long. They are cemented to edge and bent over the 1/4-in. sheet spine which runs down the center and holds the airfoil section. To get the profile, simply mark the 21-in. length off at 3-in. stations with the heights over the base line as on the figure above, beginning with 3/8-in. at the trailing edge and ending 1/4-in. above base at the leading edge. Join the points marked with a smooth curve and cut to get the reflex section. Two other ribs can be used to support the tips, but were not necessary on the prototype where strips of hard 1/16 x 1 in. reinforce the outer edges along the undersurface (chordwise) and a 1/2 x 1/8 spruce spar protected the leading edge. The Arabian Knight is laminated from 1/4-in. sheet with 1/4-in. square beech arms. Half to 1/2 oz. (7 to 14 gr.) ballast is required at the LE to balance the Flying Carpet 5-in. back from the LE. Reason for this choice of aerodynamic layout will be appreciated when observing the exceptionally stable flight characteristics.

**Acknowledgement:** All photos in this article, with exception of those in Fig. 7, were taken by Malcolm Campbell, whose help is much appreciated.



Fig. 9 Jiongyu Zou, F1C flyer from China, tried the arcane art of Scrambling using another Stowe Kanga model, in a Scramble contest in Narrandera, NSW, a couple of years ago.