

JET CAT GLIDER CONSIDERATIONS

BY Gary Morton

Some thoughts about Catapult Jets.

A lot of good information pertaining to the FAC Catapult Jet Event has recently been published (i.e. Thermalier, v. 15, #1), and is very useful when getting started. The Catapult Jet Event is often characterized as enjoyable but very frustrating. Enjoyable because the jets can be easily built and flown in almost any kind of weather. Frustrating because they often will not fly for more than 5-10 seconds.

I have done very well in the Catapult Jet Event at three recent contests. My success may just be a lucky combination of factors with one plane, but it is the result of watching and copying what I have seen other people do. Let me start by saying that there are no secrets in FAC. Everyone is willing to answer any question and tell you exactly what they do. That said, it takes time to internalize this information and adjust it to fit your way of doing things.

My first attempt with a catapult jet was not very promising. I built a P-59 that had a 16" wingspan. No matter what I did it would not fly over 10 seconds. I could get it to glide, but the launch was poor. The biggest problem was that the plane when released made a wide sweeping turn while wagging until it readjusted itself to fly straight and smooth. By that time it had lost all of its momentum and quickly landed.

Several years ago I saw Joshua Finn fly a small Canberra at a TTOMA contest. It went high and stayed up a long time. I do not remember how long, but what impressed me the most was the height that it obtained. It seemed to me that its small size allowed it to attain its great height. Despite this revelation I had given up on the Catapult Jet Event to concentrate on other FAC events and did not try a smaller plane.

About this time the boys flying catapult gliders came up with a system to eliminate the waggle by moving the hook to the front and positioning it about 1/8" below the line made by the bottom of the wing. The point where the plane was held for launch was also moved to a position near the front of the wing. The flight path on launch had no waggle and the glider would go almost straight up before transitioning. These changes increased the height of the launch and the length of each flight. I was able to observe planes with these two changes being flown and they seemed to work very well. I did not think I could duplicate their system with a front hook. A small plane with the hook (peg) under the leading edge of the wing or farther forward would move the hook closer to the line made by the bottom of the wing. It could then be held for launch very close to the hook. This would give you a system almost like that developed for catapult gliders.

A little later I was inspired to try a catapult jet again. I decided that I wanted to combine the ideas mentioned above and see if I could get a catapult jet that would fly longer than 10 seconds. I chose the French Arsenal VG 90 and made two planes, each with a 12" wingspan. These planes showed promise. They could zoom and occasionally fly quite well. My biggest problems were that they would not stay in adjustment and I could not change the sweeping curve they made in the launch. Every once in a while I got lucky. Nevertheless, in frustration I stomped them.

After this I was at a contest and watched Claude Powell fly a peanut Zero that flew extremely well. He shared his "secret" of using Gurney Flaps to adjust the plane. He put the flaps on with a glue stick wherever they were needed. There are an infinite number of variations possible with the flaps because the height, length and position of each one can be altered. I decided that this was just what I needed for my catapult jet.

I made a new jet, this time a Canberra with a wing span of 12". The fuselage and wings are from 1/8" medium weight balsa that resulted in a flying mass of 14.5 grams. The incidence angle of the wing was slightly adjusted to be parallel with the thrust line* to reduce any waggle on launch. The straight, 1/16" music wire launch peg was inserted into the bottom of the fuselage at a slight angle directly under the leading edge of the wing. The Canberra is launched by holding the fuselage just behind the launch peg. The wing is 5/8" above the bottom of the fuselage and I found that by holding the fuselage towards its bottom you get the best launch. I think that it would be beneficial to move the launch peg farther forward, however, I have been afraid to do this because it is flying so well. The flying surfaces are set at zero/zero. All adjustments were made with Gurney Flaps (1/16" x 1/32" pieces of balsa) to give the jet the straight climb and glide that I had sought. This plane will now put in at least three 30+ second flights every 6 tries. The best flight for the three contests has been 120 seconds.

Although it may be a little too soon to know if these techniques will work with other jets, the initial results with my new P-59 suggest that they will. The hook on this plane is much closer to the nose. I need a little more trimming to stop a tendency to spin in along with a little more dihedral. It already has a 30+ flight without many tries. These changes should

make long flights more consistent. One nice thing about this hobby is that there are always new things to learn or apply. These ideas and techniques are not new, but you might considered them for the catapult jet. You may find one or more of them to be useful. Who knows, you might even a find better way.

**I am calling the thrust line the straight line that the stretched rubber makes. To make the incidence angle of the wing parallel to the thrust line may take some trial and error to figure out. If you envision the jet being held on a fully stretched rubber loop, the bottom of the wing should be parallel to the line made by the stretched rubber before the jet was released. What you are striving for is a straight launch with little or no waggle. Once the waggle is taken care of the rest of the path is controlled with Gurney Flaps. The slight adjustment of the wing's angle of incidence should not change the scale appearance. The wing's incidence needs to be set first so that you can make the flying surfaces zero/zero.*