

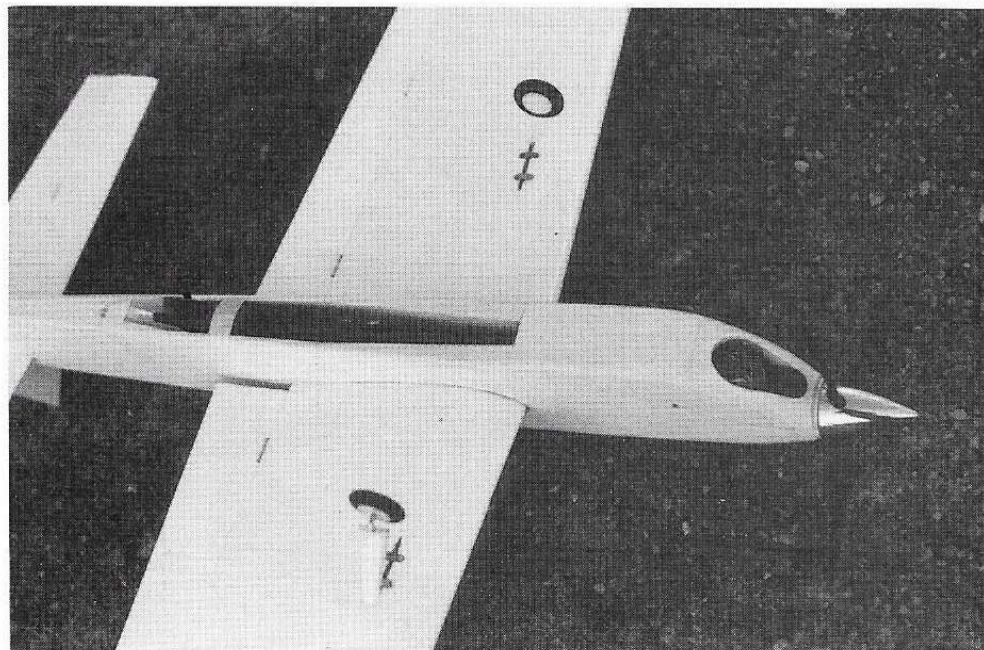
PHOTOGRAPHY: ALLEN BRICKHAUS

Packed into the author's colorfully finished stunter are a diverse number of design considerations.

Arcturus

By Allen Brickhaus

Tuned pipes present a learning curve for those in C/L Stunt. This design smoothes the curve.



Chief among the design points was the requirement for a .40 sized tuned pipe set-up. This bottom view shows the open pipe bay for maximum heat dissipation from the pipe.

This particular sojourn begins in Atlanta in the summer of 1986 when I met a friend and fellow competitor, Bill Rich of Florida. He had recently moved from the New Jersey area and was setting up his flying program for the Nats at Lake Charles like I was. We both were in the Advanced PAMPA class and we fought it out for the top prize in that category and in many succeeding contests since that hot summer day.

In 1989, at the Washington State Nats, I was impressed by the true "book-sized" patterns and shapes of Bill's *Vigilante*. We discussed the origin of his latest creation and some talks with Randy Smith of Atlanta convinced me to build what Randy terms his Stuntcraft series of control line precision aerobatic planes.

Randy Smith's Stuntcraft series began with some basic experimentation in 1974 to create a very reliable and efficient platform for the control line stunt event. Randy will describe to you that his Stuntcraft is a set of aerodynamic numbers, moments and percentages that can be adapted to a multiple size of powerplants.

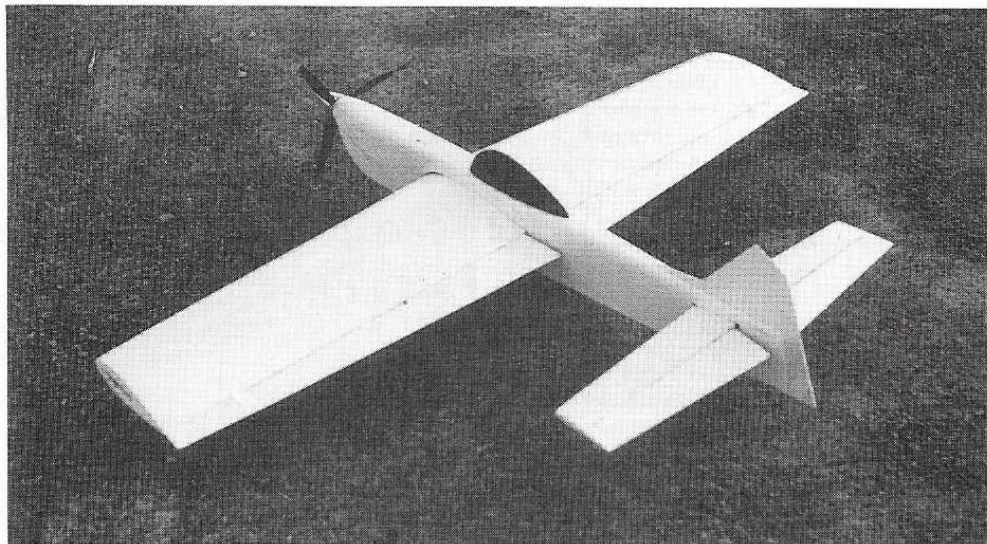
My particular desires for my new 1990 plane would first of all be set around the O.S. Max .40 VF rear-exhaust motor with the Future Force pipe system. I wanted to downsize Bill's *Vigilante* to the 675 square inch wing I decided to build. This was easy with the Stuntcraft system, as Randy can upscale or downsize the numbers to match your own needs.

The *Arcturus I* was determined to be around 675 square inches of wing area with a movable flap area of approximately 17% of the total wing area. The wing, as well as the flaps, have a one inch offset longer on the inboard side. The stab and elevator are cut to be 23% of the total wing area and the elevators are 47% of the total stab and elevator area.

Since this was to be the first all-out design of mine to house a piped-stunt motor, I wanted each and every part of the power system to be easy to access and manipulate. The fuselage would be a simple project with sheet sides, bottom and top. The pipe would lie in an inverted trench in the bottom of fuse. A SIG 9-inch plastic canopy was chosen as well as the rudder size and outline from Bill's *Vigilante*, to satisfy my own aesthetic desires.

Other powerplant choices for the *Arcturus* could be the O.S. Max .46 VF, the O.S. Max .46 SF, the Royal Pro .45, the ST .60. I have flown ST .60 planes as small as 660 square inches and have seen planes as small as 600 square inches fly with the ST. The nose moment is 10 inches and the tail is 16½ inches.

The plans for the *Arcturus* show a built-up wing if you desire to do the woodwork, but a foam core is available from Randy Smith. Construction of the wood wing is no different than any other you might have built in the past. The fuselage sides are constructed of laminations of ⅛-inch balsa and Bob Violett lightweight carbon fiber matt, glued together with slow drying epoxy. At first I did not want to believe that having no plywood in the nose area would last; but I trusted Randy's ideas, and put the fuse together as he described it to me. Notwithstanding my reservations, many flyers and judges watched me put the three week old *Arcturus* almost straight into the ground on the second corner of the wing-over at the grass site at the annual SIG Contest in Montezuma, Iowa in late June. Looking at the plane, stuck in the ground like a lost arrow, was certainly a downer for me as I searched in my mind as to how long it would take me to get my backup *Envoy III*



At this point in the construction, the *Arcturus* has the foam core wing finished, covered with MonoKote, and aligned on the fuselage. The fuselage is ready for its primer coat.

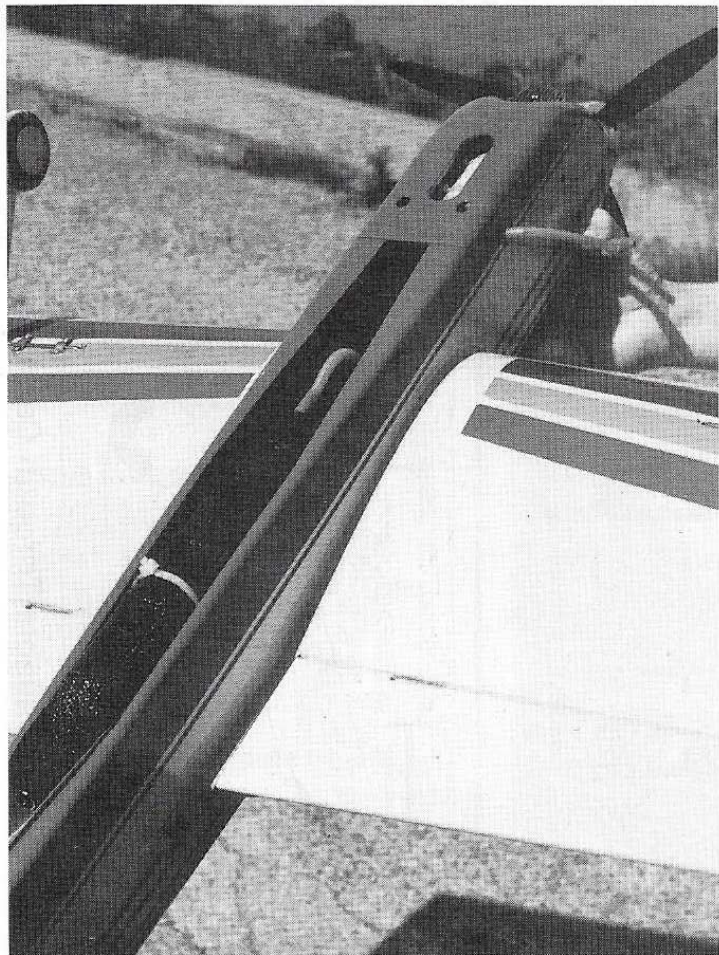
ready for the upcoming Nats.

Pulling the *Arcturus* from the ground showed only a broken Bolly three-blade prop and the candy-colored paint knocked off the inside of the canopy. Granted, we were flying over a grass site, but to see the *Arcturus* plunge into the ground at a high rate of flying speed, and then return to tie for third on the Expert circle was indeed a miracle and a testament to the construction technique. Later, some stress cracks appeared in the middle stab area, but it was stiffened with flying wires similar to full sized planes and the model like those of Gid Adkisson and Bob Whitely.

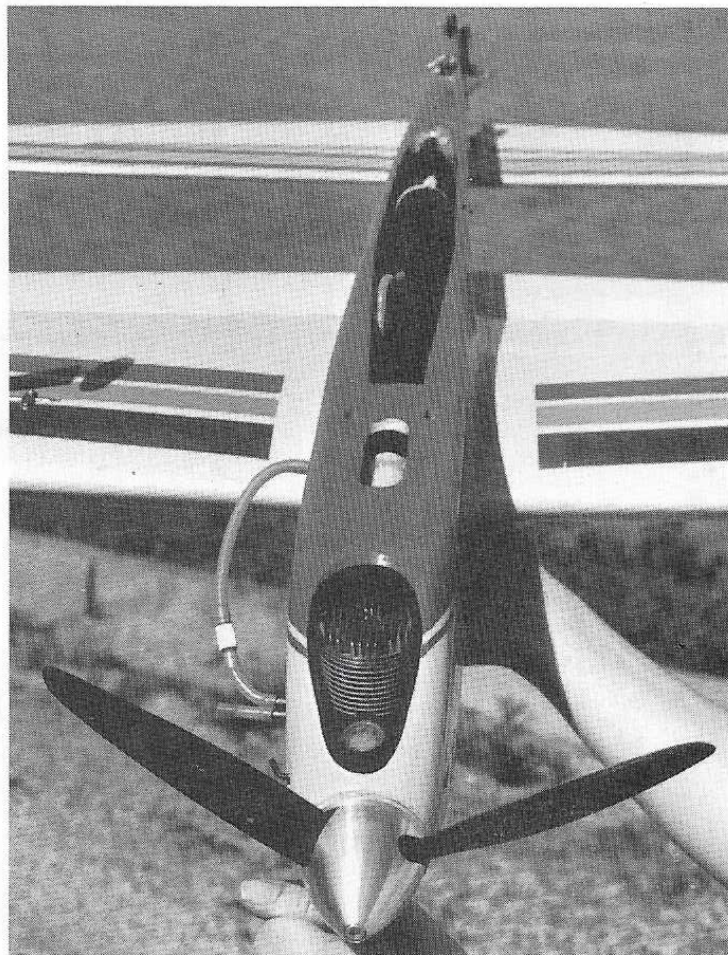
The entire front end is put together with

slow curing epoxy after the fuse sides are finished. Use only the amount needed and put these parts in a jig of some sort until the epoxy cures. The rest of the wood-glued surfaces can be put together with available thin, medium and thick CyAs. Control system parts can be purchased through a variety of sources and many are listed in the back of this article. The rear hanger for the pipe is a Dave Brown product number TPMT-5300. Please write me if you have any specific questions concerning the construction of the *Arcturus*.

The piped O.S. Max .40 VF has given me almost trouble free operation for over 180 flights of practice and competition. The

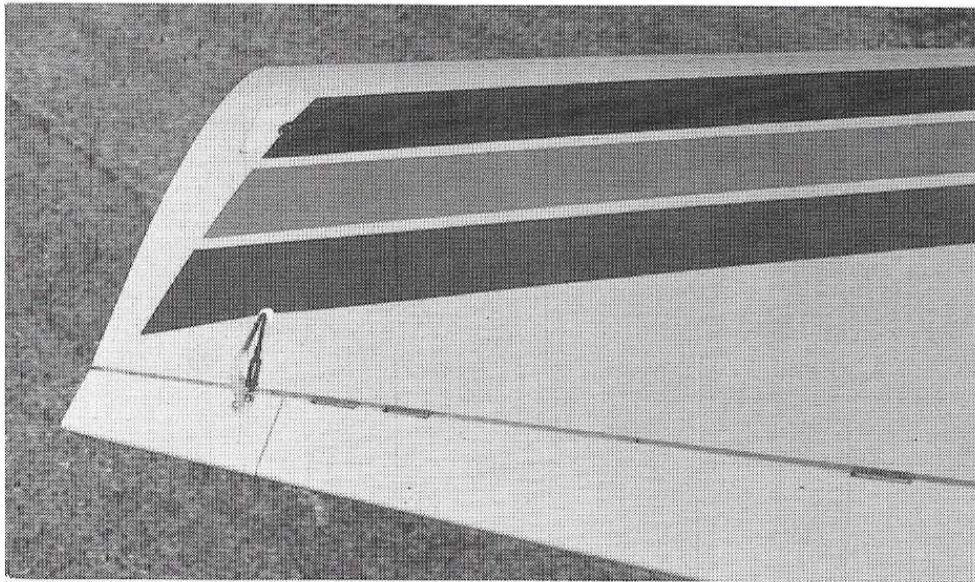


Nested in the pipe bay is a Future Force carbon fiber pipe (above left). For additional protection, an aluminum exhaust shield sits under the outlet of the



pipe. Turning the Bolly 3-blade prop (above right) is an O.S. Max .40 VF. The slot behind the engine is the exhaust for the header cooling air.

Arcturus



Towards the leading edge of the wing, you can see the tip weight box hatch on the bottom right wing tip. Very apparent is the adjustable aileron trim tab, set up the same way as an adjustable rudder.

higher velocity flights at the SIG contest came from a hole that was rubbed in the side of the pipe. I fixed the hole with some Violett carbon-fiber matt and JB Weld epoxy glue. The system ran fine after the fix. One flight with an overrun was caused by dirt in the fuel system, and the other overrun I had was caused by this nervous pilot and his choice of a needle valve setting. The other 170 some flights to date have been stunt-applicable velocities. Randy Smith built the power system and I recommend his handiwork.

The finish I use is similar to all the other planes I have built in the past fifteen years. It is basically the proper application of an iron-on film and paints consisting of combi-

nations of Rustoleum, Formula-U, and X-0 Rust spray cans available through your basic hardware and hobby stores. I have found that the product X-0 Rust is a similar or almost exact copy of Rustoleum and is available through your True Value dealers. The combination of colors in spray cans is very large when you look at the three brands listed.

I am very humble to say that these type of finishes have garnered fourteen and fifteen appearance points at the Nats in four of five years. I work hard to make this combination succeed. My wife Kathy allows me to build in the house and I am not relegated to the basement, garage, or other isolated area. We enjoy talking about daily affairs and events

while I am building or she is sewing or working at the word processor. Kathy is also my main supporter, co-driver and absolute main launcher at local contests and at the Nats. Men, please don't be upset if I prefer that Kathy launch me for officials at contests. If she is not there due to job or educational reasons, ask as I will be glad to have your assistance.

I am currently running the O.S. Max .40 VF with a Mac's 3522 header pipe and the Future Force carbon fiber .40 sized pipe. The pipe is set from the plug to the first baffle in the front of the pipe at about 17.5 inches. The venturi is a .295 with a BruLine air cleaner and a green or "fine" style filter. Fuel is Taffinder's Tuned Pipe fuel with 7½% nitro. Ground release comes at 9500 rpm. Line length is a set of .015 stranded lines of 61 feet, eyelet to eyelet. Props used are a combination of a depitched Bolly triple-blade 11¼-4, or depitched Bolly double-blade 11½-4 or a Rev-Up 12-4W cut to 11⅜ inches diameter. Lap times with this set-up are about 5.3 to 5.5 seconds per lap.

Again the choice of finish is up to you but you can read my best description of my personal technique in the *Envoy III* article in the February issue of *FLYING MODELS*. You also have a choice of powerplants available to you but the piped .40 was my selection and I am very satisfied with the propulsion system and will continue to build *Arcturus II* for the same set-up. Do remember that other motors will fit and work with the original version. My plastic tank set-up was also published in the *Envoy III* article and it still uses a Pilot brand 6-ounce size with double clunks, Uni-flo, and pipe pressure. I do recommend a YS brand one-way check valve added to the pipe pressure line as close as you can get it to the tank side of the line. ◀

ARCTURUS PRODUCT SOURCES

AERO PRODUCTS

Randy Smith
1880 Scenic Hwy
Snellville, GA 30278
wings, horns, bellcranks, pipes, motors

CAROLINA-TAFFINDER

8345 Delhi Road
No. Charleston, SC 29418
fuels

LONE STAR MODELS

1623 57th Street
Lubbock, TX 79412
balsa

SIG MANUFACTURING CO. INC.

401-7 South Front Street
Montezuma, IA 50171
supplies

P.A.M.P.A.

Precision Aerobatic Model Pilots Assoc.
Mike Keville, Editor
6109 E. Ivyglen
Mesa, AZ 85205

Allen W. Brickhaus
P.O. Box 206
Golconda, IL 62938
basic or further information



Practice helps to make perfect so the author juices up the O.S. .40 VF for a practice flight at the Metropolis airport near his home. Allen favors props slightly over 11-inch diameter with this set-up.