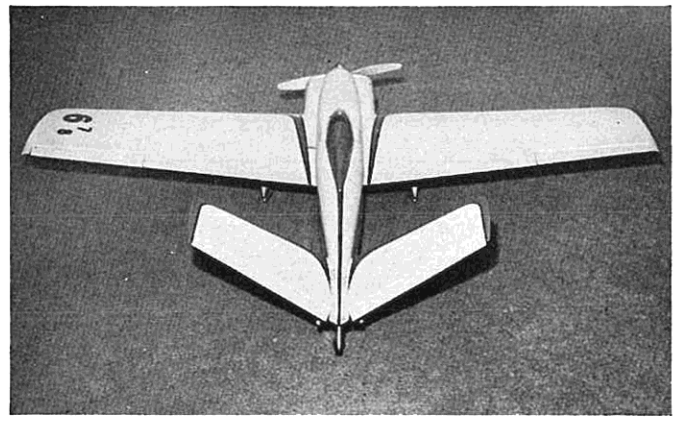




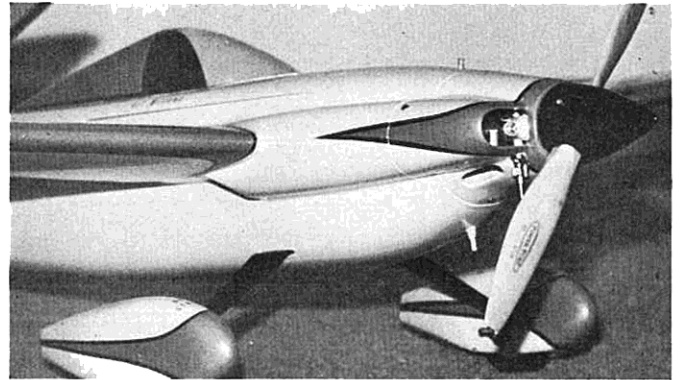
Left side and top with details of hatch & cowl — Barbie doll is approximately correct scale.



Center rear view showing tail and fuselage shape.



Bottom view detailing "V" tail pushrods and cooling vents at bottom side of wing.



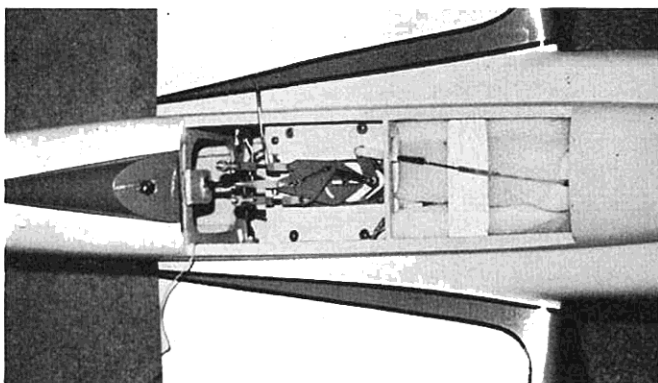
Shot of cowling and engine, wheel pants, and cooling vent. Exhaust extension added later.

# GEE VIZZ

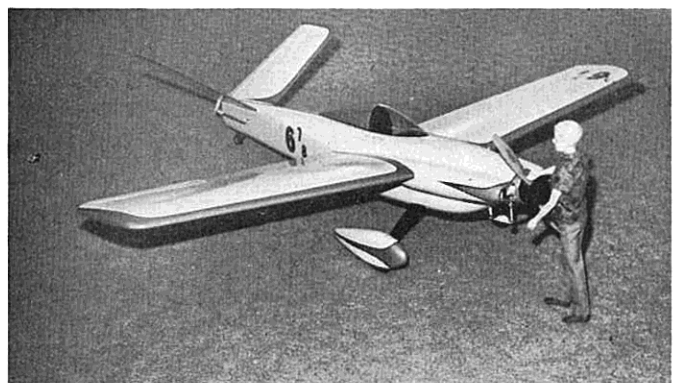
**A beautiful scale-like pylon racer designed for the Midwest-RCM Goodyear Event.**

**By Art Williams**

Rand actuator running. Note pushrod and mounting detail, also bushing on former for elevator pushrod.



Three-quarter front view shows good detail of cowling & wheel pants.



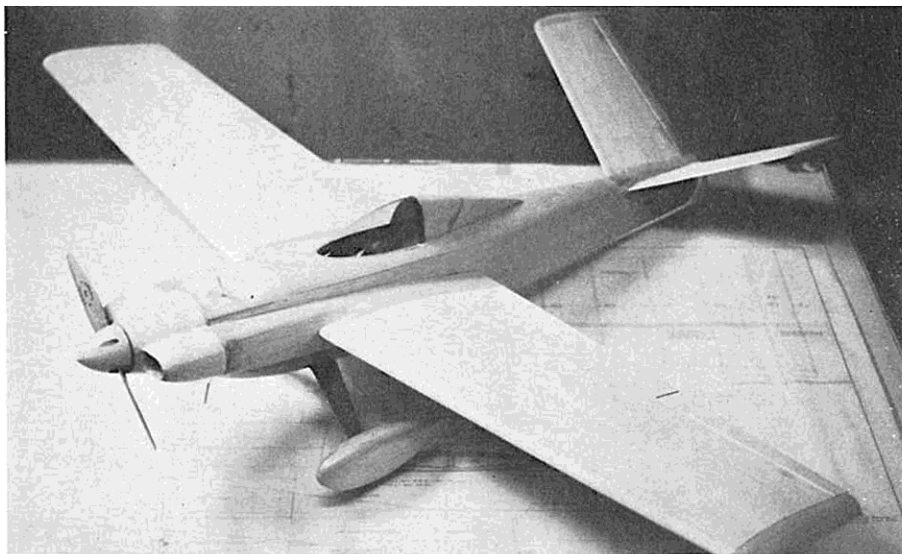
**A** NEW design and a different control system are two ingredients that very easily spell total disaster, but in this case the net result is "GEE VIZZ." Designed primarily as a racing type miniature aircraft to fit the basic rules for the Midwest-RCM Pylon class, proposed by Chuck Cunningham and published in the October issue ('66) of R/C Modeler, it can give you many hours of pure flying fun.

I draw, build and fly, purely for the enjoyment of it and my interest in the types of planes I have built in the past 32 years has run the full spectrum from balsa block solid models — rubber and gas powered free flights — towline gliders — U Control (how many of you can remember when it was called G-Line?), and then to R/C. I have settled down to two types of planes which are, scale and "scale-like." My definition of the term "scale-like" is not to take an existing R/C design and try to make it resemble a full scale aircraft, but rather to start from scratch and design something that could possibly be built full size. I believe that the "GEE VIZZ" fits this category very nicely; try 2½" equal 1'-0" and you will see what I mean.

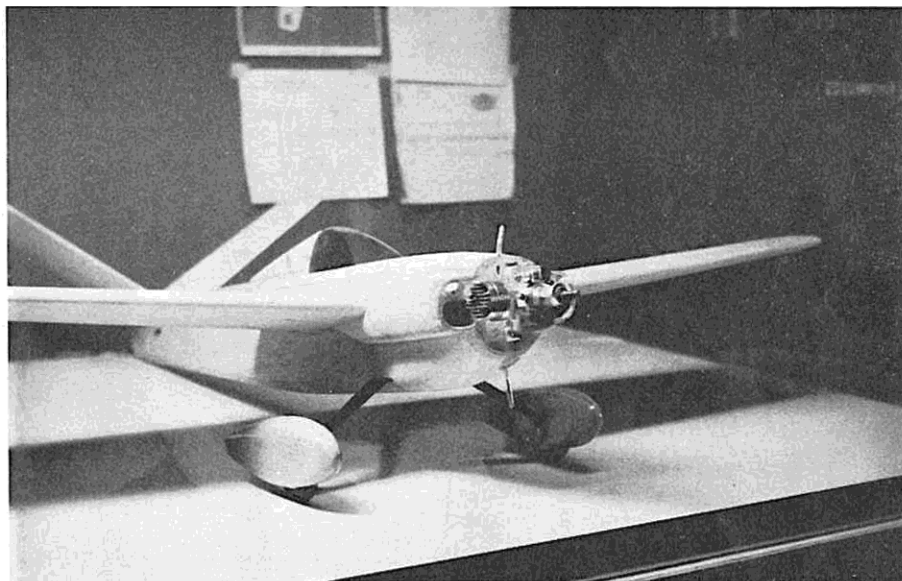
Rather than write the typical construction type article, I have chosen to present some of the reasons how and why I designed the "GEE VIZZ."

Don't be alarmed, I did not forget the rudder; I used the "V" or butterfly tail instead. This is a Pylon racer and making pylon turns with rudder or rudder and elevator without dropping the nose is a mighty tough job; therefore, the "V" tail is used as elevator only, but in conjunction with ailerons. As a result of this, the plane controls like a Delta. When a bank is initiated with aileron, and up elevator is applied, the vertical surface of the "V" exerts a force similar to conventional up-elevator whereas the horizontal surface acts as "top" rudder. These forces combine to tighten the turn and at the same time keep the nose from dropping. The elevators or ruddervators are independent, but are connected to a single push-rod by a "wish bone" type joint and can be adjusted together for elevator trim or separately for rudder trim. One word of caution here about rudder trim; for right rudder — raise the left side and lower the right side, for left rudder — reverse this procedure. Each side of the "V" is raised 30 degrees from the horizontal and the incidence is 0 degrees at the fuselage center-line. Follow the plan carefully because your eye can deceive you on setting this incidence. With only two surfaces in the tail there is less drag and subsequently more speed; also, if you are lazy like me, less to build!

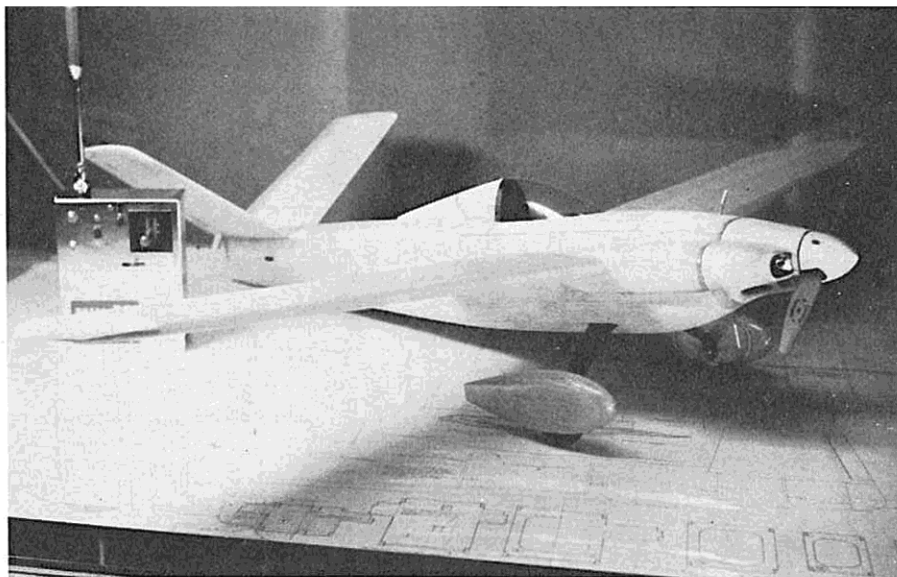
The wing is tapered, or trapezoidal, in plan with an NACA 64012 full symmetrical airfoil and has a built-in twist with the root rib set at 1 degree 30' positive and the tip rib at 0 degrees incidence. This was done to counteract any tip stall which might occur, or in a tight turn a high speed stall which usually results in a snap roll . . . a terrible thing to happen at low altitude! The tips are designed similar to the Horner vortex tip which has been used with much success on full sized aircraft for several years. Their purpose is simply this; they will definitely smooth out the airflow over the ends of the wings, thereby reducing tip drag and increasing the available lift and



Another "one-piece airplane" — only the top hatch is removable for access.

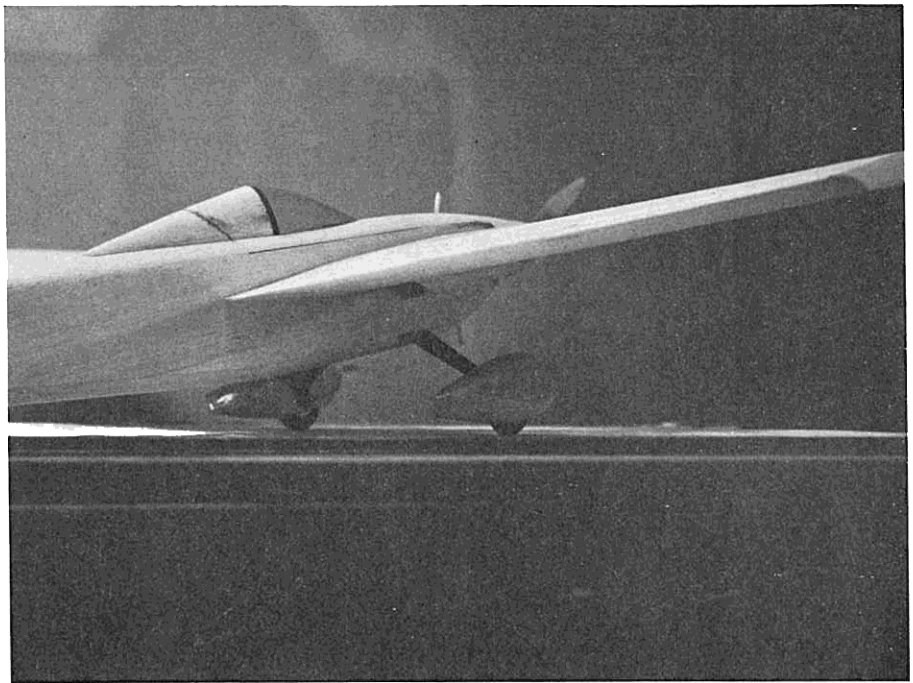


Note the engine and cooling vents (both sides).



The "Gee Vizz" prior to finishing.

aileron effectiveness, thus giving better directional or "yaw" stability and a slight increase in speed. The wing is built in two sections and joined rigidly to stub root sections which are a part of the fuselage. The incidence and dihedral is set up in these two stub sections when the fuselage is built and it is a simple job to mate the wing panels to them. This method also makes the airplane aerodynamically cleaner, and since the actuator is connected to the aileron torque tubes, damage to it is minimized in the event of a minor crash. The stub sections are planked with  $\frac{1}{16}$ " balsa with the grain running chord-wise and will absorb the majority of the shock and fracture before any other part and they are easily repaired. The ailerons are small but they are very effective without being too critical. Total travel measured on the inboard side is  $\frac{5}{16}$ " up and down. This can be varied at the actuator crank or the torque tube adjustment screw, but don't more them less than the  $\frac{5}{16}$ ". One more thought or two about wing design and then we will move on. Pappy deBolt, bless his corn cob pipe, wrote a fine article on lift and drag several years ago and R/C Modeler has recently run a series of design articles on this subject; it seems a shame to see so many people disregard material such as this for the sake of what they call "ease of construction." In one of my books on aerodynamics, the authors state that an untapered wing is the poorest platform choice because it produces excessive induced drag. This can be overcome in many different ways, but one of the easiest is the linear taper in combination with twist in the wing. So if you have not tried a different type of wing, do it, and you will be pleasantly surprised. The fuselage is basically a "box" (I hate that phrase), but has been rounded off by adding sheet balsa to the top and bottom and sanding to a smooth contour. All the formers are  $\frac{3}{32}$ " plywood and add a tremendous amount of strength to the structure. The rear portions of the cheek cowls are faired into the wing stub sections and are hollow to form hot air exhaust ducts which exit under the wing. The cowling on the prototype was carved from balsa blocks and coated with epoxy glue. The Enya 15 III TV is side mounted on hardwood bearers and runs extremely cool, due to the cowl design. The side mount also reduces engine vibration since it is transmitted spanwise and partially absorbed by the wing. The glow plug is connected to a remote socket, thus preserving a clean unbroken appearance. The landing gear is conventional (I used a Hallco unit on the prototype) with a fixed tail wheel and even though the "V" tail does not provide any ground control, unassisted takeoffs are the rule rather than the exception. The plane will weathervane behind the prop and roll down the runway like it was on rails. Equipment access is provided through a single hatch and there is plenty of room for everything. The actuator is mounted on  $\frac{1}{16}$ " plywood and secured to balsa rails with 2-56 bolts and blind nuts mounted in G. E. Silicon rubber. The rails are coated with the silicon rubber, thus the actuator is insulated from any engine vibration. I also mounted the slide switch on the same piece of plywood and epoxied a short section of bicycle spoke to it which sticks out the side of the hatch. All equipment can be



Art Williams' "Gee Vizz." Wingtip and Hallco landing gear.

disconnected and removed in less than 5 minutes.

I have talked quite a bit about the "GEE VIZZ" and some of its finer points, but what is it without a reliable and accurate system to control it? **SCRAP BALSA!**

The heart of this little jewel is Rand Mfg. Company's new G. G. Pak, which has really come through with all the qualities of a champion. It is moving four good sized control surfaces so fast that they seem to blur. There is not one trace of gallop when the plane is in the air. Control is completely proportional and dependable. The total system including the receiver weighs 8 ounces and is compact enough for much smaller planes and powerful enough for larger ones. I really believe that to compare the Rand G. G. Pak or any other pulse proportional system to reed flying is a little unfair — to reeds, that is! Oh, I know some of you "old timers" are going to say you could fly circles around one of those "wobble wobble" systems and maybe you could too, but how long did it take you to learn to fly your reed system like that? It is just the stark simplicity of the new pulse proportional that makes it so appealing; aside from the fact that it takes 5 servos to duplicate the functions obtained from one  $1\frac{1}{2}$  oz. actuator.

If you have not tried the new Gallopress Ghost or pulse proportional, I suggest you gallop down to your local hobby shop and get in on the fun. Although you will have to drop a little "folding green," you won't have to rob the Wells Fargo Stage on the way!

My Rand G. G. Pak was wired into my MIN-X 1200 receiver, using the relay and I have experienced absolutely no radio malfunction from any source; this system works perfectly together. By the way, I cannot let the opportunity go by to mention the fact that this is the same MIN-X receiver and transmitter I was lucky enough to win in the "Name the Plane" contest last

year. Along this same line, I held my own Name the Plane contest which was won by a "total friend," Jim Stein. As a prize, he was allowed to photograph the "GEE VIZZ" for this article and received a set of plans for the same. After a name like that, he should get a prize yet?

Like I said in the beginning of this book, I am in this hobby for the fun of it and this has been a fun type project. I have tried to explain the reasons I designed the airplane as I did, and if you feel I have done something too complicated, or you can do it in a better way, then feel free to try it. I have tried to include enough detail in the plans so that you can build the plane without a lot of hair pulling. The most important things to remember are to build light, but strong, and to make sure of the surface alignment. All of the incidence settings and engine offset and balance points were not just piked out of thin air, but are the result of a lot of trial and error, patch, trial and error processes. This airplane did not fly off the drawing board for several reasons, mainly because the first four test flights were tried in a 15 to 20 m.p.h. wind with the plane slightly out of trim (I should have known better), but the prototype has led a charmed life and is as tough as an old boot. It has been pranged unbelievably hard several times and came out with only minor damage.

The "GEE VIZZ" is **not** the only V tailed airplane ever to fly, it is not the "ultimate design," nor is it perfect; it was an experiment to start with and I think it has proved my theories beyond a doubt — one of them is that a single channel airplane doesn't have to be a "box" or a caricature of an airplane to fly.

Would I build another one? You can bet your next paycheck on it, because by the time you read this, there will be two more under construction plus the prototype which is now being completely refinished and readied for the races.