FLYING THE Gee Bee R-2

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Flying the "R" Model Gee Bee has been a most challenging and enjoyable experience. It is quite impossible to relate the excitement of this happy little racer through a pen. I will do my best to share the real Gee Bee story, or at least reflect the small part that I have been so lucky to experience.

The R-2 replica did not just happen. It took a major effort in man hours and capital. It consumed two years of my life . . . one year of research and one year for the actual building. My friend, Steve Wolf, details the construction, which without his skill and experience would never have begun. I did not strike out to achieve the Gee Bee, but looking back, I did unconsciously sail a fairly straight course to it. I committed my full attention to the project in November 1989, liquidating all of my airshow assets to raise capital. Thereafter, every spare minute went into achieving the R-2.

Although I am technically the test pilot of the R-2 replica, it seems more like stepping into a dream world than of piloting an actual piece of machinery. I feel like I drift between the Gee Bee dream world and reality. I flew the Gee Bee a thousand times in the simulator between my ears before December 23, 1991, and it performed in all aspects just as in the simulator. The test flight was not a major undertaking for me, but rather just a small step up from the simulator to the cockpit. Having sold my previous airplane in 1989, I had only flown on two occasions since, but I had no doubt that my reflexes would fly the airplane just as they have enabled me to ride a bicycle or drive a car. There is no airplane in existence that I feel would have prepared me for the flight of the Gee Bee better than the mental exercise I went through thousands of times before actual flight. I feel more docile aircraft tend to retrain my reflexes to a slower state, which would have been detrimental.

On the day of the test flight, I approached the task with the determination of a Samurai going into battle. In watching videos of my first takeoff roll, this aggressiveness is clearly apparent, as the rudder can be seen making full deflections all the way to rotation. Lift-off was rather abrupt due to an aft CG and lack of

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elevator pressure, and the aircraft quickly headed up hill more than I desired. Grasping the stick firmly with both hands, I stopped porpoising after about three oscillations. After stabilizing, I relaxed and flew the climbout with two fingers. The words of Jimmy Doolittle passed through my brain, "The R Model must be flown with silk gloves and is likened to balancing a pencil on the end of your finger." Words of wisdom! I would add that silk shoes would also be to the pilot's advantage. Very minuscule movement of the rudders result in the pilot careening between the longerons, as he sits with his back virtually against the tail post. That pretty much de-scribes my takeoff roll. The rate of climb stayed pegged out at 4000 fpm.

After a couple of orbits of the Creswell Airfield, I was comfortable enough to explore slow flight. Accompanying any power reduction under 160 mph, the landing wires set up a vibration turning the javelins into a six inch blur. As the little airplane passes through 100 mph the nose drops as if you've run off a cliff. There is no tendency to drop a wing and my reflex to wake up the 500 horses brings it back to flying speed directly.

Next in my adventure was to explore the ailerons. I was pleased to find the pressures and roll rate comparable to the Pitts Special. Delightful! Soon we (the airplane and I) were rolling around the sky with that happy airplane grin.

Looping maneuvers proved somewhat less happy as the duration of the high speed trajectory and no or negative elevator pressure was con-

Doc Nichol

The Gee Bee R-2 builders. Left to right, Jim McAllister, Steve Wolf, Duane Trappen, Delmar Benjamin and Vern Clements.

stantly trying to put me to sleep with 6 G divergent oscillations.

After about 15 minutes to familiarize myself with my little plane, Keith Antcliff began his climb in his Bonanza for air to air camera work. Our intention was to get as many photos as possible in case I failed to bring it back as one complete piece. Also, he was to be my communication with the tower should I need to use the longer runway in Eugene, as I had no radio of my own.

During his climb, I opened the envelope up to 250 mph which I quickly demonstrated to the waiting Gee Bee fans gathered on the airport with a low high speed pass. There is no real sensation of speed from the cockpit as the Pratt & Whitney just thumps away up front at any speed. Accounts from the ground are somewhat different as the aircraft approaches with a glorious Gee Bee scream and staccato exhaust music.

After several laps in knife-edge and inverted flight with the camera ship, I was ready to come down. In the excitement preceding the first flight I left my earplugs in my pocket. As soon as I broke ground I realized I couldn't stand the noise for long and I couldn't get my earplugs out of my pocket and into my ears while flying. After 30 minutes sitting behind those short stacks, I was really ready to come down.

Downwind is flown at 200 mph; turning to final, speed bleeds to 160. If power is reduced too abruptly, the propeller disk blanks out the tail and you begin an arc toward the center of the earth. This sensation is somewhat discomforting and I strive to avoid it. I slip in over the trees at about 140 with a touch down at 120. On my first pass, my plan was to carry power and just get a feel for the landing configuration. I felt comfortable and found the runway so I called it good and wrestled it to a stop. The rudder loses effectiveness at considerable speed so the brakes must be used to finish the roll. This last phase of the landing is more akin to wrestling than to rolling and is one of the things I need to reprogram my gray matter for.

With each new flight I become more infatuated with the ship and gain more respect for the courageous souls straddling the sticks 60 years ago.

There are a few idiosyncrasies of the aircraft I have discovered that need to be fixed or worked around. I have no desire to change the configuration of the airframe or try to improve it with a fatter airfoil, more wing, or improved visibility. If I did, it would lose the essence of the Gee Bee. Instead, my desire is to master the beast in the original configuration and enjoy it for the neat little character that it is.

The items deemed mandatory for a fix are: CG location, the seat restraints, landing wire vibration and braking methods. The seat was easily fixed by adding wrap-around hip restraints to keep me centered. Stays have been added to the landing wires, as was the original. We are trying to move the CG to 18% of the chord as recommended by Curtis Pitts. This should improve pitch and rudder sensitivity.

Although we chose the best brakes available, they are a weak link which we will have to work around. In trying to improve my landings, I made four full stops and takeoffs in a row. On the last roll-out the brake calipers melted and the pedals went to the stops. In conversation with Cleveland engineers, we discovered

brakes are designed to stop one time and then be allowed to cool. This is a problem I will have to manage with minimum brake use. Losing the brakes means losing the airplane, as it depends on them to steer through the final roll-out.

The largest discovery concerning flight characteristics was a phenomenon that I personally believe lead to the demise of the original "R" models and also was prevalent in the Hall Bulldog. This problem concerns the tendency for aileron reversal at high angles of attack and near stall speed. I encountered this nasty gremlin on the third landing. Having seen film of the original aircraft landing three point, I got the tail down at a fairly good speed so I could use the brakes hard. As we drifted to the right, I fed in left aileron and rudder at a speed well under the stall at altitude . . . and the right wing abruptly lost lift and dropped. This, in turn, pitched the left wing up and it flew quite well, popping me up into a knife-edge landing. Fortunately, I got the tail up and arrested the snap roll before we cartwheeled down the runway. I am eternally grateful to have discovered this phenomenon and not destroy the airplane. Hereafter, the tail stays up until we slow to a fast run. The aerodynamics of the problem are that the aileron deflections change the angle of attack of the airfoil, increasing one side while decreasing the other. This, aggravated by a nose high attitude in a three point, results in a snap roll at some narrow band on the airspeed. I intend to avoid this landing configuration adamantly!

I've found that if I can relax and enjoy the Gee Bee, it responds much more politely and landings are much smoother. This is not to say that the landing and rollout do not require my undivided attention. Landing the Gee Bee takes the same type of focus and concentration that it takes to do an inverted ribbon cut. This is the closest analogy that I can think of.

Of all the Gee Bee pilots, Lee Gehlbach commands my greatest respect. He was responsible for about 75% of the time accumulated on the "R" models. From all accounts, he flew the airplanes because he enjoyed it and never made an unkind statement concerning their flight characteristics.

There are several unique flight characteristics of the Gee Bee that I intend to explore after we become better acquainted. The most exciting phenomenon I have noticed is the large effect the gyroscopic propeller forces have on the airplane. This

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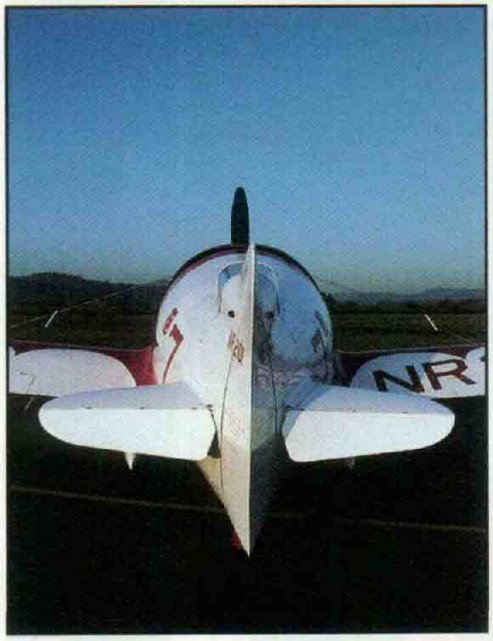

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force is the strongest of any I have found in any airplane due to the heavy propeller and light, short moment of the airframe. I believe they are strong enough to tumble the airplane about the pitch axis while executing a flat spin, this would be akin to a continuous lomcevak. I will have to proceed cautiously in this area, as spin recovery is never known until demonstrated. I do believe the configuration and power of the rudder will make spin recovery predictable, but I have not yet explored them.

In closing, I would like to thank the numerous people who have made this dream a reality. My intention is to appear at as many airshows as will have me so I can share this controversial piece of the past. ◆