

Spinner, Oh Spinner

David Orr (CA) - Someone I flew with to Kanab had an aluminium spinner split in flight and become a large source of vibration. We have all gone to lighter weight ones like Klaus' Kevlar Hershey Kiss type or the Santa Monica boy's smaller clone.

The aluminum spinner was designed to have a front plate, where the spinner leading edge is and a back plate under the prop's crush plate. After thicker props have been installed, the back plate will no longer fit and it is discarded. The remaining spinner support is now at the base of the spinner. That one plate does not provide enough support.

The failed spinner had only one support plate. In fairly close formation the spinner had a 3/4" wobble. The prop was very straight but the pilot reported severe vibration. I headed him off to a desert strip, cleared it for his landing, removed the spinner and continued to Kanab.

At Kanab we discovered the vibration had caused mag screws to back out. After the race, 3 prop bolts were broken and sticking out of the prop. The lug drive holes were egged out of round which made us all nervous. This was all from a spinner that had self destructed.

Electric Trim

Jim Voss (TX) - I have installed electric trim in my Long-EZ by using Mac servos attached to my current manual trim levers. These servos are available from aircraft suppliers or directly from the company which advertises in all the homebuilder magazines. This mod is relatively easy to do, it doesn't change the flying qualities of the airplane (which I like a lot), and even in the unlikely worst case of a trim system hardover failure you just fly to land with stick pressure against the trim springs.

I did my pitch trim first and that is what I will describe now. I have an electric

Long-EZ Project For Sale

Long-EZ 60% complete, fuselage complete on the gear, brakes and wheels installed: GU canard and elevators complete with first fill layer & sanded; wings, ailerons, and center section spar complete. I am a military pilot, have been transferred to England and can not take the project with me. Extras incl.; \$6500 firm. Excellent workmanship. Contact:

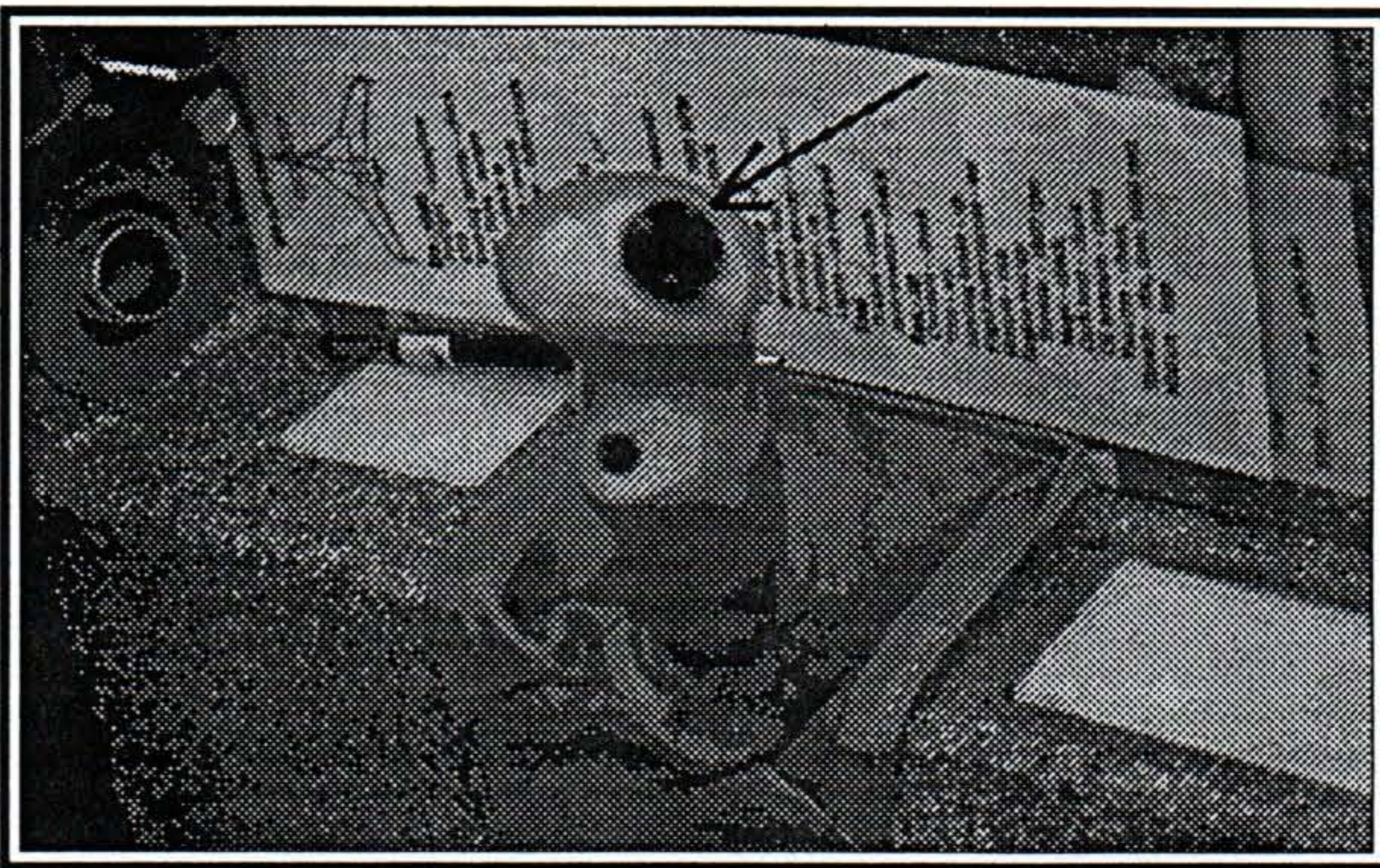
Mark Beres
1206 W. Broadway
Enid Oklahoma
(405) 242-8451

Arizona Sized Oil Cooler

Bruce Vinnola (WY) - One of the best kept secrets in homebuilt aviation is an oil cooler available from Shirl Dickey. When Shirl ruptured a certified aviation oil cooler with his V-8 powered E-Racer, he set out to create a suitable alternative. He succeeded with his conversion of a heat exchanger that is rated at 175 psi working pressure (burst pressure unknown). The cooler is Arizona sized at 6.3" x 3.8" x 13.5" and comes with AN fittings. \$180. Shirl's number is: 602-427-6384



The primary mission of Tom Kohm's Long-EZ is to provide transportation between Westhampton Beach, NY and Morehead City, NC.



Jim's roll and pitch trim servos are controlled by a neat coolie hat switch provided by Mac servo people. This professional looking installation eases pilot work load.

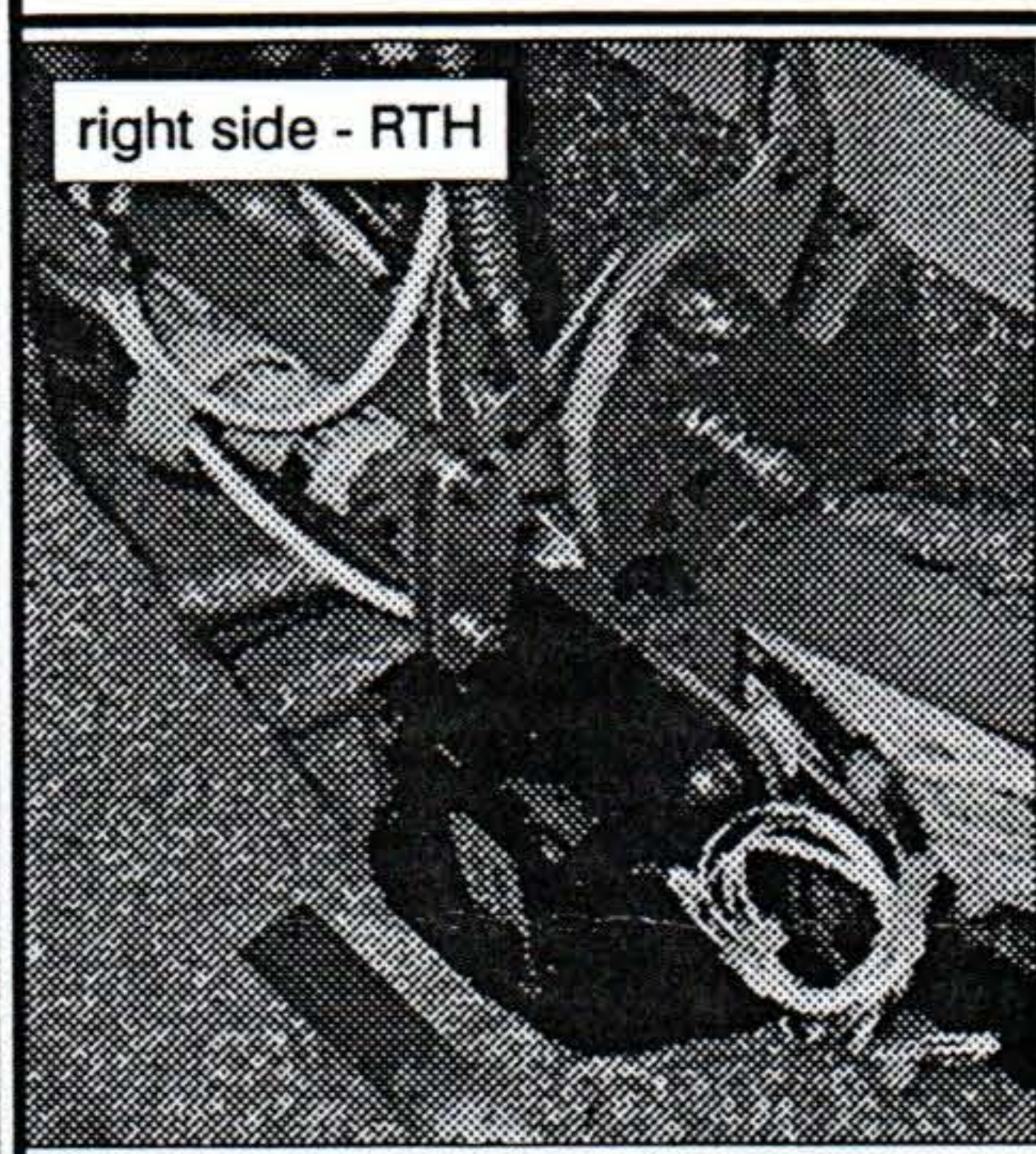
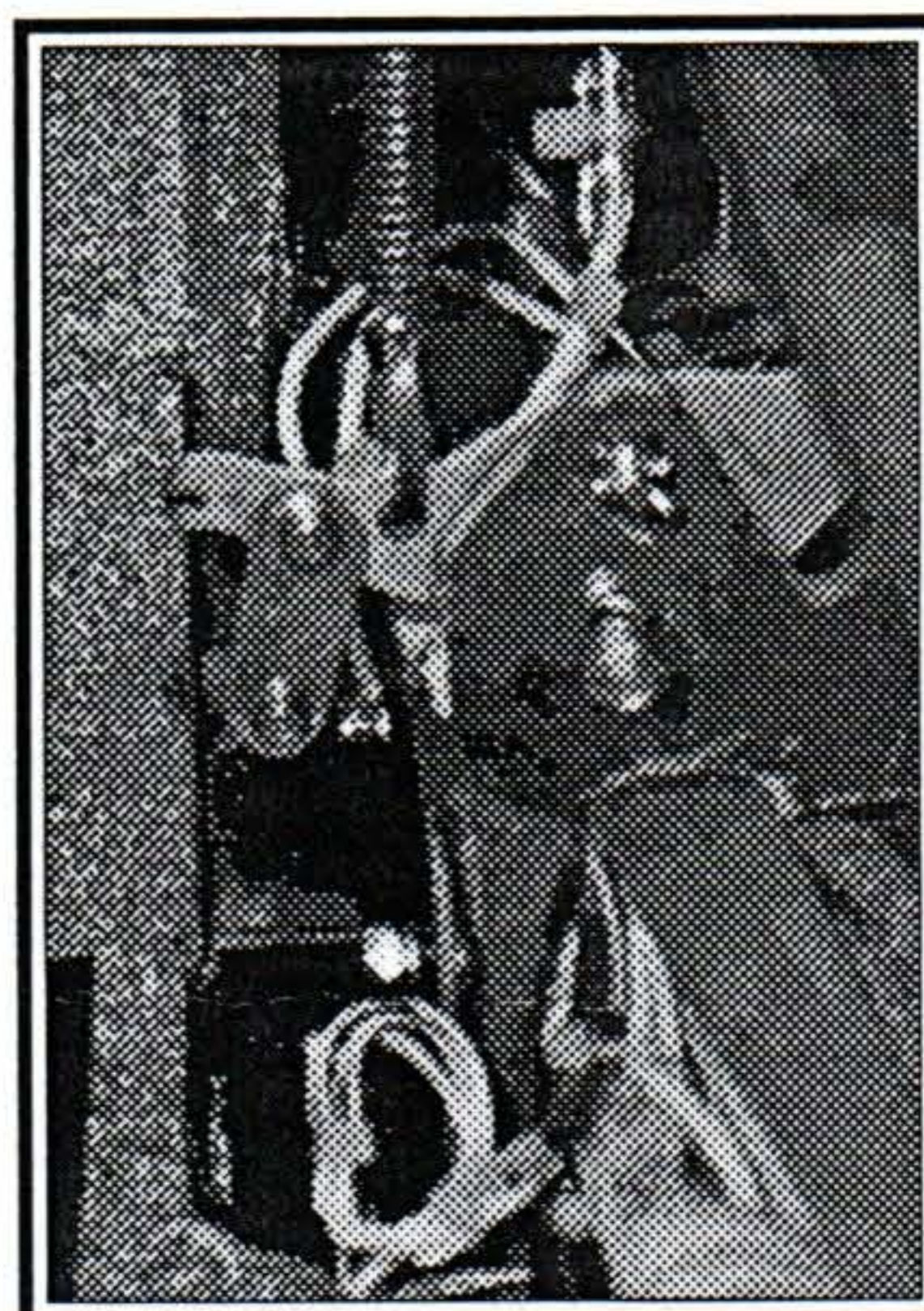
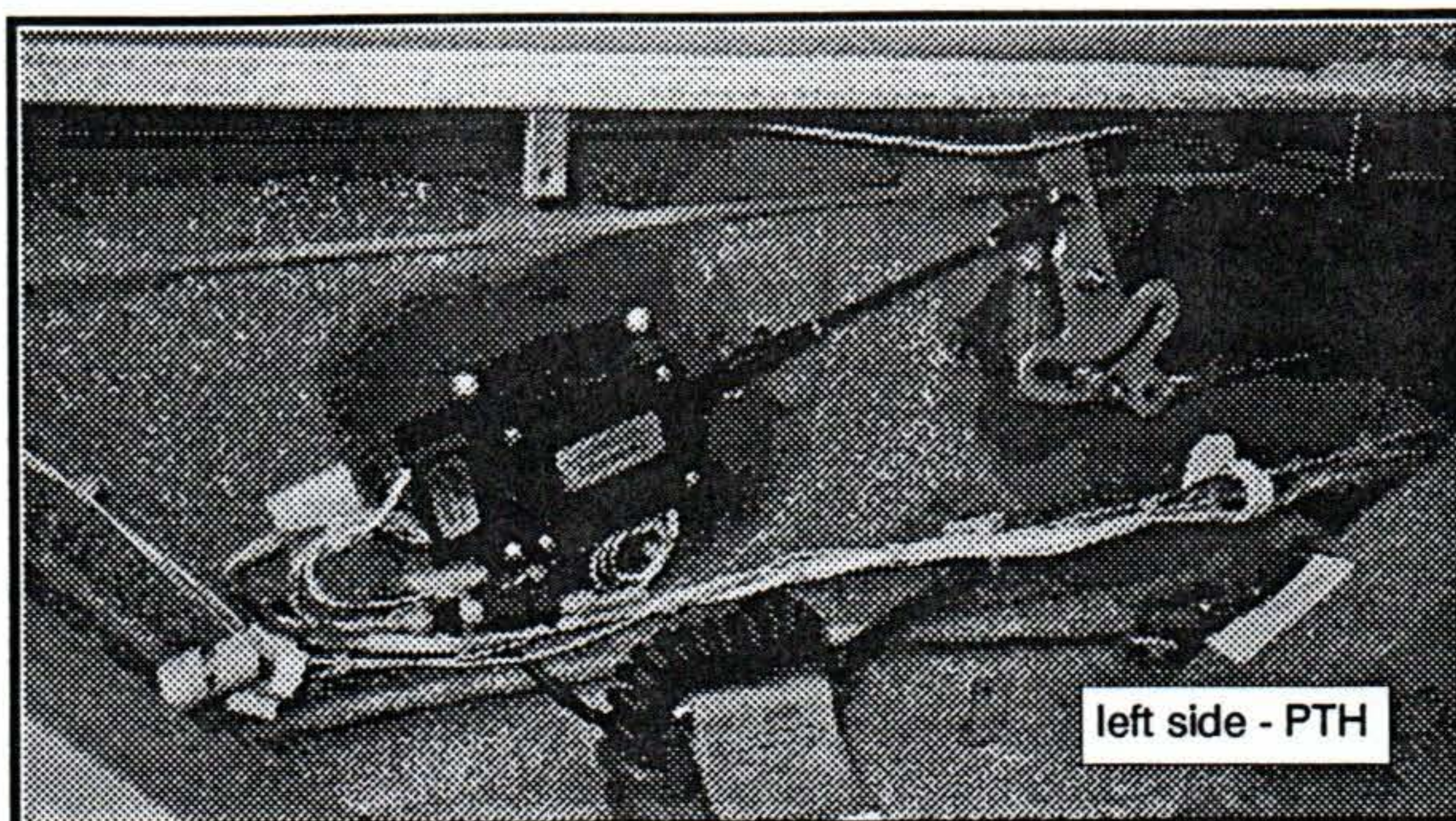
speed brake so the area near the trim lever is clear. I think with some extra work and careful planning someone can figure out how to fit this in around their manual speed brake lever. They could also put it forward of the trim lever instead of aft of it. This would be an excellent time to make the electric speed brake mod too.

I used a Mac 6A servo which provides plenty of power to move the manual lever. The drawing and photos show where the servo goes. My removable side consoles simplify access, but it shouldn't be too hard to remove part of the console if they are built per plans.

With the geometry as shown, the 1" travel of the actuator moves the trim lever through the full range of fore and aft motion. Be sure to check the geometry for your airplane. Make sure you can get full trim travel. A little too much is better than too little. Excess travel will not hurt anything since, if you get past full elevator travel (which is not normal in flight), this just stretches the springs but you are assured of full trim authority.

To check trim travel, put the trim actuator at the normal cruise setting and hold or tape the actuator so the drive rod is approximately perpendicular to the edge of the pitch trim handle (PTH). Mark the spot on PTH where the attachment hole will be drilled. Move PTH to the full forward position, then drive the actuator full forward with a 12V battery and check to insure the drive rod reaches the place you marked on PTH. Repeat for full aft trim. If you don't get full travel, move the attachment point on PTH up or down and repeat the check until you get full travel in both directions. Mark the location of the final hole position on PTH and mark where the four screws will attach the servo to the fuselage side.

Make small holes (just big enough for the nutplates to go through) with your Dremmel tool in the fuselage side where you marked the four holes. Remove enough foam around these holes (about 1/2" diameter") to per-



The above pitch and roll trim installation photos show Jim's usual meticulous craftsmanship

mit you to securely flox the nutplates in place. Put the screws through the actuator attach holes, add one or two washers on each screw, then cover the whole bottom of the actuator with a sheet of plastic wrap, pushing the screws through the plastic wrap. Grease the screws so they don't get floxed in place and put the nutplates on the screws. Mix up some flox, fill the holes with it, then place the actuator in place, pushing the nutplates into the flox and the actuator flat against the fuselage side. Wipe off the excess flox and tape the actuator in place to cure.

One could probably just epoxy the actuator to the fuselage side, but I

always build with future maintenance in mind. After the nutplates cure, remove the four screws and actuator. Cover the nutplate area with 4 plies of 4" x 4" BID to insure it meets the homebuilders' creed of "It can't be too strong". Remember to sand first and use peel ply so the installation is neat and tidy.

Remove the PTH and drill the hole for the actuator attachment. Place it as far from the handle edge as the hardware will allow and replace the PTH temporarily. Open up the nutplate holes in the four ply BID, install the actuator and connect the actuator hardware. Trim the drive rod to fit if you didn't do that earlier.

Test actuator ability to drive the trim fully in both directions. I had to trim my PTH, as shown, to avoid contact between the actuator rod fork end and PTH when near the limits of travel.

When it all works properly, tighten the attachment bolt for PTH so it moves freely but doesn't wobble, cotter pin the attach points of the actuator drive rod and adjust the friction bolt on PTH. I replaced the friction washers with metal ones and lubricated the moving parts so it all works smoothly.

Wire the actuator per the very clear Mac instructions. I used their four-way coolie hat trim switch on top of my stick and it works great. Since I don't have any space left anywhere for the Mac provided trim indicators, I just left the manual trim actuator showing and use it as my trim position indicator.

The roll trim system is similar to the pitch trim system in that there is no modification to the control system itself. You just have an electric actuator, another Mac 6A, do what you now do with your hand.

First make a small, 2-1/2" X 3-1/2", 6 ply BID lay-up for the right angle bracket for the actuator. One side of the angle is 2-1/2" X 2-1/2" and the other is 2-1/2" X 1". I just laid up the wet glass on plastic wrap and draped it over the edge of a 2 X 4, let it cure, then trimmed to fit the actuator.

Next, remove the right console; easy if you have removable consoles, otherwise do what ever to get access to the roll trim system RT3 and RTH. On the roll trim handle (RTH) locate the inboard trim spring attach point and mark a point 1/2" inboard from there, centered on the "neck" of RTH. This is where you need to drill the clevis pin hole for drive linkage bar attachment. Size the hole for the clevis pin used. Directly below this is

ЗДРАВСТВУЙТЕ!

where the Mac actuator goes, as shown in the drawings. I had to cut a hole in the inner skin of the fuselage bottom and remove foam down to the outer skin to provide room for the actuator. You will also have to trim the plywood trim support bracket RT3 to allow proper positioning of the actuator. I later glassed the inside of this hole with 2 ply BID to reinforce it.

Make 2 drive linkage bars to attach the actuator to RTH. They are 2024-T3 or other suitable aluminum 1-1/2" X 1/2" X 1/16" thick.

Attach the actuator to the 6 ply support bracket with 4 small screws, washers and lock nuts. Trial fit the actuator in place. Put 2 pieces of scrap BID under the actuator to allow for the glass you will lay-up in the hole later. With the actuator drive shaft fully retracted, measure the distance from the center of the attach point on the actuator drive shaft to the hole you drilled in RTH while RTH is positioned for full left roll. This is the distance between holes on the linkage bars. Mine are 1-3/8" apart. Drill these holes, then trial fit again with everything connected. Use enough washers to make it all fit snugly but movable on the clevis pins. Now, fully extend the actuator drive shaft; and with the actuator bracket in the same place as before, the RTH should be in the full right roll position.

You may have to adjust the up/down positioning of the actuator or the linkage bar length or their holes to fit your installation. Check that the actuator has full travel without bottoming out on the slots that are cut in RTH, and that you get full left and right roll trim. With the geometry shown, mine all worked great without altering RTH.

When satisfied that it all fits, cut a piece of 1/4" plywood 1-1/2" X 1" to reinforce RT3 and to tie it to the actuator bracket. With everything in place, put the plywood piece in place with one edge against the actuator bracket and one flat against RT3. Mark the location of the plywood on the bracket, remove everything and attach the plywood to the bracket

with flox and 2 BID tapes. When partially cured, flox the bracket with plywood piece in place as shown. Doing this while partially cured allows some repositioning to get a good fit and allows everything to bond together to make it stronger.

Connect everything to verify alignment, then put a 2 ply BID tape across the bottom of the bracket (under the actuator - so tricky) and in the corner between RT3 and the bracket.

When cured, connect the wires per Mac instructions. I also used the Mac coolie hat trim switch for roll trim. Replace the phenolic washers on the friction adjusting bolt with steel ones, lubricate and adjust the bolts, holding PTH to RT3 to move freely without wobble.

Do a final test of the trim system to assure everything works correctly. The actuator should drive through it's full 1" travel without reaching any hard stops but should allow full left and right trim.

I trimmed the end of RTH so it sticks out of the side console and use it as a trim indicator. I covered the old slot in the console with a small plastic panel with a neutral trim position marked on it.

Before replacing the right console, you may have to remove some of inside of it to provide clearance for the actuator. I did this and put a layer of 2 ply BID on the inside where I removed foam and glass.

That is all there is to it. It took me a weekend to install and another to get it wired up (after 6 months of thinking and planning!). It works smoothly, allows very precise trimming - much better than manually, and makes flying even easier. I love it!

If anyone has questions, the best way to reach me is by E-mail because of the time difference with Russia. My address is james.s.voss1@jsc.nasa.gov My normal mailing address works but takes a month.

N81JV Pitch Trim

Cut out to allow full motion of PTH

Nutplates floxed into fuselage side then entire area covered with 4 ply BID

Hardware supplied with Mac servo

PTH

0.6 in

Trim cables

1.1 in

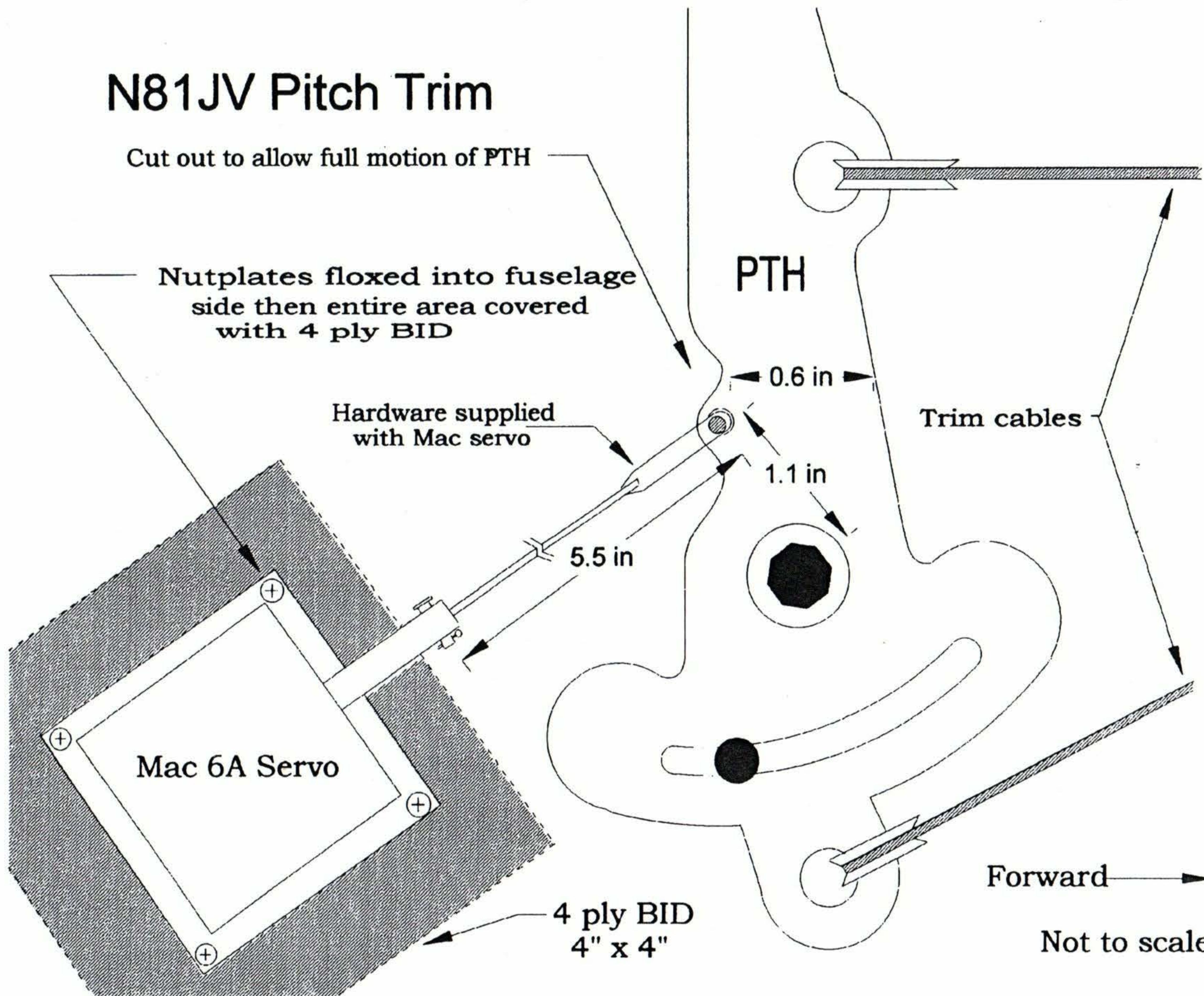
5.5 in

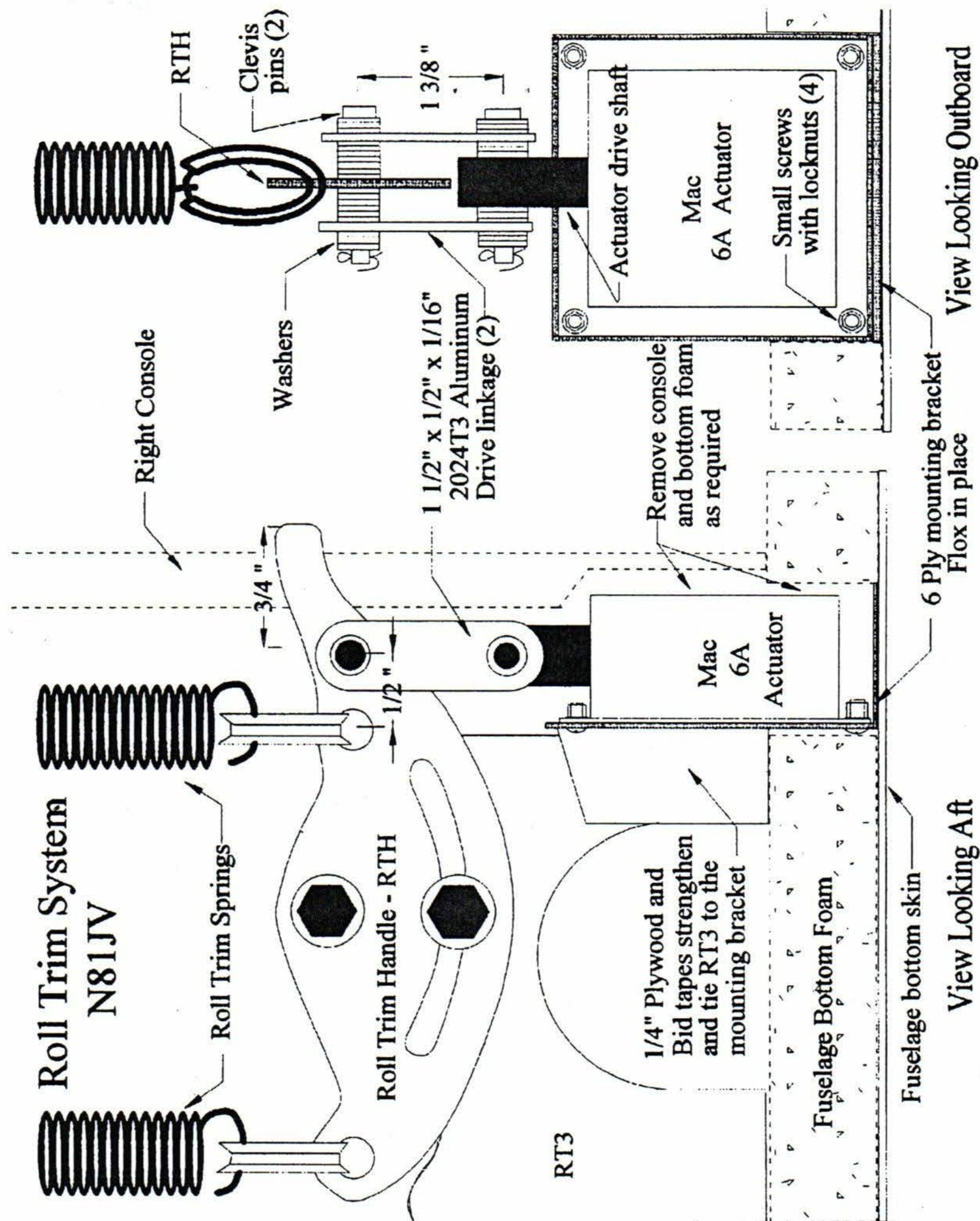
Mac 6A Servo

4 ply BID
4" x 4"

Forward →

Not to scale





Radio Transmitter License Requirement Update

The following information was taken from the FAA publication, Alerts.

Most of you know that the Telecommunications Act, passed in February, allowed the FCC to stop requiring us to have transmitter licenses. The FCC still has a rule requiring us to

have one, however. They issued a NPRM investigating the question. It's comment period expired in late May and no opposition was expected. Pending final decision the FCC issued a temporary rule eliminating the individual licensing requirement for **private aircraft operating domestically** which are not required by law to carry a radio. 15

If the NPRM does not eliminate the license requirement, FCC will allow enough time to get your license. The FCC has an information Hotline set up. Dial (800) 322-1117, then press "2" and then press "1". Update information is also available via the internet at <http://www.fcc.gov/wtb/avmarsrv.html>