

More on

Radio and Antenna Installations

Getting the message out!

PAUL GOULD

Editor's Note: Paul Gould of Sardinia, Ohio, flies his award-winning Aeronca Chief all over the eastern United States, and he often uses a handheld radio to communicate. Here are his thoughts on radio and antenna installations.

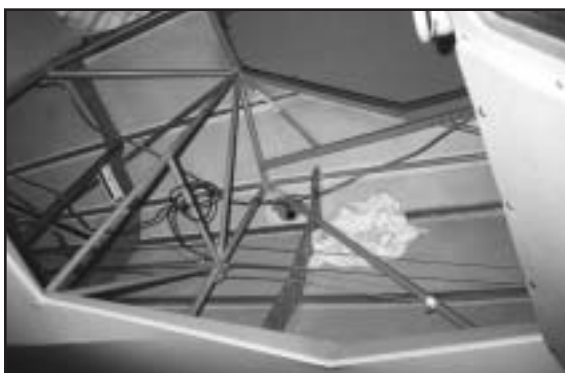
to match ground planes to the antenna on fabric-covered airplanes. When used in the airplane, the little "rubber ducky" antenna supplied with handheld radios works well when you are close to airport traffic.

other applications the navigation antenna was installed along the wing spar.

Installing the dipole antenna in tube and fabric airplanes is not an easy task. Dipole antennas don't work well when placed near metals, such as the airframe tubing. That's a no-no. To even think about putting a dipole antenna in fabric airplanes will require a lot of thought and planning. You've got to pull out seats and the baggage compartment just to get inside the fuselage, where you'll probably find there is no suitable place to install the dipole antenna. The supplier recommends vertical installation, with the optimum angle at 90 degrees to any metal structure. However, it can be mounted up to a 45-degree angle away from the metal.

If you do so, the antenna's radiation pattern suffers. It becomes more directional if installed at 45 degrees.

Still, I was able to fit a dipole into my 11AC Chief, as the fuselage is large enough to permit installation of the 40-inch-long antenna. The cost of a dipole is approximately \$150, plus fabricating wood mounting members. I used a piece of 1/4-inch by 1 1/4-inch by 46-inch spruce in my 11AC. The location was really the only place I could install it, so it went there, but I did have some doubt as to how good the installation would radiate transmission and reception. I didn't want to spoil the original factory look of restoration and lose points when the airplane was judged. The gamble paid off, however, and I have a very good reception and transmission using a battery-powered Icom A-22 handheld transceiver. I have coupled



These two photos show the AAE antenna mounted just aft of the fabric baggage compartment in Paul Gould's 11AC Chief. Keeping the antenna far away from the fuselage tubing helps keep the radiation pattern from being too adversely affected.



Using an outside antenna considerably increases the reception and transmission distances. The locations for the antenna are the biggest problem. Regular antennas mounted on the outside of the airplane either detract from the original appearance or wind up in awkward-looking locations. Wanting to avoid either of those situations brings me to the installation of the dipole antenna that was developed for airplanes built with composite materials. Advanced Aircraft Electronics builds these antennas, which were originally intended to be installed in layers of composite materials of the airplane. One communications antenna is to be installed vertically in the tail fin of composite aircraft. The navigation antenna was installed horizontally in the fuselage in the layers of composite material, and they were buried forever in the composite materials. In

I'd like to add to the article by Evan McCombs regarding installing handheld nav/comm radios in vintage airplanes (tube and fabric). Here's my two cents worth on antenna types, and how

to this a little cheap Pilot II intercom, which works very well.

I made sure that if the dipole installation had not gotten the good results, that I was able to remove the wood member the antenna was glued to by removing one 3/4-inch 5/5 No. 6 P.K. screw. It was worth the gamble, as my installation works better than I expected. I can receive the ATIS and AWOS transmissions at 20 to 30 miles out, even better on some days. I've transmitted and received on frequencies that are not often used, 123.45, as far as 90 to 100 miles. Ask Ray Johnson how far away we've talked air to air. Ray has his stainless steel whip antenna located on the left wing root fairing.

The dipole technician told me that any large metal objects must be at least 12 inches away from the antenna. The 11AC auxiliary gas tank was my main concern. I was able to install my dipole 78 degrees from vertical, staying 12 inches from the gas tank.

Note that the emergency locator transmitter (ELT) is installed on fuselage tubing using Adel clamps. The masking tape was used as a temporary measure until I was sure I was going to be pleased with the location of the antenna. I later glued the dipole to wood with aircraft glue used for cowl seal material. The seat of the 11AC must be moved forward as far as it will go to inspect the installation and test the ELT. Plus, every two years I have to pull it to change the battery during the airplane's annual inspection.

The supplier said I could return the antenna if it was not damaged, which was a plus if I was unable to install it. I'm very happy I made the choice for the dipole. It's out of the way, not seen, and no one can tamper with it like the antennas installed on the outside of the airplane.

You can reach Advanced Aircraft Electronics at www.advancedaircraft.com or write to it at P.O. Box 28, Ellwood City, PA 16117. Their telephone number is 800-758-8632.

Another AAE Antenna Installation

AAE antennas have been used by a number of restorers who were looking for a hidden antenna installation. The location in Paul's Chief has a lot of good points. First, while not super convenient, access can be gained by removing the seat and flipping up the fabric baggage compartment. The ends of the antenna are a good distance away from the fuselage tubing. We've seen installations in J-3 Cubs where the antenna was installed vertically just aft of the windows, laid right on top of the stringers and secured in place before the fabric was applied.



In a similar installation in the Aeronca Sedan I fly, an AAE antenna was also installed just aft of the baggage compartment, with the ends of the 40-inch-long antenna curving with the interior of the fuselage. (See photos.) There are a couple of important differences between my installation and the one in Paul's Chief. First off, the baggage compartment of the Sedan has a pair of metal bulkheads, with the lower portion a section of sheet aluminum. Because of its relatively close proximity to the antenna, that one difference has a major impact on the radiation pattern of the antenna.

Since it was installed on the left side of the airplane (reasoning that most of the transmissions at airports would be made to the left of the airplane, since we fly a left-hand pattern more often), transmission and reception to stations located off the *right* front of the airplane are negatively impacted, sometimes so much that a change in heading is needed. The rest of the receive/transmit pattern seems to be quite acceptable, even while using a relatively weak transmitter such as a handheld comm. I'd imagine it would be much improved with a standard panel-mount radio, or even a hard-wired, 12-volt RF amplifier.

The great folks at AAE pointed out that some fiddling with the exact location of the antenna might be needed to get an acceptable pattern, so we're planning on mounting the antenna with an orientation similar to Paul's installation. The beauty of this antenna is that it is extremely efficient in terms of its consumption of transmitter power—very little is wasted once it leaves the radio. Plus, since no holes had to be drilled in the airframe to install it, you can fiddle to your heart's content with the location to see if you can get it to work even better.

Obviously, mounting the AAE dipole antenna in an all-metal airframe won't work, but if you've got a fabric-covered airplane, I'd certainly consider installing a dipole antenna using the procedures outlined in the AAE literature.

