

## **GPS Antenna Installation Guidelines**

### **General Information**

Installations must be made by qualified personnel, and in accordance with Federal Regulations. Refer to FAA Advisory Circular 43.13-2A for General installation guidelines. A copy of the FAA Advisory Circular can be obtained at [www.faa.gov](http://www.faa.gov). Look for Advisory Circulars under the Regulatory/Advisory heading on the FAA home page.

### **Mounting Preparation**

The electrical bonding of the antenna to the aircraft ground is extremely important. If this is not done properly, antenna performance characteristics may become distorted and nulls may appear in the antenna radiation pattern. This, in turn, may cause erratic navigational readings or signal drop out. The electrical bonding of antennas to composite aircraft is best accomplished by direct metal-to-metal contact of the antenna mounting hardware to an internal ground plane. To do this, you must have the mounting screws, washers and nuts make direct contact to the internal ground plane with the use of a backing plate. The backing plate must make direct contact to the internal ground plane. Sandwich the aircraft skin and internal ground plane between the antenna base plate and internally mounted backing plate. To test the electrical bonding of the blade to the aircraft, a reading of .003 ohms between the antenna base plate and ground should be achieved.

### **Mounting Locations**

- GPS antennas must be mounted on the top of the aircraft and be oriented parallel to the horizon to assure maximum visibility of the satellites that provide positioning data. The optimum antenna location must not be “shaded” by any structure or by other antennas.
- For aircraft, the optimum antenna location is at a high point on the cabin when viewed in level flight and away from projections such as a propeller, tail surfaces, or the shadow of larger antennas.
- On high-wing aircraft, mount the antenna toward the leading edge of the wing to minimize shading during turns and climb-out, which is when navigation information is usually desired. Avoid mounting the antenna at the rear edge of the windshield since, under certain conditions; static may be generated in this area.

## **Spacing to Other Antennas & Equipment**

- If the antenna is to be installed on an aircraft with a SATCOM (INMARSAT, 1625 MHz) antenna, 4 feet minimum spacing is recommended.
- Assure proper spacing from other antennas (36" minimum) to avoid possible performance degradation due to signal shadowing and/or RF interference.
- Avoid mounting antennas or routing coaxial cable near other communications equipment, which could generate frequencies harmonic to the GPS 1575 GHz frequency.

## **Grounding**

- The Comant GPS design does not require a ground plane. To assure maximum protection from a possible lightning strike in a metal or metal and fabric aircraft, the antenna base should conduct to the mounting surface.
- Method 1. With the exception of certain ELT blade antennas, all Comant antennas can be grounded through the mounting screws. To obtain the proper electrical bond (grounding), the area inside the aircraft, where the antenna is to be mounted, must be free of paint and debris. A backing or doubler plate is placed in the aircraft interior with the antenna mounting screws affixed to the necessary nuts and lock washers. The mounting hardware will make contact to the backing plate, and the backing plate contacts the aircraft skin (interior), with this, an electrical bond is achieved.
- Method 2. Determine the area where the antenna will mount to the outside of the aircraft. Carefully remove paint where the antenna base plate makes contact to the aircraft skin. Follow the remaining instructions as described in Method 1.
- Important notes: With either method, apply alodine to any bare aircraft skin. After completing the installation, check electrical bonding with an ohmmeter. It should read no greater than .003 Ohms between a mounting screw and the aircraft skin.
- For COMPOSITE AIRCRAFT, please see Comant's guidelines for installing antennas on composite aircraft on this web site. Receiver lightning protection can be improved by grounding the coaxial shield with an appropriate mounting clamp at any convenient location before the receiver connector.

### **Coaxial Cable Considerations**

- For maximum signal strength, minimize the length of the coaxial lead from the antenna to the receiver.
- Never exceed 10 feet of RG-142 quality or 6 feet of RG-58 quality coaxial when installing a PASSIVE (non-amplified) GPS antenna.

### **Other General Installation Warnings & Instructions**

- Never exceed 20 in. lb. torque to the mounting screws. This will avoid cracking the plastic radome of the antenna.
- Never paint a GPS antenna. The finish provided on the antenna is calibrated into the tuning.
- Never use connections in a GPS installation, which are not inside a suitable connector (no solder terminations) as they will degrade or de-tune the GPS signal.
- Never mount a GPS antenna at an angle to the horizon, since, the antenna cannot “see” below that angle.