

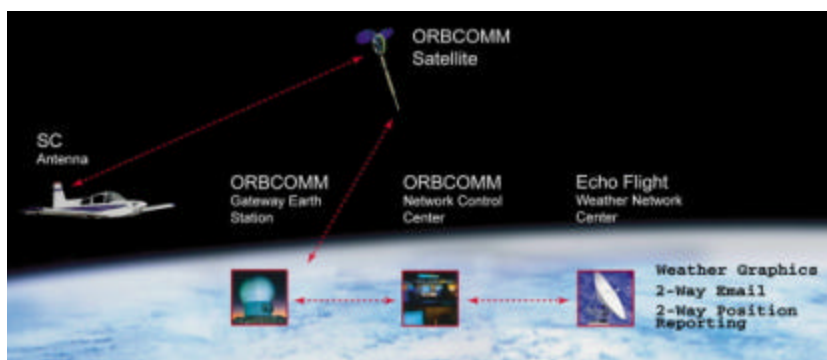
# ***FLIGHT CHEETAH***

**FL 270**

**AND**

**EchoMap 2.5 Moving Map**

## **Dipole Antenna Installation Guide**



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**Attention!** The EchoMap system includes a finely tuned VHF Transmitter/Receiver. Proper installation of the VHF Dipole Antenna is necessary for optimal system performance.

Please follow the installation instructions carefully.

**Please refer to the EchoMap User's Manual for a complete description of system alerts and restrictions.**

# Table of Contents

<b>1. INTRODUCTION.....</b>	<b>4</b>
<b>2. INSTALLING THE VHF ANTENNA.....</b>	<b>5</b>
2.1 Unpacking and Inspecting Antenna .....	5
2.2 Antenna Installation .....	5
<b>3. SPECIAL INSTALLATION INSTRUCTIONS .....</b>	<b>7</b>
3.1 Deviation From Horizontal.....	7
3.2 Deviation From Flat.....	7
3.3 Installation Near Metal Objects .....	7
3.4 Installation Parallel to Metal Objects .....	7
3.5 Installation in a Tube & Fabric Structure .....	9
3.6 Installation Perpendicular to Fuselage .....	9
3.7 Installation to Outer Skin of Aircraft .....	10
3.8 POST INSTALLATION CHECKS .....	11
<b>4. CABLING.....</b>	<b>11</b>

## **1. INTRODUCTION**

This installation manual includes all specifications, installations, and procedures necessary for proper installation of the Composite Dipole Antenna.

This antenna is designed to mount inside the structure and radiate through the non-conducting skin. This antenna is not intended for use in metal or carbon fiber structures. Metal and carbon fiber will disrupt the VHF transmission and cause poor reception.

In the case of carbon fiber composite aircraft, a mounting position must be utilized where the antenna is bonded and allowed to transmit through a surface that is not carbon fiber. If this is not possible, contact Echo Flight Tech. Support for alternate installation procedures.

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## **2. INSTALLING THE VHF ANTENNA**

### **2.1 Unpacking and Inspecting Antenna**

Unpack the antenna and inspect for possible shipping damage. All claims for damage should be filed with the transportation company involved. If claims for damage are to be filed, save the original packing carton and materials. If no defects are detected, store the antenna flat so that it will relax and uncoil from the shipping position.

### **2.2 Antenna Installation**

The antenna is a flexible fiberglass substrate designed to conform and bond to the inner composite surface of the aircraft skin. The proper orientation and position of the antenna's element is extremely important for effective operation.

For maximum effectiveness, the element's axis must be primarily horizontal and located on the top of the structure with a clear field of view of the sky. If this is not possible, see Section 3 for installation alternatives.

The following installation procedures must be performed as specified to ensure proper operation and performance. Deviation from these instructions could result in reduced performance.

1. Unpack the antenna and allow it sufficient time to uncoil from the shipping position.
2. Determine the antenna location inside the fiberglass structure on the top of the aircraft with the aid of aircraft specs and templates.
3. Determine the size of bonding area. Outline the area to be bonded, staying 1/16 of an inch within the dimensions of the base of the antenna.
4. Prepare the aircraft's mating surface by lightly rough sanding the entire area.
5. Prepare the antenna, being careful to apply the bonding process to the entire base surface.
6. Apply the antenna to the aircraft's mating surface.
7. Hold or tape in place until the bonding process cures.

**Note:** Refer to the bonding material's specific instructions

8. After the bond has cured, attach the RG-400 cable per Section 4.

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## **3. SPECIAL INSTALLATION INSTRUCTIONS**

### **3.1 Deviation From Horizontal**

In some aircraft it may not be possible to install the antenna in a completely horizontal position. It is acceptable to mount the antenna at angles up to 30° from horizontal. Additional deviation beyond this angle will result in reduced performance.

### **3.2 Deviation From Flat**

In some aircraft it may not be possible to install the antenna in a completely flat position. It is acceptable to mount the antenna in a slight curve without damaging the element. Curvature of the antenna element greatly affects the standing wave. Although a slight curve with the balun/BNC at the top may increase performance, a slight curve with the balun/BNC at the bottom will narrow the antenna's view and decrease performance.

The installer may find it necessary to do a temporary installation and test for proper operation. If the temporary installation is unsatisfactory, a new location should be selected and the test repeated.

### **3.3 Installation Near Metal Objects**

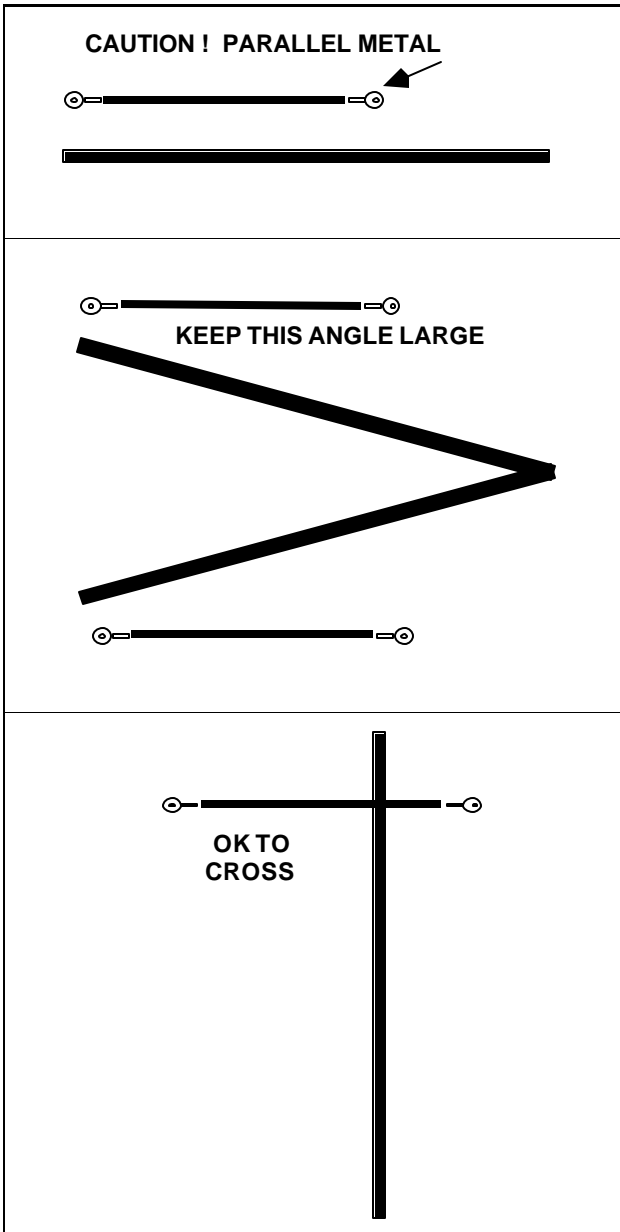
In some installations the mounting structure may include metal components and fasteners which could alter and degrade the performance of the antenna. In this configuration the standing wave is altered by the interaction between the metal and the antenna.

This interaction will decrease as the distance to the metal lengthens. Maximum degradation will occur when the distance to a metal object approaches a quarter wavelength (about 3.5 ft). As a rule, the antenna should be installed farther than a half wavelength from metal structures.

### **3.4 Installation Parallel to Metal Objects**

Some installations may require the antenna element have one end near a metal brace or a large metal structure. The angle between this metal and the antenna will determine how well the antenna will function. The optimum installation occurs when the antenna is

angled at  $90^\circ$  to the object. The installation is usable through the range to slightly over  $45^\circ$ . Installation closer to parallel than  $45^\circ$  is not recommended. (See Figure 1)

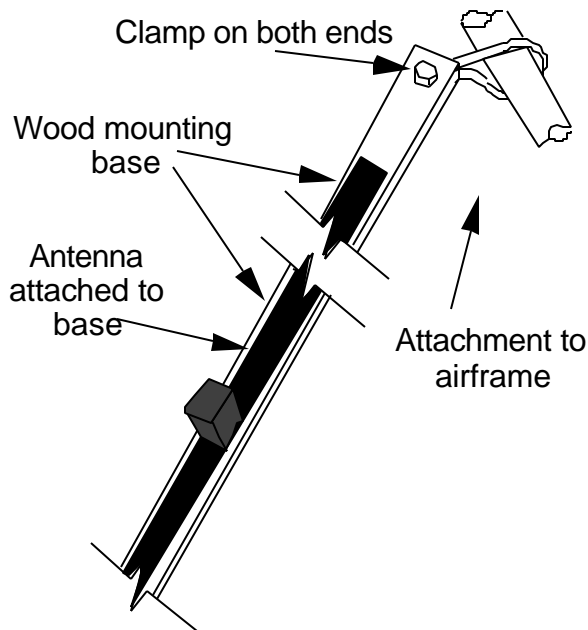


**FIGURE 1** Examples of Installations Near Metal

### 3.5 Installation in a Tube & Fabric Structure

If the installation is to be within a tube and fabric structure, care must be observed to minimize interaction with the metal structure. Although the antenna should perform satisfactorily, the installer may find it necessary to do a temporary installation and test for proper operation. If the temporary installation is unsatisfactory, a new location should be selected and the test repeated.

If the installation is in a tube and fabric structure, the antenna may be attached to a strip of wood or fiberglass and this assembly is then mounted on the tubular airframe with cushioned clamps. Figure 3 illustrates an acceptable installation.



**FIGURE 2** Sample Installation Within a Tube & Fabric Structure

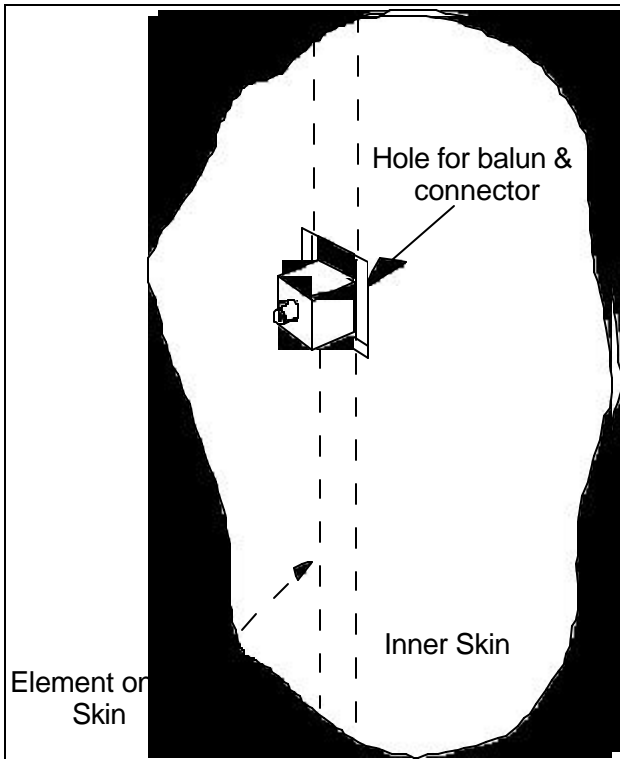
### 3.6 Installation Perpendicular to Fuselage

In some installations, the antenna may need to be mounted across the fuselage or 90 degrees to the centerline. In these installations, the length of the antenna may be too wide for the enclosed space. It is acceptable to bend the antenna to a “V” shape to accommodate the mounting requirements.

This configuration will require that the installer fabricate a wood or fiberglass structural base upon which to mount the antenna. The open end of the "V" must point towards the ground with the top of the arc pointing towards the sky.

### 3.7 Installation to Outer Skin of Aircraft

If installation must be made on the outer composite skin of the airframe the antenna can be mounted with the coax cable and connector inside. To do so requires that a one-inch square hole be made in the skin of the airframe. (See Figure 3) This hole is used to pass the balun/BNC to the interior. The antenna element is then fastened to the skin's exterior and covered with a protective material such as fiberglass. This installation is not generally recommended but may be used as a last resort when structural conditions permit.



**FIGURE 3 Sample Installation to Outside Skin of Aircraft**

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### **3.8 POST INSTALLATION CHECKS**

The antenna as shipped has been tested for RF characteristics and normal operation. As shipped, it will function without additional tuning or adjustment. Any additional checks should be concerned with the integrity of the installation, and the safe operation of the aircraft.

The antenna may be painted with nonmetallic paints.

## **4. CABLING**

The recommended cable is RG-400 coax with a braided center conductor. The length of cable will be determined by the installation.

The antenna connections are made with the BNC connector and fifty-ohm cable. The cable should be fastened to the aircraft structure and secured to eliminate failure due to vibration fatigue.

During installation of the RG-400 coaxial cable observe the following precautions:

- Leave a small amount of slack in the cable to allow for movement due to load changes and vibration.
- Fasten the coax cable to the structure to reduce flexing and possible failure.
- Be certain that the coax connector is properly assembled without short circuits.
- Route the cable in such a way that it does not interfere with motion inside the cockpit.