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INTRODUCTION

Application

This guide is applicable to the following components:

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<td>Iridium-tuned Dual-channel Antenna</td>
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Notes

Overview

The information contained in this manual describes the features, functions, technical characteristics, components, approval procedures, installation considerations, setup procedures, checkout procedures and instructions for continued airworthiness for an Iridium Antenna Installation.

The information and drawings contained in this manual are intended as a reference for engineering planning only. The drawings and wiring diagrams contained herein do not represent any specific STC, Form 337 or Form 1 aircraft installation. It is the installer’s responsibility to create installation drawings specific to the aircraft. This manual and the drawings and wiring diagrams contained herein may not be used as a substitute for any drawing package.
SYSTEM DESCRIPTION & OPERATION

System Description

**General**

The Iridium-tuned antenna is an L-band antenna tuned to the Iridium system frequency of 1616 MHz to 1626.5 MHz. The antenna is TSO’d and qualified for high-speed military and commercial aircraft.

Individual component descriptions and specifications are detailed in the *Equipment Specifications and Drawing* section of this document.
Iridium Satellite Network

The Iridium Satellite System is the only current provider of truly global, truly mobile satellite voice and data solutions with complete coverage of the Earth (including oceans, airways and Polar Regions). Through a constellation of 66 low-earth orbiting (LEO) satellites operated by Boeing, Iridium delivers essential communications services to and from remote areas where terrestrial communications are not available. The service is ideally suited for the aviation industry as well as industrial applications such as heavy construction, defense/military, emergency services, maritime, mining, forestry, oil and gas.

Satellites.........................66 (plus 6 in-orbit backup satellites)
Orbital Planes .....................6
Orbit Altitude ....................485 miles (780 kilometers)
Inclination of Orbital Plane ....86.4 degrees
Orbital Period ....................100 minutes, 28 seconds
Satellite Weight .................1,500 pounds (689 kilograms)
Spot Beams .......................48 per satellite (30 miles in diameter per beam)
FAA/JAA APPROVAL

General

Acceptance for the installation and use of the Iridium Antenna must be sought through the appropriate offices of the Federal Aviation Administration (FAA), Joint Aviation Authorities (JAA) or other certifying agency.

Installation and Operational Approval Procedures

A functional ground test procedure and an operational flight check procedure should be used to verify proper installation, functional performance and electromagnetic compatibility with existing aircraft systems.

Instructions for Continued Airworthiness

The Iridium Antenna requires no routine servicing or maintenance. The installation has no additional overhaul time limitations.

Environmental Qualification

Single-Channel Antenna

The Single-Channel Antenna is qualified to DO-160, MIL-C-5541, MIL-E-5400, MIL-STD-810 and TSO-C129.

Dual-Channel Antenna

The Dual-Channel Antenna is qualified to DO-160C, MIL-C-5541, MIL-E-5400, MIL-STD-810 and TSO-C129a.

GNSS & Iridium Antenna

The Active GPS and Iridium Antenna is qualified to FAA TSO-C144, DO-160D, DO-228, MIL-C-5541, MIL-E-5400, MIL-I-45208A, MIL-STD-810, and SAE J1455 standards.
EQUIPMENT SPECIFICATIONS & DRAWINGS

Single-Channel Antenna

The antenna is a spherical-radius molded radome that provides protection against rain, ice, and lightning strikes. It is qualified for high-speed military and commercial aircraft and is designed to DO-160, MIL-C-5541, MIL-E-5400, MIL-STD-810 and TSO-C129 standards.

- **Frequency (Iridium/GPS)**: 1616 -1626.5 MHz / 1575 ±10MHz
- **VSWR**: 1.5:1
- **Polarization**: Right Hand Circular Polarization (RHCP)
- **Impedance**: 50 ohms
- **Power Handling**: 60 watts CW
- **Gain**: +3 dBi @ Zenith
- **Lightning Protection**: DC grounded
- **Weight**: 6 oz.
- **Material**: 6061-T6 aluminum / thermoset plastic
- **Finish**: Skydrol resistant enamel
**Dual-Channel Antenna**

The Dual-Channel antenna is available for aircraft with multiple Iridium phone installations. The antenna is a low profile dual-element molded radome that provides coverage from 1610 to 1626.5 MHz for excellent Iridium operations and 1530-1660.5 MHz for low gain data application. It is designed to DO-160C, MIL-C-5541, MIL-E-5400, MIL-STD-810 and TSO-C129a standards and is qualified for high-speed military and commercial aircraft.

- Frequency:
  - J1: 1610 - 1626.5 MHz
  - J2: 1530 - 1660.5 MHz
- VSWR: 2.0:1
- Polarization: Right Hand Circular Polarization (RHCP)
- Impedance: 50 ohms
- Power Handling: 60 watts
- Gain: +3 dBi at Zenith
- Lightning Protection: DC grounded
- Weight: 16 oz.
- Material: 6061-T6 aluminum / thermoset plastic
- Finish: Skydrol resistant enamel

![Diagram of Dual-Channel Antenna]
The GNSS & Iridium antenna is a rectangular molded radome that provides protection against rain, ice, and lightning strikes. It is qualified for high-speed military and commercial aircraft and is designed to FAA TSO-C144, DO-160D, D0-228, MIL-C-5541, MIL-E-5400, MIL-I-45208A, MIL-STD-810, and SAE J1455 standards.

**ELECTRICAL:**

<table>
<thead>
<tr>
<th>FREQUENCY:</th>
<th>1610.0 - 1626.5 MHz</th>
<th>1542.50 ± 14.0 MHz</th>
<th>1575.42 ± 15.0 MHz</th>
<th>(1598 - 1600) MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLARIZATION:</td>
<td>RHCP</td>
<td>RHCP</td>
<td>RHCP</td>
<td>RHCP</td>
</tr>
<tr>
<td>IMPEDANCE:</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
<tr>
<td>ANTENNA GAIN (dBi):</td>
<td>2.61</td>
<td>2.61</td>
<td>2.61</td>
<td>2.61</td>
</tr>
</tbody>
</table>

**MECHANICAL:**

- **SIZE:** WIDTH: 2.20 in. [55.88 mm], LENGTH: 5.026 in [127.36 mm], HEIGHT: 0.643 in, [21.41 mm]
- **WEIGHT:** 8.0 oz. [226 g]
- **FINISH:** SKYDROL RESISTANT POLYURETHANE ENAMEL BASE IRIDITE PER MIL-C-5441
- **MATERIAL:** 6061-T6 ALUMINUM ALLOY BASE
- **CONNECTOR:** GPS: TNC FEMALE, IRIDIUM: N FEMALE (OPTION; SMA, TNC, TNC Bulkhead, N, N Bulkhead, MCX, MMCX, or Cable)
- **ENVIRONMENTAL:** TEMPERATURE: -67 °F TO +185 °F [-55 °C TO +85 °C]
- **ALTIMETRY:** 70,000 ft.
- **VIBRATION:** > 30 G/s
- **LEAKAGE:** HERMETICALLY SEALED

**FEDERAL & MILITARY SPECIFICATIONS:**

- **DESIGN TO:** FAA TSO-C144, DO-160D, D0-228, MIL-C-5541, MIL-E-5400, MIL-I-45208A, MIL-STD-810, AND SAE J1455
INSTALLATION & WIRING

General Information

Generally, modification of the aircraft consists of installing the Iridium Antenna in the aircraft.

NOTE: THE IRIDIUM ANTENNA REQUIRES PROFESSIONAL INSTALLATION.

License Requirements

The Iridium Phone System has no licensing requirements.

Equipment Required But Not Supplied

1. Mounting Hardware
2. Doubler Plate (Dual-Channel Only)

Antenna & Antenna Cable Installation

For optimum performance, the antenna must be installed on the upper surface of the aircraft fuselage, away from the vertical stabilizer and with an unrestricted view of the sky down to eight degrees above the horizon (similar to a GPS antenna).

Transmission from the antenna may be affected by, and can affect the operation of other systems and it is the installer’s responsibility to evaluate the location for any possible RF interference. In particular, the Iridium frequency is near the allocated GPS and Inmarsat band. The antenna should be at least 39 inches (1 meter) from TCAS and Transponder antennas and any L-band antennas, particularly GPS.

Observe all appropriate sections of AC 43.13-1B and AC 43.13-2A.

Strict maximum attenuation requirements for the coax cable and connectors that link the Antenna to the Iridium phone must be observed. The signal loss budget, including the antenna cable and all connector, from the antenna to the Iridium phone is < 2dB @1626MHz. The BSN Installation Kits include the FAA approved low loss coax antenna cable sized to meet this requirement.

Single-Channel Antenna (S67-1575-109) Installation

The S67-1575-109 Single-Channel Antenna has a low profile, providing structurally insignificant drag loads. The antenna is usually installed using four MS27039C1-10 attachment screws (10-32). However, each aircraft has unique airframe issues. The installer is responsible for the decision on any antenna installation issue.

A 1.25-inch (32 mm) diameter penetration, drilled at installation, permits the antenna coax connector to be fed into the aircraft. A doubler, provided with the antenna, reinforces the 1.25-inch diameter penetration. The doubler is 0.040 inch (1.0 mm) thick 6061-T6 aluminum alloy and creates an effective ring of 4.09 inches (104 mm). The doubler is attached to the skin using sixteen NAS1097AD3 rivets. This doubler may NOT be appropriate for your aircraft. The installation material required may vary from aircraft to aircraft and is the responsibility of the installer to determine.
Dual-Channel Antenna (S67-1575-165) Installation

The S67-1575-165 Dual-Channel Antenna has a low profile, providing structurally insignificant drag loads. The antenna is usually installed using four MS27039C1-10 attachment screws (10-32). However, each aircraft has unique airframe issues. The installer is responsible for the decision on any antenna installation issue.

A 1.25- inch (32 mm) diameter penetration, drilled at installation, permits the antenna coax connector to be fed into the aircraft. No doubler plate is included with the dual channel antenna, since each aircraft has a different shape and design.

GNSS & Iridium Antenna (S5GIRG3RR-AP-XTS-1) Installation

The GNSS & Iridium Antenna has a low profile, providing structurally insignificant drag loads. The antenna is usually installed using four MS27039C1-10 attachment screws (10-32). However, each aircraft has unique airframe issues. The installer is responsible for the decision on any antenna installation issue.
Antenna Cable Installation

The antenna cable must be routed from the antenna to Iridium phone.

**Strict maximum attenuation requirements for the coax cable and connectors that link the Antenna to the Iridium phone must be observed.** The signal loss budget, including the antenna cable and all connectors, from the antenna to the Iridium device is < 2dB @1626MHz. Maximum cable length is determined by this specification. Measured Voltage Standing Wave Ratio, or VSWR, of the coax cable assembly, antenna and any bulkhead feed-through adapter must be less than 1.5 to 1.

**Note:** The BSN Installation Kits include a 15-foot (4.6 m) FAA approved low loss coax antenna cable sized to meet this requirement. In addition, Blue Sky Network has custom cables lengths and configurations up to 60 feet (18 meters) long to meet your installation requirements. You can also request that one or both end connectors be shipped uninstalled to ease cable routing.

Antenna Cable Routing Considerations

- The length and routing of cables must be carefully planned before starting the installation.
- Avoid sharp bends in the cable. Exceeding the minimum bend radius of the antenna coax cable may result in permanent degradation of the cable loss.
- Do not locate the cable near aircraft controls.
- Observe all appropriate sections of FAR Parts 23, 25, 27, and 29, as well as AC 43.13-1B and AC 43.13-2A.
- In order to ensure optimum performance, the antenna cable should be kept a minimum of three feet from high noise sources and not routed with cables from high power sources.
POST INSTALLATION PROCEDURES

Ground Test & Operational Flight Check Procedure

A functional ground test procedure and an operational flight check procedure should be used to verify proper installation and functional performance.

The required logbook entries and FAA approvals are the responsibility of the installer and Blue Sky Network assumes no responsibility for either obligation.

Maintenance

Aircraft Annual Inspection Considerations

During the aircraft annual inspection:

- Visually inspect the antenna installation for loose fasteners or corrosion
- Perform a functional check of the system by making a telephone call