



communications

Communication Systems-West

SATCOM Airborne Terminal Products

Airborne X-band SATCOM System

The L-3 Communications Airborne X-Band SATCOM System utilizes military geostationary satellites to provide full duplex X band SATCOM connectivity between host aircraft and satellite ground station(s). The forward (command) link provides real time voice, data and control while the return link provides voice and high rate data transmission.



Typical Airborne Platform

Airborne Antenna



ASDP or GSDP

PRODUCT DESCRIPTION

System

The L-3 Communications developed Airborne X-Band SATCOM System consists of airborne and ground hardware. Control of the system is accomplished directly on the aircraft or remotely via the SATCOM link. The airborne segment interfaces to the user's network via a user provided workstation PC. Interfaces provided are Ethernet for command & control and RS-422 for voice, data, and telemetry. The ground segment provides identical interfaces but also includes a local control PC. This can be used to control the system in the event the user provided workstation PC is remotely located. The system also includes a Digital Gateway Unit to provide dial up telephone connectivity to Public Switched Telephone Networks (PSTN's). Additional detail on each of the segments is provided as follows.

Airborne Segment

The airborne segment consists of an Airborne SATCOM Data Processor (ASDP) and an antenna.

The ASDP is packaged in a standard 19" rack mounted chassis. Primary components include the modem, multiplexer, RF converter, control processor, DGU, and power supplies. The environmental design is based on a manned aircraft installation although unmanned air vehicles can be supported. The ASDP supplies RF, control, and power to the antenna. Connections between the ASDP and the antenna are via coaxial cable and shielded cable. Waveguide is not required.

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KEY FEATURES

- X Band
- Compatible with DCSC, Skynet 4 & NATO IV satellites
- Selectable data and spread rates
- COMSEC compatible
- Provides voice transmission via PSTN
- Optional data dissemination via dedicated high rate telephone lines

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SPECIFICATIONS

Airborne X-band SATCOM System

PHYSICAL CHARACTERISTICS

Airborne SATCOM Data Processor (ASDP)

- Size: 17.8" W x 5.1" H x 15.8" D (std. 19" rack mount chassis)
- Weight: 33 lbs
- Power consumption: ~400 watts
- Temperature: 0°C to +50°C
- Cooling: convection with fans

Airborne Antenna

- Overall size: fits into 30" Dia. X 30" high cylinder
- Reflector: 28" W x 23" H elliptical w/ splash plate feed
- Weight: 42 lbs
- Power consumption: ~500 watts
- Temperature: -55°C to +85°C
- Cooling: convection with fans

Ground SATCOM Data Processor (GSDP)

- Size: 17.8" W x 5.1" H x 15.8" D (std. 19" rack mount chassis)
- Weight: 33 lbs
- Power consumption: ~400 watts
- Temperature: 0°C to +50°C
- Cooling: convection with fans

Control PC

- Standard laptop

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The airborne antenna is a 2 axis design employing a "splash plate" fed elliptical reflector and carbon fiber yoke. The elliptical reflector design is conducive to aircraft installations requiring a low profile to minimize radome size and aerodynamic drag. The use of a carbon fiber yoke and composite reflector provide low weight and high dynamic response. Major components of the antenna include the yoke, reflector, feed, Microwave Power Module (MPM), LNA, diplexer, and pedestal. The antenna is designed for fuselage mounting in a non-controlled environment.

Ground Segment

The ground segment consists of a Ground SATCOM Data Processor (GSDP) and a laptop PC.

The GSDP is packaged in a standard 19" rack mounted chassis. Primary components include the modem, multiplexer, IF converter, control processor, DGU, and power supplies. The environmental design is based on a standard office environment. The GSDP interfaces to the SATCOM ground station via a standard 70 or 700 MHz IF and to the user workstation via Ethernet and RS-422.

The laptop PC provides direct control of the system from the SATCOM ground station. This may be required if the user communication workstation PC is remotely located. In this scenario L-3 can provide additional hardware to support connectivity to the remote location via high data rate telephone lines.

L-3 also designs and builds 2.4 meter, 3.8 meter, 6.2 meter, and 11.3 meter fixed and transportable satellite ground stations capable of communicating with the airborne segment.

PERFORMANCE SPECIFICATIONS

System Level

- Interleaved: Yes
- Modulation: SS-QPSK, BPSK, O-QPSK
- RF Tuneability: 10 KHz steps
- Interfaces: RS-422 for voice, telemetry, & data, Ethernet for command & control
- BER: 1×10^{-8} without encryption
- Control: direct or via satellite relay
- FEC: (rate 1/2, convolutional encoding)
- Chipping rate: 1.3 Mchip/sec.

Forward Link

- Composite data rates: up to 240 kb/sec
- Carrier Frequency: 7.25-7.75 GHz
- Bandwidth req.: spread spectrum command within 1.4 MHz allocation
- EIRP: N/A
- G/T: 8 dB/K
- Transmit Power: N/A

Return Link

- Composite data rates: selectable from 22 kb/sec to 2.0 Mb/sec
- Carrier Frequency: 7.9 - 8.4 GHz
- Bandwidth req.: coded telemetry/imager within 4.4 MHz allocation
- EIRP: <50 dBW
- G/T: N/A
- Transmit Power: 100 Watts

Airborne Antenna

- Acquisition: automatic
- Pointing: open loop

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For further information on X-band SATCOM contact:

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