

BlackRay 71

SATCOM Systems for UAS

Satellite Communications for UAS Payload Data

Tactical unmanned aircraft systems (UAS) are often capable of long endurance time while carrying significant payload weight. Satellite communications fully exploit tactical UAS capabilities, supporting intelligence, surveillance and reconnaissance (ISR) missions beyond line of sight (BLoS).

Gilat's BlackRay 71 UAS terminal utilizes commercial, geostationary satellite capacity to provide full-duplex satellite communication, linking the UAS to its ground control station. The forward link provides command and control capabilities, while the return link transfers sensor data.

High-throughput Data BLoS

Gilat's BlackRay 71 terminal is a highly integrated, minimal size, weight and power (SWaP), airborne SATCOM terminal. It comprises best-of breed technologies, all developed and manufactured by Gilat, which can be tailored to the customer's needs.

BlackRay 71 enables high throughput communication, even to the smallest UASs.

Main subassemblies are:

- Flat-array, low-profile tracking antenna
- High-performance satellite modem
- Power-efficient BUC/SSPA

The system can transmit over 1Mbps from the UAS for any IP-based voice, video or data BLoS application.

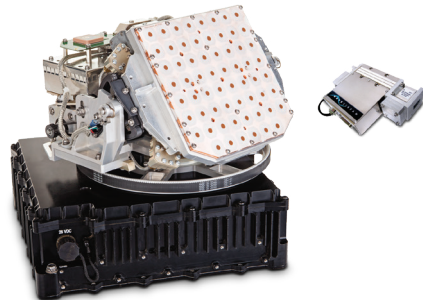
BlackRay 71 provides spectrum-efficient IP connectivity, adaptive in real time to varying link conditions. Network implementation (PAMA, DAMA) is straightforward. The terminal is powered by the GLT1000 (commercial grade) or MLT1000 (ruggedized military grade) modem, which can be installed in any gateway/teleport infrastructure or transportable hub.

Affordable, Customized Solutions

All critical technology building blocks are developed, manufactured, and integrated by Gilat, providing high end-to-end performance and great design flexibility. The antenna and modem may be installed as a unified unit, or as separate components. Customized solutions are designed to customer specifications in short design cycles and at affordable prices.

Benefits

- Affordable satellite communications for UAS sensor data
- Enables BLoS operation
- High throughput
- Built-in antenna controller
- Ruggedized, lightweight terminal
- Ku-, Ka- and X-band operation



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Technical Specifications

Elevation:

0–90 deg.

Operational Elevation:

<80 deg.

Azimuth:

360 deg. continuous

Tracking Accuracy:

0.2 deg.

Data Rates:

Over 2Mbps
(depends on link budget)

Modulations:

BPSK, QPSK, 8PSK

Spread Spectrum:

Spreading factor 1 – 16

SNR:

-12 to +13dB

Coding:

27 LDPC codes. Rates 1/4, 1/3,
2/5, 1/2, 2/3, 3/4, 5/6, 8/9

Typical Eb/No for BER=10⁻⁸:

0.8dB

(BPSK 1/2 LDPC 12k block length)

Size

Dimensions:

Antenna:

11.8L x 11.8W x 6.5H in
(30 x 30 x 16.5 cm)

BUC (Ku):

7.1L x 3.3W x 1.1H in
(18 x 8.3 x 2.8 cm)

SSPA (Ku):

8L x 5W x 2.5H in
(20.4 x 12.7 x 6.4 cm)

Modem:

10L x 9.7W x 3.5H in
(25.5 x 24.5 x 8.4 cm)

Weight:

Antenna:

12.2 lb (5.5 Kg)

BUC (Ku):

1lb (0.45 Kg)

SSPA (Ku):

4.2 lb (1.9 Kg)

Modem:

9.5 lb (4.3 Kg)

Environmental

Temperature:

-40 to +55 deg.

Vibrations: Mil Std 810F

Power & Interface

Voltage:

22–32VDC

Consumption:

Per selected configuration

Data (IP):

Ethernet 10/100/1000 Base-T

General Specifications

| | Panel Size | Frequencies Tx | Frequencies Rx | Polarization | Tx Gain | EIRP | G/T |
|---------------------|---------------------------|----------------|------------------|--------------|---------|-----------------|---|
| BR71Ku / 30B | 6x6 in (15x15 cm)** | 14.0–14.5 GHz* | 10.95–12.75 GHz* | Linear | 24dB | 39dBW (40W BUC) | 10.95–11.7: -1dB/K, 11.7–12.7: 1.5dB/K |
| BR71Ka | 10.5x6.5 in (27x17 cm) | 29–31 GHz | 19.2–21.2 GHz | Circular | 27dB | 43dBW (40W BUC) | 2.5dB/K |
| BR71X | 6x6 in (15x15 cm) | 7.9–8.4 GHz | 7.25–7.75 GHz | Circular | 19.3dB | 35dBW (50W BUC) | -2dB/K |

*Option: ITU App. 30B band (12.75–13.25/10.7–11.45 GHz)

**Option: Larger 2dB higher gain panel

***Antennas do not include radoms