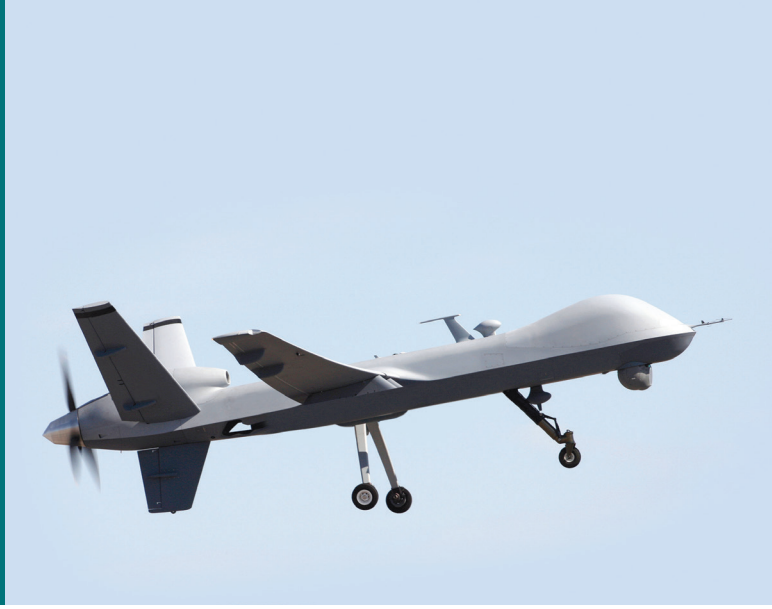
BLACKRAY PARABOLIC

SATCOM Systems for Large UAS



AIRBORNE SATCOM FOR UAS

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

Wavestream's BlackRay Parabolic 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. The terminal is available in 2 or 3-axis gimbals. The 3-axis terminal eliminates the keyhole effect when operating near the equator.

HIGH-THROUGHPUT DATA BLOS

Wavestream's BlackRay Parabolic terminal is a compact, lightweight, airborne SATCOM terminal. It comprises best-of-breed technologies, all developed and manufactured by Wavestream, which can be tailored to the customer's needs.

BlackRay Parabolic enables high-throughput communication for medium to large UASs.

Main subassemblies are:

- Parabolic carbon fiber pointing antenna
- High-performance satellite modem
- Power-efficient BUC/SSPA

The system can transmit over 20Mbps from the UAS for any IP-based voice, video or data BLoS application.

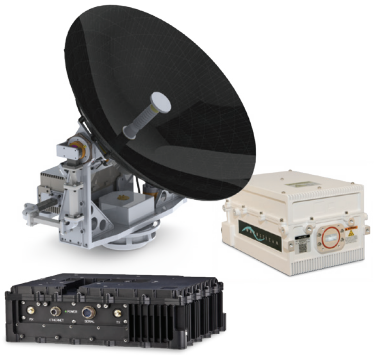
BlackRay Parabolic provides spectrum-efficient IP connectivity, adaptive in real time to varying link conditions. Network implementation (PAMA, DAMA) is straightforward. The terminal is powered by the GLT1000 (commercial grade) or MLT1000 (ruggedized military grade) modem, which can be installed in any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

AFFORDABLE, CUSTOMIZED SOLUTIONS

All critical technology building blocks are developed, manufactured, and integrated by Wavestream, enabling high end-to-end performance and 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- and Ka-band operation**



TECHNICAL SPECIFICATIONS

Elevation:
0-90 deg.
Operational Elevation:
<80 deg. (2-axis gimbals)
Azimuth:
360 deg. continuous
Pointing 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 ¼, 1/3, 2/5, ½, 2/3, ¾, 5/6, 8/9
Typical Eb/No for BER=10-8:
0.8dB
0.8dB (BPSK ½ LDPC 12k block length)

SIZE

Dimensions:
Antenna (EL=0):
2-axis gimbals:
24.7L x 14.2W x 24.3H in
(62.7 x 36 x 61.8 cm)
3-axis gimbals:
24.7L x 17.4W x 24.3H in
(62.7 x 44.3 x 61.8 cm)
BUC (60W Ku):
10.3L x 5.4W x 4.3H in
(26.1 x 13.7 x 10.9 cm)
BUC (12W Ka):
9L x 3.6W x 2.4H in
(22.9 x 9.2 x 6.1 cm)
Modem:
26.4 lb (12 Kg)

Weight:
Antenna with BUC:
2-axis gimbals: 43.9 lb (19.9 Kg)
3axis gimbals: 50.7 lb (23 Kg)
BUC (60W Ku):
7.2 lb (3.27 Kg)
BUC (12W Ka):
3.3 lb (1.5 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

	Antenna Size	Frequencies Tx	Frequencies Rx	Polarization	Tx Gain	EIRP	G/T
BRP60Ku / 30B	60cm	13.75-14.5 GHz*	10.95-12.75 GHz*	Linear	35.3 dB	52.7 dBW (60W BUC)	14 dB/K
BRP60Ka	60cm	27.5-30 GHz	17.7-20.2 GHz	Circular	42.8 dB	51.8 dBW	15.3 dB/K

*Option: ITU App. 30B band (12.75-13.25/10.7-11.45 GHz)
**Antennas do not include radoms

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ABOUT WAVESTREAM

Wavestream sets the standard in the design and manufacture of next generation high power solid state amplifiers. Wavestream's Family of Ka, Ku and X-band Solid State Power Amplifiers (SSPAs), Block Upconverters (BUCs) and transceivers provide systems integrators with field-proven, high performance solutions designed for ground mobile and fixed, gateway and airborne satellite communication systems worldwide.

These items are subject to the Export Administration Regulations (EAR), 15 C.F.R. Parts 730-774, and may not be exported or transferred to any non-U.S. person, except as authorized by the U. S. Department of Commerce.

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