

DHS/U.S. Customs and Border Protection - Technology Solutions Program Office (TSPO)

DHS/CBP Unmanned Aircraft System (UAS)

October 31, 2006





Purpose

CBP

- Provide overall UAS program overview
 - Program Description
 - System and Emitter Overview



DHS/CBP UAV Program Description

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Provides Unmanned Aircraft System (UAS), operations, maintenance, technical support, pilots, and sensor operators to surveil the Southwest border of the United States. Over the next several years UAV border surveillance will improve sensor/video surveillance capabilities of the current, monitored base system through persistent 24 hours per day / 7 days per week surveillance; integrate new surveillance technologies (aerial sensor suites), and increase interoperability with other law enforcement agencies and initiatives.



Background

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- UAS use as part of National Objective
 - “Establish substantial probability of apprehending terrorists and their weapons as they attempt to illegally enter the United States between the ports of entry”
 - “Deter illegal entries through improved enforcement”
 - “Apprehend and deter smugglers of humans, drugs, and other contraband”
 - “Leverage “Smart Border” technology to multiply the effect of enforcement personnel”

- The UAS has demonstrated an ability to enhance operational effectiveness of interdiction elements as part of the National Objective in the areas of: (1) search of high activity areas; (2) remote sensor alarm response; and (3) integration of apprehension operations that enhances situational awareness



DHS/CBP UAV Procurement Schedule

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- IDIQ T&M Contract for UAS, operational, maintenance and integration support services
(Government owned contractor operated)

- Release RFI w/Specification 4/13/05 – 4/29/05
- Pre-solicitation Notice 5/10/05
- Issue Synopsis / RFP 6/21/05
- Receive Proposals 7/19/05
- Technical Evaluation/Source Selection 7/22/05 – 8/05/05
- **Contract Award** 8/26/05



- **Conduct Flight Operations** 9/28/05



DHS/CBP UAS Operational Site Layout

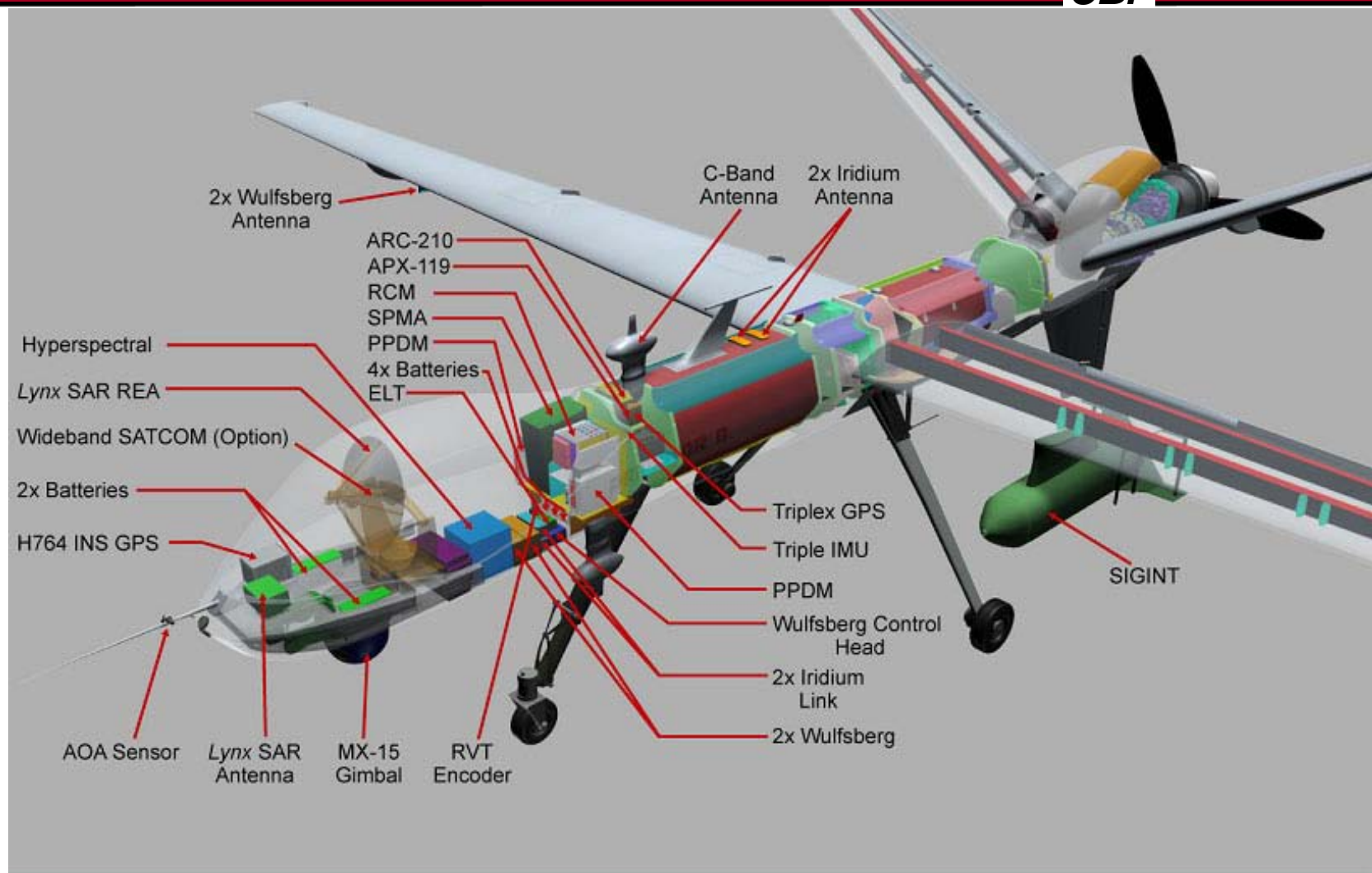
CBP





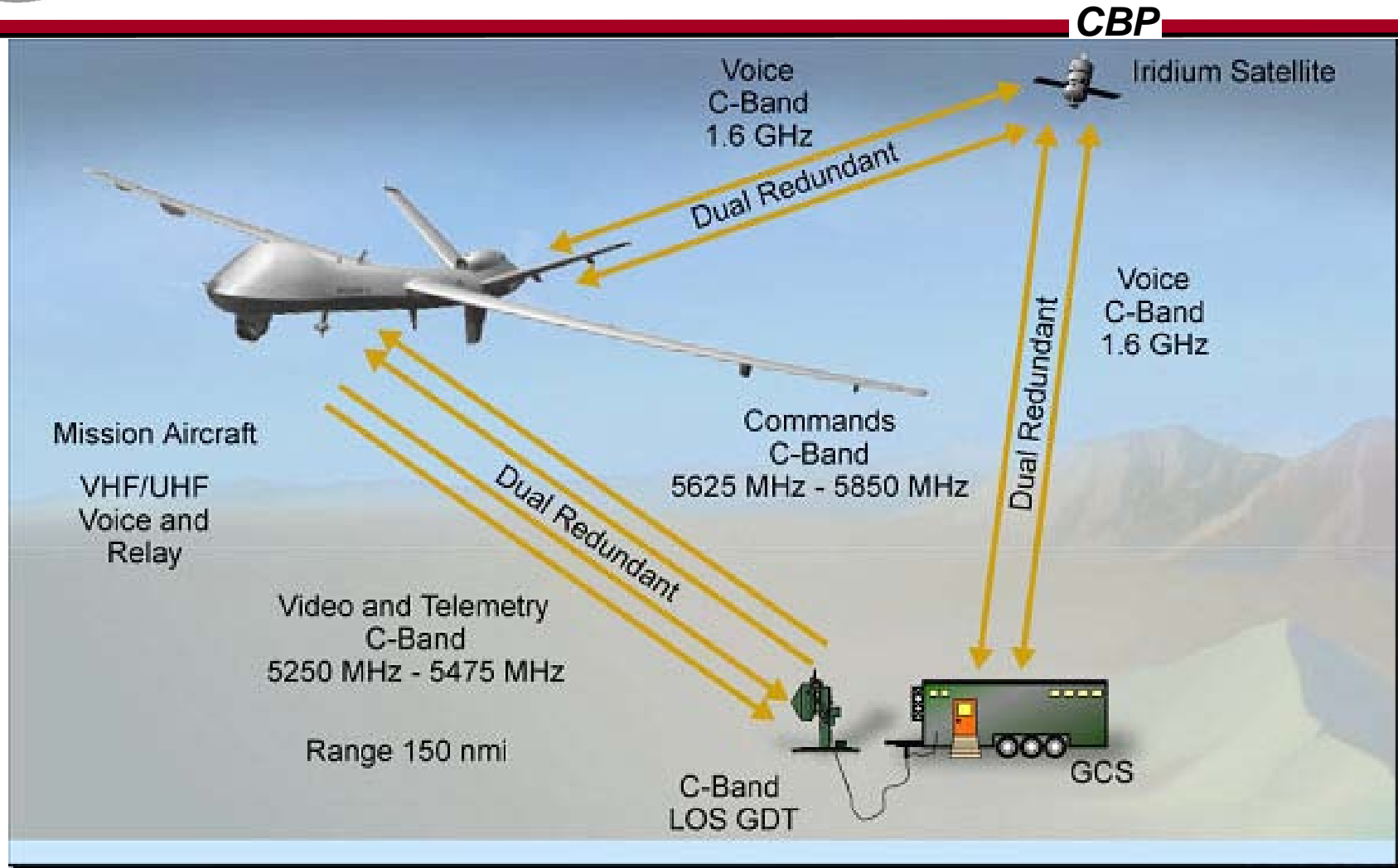
DHS/CBP UAS Platform Configuration

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DHS/CBP UAS Line of Sight (LOS) Overview



LOS Overview

VIGILANCE SERVICE INTEGRITY



Telemetry C-Band data link Command C-Band data link

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Frequency

Telemetry

5250 MHz - 5475 MHz

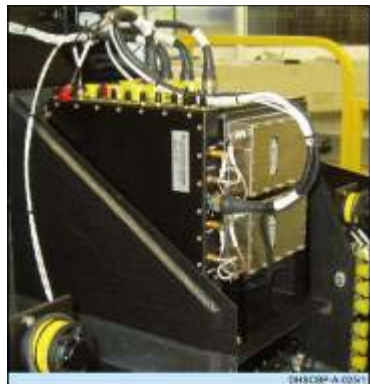
Command

5625 MHz - 5850 MHz

Power

10W (both)

The LOS link segment consists of a pair of simultaneously operating C-band data links that provide dual redundant, full duplex, digital, narrow band channels for uplinking commands to the aircraft and downlinking aircraft health and status to the GCS as well as dual redundant analog (NTSC) sensor data channels delivering aircraft sensor data to the GCS.





Iridium Data Link

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Frequency

L-band 1.6 GHz

Power

< 2.5W



Narrowband SATCOM BLOS data link is based on the commercial Iridium Low Earth Orbit satellite network. An Iridium call from one ground location is passed up to the nearest satellite (on L-band, 1.6 GHz), then forwarded to the nearest satellite above the called party and then transmitted again at L-band down to the ground and supports both a full duplex voice link and a full duplex command and telemetry link.



Ku-Band WB SATCOM (future capability)

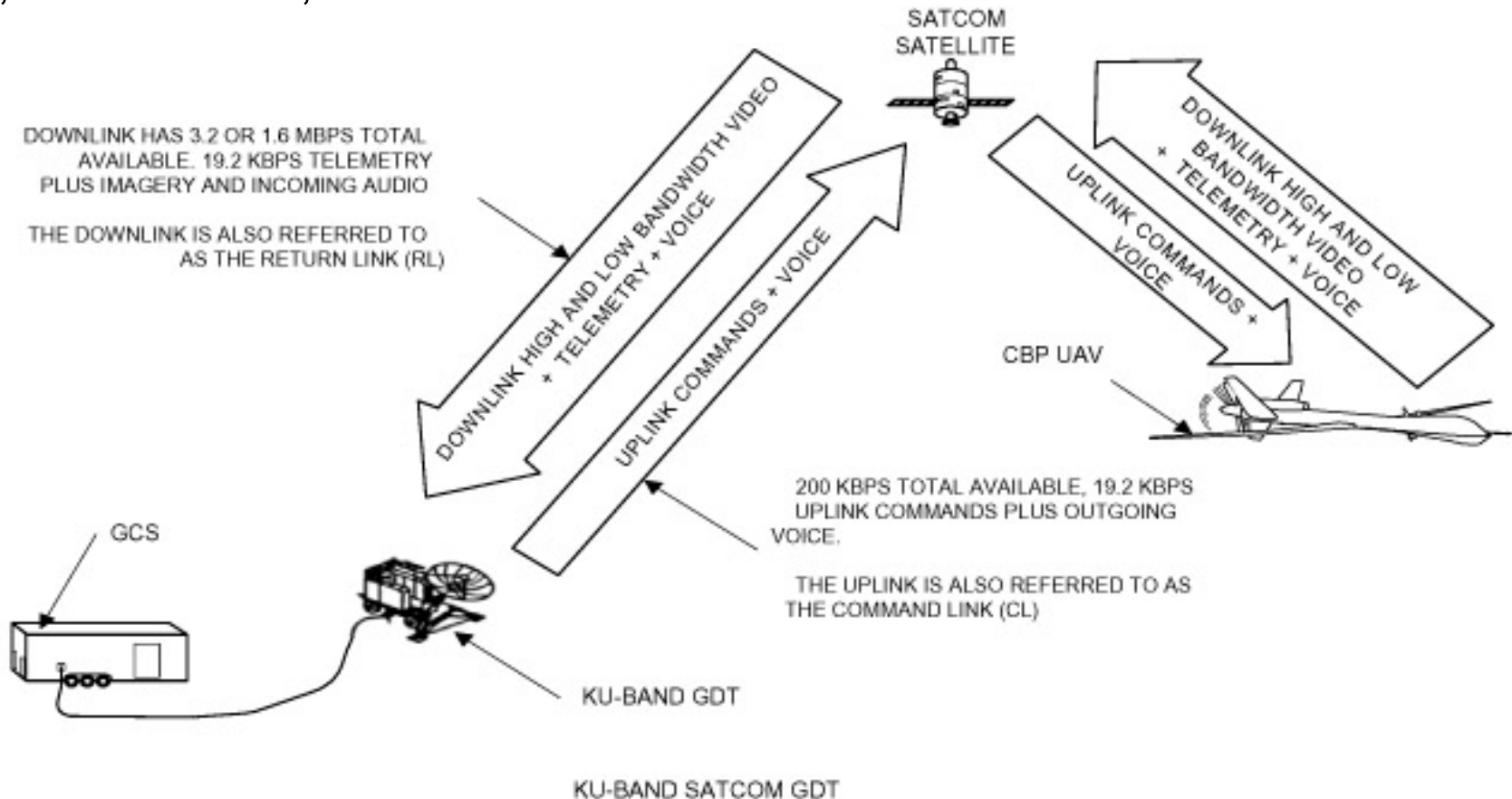
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Frequency

12,000 MHz - 18,000 MHz

Power

50W





AN/ARC-210 RT-1851

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Frequency

30.000 - 87.9925 MHz FM
108.000 - 117.9975 MHz AM
118.000 - 135.9975 MHz AM
136.000 - 155.9975 MHz AM/FM
156.000 - 173.9925 MHz FM
225.000 - 399.9925 MHz AM/FM

Power

23W (HR Smith 10-150-08-S4 Ant)
15 - 23W (Chelton Ant)



An Iridium modem on the aircraft connects to the ARC-210 VHF/UHF transceiver that communicates, via a blade antenna on the top of the aircraft, with ATC, ground, or aircraft-based nets. The Iridium modem on the aircraft is connected to the aircraft's communications relay suite to allow full interaction between the pilot and other relay users.



Wulfsberg (RT-5000)

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Frequency

FM = 29.7 - 960 MHz

AM = 29.7 - 400MHz

Power

FM = 10W nominal

AM = 15W nominal



Commands from a GUI in the GCS sent via data link (C-Band LOS Iridium or BLOS SATCOM) to the Wulfsberg Control Head, allowing the pilot to set frequencies, modulation, and encryption (Type 3 DES and AES), and perform Over the Air Re-keying (OTAR). In addition, the pilot can control the mode of operation of the system to simulcast and/or relay (in-band or cross-band) voice to or between both transceivers.



AN/APX-119 IFF RT-1861

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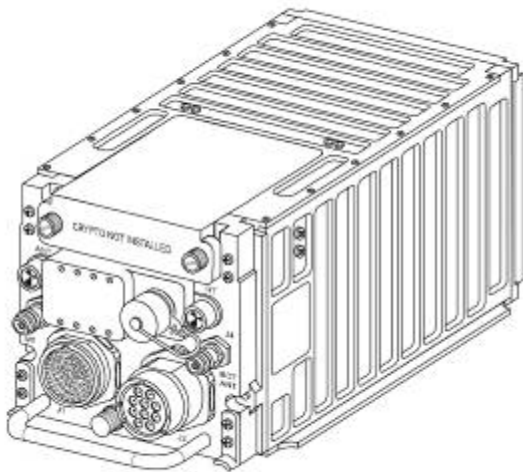
Frequency

TX = 1090 +/- 0.1 MHz

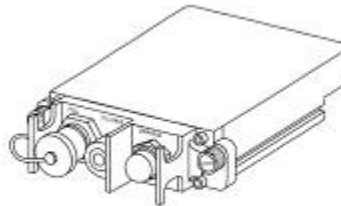
RX = 1030 +/- 0.5 MHz

Power

Peak Power Output = 500W +/- 2db



DIGITAL
TRANSPONDER



CRYPTO
APPLIQUE

FAA certified Raytheon IFF Digital Transponder combines Mode III C/Mode IV/Mode S capability to operate throughout international, civil, and military airspace, meeting IFF and ATC requirements.



Lynx II Synthetic Aperture Radar (SAR)

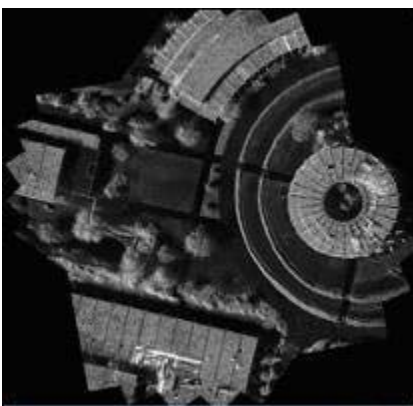
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Frequency

15.3-17.3 GHz, 2GHz bandwidth

Power

98W



Multi-mode radar that includes spotlight, two stripmap or search and GMTI modes. It features Coherent Change Detection (CCD) that can detect minute changes between two SAR images taken at different times. The system SAR resolution is 0.3 to 3 meters in strip mode, and can image up to a 10 km swath.



ARTEX ME406 Emergency Locator Transmitter (ELT)

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Frequency

406.028 Mhz \pm 2 kHz

Power

406 MHz: 37dBm \pm 2dBm (3.16W
Min to 7.94 W max) (440ms/50sec)
PERP or EIRP for 24 hours



Automatically activates during a crash and transmits the standard swept tone on 121.5 MHz. Every 50 seconds for 440 milliseconds the 406 MHz transmitter turns on and transmits an encoded digital message to the Cospas/Sarsat satellite system.



DMR-200 TRACKER

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Frequency

TX = 1626.5 TO 1660.5 MHz

RX = 1525.0 TO 1559.0 MHz

Power

EIRP: 0 dBW - 9 dBW



Beacon tracking system uses a portable beacon/transmitter (INMARSAT D+ with GPS receiver) that provides a continuous, affordable positional update to a dedicated, monitoring satellite. Each beacon is a registered asset providing both latitude/longitude and unit identification embedded within it's data transmission package.



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End