

# JDA Systems



## **VT-063 Series Autotracking Antenna**

The VT-063 twin-axis 6.3 meter diameter Autotracking antenna system from VuTrack is the culmination of a multi year company sponsored research and development project that has rethought the tracking antenna for the twenty first century.

### **Pedestal**

The antenna has been designed for light weight and exceptional stiffness with extensive computer modelling proving the designs stability in all operating conditions. Metallic materials with high corrosion resistance characteristics, normally associated with deep sea exploration, have been used throughout making the system ideal for high humidity or high salt environments. The main reflector is manufactured from a carbon fibre and Kevlar honeycomb sandwich which is extremely stiff and also very light weight with very good surface accuracy and high RF reflectivity. The reflector is polymer coated to help to keep the reflective surface dry.

The pedestal consists of two interlocking sealed tube elements that support the drive mechanics and the reception head. The reception head consists of a parabolic reflector and the receiving head itself. This wideband receiving head is a VuTrack developed monopulse system with full integrated autotracking



capabilities. The antenna has unlimited movement in the azimuth as it utilizes slip ring assemblies with dual RF rotary joints. The elevation movement is from -5 degrees from one horizon to +5 degrees to the opposite horizon (-5 degrees to 185 degrees), in other words the antenna head can track targets during a direct over flight of the antenna and can also look downwards.

The pedestal also provides a protected mounting area for the main controller, optional equipment and power supplies.

The azimuth and elevation brushless overrated motors fitted inside the pedestal head assembly, both driving self braking cyclo gearbox assemblies through planetary gearboxes. All electrical and mechanical drive components are enclosed in environmentally sealed compartments.

The motor controllers are processor based intelligent units which sit on an internal data bus around which the antenna is designed. These are designed to supply the motors with the control and power they require but also to protect the motors from overload thus dramatically extending the life of the motors and gearboxes. The motors can supply full power at zero speed and so can be easily used to hold the antenna in position when the antenna is not moving.

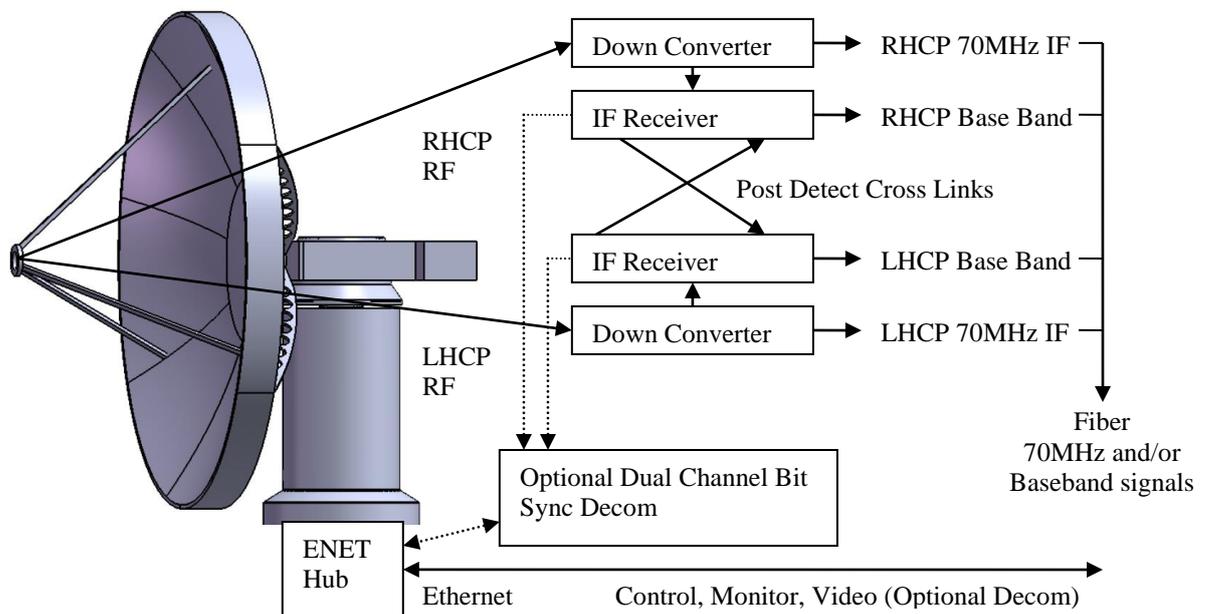
A fully sealed slip ring assembly is used in the azimuth axis through which run all signals including dual RF feeds and the bus system on which the antenna control is based.

The RF can be down converted directly in the reception head to 70MHz and then fed over the RF feeds. Uplink signals may be mixed onto the same RF cables and amplified in the head assembly to allow the antenna feed to simultaneously receive and transmit RF.

## **Antenna**

The reflector is a multiple petal form solid surface high precision parabolic reflector manufactured from a carbon fibre and Kevlar honeycomb sandwich which is extremely stiff and also very light weight. The reflector is stiffened using a surrounding ring assembly and a multi armed support that fits closely to the rear of the reflector. A front facing tripod assembly positions the receiving head assembly precisely on the focal plane of the antenna. The receiving head is a VuTrack developed monopulse unit that offers a wide reception band and extremely good low signal level performance. This unit is unique in that it offers fully automatic signal tracking with or without the use of an external antenna control unit.

This unique self contained autotracking capability is made possible by placing all of the necessary microwave level functions in the head itself which contains dual tracking receivers also developed by VuTrack. An integrated processor based tracking control computer communicates directly with the main azimuth and elevation motor controllers thus giving the VT-063 an autonomous signal autotracking capability. Of course an antenna control unit is supplied with the antenna offering all standard and many advanced features.



### ***Antenna Signal Reception Path***

Space is provided behind the receiving head to accommodate the electronics and a high resolution video camera while casting a minimal shadow on the main reflector. The optional video camera is controlled via the internal antenna bus and offers a remote controlled 36 times optical and a 200 times digital zoom capability.

An optional self test transmitter and antenna may be fitted directly in the centre of the main reflector. This allows for a looped true signal test to be carried out on the antenna at any time. As this test system is placed in the area of the reflector normally in the shadow of the reception head this has no negative effect on the antennas normal operation.

### **Antenna Control Systems**

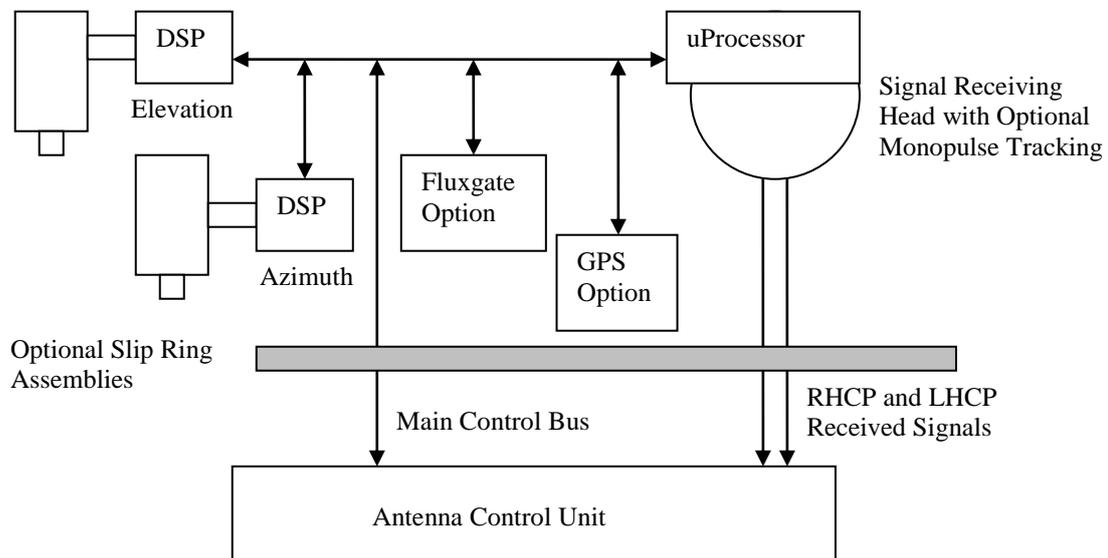
The Antenna controller software VuSoft is a highly advanced and well proven software product from John Douglas Associates providing the functions of auto calibration, slaved "pointers", Program Tracking, Pre Tracking and Full Autotracking systems together with optional data acquisition and data storage.

The antenna itself is controlled via an Ethernet link allowing for greater distances between the control room and the antenna. This offers greatly reduced cabling requirements. The antenna may also be remote monitored and controlled from multiple locations over a wide area network.

The VuSoft system is installed in a rack mounted computer chassis. The Windows XP, Vista or 7 operating system on which VuSoft runs is controlled via an external mouse and keyboard. The antenna may also be controlled via a standard joystick connected to the computer.

The antenna control unit computer supports many standard interfaces (i.e., USB, Ethernet, RS-232 etc.) and is available to control many of the VuTrack products such as Receivers, Combiners, Bit Synchronizers, Decoms, Bit Error Rate Test Sets, Power Meters, RF Switch Relays etc. Therefore, with the receivers, combiners, bit syncs and decoms integrated into controller the antenna may operate as a fully independent telemetry recovery system with built in IRIG106 Chapter 10 recording capabilities.

Calibration of the antenna is automatically carried out on every start up and continuously during operation. An optional GPS navigation system, electronic magnetic compass and flux gate levelling systems can be built in, these allow the antenna to know its three dimensional position in respect to the Earth at all times. The VuSoft software refers to an integrated geodetic data base to allow the antenna to correctly auto track the target even in difficult geographical conditions.



**Antenna Block Diagram**

For marine, or unstable platform operations the optional three axis fluxgate stabilization platform is integrated into the antenna base. This allows the antenna control software to compensate for platform movement in real time without compromising the exceptional tracking performance of the VT-063 antenna.

The chances are that one of our existing Antenna Control System Baselines will meet your needs, but if not then the modular design of these systems allows us to rapidly and inexpensively customize Antenna Control System functionality to exactly meet them.

## **Some of the main features include:**

- *Light weight corrosion resistant materials and alloy construction throughout.*
- *Solid surface main antenna reflector technology manufactured from a carbon fibre and Kevlar honeycomb sandwich improved signal gain, less weight and better aerodynamics.*
- *Optional Monopulse high gain signal recovery head with built in tracking receivers.*
- *Fully integrated auto calibration system allows the antenna to be powered and operating at optimal capacity in minutes.*
- *Brushless overrated motors with bus based controllers offering exceptional agility.*
- *Absolute encoders in all rotating parts with better than 0.0001° accuracy.*
- *Optional slip ring units with dual RF rotary joints in azimuth offering continuous unlimited azimuth movement.*
- *Easy maintenance modular design throughout requires less access panels and offers higher reliability. Optional complete module spares kit available.*
- *The VT-063 antenna is built around an Ethernet network centric design. Although it will operate as a traditional reception or tracking antenna system if required it can optionally have available receivers, bit syncs and decoders built in.*
- *Optional embedded high resolution camera system fitted on the centre line of the antenna with 36x Optical and 200x Digital zoom.*
- *Main tracking controller running Windows XP, Vista & 7. Network control link to the antenna greatly reduces the required cabling and thus the installation costs, also allows for easy remote operation.*
- *The antenna can be broken down for transport with standard trucks.*
- *Inherently stable physical design including optional GPS position and optional stabilized fluxgate platform making the system highly suitable for remote location, mobile or shipboard operation.*

Parameter	Reflector Diameter
	6.3-m (VT-063)
Operating Frequency	1300-2400 MHz Plus User Specified Optional Frequencies
G/T	Approx 19.6 dBK @ 2300 MHz
Polarization	Simultaneous RHCP/LHCP or Vertical/Horizontal
Main Antenna Gain (Minimum)	41 dBi @ 2.3 GHz
Sidelobes	ITU-RS-580, FCC
Acquisition Angle	3db at 0.81°
Velocity	Max 10°/sec both axis simultaneous
Acceleration	Max 50°/sec <sup>2</sup> both axis simultaneous
Azimuth Travel	+/-200° or Optionally Continuous
Elevation Travel	-5° to +185°
Environmental Temperature Non-Operating Operating Relative Humidity Rain Ice	-40° C to +70° C -20° C (-40° C with heater) to +65° C Plus Solar Up to 100% Including Condensation Up to 10cm Per Hour 1 cm, Radial
WIND, Operating	75 Km/H
WIND, Survival	180 Km/H When Parked
Shock and Vibration	Designed to Meet MIL-E-16400
Foundation Concrete Reinforced Steel	5.2 x 5.2 x 0.5 m 13.5 m <sup>3</sup> 900 kg
Power Requirement	Average 2.50 kW
Voltage/Frequency	Three phase 220VAC, 50 or 60 Hz, 1 $\phi$
Camera	Optional on Axis Fully Integrated Color High Resolution CCD
GPS	Optional Position and Height with Inbuilt Geodetic Model Pre-Tracking Link to Other VuTrack Model Antennas
Stabilization	Optional Three Fluxgate Axis Navigation Platform
Optional Heater	Integrated Heating System To Warm the Head and Arm Assembly For Low Temperature Operation

For more details contact your local agent or contact JDA Systems directly:

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