# QTY600-9

Ku Band Airborne VSAT System

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## **1** Introduction

The present document aims at listing the main requirements to be met by bidders for the supply of Ku Band Airborne Antenna/RF and associated engineering, design, production, implementation, documentation and support.

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Ku band Satellite Communication System defined here is an airborne Very Small Aperture Terminal (VSAT) utilizing commercial Ku-band satellite transponders.

The equipment needed to provide a broadband transport link that can be used for data, video, and voice communications typically used for passenger communications or entertainment.



## 2 System Composition & Connection

The Ku band Airborne Satellite Communication System consists of Outside Antenna Equipment(OAE)



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System Diagram(RX Polarizer is Passive polarizer (motor control), Remove the OME and add the optical gyro in the OAE, Besides MCU(Master Control Unit) is in the OAE, slip ring just needs 12 lines witch include 4 power lines @10A and 8 signals



## 3 System Design

System design consists of OAE, All design aims to meet the requirements of customer.

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SPECIFICATIONS			
Class	Tx/Rx medium profile Ku band airborne antenna		
Array Configuration	Suitable for Airbus and Boeing class aircraft		
	Ku-band		
Rx Frequency	10.70 – 12.75 GHz		
Tx Frequency	13.75 – 14.5 GHz		
RX Gain	34.13 @11.85 GHz (without radome)		
TX Gain	33.58 at 14.25 GHz (without radome)		
Polarization	Linear Cross-Pol (Swtich between Vertical and Horizontal for TX and RX)		
Stabilization	2-axis stable tracking		
Tracking Mode	INS measurement and signal tracking(beacon and carrier)		
	Azimuth: 0°~360° continuous		
Turntable rotate	Elevation: 0° ~ 90°		
range	TX Polar: 0°~360° continuous		
	RX Polar: 0°~360º continuous		
	Yaw: Velocity, 60°/s; Acceleration, 200°/ s²(max)		
Sonia Matian	El: Velocity, 60°/ s; Acceleration, 200°/ s²(max)		
Servo Motion	TX Polar: Velocity, 60°/s; Acceleration, 100°/ s²(max)		
	RX Polar: Velocity, 60°/s; Acceleration, 100°/ s²(max)		
Madian as misu	Roll: ±30°		
attitude	Pitch: ±30°		
attitude	Yaw: 40°/s		
Swept Diameter	≤1250mm;		
Height	≤ 280mm with plate;     ≤ 270mm without plate		
Weight (Maximum)	< 54 kg		
Antenna Power Supply			
Input	115 VAC, 400 Hz single phase		
Output	28 VDC/200 W nominal, 220 W maximum (without Ku band BUC)		
Temperature Range			
Operating	-55° to +70° C		
Storage	-55° to +85° C		
Navigation Data	ARINC 429 bus		

## 3.1 OAE (Outside Antenna Equipment)

We Reduce the number of electronic modules in OAE to enhance the system reliability.

RF and electronic signal are led to inside control unit and HPT by multi-channel conductive slip ring and rotary joint.

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#### 3.1.1 OAE RF System

Receive and transfer of Ku-band RF Signal is accomplished by all RF device in panel antenna. The system uses 2 channels rotary joints, one of them are used for transferring signal of Ku-band, and another one is used for receiving signal.



#### 3.1.1.1 Ku band antenna

The Rx frequency range is 10.70~12.75GHz and the Tx frequency range is 13.75~14.5GHz, the gain efficiency can reach to 85%~90% in the simulation.

We optimized the design of horn array to eliminate the grating lobe which may occur in the far side lobe in general panel antenna.

The material of reflector is aluminum alloy with multilayer design and process. Every layer is taken weight conduction to guarantee the light of the whole antenna. The metal provides high reliability and great conductivity during long term services.

### 3.1.2 OAE Servo System

We adopt 4-axis DC servo motor to drive dual panel antenna in servo system. The DC brushless servo motor is featured with large torque, high speed rotation, quick response, light quality, small volume and long life.

С АРМА

