

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION	DATE	Form Approved OMB No. 0704-0188
	UNCLASSIFIED	March 5, 2010	PAGE 1 OF 27 PAGES

The public reporting burden for this collection of information is estimated to average 24 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION. RETURN COMPLETED FORM TO THE USING AGENCY OR CONTRACTING AGENCY, AS APPROPRIATE.

DOD GENERAL INFORMATION			
TO UAVPRO 873 West Parade Avenue Blackstone, Va 23824		FROM AAI Corporation 124 Industry Lane Hunt Valley MD 21030	
1. APPLICATION TITLE Aerosonde Mark 4.7 Small Unmanned Aircraft System (SUAS)			
2. SYSTEM NOMENCLATURE MK 4.7 SUAS			
3. STAGE OF ALLOCATION (X one)			
☐ a. STAGE 1 - CONCEPTUAL ☐ b. STAGE 2 - EXPERIMENTAL ☒ c. STAGE 3 - DEVELOPMENTAL ☐ d. STAGE 4 - OPERATIONAL			
4. FREQUENCY REQUIREMENTS			
a. FREQUENCY(IES) 310-390 MHz; 902-928 MHz; 1300-1390 MHz; 4400-4999MHz; 1700-1859MHz; 1090/1030 MHz			
b. EMISSION DESIGNATOR(S) 280KFID 350KF1D 230KF1D 16M3F3F 18M8F8W 11M0P1D			
5. TARGET STARTING DATE FOR SUBSEQUENT STAGES			
a. STAGE 2		b. STAGE 3 March 5, 2010	c. STAGE 4 1QFY10
6. EXTENT OF USE Wartime use 3 hours/mission, up to 6 missions/day. Peacetime training 4 hours/day, up to 4 training missions/day			
7. GEOGRAPHICAL AREA FOR			
a. STAGE 2			
b. STAGE 3 Fort Pickett, Va; Yuma Proving Grounds, Az; Fort Dix, Nj; MCB Quantico, Va; NASA Wallops FF, Va.			
c. STAGE 4 OCONUS Site TBD			
8. NUMBER OF UNITS			
a. STAGE 2		b. STAGE 3 2 Systems	c. STAGE 4 2 Systems
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT Up to two (2) unmanned air vehicles per one (1) ground control station (GCS). Second N/AGCS in operational standby.			
10. OTHER J/F 12 APPLICATION NUMBER(S) TO BE		11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11?	
☐ a. SUPERSEDED J/F 12/ N/A ☒ b. RELATED J/F 12/ 09011, 09117, 09118 & 09324		☒ a. YES ☐ b. NO ☐ c. N/Avail	
12. NAMES AND TELEPHONE NUMBERS			
a. PROGRAM MANAGER Steve Yeager		(1) COMMERCIAL (410) 382-4991	(2) AUTOVON
b. PROJECT ENGINEER Michael H. Mercado		(1) COMMERCIAL (240) 925-4158	(2) AUTOVON
13. REMARKS 4a. 310 to 390 MHz (Command/Control) Primary uplink; 902 to 928 MHz (Command/Control) Alternate Primary uplink; 1300 to 1390 MHz (Command/Control) Secondary uplink; 4440 to 4999 MHz Analog Video Downlink; 1700 TO 1859 MHz Alternate Analog Video Downlink; 1090 MHz (IFF Pulse Transmit) 1030 MHz (IFF Pulse Receive)			
DOWNGRADING INSTRUCTIONS N/A		CLASSIFICATION UNCLASSIFIED	

CLASSIFICATION UNCLASSIFIED		PAGE 2
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX 320	2. MANUFACTURER'S NAME Microhard Systems Corp	
3. TRANSMITTER INSTALLATION Unmanned aircraft/Ground Control Station	4. TRANSMITTER TYPE FM	
5. TUNING RANGE 310 - 390 MHz	6. METHOD OF TUNING PLL synthesizer	
7. RF CHANNELING CAPABILITY 50 Hz steps	8. EMISSION DESIGNATOR(S) 280KF1D	
9. FREQUENCY TOLERANCE 2ppm	12. EMISSION BANDWIDTH (<i>X and complete as applicable</i>) ☐ CALCULATED ☒ MEASURED	
10. FILTER EMPLOYED (<i>X one</i>) ☒ a. YES ☐ b. NO		
11. SPREAD SPECTRUM (<i>X one</i>) ☒ a. YES ☐ b. NO	13. MAXIMUM BIT RATE 230.4Kbps	
14. MODULATION TECHNIQUES AND CODING Continuous phase FSK	a. -3 dB 95 KHz	
	b. -20 dB 20KHz	
	c. -40 dB 750KHz	
	d. -60 dB 1400KHz	
	e. OC-BW	
15. MAXIMUM MODULATION FREQUENCY 116KHz	16. PRE-EMPHASIS (<i>X one</i>) ☒ a. YES ☐ b. NO	
17. DEVIATION RATIO 1.25		18. PULSE CHARACTERISTICS
19. POWER		
a. MEAN 1W		
b. PEP 1W		
20. OUTPUT DEVICE Transistor		
21. HARMONIC LEVEL		22. SPURIOUS LEVEL -60dBc
a. 2ND		
b. 3RD		
23. FCC TYPE ACCEPTANCE NO. NA		c. OTHER
24. REMARKS Microhard Systems Inc. #110 1144-29th Avenue NE Calgary, AB, Canada T2E7P1 Block 16. Sallen key cutoff=1751(Hz Q=0.7)		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 3	
RECEIVER EQUIPMENT CHARACTERISTICS					
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX 320				2. MANUFACTURER'S NAME Microhard Systems Corp	
3. RECEIVER INSTALLATION Unmanned Aircraft/Ground Control Station				4. RECEIVER TYPE Dual stage heterodyne	
5. TUNING RANGE 310 - 390 MHz				6. METHOD OF TUNING PLL synthesizer	
7. RF CHANNELING CAPABILITY 50 Hz steps				8. EMISSION DESIGNATOR(S) 280KF1D	
9. FREQUENCY TOLERANCE 1.5 ppm					
10. IF SELECTIVITY		1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)
a. -3 dB		450KHz	280KHz	N/A	☐ CALCULATED ☒ MEASURED
b. -20 dB		590KHz	650KHz	N/A	a. -3 dB 100MHz
c. -60 dB		800KHz	1250KHz	N/A	b. -20 dB 150MHz
					c. -60 dB 280MHz
12. IF FREQUENCY					d. PRESELECTION TYPE LC filter
a. 1ST 243.95 MHz					13. MAXIMUM POST DETECTION FREQUENCY 120 KHz
b. 2ND 10.7MHz					14. MINIMUM POST DETECTION FREQUENCY N/A
c. 3RD N/A					
15. OSCILLATOR TUNED		1ST	2ND	3RD	16. MAXIMUM BIT RATE
a. ABOVE TUNED FREQUENCY		X	X	X	17. SENSITIVITY
b. BELOW TUNED FREQUENCY					a. SENSITIVITY -105 dBm
c. EITHER ABOVE OR BELOW TUNED FREQUENCY					b. CRITERIA SNR=120dB, 10E6 BER
18. DE-EMPHASIS (<i>X one</i>)					c. NOISE FIG 3 dB
☒ a. YES ☐ b. NO					d. NOISE TEMP N/A Kelvin
19. IMAGE REJECTION >60dBe				20. SPURIOUS REJECTION >60dBe	
21. REMARKS Block 18: Sullen key, cutoff fret 175KHz, Q=0.7					
CLASSIFICATION UNCLASSIFIED					

CLASSIFICATION UNCLASSIFIED		PAGE 4
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. 350 MHz E0650	3. MANUFACTURER'S NAME Polar Electronic Industries	
4. FREQUENCY RANGE 300 - 400 MHz	5. TYPE Monopole	
6. POLARIZATION Linear Vertical	7. SCAN CHARACTERISTICS	
a. TYPE Fixed		
b. VERTICAL SCAN		
a. MAIN BEAM 1.5 dBi		(1) MAX ELEV N/A
b. 1ST MAJOR SIDE LOBE N/A		(2) MIN ELEV N/A
		(3) SCAN RATE N/A
c. HORIZONTAL SCAN		
a. HORIZONTAL 360 degrees		(1) SECTOR SCANNED N/A
b. VERTICAL 85 degrees		(2) SCAN RATE N/A
d. SECTOR BLANKING (X one) ☐ (1) YES ☒ (2) NO		
10. REMARKS Air Vehicle Antenna. ARA # E0650		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 5
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Wide Band UHF Antenna. P/N 38214-91002-2	3. MANUFACTURER'S NAME Antcom Corp	
4. FREQUENCY RANGE 300 - 400 MHz	5. TYPE 1/4 Wave Monopole	
6. POLARIZATION Vertical	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A	
a. MAIN BEAM 2.0 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
9. BEAMWIDTH	(2) MIN ELEV N/A	
a. HORIZONTAL 360 degrees	(3) SCAN RATE N/A	
b. VERTICAL 45 degrees	c. HORIZONTAL SCAN	
10. REMARKS Ground Control Station Antenna		(1) SECTOR SCANNED N/A
		(2) SCAN RATE N/A
		d. SECTOR BLANKING (X one)
		☐ (1) YES ☒ (2) NO
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 6
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX 910 transmitter	2. MANUFACTURER'S NAME Microhard Systems Incorporated	
3. TRANSMITTER INSTALLATION Unmanned Aircraft/Ground Control Station	4. TRANSMITTER TYPE FM	
5. TUNING RANGE 902 to 928 MHz	6. METHOD OF TUNING Phase Lock Oscillator	
7. RF CHANNELING CAPABILITY 902 to 928 MHz w/400kHz increments	8. EMISSION DESIGNATOR(S) 350KF1D	
9. FREQUENCY TOLERANCE <3PPM	12. EMISSION BANDWIDTH (X and complete as applicable) ☐ CALCULATED ☒ MEASURED a. -3 dB 210 kHz b. -20 dB 350kHz c. -40 dB 695 kHz d. -60 dB 1220 kHz e. OC-BW Frequency Hopper	
10. FILTER EMPLOYED (X one) ☒ a. YES ☐ b. NO		
11. SPREAD SPECTRUM (X one) ☒ a. YES ☐ b. NO		
13. MAXIMUM BIT RATE 115.2kbps	15. MAXIMUM MODULATION FREQUENCY 87 kHz	
14. MODULATION TECHNIQUES AND CODING CPFSK	17. DEVIATION RATIO	
16. PRE-EMPHASIS (X one) ☒ a. YES ☐ b. NO	18. PULSE CHARACTERISTICS	
19. POWER a. MEAN 1 Watt b. PEP N/A	a. RATE N/A b. WIDTH N/A c. RISE TIME N/A d. FALL TIME N/A e. COMP RATIO N/A	
20. OUTPUT DEVICE 1W Power Amplifier built in the MicroHard.	21. HARMONIC LEVEL a. 2ND -27 dBm b. 3RD -30 dBm c. OTHER	
22. SPURIOUS LEVEL 60 dB	23. FCC TYPE ACCEPTANCE NO. MHX910 transmitter FCC acceptance - Part 15.247 Rules NS 901P5	
24. REMARKS Microhard Systems Inc. #110 1144-29th Avenue NE Calgary, AB, Canada T2E7P1 Item 10. Filter Description Item 11. Spectrum Description: Frequency Hopping Air vehicle and Ground Control Station Transmitter		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 7
RECEIVER EQUIPMENT CHARACTERISTICS				
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX 910			2. MANUFACTURER'S NAME Microhard Systems Inc	
3. RECEIVER INSTALLATION Unmanned Aircraft/Ground Control Station			4. RECEIVER TYPE FM	
5. TUNING RANGE 902 to 928 MHz			6. METHOD OF TUNING Phase Locked Oscillator	
7. RF CHANNELING CAPABILITY 902 to 928 w/400kHz Increments			8. EMISSION DESIGNATOR(S) 350KF1D	
9. FREQUENCY TOLERANCE <3 PPM				
10. IF SELECTIVITY	1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)
a. -3 dB	1.15MHz	280KHz		☒ CALCULATED ☐ MEASURED
b. -20 dB	3.40 MHz	650 KHz		a. -3 dB 400KHz
c. -60 dB				b. -20 dB 600KHz
12. IF FREQUENCY				c. -60 dB 2.4MHz
				d. PRESELECTION TYPE Front End LC Filter
a. 1ST 110.6 MHz				13. MAXIMUM POST DETECTION FREQUENCY 87 KHz
b. 2ND 10.7 MHz				14. MINIMUM POST DETECTION FREQUENCY 58 KHz
c. 3RD				
15. OSCILLATOR TUNED	1ST	2ND	3RD	16. MAXIMUM BIT RATE 175 KBps
a. ABOVE TUNED FREQUENCY	☒	☒		17. SENSITIVITY
b. BELOW TUNED FREQUENCY				
c. EITHER ABOVE OR BELOW TUNED FREQUENCY				
18. DE-EMPHASIS (<i>X one</i>)				a. SENSITIVITY -105 dBm
☒ a. YES ☐ b. NO				b. CRITERIA (10) ⁻⁶ Bit Error Rate (BER)
				c. NOISE FIG <5 dB
19. IMAGE REJECTION -50dBc				d. NOISE TEMP Kelvin
20. SPURIOUS REJECTION >60dBc				
21. REMARKS Air vehicle and Ground Control Station Receiver.				
CLASSIFICATION UNCLASSIFIED				

CLASSIFICATION UNCLASSIFIED		PAGE 8
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. 831 -TNC E0631-TNC	3. MANUFACTURER'S NAME Polar Electronic Industries	
4. FREQUENCY RANGE 902-928 MHz	5. TYPE 1/4 Wave Dipole	
6. POLARIZATION Vertical	7. SCAN CHARACTERISTICS	
a. TYPE N/A		
b. VERTICAL SCAN		
a. MAIN BEAM 2.2 dBi		(1) MAX ELEV N/A
b. 1ST MAJOR SIDE LOBE N/A		(2) MIN ELEV N/A
9. BEAMWIDTH		(3) SCAN RATE N/A
a. HORIZONTAL 360 degrees		c. HORIZONTAL SCAN
b. VERTICAL 80 degrees from horizontal		(1) SECTOR SCANNED N/A
		(2) SCAN RATE N/A
		d. SECTOR BLANKING (<i>X one</i>) ☐ (1) YES ☒ (2) NO
10. REMARKS Air Vehicle Antenna. ARA # E0631-TNC		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 9
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. MM5E900BNC	3. MANUFACTURER'S NAME Radiall-Larson	
4. FREQUENCY RANGE 890-960 MHz	5. TYPE 5/8 over 5/8 over 1/4 wave	
6. POLARIZATION Vertical	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A (fixed)	
a. MAIN BEAM 7.2 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
9. BEAMWIDTH	(2) MIN ELEV N/A	
a. HORIZONTAL 360 degrees	(3) SCAN RATE N/A	
b. VERTICAL 60 Degrees	c. HORIZONTAL SCAN	
10. REMARKS Ground Control Station OMNI Antenna		(1) SECTOR SCANNED N/A
		(2) SCAN RATE N/A
		d. SECTOR BLANKING (X one)
		☐ (1) YES ☒ (2) NO
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 10
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. P Series Radio Transceiver. Model P501 X005	2. MANUFACTURER'S NAME Free Wave Technologies, Inc.	
3. TRANSMITTER INSTALLATION Unmanned aircraft/Ground Control Station	4. TRANSMITTER TYPE GFSK Communication	
5. TUNING RANGE 1350 to 1390 MHz	6. METHOD OF TUNING Digital Synthesizer	
7. RF CHANNELING CAPABILITY 230.4 kHz increments starting from 1350.14 MHz	8. EMISSION DESIGNATOR(S) 230KF1D	
9. FREQUENCY TOLERANCE 1.5 PPM	12. EMISSION BANDWIDTH (X and complete as applicable) ☐ CALCULATED ☒ MEASURED a. -3 dB 180 kHz b. -20 dB 230 kHz c. -40 dB 315 kHz d. -60 dB 400 kHz e. OC-BW 230 kHz	
10. FILTER EMPLOYED (X one) ☒ a. YES ☐ b. NO		
11. SPREAD SPECTRUM (X one) ☐ a. YES ☒ b. NO	13. MAXIMUM BIT RATE 230.4Kbps	
14. MODULATION TECHNIQUES AND CODING 2 level GFSK. Frequency hopping	15. MAXIMUM MODULATION FREQUENCY 57.6 kHz	
16. PRE-EMPHASIS (X one) ☐ a. YES ☒ b. NO	17. DEVIATION RATIO 1.0	
19. POWER a. MEAN 1 Watt transceiver with 5 Watt amplifier b. PEP	18. PULSE CHARACTERISTICS a. RATE N/A b. WIDTH N/A c. RISE TIME N/A d. FALL TIME N/A e. COMP RATIO N/A	
20. OUTPUT DEVICE MOSFET	21. HARMONIC LEVEL a. 2ND -50 Mc b. 3RD -70dBc c. OTHER -70 dBc	
22. SPURIOUS LEVEL -70 dBc	23. FCC TYPE ACCEPTANCE NO. NA	
24. REMARKS Item 10: Gaussian Low-pass filter. Item 11: Frequency hopping is employed using up to 112 discrete channels in an orthogonal hop sequence. The total number of frequency channels available for the radio is 173. Minimum hop band required is not limited. The hopping rate is software defined Any channel or group of channels can be locked out		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 11		
RECEIVER EQUIPMENT CHARACTERISTICS						
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. P-Series Radio Transceiver, Model P501X005				2. MANUFACTURER'S NAME Free Wave Technologies		
3. RECEIVER INSTALLATION Unmanned Aircraft/Ground Control Station				4. RECEIVER TYPE Dual Conversion		
5. TUNING RANGE 1350 - 1390 MHz				6. METHOD OF TUNING Crystal Controlled Synthesizer		
7. RF CHANNELING CAPABILITY 230.4 kHz increments starting from 1350.144 MHz				8. EMISSION DESIGNATOR(S) 230KF1D		
9. FREQUENCY TOLERANCE 1.5 ppm						
10. IF SELECTIVITY		1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)	
a. -3 dB		1.8 MHz	200 kHz	N/A	☐ CALCULATED ☒ MEASURED	
b. -20 dB		3.4 MHz	230 kHz	N/A	a. -3 dB 46MHz	
c. -60 dB		N/A	290 kHz	N/A	b. -20 dB 68MHz	
					c. -60 dB N/A	
12. IF FREQUENCY				d. PRESELECTION TYPE BP Saw Filter		
a. 1ST 45.1584 MHz				13. MAXIMUM POST DETECTION FREQUENCY 200 kHz		
b. 2ND 921.6 kHz				14. MINIMUM POST DETECTION FREQUENCY N/A		
c. 3RD N/A						
15. OSCILLATOR TUNED		1ST	2ND	3RD	16. MAXIMUM BIT RATE	
a. ABOVE TUNED FREQUENCY		☒			17. SENSITIVITY	
b. BELOW TUNED FREQUENCY					a. SENSITIVITY -106 dBm	
c. EITHER ABOVE OR BELOW TUNED FREQUENCY			☒	☒	b. CRITERIA 10^-6 BER	
18. DE-EMPHASIS (<i>X one</i>)				c. NOISE FIG 1.5 dB		
☐ a. YES ☒ b. NO				d. NOISE TEMP N/A Kelvin		
19. IMAGE REJECTION 40 dB				20. SPURIOUS REJECTION 60 dB		
21. REMARKS N/A						
CLASSIFICATION UNCLASSIFIED						

CLASSIFICATION UNCLASSIFIED		PAGE 12
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Winglet Transponder Antenna P/N X0328-RG1350	3. MANUFACTURER'S NAME Polar Electronic industries	
4. FREQUENCY RANGE 1310 - 1390 MHz	5. TYPE 1/2 Wave Dipole	
6. POLARIZATION Linear Vertical	7. SCAN CHARACTERISTICS	
a. TYPE Fixed		
b. VERTICAL SCAN		
a. MAIN BEAM 2.2 dBi		(1) MAX ELEV N/A
b. 1ST MAJOR SIDE LOBE N/A		(2) MIN ELEV N/A
		(3) SCAN RATE N/A
c. HORIZONTAL SCAN		
a. HORIZONTAL 360 degrees		(1) SECTOR SCANNED N/A
b. VERTICAL 80 degrees		(2) SCAN RATE N/A
d. SECTOR BLANKING (X one)		
☐ (1) YES ☒ (2) NO		
10. REMARKS Unmanned Air Vehicle L-Band Secondary Link Antenna		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 13
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Yagi Antenna P/n Y221210A	3. MANUFACTURER'S NAME Comtelco Antennas	
4. FREQUENCY RANGE 1200 - 1400 MHz	5. TYPE Yagi (Directional)	
6. POLARIZATION Vertical	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A (fixed)	
a. MAIN BEAM 10.0 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 60 Degrees	(1) SECTOR SCANNED N/A	
b. VERTICAL 60 Degrees	(2) SCAN RATE N/A	
		d. SECTOR BLANKING (X one) ☐ (1) YES ☒ (2) NO
10. REMARKS Ground Control Station Secondary Link Yagi Antenna.		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 14
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. VT5OCB5NNFI-R303 C-Band Video Transmitter	2. MANUFACTURER'S NAME Advanced Microwave Products	
3. TRANSMITTER INSTALLATION Air vehicle	4. TRANSMITTER TYPE Analog FM	
5. TUNING RANGE 4400 - 4999 MHz	6. METHOD OF TUNING Synthesizer	
7. RF CHANNELING CAPABILITY 230.4 kHz increments starting from 1350.14 MHz	8. EMISSION DESIGNATOR(S) 16M3F3F	
9. FREQUENCY TOLERANCE +/- 20ppm	10. FILTER EMPLOYED (X one) ☒ a. YES ☐ b. NO	
11. SPREAD SPECTRUM (X one) ☐ a. YES ☒ b. NO	12. EMISSION BANDWIDTH (X and complete as applicable) ☒ CALCULATED ☒ MEASURED	
13. MAXIMUM BIT RATE N/A	a. -3 dB 1 MHz b. -20 dB 8.5 MHz c. -40 dB 17 MHz d. -60 dB 20 MHz e. OC-BW 14 MHz	
14. MODULATION TECHNIQUES AND CODING Analog FM, Positive Senseg	15. MAXIMUM MODULATION FREQUENCY 4.2 MHz	
16. PRE-EMPHASIS (X one) ☐ a. YES ☒ b. NO	17. DEVIATION RATIO 0.9	
19. POWER a. MEAN 5 Watt b. PEP	18. PULSE CHARACTERISTICS a. RATE N/A b. WIDTH N/A c. RISE TIME N/A d. FALL TIME N/A e. COMP RATIO N/A	
20. OUTPUT DEVICE Transistor	21. HARMONIC LEVEL a. 2ND -13 dBm b. 3RD -13 dBm c. OTHER -13 dBm	
22. SPURIOUS LEVEL -13 dBm	23. FCC TYPE ACCEPTANCE NO. NA	
24. REMARKS Block 10: 7-pole Chebychev Harmonic Low Pass Filter set to 6 GHz Blocks 12-15: Transmitter includes 6.8 MHz FM sub-carrier, insertion level -24 dB, with up to 30 kbps RS232 data at 75 kHz pk deviation.		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 15
RECEIVER EQUIPMENT CHARACTERISTICS				
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. Video receiver, P/N VRC10CA/SC/17B/LS/R/ET			2. MANUFACTURER'S NAME L3 Communications	
3. RECEIVER INSTALLATION Ground Control Station			4. RECEIVER TYPE Analog FM	
5. TUNING RANGE 4400 - 4950 MHz and 5250 - 5850 MHz			6. METHOD OF TUNING Synthesizer	
7. RF CHANNELING CAPABILITY 1 MHz channel steps			8. EMISSION DESIGNATOR(S) 16M3F3F	
9. FREQUENCY TOLERANCE 20 ppm				
10. IF SELECTIVITY	1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)
a. -3 dB	39MHz	17MHz	N/A	☐ CALCULATED ☒ MEASURED
b. -20 dB	58MHz	20MHz	N/A	a. -3 dB 730 MHz
c. -60 dB	145MHz	40MHz	N/A	b. -20 dB 1400 MHz
12. IF FREQUENCY				c. -60 dB 2409 MHz
				d. PRESELECTION TYPE Cavity Filter
a. 1ST 964 MHz				13. MAXIMUM POST DETECTION FREQUENCY 4.2 MHz
b. 2ND 70 MHz				14. MINIMUM POST DETECTION FREQUENCY 10Hz
c. 3RD N/A				
15. OSCILLATOR TUNED	1ST	2ND	3RD	16. MAXIMUM BIT RATE N/A
a. ABOVE TUNED FREQUENCY				17. SENSITIVITY
b. BELOW TUNED FREQUENCY	X	X		
c. EITHER ABOVE OR BELOW TUNED FREQUENCY			X	
18. DE-EMPHASIS (<i>X one</i>)				a. SENSITIVITY -91 dBm
☒ a. YES ☐ b. NO				b. CRITERIA 12dB S/N+N/N
				c. NOISE FIG 2.5 dB
19. IMAGE REJECTION 60 dB				d. NOISE TEMP N/A Kelvin
20. SPURIOUS REJECTION 75 dB				
21. REMARKS N/A				
CLASSIFICATION UNCLASSIFIED				

CLASSIFICATION UNCLASSIFIED		PAGE 16
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☒ a. TRANSMITTING ☐ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Nose Antenna - Blue P/n X0512	3. MANUFACTURER'S NAME Polar Electronic Industry	
4. FREQUENCY RANGE 4400 - 4950 MHz	5. TYPE Monopole	
6. POLARIZATION Linear Vertical	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A (fixed)	
a. MAIN BEAM 1.5 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 360 Degrees	(1) SECTOR SCANNED N/A	
b. VERTICAL 45 Degrees	(2) SCAN RATE N/A	
d. SECTOR BLANKING (X one)		
☐ (1) YES ☒ (2) NO		
10. REMARKS Air Vehicle Video Downlink Antenna. ARA # X0512		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 17
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☒ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Video omni antenna P/N 40297-90012	3. MANUFACTURER'S NAME Antcom Corp.	
4. FREQUENCY RANGE 4400 - 4950 MHz	5. TYPE Monopole	
6. POLARIZATION Linear Vertical	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE Fixed	
a. MAIN BEAM 3.5 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 360 degrees	(1) SECTOR SCANNED N/A	
b. VERTICAL 45 degrees	(2) SCAN RATE N/A	
		d. SECTOR BLANKING (<i>X one</i>) ☐ (1) YES ☒ (2) NO
10. REMARKS Ground Control Station Video Omni Antenna		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 18
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☒ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Video Dish Antenna P/N A4060RL.24	3. MANUFACTURER'S NAME Epsilon 10 Microdesign	
4. FREQUENCY RANGE 4400 - 6000 MHz	5. TYPE 24 inch diameter parabolic with C-Band Feed	
6. POLARIZATION Right Hand Circular	7. SCAN CHARACTERISTICS	
8. GAIN		a. TYPE N/A (fixed)
a. MAIN BEAM 29 dBi		b. VERTICAL SCAN
b. 1ST MAJOR SIDE LOBE N/A		(1) MAX ELEV N/A
		(2) MIN ELEV N/A
		(3) SCAN RATE N/A
9. BEAMWIDTH		c. HORIZONTAL SCAN
a. HORIZONTAL 7 degrees		(1) SECTOR SCANNED N/A
b. VERTICAL 7 degrees		(2) SCAN RATE N/A
		d. SECTOR BLANKING (X one)
		☐ (1) YES ☒ (2) NO
10. REMARKS Ground Control Station Video Dish Antenna Epsilon 10 Microdesign Stuart, Florida 34997 (772) 287-1980		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 19
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. ST L-Band Video Transmitter	2. MANUFACTURER'S NAME Global Microwave Systems (Transmitter)	
3. TRANSMITTER INSTALLATION Unmanned Aircraft	4. TRANSMITTER TYPE FM Analog Video/Audio	
5. TUNING RANGE 1700 to 1859 MHz	6. METHOD OF TUNING PLL Synthesizer	
7. RF CHANNELING CAPABILITY 250 kHz tuning steps	8. EMISSION DESIGNATOR(S) I8M8F8W	
9. FREQUENCY TOLERANCE +/- 5 PPM	12. EMISSION BANDWIDTH (X and complete as applicable) ☒ CALCULATED ☐ MEASURED a. -3 dB 7 MHz b. -20 dB 15MHz c. -40 dB 22 MHz d. -60 dB 32 MHz e. OC-BW 18MHz	
10. FILTER EMPLOYED (X one) ☒ a. YES ☐ b. NO		
11. SPREAD SPECTRUM (X one) ☐ a. YES ☒ b. NO	15. MAXIMUM MODULATION FREQUENCY 4.4 MHz	
13. MAXIMUM BIT RATE N/A	17. DEVIATION RATIO (see remarks)	
14. MODULATION TECHNIQUES AND CODING FM Video, FM-FM Audio	18. PULSE CHARACTERISTICS	
16. PRE-EMPHASIS (X one) ☒ a. YES ☐ b. NO	19. POWER a. MEAN 10 watts (+40 dBm) b. PEP N/A	
20. OUTPUT DEVICE Solid State Linear Amplifier	21. HARMONIC LEVEL a. 2ND -68 dBc b. 3RD -66 dBc c. OTHER -62 dBc	
22. SPURIOUS LEVEL -60dBc	23. FCC TYPE ACCEPTANCE NO. N/A NTIA Band	
24. REMARKS Item 8: The emission designator is the maximum designation that includes the highest audio sub-channel frequency which is at 8.59 MHz. Typically this carrier is at 6.2 MHz. Item 10: 4-Pole filter. Item 14: The possible audio sub-carriers are located at 4.83, 5.6, 5.8, 6.0, 6.2, 6.5, 7.02, 7.5, 8.3, 8.5, and 8.59 MHz. The radios are configured with up to two of these sub-carriers available. 6.2 and 8.5 MHz are normally used. Item 16: Emphasis is set for NTSC video per EIA/TIA RS-170 Rec. 405-1, 3 dB. Item 17: The video signal is summed with the two audio subchannels and the composite signal is the input to the VCO operating at the transmitter center frequency. The Video channel (Max frequency of 4.4 MHz) is subjected to a deviation ratio of 1.2. The audio subcarriers are subjected to a deviation of about 0.2 at the final VCO stage which is the same VCO for the video signal.		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 20
RECEIVER EQUIPMENT CHARACTERISTICS				
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MR L-Band Video Receiver			2. MANUFACTURER'S NAME Global Microwave Systems, Inc	
3. RECEIVER INSTALLATION Ground Control Station			4. RECEIVER TYPE Single stage superheterodyne, FM Video / Audio	
5. TUNING RANGE 1710 to 1850 MHz			6. METHOD OF TUNING PLL Synthesizer	
7. RF CHANNELING CAPABILITY 250 kHz increments			8. EMISSION DESIGNATOR(S) 18M8F8W	
9. FREQUENCY TOLERANCE 5 PPM				
10. IF SELECTIVITY	1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)
a. -3 dB	18MHz			☒ CALCULATED ☐ MEASURED
b. -20 dB	27 MHz			a. -3 dB 200MHz
c. -60 dB	42 MHz			b. -20 dB 260MHz
				c. -60 dB 760MHz
12. IF FREQUENCY				d. PRESELECTION TYPE Lumped Element BPF
a. 1ST 480MHz				13. MAXIMUM POST DETECTION FREQUENCY 10 MHz
b. 2ND N/A				14. MINIMUM POST DETECTION FREQUENCY 4 MHz
c. 3RD N/A				
15. OSCILLATOR TUNED	1ST	2ND	3RD	16. MAXIMUM BIT RATE N/A
a. ABOVE TUNED FREQUENCY				17. SENSITIVITY
b. BELOW TUNED FREQUENCY	X			a. SENSITIVITY -83 dBm
c. EITHER ABOVE OR BELOW TUNED FREQUENCY				b. CRITERIA 40 dB SNR
18. DE-EMPHASIS (<i>X one</i>)				c. NOISE FIG 5 dB
☒ a. YES ☐ b. NO				d. NOISE TEMP N/A Kelvin
19. IMAGE REJECTION 60 dB				20. SPURIOUS REJECTION 70dB
21. REMARKS Item 18: De-emphasis for TIA/EIA RS-1 70 video plus audio.				
CLASSIFICATION UNCLASSIFIED				

CLASSIFICATION UNCLASSIFIED		PAGE 21
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☒ a. TRANSMITTING ☐ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Nose Antenna - Red P/n X0546	3. MANUFACTURER'S NAME Polar Electronic Industry	
4. FREQUENCY RANGE 1700 to 1850 MHz	5. TYPE 1/2 Wave Dipole	
6. POLARIZATION Vertical Linear	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A (fixed)	
a. MAIN BEAM 2.2 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 360 Degrees (Omni)	(1) SECTOR SCANNED N/A	
b. VERTICAL 80 Degrees (Omni)	(2) SCAN RATE N/A	
d. SECTOR BLANKING (X one)		
☐ (1) YES ☒ (2) NO		
10. REMARKS Air Vehicle Video Downlink Antenna. ARA # X0546		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED		PAGE 22
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☒ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. L Band Omni Antenna. P/N 109-1008	3. MANUFACTURER'S NAME BAI Aerosystems, Inc.	
4. FREQUENCY RANGE 1750 to 1850 MHz	5. TYPE Lindendlad-style RHCP Omni	
6. POLARIZATION Right Hand Circular Polarized	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE N/A	
a. MAIN BEAM 0 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 360 Degrees (Omni)	(1) SECTOR SCANNED N/A	
b. VERTICAL 180 Degrees (Omni)	(2) SCAN RATE N/A	
		d. SECTOR BLANKING (X one) ☐ (1) YES ☒ (2) NO
10. REMARKS Ground Control Station Video Antenna		
CLASSIFICATION UNCLASSIFIED		

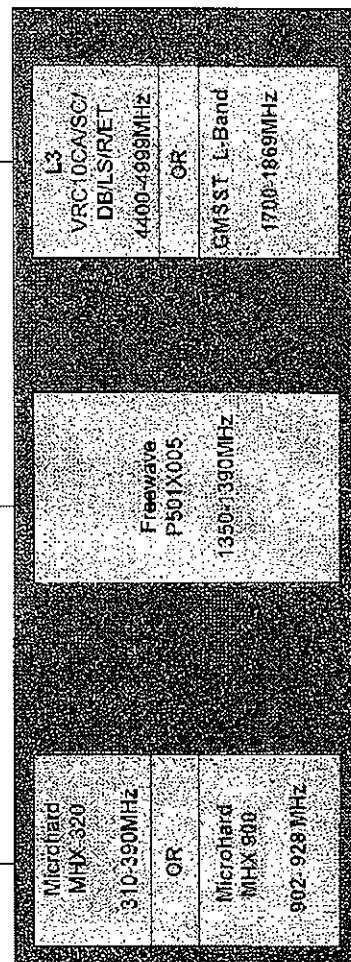
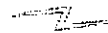
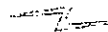
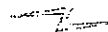
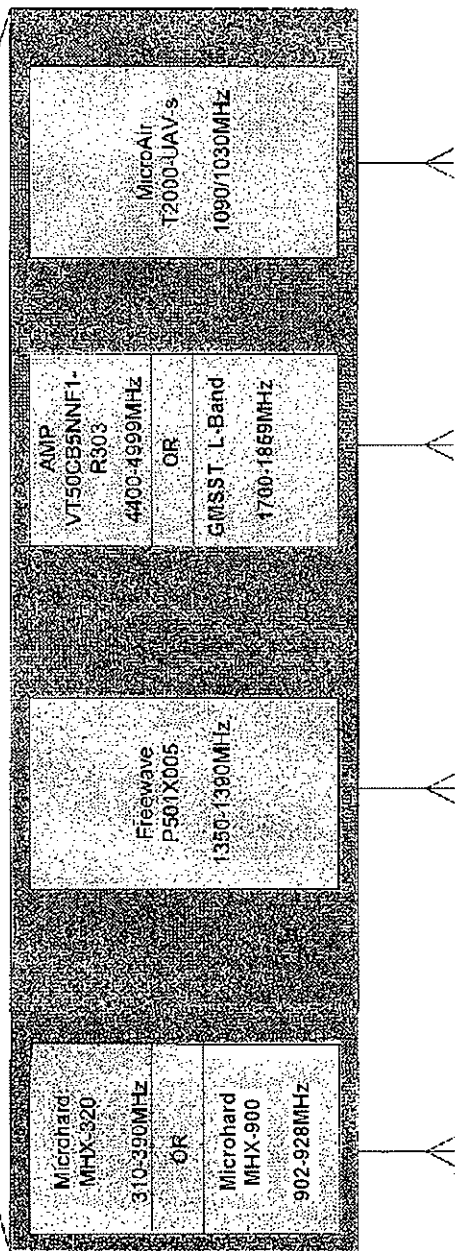
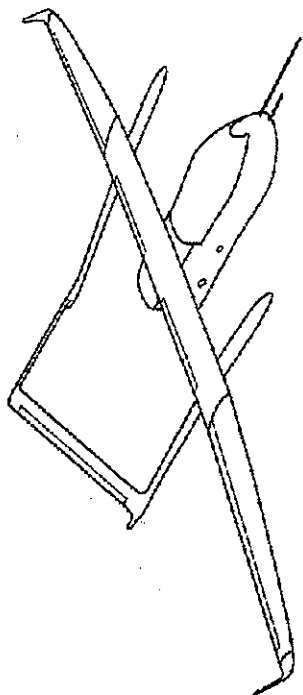
CLASSIFICATION UNCLASSIFIED		PAGE 23
TRANSMITTER EQUIPMENT CHARACTERISTICS		
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. T2000UAV-S	2. MANUFACTURER'S NAME MICROAIR AVIONICS PTY Ltd	
3. TRANSMITTER INSTALLATION Unmanned Aircraft	4. TRANSMITTER TYPE Pulse	
5. TUNING RANGE 1090.0 MHz	6. METHOD OF TUNING Synthesizer	
7. RF CHANNELING CAPABILITY None	8. EMISSION DESIGNATOR(S) 11M0P0N	
9. FREQUENCY TOLERANCE +/- 0.500 KHz	12. EMISSION BANDWIDTH (X and complete as applicable) ☒ CALCULATED ☐ MEASURED a. -3 dB 2.0 MHz b. -20 dB 20.0 MHz c. -40 dB 40.0 MHz d. -60 dB 100.0 MHz e. OC-BW 100.0 MHz	
10. FILTER EMPLOYED (X one) ☒ a. YES ☐ b. NO		
11. SPREAD SPECTRUM (X one) ☐ a. YES ☒ b. NO		
13. MAXIMUM BIT RATE 750 Kb	15. MAXIMUM MODULATION FREQUENCY N/A	
14. MODULATION TECHNIQUES AND CODING Pulse Position Modulation	17. DEVIATION RATIO N/A	
16. PRE-EMPHASIS (X one) ☐ a. YES ☒ b. NO	18. PULSE CHARACTERISTICS	
19. POWER a. MEAN 0.16116W b. PEP 200.0 W	a. RATE 750 Kb b. WIDTH 0.45 usec c. RISE TIME 80 nS d. FALL TIME 120 nS e. COMP RATIO N/A	
20. OUTPUT DEVICE MA-COM TPR-175 RF Pulse Transistor Class C operation	21. HARMONIC LEVEL	
22. SPURIOUS LEVEL	a. 2ND > 55 dB below Fundamental b. 3RD > 58 dB below Fundamental c. OTHER >60 dB below Fundamental	
23. FCC TYPE ACCEPTANCE NO. FCC identifier = PS3T2000		
24. REMARKS The T2000UAV-S IFF transponder transmitter is fixed frequency design. Signal is created using a tuned transistor oscillator, which is turned on and off by the modulation. The signal is buffered by a class C operation transistor, and passed to the PA. The PA is a class transistor which is set to output at 200W to a 50 ohm BNC.		
CLASSIFICATION UNCLASSIFIED		

CLASSIFICATION UNCLASSIFIED				PAGE 24
RECEIVER EQUIPMENT CHARACTERISTICS				
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. T2000UAV-S			2. MANUFACTURER'S NAME Microair Avionics Pty Ltd.	
3. RECEIVER INSTALLATION Unmanned Aircraft			4. RECEIVER TYPE Direct Conversion	
5. TUNING RANGE 1030 MHz			6. METHOD OF TUNING Fixed Frequency (1030 MHz)	
7. RF CHANNELING CAPABILITY N/A			8. EMISSION DESIGNATOR(S) 11M0P0N	
9. FREQUENCY TOLERANCE +/- 5 MHz				
10. IF SELECTIVITY	1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)
a. -3 dB				☒ CALCULATED ☐ MEASURED
b. -20 dB				a. -3 dB 9.0 MHz
c. -60 dB				b. -20 dB 16.0 MHz
				c. -60 dB 52.0 MHz
12. IF FREQUENCY				d. PRESELECTION TYPE Mechanically tuned 5 stage comb-line cavity filter
a. 1ST N/A				13. MAXIMUM POST DETECTION FREQUENCY 350KHz
b. 2ND N/A				14. MINIMUM POST DETECTION FREQUENCY DC
c. 3RD N/A				
15. OSCILLATOR TUNED	1ST	2ND	3RD	16. MAXIMUM BIT RATE 750 Kb
a. ABOVE TUNED FREQUENCY				17. SENSITIVITY
b. BELOW TUNED FREQUENCY				a. SENSITIVITY Min Trigger Lvl(MTL) = -72 dBm
c. EITHER ABOVE OR BELOW TUNED FREQUENCY				b. CRITERIA
18. DE-EMPHASIS (<i>X one</i>)				c. NOISE FIG dB
☐ a. YES ☒ b. NO				d. NOISE TEMP Kelvin
19. IMAGE REJECTION				20. SPURIOUS REJECTION >60 dB
21. REMARKS The T2000UAV-s IFF transponder receiver is a direct conversion design, with a single LNA and detector. Received signal is filtered via a bandpass with a -3dB roll-off at +/-5MHz of the fundamental channel frequency 1030 MHz. The LNA provides approximate. 10 dB of gain before the signal is passed to the 70 dB detector. The demodulated signal is outputted as pulses. The output signal is buffered and adjusted for a dynamic range scale of 200 mV to 2.0V				
CLASSIFICATION UNCLASSIFIED				

CLASSIFICATION UNCLASSIFIED		PAGE 25
ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING		
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. Winglet Transponder Antenna P/N X0328-LR1030	3. MANUFACTURER'S NAME Polar Electronic industries	
4. FREQUENCY RANGE 1030 - 1309 MHz	5. TYPE 1/2 Wave Dipole	
6. POLARIZATION Vertical Linear	7. SCAN CHARACTERISTICS	
8. GAIN	a. TYPE Fixed	
a. MAIN BEAM 2.2 dBi	b. VERTICAL SCAN	
b. 1ST MAJOR SIDE LOBE N/A	(1) MAX ELEV N/A	
	(2) MIN ELEV N/A	
	(3) SCAN RATE N/A	
9. BEAMWIDTH	c. HORIZONTAL SCAN	
a. HORIZONTAL 360 degrees	(1) SECTOR SCANNED N/A	
b. VERTICAL 80 degrees	(2) SCAN RATE N/A	
		d. SECTOR BLANKING (X one) ☐ (1) YES ☒ (2) NO
10. REMARKS Unmanned Air Vehicle IFF Antenna		
CLASSIFICATION UNCLASSIFIED		

Mark 4.7 System Line Diagram

Mark 4.7 Air Vehicle



Mk 4.7 Expeditionary Ground
Control Station (EGCS) or On
the Move Command and
Control Station (OMCC)

