

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION Unclassified	DATE 30 July, 2008	Form Approved OMB No. 0704-0188
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DOD GENERAL INFORMATION			
TO		FROM	
1. APPLICATION TITLE Micro Hard Systems Inc. Model MHX1320 Transceiver			
2. SYSTEM NOMENCLATURE Micro Air Vehicle (MAV)			
3. STAGE OF ALLOCATION (X one) <input type="checkbox"/> a. STAGE 1 - CONCEPTUAL <input type="checkbox"/> b. STAGE 2 - EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 - DEVELOPMENTAL <input checked="" type="checkbox"/> d. STAGE 4 - OPERATIONAL			
4. FREQUENCY REQUIREMENTS a. FREQUENCY(IES) 1350 MHz to 1390 MHz b. EMISSION DESIGNATOR(S) 300KF1D (fast mode) 41KF1D (slow mode)			
5. TARGET STARTING DATE FOR SUBSEQUENT STAGES			
a. STAGE 2 NA	b. STAGE 3 NA	c. STAGE 4 7 July, 2008	
6. EXTENT OF USE 1-24 hrs per day, day/night			
7. GEOGRAPHICAL AREA FOR			
a. STAGE 2			
b. STAGE 3			
c. STAGE 4 US &P, Iraq			
8. NUMBER OF UNITS			
a. STAGE 2 N/A	b. STAGE 3 NA	c. STAGE 4 400	
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT 2 to 16			
10. OTHER J/F 12 APPLICATION NUMBER(S) TO BE		11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11?	
<input type="checkbox"/> a. SUPERSEDED J/F 12/	<input type="checkbox"/> b. RELATED J/F 12/	<input type="checkbox"/> a. YES	<input checked="" type="checkbox"/> b. NO <input type="checkbox"/> c. NAvail
12. NAMES AND TELEPHONE NUMBERS			
a. PROGRAM MANAGER David Milburn	(1) COMMERCIAL 256-313-5377	(2) AUTOVON 897-5377	
b. PROJECT ENGINEER Richard Szczepanski	(1) COMMERCIAL 256-876-1996	(2) AUTOVON 746-1996	
13. REMARKS Item 4: The MAV system utilizes the Fast Mode.			
DOWNGRADING INSTRUCTIONS N/A		CLASSIFICATION Unclassified	

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TRANSMITTER EQUIPMENT CHARACTERISTICS																				
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX1320	2. MANUFACTURER'S NAME Microhard Systems Inc.																			
3. TRANSMITTER INSTALLATION Micro Air Vehicle (MAV) / MAV Ground Control Station	4. TRANSMITTER TYPE FM																			
5. TUNING RANGE 1350 -1390 MHz	6. METHOD OF TUNING PLL Synthesizer																			
7. RF CHANNELING CAPABILITY 1350 – 1390 MHz w/<50 Hertz increments	8. EMISSION DESIGNATOR(S) 300KF1D (fast mode) 41KF1D (slow mode)																			
9. FREQUENCY TOLERANCE 2.0 ppm																				
10. FILTER EMPLOYED (X one) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO																				
11. SPREAD SPECTRUM (X one) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO	12. EMISSION BANDWIDTH (X and complete as applicable)																			
13. MAXIMUM BIT RATE 230.4 kbps (fast) 19.2 Kbps (slow)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>CALCULATED</th> <th><input checked="" type="checkbox"/> MEASURED</th> </tr> </thead> <tbody> <tr> <td>a. -3 dB</td> <td>135 KHz (fast)</td> <td>23 KHz (slow)</td> </tr> <tr> <td>b. -20 dB</td> <td>300 KHz (fast)</td> <td>41 KHz (slow)</td> </tr> <tr> <td>c. -40 dB</td> <td>750 KHz(fast)</td> <td>120 KHz (slow)</td> </tr> <tr> <td>d. -60 dB</td> <td>1400 KHz (fast)</td> <td>250 KHz (slow)</td> </tr> <tr> <td>e. OC-BW</td> <td>300 KHz (fast)</td> <td>41 KHz (slow)</td> </tr> </tbody> </table>			CALCULATED	<input checked="" type="checkbox"/> MEASURED	a. -3 dB	135 KHz (fast)	23 KHz (slow)	b. -20 dB	300 KHz (fast)	41 KHz (slow)	c. -40 dB	750 KHz(fast)	120 KHz (slow)	d. -60 dB	1400 KHz (fast)	250 KHz (slow)	e. OC-BW	300 KHz (fast)	41 KHz (slow)
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d. -60 dB	1400 KHz (fast)	250 KHz (slow)																		
e. OC-BW	300 KHz (fast)	41 KHz (slow)																		
14. MODULATION TECHNIQUES AND CODING Continuous Phase FSK; FH (See Remarks)	15. MAXIMUM MODULATION FREQUENCY 1.25 KHz (fast) 9.6 KHz (slow)																			
16. PRE-EMPHASIS (X one) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	17. DEVIATION RATIO 1.25																			
19. POWER a. MEAN 1W b. PEP 1W	18. PULSE CHARACTERISTICS N/A (frequency modulated)																			
20. OUTPUT DEVICE Transistor	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr><td>a. RATE</td><td>N/A</td></tr> <tr><td>b. WIDTH</td><td>N/A</td></tr> <tr><td>c. RISE TIME</td><td>N/A</td></tr> <tr><td>d. FALL TIME</td><td>N/A</td></tr> <tr><td>e. COMP RATIO</td><td>N/A</td></tr> </tbody> </table>		a. RATE	N/A	b. WIDTH	N/A	c. RISE TIME	N/A	d. FALL TIME	N/A	e. COMP RATIO	N/A								
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d. FALL TIME	N/A																			
e. COMP RATIO	N/A																			
22. SPURIOUS LEVEL -60 dBc	21. HARMONIC LEVEL																			
23. FCC TYPE ACCEPTANCE NO. N/A	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr><td>a. 2ND</td><td>-50 dBc</td></tr> <tr><td>b. 3RD</td><td></td></tr> <tr><td>c. OTHER</td><td></td></tr> </tbody> </table>		a. 2ND	-50 dBc	b. 3RD		c. OTHER													
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b. 3RD																				
c. OTHER																				
24. REMARKS																				
<p>Item 8: The MAV system utilizes the Fast Mode.</p> <p>Item 10: LC Filter, 3dB Bandwidth is 100 MHz</p> <p>Item 13: Radio is operated in Fast Mode – 230.4</p> <p>Item 14: The radio may operate on a single frequency or it may hop over a frequency list containing as many as 50 entries. Hop rate is 2.5 hops per second.</p> <p style="text-align: center;">Note: The High Data Rate Emission enables the communication of platform telemetry data to the ground station during system development. The low data rate Emission may be used with adverse loss of control of the air vehicle.</p>																				
CLASSIFICATION																				
Unclassified																				

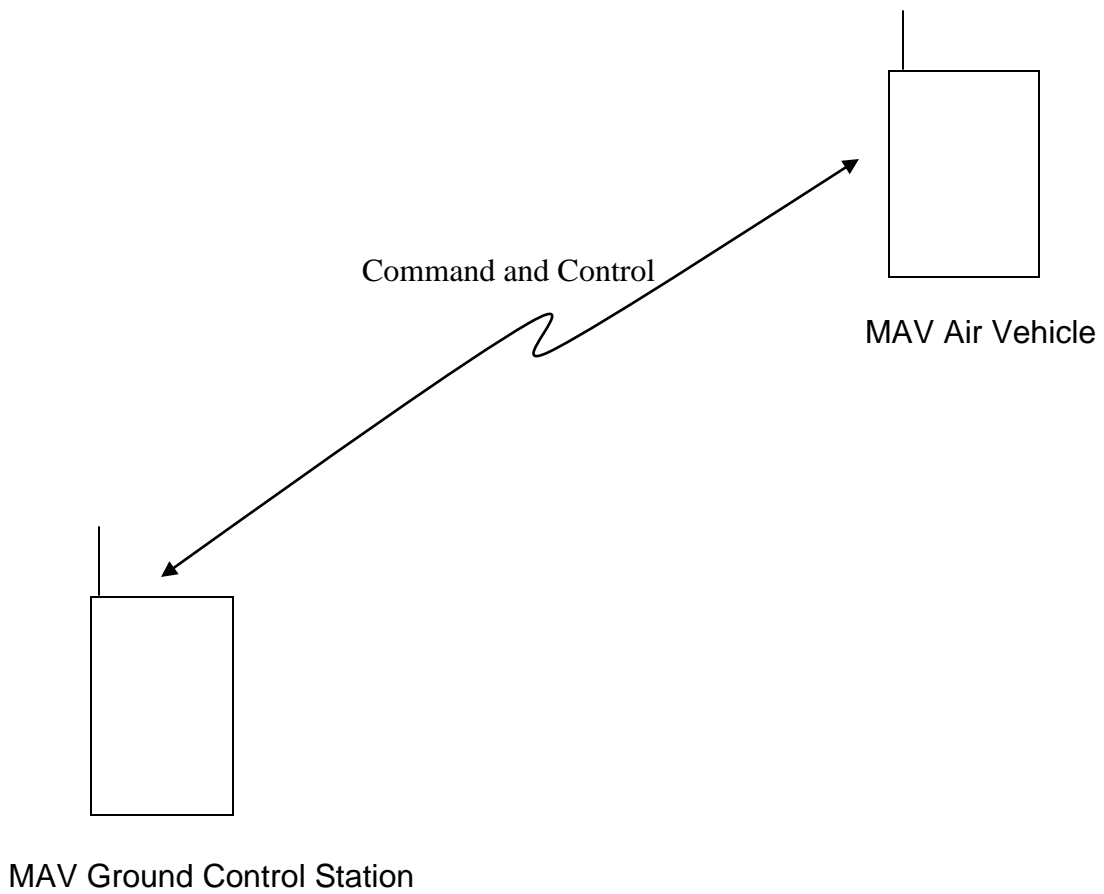
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RECEIVER EQUIPMENT CHARACTERISTICS					
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. MHX1320			2. MANUFACTURER'S NAME Microhard Systems Inc.		
3. RECEIVER INSTALLATION Micro Air Vehicle (MAV) / MAV Ground Control Station			4. RECEIVER TYPE Dual Conversion Supperheterodyne		
5. TUNING RANGE 1350 - 1390 MHz			6. METHOD OF TUNING PLL Synthesizer		
7. RF CHANNELING CAPABILITY 1350 MHz – 1390 MHz w/<50 Hertz increments			8. EMISSION DESIGNATOR(S) FM Modulated Reciver 300KF1D (fast mode) 41KF1D (slow mode)		
9. FREQUENCY TOLERANCE 1.5 PPM					
10. IF SELECTIVITY		1ST	2ND	3RD	11. RF SELECTIVITY (X and complete as applicable)
a. -3 dB		450 kHz	(see remarks)	N/A	<input type="checkbox"/> CALCULATED <input checked="" type="checkbox"/> MEASURED
b. -20 dB		590 kHz	(see remarks)	N/A	a. -3 dB 100 MHz
c. -60 dB		800 kHz	(see remarks)	N/A	b. -20 dB 150 MHz
					c. -60 dB 280 MHz
					d. PRESELECTION TYPE Front End LC Filter
12. IF FREQUENCY			13. MAXIMUM POST DETECTION FREQUENCY		
a. 1ST 243.95 MHz			120 kHz		
b. 2ND 10.7 MHz (fast) 450 KHz (slow)			14. MINIMUM POST DETECTION FREQUENCY		
c. 3RD N/A			N/A		
15. OSCILLATOR TUNED		1ST	2ND	3RD	16. MAXIMUM BIT RATE
a. ABOVE TUNED FREQUENCY		X	X	N/A	230.4 kbps
b. BELOW TUNED FREQUENCY					17. SENSITIVITY
c. EITHER ABOVE OR BELOW TUNED FREQUENCY					a. SENSITIVITY (see remarks)
					b. CRITERIA SNR = 12dB; 10⁻⁶ BER
18. DE-EMPHASIS (X one)			c. NOISE FIG <3 dB		
<input type="checkbox"/> a. YES		<input checked="" type="checkbox"/> b. NO		d. NOISE TEMP N/A	
19. IMAGE REJECTION -60 dBc			20. SPURIOUS REJECTION > 60 dBc		
21. REMARKS					
For Items 8 and 12b radio is operated in Fast Mode.					
For items 10 and 17a the parameters vary as a function of emission designator as follow:					
Emissions		300KF1D (fast)		41KF1D (slow)	
Item 10: Second IF Filtering Attenuation		Bandwidth (KHz)			
3		280		25	
20		650		45	
60		1250		2250	
Item 17a: Sensitivity (dBm)		-105		-114	
CLASSIFICATION					
Unclassified					

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ANTENNA EQUIPMENT CHARACTERISTICS	
1. <input type="checkbox"/> a. TRANSMITTING <input type="checkbox"/> b. RECEIVING <input checked="" type="checkbox"/> c. TRANSMITTING AND RECEIVING	
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. 0145AM-1370S	3. MANUFACTURER'S NAME Nearson Inc.
4. FREQUENCY RANGE 1325 MHz – 1425 MHz	5. TYPE Dipole, 1/2 Wave
6. POLARIZATION Vertical	7. SCAN CHARACTERISTICS
8. GAIN	a. TYPE FIXED
a. MAIN BEAM 2 dBi	b. VERTICAL SCAN
b. 1ST MAJOR SIDE LOBE NA	(1) MAX ELEV N/A
	(2) MIN ELEV N/A
	(3) SCAN RATE N/A
9. BEAMWIDTH	c. HORIZONTAL SCAN
a. HORIZONTAL 360 deg	(1) SECTOR SCANNED N/A
b. VERTICAL 70 deg	(2) SCAN RATE N/A
	d. SECTOR BLANKING (X one)
	<input type="checkbox"/> (1) YES <input checked="" type="checkbox"/> (2) NO
10. REMARKS	
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Unclassified	

Table 1

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ANTENNA CONTINUATION PAGE



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APPLICATION FOR SPECTRUM REVIEW	CLASSIFICATION Unclassified	PAGE 6 of 6
NTIA GENERAL INFORMATION		
1. APPLICATION TITLE Microhard Systems Inc. Model MHX1320 Transceiver		
2. SYSTEM NOMENCLATURE Micro Air Vehicle (MAV) Explosive Ordnance Disposal (EOD)		
3. STAGE OF ALLOCATION (X one) <input type="checkbox"/> a. STAGE 1 - CONCEPTUAL <input type="checkbox"/> b. STAGE 2 - EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 - DEVELOPMENTAL <input checked="" type="checkbox"/> d. STAGE 4 - OPERATIONAL		
4. FREQUENCY REQUIREMENTS a. FREQUENCY(IES) 1350 to 1390 MHz b. EMISSION DESIGNATOR(S) 300KF1D (fast mode) 41KF1D (slow mode)		
5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) (X one) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO Scout reconnaissance, Route clearance, FOB security and EOD IED investigation		
6. INFORMATION TRANSFER REQUIREMENTS 230.4 kbps		
7. ESTIMATED INITIAL COST OF THE SYSTEM \$325 K		
8. TARGET DATE FOR a. APPLICATION APPROVAL April 2008 b. SYSTEM ACTIVATION 15 May 2008 c. SYSTEM TERMINATION		
9. SYSTEM RELATIONSHIP AND ESSENTIALITY Support 25 th ID and Joint EOD operations		
10. REPLACEMENT INFORMATION NA		
11. RELATED ANALYSIS AND TEST DATA NA		
12. NUMBER OF MOBILE UNITS 100		
13. GEOGRAPHICAL AREA FOR a. STAGE 2 NA b. STAGE 3 NA c. STAGE 4 US & P and Iraq		
14. LINE DIAGRAM See Page(s) 5	15. SPACE SYSTEMS See Page(s) NA	
16. TYPE OF SERVICE(S) FOR STAGE 4 Mobile / Fixed	17. STATION CLASS(ES) FOR STAGE 4 MO / FX	
18. REMARKS Item 7: System consist of 2 Micro Air Vehicles and 1 Ground Control Station		
DOWNGRADING INSTRUCTIONS N/A	CLASSIFICATION Unclassified	