

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION	DATE 04/09/99	Form Approved OMB No. 0704-0188
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DOD GENERAL INFORMATION			
TO		FROM	
1. APPLICATION TITLE HiFAR - High Frequency Array Radar			
2. SYSTEM NOMENCLATURE HiFAR-001			
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) Four Frequencies 3-30 MHz			
b. EMISSION DESIGNATOR(S) 200KM1N			
5. TARGET STARTING DATE FOR SUBSEQUENT STAGES			
a. STAGE 2 05/01/99		b. STAGE 3 2000	c. STAGE 4 2001
6. EXTENT OF USE Intermittent			
7. GEOGRAPHICAL AREA FOR			
a. STAGE 2 Santa Cruz, CA; within 2 km of coasts of CA, VA, NC			
b. STAGE 3 TBD			
c. STAGE 4 TBD			
8. NUMBER OF UNITS			
a. STAGE 2 1		b. STAGE 3 3	c. STAGE 4 TBD
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT 1			
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☐ a. SUPERSEDED J/F 12/ ☐ b. RELATED J/F 12/		☐ a. YES ☒ b. NO ☐ c. N/Avail	
12. NAMES AND TELEPHONE NUMBERS			
a. PROGRAM MANAGER Dr. Dennis Trizna, Office of Naval Research		(1) COMMERCIAL 404-7891	(2) AUTOVON
b. PROJECT ENGINEER James S. Roush, METRATEK, Inc.		(1) COMMERCIAL (703) 293-9040	(2) AUTOVON
13. REMARKS HiFAR is a research tool that will be used to generate synoptic measurements of sea characteristics and currents over a 60-100 km x 60 degree sector. See attachment #1, page 7 for selectable frequencies			
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TRANSMITTER EQUIPMENT CHARACTERISTICS			
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. HiFAR Transmitter		2. MANUFACTURER'S NAME METRATEK, Inc.	
3. TRANSMITTER INSTALLATION Building		4. TRANSMITTER TYPE Pulsed RF	
5. TUNING RANGE 4 fixed frequencies (3-30 MHz)		6. METHOD OF TUNING synthesizer locked to Crystal Oscillator	
7. RF CHANNELING CAPABILITY 3 MHz Continuous		8. EMISSION DESIGNATOR(S) 200KMIN	
9. FREQUENCY TOLERANCE 0.2 ppm			
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 200 kHz		a. -3 dB 200 KHz	
		b. -20 dB 500 KHz	
14. MODULATION TECHNIQUES AND CODING Four Frequency Pulsed Waveform 5 microsec. uncoded Pulse 40 microsec. phase coded Pulse		c. -40 dB 820 KHz	
		d. -60 dB 1.2 MHz	
		e. OC-BW 208 KHz	
16. PRE-EMPHASIS (X one) ☐ a. YES ☒ b. NO		15. MAXIMUM MODULATION FREQUENCY N/A	
		17. DEVIATION RATIO 0/180 Degree Pseudo-Random Phase shift	
19. POWER a. MEAN - b. PEP 300 W		18. PULSE CHARACTERISTICS a. RATE 2000-5000 pps b. WIDTH 5 and 40 usec c. RISE TIME 1 usec d. FALL TIME 1 usec e. COMP RATIO 8	
20. OUTPUT DEVICE Transmitter		21. HARMONIC LEVEL a. 2ND -60 dB b. 3RD -60 dB c. OTHER 60 dB	
22. SPURIOUS LEVEL -60 dB			
23. FCC TYPE ACCEPTANCE NO.			
24. REMARKS Tuning Range Fixed by Software Control, see attachment #1, page 7 for selectable frequencies. One Transmitter Station at Each of Two Sites			
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RECEIVER EQUIPMENT CHARACTERISTICS						
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. HiFAR, Receiver			2. MANUFACTURER'S NAME METRATEK, Inc.			
3. RECEIVER INSTALLATION On Ground Antenna, Near Antenna			4. RECEIVER TYPE Multichannel Superheterodyne			
5. TUNING RANGE 3-30 MHz			6. METHOD OF TUNING Synthesizer locked to crystal oscillator			
7. RF CHANNELING CAPABILITY Four Fixed Frequencies			8. EMISSION DESIGNATOR(S) 200KMIN			
9. FREQUENCY TOLERANCE 0.2 ppm						
10. IF SELECTIVITY		1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)	
a. -3 dB		200 KHz	200 KHz		☒ CALCULATED ☐ MEASURED	
b. -20 dB		434 KHz	480 KHz		a. -3 dB 400 KHz	
					b. -20 dB 961 KHz	
c. -60 dB		916 MHz	1.28 MHz		c. -60 dB 2.5 MHz	
12. IF FREQUENCY			13. MAXIMUM POST DETECTION FREQUENCY 200 KHz			
a. 1ST 1 MHz			14. MINIMUM POST DETECTION FREQUENCY 0			
b. 2ND DC - 200KHz						
c. 3RD N/A						
15. OSCILLATOR TUNED		1ST	2ND	3RD	16. MAXIMUM BIT RATE	
a. ABOVE TUNED FREQUENCY					17. SENSITIVITY	
b. BELOW TUNED FREQUENCY		X			a. SENSITIVITY -128 dBm	
c. EITHER ABOVE OR BELOW TUNED FREQUENCY					b. CRITERIA 12 dB SINAD	
18. DE-EMPHASIS (<i>X one</i>)				c. NOISE FIG N/A dB		
☐ a. YES ☒ b. NO				d. NOISE TEMP N/A Kelvin		
19. IMAGE REJECTION 60 dB				20. SPURIOUS REJECTION greater than 60 dB		
21. REMARKS Computer tuned and locked to crystal Oscillator. (see attchment #1, page 7 for selectable frequencies)						
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ANTENNA EQUIPMENT CHARACTERISTICS			
1. ☒ a. TRANSMITTING ☐ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING			
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. HiFAR, Transmitter Antenna		3. MANUFACTURER'S NAME METRATEK, INC.	
4. FREQUENCY RANGE Four Frequencies		5. TYPE Two, Dual-Band Vertical Monopoles	
6. POLARIZATION V		7. SCAN CHARACTERISTICS	
8. GAIN		a. TYPE N/A	
a. MAIN BEAM 2 dB		b. VERTICAL SCAN N/A	
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 OMN1		(1) SECTOR SCANNED N/A	
b. VERTICAL 78 Degrees		(2) SCAN RATE N/A	
		d. SECTOR BLANKING (X one)	
		☐ (1) YES ☒ (2) NO	
10. REMARKS See attchment #1, page 7 for selctable frequencies.			
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ANTENNA EQUIPMENT CHARACTERISTICS			
1. ☐ a. TRANSMITTING ☒ b. RECEIVING ☐ c. TRANSMITTING AND RECEIVING			
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. HiFAR Revceive Antenna		3. MANUFACTURER'S NAME METRATEK, Inc.	
4. FREQUENCY RANGE Four Frequencies		5. TYPE 16 - Element Linear Array of Loop Antenna Elements	
6. POLARIZATION V		7. SCAN CHARACTERISTICS	
8. GAIN		a. TYPE Multiple Simultaneous Receive Array	
a. MAIN BEAM -6 to + 3 dB		b. VERTICAL SCAN None	
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 15 - 67 degrees		(1) SECTOR SCANNED ± 60 Degrees	
b. VERTICAL 45 degrees		(2) SCAN RATE Simultaneous	
		d. SECTOR BLANKING (X one)	
		☐ (1) YES ☒ (2) NO	
10. REMARKS See Atttchment #1, page 7 for selcetable frequencies			
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NTIA GENERAL INFORMATION			
1. APPLICATION TITLE HiFAR - High Frequency Array Radar			
2. SYSTEM NOMENCLATURE HiFAR-001			
3. STAGE OF ALLOCATION (<i>X one</i>) ☐ a. STAGE 1 - CONCEPTUAL ☒ b. STAGE 2 - EXPERIMENTAL ☐ c. STAGE 3 - DEVELOPMENTAL ☐ d. STAGE 4 - OPERATIONAL			
4. FREQUENCY REQUIREMENTS a. FREQUENCY(IES) Four Frequencies (see remarks) b. EMISSION DESIGNATOR(S) 200KM1N			
5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) (<i>X one</i>) ☐ a. YES ☒ b. NO Synoptic Measurements of Sea Characteristics and Currents over a 60-100 km x 60 degree sector.			
6. INFORMATION TRANSFER REQUIREMENTS None			
7. ESTIMATED INITIAL COST OF THE SYSTEM \$ 600,000.00			
8. TARGET DATE FOR a. APPLICATION APPROVAL June 01, 1999 b. SYSTEM ACTIVATION August 1, 1999 c. SYSTEM TERMINATION August 1, 2003			
9. SYSTEM RELATIONSHIP AND ESSENTIALITY HiFAR is a research tool that will be used to generate synoptic measurements of sea characteristics. Future applications include monitoring of Naval Traffic and commercial port activity.			
10. REPLACEMENT INFORMATION N/A			
11. RELATED ANALYSIS AND TEST DATA STTR- Topic N97-T004			
12. NUMBER OF MOBILE UNITS None			
13. GEOGRAPHICAL AREA FOR a. STAGE 2 Santa Cruz, CA, within 2 km of Coast of CA, VA, NC b. STAGE 3 TBD c. STAGE 4 TBD			
14. LINE DIAGRAM (See Page(s)) Page 8, attachment #2		15. SPACE SYSTEMS (See Page(s)) N/A	
16. TYPE OF SERVICE(S) FOR STAGE 4 None		17. STATION CLASS(ES) FOR STAGE 4 XC	
18. REMARKS See attachment #1 for selectable frequencies (page 7)			
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SELECTABLE FREQUENCIES

FREQUENCY kHz	POWER			EMISSION	MODULATING SIGNAL	NECESSARY BANDWIDTH kHz
(A)	(B)	(C)	(D)	(E)	(F)	(G)
4800.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
4830.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
6780.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
7380.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
7820.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
9150.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
9180.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
10150.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
10180.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
12050.00000-						
12230.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
13380.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
13440.00000-						
13600.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
13800.00000-						
14000.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
14530.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
14560.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
14590.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
16590.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
16620.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
18120.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
18150.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
21770.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
21800.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
22800.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
25200.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
25260.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
27600.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
27630.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
27660.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
29720.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
29750.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200
29780.00000	300W	300 W	PEAK	200KM1N	PULSED/PHASE	200

SYSTEM BLOCK DIAGRAM