

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION UNCLASSIFIED	DATE 04 Mar 2019	J/F 12 No. Page No. 1
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DOD GENERAL INFORMATION			
TO Yuma Proving Ground Spectrum Management Office		FROM Fortem Technologies 2015 W Grove Parkway Pleasant Grove, UT 84062	
1. APPLICATION TITLE Fortem TrueView Radar model R20 on 16.2-16.6 GHz			
2. SYSTEM NOMENCLATURE TrueView R20 16.2-16.6GHz			
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): See 'Remarks' block			
b. EMISSION DESIGNATOR(S):			
5. TARGET STARTING DATE FOR SUBSEQUENT STAGES			
a. STAGE 2:		b. STAGE 3: 11 Mar 2019	
c. STAGE 4:			
6. EXTENT OF USE Radar operations during DARPA Mobile Force Protection testing at YPG			
7. GEOGRAPHICAL AREA FOR			
a. STAGE 2:			
b. STAGE 3: YPG			
c. STAGE 4:			
8. NUMBER OF UNITS			
a. STAGE 2		b. STAGE 3 5	
c. STAGE 4			
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT 4			
10. OTHER J/F 12 APPLICATION NUMBER(S) TO BE a. SUPERSEDED J/F 12/ b. RELATED J/F 12/		11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11? ☐ a. YES ☐ b. NO ☒ c. NAvail	
12. NAMES AND TELEPHONE NUMBERS			
a. PROGRAM MANAGER Spencer Prows		(1) COMMERCIAL PHONE 608-358-8051	(2) DSN
b. PROJECT ENGINEER George Mayor		(1) COMMERCIAL PHONE 352-339-5272	(2) DSN
13. REMARKS Operating during test conducted by CRAM Office. Gov't POC: Hi-Sing Silen (hi-sing.e.silen.civ@mail.mil)			
a. FREQUENCY(IES):		16.2 - 16.6 GHz	
b. EMISSION DESIGNATOR(S):		300MF0N	150MF0N 75MF0N

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30MF0N				
a. FREQUENCY(IES):				
b. EMISSION DESIGNATOR(S):				
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TRANSMITTER EQUIPMENT CHARACTERISTICS			
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. TrueView R20		2. MANUFACTURER'S NAME Fortem Technologies, Inc.	
3. TRANSMITTER INSTALLATION Aircraft		4. TRANSMITTER TYPE FMCW	
5. TUNING RANGE 16.2 GHz -16.6 GHz		6. METHOD OF TUNING VCO, Voltage Controlled Oscillator	
7. RF CHANNELING CAPABILITY:		8. EMISSION DESIGNATOR(S)	
a. Lowest channel/frequency N/A		Single 300MF0N, 150MF0N, 75MF0N, 30MF0N	
b. Tuning increments N/A			
c. Number of channels N/A			
d. Number of frequencies required for operation N/A		12. EMISSION BANDWIDTH (x and complete as applicable)	
e. Minimum Frequency Separation N/A		☒ CALCULATED ☐ MEASURED	
9. FREQUENCY TOLERANCE 0.028 ppm		a. -3 dB 158 MHz of occupancy	
10. FILTER EMPLOYED (X one) ☒ a. Yes ☐ b. No		b. -20 dB 171 MHz of occupancy	
11. SPREAD SPECTRUM (X one) ☐ a. Yes ☒ b. No		c. -40 dB 198 MHz of occupancy	
		d. -60 dB 228 MHz of occupancy	
		e. OC-BW 150 MHz	
13. MAXIMUM BIT RATE N/A		15. MODULATION FREQUENCY ☐ a. Maximum ☐ b. Minimum	
14. MODULATION TECHNIQUES AND CODING FMCW Ramp (See remarks below)		16. PRE-EMPHASIS (X one) ☐ a. Yes ☐ b. No	
17. DEVIATION RATIO		18. PULSE CHARACTERISTICS	
19. POWER (X one) ☒ a. MEAN ☐ b. PEP		a. RATE 250 us	
Mean 2.3 W		b. WIDTH 237.5 us	
		c. RISE TIME 215 us	
		d. FALL TIME 22.5 us	
		e. COMP RATIO 150,000	
20. OUTPUT DEVICE Field Effect Transistor		21. HARMONIC LEVEL	
22. SPURIOUS LEVEL -46.91 dB		a. 2ND -36.7 dB	
23. FCC TYPE ACCEPTANCE NO.		b. 3RD < -50dB	
		c. OTHER	
24. NAVSTAR GPS BAND MEASUREMENT			
a. GPS WIDEBAND EMISSION LEVEL (1164-1240 MHz): dBw/MHz N/A			
b. GPS WIDEBAND EMISSION LEVEL (1559-1610 MHz): dBw/MHz N/A			
c. GPS NARROWBAND EMISSION LEVEL (1164-1240 MHz): dBw N/A			
d. GPS NARROWBAND EMISSION LEVEL (1559-1610 MHz): dBw N/A			
e. PULSE SYSTEMS N/A			
25. REMARKS Data was from both measured and calculated estimates			
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RECEIVER EQUIPMENT CHARACTERISTICS					
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. TrueView R20			2. MANUFACTURER'S NAME Fortem Technologies, Inc.		
3. RECEIVER INSTALLATION Aircraft			4. RECEIVER TYPE Homodyne		
5. TUNING RANGE 16.2 GHz - 16.6 GHz			6. METHOD OF TUNING Voltage Controlled Oscillator		
7. RF CHANNELING CAPABILITY:			8. EMISSION DESIGNATOR(S)		
a. Lowest channel/frequency			150MF0N		
b. Tuning increments					
c. Number of channels					
d. Number of frequencies required for operation					
e. Minimum Frequency Separation					
9. FREQUENCY TOLERANCE 0.028 ppm					
10. IF SELECTIVITY	1ST	2ND	3RD	11. RF SELECTIVITY (<i>X and complete as applicable</i>)	
a. -3 dB	N/A			☐ CALCULATED ☒ MEASURED	
b. -20 dB	N/A			a. -3 dB 158 MHz of occupied bandwidth	
c. -60 dB	N/A			b. -20 dB 171 MHz of occupied bandwidth	
				c. -60 dB 228 MHz of occupied bandwidth	
12. IF FREQUENCY				d. PRESELECTION TYPE None	
a. 1ST N/A				13. MAXIMUM POST DETECTION FREQUENCY N/A	
b. 2ND N/A				14. MINIMUM POST DETECTION FREQUENCY N/A	
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				a. SENSITIVITY -90 dBm	
c. EITHER ABOVE OR BELOW TUNED FREQUENCY				b. CRITERIA Min Detectable Signal	
18. DE-EMPHASIS (<i>X one</i>)				c. NOISE FIG 2.5 dB	
☐ a. Yes ☒ b. No				d. NOISE TEMP N/A Kelvin	
19. IMAGE REJECTION N/A				20. SPURIOUS REJECTION N/A	
21. ADJACENT CHANNEL SELECTIVITY (dB)		22. INTERMODULATION REJECTION LEVEL (dB)		23. CONDUCTED UNDESIRE EMISSIONS (dBm)	
24. REMARKS Sensitivity assumes a minimum detection signal (MDS) 13.2dB above the noise floor.					
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ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☐ a. TRANSMITTING	☒ b. RECEIVING	☐ c. TRANSMITTING AND RECEIVING
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. TrueView R20 (RX Antenna)		3. MANUFACTURER'S NAME Fortem Technologies, Inc.
4. FREQUENCY RANGE 16.2 - 16.6 GHz		5. TYPE Microstrip Patch (2 x 2)
6. POLARIZATION V		7. SCAN CHARACTERISTICS
8. GAIN		a. TYPE Horizontal
a. MAIN BEAM 9 dBi		b. VERTICAL SCAN
b. 1ST MAJOR SIDE LOBE AND ANGULAR DISPLACEMENT -15 dBi at 45°		(1) MAX ELEV N/A
		(2) MIN ELEV N/A
		(3) SCAN RATE N/A
9. BEAMWIDTH		c. HORIZONTAL SCAN
a. HORIZONTAL 25°		(1) SECTOR SCANNED -20° to 20°
		(2) SCAN RATE 200
b. VERTICAL 25°		d. SECTOR BLANKING (x one)
		☐ a. Yes ☒ b. No
10. REMARKS		
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ANTENNA EQUIPMENT CHARACTERISTICS		
1. ☒ a. TRANSMITTING	b. RECEIVING ☐	c. TRANSMITTING AND RECEIVING ☐
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. TrueView R20 (TX antenna)		3. MANUFACTURER'S NAME Fortem Technologies
4. FREQUENCY RANGE 16.2 - 16.6 GHz		5. TYPE Microstrip Patch (3 x 3)
6. POLARIZATION V		7. SCAN CHARACTERISTICS
8. GAIN		a. TYPE Horizontal
a. MAIN BEAM 10.8 dBi		b. VERTICAL SCAN
b. 1ST MAJOR SIDE LOBE AND ANGULAR DISPLACEMENT -14 dBi at 30°		(1) MAX ELEV NA
		(2) MIN ELEV NA
		(3) SCAN RATE NA
9. BEAMWIDTH		c. HORIZONTAL SCAN
a. HORIZONTAL 17°		(1) SECTOR SCANNED -20° to 20°
		(2) SCAN RATE 200
b. VERTICAL 17°		d. SECTOR BLANKING (x one)
		☐ a. Yes ☒ b. No
10. REMARKS		
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NTIA GENERAL INFORMATION				
1. APPLICATION TITLE Fortem TrueView Radar model R20 16.2-16.6GHz				
2. SYSTEM NOMENCLATURE TrueView R20 16.2-16.6GHz				
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):		See 'Remarks' block		
b. EMISSION DESIGNATOR(S):				
5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (NSEP USE) (X one) ☒ a. YES ☐ b. NO Small SWaP-C radar to be mounted on sUAS platform. Radar used for counter-UAS and general aviation.				
6. INFORMATION TRANSFER REQUIREMENTS N/A				
7. ESTIMATED INITIAL COST OF THE SYSTEM \$15K per Unit				
8. TARGET DATE FOR				
a. APPLICATION APPROVAL 11 Mar 2019		b. SYSTEM ACTIVATION 11 Mar 2019		c. SYSTEM TERMINATION 21 Mar 2019
9. SYSTEM RELATIONSHIP AND ESSENTIALITY Critical for detecting and countering sUAS threats in all weather/daylight conditions Essential component for determining performance of DARPA Mobile Force Protection system under test				
10. REPLACEMENT INFORMATION				
11. RELATED ANALYSIS AND TEST DATA				
12. NUMBER OF MOBILE UNITS				
13. GEOGRAPHICAL AREA FOR				
a. STAGE 2:				
b. STAGE 3: YPG				
c. STAGE 4:				
14. LINE DIAGRAM (See Page(s))		15. SPACE SYSTEMS (X and complete SPACE SYSTEMS DATA field if applicable) ☐ Yes ☒ No		
16. TYPE OF SERVICE(S) FOR STAGE 4 Radiodetermination		17. STATION CLASS(ES) FOR STAGE 4 Radiolocation		
18. REMARKS				
a. FREQUENCY(IES):		16.2 - 16.6 GHz		
b. EMISSION DESIGNATOR(S):		150MF0N		

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FOREIGN COORDINATION GENERAL INFORMATION				
1. APPLICATION TITLE				
2. SYSTEM NOMENCLATURE				
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):				
b. EMISSION DESIGNATOR(S):				
5. PROPOSED OPERATING LOCATIONS OUTSIDE US&P				
6. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS				
7. INFORMATION TRANSFER REQUIREMENTS				
8. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT				
9. REPLACEMENT INFORMATION				
10. LINE DIAGRAM (<i>See Page(s)</i>)		11. SPACE SYSTEMS <i>(X and complete SPACE SYSTEMS DATA field if applicable)</i> ☐ Yes ☐ No		
		Attach Diagram		
12. PROJECTED OPERATIONAL DEPLOYMENT DATE				
13. REMARKS				
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