

SR Hawk Radar FCC STA License Request

1 Purpose of Operation

Raytheon Network Centric Systems (NCS) to develop and demonstrate A mobile surveillance system based on commercial-off-the-shelf radar (DRS MSTAR) and electro-optical/infrared cameras to monitor international borders. **This testing will conducted at New Mexico State University**

- File Number: 0455-EX-ST-2011
- Class of Station: MO
- Station Locations: MOBILE
- Effective: 07/26/2011
- Expiration: 01/26/2012

2 STA Explanation

As detailed in paragraph 1 above, Raytheon seeks this STA in order to allow testing and technical demonstrations of this Radar system for mobile surveillance system based on commercial-off-the-shelf radar (DRS MSTAR).

3 Transmitter Characteristics;

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TRANSMITTER EQUIPMENT CHARACTERISTICS			
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) AN/GPN-30 DASR Transmitter		2. MANUFACTURER'S NAME (U) Raytheon Company DASR	
3. TRANSMITTER INSTALLATION (U) Fixed Site		4. TRANSMITTER TYPE (U) Pulsed Doppler Radar	
5. TUNING RANGE (U) 2702.60 MHz - 2897.5 MHz		6. METHOD OF TUNING (U) Crystal Controlled	
7. RF CHANNELING CAPABILITY (U) None (Fixed Crystals)		8. EMISSION DESIGNATORS (U) 2M80Q3N (U) 5M10P0N (U)	
9. FREQUENCY TOLERANCE (U) 30 ppm		12. EMISSION BANDWIDTH ☐ CALCULATED ☒ MEASURED	
10. FILTER EMPLOYED (U) ☒ a. YES ☐ b. NO		a. -3 dB (U) 0.9 MHz (U) 0.7 MHz (U)	
11. SPREAD SPECTRUM (U) ☐ a. YES ☒ b. NO		b. -20 dB (U) 1.8 MHz (U) 4.1 MHz (U)	
13. MAXIMUM BIT RATE (U) NA		c. -40 dB (U) 3.3 MHz (U) 9.8 MHz (U)	
14. MODULATION TECHNIQUES AND CODING (U) Alternates between pulse and Non-Linear FM. In NLFM, chirps across 4 MHz bandwidth during 89 us pulse.		d. -60 dB (U) 6.4 MHz (U) 20.0 MHz (U)	
16. PRE-EMPHASIS (U) ☐ a. YES ☒ b. NO		e. OC-BW (U) 2.8 MHz (U) 5.6 MHz (U)	
19. POWER		15. MAXIMUM MODULATION FREQUENCY (U) NA	
a. MEAN (U) 2.1 KW (U) 0.021 KW (U)		17. DEVIATION RATIO (U) NA	
b. PEP (U) 25.0 KW (U) 25. KW (U)		18. PULSE CHARACTERISTICS	
20. OUTPUT DEVICE (U) Solid State Transistors, Class C		a. RATE (U) 700 pps (U) 700 pps (U)	
22. SPURIOUS LEVEL (U) -80 dB		- 1000 pps (U)	
23. FCC TYPE ACCEPTANCE NO. (U) NA		b. WIDTH (U) 89 us (U) 1.45 us (U)	
24. REMARKS (U)		c. RISE TIME (U) 0.7 us (U) 0.6 us (U)	
7. Crystal controlled. Two frequency pairs are required for each radar system. The two frequency pairs may be selected from anywhere within the transmitter's tuning range, but must be separated by at least 30 MHz. Each pair radiates two frequencies that are +/- 0.5 MHz offset from the carrier. This results in four frequencies with the emission bandwidths identified in block 12. (See page 12 for additional information.) 8/12/18/19. Left column describes non-linear FM (Q3N) waveform, the right column details the simple FM pulse (P0N) waveform. 10. Harmonic filter has a 0.12 dB loss in band and an attenuation of 29 dB at the second harmonic. 14. The measured bandwidth of the NLFM pulse at the -20 dB point is 1.8		d. FALL TIME (U) 1.0 us (U) 0.32 us (U)	
		e. COMP RATIO (U) 89 (U) 1 (U)	
		21. HARMONIC LEVEL	
		a. 2nd (U) -74 dB	
		b. 3rd (U) -80 dB	
		c. OTHER (U) -80 dB	
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S/N 0102-LF-001-4941

4 Receiver Characteristics

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RECEIVER EQUIPMENT CHARACTERISTICS											
1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) AN/GPN-30 DASR Receiver						2. MANUFACTURER'S NAME (U) Raytheon Company DASR					
3. RECEIVER INSTALLATION (U) Fixed Site						4. RECEIVER TYPE (U) Triple Stage Superhetrodyne					
5. TUNING RANGE (U) 2702.60 MHz - 2897.40 MHz						6. METHOD OF TUNING (U) Crystal Controlled					
7. RF CHANNELING CAPABILITY (U) None (Fixed Crystals)						8. EMISSION DESIGNATORS (U) 2M80Q3N 5M10P0N					
9. FREQUENCY TOLERANCE (U) 10 ppm						11. RF SELECTIVITY ☐ CALCULATED ☒ MEASURED					
10. IF SELECTIVITY		1st (U)	2nd (U)	3rd (U)	a. -3 dB (U) 280.6 MHz						
a. -3 dB		15 MHz	3.2 MHz	1.06 MHz	b. -20 dB (U) 357.1 MHz						
b. -20 dB		23 MHz	4.5 MHz	1.66 MHz	c. -60 dB (U) 505.9 MHz						
c. -60 dB		69 MHz	9.1 MHz	3.01 MHz	d. Preselection Type (U) NA						
12. IF FREQUENCY						13. MAXIMUM POST DETECTION FREQUENCY (U) NA					
a. 1st (U) 524.32 MHz						14. MINIMUM POST DETECTION FREQUENCY (U) NA					
b. 2nd (U) 27.18 MHz						16. MAXIMUM BIT RATE (U) NA					
c. 3rd (U) 3.88 MHz						17. SENSITIVITY					
15. OSCILLATOR TUNED		1st (U)	2nd (U)	3rd (U)	a. SENSITIVITY (U) -110 dBm						
a. ABOVE TUNED FREQUENCY		X		X	b. CRITERIA (U) Minimum Discernible Signal (MDS)						
b. BELOW TUNED FREQUENCY			X		c. NOISE FIG (U) 2.9 dB						
c. EITHER ABOVE OR BELOW THE FREQUENCY					d. NOISE TEMP (U) 339 Kelvin						
18. DE-EMPHASIS (U) ☒ a. YES ☐ b. NO						20. SPURIOUS REJECTION (U) 65 dB					
19. IMAGE REJECTION (U) 60 dB						21. REMARKS (U)					
21. NOTE: Local oscillator radiation is -75 dBm. System is designed to suppress pulsed interference with the following characteristics: Peak I/N: 75 dB at the IF prior to pulse compression Pulsewidth: 0.5 - 4.0 microsec PRF: 100 to 2000 pps											
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5 Antenna Characteristics

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ANTENNA EQUIPMENT CHARACTERISTICS			
1. (U) ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING			
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) AN/GPN-30 DASR Antenna		3. MANUFACTURER'S NAME (U) Andrew Antenna Corp DASR	
4. FREQUENCY RANGE (U) 2700 MHz - 2900 MHz		5. TYPE (U) Parabolic Reflector	
6. POLARIZATION (U) Circular or Linear		7. SCAN CHARACTERISTICS	
8. GAIN		a. TYPE (U) MECHANICAL	
a. MAIN BEAM (U) 34 dBi		b. VERTICAL SCAN (U) Adjustable Mount	
b. 1st MAJOR SIDE LOBE (U) 9.5 dBi @ 3.5 deg		(1) Max Elev (U) +5.0 deg	
9. BEAMWIDTH		(2) Min Elev (U) -3.0 deg	
a. HORIZONTAL (U) 1.45 deg		(3) Scan Rate (U) NA	
b. VERTICAL (U) 4.8 deg		c. HORIZONTAL SCAN (U) Mechanical	
10. REMARKS (U)		(1) Sector Scanned (U) 360	
		(2) Scan Rate (U) 12.5 RPM	
		d. SECTOR BLANKING (U) ☒ (1) YES ☐ (2) NO	
5. Doubly-Curved reflector, 5 meters wide by 2.75 meters tall 6. Operator selectable. 7. Transmitter control inhibits RF output in designated sectors 8. Antenna meets NTIA RSEC Criteria D specifications: Median antenna gain is less than -10 dBi.			
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