SR Hawk Radar FCC STA License Request

1 Purpose of Operation

Raytheon Network Centric Systems (NCS) to research develop and demonstrate A mobile surveillance system based on commercial-off-the-shelf radar (ELTA Systems Ltd EL/M- 2112 Ground Master) and electro-optical/infrared cameras to monitor international borders.

- File Number: 0426-EX-ST-2011
- Class of Station: MO
- Station Locations: MOBILE
- Effective: 07/15/2011
- Expiration: 01/15/2012

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 (ELTA Systems Ltd EL/M- 2112 Ground Master).

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
	8. EMISSION DESIGNATORS (U) 2M80Q3N (U) 5M10P0N (U)
7. RF CHANNELING CAPABILITY (U) None (Fixed Crystals)	**12. EMISSION BANDWIDTH** [ ] CALCULATED [X] MEASURED
9. FREQUENCY TOLERANCE (U) 30 ppm	a. -3 dB (U) 0.9 MHz (U) 0.7 MHz (U)
10. FILTER EMPLOYED (U) [X] a. YES [ ] b. NO	b. -20 dB (U) 1.8 MHz (U) 4.1 MHz (U)
	c. -40 dB (U) 3.3 MHz (U) 9.8 MHz (U)
11. SPREAD SPECTRUM (U) [ ] a. YES [X] b. NO	d. -60 dB (U) 6.4 MHz (U) 20.0 MHz (U)
	e. OC-BW (U) 2.8 MHz (U) 5.6 MHz (U)
13. MAXIMUM BIT RATE (U) NA	**15. MAXIMUM MODULATION FREQUENCY** (U) NA
14. MODULATION TECHNIQUES AND CODING (U) Alternates between pulse and Non-Linear FM. In NLFM, chirps across 4 MHz bandwidth during 89 uS pulse.	**17. DEVIATION RATIO** (U) NA
	18. PULSE CHARACTERISTICS
16. PRE-EMPHASIS (U) [ ] a. YES [X] b. NO	a. RATE (U) 700 pps - 1000 pps (U) 700 pps - 1000 pps (U)
19. POWER	b. WIDTH (U) 89 us (U) 1.45 us (U)
a. MEAN (U) 2.1 KW (U) 0.021 KW (U)	c. RISE TIME (U) 0.7 us (U) 0.6 us (U)
b. PEP (U) 25.0 KW (U) 25. KW (U)	d. FALL TIME (U) 1.0 us (U) 0.32 us (U)
	e. COMP RATIO (U) 89 (U) 1 (U)
20. OUTPUT DEVICE (U) Solid State Transistors, Class C	**21. HARMONIC LEVEL**
	a. 2nd (U) -74 dB
22. SPURIOUS LEVEL (U) -80 dB	b. 3rd (U) -80 dB
	c. OTHER (U) -80 dB
23. FCC TYPE ACCEPTANCE NO. (U) NA	

24. REMARKS (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

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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 Superheterodyne
5. TUNING RANGE (U) 2702.60 MHz - 2897.40 MHz	6. METHOD OF TUNING (U) Crystal Controlled
	8. EMISSION DESIGNATORS (U) 2M80Q3N 5M10P0N
7. RF CHANNELING CAPABILITY (U) None (Fixed Crystals)	11. RF SELECTIVITY [ ] CALCULATED [X] MEASURED
9. FREQUENCY TOLERANCE (U) 10 ppm	a. -3 dB (U) 280.6 MHz
	b. -20 dB (U) 357.1 MHz
	c. -60 dB (U) 505.9 MHz
	d. Preselection Type (U) NA
	13. MAXIMUM POST DETECTION FREQUENCY (U) NA
12. IF FREQUENCY a. 1st (U) 524.32 MHz b. 2nd (U) 27.18 MHz c. 3rd (U) 3.88 MHz	14. MINIMUM POST DETECTION FREQUENCY (U) NA
	16. MAXIMUM BIT RATE (U) NA
	17. SENSITIVITY
	a. SENSITIVITY (U) - 110 dBm
	b. CRITERIA (U) Minimum Discernible Signal (MDS
	c. NOISE FIG (U) 2.9 dB
	d. NOISE TEMP (U) 339 Kelvin
19. IMAGE REJECTION (U) 60 dB	20. SPURIOUS REJECTION (U) 65 dB

10. IF SELECTIVITY	1st (U)	2nd (U)	3rd (U)
a. -3 dB	15 MHz	3.2 MHz	1.06 MHz
b. -20 dB	23 MHz	4.5 MHz	1.66 MHz
c. -60 dB	69 MHz	9.1 MHz	3.01 MHz

15. OSCILLATOR TUNED	1st (U)	2nd (U)	3rd (U)
a. ABOVE TUNED FREQUENCY	X		X
b. BELOW TUNED FREQUENCY		X	
c. EITHER ABOVE OR BELOW THE FREQUENCY			

18. DE-EMPHASIS
(U) [X] a. YES [ ] b. NO

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 [X] 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
	5. TYPE (U) Parabolic Reflector
4. FREQUENCY RANGE (U) 2700 MHz - 2900 MHz	7. SCAN CHARACTERISTICS a. TYPE (U) MECHANICAL
	b. VERTICAL SCAN (U) Adjustable Mount
6. POLARIZATION (U) Circular or Linear	(1) Max Elev (U) +5.0 deg
8. GAIN	(2) Min Elev (U) -3.0 deg
a. MAIN BEAM (U) 34 dBi	(3) Scan Rate (U) NA
	c. HORIZONTAL SCAN (U) Mechanical
b. 1st MAJOR SIDE LOBE (U) 9.5 dBi @ 3.5 deg	(1) Sector Scanned (U) 360
9. BEAMWIDTH	(2) Scan Rate (U) 12.5 RPM
a. HORIZONTAL (U) 1.45 deg	d. SECTOR BLANKING (U) [X] (1) YES [ ] (2) NO
b. VERTICAL (U) 4.8 deg	

10. REMARKS (U)

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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