APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION

CLASSIFICATION	DATE	FORM APPROVED OMB No. 0704-0188
UNCLASSIFIED	11 Sept 2007	Page 1 of 7 Pages

DOD GENERAL INFORMATION

TO Department of the Army
Army Spectrum Management, NETCOM
2461 Eisenhower Avenue Suite 1200
Alexandria, VA 22331-1400

FROM US Army CECOM
Information & Intelligence Warfare Directorate
Fort Monmouth, NJ 07703

1. APPLICATION TITLE
UHF Synthetic Aperture Radar (UHFSAR)

2. SYSTEM NOMENCLATURE
UHFSAR

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) 235-445 MHz
b. EMISSION DESIGNATOR(S) 210MM3N

5. TARGET STARTING DATE FOR SUBSEQUENT STAGES

a. STAGE 2	b. STAGE 3	c. STAGE 4
As Soon As Possible	N/A	N/A

6. EXTENT OF USE
5 hours weekly for one year.

7. GEOGRAPHICAL AREA FOR
a. STAGE 2 300 KM radius of Phoenix, AZ
b. STAGE 3 N/A
c. STAGE 4 N/A

8. NUMBER OF UNITS

a. STAGE 2	b. STAGE 3	c. STAGE 4
1	N/A	N/A

9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT 1

10 OTHER J/F 12 APPLICATION NUMBER(S) TO BE
☐ a. SUPERSEDED J/F 12/
☒ b. RELATED J/F 12/ 7560

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	(1) COMMERCIAL	(2) AUTOVON
Harmon "Kirk" Willey	(732) 427-2663	
b. PROJECT ENGINEER	**(1) COMMERCIAL**	**(2) AUTOVON**
Graydon Lutes	(732) 532-6110	

13. REMARKS

Item 6: Radar will be installed on Lockheed Martin Sabreliner 60 aircraft.

DOWNGRADING INSTRUCTIONS	CLASSIFICATION	
N/A	UNCLASSIFIED	

DD Form 1494, AUG 96

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
UHF Transmitter, 5648309-001

2. MANUFACTURER'S NAME
Comtech PST

3. TRANSMITTER INSTALLATION
See Remarks Page 1

4. TRANSMITTER TYPE
Compressed Pulse Radar

5. TUNING RANGE
235-445 MHz

6. METHOD OF TUNING
Synthesizer

7. RF CHANNELING CAPABILITY
(See Remarks)

8. EMISSION DESIGNATOR(S)
210MM3N

9. FREQUENCY TOLERANCE
50 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
N/A

14. MODULATION TECHNIQUES AND CODING
210 MHz maximum linear frequency modulation during pulse.
(See Remarks)

a. -3 dB	210 MHz
b. -20 dB	235 MHz
c. -40 dB	268 MHz
d. -60 dB	305 MHz
e. OC-BW	235 MHz

15. MAXIMUM MODULATION FREQUENCY N/A

16. PRE-EMPHASIS *(X one)*
☐ **a. YES** ☒ **b. NO**

17. DEVIATION RATIO
N/A

18. PULSE CHARACTERISTICS

a. RATE	400-4000 pps
b. WIDTH	7-100 us
c. RISE TIME	1 us
d. FALL TIME	1 us
e. COMP RATIO	1701 – 24300

19. POWER

a. MEAN	N/A
b. PEP	1410 watts

20. OUTPUT DEVICE
Transistor

21. HARMONIC LEVEL

22. SPURIOUS LEVEL
-62 dB

a. 2nd **27 dB below carrier @ 235 MHz f_0, 30 dB below carrier @ 275 - 445 MHz f_0**

23. FCC TYPE ACCEPTANCE NO.
N/A

b. 3rd **More than 30 dB below carrier**

c. OTHER **Less than -30 dB below carrier**

24. REMARKS

Item 3: See remarks page 1.

Item 5, 6, and 7: There is no provision for tuning or channeling per se; a digital synthesizer is employed to produce a 210 MHz linear sweep during the pulse.

Item 10: An Arbitrary Waveform Generator generates notches as required at user-defined frequencies and with user-defined notch widths. Notch widths vary from 200 kHz to over 20 MHz. Notch depths are approximately 15 dB for notches with width of 500 kHz or less and 20-25 dB for notches with widths of 1 MHz or larger. The following bands are always notched: 242.9-243.1 MHz, 255.35-255.45 MHz, 328.6-355.4 MHz (notch depth in this band is 24 dB or greater) and 406.0 to 406.1 MHz
Item 18: Pulse length and PRF under software control and vary with mode. Duty cycle limited to less than 16%.

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. Digital Receiver Exciter, 5648409-001	**2. MANUFACTURER'S NAME** Lockheed Martin IS&S
3. RECEIVER INSTALLATION See Remarks Page 1	**4. RECEIVER TYPE** Digital Downconversion
5. TUNING RANGE 235-445 MHz	**6. METHOD OF TUNING** Resonant Filter
7. RF CHANNELING CAPABILITY (See Remarks)	**8. EMISSION DESIGNATOR(S)** 210MM3N
9. FREQUENCY TOLERANCE 50 ppm	

10. IF SELECTIVITY	**1st**	**2nd**	**3rd**
a. -3 dB	N/A	N/A	N/A
b. -20 dB	N/A	N/A	N/A
c. -60 dB	N/A	N/A	N/A

11. RF SELECTIVITY (X and complete as applicable)

☒ **CALCULATED** ☐ **MEASURED**

a. -3 dB	243 MHz
b. -20 dB	251 MHz
c. -60 dB	279 MHz
d. Preselection Type	Fixed Tuned Filter

12. IF FREQUENCY	
a. 1st	N/A
b. 2nd	N/A
c. 3rd	N/A
13. MAXIMUM POST DETECTION FREQUENCY	N/A
14. MINIMUM POST DETECTION FREQUENCY	N/A
16. MAXIMUM BIT RATE	N/A

15. OSCILLATOR TUNED	**1st**	**2nd**	**3rd**
a. ABOVE TUNED FREQUENCY	N/A	N/A	N/A
b. BELOW TUNED FREQUENCY	N/A	N/A	N/A
c. EITHER ABOVE OR BELOW THE FREQUENCY	N/A	N/A	N/A

17. SENSITIVITY

a. SENSITIVITY	**-75 dBm**
b. CRITERIA	**S/N = 8db**
c. NOISE FIG	**5 dB**
d. NOISE TEMP	**N/A Kelvin**

18. DE-EMPHASIS *(X one)*

☐ **a. YES** ☒ **b. NO**

19. IMAGE REJECTION
N/A

20. SPURIOUS REJECTION
-60 dB

21. REMARKS

Item 3: See Remarks page 1

Item 4: Receiver does not incorporate conventional frequency downconversion of received RF signal. Received signal is filtered and amplified, then sampled with an Analog-Digital Converter (ADC).

Item 5, 6, and 7: There is no provision for tuning or channeling per se.

Item 17: A processing gain of 30 - 41 dB (depending on mode) is obtained from the linear FM pulse compression.
Item 17b: S/N = 8 dB represents the tangential sensitivity.

CLASSIFICATION
UNCLASSIFIED

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ANTENNA EQUIPMENT CHARACTERISTICS

1.

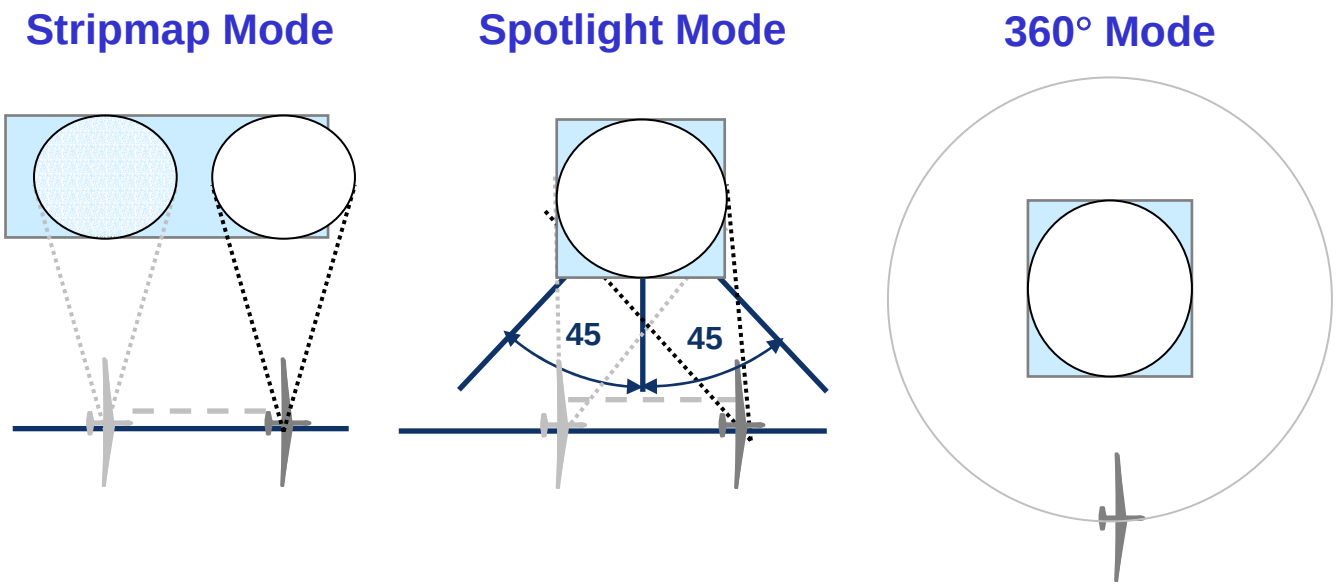
☐ **a. TRANSMITTING** ☐ **b. RECEIVING** ☒ **c. TRANSMITTING AND RECEIVING**

2. NOMENCLATURE, MANUFACTURER'S MODEL NO. UHF Antenna, 5648109-001	**3. MANUFACTURER'S NAME** First RF
4. FREQUENCY RANGE 235-445 MHz	**5. TYPE** Cavity-backed dual polarization patch radiator
6. POLARIZATION Dual - Horizontal and Vertical	**7. SCAN CHARACTERISTICS** **a. TYPE** See Remarks
8. GAIN	**b. VERTICAL SCAN** N/A
a. MAIN BEAM 7.2 dBi average across frequency range	**(1) Max Elev**
b. 1st MAJOR SIDE LOBE	**(2) Min Elev**
N/A	**(3) Scan Rate**
9. BEAMWIDTH	**c. HORIZONTAL SCAN** See Remarks
a. HORIZONTAL 60°	**(1) Sector Scanned**
b. VERTICAL 60°	**(2) Scan Rate**
	d. SECTOR BLANKING *(X one)* ☐ **(1) YES** ☒ **(2) NO**

10. REMARKS

Item 7: Antenna is either fixed at broadside to aircraft velocity vector or mechanically steered in the azimuth direction between ±50° of broadside, to maintain maximum power radiated on the imaged area.

Radar Modes



Stripmap Modes: Stripmap mode utilizes single or dual polarization UHF. The antenna is fixed at broadside for the duration of the aperture.

Spotlight Mode: Spotlight mode produces an image of the area around the aimpoint. It utilizes single or dual polarization UHF. The antenna is steered toward the aimpoint for the duration of the pass.

360° Mode: The 360 degree mode utilizes single or dual polarization UHF. The aircraft is flown in a circle about the aimpoint with the antenna is pointed broadside to the aircraft at the aimpoint.

All Modes: The radar generally operates at depression angles between 20 and 45 degrees to the aimpoint. Operational altitudes are between 12,000 and 29,000 feet.

APPLICATION FOR SPECTRUM REVIEW	CLASSIFICATION: UNCLASSIFIED	PAGE 6 of 7 Pages

NTIA GENERAL INFORMATION

1. APPLICATION TITLE
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UHFSAR

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) 235-445 MHz
b. EMISSION DESIGNATOR(S) 210MM3N

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS **(WARTIME USE)** *(X one)* ☐ a. YES ☒ b. NO
Validate performance of new radar system design.

6. INFORMATION TRANSFER REQUIREMENTS
Compressed radar pulses

7. ESTIMATED INITIAL COST OF THE SYSTEM

8. TARGET DATE FOR

a. APPLICATION APPROVAL	b. SYSTEM ACTIVATION	c. SYSTEM TERMINATION
As Soon As Possible	N/A	N/A

9. SYSTEM RELATIONSHIP AND ESSENTIALITY
This system is a near-real-time foliage penetration, synthetic aperture radar which detects objects under foliage and camouflage.

10. REPLACEMENT INFORMATION
None

11. RELATED ANALYSIS AND/OR TEST DATA
None

12. NUMBER OF MOBILE UNITS
Two

13. GEOGRAPHICAL AREA FOR

a. STAGE 2
300 KM radius of Phoenix, AZ

b. STAGE 3
N/A

c. STAGE 4
N/A

14. LINE DIAGRAM	15. SPACE SYSTEMS
See page(s) 5	See page(s) N/A
16. TYPE OF SERVICE(S) FOR STAGE 4	**17. STATION CLASS(ES) FOR STAGE 4**
Radiolocation	N/A

18. REMARKS

DOWNGRADING INSTRUCTIONS	CLASSIFICATION	
N/A	UNCLASSIFIED	

APPLICATION FOR FOREIGN SPECTRUM SUPPORT	CLASSIFICATION: UNCLASSIFIED	PAGE 7 of 7 Pages

FOREIGN COORDINATION GENERAL INFORMATION

1. APPLICATION TITLE
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2. SYSTEM NOMENCLATURE
UHFSAR

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) 235-445 MHz
b. EMISSION DESIGNATOR(S) 210MM3N

5. PROPOSED OPERATING LOCATIONS OUTSIDE US&P
None

6. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS

This system is a near-real-time foliage penetration, synthetic aperture radar to detect objects under foliage and camouflage.

7. INFORMATION TRANSFER REQUIREMENTS

Compressed radar pulses

8. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT

1

9. REPLACEMENT INFORMATION
None

10. LINE DIAGRAM	11. SPACE SYSTEMS
See page(s) 5	See page(s) N/A

12. PROJECTED OPERATIONAL DEPLOYMENT DATE
N/A

13. REMARKS

DOWNGRADING INSTRUCTIONS	CLASSIFICATION	
N/A	UNCLASSIFIED	