

**UNCLASSIFIED**

J/F 12/07996

**SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS**

The title of this application is: TUAV Command and Control Transceiver (CONUS)

The overall classification of this application is: **UNCLASSIFIED**

The following Special Handling summary lists the applicable markings for the printed page(s). It is your responsibility to place all Special Handling markings on the cover page of the application.

If an Entire Application was printed, the following Special Handling summary lists the applicable markings for the Entire Application.

If an Individual Page (TX, RX, ANT, etc.) was printed, the following Special Handling summary lists the applicable markings for the printed page. It is your responsibility to make certain that any Special Handling markings that are unique to the Individual Page are also reflected on the cover of the Entire Application.

If the "!" code is shown below, the "SEE REMARKS" refers to the REMARKS block on the applicable page.

Refer to your Security Manual for further guidance.

No Application Level Special Handling  
No Page Level Special Handling

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If the "I" code is shown below, the "SEE REMARKS" refers to the REMARKS block on the applicable page.

Page Type:	Page #:	Classification:	Special Handling Requirement:
DoD Page	1	UNCLASSIFIED	
Transmitter Page 1	2	UNCLASSIFIED	
TX Remark Overflow	3	UNCLASSIFIED	
Receiver Page 1	4	UNCLASSIFIED	
Antenna Page 1	5	UNCLASSIFIED	
Antenna Page 2	6	UNCLASSIFIED	
NTIA Page	7	UNCLASSIFIED	
NTIA Remark Overflow	8	UNCLASSIFIED	
MCEB Guidance Page	9	UNCLASSIFIED	
MCEB Overflow	10	UNCLASSIFIED	
Administrative Page		UNCLASSIFIED	

**DOD GENERAL INFORMATION**

<b>TO</b> USMCEB	<b>FROM</b> Office of the Army Spectrum Manager Submitted By: (Tactical Unmanned Air Vehicle ATTN: SFAE-IEW&S-UAV)
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1. **APPLICATION TITLE** (U) TUAV Command and Control Transceiver (CONUS)

2. **SYSTEM NOMENCLATURE** (U) RQ-7A Tactical Unmanned Aerial Vehicle System

3. **STAGE OF ALLOCATION** (U)  a. STAGE 1 CONCEPTUAL  b. STAGE 2 EXPERIMENTAL  c. STAGE 3 DEVELOPMENTAL  d. STAGE 4 OPERATIONAL

4. **FREQUENCY REQUIREMENTS**  
a. **FREQUENCY(IES)** (U) 2.4 GHz - 2.4835 GHz  
b. **EMISSION DESIGNATORS** (U) 230KF1D

5. **TARGET STARTING DATE FOR SUBSEQUENT STAGES**  
a. **STAGE 2** (U) NA      b. **STAGE 3** (U) NA      c. **STAGE 4** (U) NA

6. **EXTENT OF USE** (U) Training: up to 18 hrs/day Wartime: Continuous use

7. **GEOGRAPHICAL AREA FOR**  
a. **STAGE 2** (U) NA  
b. **STAGE 3** (U) NA  
c. **STAGE 4** (U) (See Remarks)

8. **NUMBER OF UNITS**  
a. **STAGE 2** (U) NA      b. **STAGE 3** (U) NA      c. **STAGE 4** (U) 176

9. **NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT**(U) 2

10. <b>OTHER J/F 12 APPLICATION ID(S) TO BE</b> (U) <input type="checkbox"/> a. SUPERSEDED <input type="checkbox"/> b. RELATED	11. <b>IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11?</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO <input type="checkbox"/> c. NAVAIL
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12. **NAMES AND TELEPHONE NUMBERS** (U)

a. <b>PROGRAM MANAGER</b> (b) (6)	(1) <b>COMMERCIAL</b> (b) (6)	(2) <b>DSN</b> (b) (6)
b. <b>PROJECT ENGINEER</b> (b) (6)	(1) <b>COMMERCIAL</b> (b) (6)	(2) <b>DSN</b> (b) (6)

13. **REMARKS** (U)  
General: Unit is used for Command and Control of the UAV on a continuous basis during the mission. Only two transceivers, one airborne, one on the ground are actively communicating at any one time.  
  
Item 7.c.: Fort Bragg, NC; Fort Campbell, KY; Fort Carson, CO; Fort Drum, NY; Fort Hood, TX; Fort Huachuca, AZ; Fort Irwin, CA; Fort Lewis, WA; Fort Polk, LA; Scofield Barracks, HA; Fort Stewart, GA; Fort Wainwright, AK; Leighton Barracks, Wurzburg, GE; Ui Jongbu, Camp Red Cloud, Korea; Hunt Valley, MD; Benson, AZ; Farmville Municipal Airport, VA.

## TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) Command and Control Transmitter	2. MANUFACTURER'S NAME (U) AAI Corporation
3. TRANSMITTER INSTALLATION (U) RQ-7A TUAV & Mobile Ground Stations	4. TRANSMITTER TYPE (U) GFSK Communications
5. TUNING RANGE (U) 2400 MHz - 2483.5 MHz	6. METHOD OF TUNING (U) Digital Synthesizer
7. RF CHANNELING CAPABILITY (U) 2400.307 MHz, 230.4 kHz increments	8. EMISSION DESIGNATORS (U) 230KF1D (U) (U)
9. FREQUENCY TOLERANCE (U) 2.5 ppm	12. EMISSION BANDWIDTH <input type="checkbox"/> CALCULATED <input checked="" type="checkbox"/> MEASURED
10. FILTER EMPLOYED (U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO	a. -3 dB (U) 180 KHz (U) (U)
11. SPREAD SPECTRUM (U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO	b. -20 dB (U) 230 KHz (U) (U)
13. MAXIMUM BIT RATE (U) 115.2 Kbps	c. -40 dB (U) 315 KHz (U) (U)
14. MODULATION TECHNIQUES AND CODING (U) 2 level GFSK with Frequency Hopping and TDMA (See Remarks)	d. -60 dB (U) 400 KHz (U) (U)
16. PRE-EMPHASIS (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	e. OC-BW (U) 230 KHz (U) (U)
19. POWER	15. MAXIMUM MODULATION FREQUENCY (U) 57.6 KHz
a. MEAN (U) See Remarks (U) (U)	17. DEVIATION RATIO (U) 1
b. PEP (U) NA (U) (U)	18. PULSE CHARACTERISTICS
20. OUTPUT DEVICE (U) Silicon Bi-polar Xistor, Class C	a. RATE (U) NA (U) (U)
22. SPURIOUS LEVEL (U) -70 dB	b. WIDTH (U) NA (U) (U)
23. FCC TYPE ACCEPTANCE NO. (U)	c. RISE TIME (U) NA (U) (U)
24. REMARKS (U)	d. FALL TIME (U) NA (U) (U)
	e. COMP RATIO (U) NA (U) (U)
	21. HARMONIC LEVEL
	a. 2nd (U) -50 dB
	b. 3rd (U) -70 dB
	c. OTHER (U) -80 dB

Item 14: System is 1/2 duplex data transceiver that frequency hops in accordance with the requirements of Annex K of the NTIA manual. Transceiver is certified for operation in 2.4 GHz ISM band in accordance with FCC Part 15 Rules. See remarks for Item 23.

Item 19:

Output Power Level dependent on antenna connection:

Max Power into Ground Based Omni-directional Antenna 38214-91001-1 (3.5 dBi gain): 26.3 dBm (426.5 mW)

Max Power into Ground Based Directional Antenna 38214-90004-1 (25 dBi gain): 10.3 dBm (10.7 mW)

Max Power into Airborne Omni-directional antenna 38214-91001-1 (3.5 dBi gain): 27 dBm (500 mW).

TUAV communications system will not work if ground antennas are

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) Command and Control Receiver				2. MANUFACTURER'S NAME (U) AAI Corporation			
3. RECEIVER INSTALLATION (U) RQ-7A TUAV & Mobile Ground Stations				4. RECEIVER TYPE (U) Single Stage Superheterodyne			
5. TUNING RANGE (U) 2400 MHz - 2483.5 MHz				6. METHOD OF TUNING (U) Digital Synthesizer			
7. RF CHANNELING CAPABILITY (U) 2400.307 MHz, 230.4 kHz increments				8. EMISSION DESIGNATORS (U) 230KF1D			
9. FREQUENCY TOLERANCE (U) 1.5 ppm				11. RF SELECTIVITY <input type="checkbox"/> CALCULATED <input checked="" type="checkbox"/> MEASURED			
10. IF SELECTIVITY		1st (U)	2nd (U)	3rd (U)	a. -3 dB (U) 87 MHz		
a. -3 dB		200 KHz	NA		b. -20 dB (U) 130 MHz		
b. -20 dB		230 KHz	NA		c. -60 dB (U) 240 MHz		
c. -60 dB		290 KHz	NA		d. Preselection Type (U) LC Filter		
12. IF FREQUENCY				13. MAXIMUM POST DETECTION FREQUENCY (U) 200 KHz			
a. 1st (U)		74.6 MHz		14. MINIMUM POST DETECTION FREQUENCY (U) NA			
b. 2nd (U)		NA		16. MAXIMUM BIT RATE (U) 115.2 Kbps			
c. 3rd (U)				17. SENSITIVITY			
15. OSCILLATOR TUNED		1st (U)	2nd (U)	3rd (U)	a. SENSITIVITY (U) - 108 dBm		
a. ABOVE TUNED FREQUENCY		X			b. CRITERIA (U) 10E-6 BER, S/N=12 dB		
b. BELOW TUNED FREQUENCY					c. NOISE FIG (U) 3.5 dB		
c. EITHER ABOVE OR BELOW THE FREQUENCY					d. NOISE TEMP (U) NA		
18. DE-EMPHASIS (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO				20. SPURIOUS REJECTION (U) 60 dB			
19. IMAGE REJECTION (U) 60 dB							

21. REMARKS (U) Item 9: Unit incorporates a 9 section LC preselection filter.

## TRANSMITTER REMARK OVERFLOW PAGE

cross-connected to improper transceiver connections.

Item 23: System incorporates COTS modem from Freewave Technologies, FCC  
ID KNY-209228624168

## ANTENNA EQUIPMENT CHARACTERISTICS

1. (U)  a. TRANSMITTING  b. RECEIVING  c. TRANSMITTING AND RECEIVING

## 2. NOMENCLATURE, MANUFACTURER'S MODEL NO.

(U) GDT Antenna System (See Remarks)

## 3. MANUFACTURER'S NAME

(U) AAI Corporation

5. TYPE (U) Parabolic Reflector

## 4. FREQUENCY RANGE

(U) 2400 MHz - 2485 MHz

## 7. SCAN CHARACTERISTICS

a. TYPE (U) MECHANICAL

## 6. POLARIZATION

(U) Linear Vertical

b. VERTICAL SCAN (U) Mechanical

(1) Max Elev (U) +95 deg

## 8. GAIN

(2) Min Elev (U) -5 deg

## a. MAIN BEAM

(U) 25 dBi

(3) Scan Rate (U) 11 deg/sec max

## b. 1st MAJOR SIDE LOBE

(U) 11 dBi @ 12 deg

c. HORIZONTAL SCAN (U) Mechanical

(1) Sector Scanned (U) 360 degrees

## 9. BEAMWIDTH

## a. HORIZONTAL

(U) 7.2 deg

(2) Scan Rate (U) 11 deg/sec max

## b. VERTICAL

(U) 7.2 deg

d. SECTOR BLANKING (U)  (1) YES  (2) NO

## 10. REMARKS (U)

General: The GDT is also equipped with an omni-directional antenna (38214-91001-1) accommodating this frequency band for UAV operation at close range, and described elsewhere in this application. Antenna selection (directional or omni) is made by operator command.

The TUAV GDT Directional Antenna System is configurable depending on operating location. The system consists of an antenna rotator, 4 foot diameter parabolic reflector, and one of two feed assemblies. Each feed assembly contains two antenna elements. This antenna element is common to both feed assemblies.

## Item 2: System Elements:

Feed part numbers: 38214-90004-2

Rotator part number is 38214-90002-1

Reflector part number is 38214-90003-1

## ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) <input type="checkbox"/> a. TRANSMITTING		<input type="checkbox"/> b. RECEIVING		<input checked="" type="checkbox"/> c. TRANSMITTING AND RECEIVING	
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) 38214-91001-1			3. MANUFACTURER'S NAME (U) AAI Corporation		
4. FREQUENCY RANGE (U) 2400 MHz - 2485 MHz			5. TYPE (U) Monopole		
6. POLARIZATION (U) Vertical			7. SCAN CHARACTERISTICS		
8. GAIN			a. TYPE (U) FIXED		
a. MAIN BEAM (U) 3.5 dBi			b. VERTICAL SCAN (U) NA		
b. 1st MAJOR SIDE LOBE (U)			(1) Max Elev (U) NA		
9. BEAMWIDTH			(2) Min Elev (U) NA		
a. HORIZONTAL (U) 360 deg			(3) Scan Rate (U) NA		
b. VERTICAL (U) 45 deg			c. HORIZONTAL SCAN (U) NA		
			(1) Sector Scanned (U) NA		
			(2) Scan Rate (U) NA		
			d. SECTOR BLANKING (U) <input type="checkbox"/> (1) YES <input checked="" type="checkbox"/> (2) NO		

## 10. REMARKS (U)

General: This omni antenna is used on the UAV and as part of both the Ground Data Terminal (GDT), and Portable Ground Data Terminal (PGDT).

**NTIA GENERAL INFORMATION**

1. APPLICATION TITLE (U) TUAV Command and Control Transceiver (CONUS)

2. SYSTEM NOMENCLATURE (U) RQ-7A Tactical Unmanned Aerial Vehicle System

3. STAGE OF ALLOCATION (U)     a. STAGE 1 CONCEPTUAL     b. STAGE 2 EXPERIMENTAL     c. STAGE 3 DEVELOPMENTAL     d. STAGE 4 OPERATIONAL

4. FREQUENCY REQUIREMENTS  
 a. FREQUENCY(IES) (U) 2400 MHz - 2483.5 MHz  
 b. EMISSION DESIGNATORS (U) 230KF1D

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (U) Transceiver provides command and control communications via bi-directional link to the Tactical Unmanned Aerial Vehicle System. The TUAV system provides realtime video reconnaissance and surveillance capability to the brigade commander in the tactical wartime environment. (WARTIME USE)  a. YES     b. NO

6. INFORMATION TRANSFER REQUIREMENTS(U) Up to 115.2 Kbps

7. ESTIMATED INITIAL COST OF THE SYSTEM (U) Each Transceiver cost \$1300

8. TARGET DATE FOR		
a. APPLICATION APPROVAL (U) 11-01-2002	b. SYSTEM ACTIVATION (U) 12-30-2002	c. SYSTEM TERMINATION (U) 12-31-2025

9. SYSTEM RELATIONSHIP AND ESSENTIALITY (U) The command and control link system provides the required operational controls, for the TUAV system, that control the aircraft during all mission phases from pre-flight checkout through launch, mission performance, and air vehicle recovery.(See Remarks)

10. REPLACEMENT INFORMATION (U) NA

11. RELATED ANALYSIS AND/OR TEST DATA (U) NA

12. NUMBER OF MOBILE UNITS (U) 2 airborne platforms

13. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) (See Remarks)

14. LINE DIAGRAM (U) See Page(s) 7

15. SPACE SYSTEMS (U) See Page(s) NA

16. TYPE OF SERVICE(S) FOR STAGE 4 (U) Mobile

17. STATION CLASS(ES) FOR STAGE 4 (U) MO

18. REMARKS (U) Item 9: The TUAV system can operate as a self contained system presenting live video imagery to the commander on a video monitor, or the video intelligence information may be disseminated via C4I interfaces to other units in the Tactical Operations Center (TOC).  
  
Item 12: Ground mobile stations are used to provide command/control of the TUAV airborne component.

## NTIA REMARK OVERFLOW PAGE

Item 13.c: Fort Bragg, NC; Fort Campbell, KY; Fort Carson, CO; Fort Drum, NY; Fort Hood, TX; Fort Huachuca, AZ; Fort Irwin, CA; Fort Lewis, WA; Fort Polk, LA; Scofield Barracks, HA; Fort Stewart, GA; Fort Wainwright, AK; Leighton Barracks, Wurzburg, GE; Ui Jongbu, Camp Red Cloud, Korea, Hunt Valley, MD; Benson, AZ; Farmville Municipal Airport, VA.

UNCLASSIFIED  
MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB)  
EQUIPMENT FREQUENCY ALLOCATION GUIDANCE

Military Department: Army  
Equipment: TUAV Command and Control Transceiver (CONUS)  
Stage: 4 - Operational

Section 1: ENCLOSURES

1. J/F 12/7996, 17 Sep 02

Section 2: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED

Frequency: 2400-2483.5 MHz  
Emission: 230KF1D  
Power(Mean): 10.7 mW, 426.5 mW or 500 mW  
Stage 4 Type of Service: Mobile  
Operating Location (See Section 3): US&P

Section 3: MCEB GUIDANCE

1. The enclosed application as described above is noted and forwarded for information and file.
2. Operational use within the appropriate theater commands outside the United States has not been approved. Approval for operational use in the intended deployment area requires appropriate CINC's statement(s) that the subject system has been deemed frequency supportable.
3. This equipment meets the requirements of NTIA Manual Annex K, Technical Standards for Federal "Non-Licensed" Devices. An authorized transmission system must always be used in the configuration in which it was authorized. No external power amplifier, amplifier kit or new antenna shall be used.
4. Operations will be on an unprotected and non-interference basis to established services. Operations must be in accordance with the NTIA Manual.
5. Coordination with the NTIA was not requested.

Steering Member  
J-12 Working Group  
MCEB Frequency Panel

APPROVAL Signature Date: 16 OCT 2002

IRAC/SPS Number: NA

Downgrading Instructions  
Classified by: NA

Declassify on:

Distribution: J-12 Holders

MCEB J-12 Number: J/F 12/7996/1

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**ADMINISTRATIVE INFORMATION PAGE**

- 1. SYSTEM IDENTIFIER: (U) C
- 2. EQUIPMENT FUNCTION: (U) CD C GG G
- 3. EQUIPMENT NOMENCLATURE: (U) RQ-7A TUAV CONTROL SYS (U)  
(U) (U)  
(U) (U)  
(U) (U)
- 4. ECI CODE: (U)
- 5. MCEB USE: (U) O (C:CONCEP; E:EXPER; D:DEVELOP; O:OPER; N:NOTED)
- 6. MCEB LOCATIONS: (U) COUNTRY STATE CITY  
USP US&P

- 7. HOST COUNTRY: COUNTRY DATE MESSAGE DTG  
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- 8. NOTE-TO-HOLDER:  
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9. JSC MEMO DATE: (U) 10-16-2002

10. USING AGENCIES: (U) 1:AR 2: 3:

11. PROCURING AGENCY: (U) AR

12. APPLICATION STATUS: (U) 4 (1:APPROV; 2:CANCEL; 3:SUPERSE; 4:NOTED; 5:WITHDR; 6:PEND)