SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

The title of this application is: TUAV Video Link

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

SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

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If the "!" 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	
Receiver Page 1	3	UNCLASSIFIED	
Antenna Page 1	4	UNCLASSIFIED	
Antenna Page 2	5	UNCLASSIFIED	
Antenna Page 3	6	UNCLASSIFIED	
Antenna Page 4	7	UNCLASSIFIED	
NTIA Page	8	UNCLASSIFIED	
NTIA Remark Overflow	9	UNCLASSIFIED	

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION UNCLASSIFIED	DATE 10-17-2002	J/F 12/07989
			Page 1 of 9 Pages

DOD GENERAL INFORMATION

TO	FROM
USMCEB	Office of the Army Spectrum Manager Submitted By: (Project Manager, UAV Systems ATTN: SFAE-AV-UAV-TM)

1. APPLICATION TITLE (U) TUAV Video Link

2. SYSTEM NOMENCLATURE (U) Tactical Unmanned Aerial Vehicle System (079 89)

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

4. FREQUENCY REQUIREMENTS

a. FREQUENCY(IES)	(U)	4.4 GHz - 4.94 GHz	5.25 GHz - 5.85 GHz
b. EMISSION DESIGNATORS	(U)	16M3F3F	16M3F3F

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) Up to 18 hrs/day

7. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) US&P (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) 6

10. OTHER J/F 12 APPLICATION ID(S) TO BE (U) [ ] a. SUPERSEDED [ ] b. RELATED

11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11? (U) [ ] a. YES [X] b. NO [ ] c. NAVAIL

12. NAMES AND TELEPHONE NUMBERS (U)

a. PROGRAM MANAGER COL Michael Hamilton	(1) COMMERCIAL 256-895-4449	(2) DSN 788-4449
b. PROJECT ENGINEER Mr. Tommy Thomas	(1) COMMERCIAL 256-895-4321	(2) DSN 788-4321

13. REMARKS (U)

Unit is used for transmission of realtime analog video imagery from the UAV to any properly equipped ground receiver within LOS.

Block 7c: Leighton Barracks, Wurzburg, Germany; (Uijongbu, Camp Red Cloud) Republic of Korea;

Item 8c: 4 transmitters and 7 receivers per TUAV system.

DOWNGRADING INSTRUCTIONS

J/F 12/07989

CLASSIFICATION UNCLASSIFIED

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-41660-10 Transmitter

2. MANUFACTURER'S NAME
(U) AAI Corporation

3. TRANSMITTER INSTALLATION
(U) TUAV

4. TRANSMITTER TYPE
(U) FM Communications

5. TUNING RANGE
(U) 4.4 GHz - 4.94 GHz 5.25 GHz - 5.85 GHz

6. METHOD OF TUNING
(U) Digital Synthesizer

7. RF CHANNELING CAPABILITY
(U) 4.4 GHz, 1 MHz increments(See Remarks)

8. EMISSION DESIGNATORS
(U) 16M3F3F (U) (U)

9. FREQUENCY TOLERANCE
(U) 20 ppm

10. FILTER EMPLOYED
(U) [ ] a. YES [X] b. NO

11. SPREAD SPECTRUM
(U) [ ] a. YES [X] b. NO

12. EMISSION BANDWIDTH
[ ] CALCULATED [X] MEASURED

a. -3 dB	(U) 2 MHz	(U)	(U)
b. -20 dB	(U) 16.0 MHz	(U)	(U)
c. -40 dB	(U) 26 MHz	(U)	(U)
d. -60 dB	(U) 30.0 MHz	(U)	(U)
e. OC-BW	(U) 16.8 MHz	(U)	(U)

13. MAXIMUM BIT RATE
(U) NA

15. MAXIMUM MODULATION FREQUENCY
(U) 4.2 MHz

14. MODULATION TECHNIQUES AND CODING
(U) FM Video

17. DEVIATION RATIO
(U) 1

16. PRE-EMPHASIS
(U) [X] a. YES [ ] b. NO

18. PULSE CHARACTERISTICS

a. RATE	(U) NA	(U)	(U)
b. WIDTH	(U) NA	(U)	(U)
c. RISE TIME	(U) NA	(U)	(U)
d. FALL TIME	(U) NA	(U)	(U)
e. COMP RATIO	(U) NA	(U)	(U)

19. POWER

a. MEAN	(U) 10 mW - 30 W	(U)	(U)
b. PEP	(U) NA	(U)	(U)

20. OUTPUT DEVICE
(U) Field Effect Transistor

21. HARMONIC LEVEL

a. 2nd	(U)	-50 dB
b. 3rd	(U)	-70 dB
c. OTHER	(U)	-80 dB

22. SPURIOUS LEVEL
(U) -50 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U)

Item 1: OCONUS HPA part number is 38214-91005-1; 5 GHz band
CONUS HPA part number is 38214-91005-2; 4 GHz band

Item 7: 5.25 GHz, 1.0 MHz increments

Item 16: Pre-emphasis IAW ITU Recommendation F405-1 for 525 line video; is 3 dB.

Item 19: The transmitter system is composed of a tunable low power device with the capability to output between 10 to 30 mWatts. The HPA add 20 dB of gain to achieve between 10 to 30 Watts of output.

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-44410-10 Compact2 Receiver

2. MANUFACTURER'S NAME
(U) AAI Corporation

3. RECEIVER INSTALLATION
(U) Mobile Ground Stations

4. RECEIVER TYPE
(U) Double Conversion Superhetrodyne

5. TUNING RANGE
(U) 4.4 GHz - 4.94 GHz 5.25 GHz - 5.85 GHz

6. METHOD OF TUNING
(U) Digital Synthesizer

8. EMISSION DESIGNATORS
(U) 16M3F3F

7. RF CHANNELING CAPABILITY
(U) 4.4 GHz, 1 MHz increments(See Remarks)

11. RF SELECTIVITY
[ ] CALCULATED [X] MEASURED

9. FREQUENCY TOLERANCE
(U) 20 ppm

10. IF SELECTIVITY	1st (U)	2nd (U)	3rd (U)
a. -3 dB	39 MHz	17 MHz	
b. -20 dB	58 MHz	20 MHz	
c. -60 dB	145 MHz	40 MHz	

a. -3 dB	(U)	730 MHz
b. -20 dB	(U)	1400 MHz
c. -60 dB	(U)	2409 MHz
d. Preselection Type	(U)	6 Section Cavity BPF

12. IF FREQUENCY
a. 1st (U) 964 MHz
b. 2nd (U) 70 MHz
c. 3rd (U)

13. MAXIMUM POST DETECTION FREQUENCY
(U) 4.2 MHz

14. MINIMUM POST DETECTION FREQUENCY
(U) 10 Hz

16. MAXIMUM BIT RATE
(U) NA

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

17. SENSITIVITY

a. SENSITIVITY	(U)	- 91 dBm
b. CRITERIA	(U)	12dB S+N/N
c. NOISE FIG	(U)	2.5 dB
d. NOISE TEMP	(U)	NA

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

19. IMAGE REJECTION
(U) 60 dB

20. SPURIOUS REJECTION
(U) 75 dB

21. REMARKS (U)

Unit is wideband in design to accommodate operation in both the CONUS and OCONUS (4.4 to 4.95 GHz and 5.25 to G5.85 GHz respectively).

Item 7: 5.25 GHz, 1.0 MHz increments

Item 17: The receiver system includes a 30 dB gain LNA in RF Box Assembly (part number 38214-444401-10) which is located 12 feet from the receiver assembly.

Item 18: De-emphasis IAW ITU Recommendation F405-1 for 525 line video, is 3 dB.

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-90001-1

3. MANUFACTURER'S NAME
(U) AAI Corporation

4. FREQUENCY RANGE
(U) 5.25 GHz - 5.85 GHz

5. TYPE (U) Monopole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) FIXED
b. VERTICAL SCAN (U) NA
(1) Max Elev (U) NA
(2) Min Elev (U) NA
(3) Scan Rate (U) NA
c. HORIZONTAL SCAN (U) NA
(1) Sector Scanned (U) NA
(2) Scan Rate (U) NA
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 4.32 dBi
b. 1st MAJOR SIDE LOBE
(U) NA

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 60 deg

10. REMARKS (U)

Item 1: These omni antennas are used in 2 places in the system, one as a transmit antenna aboard the UAV and one as a receive only unit at each control station, either the Ground Data Terminal or the Portable Ground Data Terminal (see line diagram).

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [X] b. RECEIVING [ ] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-90003-1 Reflector (Remarks)

3. MANUFACTURER'S NAME
(U) AAI Corporation

4. FREQUENCY RANGE
(U) 5.25 GHz - 5.85 GHz

5. TYPE (U) Parabolic Reflector

6. POLARIZATION
(U) Linear Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) MECHANICAL
b. VERTICAL SCAN (U) Mechanical
(1) Max Elev (U) +95 deg
(2) Min Elev (U) -5 deg
(3) Scan Rate (U) 11 deg/sec max
c. HORIZONTAL SCAN (U) Mechanical
(1) Sector Scanned (U) 360 degrees
(2) Scan Rate (U) 11 deg/sec max
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 32.5 dBi
b. 1st MAJOR SIDE LOBE
(U) 13 dBi @ 5.0 deg

9. BEAMWIDTH
a. HORIZONTAL
(U) 2.8 deg
b. VERTICAL
(U) 2.8 deg

10. REMARKS (U)

Item 2: Dual Element Feed part number is 38214-90004-1 (OCONUS)
Rotor part number is 38214-90002-1

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [X] b. RECEIVING [ ] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-90003-1 Reflector (Remarks)

3. MANUFACTURER'S NAME
(U) AAI Corporation

4. FREQUENCY RANGE
(U) 4.4 GHz - 4.95 GHz

5. TYPE (U) Parabolic Reflector

6. POLARIZATION
(U) Linear Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) MECHANICAL
b. VERTICAL SCAN (U) Mechanical
(1) Max Elev (U) +95 deg
(2) Min Elev (U) -5 deg
(3) Scan Rate (U) 11 deg/sec max
c. HORIZONTAL SCAN (U) Mechanical
(1) Sector Scanned (U) 360 degrees
(2) Scan Rate (U) 11 deg/sec max
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 31.5 dBi
b. 1st MAJOR SIDE LOBE
(U) 11.5 dBi @ 7.3 deg

9. BEAMWIDTH
a. HORIZONTAL
(U) 4.35 deg
b. VERTICAL
(U) 4.35 deg

10. REMARKS (U)

Item 2: Dual Element Feed part number is 38214-90004-1 (CONUS)
Rotor part number is 38214-90002-1

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 38214-90001-2

3. MANUFACTURER'S NAME
(U) AAI Corporation

4. FREQUENCY RANGE
(U) 4.4 GHz - 4.95 GHz

5. TYPE (U) Monopole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) FIXED
b. VERTICAL SCAN (U) NA
(1) Max Elev (U) NA
(2) Min Elev (U) NA
(3) Scan Rate (U) NA
c. HORIZONTAL SCAN (U) NA
(1) Sector Scanned (U) NA
(2) Scan Rate (U) NA
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 3.5 dBi
b. 1st MAJOR SIDE LOBE
(U) NA

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 65 deg

10. REMARKS (U)

Block 1: These omni antennas are used in 2 places in the system, one as a transmit antenna aboard the UAV and one as a receive only unit at each control station, either the Ground Data Terminal or the Portable Ground Data Terminal.

NTIA GENERAL INFORMATION

1. APPLICATION TITLE (U) TUAV Video Link

2. SYSTEM NOMENCLATURE (U) Tactical Unmanned Aerial Vehicle System (079 89)

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

4. FREQUENCY REQUIREMENTS

a. FREQUENCY(IES) (U)	4.4 GHz - 4.94 GHz	5.25 GHz - 5.85 GHz
b. EMISSION DESIGNATORS (U)	16M3F3F	16M3F3F

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) [X] a. YES [ ] b. NO

(U) Video Tx/Rx system used for dissemination of real time imagery intelligence from the airborne UAV.

6. INFORMATION TRANSFER REQUIREMENTS (U) NA

7. ESTIMATED INITIAL COST OF THE SYSTEM (U) Development TUAV System: $2M; Production TUAV System: $4M ea

8. TARGET DATE FOR

a. APPLICATION APPROVAL	b. SYSTEM ACTIVATION	c. SYSTEM TERMINATION
(U) 09-01-2002	(U) 10-31-2002	(U) 2025

9. SYSTEM RELATIONSHIP AND ESSENTIALITY (U) System provides critical realtime surveillance and reconnaissance to the Brigade commander in the tactical environment. System is used for accurately locating and identifying tactical targets, gunfire direction support,and battle damage assessment.

10. REPLACEMENT INFORMATION (U) NA

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

12. NUMBER OF MOBILE UNITS (U) Per system: 4 aeronautical mobile, 3 ground mobile

13. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) US&P (See Remarks)

14. LINE DIAGRAM (U) See Page(s) 8

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) The system is designed to operate in two sections of 4.4 to 5.85 GHz Band known as CONUS and OCONUS, with simple substitution of a minimal amount of hardware. The transmitter and receiver are capable of operation in 1 MHz steps in each band. Airborne antennas and power amplifiers are swapped in the UAV and ground based antennas (both directional and omni-directional) are swapped on the ground to effect band switch-over.

DOWNGRADING INSTRUCTIONS

J/F 12/07989

CLASSIFICATION UNCLASSIFIED

NTIA REMARK OVERFLOW PAGE

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 13c: Leighton Barracks, Wurzburg, Germany; (Uijongbu, Camp Red Cloud) Republic of Korea