

**UNCLASSIFIED**

J/F 12/08057/4

**SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS**

The title of this application is: AeroVironment Data 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 "I" 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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All Application Level Special Handling markings (if any) will appear at the top of the Special Handling list for each individual page type. Field Level markings will follow. It is your responsibility to mark the individual pages of this application in accordance with the procedures in your Security Manual. The following summaries are provided for that purpose.

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	
Receiver Page 1	3	UNCLASSIFIED	
Antenna Page 1	4	UNCLASSIFIED	
General Continuation 1	5	UNCLASSIFIED	
NTIA Page	6	UNCLASSIFIED	
NTIA Remark Overflow	7	UNCLASSIFIED	
MCEB Guidance Page	8	UNCLASSIFIED	
MCEB Overflow	9	UNCLASSIFIED	
Note to Holders 1	10	UNCLASSIFIED	
NTIA Admin Page	11	UNCLASSIFIED	
Administrative Page		UNCLASSIFIED	

**DOD GENERAL INFORMATION**

<b>TO</b> AF Frequency Management Agency AFFMA/DON 2461 Eisenhower Ave., Suite 1203 Alexandria, VA 22331-1500	<b>FROM</b> Aeronautical Systems Center (AFMC) 88CG/SCXI (ASC 2004-023) Area B, Building 47, 2690 K Street Wright Patterson AFB, OH 45433-7661
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**1. APPLICATION TITLE** (U) AeroVironment Data Link

**2. SYSTEM NOMENCLATURE** (U) Small UAV

**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) 350 MHz - 399.9 MHz  
 b. EMISSION DESIGNATORS (U) 15K6F1D

**5. TARGET STARTING DATE FOR SUBSEQUENT STAGES**

a. STAGE 2 (U) NA	b. STAGE 3 (U) NA	c. STAGE 4 (U) NA
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**6. EXTENT OF USE** (U) Intermittent

**7. GEOGRAPHICAL AREA FOR**

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) US&P, Worldwide

**8. NUMBER OF UNITS**

a. STAGE 2 (U) NA	b. STAGE 3 (U) NA	c. STAGE 4 (U) 1000
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**9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT(U)** 4

<b>10. OTHER J/F 12 APPLICATION ID(S) TO BE</b> (U) <input checked="" type="checkbox"/> a. SUPERSEDED J/F 12/08057/2 <input checked="" type="checkbox"/> b. RELATED J/F 12/08252	<b>11. 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. PROGRAM MANAGER Lt Joshua Seder, ASC/RAJA	(1) COMMERCIAL 937-656-3189	(2) DSN 986-3189
b. PROJECT ENGINEER Mr. William Green, ASC/RAJA	(1) COMMERCIAL 937-255-5082	(2) DSN 785-5082

**13. REMARKS (U)** Positive control of the air vehicle is maintained by pre-programmed response to loss of the control link. When a loss of the control link is detected, the air vehicle returns to a pre-programmed point and auto-lands.

**TRANSMITTER EQUIPMENT CHARACTERISTICS**

<b>1. NOMENCLATURE, MANUFACTURER'S MODEL NO.</b> (U) Uplink Transmitter (See Remarks)	<b>2. MANUFACTURER'S NAME</b> (U) AeroVironment, Inc.
<b>3. TRANSMITTER INSTALLATION</b> (U) Ground	<b>4. TRANSMITTER TYPE</b> (U) Digital FM Communication
<b>5. TUNING RANGE</b> (U) 350 MHz - 400 MHz (See Remarks)	<b>6. METHOD OF TUNING</b> (U) Synthesizer
<b>7. RF CHANNELING CAPABILITY</b> (U) (See Remarks)	<b>8. EMISSION DESIGNATORS</b> (U) 15K6F1D (U) (U)
<b>9. FREQUENCY TOLERANCE</b> (U) 2.5 ppm	<b>12. EMISSION BANDWIDTH</b> <div style="text-align: center;"> <input type="checkbox"/> CALCULATED      <input checked="" type="checkbox"/> MEASURED         </div>
<b>10. FILTER EMPLOYED</b> (U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO	<b>a. -3 dB</b> (U) 5 KHz (U) (U) <b>b. -20 dB</b> (U) 12 KHz (U) (U) <b>c. -40 dB</b> (U) 34 KHz (U) (U)
<b>11. SPREAD SPECTRUM</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	<b>d. -60 dB</b> (U) 70 KHz (U) (U) <b>e. OC-BW</b> (U) 17 KHz (U) (U)
<b>13. MAXIMUM BIT RATE</b> (U) 9.6 Kbps	<b>15. MAXIMUM MODULATION FREQUENCY</b> (U) 9.6 KHz
<b>14. MODULATION TECHNIQUES AND CODING</b> (U) Manchester encoded FSK	<b>17. DEVIATION RATIO</b> (U) 0.55
<b>16. PRE-EMPHASIS</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	<b>18. PULSE CHARACTERISTICS</b> <b>a. RATE</b> (U) NA (U) (U) <b>b. WIDTH</b> (U) NA (U) (U)
<b>19. POWER</b>	<b>c. RISE TIME</b> (U) NA (U) (U) <b>d. FALL TIME</b> (U) NA (U) (U) <b>e. COMP RATIO</b> (U) NA (U) (U)
<b>a. MEAN</b> (U) 2 W (U) (U) <b>b. PEP</b> (U) NA (U) (U)	<b>21. HARMONIC LEVEL</b> <b>a. 2nd</b> (U) -55 dB <b>b. 3rd</b> (U) -70 dB <b>c. OTHER</b> (U) -80 dB
<b>20. OUTPUT DEVICE</b> (U) Transistor	
<b>22. SPURIOUS LEVEL</b> (U) -50 dB	
<b>23. FCC TYPE ACCEPTANCE NO.</b> (U) NA	

**24. REMARKS (U)**    Item 1: For DoD requirement, AeroVironment modified Part No. 55025

Item 5/7: The module has 4 factory preset channels; per module, all 4 channels must be within a 10 MHz band. This 10 MHz window can be set in the 350-399.9 MHz frequency range.

Item 10: 2 pole low pass Butterworth filter with the 3 dB point at approximately 425 MHz. The insertion loss is 2 dB.

RECEIVER EQUIPMENT CHARACTERISTICS

<b>1. NOMENCLATURE, MANUFACTURER'S MODEL NO.</b> (U) Uplink Receiver				<b>2. MANUFACTURER'S NAME</b> (U) AeroVironment, Inc.			
<b>3. RECEIVER INSTALLATION</b> (U) Aircraft				<b>4. RECEIVER TYPE</b> (U) Double Conversion Superheterodyne			
<b>5. TUNING RANGE</b> (U) 350 MHz - 400 MHz (See Remarks)				<b>6. METHOD OF TUNING</b> (U) Synthesizer			
<b>7. RF CHANNELING CAPABILITY</b> (U) (See Remarks)				<b>8. EMISSION DESIGNATORS</b> (U) 15K6F1D			
<b>9. FREQUENCY TOLERANCE</b> (U) 2.5 ppm				<b>11. RF SELECTIVITY</b> <input type="checkbox"/> CALCULATED <input checked="" type="checkbox"/> MEASURED			
<b>10. IF SELECTIVITY</b>		1st (U)	2nd (U)	3rd (U)	<b>a. -3 dB</b> (U) 10 MHz		
<b>a. -3 dB</b>		50 KHz	7 KHz	NA	<b>b. -20 dB</b> (U) 74 MHz		
<b>b. -20 dB</b>		150 KHz	44 KHz	NA	<b>c. -60 dB</b> (U) 250 MHz		
<b>c. -60 dB</b>		300 KHz	72 KHz	NA	<b>d. Preselection Type</b> (U) LC Filter		
<b>12. IF FREQUENCY</b>				<b>13. MAXIMUM POST DETECTION FREQUENCY</b> (U) 9.792 KHz			
<b>a. 1st (U)</b> 86.85 MHz				<b>14. MINIMUM POST DETECTION FREQUENCY</b> (U) 9.408 KHz			
<b>b. 2nd (U)</b> 455 KHz				<b>16. MAXIMUM BIT RATE</b> (U) 9.6 Kbps			
<b>c. 3rd (U)</b> NA				<b>17. SENSITIVITY</b>			
<b>15. OSCILLATOR TUNED</b>		1st (U)	2nd (U)	3rd (U)	<b>a. SENSITIVITY</b> (U) - 105 dBm		
<b>a. ABOVE TUNED FREQUENCY</b>					<b>b. CRITERIA</b> (U) SNR = 16 dB: 10-5 BER		
<b>b. BELOW TUNED FREQUENCY</b>		X	X		<b>c. NOISE FIG</b> (U) 4.5 dB		
<b>c. EITHER ABOVE OR BELOW THE FREQUENCY</b>					<b>d. NOISE TEMP</b> (U) NA		
<b>18. DE-EMPHASIS</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO				<b>20. SPURIOUS REJECTION</b> (U) 60 dB			
<b>19. IMAGE REJECTION</b> (U) 73 dB							

**21. REMARKS (U)** Item 5/7: The module operates within 10 MHz band and has a maximum of 4 factory preset channels.

## ANTENNA EQUIPMENT CHARACTERISTICS

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

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

(U) PN 55017 and 55008

## 3. MANUFACTURER'S NAME

(U) AeroVironment, Inc.

5. TYPE (U) Dipole

## 4. FREQUENCY RANGE

(U) 350 MHz - 400 MHz

## 7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

## 6. POLARIZATION

(U) Vertical

b. VERTICAL SCAN (U) NA

(1) Max Elev (U) NA

(2) Min Elev (U) NA

(3) Scan Rate (U) NA

## 8. GAIN

## a. MAIN BEAM

(U) 2.2 dBi

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U) NA

## b. 1st MAJOR SIDE LOBE

(U) NA

(2) Scan Rate (U) NA

## 9. BEAMWIDTH

## a. HORIZONTAL

(U) 360 deg

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

## b. VERTICAL

(U) 78 deg

## 10. REMARKS (U)

Item 2: Both antennas characteristics are identical.  
Part Number 55017 is the ground - transmit antenna.  
Part Number 55008 is the aircraft - receive antenna.

**GENERAL CONTINUATION PAGE**

Line Diagram

## NTIA GENERAL INFORMATION

1. APPLICATION TITLE (U) AeroVironment Data Link

2. SYSTEM NOMENCLATURE (U) Small UAV

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) 350 MHz - 399.9 MHz

b. EMISSION DESIGNATORS (U) 15K6F1D

## 5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS

(U) Provide the capability to command and control small UAVs

(WARTIME USE)

a. YES

b. NO

6. INFORMATION TRANSFER REQUIREMENTS(U) 9.6 Kbps data

7. ESTIMATED INITIAL COST OF THE SYSTEM (U) \$4000

## 8. TARGET DATE FOR

a. APPLICATION APPROVAL

(U) 04-30-2005

b. SYSTEM ACTIVATION

(U) ASAP

c. SYSTEM TERMINATION

(U) 2030

9. SYSTEM RELATIONSHIP (U)  
AND ESSENTIALITY

10. REPLACEMENT INFORMATION (U) Will eventually supersede J/F 12/08057/2

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

12. NUMBER OF MOBILE UNITS (U) 1000

## 13. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) US&amp;P; Worldwide

14. LINE DIAGRAM (U) See Page(s) 5

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

## 16. TYPE OF SERVICE(S) FOR STAGE 4

(U) Aeronautical Mobile

## 17. STATION CLASS(ES) FOR STAGE 4

(U) FAD

## 18. REMARKS (U)

Positive control of the air vehicle is maintained by pre-programmed response to loss of the control link. When a loss of the control link is detected, the air vehicle returns to a pre-programmed point and auto-lands.

The module has 4 factory preset channels; per module, all 4 channels must be within a 10 MHz band. This 10 MHz window can be set in the 350-399.9

## DOWNGRADING INSTRUCTIONS

J/F 12/08057/4

CLASSIFICATION  
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**NTIA REMARK OVERFLOW PAGE**

MHz frequency range.

Use of this system must be in accordance with the channeling plans for the 225-399.9 MHz band. Assignments that do not fit the wideband channels in the 380-399.9 MHz band may be difficult to obtain.

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MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB)  
EQUIPMENT FREQUENCY ALLOCATION GUIDANCE

Military Department: Air Force, Navy, Army  
Equipment: AeroVironment Data Link  
Stage: 4 - Operational

Section 1: ENCLOSURES

J/F 12/8057/4, 18 August 2004

Section 2: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED

Frequency: 350-399.9 MHz (See Paragraph 5)  
Emission: 15K6F1D  
Power (Mean): 2 W  
Type of Service: Aeronautical Mobile  
Operating Location: US&P

Section 3: MCEB GUIDANCE

1. The enclosed application is approved for operational systems at the above locations subject to the guidance provided in the following paragraphs.
2. For the intended operation in the Aeronautical Mobile service, the subject equipment is in accordance with the ITU and US Tables of Frequency Allocation.
3. The transmitter does not comply with MIL-STD-461E requirements for spurious emission and harmonic levels.
4. Frequency assignment request must be submitted using Standard Frequency Action Format (SFAF) and coordinated with the cognizant Area Frequency Coordinator (AFC) in accordance with ACP 190 US SUPP-1(C), Guide to Frequency Planning, prior to activation. Prior to selection of factory fixed frequency, the cognizant AFC must be consulted.
5. Use of this system must be in accordance with the channeling plans for the 225-399.9 MHz band. Assignments that do not fit the wideband channels in the 380-399.9 MHz band may be very difficult to obtain. Per SECDEF Memo, 1 Aug 2001, Subj: Policy for Land Mobile Radio, the band 380-399.9 MHz will be heavily used by Land Mobile Radio (LMR) systems in the future. The Program Office might consider moving the uplink of this system to operate in the 225-380 MHz band at the earliest opportunity to ensure future frequency assignments availability. The 225-380 MHz band is heavily used by various space, ground, airborne and sea communication systems; however, there are more channels available in this band than in the 380-399.9 MHz bands.
6. Coordination with NTIA/SPS was completed and the following US certification statements were received:

a. The Spectrum Planning Subcommittee (SPS) has reviewed this system under the provisions of Chapter 10 of the NTIA Manual, the SPS recommends that:

b. NTIA certify Stage 4 spectrum support for the AeroVironment Data Link as specified in Section 2.

c. Air Force work with Military Assignment Group (MAG) to process all frequency assignment actions in accordance with Section 1.4.1 of the NTIA Manual.

d. Air Force ensure that personnel are protected from radiation levels that exceed generally accepted exposure criteria.

7. Authorization for use outside of the US&P is dependent on receiving a statement of supportability from the appropriate COCOM. Host nation frequency support coordination has been initiated.

Steering Member  
ESG Working Group  
MCEB Frequency Panel  
APPROVAL Signature Date: 20 APR 2005

IRAC/SPS Numbers:  
IRAC Doc. 34274/1  
SPS-14857

Downgrading Instructions: NA  
Distribution: J-12 Holders  
MCEB J-12 Number: 8057/5  
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MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON DC 20301

01 Jun 2005

NH J/F 12/8057/4  
(Agenda Item No. J-12)

NOTE TO HOLDERS  
OF  
J/F 12/8057/4

AeroVironment Data Link

Holders of subject Air Force, Army and Navy document, dated 18 Aug 04,  
are requested by Air Force to note the following:

J/F 12/8057/4

DoD General Information Page, Block 10b: Change to read "J/F 12/8252"

STEERING MEMBER  
ESG WORKING GROUP  
MCEB FREQUENCY PANEL

cc: MCEB J-12 Distribution List  
UNCLASSIFIED NH J/F 12/8057/4

ADMINISTRATIVE INFORMATION PAGE

- 1. SYSTEM IDENTIFIER: (U) C
- 2. EQUIPMENT FUNCTION: (U) CD C GG G
- 3. EQUIPMENT NOMENCLATURE: (U) AEROVIRONMENT DATA LINK (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  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)

- 8. NOTE-TO-HOLDER:  
(U) 06-01-2005  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)  
(U)

- 9. JSC MEMO DATE: (U) 04-20-2005

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

- 11. PROCURING AGENCY: (U) AF

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

NTIA ADMINISTRATIVE PAGE

(U) SPS #: 14857

(U) SIN #:

(U) AGENCY: AF

(U) STAGE: 4

(U) PREVIOUS CERTIFICATION:

(U) STATUS:           DATE:           ACTION:

(U) REMARKS:

IRAC DOC.#: 34274/1

(U) SPS RELATED DOCUMENTS:           DATE:           DOCKET #:           DESCRIPTION:

(U) SPS RECOMMENDATIONS:

(U) NTIA CERTIFICATION: