



## DEPARTMENT OF THE AIR FORCE

Headquarters, 88th Air Base Wing (AFMC)  
Wright-Patterson Air Force Base Ohio

19 May 2005

**MEMORANDUM FOR ASC/RAJA**  
**ATTENTION**

(b) (6)

**FROM:** 88 CG/SCXI

**SUBJECT:** Approved Equipment Frequency Allocation Papers for the AeroVironment Data and Video Links, ASC 2004-23 and ASC 2004-24.

1. The US Military Communications Electronics Board (MCEB) has issued guidance for use of the AeroVironment Data and Video Links. Please retain the attached MCEB guidance letters and the equipment frequency allocation papers for your files and future reference. This is your operational equipment certification documentation for these systems.
2. For the AeroVironment Data Link, please note frequency assignment requests must be submitted and specific frequencies identified prior to selection of factory fixed frequencies.
3. For the AeroVironment Video Link, please note:
  - a. This document is not your license/authorization to transmit. Frequency assignment requests must be submitted and coordinated with the cognizant Area Frequency Coordinator (AFC) prior to activation.
  - b. The 1755-1850 MHz band is a heavily used band and use of this system within this band will require extensive coordination and/or EMC analysis to prevent any potential mutual interference to or from other systems (for each location).
  - c. Be aware that this system does not comply with frequency tolerance as specified in Table 5.2.1 of the NTIA manual and therefore, if interference occurs, mitigating interference normally rests with the station in non-conformance.
4. AFI 33-118 requires customers to acknowledge receipt of MCEB guidance within 60 days. Please sign and return attachment 1 (endorsement only) by COB 06 Jun 2005.

3. If you have any questions about the attached documentation please contact (b) (6) at extension (b) (6)

(b) (6)

**Attachments:**

1. Endorsement Letter
2. J/F 12/8057/5, MCEB Guidance dated Apr 20 2005
3. J/F 12/8057/4, Equipment Frequency Allocation dated 08-18-2004
4. J/F 12/8252/1, MCEB Guidance dated May 04 2005
5. J/F 12/8252, Equipment Frequency Allocation dated 09-13-2004

1<sup>st</sup> Ind. to 88 CG/SCXI Letter, 19 May 2005, Approved Equipment Frequency Allocation Papers for the AeroVironment Data and Video Links, ASC 2004-23 and ASC 2004-24.

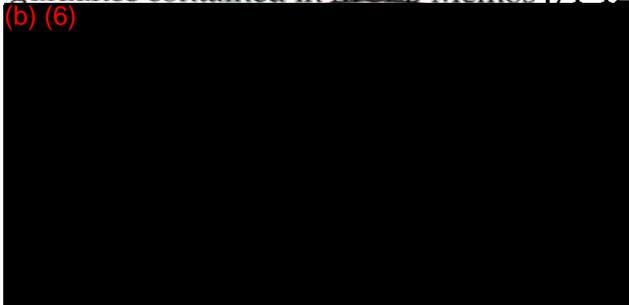
ASC/RAJA

24 May 05  
Date

TO: 88 CG/SCXI

In accordance with AFI 33-118 para 11.5.4, I acknowledge receipt and understanding of MCEB guidance contained in MCEB Memos I/E 12/8057/5 and J/F 12/8252/1

(b) (6)



# UNCLASSIFIED

MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB) EQUIPMENT FREQUENCY ALLOCATION GUIDANCE						
Military Department  Air Force Navy Army	Equipment  <b>AeroVironment Video Link</b>			Stage  4 - Operational		
<b>Section 1: ENCLOSURES</b>						
Enclosure Number  1	Description  J/F 12/8252			Dated  13 September 2004		
<b>Section 2: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED</b>						
Frequency (MHz)  1755-1850	Emission  14M8F9W	Power (Mean)  1.5 W	Type of Service  Aeronautical Mobile	Operating Location  US&P		
<b>Section 3: MCEB GUIDANCE</b>						
<p>1. The enclosed application is approved for operational systems at the above locations subject to the guidance provided in the following paragraphs.</p> <p>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.</p> <p>3. Based on the information provided,</p> <p style="margin-left: 40px;">a. The transmitter does not comply with NTIA Manual, Sections 5.2.1, requirements for frequency tolerance.</p> <p style="margin-left: 40px;">b. The transmitter complies with NTIA Manual, Sections 5.2.2, requirements for unwanted emission bandwidth, spurious emission and harmonic levels.</p> <p style="margin-left: 40px;">c. The transmitter does comply with MIL-STD-461E requirements for spurious emissions and harmonic levels.</p> <p>4. In any instance of harmful interference caused by nonconformance with NTIA Manual, Section 5.2.1, the responsibility for eliminating the harmful interference shall rest with the agency operating in nonconformance.</p>						
Steering Member ESG Working Group MCEB Frequency Panel		(b) (6)		Date  MAY 04 2005	IRAC/SPS Number Doc. 34197/1 SPS-14822/2	Page  1 of 2
Downgrading Instructions Classified by: NA Declassify on: NA			Distribution  J-12 Holders		MCEB J-12 Number  <b>8252/1</b>	

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MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB)		
EQUIPMENT FREQUENCY GUIDANCE		
MCEB GUIDANCE	Equipment	
CONTINUATION PAGE	AeroVironment Video Link	
Section 3: MCEB GUIDANCE (continued)		
<p>5. Frequency assignment requests 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.</p> <p>6. The 1755-1850 MHz band is heavily used by other DoD and Federal Government systems. It may be possible to accommodate the use of this system in the 1755-1850 MHz band on a case-by-case, location-by-location basis; however, it will require extensive coordination and/or EMC analysis to prevent any potential mutual interference to or from the many DoD systems (e.g. Space Ground Link Subsystem (SGLS), Mobile subscriber Equipment (MSE), Tactical Control Link/Precision Guided Munitions, Air Combat Training Systems, Digital Wideband Transmission System, Point-to-Point Microwave Systems, etc.).</p> <p>7. Coordination with NTIA/SPS was completed and the following US certification statements were received:</p> <ul style="list-style-type: none"><li>a. The Spectrum Planning Subcommittee (SPS) has reviewed this system under the provisions of Chapter 10 of the NTIA Manual, the SPS recommends that:</li><li>b. NTIA certify Stage 4 spectrum support for the AeroVironment Video Link as specified in Section 2.</li><li>c. Air Force be aware that mitigating interference caused by the nonconforming frequency tolerance of 30 ppm (vs. 20 ppm as specified in Table 5.2.1 of the NTIA Manual) shall normally rest with the agency operating in nonconformance, in accordance with Section 5.1.2 of the NTIA Manual.</li><li>d. Air Force be aware that it may be difficult or impossible to successfully coordinate assignments at some locations, due to the congested electromagnetic environment in the operating band of the subject system and the relatively wide bandwidth required for transmissions from an airborne station.</li></ul> <p>8. Authorization for use outside of the US&amp;P is dependent on receiving a statement of supportability from the appropriate COCOM. Host nation frequency support coordination has been initiated.</p>		
	Page 2 of 2	MCEB J-12 Number 8252/1

UNCLASSIFIED

<b>APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION</b>	<b>CLASSIFICATION UNCLASSIFIED</b>	<b>DATE</b> 09-13-2004	J/F 12/08252
			Page 1 of 7 Pages
<b>DOD GENERAL INFORMATION</b>			
<b>TO</b> Air Force Frequency Management Agency Engineering Division (DON) 2461 Eisenhower Ave., Suite 1203 Alexandria, VA 22331-1500	<b>FROM</b> Aeronautical Systems Center (AFMC) 88CG/SCXI (ASC 2004-024) Area B, Building 47, 2690 K Street Wright-Patterson AFB, OH 45433-7661		
1. APPLICATION TITLE (U) AeroVironment Video Link			
2. SYSTEM NOMENCLATURE (U) Small UAV			
3. STAGE OF ALLOCATION (U) <input type="checkbox"/> a. STAGE 1 CONCEPTUAL <input type="checkbox"/> b. STAGE 2 EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 DEVELOPMENTAL <input checked="" type="checkbox"/> d. STAGE 4 OPERATIONAL			
4. FREQUENCY REQUIREMENTS a. FREQUENCY(IES) (U) 1755 MHz - 1850 MHz b. EMISSION DESIGNATORS (U) 14M8F9W			
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) Intermittent			
7. GEOGRAPHICAL AREA FOR			
a. STAGE 2 (U) NA			
b. STAGE 3 (U) NA			
c. STAGE 4 (U) US&P			
8. NUMBER OF UNITS			
a. STAGE 2 (U) NA		b. STAGE 3 (U) NA	c. STAGE 4 (U) 1000
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT(U) 4			
10. OTHER J/F 12 APPLICATION ID(S) TO BE (U) <input type="checkbox"/> a. SUPERSEDED <input checked="" type="checkbox"/> b. RELATED J/F 12/6892 J/F 12/08057/4		11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11? (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO <input type="checkbox"/> c. NAVAIL	
12. NAMES AND TELEPHONE NUMBERS (U)			
a. PROGRAM MANAGER	(b) (6)	(1) COMMERCIAL	(b) (6)
b. PROJECT ENGINEER	(b) (6)	(1) COMMERCIAL	(b) (6)
13. REMARKS (U)			
DOWNGRADING INSTRUCTIONS			J/F 12/08252
			<b>CLASSIFICATION UNCLASSIFIED</b>

TRANSMITTER EQUIPMENT CHARACTERISTICS

<b>1. NOMENCLATURE, MANUFACTURER'S MODEL NO.</b> (U) VNTXL-2A/SC232 Video/Telemetry Tx	<b>2. MANUFACTURER'S NAME</b> (U) L3 Communications
<b>3. TRANSMITTER INSTALLATION</b> (U) Aircraft	<b>4. TRANSMITTER TYPE</b> (U) FM Video and Telemetry
<b>5. TUNING RANGE</b> (U) 1710 MHz - 1850 MHz	<b>6. METHOD OF TUNING</b> (U) Synthesizer
<b>7. RF CHANNELING CAPABILITY</b> (U) 1710 MHz, 57 channels in 2.5 MHz steps	<b>8. EMISSION DESIGNATORS</b> (U) 14M8F9W (U) (U)
<b>9. FREQUENCY TOLERANCE</b> (U) 30 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) 2.4 MHz (U) (U) <b>b. -20 dB</b> (U) 14.8 MHz (U) (U) <b>c. -40 dB</b> (U) 26 MHz (U) (U) <b>d. -60 dB</b> (U) 38 MHz (U) (U) <b>e. OC-BW</b> (U) 14.8 MHz (U) (U)
<b>11. SPREAD SPECTRUM</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	<b>15. MAXIMUM MODULATION FREQUENCY</b> (U) 7.6 MHz
<b>13. MAXIMUM BIT RATE</b> (U) 9600 bps	<b>17. DEVIATION RATIO</b> (U) 1.027
<b>14. MODULATION TECHNIQUES AND CODING</b> (U) NTSC video and telemetry subcarrier using FSK modulation.	<b>18. PULSE CHARACTERISTICS</b> <b>a. RATE</b> (U) NA (U) (U) <b>b. WIDTH</b> (U) NA (U) (U) <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>16. PRE-EMPHASIS</b> (U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO	<b>21. HARMONIC LEVEL</b> <b>a. 2nd</b> (U) -86 dB <b>b. 3rd</b> (U) -89 dB <b>c. OTHER</b> (U) (See Remarks)
<b>19. POWER</b> <b>a. MEAN</b> (U) 1.5 W (U) (U) <b>b. PEP</b> (U) NA (U) (U)	<b>20. OUTPUT DEVICE</b> (U) Common Source FET Transistor
<b>22. SPURIOUS LEVEL</b> (U) -80 dB	<b>23. FCC TYPE ACCEPTANCE NO.</b> (U) NA
<b>24. REMARKS</b> (U) <p>Item 10: 7 pole low pass filter between output device and antenna. The insertion loss is 3 dB in the pass band and 75 dB at the 2nd Harmonic.</p> <p>Item 15: Highest Modulation Frequency is subcarrier at 7.6 MHz. Highest Video is 4.2 MHz.</p> <p>Item 16: Video Pre-Emphasis per CCIR 405, 525 Line Curve.</p> <p>Item 21c. None observed.</p>	

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) VR(10/20)LA/SC232 Receiver				2. MANUFACTURER'S NAME (U) L3 Communications			
3. RECEIVER INSTALLATION (U) Ground Station				4. RECEIVER TYPE (U) Single Conversion Superheterodyne			
5. TUNING RANGE (U) 1710 MHz - 1850 MHz				6. METHOD OF TUNING (U) Synthesizer			
7. RF CHANNELING CAPABILITY (U) 1710 MHz, 57 channels in 2.5 MHz steps				8. EMISSION DESIGNATORS (U) 14M8F9W			
9. FREQUENCY TOLERANCE (U) 30 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) 200 MHz		
a. -3 dB		24 MHz	NA	NA	b. -20 dB (U) 250 MHz		
b. -20 dB		27 MHz	NA	NA	c. -60 dB (U) 350 MHz		
c. -60 dB		40 MHz	NA	NA	d. Preselection Type (U) 8-POLE LC band-pass		
12. IF FREQUENCY				13. MAXIMUM POST DETECTION FREQUENCY (U) 7.6 MHz			
a. 1st (U) 480 MHz				14. MINIMUM POST DETECTION FREQUENCY (U) 6 Hz			
b. 2nd (U) NA				16. MAXIMUM BIT RATE (U) 9600 bps			
c. 3rd (U) NA				17. SENSITIVITY			
15. OSCILLATOR TUNED		1st (U)	2nd (U)	3rd (U)	a. SENSITIVITY (U) -85 dBm		
a. ABOVE TUNED FREQUENCY		X			b. CRITERIA (U) 12dB S/N		
b. BELOW TUNED FREQUENCY					c. NOISE FIG (U) 6 dB		
c. EITHER ABOVE OR BELOW THE FREQUENCY					d. NOISE TEMP (U) NA		
18. DE-EMPHASIS (U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO				20. SPURIOUS REJECTION (U) 60 dB			
19. IMAGE REJECTION (U) 60 dB							

21. REMARKS (U) Item 18: 6 Hz to 5 MHz per CCIR 405, 525 lines.

ANTENNA EQUIPMENT CHARACTERISTICS

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

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.  
(U) AeroVironment 55018

3. MANUFACTURER'S NAME  
(U) AeroVironment, Inc.

4. FREQUENCY RANGE  
(U) 1710 MHz - 1850 MHz

5. TYPE (U) Dipole

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

8. GAIN

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U) NA

(2) Scan Rate (U) NA

a. MAIN BEAM  
(U) 2.2 dBi

b. 1st MAJOR SIDE LOBE  
(U) NA

9. BEAMWIDTH

a. HORIZONTAL  
(U) 360 deg

b. VERTICAL  
(U) 78 deg

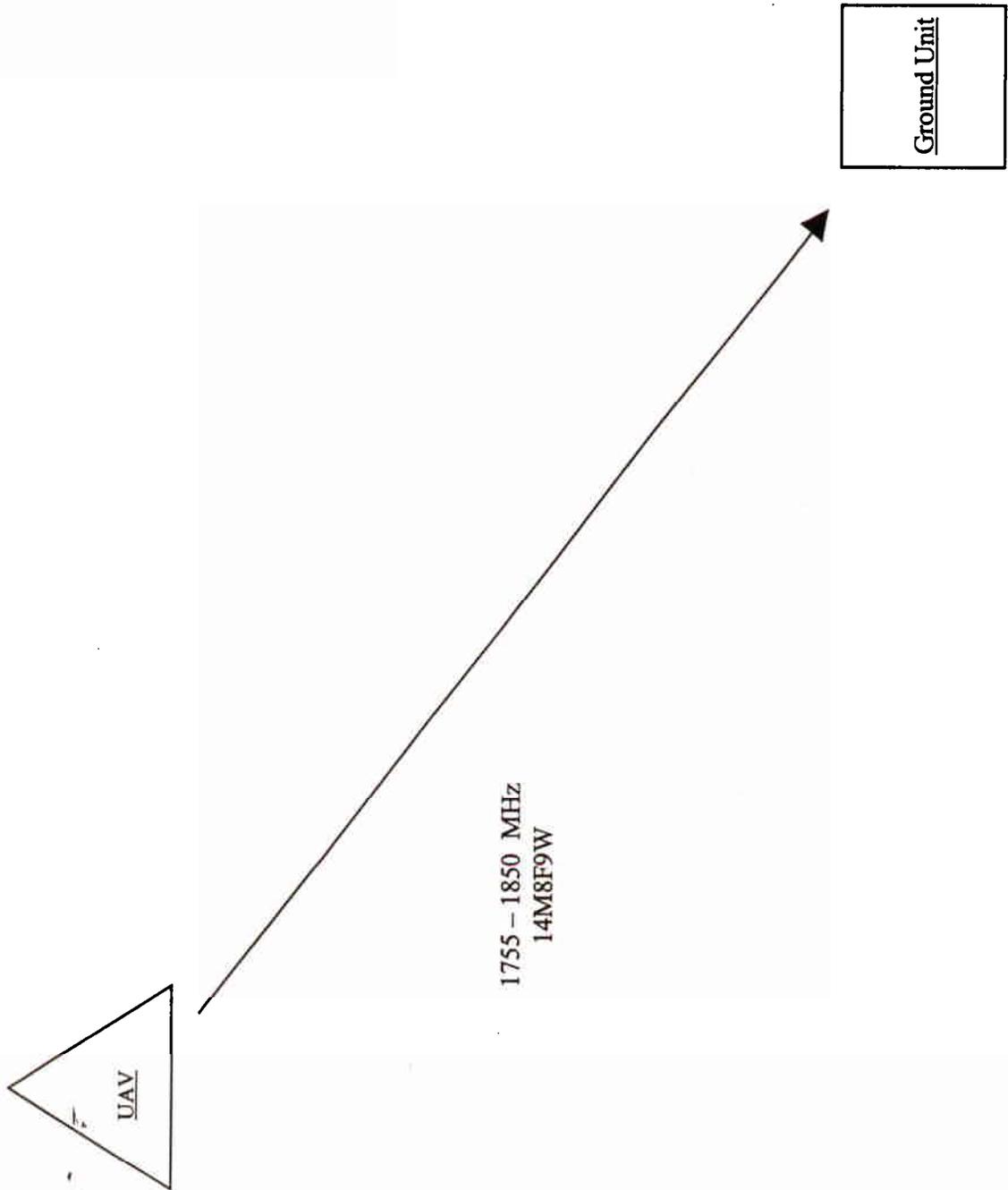
d. SECTOR BLANKING (U)  (1) YES  (2) NO

10. REMARKS (U)



PICTORIAL LINE DIAGRAM

Aero Vironnet Video Link



<b>APPLICATION FOR SPECTRUM REVIEW</b>		<b>CLASSIFICATION UNCLASSIFIED</b>		<b>PAGE 7</b>	
<b>NTIA GENERAL INFORMATION</b>					
1. <b>APPLICATION TITLE</b> (U) AeroVironment Video Link					
2. <b>SYSTEM NOMENCLATURE</b> (U) Small UAV					
3. <b>STAGE OF ALLOCATION</b> (U) <input type="checkbox"/> a. STAGE 1 CONCEPTUAL <input type="checkbox"/> b. STAGE 2 EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 DEVELOPMENTAL <input checked="" type="checkbox"/> d. STAGE 4 OPERATIONAL					
4. <b>FREQUENCY REQUIREMENTS</b> a. <b>FREQUENCY(IES)</b> (U) 1755 MHz - 1850 MHz b. <b>EMISSION DESIGNATORS</b> (U) 14M8F9W					
5. <b>PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS</b> (U) Small Unmanned Aerial Vehical (UAV) designed to provide surveillance and reconnaissance information. <b>(WARTIME USE)</b> <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO					
6. <b>INFORMATION TRANSFER REQUIREMENTS</b> (U) FM Video and Data with 9600 bps					
7. <b>ESTIMATED INITIAL COST OF THE SYSTEM</b> (U) \$139k each					
8. <b>TARGET DATE FOR</b>					
a. <b>APPLICATION APPROVAL</b> (U) 12-31-2004		b. <b>SYSTEM ACTIVATION</b> (U) ASAP		c. <b>SYSTEM TERMINATION</b> (U) 2030	
9. <b>SYSTEM RELATIONSHIP AND ESSENTIALITY</b> (U) Small UAV with Command and Video link					
10. <b>REPLACEMENT INFORMATION</b> (U) None					
11. <b>RELATED ANALYSIS AND/OR TEST DATA</b> (U) None					
12. <b>NUMBER OF MOBILE UNITS</b> (U) 1000					
13. <b>GEOGRAPHICAL AREA FOR</b>					
a. <b>STAGE 2</b> (U) NA					
b. <b>STAGE 3</b> (U) NA					
c. <b>STAGE 4</b> (U) US&P					
14. <b>LINE DIAGRAM</b> (U) See Page(s) 6			15. <b>SPACE SYSTEMS</b> (U) See Page(s) NA		
16. <b>TYPE OF SERVICE(S) FOR STAGE 4</b> (U) Aeronautical Mobile			17. <b>STATION CLASS(ES) FOR STAGE 4</b> (U) MA		
18. <b>REMARKS</b> (U) Item 4a: This equipment can be tuned from 1710 to 1850 MHz; however within the US&P usage will be limited to the 1755 to 1850 MHz band only.					
<b>DOWNGRADING INSTRUCTIONS</b>				J/F 12/08252	
				<b>CLASSIFICATION UNCLASSIFIED</b>	

# UNCLASSIFIED

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						
Enclosure Number 1	Description J/F 12/8057/4			Dated 18 August 2004		
Section 2: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED						
Frequency (MHz) 350-399.9 (See Paragraph 5)	Emission 15K6F1D	Power (Mean) 2 W	Type of Service Aeronautical Mobile	Operating Location US&P		
Section 3: MCEB GUIDANCE						
<p>1. The enclosed application is approved for operational systems at the above locations subject to the guidance provided in the following paragraphs.</p> <p>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.</p> <p>3. The transmitter does not comply with MIL-STD-461E requirements for spurious emission and harmonic levels.</p> <p>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.</p>						
Steering Member ESG Working Group MCEB Frequency Panel	(b) (6)			Date APR 20 2005	IRAC/SPS Number Doc. 34274/1 SPS-14857	Page 1 of 2
Downgrading Instructions Classified by: NA Declassify on: NA			Distribution J-12 Holders	MCEB J-12 Number 8057/5		

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## MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB)

### EQUIPMENT FREQUENCY GUIDANCE

MCEB GUIDANCE CONTINUATION PAGE	Equipment  AeroVironment Data Link
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#### Section 3: MCEB GUIDANCE (continued)

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.

	Page 2 of 2	MCEB J-12 Number 8057/5
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# UNCLASSIFIED

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION		CLASSIFICATION <b>UNCLASSIFIED</b>	DATE 08-18-2004	J/F 12/08057/4
				Page 1 of 7 Pages
<b>DOD GENERAL INFORMATION</b>				
<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		
1. APPLICATION TITLE (U) AeroVironment Data Link				
2. SYSTEM NOMENCLATURE (U) Small UAV				
3. STAGE OF ALLOCATION (U) <input type="checkbox"/> a. STAGE 1 CONCEPTUAL <input type="checkbox"/> b. STAGE 2 EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 DEVELOPMENTAL <input checked="" type="checkbox"/> 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
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
9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT(U) 4				
10. OTHER J/F 12 APPLICATION ID(S) TO BE (U) <input checked="" type="checkbox"/> a. SUPERSEDED J/F 12/8057/2 <input checked="" type="checkbox"/> b. RELATED J/F 12/08254			11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11? (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO <input type="checkbox"/> c. NAVAIL	
12. NAMES AND TELEPHONE NUMBERS (U)				
a. PROGRAM MANAGER (b) (6)		(1) COMMERCIAL (b) (6)		(2) DSN (b) (6)
b. PROJECT ENGINEER (b) (6)		(1) COMMERCIAL (b) (6)		(2) DSN (b) (6)
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.				
DOWNGRADING INSTRUCTIONS				J/F 12/08057/4
				CLASSIFICATION <b>UNCLASSIFIED</b>

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) Uplink Transmitter (See Remarks)	2. MANUFACTURER'S NAME (U) AeroVironment, Inc.
3. TRANSMITTER INSTALLATION (U) Ground	4. TRANSMITTER TYPE (U) Digital FM Communication
5. TUNING RANGE (U) 350 MHz - 400 MHz (See Remarks)	6. METHOD OF TUNING (U) Synthesizer
7. RF CHANNELING CAPABILITY (U) (See Remarks)	8. EMISSION DESIGNATORS (U) 15K6F1D (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) 5 KHz (U) (U)
11. SPREAD SPECTRUM (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	b. -20 dB (U) 12 KHz (U) (U)
13. MAXIMUM BIT RATE (U) 9.6 Kbps	c. -40 dB (U) 34 KHz (U) (U)
14. MODULATION TECHNIQUES AND CODING (U) Manchester encoded FSK	d. -60 dB (U) 70 KHz (U) (U)
15. MAXIMUM MODULATION FREQUENCY (U) 9.6 KHz	e. OC-BW (U) 17 KHz (U) (U)
16. PRE-EMPHASIS (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO	17. DEVIATION RATIO (U) 0.55
19. POWER	18. PULSE CHARACTERISTICS
a. MEAN (U) 2 W (U) (U)	a. RATE (U) NA (U) (U)
b. PEP (U) NA (U) (U)	b. WIDTH (U) NA (U) (U)
20. OUTPUT DEVICE (U) Transistor	c. RISE TIME (U) NA (U) (U)
22. SPURIOUS LEVEL (U) -50 dB	d. FALL TIME (U) NA (U) (U)
23. FCC TYPE ACCEPTANCE NO. (U) NA	e. COMP RATIO (U) NA (U) (U)
24. REMARKS (U)	21. HARMONIC LEVEL
Item 1: For DoD requirement, AeroVironment modified Part No. 55025	a. 2nd (U) -55 dB
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.	b. 3rd (U) -70 dB
Item 10: 2 pole low pass Butterworth filter with the 3 dB point at approximately 425 MHz. The insertion loss is 2 dB.	c. OTHER (U) -80 dB

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> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width:15%;"></th> <th style="width:15%;">1st (U)</th> <th style="width:15%;">2nd (U)</th> <th style="width:15%;">3rd (U)</th> </tr> </thead> <tbody> <tr> <td>a. -3 dB</td> <td>50 KHz</td> <td>7 KHz</td> <td>NA</td> </tr> <tr> <td>b. -20 dB</td> <td>150 KHz</td> <td>44 KHz</td> <td>NA</td> </tr> <tr> <td>c. -60 dB</td> <td>300 KHz</td> <td>72 KHz</td> <td>NA</td> </tr> </tbody> </table>					1st (U)	2nd (U)	3rd (U)	a. -3 dB	50 KHz	7 KHz	NA	b. -20 dB	150 KHz	44 KHz	NA	c. -60 dB	300 KHz	72 KHz	NA	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;"><b>a. -3 dB</b></td> <td style="width:15%;">(U) 10 MHz</td> </tr> <tr> <td><b>b. -20 dB</b></td> <td>(U) 74 MHz</td> </tr> <tr> <td><b>c. -60 dB</b></td> <td>(U) 250 MHz</td> </tr> <tr> <td><b>d. Preselection Type</b></td> <td>(U) LC Filter</td> </tr> </table>				<b>a. -3 dB</b>	(U) 10 MHz	<b>b. -20 dB</b>	(U) 74 MHz	<b>c. -60 dB</b>	(U) 250 MHz	<b>d. Preselection Type</b>	(U) LC Filter
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<b>12. IF FREQUENCY</b> <table style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width:15%;">a. 1st (U)</td> <td>86.85 MHz</td> </tr> <tr> <td>b. 2nd (U)</td> <td>455 KHz</td> </tr> <tr> <td>c. 3rd (U)</td> <td>NA</td> </tr> </table>				a. 1st (U)	86.85 MHz	b. 2nd (U)	455 KHz	c. 3rd (U)	NA	<b>13. MAXIMUM POST DETECTION FREQUENCY</b> (U) 9.792 KHz																					
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<b>15. OSCILLATOR TUNED</b> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width:20%;"></th> <th style="width:10%;">1st (U)</th> <th style="width:10%;">2nd (U)</th> <th style="width:10%;">3rd (U)</th> </tr> </thead> <tbody> <tr> <td>a. ABOVE TUNED FREQUENCY</td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. BELOW TUNED FREQUENCY</td> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td>c. EITHER ABOVE OR BELOW THE FREQUENCY</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					1st (U)	2nd (U)	3rd (U)	a. ABOVE TUNED FREQUENCY				b. BELOW TUNED FREQUENCY	X	X		c. EITHER ABOVE OR BELOW THE FREQUENCY				<b>14. MINIMUM POST DETECTION FREQUENCY</b> (U) 9.408 KHz											
	1st (U)	2nd (U)	3rd (U)																												
a. ABOVE TUNED FREQUENCY																															
b. BELOW TUNED FREQUENCY	X	X																													
c. EITHER ABOVE OR BELOW THE FREQUENCY																															
<b>18. DE-EMPHASIS</b> (U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO				<b>16. MAXIMUM BIT RATE</b> (U) 9.6 Kbps																											
<b>19. IMAGE REJECTION</b> (U) 73 dB				<b>17. SENSITIVITY</b> <table style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width:15%;"><b>a. SENSITIVITY</b></td> <td>(U) -105 dBm</td> </tr> <tr> <td><b>b. CRITERIA</b></td> <td>(U) SNR = 16 dB: 10-5 BER</td> </tr> <tr> <td><b>c. NOISE FIG</b></td> <td>(U) 4.5 dB</td> </tr> <tr> <td><b>d. NOISE TEMP</b></td> <td>(U) NA</td> </tr> </table>				<b>a. SENSITIVITY</b>	(U) -105 dBm	<b>b. CRITERIA</b>	(U) SNR = 16 dB: 10-5 BER	<b>c. NOISE FIG</b>	(U) 4.5 dB	<b>d. NOISE TEMP</b>	(U) NA																
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<b>c. NOISE FIG</b>	(U) 4.5 dB																														
<b>d. NOISE TEMP</b>	(U) NA																														
<b>20. SPURIOUS REJECTION</b> (U) 60 dB				<b>21. REMARKS (U)</b> Item 5/7: The module operates within 10 MHz band and has a maximum of 4 factory preset channels.																											

**ANTENNA EQUIPMENT CHARACTERISTICS**

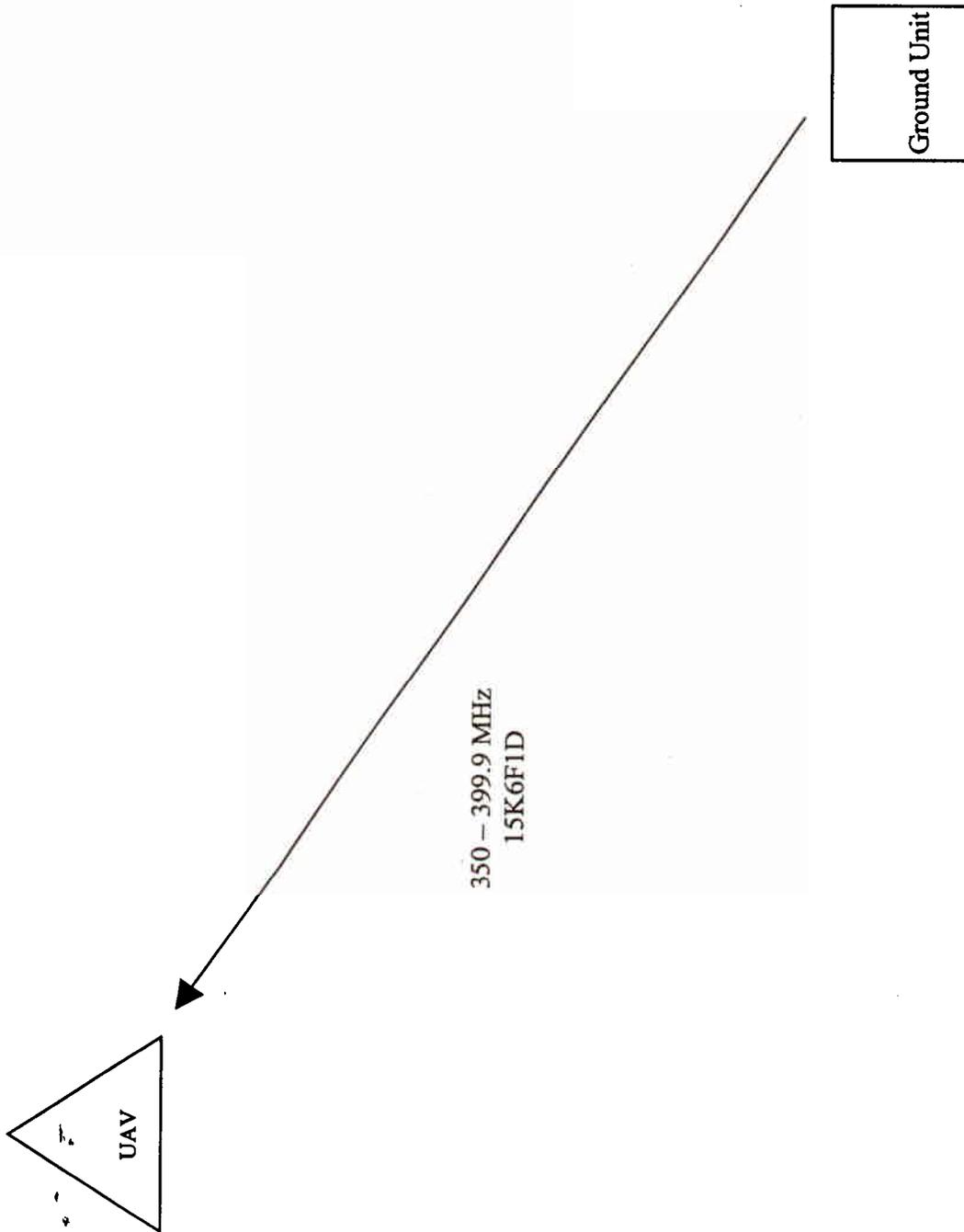
1. (U) <input type="checkbox"/> a. TRANSMITTING <input type="checkbox"/> b. RECEIVING <input checked="" type="checkbox"/> c. TRANSMITTING AND RECEIVING	
2. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) PN 55017 and 55008	3. MANUFACTURER'S NAME (U) AeroVironment, Inc.
4. FREQUENCY RANGE (U) 350 MHz - 400 MHz	5. TYPE (U) Dipole
6. POLARIZATION (U) Vertical	7. SCAN CHARACTERISTICS
8. GAIN	a. TYPE (U) FIXED
a. MAIN BEAM (U) 2.2 dBi	b. VERTICAL SCAN (U) NA
b. 1st MAJOR SIDE LOBE (U) NA	(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) 78 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)

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

PICTORIAL LINE DIAGRAM

**Aero Vironnet Data Link**



APPLICATION FOR SPECTRUM REVIEW	CLASSIFICATION <b>UNCLASSIFIED</b>	PAGE 6
<b>NTIA GENERAL INFORMATION</b>		
1. APPLICATION TITLE (U) AeroVironment Data Link		
2. SYSTEM NOMENCLATURE (U) Small UAV		
3. STAGE OF ALLOCATION (U) <input type="checkbox"/> a. STAGE 1 CONCEPTUAL <input type="checkbox"/> b. STAGE 2 EXPERIMENTAL <input type="checkbox"/> c. STAGE 3 DEVELOPMENTAL <input checked="" type="checkbox"/> 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) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> 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) NA 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&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 ( ) 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 <b>UNCLASSIFIED</b>

## 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.