

UNCLASSIFIED

J/F 12/06982

**SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS**

The title of this application is: Unmanned Aerial Vehicle Command Automatic Recovery System (UAVCARS), AN/UPN-51(V)

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.

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Refer to your Security Manual for further guidance.

No Application Level Special Handling  
No Page Level Special Handling

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| Page Type:         | Page #:  | Classification:              | Special Handling Requirement: |
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| DoD Page           | 1        | UNCLASSIFIED                 |                               |
| DoD Data Overflow  | 2        | UNCLASSIFIED                 |                               |
| Transmitter Page 1 | 3        | UNCLASSIFIED                 |                               |
| Transmitter Page 2 | 4        | UNCLASSIFIED                 |                               |
| Transmitter Page 3 | 5        | UNCLASSIFIED                 |                               |
| Transmitter Page 4 | 6        | UNCLASSIFIED                 |                               |
| Receiver Page 1    | 7        | UNCLASSIFIED                 |                               |
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| Receiver Page 3    | 9        | UNCLASSIFIED                 |                               |
| Receiver Page 4    | 10       | UNCLASSIFIED                 |                               |
| Antenna Page 1     | 11       | UNCLASSIFIED                 |                               |
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| ANT Data Overflow  | 13       | UNCLASSIFIED                 |                               |
| Antenna Page 3     | 14       | UNCLASSIFIED                 |                               |
| Antenna Page 4     | 15       | UNCLASSIFIED                 |                               |
| Antenna Page 5     | 16       | UNCLASSIFIED                 |                               |
| Antenna Page 6     | 17       | UNCLASSIFIED                 |                               |
| NTIA Page          | 18       | UNCLASSIFIED                 |                               |
| NTIA Data Overflow | 19       | UNCLASSIFIED                 |                               |
| MCEB Guidance Page | 20       | UNCLASSIFIED                 |                               |
| MCEB Overflow      | 21<br>22 | UNCLASSIFIED<br>UNCLASSIFIED |                               |

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| Page Type:          | Page #: | Classification: | Special Handling Requirement: |
|---------------------|---------|-----------------|-------------------------------|
| Note to Holders 1   | 23      | UNCLASSIFIED    |                               |
| Note to Holders 2   | 24      | UNCLASSIFIED    |                               |
| Note to Holders 3   | 25      | UNCLASSIFIED    |                               |
| Note to Holders 4   | 26      | UNCLASSIFIED    |                               |
| Note to Holders 5   | 27      | UNCLASSIFIED    |                               |
| Note to Holders 6   | 28      | UNCLASSIFIED    |                               |
| NTH Overflow        | 29      | UNCLASSIFIED    |                               |
| Note to Holders 7   | 30      | UNCLASSIFIED    |                               |
| NTIA Admin Page     | 31      | UNCLASSIFIED    |                               |
| Administrative Page |         | UNCLASSIFIED    |                               |

**DOD GENERAL INFORMATION**

|  |  |
|--|--|
| <b>TO</b><br>Department of the Navy<br>Naval Electromag. Spectrum Mgmt. Off.<br>(CNO N61T1)<br>Washington, DC 20350-2000 | <b>FROM</b><br>Naval Air Systems Command<br>POE(CU)-UP<br>Washington, DC 20350 |
|--|--|

1. APPLICATION TITLE (U) Unmanned Aerial Vehicle Command Automatic Recovery System (UAVCARS), AN/UPN-51(V)

2. SYSTEM NOMENCLATURE (U) Unmanned Aerial Vehicle Command Automatic Recovery

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)    34.9 GHz - 35.1 GHz    (See Remarks)

b. EMISSION DESIGNATORS (U)    1M08P0N    460KP0N    350KP0N    28M9P0N  
See Data Overflow Page

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) Launch and recovery phases on Unmanned Air Vehicle operation

7. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U) NA

c. STAGE 4 (U) US&P, Japan, Korea, NATO, Sea Areas Worldwide

8. NUMBER OF UNITS

|                   |                   |                   |
|-------------------|-------------------|-------------------|
| a. STAGE 2 (U) NA | b. STAGE 3 (U) NA | c. STAGE 4 (U) 23 |
|-------------------|-------------------|-------------------|

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

|  |   |
|--|---|
| 10. OTHER J/F 12 APPLICATION ID(S) TO BE (U)<br><input type="checkbox"/> a. SUPERSEDED<br><input type="checkbox"/> b. RELATED NA | 11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11?<br>(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)

Item 2: System (UAVCARS), AN/UPN-51(V)

Item 4a: Preferred frequencies 34.93 GHz and 35 GHz.

## DOD DATA OVERFLOW PAGE

## 2. SYSTEM NOMENCLATURE

## 4. FREQUENCY REQUIREMENTS

b. EMISSION DESIGNATORS (U)

6M24M0N

2K89P0N

## 10. OTHER J/F 12 APPLICATION NUMBER(S) TO BE

b. RELATED J/F 12/

TRANSMITTER EQUIPMENT CHARACTERISTICS

|   |  |
|---|--|
| <b>1. NOMENCLATURE, MANUFACTURER'S MODEL NO.</b><br>(U) UAVCARS Interrogator                                | <b>2. MANUFACTURER'S NAME</b><br>(U) Sierra Nevada Corp.   |
| <b>3. TRANSMITTER INSTALLATION</b><br>(U) Mobile, Ship based and land based                                 | <b>4. TRANSMITTER TYPE</b><br>(U) Pulse Radar  |
| <b>5. TUNING RANGE</b><br>(U) 34.9 GHz - 35.1 GHz (See Remarks)   | <b>6. METHOD OF TUNING</b><br>(U) Tuned Gunn Oscillator  |
| <b>7. RF CHANNELING CAPABILITY</b><br>(U) Continuous (see remarks)  | <b>8. EMISSION DESIGNATORS</b><br>(U) 1M08P0N (U) (U)  |
| <b>9. FREQUENCY TOLERANCE</b><br>(U) 14 ppm   | <b>12. EMISSION BANDWIDTH</b><br><input type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |
| <b>10. FILTER EMPLOYED</b><br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | <b>a. -3 dB (U)</b> 420 KHz (U) (U)  |
| <b>11. SPREAD SPECTRUM</b><br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | <b>b. -20 dB (U)</b> 1.08 MHz (U) (U)  |
| <b>13. MAXIMUM BIT RATE</b><br>(U) NA   | <b>c. -40 dB (U)</b> 2.21 MHz (U) (U)  |
| <b>14. MODULATION TECHNIQUES AND CODING</b><br>(U) Unmodulated pulse  | <b>d. -60 dB (U)</b> 2.25 MHz (U) (U)  |
| <b>16. PRE-EMPHASIS</b><br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO    | <b>e. OC-BW (U)</b> 1.08 MHz (U) (U)   |
| <b>19. POWER</b><br><b>a. MEAN (U)</b> NAvail (U) (U)   | <b>15. MAXIMUM MODULATION FREQUENCY</b><br>(U) NA  |
| <b>b. PEP (U)</b> 2 W (U) (U)   | <b>17. DEVIATION RATIO</b><br>(U) NA   |
| <b>20. OUTPUT DEVICE</b><br>(U) Oscilator Fed by Cav. Stab. Gunn Diode                                      | <b>18. PULSE CHARACTERISTICS</b>   |
| <b>22. SPURIOUS LEVEL</b><br>(U) -80 dB   | <b>a. RATE (U)</b> 6 Kpps (U) (U)  |
| <b>23. FCC TYPE ACCEPTANCE NO.</b><br>(U) NA  | <b>b. WIDTH (U)</b> 200 ns (U) (U)   |
| <b>24. REMARKS (U)</b>  | <b>c. RISE TIME (U)</b> 20 ns (U) (U)  |
|   | <b>d. FALL TIME (U)</b> 20 ns (U) (U)  |
|   | <b>e. COMP RATIO (U)</b> NA (U) (U)  |
|   | <b>21. HARMONIC LEVEL</b>  |
|   | <b>a. 2nd (U)</b> -45 dB   |
|   | <b>b. 3rd (U)</b> -50 dB   |
|   | <b>c. OTHER (U)</b> -59 dB   |

Item 7: Preferred fixed frequency at 34.93 GHz.

Item 18: Interrogator transmit 3 200-ns pulses at 2000 Hz.

TRANSMITTER EQUIPMENT CHARACTERISTICS

|  |   |
|--|---|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) UAVCARS Transponder                                 | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corp.   |
| 3. TRANSMITTER INSTALLATION<br>(U) UAV   | 4. TRANSMITTER TYPE<br>(U) Pulse Radar  |
| 5. TUNING RANGE<br>(U) 34.9 GHz - 35.1 GHz (See Remarks)   | 6. METHOD OF TUNING<br>(U) Tuned Gunn Oscillator  |
| 7. RF CHANNELING CAPABILITY<br>(U) Continuous (see remarks)  | 8. EMISSION DESIGNATORS<br>(U) 460KP0N (U) 350KP0N (U)  |
| 9. FREQUENCY TOLERANCE<br>(U) 14 ppm   | 12. EMISSION BANDWIDTH<br><input type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |
| 10. FILTER EMPLOYED<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | a. -3 dB (U) 180 KHz (U) 120 KHz (U)  |
| 11. SPREAD SPECTRUM<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | b. -20 dB (U) 460 KHz (U) 350 KHz (U)   |
| 13. MAXIMUM BIT RATE<br>(U) NA   | c. -40 dB (U) 1.92 MHz (U) 780 KHz (U)  |
| 14. MODULATION TECHNIQUES AND CODING<br>(U) Unmodulated pulse  | d. -60 dB (U) 3.58 MHz (U) 1.79 MHz (U)   |
| 16. PRE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO    | e. OC-BW (U) 460 KHz (U) 350 KHz (U)  |
| 19. POWER  | 15. MAXIMUM MODULATION FREQUENCY<br>(U) NA  |
| a. MEAN (U) NAvail (U) NAvail (U)  | 17. DEVIATION RATIO<br>(U) NA   |
| b. PEP (U) 2 mW (U) 2 mW (U)   | 18. PULSE CHARACTERISTICS   |
| 20. OUTPUT DEVICE<br>(U) Diode oscillator  | a. RATE (U) 2000 pps (U) 188.7 pps (U)  |
| 22. SPURIOUS LEVEL<br>(U) -80 dB   | b. WIDTH (U) 300 us (U) 5 ms (U)  |
| 23. FCC TYPE ACCEPTANCE NO.<br>(U) NA  | c. RISE TIME (U) 20 ns (U) 20 ns (U)  |
|  | d. FALL TIME (U) 20 ns (U) 20 ns (U)  |
|  | e. COMP RATIO (U) NA (U) NA (U)   |
|  | 21. HARMONIC LEVEL  |
|  | a. 2nd (U) -45 dB   |
|  | b. 3rd (U) -50 dB   |
|  | c. OTHER (U) -50 dB   |

24. REMARKS (U) Item 7: Preferred fixed frequency at 35 GHz.  
Item 8: 460KP0N (transponder mode), 350KP0N (beacon mode).

TRANSMITTER EQUIPMENT CHARACTERISTICS

|  |  |
|--|--|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) TALS Interrogator P/N 00423300-01                   | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corporation  |
| 3. TRANSMITTER INSTALLATION<br>(U) RQ-7A Transportable Ground Stations                               | 4. TRANSMITTER TYPE<br>(U) Pulsed Radar  |
| 5. TUNING RANGE<br>(U) 34.93 GHz   | 6. METHOD OF TUNING<br>(U) Factory Fixed Phase Locked Gunn   |
| 7. RF CHANNELING CAPABILITY<br>(U) 34.93 GHz - Fixed   | 8. EMISSION DESIGNATORS<br>(U) 28M9P0N (U) (U)   |
| 9. FREQUENCY TOLERANCE<br>(U) 14 ppm   | 12. EMISSION BANDWIDTH<br><input checked="" type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |
| 10. FILTER EMPLOYED<br>(U) <input type="checkbox"/> a. YES <input type="checkbox"/> b. NO            | a. -3 dB (U) 4.09 MHz (U) (U)  |
| 11. SPREAD SPECTRUM<br>(U) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO | b. -20 dB (U) 28.9 MHz (U) (U)   |
| 13. MAXIMUM BIT RATE<br>(U) NA   | c. -40 dB (U) 96 MHz (U) (U)   |
| 14. MODULATION TECHNIQUES AND CODING<br>(U) Unmodulated pulse  | d. -60 dB (U) 303 MHz (U) (U)  |
| 16. PRE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO    | e. OC-BW (U) 28.9 MHz (U) (U)  |
| 19. POWER  | 15. MAXIMUM MODULATION FREQUENCY<br>(U) NA   |
| a. MEAN (U) 0.4 mW (U) (U)   | 17. DEVIATION RATIO<br>(U) NA  |
| b. PEP (U) NAvail (U) (U)  | 18. PULSE CHARACTERISTICS  |
| 20. OUTPUT DEVICE<br>(U) MMIC Amplifier  | a. RATE (U) 980 pps (U) (U)<br>- 1000 pps  |
| 22. SPURIOUS LEVEL<br>(U) -80 dB   | b. WIDTH (U) 200 ns (U) (U)  |
| 23. FCC TYPE ACCEPTANCE NO.<br>(U) NA  | c. RISE TIME (U) 20 ns (U) (U)   |
|  | d. FALL TIME (U) 20 ns (U) (U)   |
|  | e. COMP RATIO (U) NA (U) (U)   |
|  | 21. HARMONIC LEVEL   |
|  | a. 2nd (U) -45 dB  |
|  | b. 3rd (U) -50 dB  |
|  | c. OTHER (U) -50 dB  |

24. REMARKS (U) Item 7: Factory tuned, cavity stabilized, varactor tuned GUNN diode Oscillator

Item 18: Interrogator transmits single pulses (200 ns wide) at 980 or 1000 microsecond pulse spacing to cause the Transponder to transmit a long pulse (2.2 ms) to enable the acquisition of the aerial vehicle.

Once the aerial vehicle has been acquired, the Interrogator changes emission to two 200-ns pulses separated by 20 - 30 usec at a repetition rate of 1000 usec. This change of interrogator emission causes the transponder to change emission characteristics which includes data.

Item 19: The power stated is for the dual pulse emission. The single pulse emission power is 0.2 mW maximum.

## TRANSMITTER EQUIPMENT CHARACTERISTICS

|  |  |
|--|--|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) TALS Transponder, P/N 00424100-01                   | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corporation  |
| 3. TRANSMITTER INSTALLATION<br>(U) RQ-7A TUAV  | 4. TRANSMITTER TYPE<br>(U) Radar Transponder   |
| 5. TUNING RANGE<br>(U) 35 GHz  | 6. METHOD OF TUNING<br>(U) Mechanically Tuned Cavity   |
| 7. RF CHANNELING CAPABILITY<br>(U) 35 GHz, Fixed (Factory Preset)                                    | 8. EMISSION DESIGNATORS<br>(U) 6M24M0N (U) 2K89P0N (U)   |
| 9. FREQUENCY TOLERANCE<br>(U) 14 ppm   | 12. EMISSION BANDWIDTH<br><input checked="" type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |
| 10. FILTER EMPLOYED<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | a. -3 dB (U) 882 KHz (U) 4.09 Hz (U)   |
| 11. SPREAD SPECTRUM<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO | b. -20 dB (U) 6.24 MHz (U) 2.89 KHz (U)  |
| 13. MAXIMUM BIT RATE<br>(U) NA   | c. -40 dB (U) 44.6 MHz (U) 28.9 KHz (U)  |
| 14. MODULATION TECHNIQUES AND CODING<br>(U) Unmodulated Pulses and PPM                               | d. -60 dB (U) 141 MHz (U) 289 KHz (U)  |
| 16. PRE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO    | e. OC-BW (U) 6.24 MHz (U) 2.89 KHz (U)   |
| 19. POWER  | 15. MAXIMUM MODULATION FREQUENCY<br>(U) NA   |
| a. MEAN (U) 85 mW (U) 85 mW (U)  | 17. DEVIATION RATIO<br>(U)   |
| b. PEP (U) (U) (U)   | 18. PULSE CHARACTERISTICS  |
| 20. OUTPUT DEVICE<br>(U)   | a. RATE (U) 1000 pps (U) 1000 pps (U)  |
| 22. SPURIOUS LEVEL<br>(U) -80 dB   | b. WIDTH (U) 1 us (U) 2.2 ms (U)   |
| 23. FCC TYPE ACCEPTANCE NO.<br>(U) NA  | c. RISE TIME (U) 20 ns (U) 20 ns (U)   |
| 24. REMARKS (U)  | d. FALL TIME (U) 20 ns (U) 20 ns (U)   |
|  | e. COMP RATIO (U) (U) (U)  |
|  | 21. HARMONIC LEVEL   |
|  | a. 2nd (U) -45 dB  |
|  | b. 3rd (U) -50 dB  |
|  | c. OTHER (U) -50 dB  |

Item 14: In the track mode, the pulse reply contains a 300-usec pulse group (a 260-usec pulse and one 10-usec pulse) followed by four 1.0-usec pulses used to pass PPM coded data. The four data pulses pass 15 bits of encoded data.

In the acquisition mode, the pulse reply consists of a single 2.2-msec pulse transmitted at a 400 pps rate.

Item 18: In the track mode, pulse groups repeat in response to signals from the Interrogator at 1000 Hz rate. Pulse groups consist of a 260-usec tracking pulse, a 10-usec calibration pulse, and four 1.0-usec pulses for down-link data. The first down-link data pulse is 340 usec, after the start of the tracking pulse, others follow in windows of 380 to 412, 450 to 482, and 510 to 542 (all usec) used after the start of the tracking pulse.

RECEIVER EQUIPMENT CHARACTERISTICS

|   |         |               |         |  |                       |  |  |
|---|---------|---------------|---------|--|-----------------------|--|--|
| <b>1. NOMENCLATURE, MANUFACTURER'S MODEL NO.</b><br>(U) UAVCARS Interrogator                            |         |               |         | <b>2. MANUFACTURER'S NAME</b><br>(U) Sierra Nevada Corp.   |                       |  |  |
| <b>3. RECEIVER INSTALLATION</b><br>(U) Mobile, Ship/land based  |         |               |         | <b>4. RECEIVER TYPE</b><br>(U) Single conversion superheterodyne                                   |                       |  |  |
| <b>5. TUNING RANGE</b><br>(U) 34.9 GHz - 35.1 GHz (See Remarks)   |         |               |         | <b>6. METHOD OF TUNING</b><br>(U) (see remarks)  |                       |  |  |
| <b>7. RF CHANNELING CAPABILITY</b><br>(U) Continuous (see remarks)                                      |         |               |         | <b>8. EMISSION DESIGNATORS</b><br>(U) 460KP0N 350KP0N  |                       |  |  |
| <b>9. FREQUENCY TOLERANCE</b><br>(U) 14 ppm   |         |               |         | <b>11. RF SELECTIVITY</b><br><input type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |                       |  |  |
| <b>10. IF SELECTIVITY</b>   |         | 1st (U)       | 2nd (U) | 3rd (U)  |                       |  |  |
| a. -3 dB  | 1.2 MHz | (See Remarks) | NA      |  | a. -3 dB (U) 13.5 GHz |  |  |
| b. -20 dB   | 3.2 MHz | NA            |         |  | b. -20 dB (U) 17 GHz  |  |  |
| c. -60 dB   | 4.0 MHz |               |         |  | c. -60 dB (U) 20 GHz  |  |  |
|   |         |               |         | d. Preselection Type (U) Waveguide cutoff  |                       |  |  |
| <b>12. IF FREQUENCY</b>   |         |               |         | <b>13. MAXIMUM POST DETECTION FREQUENCY</b><br>(U) NA  |                       |  |  |
| a. 1st (U) 70 MHz   |         |               |         | <b>14. MINIMUM POST DETECTION FREQUENCY</b><br>(U) NA  |                       |  |  |
| b. 2nd (U) NA   |         |               |         | <b>16. MAXIMUM BIT RATE</b><br>(U) NA  |                       |  |  |
| c. 3rd (U) NA   |         |               |         | <b>17. SENSITIVITY</b>   |                       |  |  |
| <b>15. OSCILLATOR TUNED</b>   |         | 1st (U)       | 2nd (U) | a. SENSITIVITY (U) -91 dBm   |                       |  |  |
| a. ABOVE TUNED FREQUENCY  |         |               |         | b. CRITERIA (U) SNR 14 dB  |                       |  |  |
| b. BELOW TUNED FREQUENCY  |         | X             |         | c. NOISE FIG (U) 9 dB  |                       |  |  |
| c. EITHER ABOVE OR BELOW THE FREQUENCY  |         |               |         | d. NOISE TEMP (U) NA   |                       |  |  |
| <b>18. DE-EMPHASIS</b><br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO |         |               |         | <b>20. SPURIOUS REJECTION</b><br>(U) 60 dB   |                       |  |  |
| <b>19. IMAGE REJECTION</b><br>(U) NAvail  |         |               |         |  |                       |  |  |

**21. REMARKS (U)**

Item 6: Mechanically and electrically tuned VCO. Receiver phase locks on transponder transmit frequency using varactor tuned oscillator source. Mechanical tuning requires disassembly and test equipment.

Item 7: Preferred fixed frequency at 35 GHz.

Item 10: Two IF bandwidths. Narrow BW is used when target is at long range. Wide BW is used at close range.

Wideband IF Selectivity:

- 3 dB: 20 MHz
- 20 dB: 40 MHz
- 60 dB: 75 MHz

## RECEIVER EQUIPMENT CHARACTERISTICS

|  |  |         |         |   |  |     |                    |
|--|--|---------|---------|---|--|-----|--------------------|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) UAVCARS transponder                             |  |         |         | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corp.   |  |     |                    |
| 3. RECEIVER INSTALLATION<br>(U) UAV  |  |         |         | 4. RECEIVER TYPE<br>(U) Single conversion superheterodyne                                   |  |     |                    |
| 5. TUNING RANGE<br>(U) 34.9 GHz - 35.1 GHz (See Remarks)   |  |         |         | 6. METHOD OF TUNING<br>(U) Mechanically Tuned Gunn Oscillator                               |  |     |                    |
| 7. RF CHANNELING CAPABILITY<br>(U) Continuous (see remarks)                                      |  |         |         | 8. EMISSION DESIGNATORS<br>(U) 1M08P0N  |  |     |                    |
| 9. FREQUENCY TOLERANCE<br>(U) 14 ppm   |  |         |         | 11. RF SELECTIVITY<br><input type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |  |     |                    |
| 10. IF SELECTIVITY   |  | 1st (U) | 2nd (U) | a. -3 dB  |  | (U) | 21 GHz             |
|  |  | 20 MHz  | NA      | b. -20 dB   |  | (U) | 27 GHz             |
|  |  | 40 MHz  |         | c. -60 dB   |  | (U) | 32 GHz             |
|  |  | 75 MHz  |         | d. Preselection Type  |  | (U) | Ferrite circulator |
| 12. IF FREQUENCY   |  |         |         | 13. MAXIMUM POST DETECTION FREQUENCY<br>(U) NA  |  |     |                    |
| a. 1st (U)   |  | 70 MHz  |         | 14. MINIMUM POST DETECTION FREQUENCY<br>(U) NA  |  |     |                    |
| b. 2nd (U)   |  | NA      |         | 16. MAXIMUM BIT RATE<br>(U) NA  |  |     |                    |
| c. 3rd (U)   |  | NA      |         | 17. SENSITIVITY   |  |     |                    |
| 15. OSCILLATOR TUNED   |  | 1st (U) | 2nd (U) | a. SENSITIVITY  |  | (U) | - 78 dBm           |
|  |  | X       |         | b. CRITERIA   |  | (U) | SNR = 14 dB        |
| a. ABOVE TUNED FREQUENCY   |  |         |         | c. NOISE FIG  |  | (U) | 9 dB               |
| b. BELOW TUNED FREQUENCY   |  |         |         | d. NOISE TEMP   |  | (U) | NA                 |
| c. EITHER ABOVE OR BELOW THE FREQUENCY   |  |         |         | 20. SPURIOUS REJECTION<br>(U) 60 dB   |  |     |                    |
| 18. DE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO |  |         |         |   |  |     |                    |
| 19. IMAGE REJECTION<br>(U) NAvail  |  |         |         |   |  |     |                    |
| 21. REMARKS (U) Item 7: Preferred fixed frequency at 34.93 GHz.                                  |  |         |         |   |  |     |                    |

RECEIVER EQUIPMENT CHARACTERISTICS

|  |  |         |         |  |   |
|--|--|---------|---------|--|---|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) TALS Interrogator P/N 00423300-01               |  |         |         | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corp   |   |
| 3. RECEIVER INSTALLATION<br>(U) RQ-7A Mobile Ground Station                                      |  |         |         | 4. RECEIVER TYPE<br>(U) Single Conversion Superheterodyne  |   |
| 5. TUNING RANGE<br>(U) 35 GHz  |  |         |         | 6. METHOD OF TUNING<br>(U) Factory Fixed Phased Locked Gunn  |   |
| 7. RF CHANNELING CAPABILITY<br>(U) 35 GHz, Fixed (Factory preset)                                |  |         |         | 8. EMISSION DESIGNATORS<br>(U) 6M24M0N 2K89P0N   |   |
| 9. FREQUENCY TOLERANCE<br>(U) 14 ppm   |  |         |         | 11. RF SELECTIVITY<br><input checked="" type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |   |
| 10. IF SELECTIVITY   |  | 1st (U) | 2nd (U) | 3rd (U)  | a. -3 dB (U) 13.5 GHz                     |
| a. -3 dB   |  | 1.2 MHz |         |  | b. -20 dB (U) 17 GHz                      |
| b. -20 dB  |  | 1.8 MHz |         |  | c. -60 dB (U) 20 GHz                      |
| c. -60 dB  |  | 3.2 MHz |         |  | d. Preselection Type (U) WAVEGUIDE CUTOFF |
| 12. IF FREQUENCY   |  |         |         | 13. MAXIMUM POST DETECTION FREQUENCY<br>(U) NA   |   |
| a. 1st (U) 70 MHz  |  |         |         | 14. MINIMUM POST DETECTION FREQUENCY<br>(U) NA   |   |
| b. 2nd (U)   |  |         |         | 16. MAXIMUM BIT RATE<br>(U) NA   |   |
| c. 3rd (U)   |  |         |         | 17. SENSITIVITY  |   |
| 15. OSCILLATOR TUNED   |  | 1st (U) | 2nd (U) | 3rd (U)  | a. SENSITIVITY (U) -83 dBm                |
| a. ABOVE TUNED FREQUENCY   |  | X       |         |  | b. CRITERIA (U) 14 dB S/N                 |
| b. BELOW TUNED FREQUENCY   |  |         |         |  | c. NOISE FIG (U) 13 dB                    |
| c. EITHER ABOVE OR BELOW THE FREQUENCY   |  |         |         |  | d. NOISE TEMP (U) NAvail                  |
| 18. DE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO |  |         |         | 20. SPURIOUS REJECTION<br>(U) 60 dB  |   |
| 19. IMAGE REJECTION<br>(U) NAvail  |  |         |         |  |   |

21. REMARKS (U)

Item 6: Receiver Phase Locks on transponder transmit frequency using varactor tuned oscillator. Mechanical tuning range is factory set.

Item 10: Two IF bandwidths are used. Narrowband (1 MHz) with target at long range; wide bandwidth (20 MHz) at close range.  
Wideband IF selectivity is:  
-3 dB: 20 MHz  
-20 dB: 40 MHz  
-60 dB: 75 MHz

Item 17: The wideband sensitivity is -71 dBm

## ANTENNA EQUIPMENT CHARACTERISTICS

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

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

(U) UAVCARS Transponder Omnidirectional

## 3. MANUFACTURER'S NAME

(U) Sierra Nevada

5. TYPE (U) Omnidirectional Biconic

## 4. FREQUENCY RANGE

(U) 34.9 GHz - 35.1 GHz

## 7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

## 6. POLARIZATION

(U) Vertical

b. VERTICAL SCAN (U) NA

(1) Max Elev (U)

## 8. GAIN

## a. MAIN BEAM

(U) 6 dBi

(2) Min Elev (U)

(3) Scan Rate (U)

## b. 1st MAJOR SIDE LOBE

(U) -18 dBi @ 60 deg

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U)

## 9. BEAMWIDTH

## a. HORIZONTAL

(U) 360 deg

(2) Scan Rate (U)

## b. VERTICAL

(U) 30 deg

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

## 10. REMARKS (U)

RECEIVER EQUIPMENT CHARACTERISTICS

|  |  |         |         |  |   |
|--|--|---------|---------|--|---|
| 1. NOMENCLATURE, MANUFACTURER'S MODEL NO.<br>(U) TALS Transponder P/N 00424200-01                |  |         |         | 2. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corp   |   |
| 3. RECEIVER INSTALLATION<br>(U) RQ-7A tuav   |  |         |         | 4. RECEIVER TYPE<br>(U) Single Conversion Superheterodyne  |   |
| 5. TUNING RANGE<br>(U) 34.93 GHz   |  |         |         | 6. METHOD OF TUNING<br>(U) Factory Fixed Phased Locked Gunn  |   |
| 7. RF CHANNELING CAPABILITY<br>(U) 34.93 GHz, Fixed (Factory preset)                             |  |         |         | 8. EMISSION DESIGNATORS<br>(U) 28M9P0N   |   |
| 9. FREQUENCY TOLERANCE<br>(U) 2300 ppm   |  |         |         | 11. RF SELECTIVITY<br><input checked="" type="checkbox"/> CALCULATED <input type="checkbox"/> MEASURED |   |
| 10. IF SELECTIVITY   |  | 1st (U) | 2nd (U) | 3rd (U)  | a. -3 dB (U) 13.5 GHz                     |
| a. -3 dB   |  | 20 MHz  |         |  | b. -20 dB (U) 17 GHz                      |
| b. -20 dB  |  | 40 MHz  |         |  | c. -60 dB (U) 20 GHz                      |
| c. -60 dB  |  | 75 MHz  |         |  | d. Preselection Type (U) WAVEGUIDE CUTOFF |
| 12. IF FREQUENCY   |  |         |         | 13. MAXIMUM POST DETECTION FREQUENCY<br>(U) NA   |   |
| a. 1st (U) 70 MHz  |  |         |         | 14. MINIMUM POST DETECTION FREQUENCY<br>(U) NA   |   |
| b. 2nd (U)   |  |         |         | 16. MAXIMUM BIT RATE<br>(U) NA   |   |
| c. 3rd (U)   |  |         |         | 17. SENSITIVITY  |   |
| 15. OSCILLATOR TUNED   |  | 1st (U) | 2nd (U) | 3rd (U)  | a. SENSITIVITY (U) - 74 dBm               |
| a. ABOVE TUNED FREQUENCY   |  | X       |         |  | b. CRITERIA (U) 14 dB S/N                 |
| b. BELOW TUNED FREQUENCY   |  |         |         |  | c. NOISE FIG (U) 10.5 dB                  |
| c. EITHER ABOVE OR BELOW THE FREQUENCY   |  |         |         |  | d. NOISE TEMP (U) NAvail                  |
| 18. DE-EMPHASIS<br>(U) <input type="checkbox"/> a. YES <input checked="" type="checkbox"/> b. NO |  |         |         | 20. SPURIOUS REJECTION<br>(U) 60 dB  |   |
| 19. IMAGE REJECTION<br>(U) NAvail  |  |         |         |  |   |
| 21. REMARKS (U)  |  |         |         |  |   |

## 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.<br>(U) UAVCARS Interrogator   | 3. MANUFACTURER'S NAME<br>(U) Sierra Nevada  |
| 4. FREQUENCY RANGE<br>(U) 34.9 GHz - 35.1 GHz   | 5. TYPE (U) 4-Lobe, Switched, Prime Focus Reflector  |
| 6. POLARIZATION<br>(U) Vertical   | 7. SCAN CHARACTERISTICS  |
| 8. GAIN   | a. TYPE (U) ELECTRICAL   |
| a. MAIN BEAM<br>(U) 41 dBi  | b. VERTICAL SCAN (U) electrical  |
| b. 1st MAJOR SIDE LOBE<br>(U) 28 dBi @ 2 deg  | (1) Max Elev (U) 70 deg  |
| 9. BEAMWIDTH  | (2) Min Elev (U) -35 deg   |
| a. HORIZONTAL<br>(U) 1.4 deg  | (3) Scan Rate (U) (see remarks)  |
| b. VERTICAL<br>(U) 1.4 deg  | c. HORIZONTAL SCAN (U) electrical  |
|   | (1) Sector Scanned (U) 110   |
|   | (2) Scan Rate (U) (see remarks)  |
|   | d. SECTOR BLANKING (U) <input type="checkbox"/> (1) YES <input checked="" type="checkbox"/> (2) NO |

## 10. REMARKS (U)

Item 7: The antenna pedestal subsystem has two modes of operation  
 (a) Acquisition Mode: The antenna raster-scans a selected volume with a 20 deg/sec horizontal scan rate  
 (b) Track Mode: Once the target has been acquired, the antenna uses a four-lobe switching scan to develop vertical and horizontal discriminators. The antenna can track up to 100 deg/sec over the volume described above in 7b and 7c. In the track mode, the antenna is always pointed within +/- 1 deg of transponder being tracked.

Note: Antenna will be placed on a mobile cart requiring operator to place the cart at the desired location to locate and precisely track a single UAV relative to a desired touchdown.

## 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.<br>(U) UAVCARS Transponder Directional<br><br>See Data Overflow Page |  |                                       | 3. MANUFACTURER'S NAME<br>(U) Sierra Nevada  |   |  |
| 4. FREQUENCY RANGE<br>(U) 26.5 GHz - 40.1 GHz  |  |                                       | 5. TYPE (U) Pyramidal Horn (see remarks)   |   |  |
| 6. POLARIZATION<br>(U) Vertical  |  |                                       | 7. SCAN CHARACTERISTICS  |   |  |
| 8. GAIN  |  |                                       | a. TYPE (U) FIXED  |   |  |
| a. MAIN BEAM<br>(U) 15 dBi   |  |                                       | b. VERTICAL SCAN (U) NA  |   |  |
| b. 1st MAJOR SIDE LOBE<br>(U) -10 dBi @ 20 deg   |  |                                       | (1) Max Elev (U)   |   |  |
| 9. BEAMWIDTH   |  |                                       | (2) Min Elev (U)   |   |  |
| a. HORIZONTAL<br>(U) 45 deg  |  |                                       | (3) Scan Rate (U)  |   |  |
| b. VERTICAL<br>(U) 20 deg  |  |                                       | c. HORIZONTAL SCAN (U) NA  |   |  |
|  |  |                                       | (1) Sector Scanned (U)   |   |  |
|  |  |                                       | (2) Scan Rate (U)  |   |  |
|  |  |                                       | d. SECTOR BLANKING (U) <input type="checkbox"/> (1) YES <input checked="" type="checkbox"/> (2) NO |   |  |

## 10. REMARKS (U)

Item 5: The transponder uses two small antennas (directional and Omni) packaged under a single radome switchable via operator and/or range/incident angle of UAV.

**ANTENNA DATA OVERFLOW PAGE**

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

4. FREQUENCY RANGE

8. GAIN

9. BEAMWIDTH

USCINCEUR 14 Aug 03

The Netherlands: "1. Frequency support for the Sierra Nevada Corporation, AN/UPN-51(V) UAVCARS and TALS interrogators and transponders operating in the 34.9-35.1 GHz band is granted.

2. Normal frequency coordination procedures will apply when this system is to be used in The Netherlands."

Steering Member  
J-12 Working Group  
MCEB Frequency Panel  
approval SIGNATURE DATE: 12 DEC 1995

IRAC/SPS NUMBER: SPS-10759/2  
DOWNGRADING INSTRUCTIONS: NA  
MCEB J-12 NUMBER: J/F 12/6982/1  
UNCLASSIFIED

MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, DC 20301

UNCLASSIFIED  
13 AUG 1996  
NH J/F 12/6982/1

NOTE TO HOLDERS

OF

J/F 12/6982/1

Common Automatic Recovery System (CARS)

Holders of subject Army and Navy document dated 12 December 1995 are requested by the Navy to note the following changes:

J/F 12/6982/1

Section 2, Frequency: Change to read "33.4-36.0 GHz".

Paragraph 6: Change to read "Coordination with NTIA Spectrum Planning Subcommittee has been accomplished (SPS-10759/2)".

STEERING MEMBER  
J-12 WORKING GROUP  
MCEB FREQUENCY PANEL

cc: MCEB J-12 Distribution List

UNCLASSIFIED  
NH J/F 12/6982/1

## ANTENNA EQUIPMENT CHARACTERISTICS

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

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

(U) TALS Interrogator Antenna

## 3. MANUFACTURER'S NAME

(U) Sierra Nevada Corp

5. TYPE (U) Parabolic Reflector

## 4. FREQUENCY RANGE

(U) 34.9 GHz - 35.1 GHz

## 7. SCAN CHARACTERISTICS

a. TYPE (U) ELECTROMECHANICAL

## 6. POLARIZATION

(U) Vertical

b. VERTICAL SCAN (U) Mechanical

(1) Max Elev (U) 70 deg

## 8. GAIN

## a. MAIN BEAM

(U) 41.0 dBi

(2) Min Elev (U) -10 deg

(3) Scan Rate (U) (See Remarks)

## b. 1st MAJOR SIDE LOBE

(U) 13.4 dBi @ 3.7 deg

c. HORIZONTAL SCAN (U) Mech +/- 130 deg

(1) Sector Scanned (U) (See Remarks)

## 9. BEAMWIDTH

## a. HORIZONTAL

(U) 1.4 deg

(2) Scan Rate (U) (See Remarks)

## b. VERTICAL

(U) 1.2 deg

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

## 10. REMARKS (U)

Item 2: The part number is 00323400-01

Item 5: The antenna aperture is 18 inches. It has 4 off-set feed horns placed in four quadrants around the mainbeam feed.

Item 7: The antenna and rotator system have two modes of operation:  
 (a) Acquisition mode - the antenna scans a programmed volume from 10 to 50 degrees wide (azimuth) by 1 to 10 degrees high (elevation). Sector is raster scanned at 50 deg per second horizontal scan rate. Elevation scan rate is 40 deg per second in one degree steps. Typical 20 degree wide by 5 degree high sector is scanned in less than 20 seconds.

(b) Tracking Mode - Once the target is acquired, the antenna switches to a 4 lobe (4 horn feed system) electronically switched scan (top, bottom, left, right) centered on the acquired mechanical bearing for tracking. In this mode, the antenna system can track at a rate up to 200 degrees per second over the full volume specified in Item 7a.

Item 8: The first major side lobe directed away from the antenna lobe centroid data is provided above. The first major side lobe toward the antenna centroid (generated for each off-set horn) is 24.3 dBi @ 2.1 deg. Separation between antenna lobes is about 1.7 deg for the right to left or up to down lobes.

## ANTENNA EQUIPMENT CHARACTERISTICS

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

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

(U) TALS Transponder Directional Ant.

## 3. MANUFACTURER'S NAME

(U) Sierra Nevada Corp

5. TYPE (U) Horn

## 4. FREQUENCY RANGE

(U) 34.82 GHz - 35.12 GHz

## 7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

## 6. POLARIZATION

(U) Linear Vertical

b. VERTICAL SCAN (U) NA

(1) Max Elev (U)

## 8. GAIN

## a. MAIN BEAM

(U) 15 dBi

(2) Min Elev (U)

(3) Scan Rate (U)

## b. 1st MAJOR SIDE LOBE

(U) -15 dBi @ 87.5 deg

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U)

## 9. BEAMWIDTH

## a. HORIZONTAL

(U) 45 deg

(2) Scan Rate (U)

## b. VERTICAL

(U) 20 deg

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

## 10. REMARKS (U)

General: The transponder uses two antennas (directional and omni) packaged under a single radome and switchable via operator command at long ranges. When system measures a range of less than 1000 feet, the antenna system automatically switches to omni operation.

Item 2: Part Number is 00424400-01

## 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.<br>(U) TALS Transponder OmniDirectional An |  | 3. MANUFACTURER'S NAME<br>(U) Sierra Nevada Corp |  | 5. TYPE (U) Dipole   |  |
| 4. FREQUENCY RANGE<br>(U) 34.9 GHz - 35.1 GHz  |  | 7. SCAN CHARACTERISTICS                          |  | a. TYPE (U) FIXED  |  |
| 6. POLARIZATION<br>(U) Linear Vertical   |  | b. VERTICAL SCAN (U) NA                          |  | (1) Max Elev (U)   |  |
| 8. GAIN  |  | (2) Min Elev (U)                                 |  | (3) Scan Rate (U)  |  |
| a. MAIN BEAM<br>(U) 6 dBi  |  | c. HORIZONTAL SCAN (U) NA                        |  | (1) Sector Scanned (U)   |  |
| b. 1st MAJOR SIDE LOBE<br>(U) NA   |  | (2) Scan Rate (U)                                |  | d. SECTOR BLANKING (U) <input type="checkbox"/> (1) YES <input checked="" type="checkbox"/> (2) NO |  |
| 9. BEAMWIDTH   |  | a. HORIZONTAL<br>(U) 360 deg                     |  | b. VERTICAL<br>(U) 22 deg  |  |

## 10. REMARKS (U)

General: The transponder uses two antennas (directional and omni) packaged under a single radome and switchable via operator command at long ranges. When system measures a range of less than 1000 feet, the antenna system automatically switches to omni operation.

Item 2: Part Number is 00424400-01

**NTIA GENERAL INFORMATION**

|   |  |
|---|--|
| 1. APPLICATION TITLE (U) Unmanned Aerial Vehicle Command Automatic Recovery System (UAVCARS), AN/UPN-51(V)        |  |
| 2. SYSTEM NOMENCLATURE (U) Unmanned Aerial Vehicle Command Automatic Recovery                                     |  |
| 3. STAGE OF ALLOCATION (U)  | <input type="checkbox"/> a. STAGE 1<br>CONCEPTUAL <input type="checkbox"/> b. STAGE 2<br>EXPERIMENTAL <input type="checkbox"/> c. STAGE 3<br>DEVELOPMENTAL <input checked="" type="checkbox"/> d. STAGE 4<br>OPERATIONAL |
| 4. FREQUENCY REQUIREMENTS   |  |
| a. FREQUENCY(IES) (U) 34.9 GHz - 35.1 GHz (See Remarks)   |  |
| b. EMISSION DESIGNATORS (U) 1M08P0N 460KP0N 350KP0N 28M9P0N   | See Data Overflow Page   |
| 5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (U) Common UAV Recovery System for use at range up to 5 km. |  |
|   | (WARTIME USE) <input checked="" type="checkbox"/> a. YES <input type="checkbox"/> b. NO  |
| 6. INFORMATION TRANSFER REQUIREMENTS (U) NA   |  |
| 7. ESTIMATED INITIAL COST OF THE SYSTEM (U) \$400 K   |  |
| 8. TARGET DATE FOR  |  |
| a. APPLICATION APPROVAL (U)   | b. SYSTEM ACTIVATION (U)   |
|   | c. SYSTEM TERMINATION (U)  |
| 9. SYSTEM RELATIONSHIP (U) UAV Recovery System includes interrogator and beacon/transponder.<br>AND ESSENTIALITY  |  |
| 10. REPLACEMENT INFORMATION (U) NA  |  |
| 11. RELATED ANALYSIS AND/OR TEST DATA (U) NA  |  |
| 12. NUMBER OF MOBILE UNITS (U) 23   |  |
| 13. GEOGRAPHICAL AREA FOR   |  |
| a. STAGE 2 (U) NA   |  |
| b. STAGE 3 (U) NA   |  |
| c. STAGE 4 (U) US&P, Japan, Korea, NATO, Sea Areas Worldwide  |  |
| 14. LINE DIAGRAM (U) See Page(s) 9  | 15. SPACE SYSTEMS (U) See Page(s) NA   |
| 16. TYPE OF SERVICE(S) FOR STAGE 4 (U) Radiolocation  | 17. STATION CLASS(ES) FOR STAGE 4 (U) MR   |
| 18. REMARKS (U) Item 4a: Preferred frequencies 34.93 GHz and 35 GHz.  |  |

DOWNGRADING INSTRUCTIONS

J/F 12/06982

CLASSIFICATION  
**UNCLASSIFIED**

NTIA DATA OVERFLOW PAGE

2. SYSTEM NOMENCLATURE

4. FREQUENCY REQUIREMENTS

b. EMISSION DESIGNATORS (U)                      6M24M0N                      2K89P0N

17. STATION CLASS(ES) FOR STAGE 4

UNCLASSIFIED

Military Communication Electronics Board (MCEB)  
Equipment Frequency Allocation Guidance

Military Department: Navy, Army and AIR FORCE

Equipment:

Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS),  
AN/UPN-51(V)

Stage: 4-Operational

Section 1: ENCLOSURES

1. J/F 12/6982, 1 Sep 95

Section 2: EQUIPMENT APPLICATION INFORMATION

Frequency: 33.4-36.0 GHz

Emission: (a)1M08P0N; (b)350KP0N, 460KP0N; (c)28M9P0N; (d)6M24M0N,  
2K89P0N

Power: (a)2 W, (b)0.2 W, (c) 0.4 mW, (d)85 mW

Type of Service: Radiolocation

Operating Location: US&P; Germany, Korea, the Netherlands.

Section 3: MCEB GUIDANCE

1. The enclosed application is approved for operational use at the above location, subject to the guidance provided in the following paragraphs. Approval for operational use outside the US&P is withheld pending CINC coordination.

2. For the intended use in Radiolocation service, the subject equipment is in accordance with the US and ITU Tables of Frequency Allocations.

3. The provisions of NTIA MANUAL section 5.1 are considered applicable to the operation of the subject equipment. Based on the information provided, the subject equipment comply with NTIA Manual Section 5.1.

4. Prior to selection of factory fixed frequency, the cognizant area frequency coordinator should be consulted.

5. Operation of the subject equipment must be coordinated with the cognizant area frequency coordinator in accordance with ACP 190 US SUPP-1 (C), Guide to Frequency Planning, prior to activation.

6. coordination with NTIA Spectrum Planning Subcommittee has been accomplished (SPS-10759/2).

7. Host nations comments follows:

EUCOM 13 Nov 02

Germany: "On behalf of Ministry of Defence IT staff 4 frequency supportability is herewith granted with restrictions on the basis of the Telecommunications Act, dated 25 July 1996; Section 2 paragraph (4), and

in accordance with the Bundeswehr Special Communications Directive No. 6, for the following radio system and equipment of the radiolocation service.

1. Designation

- System Designation: AN/UPN-51(V) Shadow 2000

(RQ-7A)

- a) UAVCARS Interrogator
- b) UAVCARS Transponder
- c) TALS Interrogator
- d) TALS Transponder

- Manufacturer: Sierra Nevada Corporation Tuning

Range:

- a, b) 34.9 - 35.1 GHz
- c) 34.93 GHz
- d) 35 GHz

- Transmitter Output:

- a) 2 W
- b) 2 mW
- c) 0.4 mW
- d) 85 mW

- Emission Designation:

- a) 1M08P0N
- b) 460KP0N, 350KP0N
- c) 28M9P0N
- d) 6M224M0N, 2K89P0N

- Antenna Type:

- a) 4-Lobe, Switched, Prime Focus Reflector
- b) Pyramidal Horn, Omnidirectional Bionic
- c) Parabolic Reflector
- d) Horn, Dipole

2. Special Provisions and Organizational Arrangements:

- The system is allowed to be operated exclusively at US training areas.
- Requests for frequency assignment will have to be submitted to NARFA GA (for permanent requests) or to Joint Support Command (for temporary requests) at least ten (10) weeks prior to putting the system into operation.

3. Validity

- This Declaration of Frequency Supportability will be granted only for the territory of the Federal Republic of Germany.
- This Declaration ceases to be valid on 31 July 2013. A request for extension of the Declaration should be directed to NARFA GE at least 10 weeks before the date of expiration."

USCINCPAC 4 Oct 03

Republic of Korea: Approved with restrictions as follows: frequency assignment required, not to exceed two (2) watts output power. Non-interference basis.

MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, DC 20301

MAY 02 1996

UNCLASSIFIED  
NH J/F 12/6982/1  
(Agenda Item No. J-12)

## NOTE TO HOLDERS

OF

J/F 12/6982/1

## Common Automatic Recovery System (CARS)

Holders of the subject Navy document dated 12 December 1995 are requested  
by the Army to note the following:

Military Department

Add: "Army"

STEERING MEMBER  
J-12 Working Group  
MCEB Frequency Panel

Copy to: MCEB J-12 Distribution List

UNCLASSIFIED

NH J/F 12/6982/1

US MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, DC 20301

UNCLASSIFIED 21 JUL 1999  
NH J/F 12/6982/1  
and J/F 12/6982  
(Agenda Item No. J-12)

NOTE TO HOLDERS  
OF  
J/F 12/6982/1 and J/F 12/6982

COMMON AUTOMATIC RECOVERY SYSTEM (CARS)

Holders of subject Army and Navy documents dated 12 December 1995 and 01 September 1995 are requested by the Navy to note the following changes:

J/F 12/6982/1

Equipment: Change to read: "Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS), AN/UPN-51(V)".

J/F 12/6982

Pages 1 and 10, Blocks 1 & 2 - Change to read: "Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS), AN/UPN-51(V)".

Pages 2 and 4, Block1 - Change to read: "UAVCARS Interrogator".

Pages 3 and 5, Block 1 - Change to read: "UAVCARS Transponder".

Page 6, Block 2 - Change to read: "UAVCARS Interrogator".

Page 7, Block 2 - Change to read: "UAVCARS Transponder Directional Antenna".

Page 8, Block 2 - Change to read "UAVCARS Transponder Omnidirectional Antenna".

Steering Member  
J-12 Working Group  
MCEB Frequency Panel

cc: MCEB J-12 Distribution List

UNCLASSIFIED NH J/F 12/6982/1

MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON DC 20301

UNCLASSIFIED

17 OCT 2001

NH J/F 12/6982/1  
(Agenda Item No. J-12)

NOTE TO HOLDERS

OF

J/F 12/6982/1

Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS),  
AN/UPN-51(V)

Holders of subject Army and Navy document, dated 12 December 1995 are  
requested by the Air Force (ASC 013-01L) to note the following:

J/F 12/6982/1(MEMO)

"Military Department" Block: Add "Air Force".

STEERING MEMBER  
J-12 WORKING GROUP  
MCEB FREQUENCY PANEL

cc: MCEB J-12 Distribution List

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J/F 12/6982/1

MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, D.C. 20301

06 November 2002

UNCLASSIFIED  
NH J/F 12/6982/1  
NH J/F 12/6982  
(Agenda Item No. J-12)

NOTE TO HOLDERS  
OF  
J/F 12/6982/1  
and  
J/F 12/6982

Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS)  
AN/UPN-51(V)

Holders of subject Navy, Army and Air Force documents dated 12 Dec 1995  
and 01 Sep 1995 are requested by the Army to note the following changes:

J/F 12/6982/1(MEMO)

Emission and Power:

Change to read: "1M08P0N, 2 watts  
350KP0N and 460KP0N, 0.2 watts  
28M9P0N, 0.4 milliwatts  
6M24M0N and 2K89P0N, 85 milliwatts"

J/F 12/6982(APPLICATION)

DoD and NTIA General Information Pages, Item 4b:

add; "28M9P0N, 6M24M0N, and 2K89P0N"

Add the attached Transmitter, Receiver and Antenna Pages

Replace the line diagram with the attached page.

STEERING MEMBER  
ESG Working Group  
MCEB Frequency Panel  
cc: MCEB J-12  
Distribution List

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NH J/F 12/6982/1  
NH J/F 12/6982

MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, D.C. 20301

UNCLASSIFIED  
NH J/F 12/6982/1  
(Agenda Item No. J-12)

21 April 2004

NOTE TO HOLDERS  
OF  
J/F 12/6982/1

Unmanned Aerial Vehicle Command Automatic Recovery System (UAVCARS)  
AN/UPN-51(V)

Holders of subject Navy, Army, and Air Force document dated 12 Dec 95,  
are requested by the Army to note the following Host Nation comments:

Operating Locations: add; "Germany, Korea, the Netherlands"

Section 3, paragraph 7, add; HOST NATIONS COMMENTS FOLLOWS:

EUCOM 13 Nov 02

Germany: "On behalf of Ministry of Defence IT staff 4 frequency  
supportability is herewith granted with restrictions on the basis of the  
Telecommunications Act, dated 25 July 1996; Section 2 paragraph (4), and  
in accordance with the Bundeswehr Special Communications Directive No. 6,  
for the following radio system and equipment of the radiolocation  
service.

1. Designation

- System Designation: AN/UPN-51(V) Shadow 2000

(RQ-7A)

- a) UAVCARS Interrogator
- b) UAVCARS Transponder
- c) TALS Interrogator
- d) TALS Transponder

- Manufacturer: Sierra Nevada Corporation Tuning

Range:

- a, b) 34.9 - 35.1 GHz
- c) 34.93 GHz
- d) 35 GHz

- Transmitter Output:

- a) 2 W
- b) 2 mW
- c) 0.4 mW
- d) 85 mW

- Emission Designation:

- a) 1M08P0N
- b) 460KP0N, 350KP0N
- c) 28M9P0N
- d) 6M224M0N, 2K89P0N

- Antenna Type:
  - a) 4-Lobe, Switched, Prime Focus Reflector
  - b) Pyramidal Horn, Omnidirectional Bionic
  - c) Parabolic Reflector
  - d) Horn, Dipole
- 2. Special Provisions and Organizational Arrangements:
  - The system is allowed to be operated exclusively at US training areas.
  - Requests for frequency assignment will have to be submitted to NARFA GA (for permanent requests) or to Joint Support Command (for temporary requests) at least ten (10) weeks prior to putting the system into operation.
- 3. Validity
  - This Declaration of Frequency Supportability will be granted only for the territory of the Federal Republic of Germany.
  - This Declaration ceases to be valid on 31 July 2013. A request for extension of the Declaration should be directed to NARFA GE at least 10 weeks before the date of expiration."

USCINCPAC 4 Oct 03

Republic of Korea: Approved with restrictions as follows: frequency assignment required, not to exceed two (2) watts output power. Non-interference basis.

USCINCEUR 14 Aug 03

The Netherlands: "1. Frequency support for the Sierra Nevada Corporation, AN/UPN-51(V) UAVCARS and TALS interrogators and transponders operating in the 34.9-35.1 GHz band is granted.

2. Normal frequency coordination procedures will apply when this system is to be used in The Netherlands."

STEERING MEMBER  
ESG Working Group  
MCEB Frequency Panel

cc: MCEB J-12  
Distribution List

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NH J/F 12/6982/1

US MILITARY COMMUNICATIONS ELECTRONICS BOARD  
WASHINGTON, DC 20301

UNCLASSIFIED  
NH J/F 12/6982  
(Agenda Item No. J-12)

24 MAR 2005

NOTE TO HOLDERS  
OF  
J/F 12/6982

Unmanned Aerial Vehicle Common Automatic Recovery System (UAVCARS),  
AN/UPN-51(V)

Holders of subject Navy, Army and Air Force document dated 01 September  
1995 are requested by the Navy to note the following changes:

First Antenna Equipment Characteristics page, UAVCARS Interrogator  
Antenna:

Item 10, Remarks - add "Note: Antenna will be placed on a mobile cart  
requiring operator to place the cart at the desired location to locate  
and precisely track a single UAV relative to a desired touchdown."

Second Antenna Equipment Characteristics page, UAVCARS Transponder  
Directional Antenna:

Item 9.a, Horizontal Beamwidth - change to read "45 deg".  
Item 9.b, Vertical Beamwidth - change to read "20 deg".

Third Antenna Equipment Characteristics page, UAVCARS Transponder  
Omnidirectional Antenna:

Item 10, Remarks - Delete remark associated with Item8,9.

Steering Member  
ESG Permanent Working Group  
MCEB Frequency Panel

cc: MCEB J-12 Distribution List  
UNCLASSIFIED

NH J/F 12/6982

NTIA ADMINISTRATIVE PAGE

(U) SPS #: 10759/2

(U) SIN #:

(U) AGENCY: N

(U) STAGE:

(U) PREVIOUS CERTIFICATION:

(U) STATUS:           DATE:           ACTION:

(U) REMARKS:

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

(U) SPS RECOMMENDATIONS:

(U) NTIA CERTIFICATION:

ADMINISTRATIVE INFORMATION PAGE

- 1. SYSTEM IDENTIFIER: (U) R
- 2. EQUIPMENT FUNCTION: (U) RP RU R
- 3. EQUIPMENT NOMENCLATURE: (U) UAVCARS (U)  
(U) AN/UPN-051 (V) (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)              | D       | 13 NOV 02 | LTR         |
| (U)              | KO      | 4 OCT 03  | LTR         |
| (U)              | HOL     | 14 AUG 03 | LTR         |
| (U)              |         |           |             |

- 8. NOTE-TO-HOLDER:
  - (U) 05/02/1996
  - (U) 08/13/1996
  - (U) 07-21-1999
  - (U) 10-17-2001
  - (U) 11-06-2002
  - (U) 04-21-2004
  - (U) 03-24-2005
  - (U)
  - (U)
  - (U)

- 9. JSC MEMO DATE: (U) 12/12/1995

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

- 11. PROCURING AGENCY: (U) N

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