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AUTHORITY

**USAFGL ltr, 7 Sep 1982**

AD B 022525

AUTHORITY: USAFGL
ltr, 7 Sep 82

E-SYSTEMS
Montek Division

Report No. 131500-616
12 August 1977

# LOW PRESSURE ALTITUDE TEST REPORT
# FOR THE
# AN/TRN-41 TACAN NAVIGATIONAL SET





Prepared for:
Department of the Air Force
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Contract No. F19628-75-C-0200
CDRL Item A00Y

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|---|
| 1. REPORT NUMBER: ESD-TR-77-313 | 2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (and Subtitle): LOW PRESSURE ALTITUDE TEST REPORT FOR THE AN/TRN-41 TACAN NAVIGATIONAL SET | 5. TYPE OF REPORT & PERIOD COVERED |
| | 6. PERFORMING ORG. REPORT NUMBER: 14 131500-616 |
| 7. AUTHOR(s): None | 8. CONTRACT OR GRANT NUMBER(s): F19628-75-C-0[illegible] |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS: E-Systems, Inc., Montek Division, 2268 South 3270 West, Salt Lake City, Utah 84119 | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS |
| 11. CONTROLLING OFFICE NAME AND ADDRESS: Electronic Systems Division (AFSC), Hanscom AFB Ma. 01731 | 12. REPORT DATE: 12 August 1977 |
| | 13. NUMBER OF PAGES: 10P. |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) | 15. SECURITY CLASS. (of this report): Unclassified |
| | 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: N/A |

16. DISTRIBUTION STATEMENT (of this Report)

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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

AN/TR-41 TACAN NAVIGATIONAL SET

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes the low pressure test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TR-41.

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LOW PRESSURE ALTITUDE TEST REPORT

for the

NAVIGATIONAL SET, TACAN, AN/TRN-41

This report describes the low pressure test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41, 131500-415.

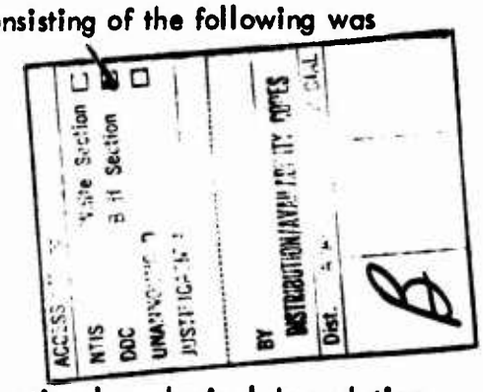
1. Test Identification. Low pressure test as defined in Appendix IV-C (low pressure test procedure) of the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41.

2. Functional Purpose of Test. This test forms a part of the AN/TRN-41 system qualification tests.

3. Test Objectives. To demonstrate that the AN/TRN-41 will meet the low pressure requirements of paragraphs 3.2.5.1.3 and 4.2.1.4.3.4 of Specification No. 404L-701-5017A, Part I of 2 parts (20 August 1976).

4. Description of Test Articles. The AN/TRN-41 system consisting of the following was used for the tests:

| | |
|---|---|
| Receiver-Transmitter | RT-1202/T |
| Antenna | AS-3132/T |
| Antenna Support | AB-1237/T |
| Filter, DC Power | F-1439/T |
| Interconnecting Cables | |




5. Summary of Test Results. The AN/TRN-41 showed no functional or physical degradation during the low pressure test.

6. Description of Test Facilities and Procedures. The test facilities and test procedures are described in Appendix IV-C of the Equipment Test Plan.

7. Test Setup Diagrams. The test setup diagrams are provided in Appendix IV-C of the Equipment Test Plan.

8. Test Equipment. See Attachment 1 for test equipment used for the low pressure test and the pretest, test and post test operational tests.

9. Test Data. Attachment 2 contains the data sheets for the low pressure test and the pretest, test and post test operational tests.

10. Test Conditions. The system was maintained at a pressure equivalent to an altitude of 45,000 feet for 1 hour. The pressure was then increased to an altitude of 13,100 feet and the system operated at that pressure.

11. Test Results Analysis. The system operated normally during the low pressure tests and comparison of test data showed that no degradation of performance occurred during the test. No physical degradation was observed in the visual inspection.

12. Certification. The data sheets shown in Attachment 2 have been signed by a Montek Quality Assurance representative and a DCAS representative, certifying that the test results are authentic, accurate, current and in accordance with the related test plan.

# ATTACHMENT 1
# TEST EQUIPMENT

## TEST EQUIPMENT

| Description/Manufacturer | Model | Calibration Due Date |
|---|---|---|
| Oscilloscope, Tektronix | 465 | 7/6/77 |
| Signal Generator, RF, H.P. | 612A | 6/23/77 |
| Peak Power Meter, Boonton | 8900B | 9/19/77 |
| Pulse Generator, Data Pulse | 110B | 5/12/77 |
| Counter, Fluke | 1953 | 8/12/77 |
| Half-Ampl. Det. Montek | 131500-702 | N/A |
| RF Detector, Montek | 135203-100 | N/A |
| Monitor Ant., Montek | 006300 | N/A |
| Test Box - Interconnection - Montek | 131500-703 | N/A |
| Power Supply HP | 6274B | 1/16/78 |
| Power Supply Acopian | | 12/9/77 |
| Power Supply, Sorensen | QR4075A | 9/19/77 |
| Directional Coupler 20 dB, Narda | 3042B | N/A |
| Directional Coupler 10 dB, Microlab | CBA-78 | N/A |
| Variable Attenuator, Weinschel 0-10 dB | 905 | N/A |
| RF Attenuator, Weinschel | 10 dB | N/A |
| Multimeter, Fluke | 8120A | 8/2/77 |
| Altitude Chamber, Sperry Univac | - | N/A |
| Electronic Monometer, Datametric | 1023A | 10/7/77 |
| Temperature Controller, Honeywell | 152P1-92-111-74 | 10/7/77 |

# ATTACHMENT 2
# DATA SHEETS

APPENDIX IV-K

DATA SHEET
ENVIRONMENTAL TEST

TEST Low Pressure (Altitude)

SYSTEM 002

DATE from 9 May 1977
to 9 May 1977

ACCEPTABLE X

NOT ACCEPTABLE

REMARKS The system was subjected to the low pressure (altitude) tests as outlined by test procedure 131500-415, appendix IV-C. At the conclusion of the low pressure test, the system operated normally. There was no degradation in performance based on comparison of test data. No discrepancies were noted.

DISCREPANCIES

SIGN OFF INFORMATION

ENVIRONMENTAL TEST ENGINEER _____ DATE _____

REPRESENTATIVE ENGINEER B D Dayton DATE 5-11-77

QA REPRESENTATIVE M. B. Grant DATE 5-11-77

DCASD OR AF CONCURRENCE [illegible] DATE 5-11-77

June 30, 1976

DATA SHEET

OPERATIONAL TESTS

AN/TRN-41



Test ALTITUDE - (LOW PRESSURE  Date 5/8/77

System 003  Time 10:45

Tech

| Para. No. | Description | Pre Test 5/8/77 mbz | Test | Post Test | Requirements | Units |
|---|---|---|---|---|---|---|
| 6.1 | Calibrated RF insertion loss | | | | | |
| | $P_L$ = 31.2 dB | N/A | N/A | N/A | N/A | N/A |
| | Used in determining RF peak power. | | | | | |
| .2 | System turn on normal operation | ✓ | ✓ | ✓ | Check if OK | N/A |
| .3.1 | Antenna radiated signal | ✓ | ✓ | ✓ | | |
| | 15 Hz | ✓ | ✓ | ✓ | Check if OK | N/A |
| | 135 Hz | ✓ | ✓ | ✓ | Check if OK | N/A |
| 6.3.2 | Antenna Speed | 66.667 | 66.669 | 66.667 | 66.667 ± .133 | ms |
| 6.4.1.1 | Correct identity code | ✓ | ✓ | ✓ | Check if OK | N/A |
| 6.4.1.2 | Identity period | 37.5 | 38.0 | 38.0 | 37.5 ± 3.75 | Seconds |
| 6.4.2 | Peak power | | | | | |
| | (1) Reading of peak power meter Pm = | 76mw | 76 mw | 76 mw | N/A | Watts |
| | (2) Convert to dBm = 10 log Pm x $10^3$ = Pm dBm | 18.8 dBM | 18.81 dBM | 18.81 dBM | N/A | dBm |
| | Total power output in dBm $Pm_{dBm} + P_L$ = *Insertion loss see 6.1 above. | dBM | 50.01 dBM | 50.01 dBM | 50 dBm | dB |
| 6.4.3.3 | Pulse count | 7184 | 7182 | 7187 | 7200 ± 180 | Counts |
| 6.4.4.2 | Pulse shape | | | | | |
| | Width (50%) | 3.6 ms | 3.6 ms | 3.6 ms | 3.5 ± 0.5 | µs |
| | Rise time (10-90%) | 2.2 ms | 2.2 ms | 2.2 ms | 2 ± 0.25 | µs |
| | Fall time (90-10%) | 2.5 ms | 2.5 ms | 2.5 ms | 2.5 ± 0.5 | µs |
| 6.4.4.4 | Pulse spacing | 12.0 ms | 12.0 ms | 12.0 ms | 12.0 ± 0.1 | µs |
| 6.4.5.2 | Delay - 60 ±10 µs 15 Hz trig to first burst pulse. | ✓ | ✓ | ✓ | Check if OK | |

DATA SHEET

OPERATIONAL TESTS

AN/TRN-41 (Continued)

| No. | Description | Pre Test | Test | Post Test | Requirements | Units |
|---|---|---|---|---|---|---|
| 4.4.5.3 | Correct north burst - 12 pulse pairs spaced 30 ± 0.1 μs | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.5.5 | Delay 50 ± 10 μs - 135 Hz trig to first burst pulse | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.5.6 | Correct Aux burst - 6 pulse pairs spaced 24 ± 0.1 μs | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.6.5 | RT replies to 3300 interrogations | 2627 | 2562 | 2508 | ≥2310 (Counts/Second) | |
| 4.4.6.7 | Demand only mode - times to switch from ON to STBY within 70 seconds | ✓ | ✓ | ✓ | Check if OK | ✓ |
| 4.4.6.8 | STBY mode | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.6.9 | Demand Only mode - time to switch from STBY to ON ~~≤15~~ 20 sec 4/19/77 | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.6.10 | ON AIR mode | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.7.1 | DME ONLY mode | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.7.2 | Switch from DME to TACAN | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.8.1 | Antenna Alarm - Within four seconds | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.8.2 | Alarm Reset | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.8.3 | RT Alarm - Within five seconds | ✓ | ✓ | ✓ | Check if OK | |
| 4.4.8.4 | Alarm Reset | ✓ | ✓ | ✓ | Check if OK | |

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| FACILITY: A-1 | ENVIRONMENTAL DATA SHEET<br>ENVIRONMENTAL LABORATORY — DEPT. 330 | |
|---|---|---|
| A.O. 298K-143 | ENV. TECH R K Davis | TEST SCHED. |
| ENGINEER OR Q.C. M. Rogers (E systems) | PHONE 993-9300, X288 | TEST COMPLETED |
| TECHNICIAN | PHONE | TEST REMOVED |
| UNIT TITLE AN/TRN-41 | SER. QTY. 1 | TOTAL UTILIZATION |

| INSTRUCTIONS TO OPERATOR | TEST TO TERMINATE: | BY: | ENVIRONMENTAL LABORATORY SUPERVISORS APPROVAL |
|---|---|---|---|
| TEST Low Pressure<br>SPEC. Mil-std 810<br>PAR. Method 500.1 | 1. Test per procedure I<br>A. 3.28 "Hg or 45,900 ft.<br>B. hold for 1 hr.<br>C. 16.20 "Hg or 13,100 ft.<br>D. operate Test Item.<br>E. Return to Ambient pressure. | | W. W. Black SIGNATURE<br>DATE |

| DATE | TIME | CHRONOLOGICAL RECORD OF TEST | INITIALS (PRINT) |
|---|---|---|---|
| 5/9/77 | | Place AN/TRN-41 in Altitude chamber. | DwB |
| | | set pressure to 3.28 "Hg. hold for 1 hr. | |
| | | | |
| 5/9/77 | | Reset pressure to 16.20" Hg. After stabilization. operated Test ITEM | DwB |
| | | | |
| 5/9/77 | | Return chamber to ambient pressure. | DwB |



VERIFIED & RELEASED BY: _____ Q.C. OR PROGRESS _____ COGNIZANT ENGINEER