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Report No. 131500-617
12 August 1977

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SAND AND DUST TEST REPORT
FOR THE
AN/TRN-41 TACAN NAVIGATIONAL SET

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes the sand and dust test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41. 408354 B		

SAND AND DUST TEST REPORT
for the
NAVIGATIONAL SET, TACAN, AN/TRN-41

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

1. **Test Identification.** Sand and dust test as defined in Appendix IV-D (sand and dust 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 sand and dust requirements of paragraphs 3.2.5.1.4 and 4.2.1.4.3.5 of Specification No. 404L-701-5017A, Part 1 of 2 parts (20 August 1976).
4. **Description of Test Article.** 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	

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5. **Summary of Test Results.** The AN/TRN-41 showed no functional or physical degradation during the sand and dust test.
6. **Description of Test Facilities and Procedures.** The test facilities and test procedures are described in Appendix IV-D of the Equipment Test Plan.
7. **Test Setup Diagrams.** The test setup diagrams are provided in Appendix IV-D of the Equipment Test Plan.

8. **Test Equipment.** See Attachment 1 for test equipment used for the sand and dust test and the pretest and post test operational tests.

9. **Test Data.** Attachment 2 contains test data for the sand and dust test. This data includes:

- a. Environmental Test Data Sheet
- b. Operational Test Data Sheet, (pretest and post test)
- c. Chamber Data Sheet
- d. Photographs of AN/TRN-41 system after sand and dust test.

10. **Test Conditions.** The system was subjected to sand and dust as described in Appendix IV-D of the equipment test plan.

11. **Test Results Analysis.** The system functioned normally during and after the sand and dust test. Visual inspection revealed some dust in the antenna, RT and DC power filter as noted in the data sheet in Attachment 2. The dust as noted did not affect the functional operation of the system.

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

<u>Description/Manufacturer</u>	<u>Model</u>	<u>Calibration Due Date</u>
Oscilloscope, Tektronix	465	7/6/77
Signal Generator, RF, H.P.	612A	6/23/77
Peak Power Meter, HP	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	2/13/78
Directional Coupler 10 dB, Microlab	CBA-78	N/A
Variable Attenuator, Weinschel 0-10 dB	905	12/13/77
RF Attenuator, Weinschel	10 dB	N/A
Multimeter, Fluke	8120A	8/2/77
Sand and Dust Chamber, Hiatt Eng.	SDHL-96	7/15/77

ATTACHMENT 2
DATA SHEETS

APPENDIX IV-K
DATA SHEET
ENVIRONMENTAL TEST

131500-415

June 30, 1976

TEST: Sand And Dust
SYSTEM: 002

from 9 May 1977
DATE to 13 May 1977
ACCEPTABLE X
NOT ACCEPTABLE _____

REMARKS: System Serial No. 002 was subjected to Sand and Dust Testing as outlined by Appendix IV-D of Equipment Test Plan 131500-415. The system functioned normally upon completion of the test. The following was observed during visual-mechanical inspection:
Antenna--There was a very thin layer of dust on the inner diameter of the 135HZ element, P/N 131062-100. There was no evidence of any dust leakage on the o-ring seal area. Suspect dust entered through the pressure relief valve due to temperature changes required during the test. There was a very thin film of dust on the RF gasket of the Speed Control Assembly Cover, P/N 131009-001, between all mounting screws. There was dust on the interior of the Drive Unit Cover, P/N 131019-001. There was a very minor indication of dust at one place on the machined flange of the Bottom Bearing Plate (Motor), P/N 131003-001. Even though dust was observed as noted above, it would not affect the functions and operations of the antenna .
Receiver-Transmitter--There was a very thin film of dust on the gasket of Channel Selector and Code Switch Cover, P/N 19156-131103-001. Even though a very thin layer of dust was observed, it would not affect the operation of the Receiver-Transmitter.
D.C. Power Filter--There was dust (1 tablespoon) on interior of enclosure. The dust entered this unit due to gasket bond failures and improper seal in a localized area. Even though dust was present, it would not affect the operation of the D.C. Power Filter.

SIGN OFF INFORMATION

ENVIRONMENTAL TEST ENGINEER _____ DATE _____

REPRESENTATIVE ENGINEER B.G. TAYLOR by JMRogers DATE 6/3/77

QA REPRESENTATIVE m. B. Smith DATE 6/3/77

DCASD OR AF CONCURRENCE [Signature] DATE 6-3-77

June 30, 1976

DATA SHEET
OPERATIONAL TESTS
AN/TRN-41

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Test SAND & DUST

System 002 RT 003
ANT 001
DC 001
TRIPOD 002

Date 5/8/77

Time

Tech

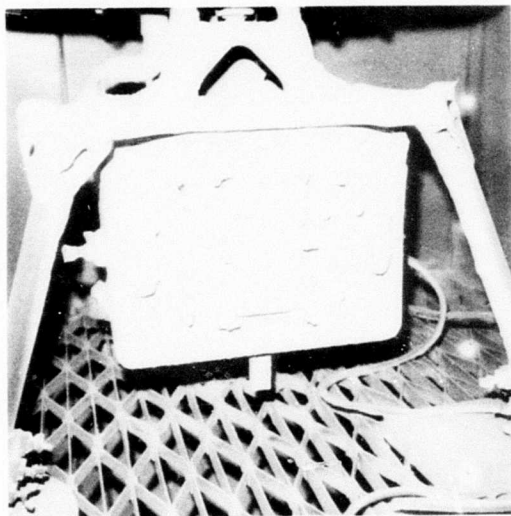
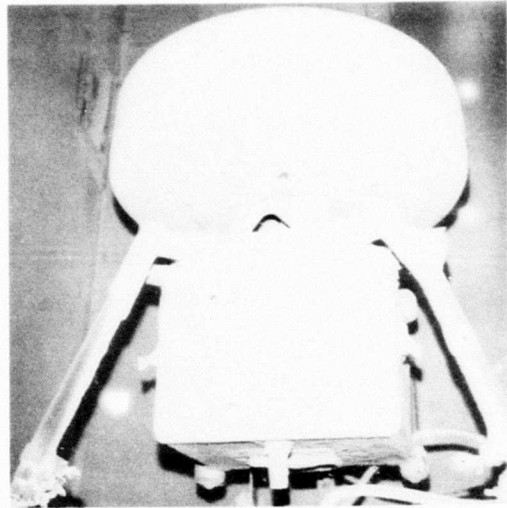
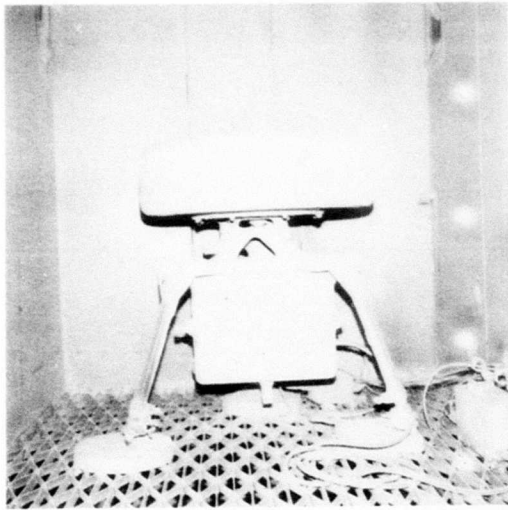
Para. No.	Description	Pre-Test	Test	Post-Test	Requirements	Units
0.1	Calibrated RF insertion loss $P_L = 32.5$ dB Used in determining RF peak power.	N/A	N/A	N/A	N/A	N/A
0.2	System turn on normal operation	✓		✓	Check if OK	N/A
0.3.1	Antenna radiated signal 15 Hz	✓		✓	Check if OK	N/A
	135 Hz	✓		✓	Check if OK	N/A
0.3.2	Antenna Speed	66.667		66.667	66.667 ± .133	ms
1.4.1.1	Correct identity code	✓		✓	Check if OK	N/A
2.4.1.2	Identity period	38.0	38.0	38.0	37.5 ± 3.75	Seconds
2.4.2	Peak power (1) Reading of peak power meter $P_m =$ (2) Convert to dBm - 10 log $P_m \times 10^3 = P_m \text{ dBm}$ Total power output in dBm $P_{m \text{ dBm}} + P_L =$ *Insertion loss see 6.1 above.	70.mw 18.45		70.mw 18.45 dBm	N/A N/A	Watts dBm
0.4.3.3	Pulse count	7190		7215	7200 ± 180	Counts
0.4.4.2	Pulse shape Width (50%) Rise time (10-90%) Fall time (90-10%)	3.4 μs 2.0 μs 2.5 μs		3.4 μs 1.9 μs 2.5 μs	3.5 ± 0.5 2 ± 0.25 2.5 ± 0.5	μs μs μs
0.4.4.4	Pulse spacing	12.0 μs		12.0 μs	12.0 ± 0.1	μs
1.5.2	Delay - 60 ± 10 μs 15 Hz trig to first burst pulse.	✓		✓	Check if OK	

1000-113
June 30, 1976

DATA SHEET
OPERATIONAL TESTS
AN/TRN-41 (Continued)

No.	Description	Pre Test	Test	Post Test	Requirements	Units
4.5.3	Correct north Burst - 12 pulse pairs spaced 30 ± 0.1 μs	✓		✓	Check if OK	
4.5.5	Delay 40 ± 10 μs - 135 Hz trig to first burst pulse	✓		✓	Check if OK	
4.5.6	Correct Aux burst - 6 pulse pairs spaced 24 ± 0.1 μs	✓		✓	Check if OK	
4.6.5	RT replies to 3300 interrogations	2735		2751	≥ 2310 (Counts/Second)	
4.6.7	Demand only mode - times to switch from ON to STBY within 70 seconds 80	✓		✓	Check if OK	✓
4.6.8	STBY mode	✓		✓	Check if OK	
4.6.9	Demand Only mode - time to switch from STBY to ON 510 sec 20	✓		✓	Check if OK	
4.6.10	ON AIR mode	✓		✓	Check if OK	
4.7.1	DME ONLY mode	✓		✓	Check if OK	
4.7.2	Switch from DME to TACAN	✓		✓	Check if OK	
4.8.1	Antenna Alarm - Within four seconds	✓		✓	Check if OK	
4.8.2	Alarm Reset	✓		✓	Check if OK	
4.8.3	RT Alarm - Within five seconds	✓		✓	Check if OK	
4.8.4	Alarm Reset	✓		✓	Check if OK	

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AN/TRN-41 AFTER SAND AND DUST TEST

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