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MILITARY SPECIFICATION
TEST SET, MISSILE INTERFACE (MITS)
TS-3561()/AWM-23(V)

This specification has been approved
by the Naval Air Systems Command,
Department of the Navy

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SUPPLEMENT.

MIL-T-85039(AS) Military Specification, Test Set, Missile
 Supplement 1 Interface (MITS), TS-3561()/AWM-23(V)

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MILITARY SPECIFICATION
TEST SET, MISSILE INTERFACE (MITS)
TS-3561()/AWM-23(V)

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1. SCOPE

1.1 Scope. This specification covers the performance, design, and test requirements for the Missile Interface Test Set (MITS), TS-3561()/AWM-23(V).

1.2 Classification. The MITS shall consist of the following assemblies:

- a. Assembly, Test Set (see 3.6.1)
- b. Assembly, Eject Cable (see 3.6.2)
- c. Assembly, Identifi- (see 3.6.3)
cation/Test Access

1.3 Associated equipment. The MITS shall be capable of operating with the cable assembly set of MIL-C-81954(AS).

2. APPLICABLE DOCUMENTS

2.1 General. The following documents, of the issue specified in AS-4053, Applicable Document List for AWCS Test Set AN/AWM-23(V), form a part of this specification to the extent specified herein. MIL-T-81734(AS) shall be the applicable general specification for the MITS described herein (see 6.6).

SPECIFICATIONS

Military

MIL-M-7793	Meter, Time Totalizing
MIL-C-13777	Cable, Special Purpose, Electrical, General Specification for

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MIL-E-17555	Electronic and Electrical Equipment, Accessories, and Repair Parts; Packaging and Packing of
MIL-T-18303	Test Procedures, Preproduction, Acceptance, and Life for Aircraft Electronic Equipment, Format for
MIL-N-18307	Nomenclature and Identification for Electronic, Aeronautical and Aeronautical Support Equipment including Ground Support Equipment
MIL-T-21200	Test Equipment for Use with Electronic and Fire Control Systems, General Specification for
MIL-S-46844	Solder Bath Soldering of Printed Wiring Assemblies, Automatic Machine Type
MIL-W-81044	Wire, Electric, Crosslinked, Polyalkene Insulated, Copper
MIL-T-81734(AS)	Test Set, Airborne Weapon Control System, AN/AWM-23(V)
MIL-C-81954(AS)	Cable Assembly Set, Electrical, MATS, Special Purpose
MIL-T-85039(AS)	Test Set, Missile Interface (MITS) Supplement 1 (Confidential)

Naval Air Systems Command (NAVAIR)

AS-2695	Interface Specification, F-14A Weapon Control System AN/AWG-9 (N-3) Interface with the AIM-54A-1 Missile
AS-2696	Interface Specification, AIM-54A-1 Guided Missile (Production) Installation and Physical Interface with F-14A Aircraft

PUBLICATIONS

Hughes Aircraft Company

3326964	Acceptance Test Procedure, Missile Interface Test Set
Tape 4810CP-1XX	Computer Program NDRO/Bulk Store
DWG 493507-1XX	Test Set, Missile Interface
DWG T493507-11-1	MITTS Test Position
DWG 493513-1XX	Cable Assembly, MATS
HMS 2-1132	Material Specification, Wire (Bus), Solid Copper Conductor, General Purpose (200°C Service)
HMS 2-1144	Material Specification, Wire, Electrical, Polytetrafluorethylene Insulated, Hookup and General Purpose (for 392°F service)
HMS 2-1377	Material Specification, Cable--Multiconductor, Hook-up and General Purpose (for 392°F service)
HMS 2-1480	Material Specification, Wire and Cable, Multiconductor, Hook-up, Fluorocarbon-TFE Insulated, 600 volts RMS (275°F service)
HMS 2-1513	Material Specification, Wire and Cable, Cabling and Harnessing Usage, Polyalkene Insulated, 600 volts RMS (275°F service)
HMS 2-1514	Material Specification, Wire and Cable, Cabling and Harnessing Usage, Polyalkene Insulated, 100 volts RMS (275°F service)
HMS 2-1551	Material Specification, Wire, Electrical Polyvinylidene, Fluoride Insulated

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HMS 2-1563	Material Specification, Wire, Electrical Polytetrafluorethylene Insulated, 600 and 1000 volts rms (for 392° F service)
HMS 2-1619	Material Specification, Wire and Cable, Electrical, Polyimide-Fluorocarbon Insulated (for 392° F service)
HMS 22-1672	Material Specification, Gold-Silicon Solder Alloy
FS 31050-038	Finish Specification, AN/AWM-23 Ground Support Equipment
GS 30620-781	General Specification for Identification and Marking of AN/AWM-23 Ground Support Equipment
DP 30847-008	Detail Process Specification, Engineering Modification of Printed Circuit Boards
DP 31050-918	Detail Process Specification, REMCAM Fabrication Procedure
DP 31050-919	Detail Process Specification, Assembly of Repairable Multilayer Circuit Strips (REMCAM)
DP 50062	Detail Process Specification, Modification of REMCAM Circuit Boards
HP 11-39	Hughes Process, Welding, Resistance for the Assembly of Electronic Modules
HP 31-17	Hughes Process, Printed Circuit Board, Lead-Tin Plated, Projecting Contact Pin Type, Production of
HP 31-23	Hughes Process, Printed Wiring Board, Requirements for

Navy

AR-5	Microelectronic Devices Used in Avionics Equipment, Procedures for Selection and Approval of
NAVAIR 00-25-543	List of Standard Drawings used by the NAVAL AIR Systems Command
NAVAIR 00-25-544	List of Specifications and Standards (Book Form) Approved by the Naval Air Systems Command
MIL-HDBK-235-2 (NAVY) dtd 23 June 1972	Electromagnetic (Radiation) Environment Considerations for Design and Procurement of Electrical and Electronic Equipment

STANDARDS

Military

MIL-STD-167	Mechanical Vibrations of Shipboard Equipment
MIL-STD-280	Definitions of Item Levels, Item Exchangeability, Models, and Related Terms
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment
MIL-STD-480	Configuration Control - Engineering Changes, Deviations and Waivers
MIL-STD-721	Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety
MIL-STD-761	Electric Power, Alternating Current for Shipboard Use, Characteristics and Utilization of

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Industry

NAS-729

Cable, Electrical, Flat
Conductor, Flexible--300 volts,
Copper

2.2 Availability of documents. When requesting specifications, standards, drawings, and publications, refer to both title and number. Copies of applicable specifications required by contractors in connection with specific procurement functions may be obtained upon application to the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3 Precedence of documents. When the requirements of the contract, this specification, or applicable subsidiary documents are in conflict, the following precedence shall apply:

- a. Contract - The contract shall have precedence over any other document.
- b. This specification - This specification shall have precedence over all applicable subsidiary documents (see 6.6).
- c. Reference documents - Any document referenced in this specification shall have precedence over all applicable documents referenced therein.

3. REQUIREMENTS

3.1 Materials, parts, and processes. Unless otherwise specified herein, MIL-T-21200 shall apply for materials, parts, and processes.

3.1.1 Selection of materials, parts, and processes. Unless otherwise specified herein, MIL-T-21200 shall apply for the selection of materials, parts, and processes. In addition, selection of materials, parts, and processes may be based on documents or drawings listed in NAVAIR 00-25-543 or NAVAIR 00-25-544.

3.1.1.1 Approval of nonstandard materials, parts and processes. Parts submitted and approved on any prior PHOENIX contract need not be resubmitted nor reapproved. If a nonstandard part is submitted under this contract for disposition by Naval Avionics Facility, Indianapolis (NAFI) and the disposition designates a degradation in system performance or a maintenance problem, the contractor will, at NAVAIR discretion retrofit the nonapproved parts with approved parts. In addition, the following shall apply:

- a. Electric and electronic part approval in accordance with MIL-T-21200.
- b. Microelectronic device approval in accordance with AR-5.
- c. Polyurethane elastomeric materials covered by requirements 17 and 47 of MIL-STD-454 shall have been tested and found suitable for the test set environment.

3.1.2 Flammable materials. In lieu of the requirements of MIL-T-21200, the following shall apply:

- a. Use of materials which may support combustion shall be avoided, wherever practical.
- b. No materials capable of causing an explosion shall be used.

3.1.3 Cables and connectors. The applicable requirements of MIL-T-21200 or MIL-C-13777 shall apply. In addition, if flexible flat conductor electrical cable is required, NAS 729 shall apply.

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3.1.4 Wire. Wire shall be selected in accordance with MIL-T-21200 or MIL-W-81044, as applicable. In addition, the following types of wire may be used: HMS 2-1132, HMS 2-1513, HMS 2-1514, HMS 2-1377, HMS 2-1144, HMS 2-1563, HMS 2-1480, HMS 2-1551, HMS 2-1619.

3.1.5 Rotary switches. Rotary switches shall be in accordance with MIL-STD-454, Requirement 58, except that the material for contacts and contactors may also be copper with subsequent nickel and rhodium plating.

3.1.6 Finishes. Finishes and surface treatments shall be in accordance with FS 31050-038.

3.1.7 Marking and identification. Marking and identification shall be in accordance with GS 30620-781 and panel marking processes in accordance with FS 31050-038. The requirements of MIL-N-18307 shall apply as specified in GS 30620-781.

3.1.8 Soldering. Soldering shall be performed in accordance with MIL-STD-454, Requirement 5, MIL-S-46844, or DP 30847-008 as appropriate. Solder for use in microelectronic items shall be in accordance with HMS 22-1672.

3.1.9 Welding

3.1.9.1 Structural. Structural welding shall be in accordance with MIL-STD-454, Requirement 13.

3.1.9.2 Welds, resistance, electrical interconnections. Electrical interconnection resistance welds shall be in accordance with MIL-STD-454, Requirement 24 or in accordance with HP 11-39.

3.1.10 Printed wiring. Printed wiring (etched circuitry) shall be in accordance with HP 31-17 or HP 31-23 (except contact areas shall have a minimum of .00005 inch gold over a minimum of .0005 inch nickel). Plated through holes may be used in lieu of test jacks. When using the Repairable Multilayer Circuit Assembly Method (REMCAM) one or two REMCAM flat leads may occupy the plated through hole with the component lead, provided the procedure for this process is in accordance with DP 31050-918 and DP 31050-919.

3.1.11 Engineering changes to printed circuit boards. In the event that an engineering change to a printed circuit board cannot be implemented in the appropriate master patterns before the start of board

fabrication, DP 50062 and DP 30847-008 may be used as the workmanship criteria for effecting the engineering change. In those cases where the rework deviates from the MIL-STD-454, Naval Technical Representative (NTR) approval of a minor deviation on a DD Form 1694 is required before production release of the engineering.

3.1.12 Replaceability of electronic standard parts and materials. Nonstandard nonapproved electronic items may be used in the AN/AWM-23 with no requirement for traceability to a particular SRA or WRA in only those cases where approved parts are not available to meet schedule requirements. When such a replacement is utilized, the contractor shall abide by the replaceability of electronic standard parts and materials requirements of MIL-T-21200 as follows:

- a. The equipment shall be arranged to permit replacement of the nonstandard, nonapproved items by the approved items.
- b. NTR approval of a minor deviation on a DD Form 1694 is required before the items are incorporated into any hardware.

3.2 Design and construction. Except as otherwise specified herein, the design and construction of the MITS shall be in accordance with MIL-T-21200.

3.2.1 Design features.

- a. The Test Set Assembly (TSA) shall contain an umbilical connector, wiring harness, control panel and readout, electronic modules, launcher attachment device and electrical connection provisions for the eject cable assembly mounted in a combination case. The TSA shall directly attach to the AIM-54A launcher umbilical connector in accordance with AS-2696, or to the F-14A fuselage umbilical connector by use of the cable set of MIL-C-81954(AS). The combination case shall consist of a detachable cover, and a case body with a hinged front cover. The covers shall provide storage space for the eject cable assembly and the identification/test access assembly (IDTA). The case shall be designed to meet the requirements of MIL-T-21200, with the exception that the affixed schematic diagram of paragraph 3.1.16.6 of MIL-T-21200 and the accessory storage for the operating manual of paragraph 3.2.3.3.12 of MIL-T-21200 shall not be required.

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- b. The Eject Cable Assembly shall provide the electrical interface between the eject cartridge connector and the TSA.
- c. The Identification/Test Access Assembly shall consist of an umbilical connector, a unique identification capability, launcher attachment device, test access points with associated wiring for all tactical missile umbilical functions and a dynamic load simulation for missile power forms. The IDTA shall be a self-contained assembly that fits and is secured in the MITS cover by quick disconnect devices. The IDTA shall directly attach to the AIM-54A launcher umbilical connector in accordance with AS-2696 or to the F-14A fuselage umbilical connector by use of the cable set of MIL-C-81954. The IDTA shall be provided with a power supply for purpose of supplying its unique ID signal with input power obtained from the 400 Hz heater power on the umbilical connector. The IDTA shall be protected by a circuit breaker on the input power, and a lamp indicator for POWER ON be provided. With IDTA input power off, the power supply shall be disconnected from the umbilical wiring, the missile ID jumper shall be opened and the dynamic load simulation shall be disconnected.

3.2.1.1 Method of operation. The MITS shall operate in manual and semi-automatic modes with the test program on the AN/AWG-9 tape 4810CP-1XX.

3.2.1.2 Commercial test equipment. Not applicable.

3.2.1.2.1 Other commercial components. Other commercial components (such as power supplies, tape readers, or tape recorders), may be incorporated in the MITS. When installed in the MITS, they shall meet the environmental and electrical service conditions of this specification.

3.2.1.3 Circuit grounds. To the greatest extent practicable, circuit ground or common shall be connected to the chassis, enclosure, or aircraft frame at only one physical point. The aircraft frame shall not be used as an electrical conductor in equipment circuitry.

3.2.1.4 Interchangeability. Interchangeability shall be in accordance with MIL-STD-454, Requirement 7.

3.2.1.5 Identification of product. MIL-T-21200 shall apply.

3.2.1.6 Human factors. The human engineering requirements of MIL-STD-454, Requirement 62, shall apply.

3.2.1.7 Test set generated acoustic noise. The acoustic noise requirements of MIL-T-21200 shall apply.

3.2.1.8 Forced-liquid cooling. Not applicable.

3.2.1.9 Space and weight limitations. Dimensions of the MITS shall not exceed 23 by 12 by 20 inches. The weight, including the eject cable assembly, shall not exceed 55 pounds.

3.2.1.10 Connectors. "Edgeboard" printed contacts utilizing pressure method contacts may be used for shop replaceable assemblies. Plug-in relays may be used.

3.2.1.11 Secondary electrical power. Secondary power forms shall be provided by power supplies which are a part of the MITS.

3.2.1.12 Interface. The MITS shall directly attach to the AIM-54A launcher umbilical connector and the eject cartridge connector, or to the F-14A fuselage umbilical connector by use of the cable set of MIL-C-81954(AS). Dimensional characteristics and details of the mounting and interconnection interface of the MITS to the F-14A shall be in accordance with AS-2696. The F-14A contractor will provide suitable physical interconnection access for the MITS.

3.2.2 Utilities. The MITS shall be designed to accept the utilities specified herein.

3.2.2.1 Electrical power. The MITS shall operate with electrical power having the characteristics of MIL-STD-761, Type I, when used in flight line application. The MITS shall receive 115 volt, 400 Hz, single phase power

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through the umbilical connector on the F-14A weapon rail or through the umbilical and attack connectors of the cable set of MIL-C-81954(AS).

3.2.2.2 Clean air. Not applicable.

3.2.2.3 Potable water. Not applicable.

3.2.2.4 Liquid coolant. Not applicable.

3.2.2.5 Helium. Not applicable.

3.2.2.6 Nitrogen. Not applicable.

3.2.2.7 Hydraulic fluid. Not applicable.

3.2.3 Service conditions

3.2.3.1 Electrical. The MITS shall be designed to meet the performance requirements of this specification when supplied with the electrical power of 3.2.2.1.

3.2.3.2 Environmental. The MITS shall operate satisfactorily under the environmental service conditions specified below.

3.2.3.2.1 Organizational level. The MITS shall withstand exposure to the environments specified in MIL-T-21200 for Class 2 equipment, except as follows: maximum nonoperating temperature shall be +71°C (+159.8°F), the vibration exposure shall be in accordance with MIL-STD-167 Type 1.

3.2.3.2.2 Intermediate-level. Not applicable.

3.2.4 Maintainability. MIL-T-21200, as modified below, shall apply.

3.2.4.1 Mean time to repair (MTTR). The MITS shall be capable of being restored to normal operation within 4 hours (mean time) after a malfunction is detected (see 6.3.14).

3.2.4.2 Test points. Test points shall be in accordance with MIL-T-21200 except that color coding shall be in accordance with GS 30620-781.

3.2.4.3 Shop replaceable assemblies (SRAs). The electronic portions of the MITS shall be divided into SRAs.

Where practicable, these shall be Quick Replaceable Assemblies (QRAs). All others shall be In-Place Repairable Assemblies (IPRAs). QRAs shall be designed to make maximum practicable use of microelectronic packages.

3.2.4.4 Self test capabilities. The MITS shall have no provision for built-in self test capability.

3.2.5 Reliability. The mean time between failures (MTBF) shall be 500 hours minimum.

3.2.5.1 Operating life. The MITS shall have a minimum of 15,000 hours operating life (see 6.3.12) with scheduled maintenance and replacement of parts.

3.2.5.2 Storage life. Storage life of the MITS shall be a minimum of 5 years.

3.2.5.3 Operational stability. The MITS shall operate satisfactorily over a period of 16 hours, continuously or intermittently, without the necessity for readjustment of any controls which are inaccessible during normal use.

3.2.6 Electromagnetic interference (EMI). The EMI requirements shall be in accordance with MIL-STD-461 for Class 1D equipment except as follows:

- a. MIL-STD-461, tests CE02 and CE04 and the limits therein shall apply to the eject cable only.
- b. In lieu of the radiated susceptibility (RS03) test called for in MIL-STD-461, a government controlled susceptibility test with limits as specified in supplement 1 to this specification shall be substituted.
- c. MIL-STD-461 tests RE02, RS01, RS02, RS04 shall not apply.

3.2.7 Utilities protection. The MITS shall protect itself and the item under test from damage as required for out-of-tolerance (OOT) utility inputs as follows.

3.2.7.1 Liquid cooling protection. Not applicable.

3.2.7.2 Clean air protection. Not applicable.

3.2.7.3 Electrical power protection. The MITS shall protect itself from OOT electrical power input.

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3.2.8 Calibration cycle. The MITS shall be designed for a minimum calibration cycle of nine months, exclusive of routine maintenance adjustments.

3.2.9 Power switching control. The MITS shall provide the necessary switching to control incoming power forms. A front panel POWER ON switch shall control incoming power, and may be utilized for emergency shutdown. An indicator lamp shall be provided for POWER ON indication.

3.2.10 Status displays. An illuminated numerical display on the TSA shall provide an indication of test mode, test number, eject pulse, detected eject pulse gone and completion of test. Indicator lamps on the IDTA shall be provided to display the status of the dynamic load test for missile 100 Vdc power and presence of a telemetry (TM) weapon rail. Readouts shall be useable under all organizational level conditions, including sunlight and "red-light" hanger deck conditions.

3.3 Performance.

3.3.1 General. The MITS shall provide the capability to test the F-14A functional interface of the AIM-54A Guided Missile through the F-14A launcher missile umbilical connector. In addition the MITS shall provide capability to test the eject cartridge firing signal at the eject cartridge connector. The functional interface is defined in AS-2695.

3.3.2 Organizational level functional requirements. The MITS shall operate at the organizational level as defined herein.

3.3.3 Intermediate level functional requirements. Not applicable.

3.3.4 Warmup time. The MITS shall not require a warm-up time.

3.4 Detailed functional requirements.

3.4.1 Test capabilities. The following test capabilities shall be provided. Failures shall be indicated by a unique numerical display identifiable to a particular malfunction.

3.4.2 Verification. The signals listed in Table I will be verified to the stated accuracy. Accuracy is defined as the allowable error in the setting of each

TABLE I
VERIFIED SIGNALS

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
<u>AC ANALOG SIGNALS</u>					
37	Slaving Voltage Reference	26.0 VRMS	± 1.3 VRMS	$\pm 1\%$ (0.26 VRMS)	Ratios & phases are with respect to UP 37
77	K_m SHP	Ratio=0.135 Phase=180°	± 0.007 $\pm 55^\circ$	$\pm 1\%$ (.0013) $\pm 20^\circ$	
109	J_m SHP	Ratio=0.135 Phase=0°	± 0.007 $\pm 55^\circ$	$\pm 1\%$ (.0013) $\pm 20^\circ$	
147	I_m SHP	Ratio=0.135 Phase=0°	± 0.007 $\pm 55^\circ$	$\pm 1\%$ (.0013) $\pm 20^\circ$	
201	Target Doppler Reference Frequency	>-1.0 dbm 29.999 MHz	- ± 3 kHz	$\pm .004\%$ (1.2 kHz)	
<u>DC ANALOG SIGNALS</u>					
158	Roll IC	-8.0 VDC	± 0.4 VDC	$\pm 1\%$ (0.08 VDC)	
161	Pitch IC	6.5 VDC	± 0.32 VDC	$\pm 1\%$ (0.065 VDC)	
162	EL V _{rg} Program Test (MOAT)	8.0 VDC	± 0.4 VDC	$\pm 1\%$ (0.08 VDC)	
198	AZ V _{rh} Program Test (MOAT)	>3.5 VDC	-	-	Jumpered to UP 162 in aircraft

TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
13	Adaptive IC	8.0 VDC	±0.4 VDC	±1% (0.08 VDC)	
159	RIG Driver Test (MOAT)	8.0 VDC	±0.4 VDC	±1% (0.08 VDC)	
<u>POWER SIGNALS</u>					
54	RLM Power	95.0 VDC	±5.0 VDC	±1.5% (1.3 VDC)	
74	Launch Power A				
55	Launch Power B				
<u>SWITCHED SIGNALS</u>					
15	Aircraft Protected 28Vdc	>21.0 VDC			
173	ISM Unlock				
18	External Slaving Command				
36	Battery Activate				
25	ISM Relock				

TABLE I
VERIFIED SIGNALS

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
43	Identification Power	12.0 VDC	± 0.36 VDC	$\pm 1\%$ (0.12 VDC)	
92	Motor Ignition Hold	> 8.0 VDC	-		
137	Timer Zero Set	11.03 VDC	± 55 VDC	$\pm 1\%$ (0.11 VDC)	
100	Prelaunch Velocity Servo Enable	11.3 VDC	± 55 VDC	$\pm 1\%$ (0.11 VDC)	
115	Parameter Reset	> 8.0 VDC	-	-	
1	8/4-Second Signal (MOAT)	> 8.0 VDC	-	-	
185	Center Channel Target Simulator (MOAT)	> 3.5 VDC	-	-	

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TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
128	Semiactive Channel Select A	>3.5 VDC	-	-	
149	Semiactive Channel Select B				
168	Semiactive Channel Select C				
58	Transmitter RF ON Command (MOAT)	>4.1 VDC	-	-	
31	Yaw Rate Test (MOAT)	>3.5 VDC	-	-	
51	Pitch Rate Test (MOAT)				
DIGITAL SIGNALS					
190	ACM Active Launch	>8.0 VDC	-	-	
192	Single Target Track Enable	>8.0 VDC	-	-	

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TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
6	Doppler g-Bias	>3.5 VDC			UP 64 shall be checked for >.5 milliseconds pulse width
102	Programmed Phase g-Bias B ₃				
117	Programmed Phase g-Bias B ₂				
135	Programmed Phase g-Bias B ₁				
83	h-Bias H ₁				
118	h-Bias H ₂				
136	h-Bias H ₃				
64	Gr Semiactive Set				
150	Prelaunch Address A-1				
151	Prelaunch Address B-1				
152	Prelaunch Address C-1				
2	Act. Trans. Bias Set A				
3	Act. Trans. Bias Set B				

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TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
175	Tail Attack	>3.5 VDC			
7	Doppler g-Bias Clock Pulse				
97	Prelaunch Message C				
112	Prelaunch Message B				
129	Prelaunch Message A				
65	Spare				
85	Spare				
101	High Altitude				
84	Spare				

TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
<u>MISCELLANEOUS MITS INPUTS</u>					
66	Roll Flipper Command (MOAT)	<1.2 VDC	-	-	Shorted to UP 67 in MOAT
108	Heating Power	-	-	-	Used for MITS primary power, presence indicated by ON/OFF lamp. Heating power return is in attack cable when using cable set of MIL-C-81954(AS)
145	Heating Power Return	-	-	-	
-	Freq. Coded Fire Signal A	7.6 kHz >6.5 Vp to p	±90 Hz	±.3% (22 Hz)	
-	Freq. Coded Fire Signal B	7.6 kHz >6.5 Vp to p	±90 Hz	±.3% (22 Hz)	
-	Eject Signal A	>13.5 VDC	-	-	
-	Eject Signal B	>13.5 VDC	-	-	
-	Eject	-	-	-	

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TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
<u>RETURNS</u>					
187	DC Return	-	-	-	Master Ground
165	Special Detector Disable (MOAT)				
126	I _m SHP Return	<1.2 VDC			
94	J _m SHP Return				
78	K _m SHP Return				
38	28 V Return				
138	Roll/Pitch IC Return				
40	Analog Return				
56	Battery Activate Return				

TABLE I
VERIFIED SIGNALS (continued)

Umbilical Pin	Nomenclature	Nominal	Passband	Accuracy	Remarks
174	ISM Unlock/Relock Return	<1.2 VDC			See UP 66
67	MOAT Test Return				
-	Freq. Code Fire Signal A Return				
-	Freq Code Fire Signal B Return				
57	Slaving Voltage : Reference Return				Floating returns - presence verified by Freq. Coded Fire signals test Presence of return verified by test of UP 37
16	Launch Power A Return				Presence of returns verified by test of UP 55 and 74
35	Launch Power B Return				
-	Eject Return				Isolated return - presence verified by test of Eject
-	Eject Power A Return				Presence verified by Eject Power Test
-	Eject Power B Return				

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passband threshold expressed as a percentage of the nominal signal value. Signals for which no passband is given are listed as threshold values.

3.4.3 Simulations. The following simulated signals/loads shall be provided:

- a. AIM-54A Missile identification.
- b. Missile output signals as shown in Table II.
- c. Loads to all applicable interface lines equivalent to or greater than the loads imposed by a missile. High power loads are required only for the time period during which a measurement/verification is being made on those interface lines requiring such loads.

3.4.4 Short tests. The following tests for shorts shall be provided on those wires as shown in the indicated tables.

- a. Intrastation - Table III.
- b. Interstation - Table IV.

3.4.5 Miscellaneous. Signals utilizing circuitry in the MOAT mode independent of the circuitry used in the LTE mode will be tested in both modes.

3.4.6 Test access capability. The IDTA shall provide test access points for all applicable pins at the missile umbilical and eject connector interface. The test points will be color coded by function per GS 30620-781.

3.5 Workmanship. Workmanship shall conform to MIL-STD-454, Requirement 9.

3.6 Elements.

3.6.1 TSA. The TSA shall provide the capability to perform the tests listed in Tables I, II and III when used with the eject cable assembly. When used with the IDTA and eject cable assembly, the TSA shall provide the capability to perform the tests in Table IV and a dynamic load test for the missile 100 Vdc power. The TSA shall provide the indication for all detected failures except for the dynamic load test for the missile 100 Vdc power. (See IDTA assembly). An elapsed time meter conforming to MIL-M-7793 shall be provided.

TABLE II
MITS OUTPUTS

Umbilical Pin	Nomenclature	Nominal	Accuracy	Remarks
45	Missile Type Sensing	12.0 VDC	±5% (0.60 VDC)	MITS ID Signal IDTA ID Signal
63	Active Frequency ID	-8.0 VDC -3.0 VDC	±12% (1.0 VDC) ±20% (0.6 VDC)	
19	Prelaunch Phase Lock Ind. (MOAT)	12.0 VDC	±10% (1.2 VDC)	
81	Detection Signal (MOAT)	5.0 VDC	±20% (1.0 VDC)	
96	TO MOAT Output (MOAT)	5.0 VDC	±20% (1.0 VDC)	
167	Az Steering Signal V_{sh} (MOAT)	2.0 VDC	±20% (0.4 VDC)	
148	El Steering Signal V_{sg} (MOAT)	3.0 VDC	±20% (0.6 VDC)	
114	VCLO Control Voltage (MOAT)	4.0 VDC	±20% (0.8 VDC)	
103	MOAT Flipper Output (MOAT)	5.0 VDC	±20% (1.0 VDC)	
196	AP MOAT Command Output (MOAT)	1.0 VDC	±20% (0.2 VDC)	
79	Front Receiver On Monitor (MOAT)	5.0 VDC	±10% (0.5 VDC)	
111	XMTR PA Output (MOAT)	-5.0 VDC	±25% (1.25 VDC)	

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TABLE III
INTRASTATION SHORTS TEST

Item	Umbilical Pin	Signal Name
1	190	ACM Active Launch
2	192	Single Target Track Enable
3	168	Semi-Active Channel Select C
4	149	Semi-Active Channel Select B
5	128	Semi-Active Channel Select A
6	102	Programmed Phase g-Bias B ₃
7	117	Programmed Phase g-Bias B ₂
8	135	Programmed Phase g-Bias B ₁
9	118	h-Bias H ₂
10	136	h-Bias H ₃
11	175	Tail Attack
12	64	Gr Semiactive Set
13	101	High Altitude
14	83	h-Bias H ₁
15	3	Act. Trans. Bias Set B
16	2	Act. Trans. Bias Set A
17	85	Spare
18	65	Spare
19	84	Spare
20	152	Prelaunch Address C-1
21	151	Prelaunch Address B-1
22	150	Prelaunch Address A-1
23	6	Doppler g-bias
24	97	Prelaunch Message C
25	112	Prelaunch Message B
26	129	Prelaunch Message A
27	1	8/4-Second Signal (MOAT)
28	58	Transmitter RF ON Command (MOAT)
29	185	Center Channel Target Simulator (MOAT)
30	115	Parameter Reset
31	18	External Slaving Command
32	137	Timer Zero Set
33	100	Prelaunch Velocity Servo Enable

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TABLE IV
INTERSTATION SHORTS TEST

Item	Umbilical Pin	Signal Name
1	162	El V _{rg} Program Test (MOAT)
2	161	Pitch Initial Condition
3	13	Adaptive Roll Initial Condition
4	159	RIG Driver Test (MOAT)
5	158	Roll IC
6	173	ISM Unlock
7	36	Battery Activate
8	25	ISM Relock
9	109	J _m SHP
10	77	K _m SHP
11	147	I _m SHP
12	74	Launch Power A
13	55	Launch Power B
14	201	Target Doppler Reference Frequency
15	Eject A	Eject Signal A
16	Eject B	Eject Signal B

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3.6.2 Eject cable assembly. The eject cable assembly shall provide the electrical interface between the eject cartridge connector and the TSA.

3.6.3 IDTA assembly. The IDTA assembly when used with the TSA eject cable assembly shall provide the additional missile ID required to perform the interstation shorts test (Table IV), and a dynamic load test for the missile 100 Vdc power. The IDTA shall also provide test access to the missile interface connector pins. The IDTA shall provide fault indication for dynamic load test of the missile 100 Vdc power.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 General. Acceptance of the MITS shall be solely on the basis of this specification.

4.2.1 Classification. The MITS shall be classified as a production model in accordance with paragraph 3.3.5 of MIL-STD-280: "A model in its final form of final production design made by production tools, jigs, fixtures, and methods. It employs standard parts (or nonstandard parts approved by the agency concerned)." If it is necessary to depart temporarily from the mandatory requirements (parts, processes, etc.) of the technical documents, a form DD 1694 shall be prepared. Minor deviations shall be submitted to the Navy Technical Representative (NTR) for approval. Major and critical deviations and waivers shall be submitted to Naval Air Systems Command for approval in accordance with the contract. The DD Form 1694 (Request for Deviation/Waiver) shall be prepared as delineated in MIL-STD-480.

4.2.2 Individual items. The MITS will be accepted separately and independently of other items of the AN/AWM-23.

4.2.3 In-process inspection. Prior to entering acceptance tests, the MITS shall have completed in-process inspections.

4.2.4 In-process data. The data resulting from contractor conducted in-process inspections shall be presented to the Cognizant Government Inspector (CGI) at the time the MITS is offered for Government inspection and acceptance.

4.2.5 Acceptance test plan. All testing shall be as specified in the acceptance test plan. Data sheets containing test criteria and measurement results are a part of the acceptance procedure document. Table V shall apply.

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TABLE V
ACCEPTANCE TEST PLAN FOR MISSILE INTERFACE TEST SET
TS-3561 ()/AWM-23 (V)

1.0 TEST OBJECTIVE.

To demonstrate the functional performance of the Missile Interface Test Set.

2.0 TEST CONDITIONS.

a. Test Equipment

(1) MITS Test Position - T493507-11-1

b. Utilities Required (Information only, ref. 4.2.8).

(1) Power as specified in 3.2.2.1.

3.0 TESTS.

In accordance with Acceptance Test Procedure - 3326964.

a. Perform the acceptance test.

b. Perform operational run-in-tests.

4.2.6 Test Results. The contractor shall present test data, as documented evidence that the MITS has completed tests, as applicable. Test indications shall be recorded on test data sheets by the responsible contractor test engineer and inspected by contractor Quality Assurance (QA). A record shall be kept of all failures.

4.2.7 Acceptance. Upon completion of Government inspection, Government acceptance will be consummated by CGI execution of the DD Form 250.

4.2.8 Utilities. Electrical power consumption is a facilities requirement and need not require verification as conditions of acceptance. The contractor may use his facilities providing they are within the required tolerances of 3.2.2.

4.2.9 Configuration. Physical configuration of the MITS during acceptance testing shall conform to the applicable 493507-1XX drawing.

4.3 Tests

4.3.1 Electrical and electronic items - operational run-in test. The MITS items shall be operated as specified in the acceptance test plan (Table V) to perform the operational run-in test. Equipment tests shall be performed at the beginning, 3 hours after the beginning, and at the end of the operational run-in test. The equipment shall be operated for a period of 6 hours, computed in the following manner:

- a. Operational run-in of 3 hours minimum without a failure from start is required.
- b. In the event of equipment failure after 3 hours of run-in time, the MITS equipment shall be repaired and the test shall be continued. However, only one-half of the time accumulated to the time of failure shall be applicable towards meeting the total 6 hours of operational run-in test. A maximum of three MITS failures is allowable to complete a run-in test sequence.
- c. The MITS panel mounted elapsed time meter shall be the indicator of operational run-in time accumulated.

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- d. A relevant failure for the run-in test is defined as a condition of malfunction wherein the equipment is unable to provide a required test capability.

4.3.2 Mechanical items. As specified in the acceptance test plan, the MITS shall be inspected for conformance to drawings.

4.4 Environmental test conditions. All tests shall be performed under the prevailing environmental conditions which shall be within the following limits:

- | | |
|-----------------|---|
| (1) Temperature | Room ambient (30 \pm 10 C) |
| (2) Altitude | Normal ground |
| (3) Vibration | None |
| (4) Humidity | Room ambient up to 90 percent relative humidity |

4.5 Test location. Inspection for the purpose of acceptance shall be made at the contractor's plants and the contractor's vendors' plants.

4.6 Acceptance schedule. The schedule of acceptance activities is shown in Table VI. Upon completion of Government acceptance, the MITS shall be shipped in accordance with the allocation instructions. Minor changes may be made in the schedule of acceptance activities as informally agreed to by representatives of the Government and the contractor without requiring changes to this document. Delivery configuration shall be as stated in 4.2.9.

4.7 Test procedures. Acceptance tests shall be performed in accordance with a test plan and test procedures mutually agreeable to the procuring activity and the supplier. The test plan shall be prepared by the supplier. MIL-T-18303 shall be used as a guide for preparation of test procedures. All inspections and testing shall be under the supervision of the Government inspector. Acceptance or approval of material during the course of manufacture shall not be construed as a guarantee of the acceptance of the finished product.

TABLE VI
ACCEPTANCE ACTIVITIES

Item	Acceptance Activities	Responsibility	Time
1	Submit request for allocation instructions to CAO*	HAC**	Delivery (D) day minus 120 days
2	Provide allocation instructions	CAO	D day minus 30 days
3	Complete Contractor inspection	HAC	D day minus 10 days
4	Notify Government that GSE control items are ready for inspection and acceptance	HAC	D day minus 10 days
5	Conduct Government inspection for acceptance	AFQAR***	D day
6	Accept and deliver units as appropriate	AFQAR	D day
<p>*Contract Administrative Officer. Shipping instructions are provided to the CAO by NAVAIR.</p> <p>**Hughes Aircraft Company</p> <p>***Air Force Quality Assurance Representative</p>			

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4.8 Rejection and retest. Equipment which has been rejected may be reworked or have parts replaced to correct the defects and be resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished to the Government Inspector. Units rejected after retest shall not be resubmitted without the specific approval of the procuring activity.

4.9 Special tests. Special tests shall consist of such tests as are selected by the procuring activity. Test procedures previously approved for the preproduction and sampling tests shall be used where applicable. As a minimum, a government controlled radiated susceptibility test in accordance with the requirements of paragraph 3.2.6b shall be conducted on a preproduction or production model.

5. PREPARATION FOR DELIVERY

5.1 General. The MITS shall be preserved, packaged, packed and marked for the level of shipment specified in the contract or order in accordance with MIL-E-17555.

6. NOTES

6.1 Intended use. The MITS is intended to be portable and for use at the organizational level aboard an aircraft carrier or at a shore station to check out the electrical interface to the AIM-54 Guided Missile through the F-14A launcher umbilical connector or to the F-14A fuselage umbilical connectors by use of the cable assembly set of MIL-C-81954 (AS).

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification
- b. Applicable level of packaging and packing desired.

6.3 Definitions. For the purpose of this specification, the following definitions shall apply.

6.3.1 Proper performance of the maintenance function. Proper performance of the maintenance function is defined as testing, memory loading, fault isolating, repair, and adjustment to a degree of quality and thoroughness

consistent with the requirements established for a given maintenance level, accomplished by the support personnel and resources established for that level, and accomplished in a period of time consistent with the work load predicted for maintenance involved in performing the function.

6.3.2 Organizational level maintenance. All maintenance performed by the using organization employing only those skills, tools, support equipment, publications, procedures, and techniques planned for service use when deployed. (Organizational maintenance of avionics equipment installed in an aircraft would be performed at or in the aircraft.)

6.3.3 Intermediate level maintenance. All maintenance other than organizational maintenance performed at the using activity, employing only skills, tools, support equipment, publications, procedures, techniques, and utilities planned for normal service use on board an aircraft carrier or at a designated intermediate maintenance facility ashore.

6.3.4 Ground support equipment (GSE). GSE is defined as equipment used by operating forces for service, maintenance, test, fault isolation, and repair of units or components of the WCS AN/AWG-9 and is not physically a part of the WCS. It is composed of special test, special handling, and special conditioning equipment.

6.3.5 Commercial test equipment. Commercial test equipment is defined as test equipment listed and described in a manufacturer's catalog as a standard item. It is built to standards of good commercial practice; however, it is not required to meet military specifications.

6.3.6 Weapon replaceable assembly (WRA). WRA is a generic term which includes all the replaceable packages of an avionic equipment pod or system as installed in an aircraft weapon system with the exception of cables, mounting provisions, and fuse boxes or circuit breakers.

6.3.7 Shop replaceable assembly (SRA). A generic term which includes all the packages within a test set. The term SRA includes Quick Replaceable Assemblies (QRA) and In-Place Repairable Assemblies (IPRA).

6.3.8 Quick replaceable assembly (QRA). A preferred form of SRA which is easily removable from the test set without complex removal operations. It is typified by a plug-in design.

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6.3.9 In-place repairable assembly (IPRA). The least desirable form of SRA having the characteristic that it is repaired in the shop while in place in the test set.

6.3.10 Checkout. Checkout is defined as a test operation to verify compliance with established performance standards.

6.3.11 Primary failures. Failures which occur without being the result of associated equipment failures or through procedural errors, are primary failures.

6.3.12 Operating life. Operating life shall exclude standby power condition and includes only time on the elapsed time meter in the high voltage condition.

6.3.13 MTBF. The definition of MTBF shall be in accordance with MIL-STD-721.

6.3.14 MTTR. Mean time to repair, applied herein, consists of locating a defective shop replaceable assembly (SRA), replacing that SRA with a serviceable assembly, and performing a confidence test to verify repair.

6.3.15 Short. A short is defined as an impedance between two or more wires or between a wire and ground/frame, which are normally not connected, sufficiently low to cause degraded performance.

6.3.16 Continuity. Continuity is defined as a desired electrical connection whose impedance is sufficiently low so as to cause no degradation of performance.

6.3.17 Verification. Verification is defined as the determination that a measured parameter is within acceptable limits without providing a discrete display of the actual value.

6.3.18 Interstation shorts. Interstation shorts are defined as a short condition existing between wires going to different missile stations.

6.3.19 Intrastation shorts. Intrastation shorts are defined as a short condition existing between wires going to the same missile station.

6.3.20 Accuracy. Accuracy is defined as the allowable error in the setting of the passband thresholds expressed as a percentage of nominal value.

6.3.21 Threshold. Signals which have only a nominal value, with no passband listed, shall be verified by threshold detectors as defined below.

6.3.21.1 Greater - than threshold. A signal value less than the corresponding threshold value shown in Table I will result in a MITS failure indication. Due to component variance, threshold values may vary within the limits specified below.

THRESHOLD TOLERANCES

Threshold	Minimum Value	Maximum Value
> 3.5 vdc	3.5 vdc	5.0 vdc
> 8.0 vdc	8.0 vdc	8.8 vdc
> 4.1 vdc	4.1 vdc	5.6 vdc
> -1.0 dbm	-1.0 dbm	2.0 dbm
> 21.0 vdc	21.0 vdc	23.0 vdc
> 0.5 msec	0.5 msec	0.9 msec
> 6.5 vp-p	6.5 vp-p	7.5 vp-p
> 13.5 vdc	13.5 vdc	14.5 vdc

6.3.21.2 Less - than threshold. Return lines tested by the MITS with signal voltages greater than 1.2 VDC shall cause a MITS failure indication.

6.4 Nomenclature cross-reference. The following is a cross reference between the official Navy nomenclature and the major contractor part numbers. The contractor part number suffix is controlled by the configuration list in the contract.

<u>Official Nomenclature</u>	<u>Contractor Part No.</u>
a. Test Set, Missile Interface	493507-1XX
b. Cable Assembly Set, Electrical, MATS, Special Purpose	493513-1XX

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c. AN/AWG-9-Computer Program
NDRO/Bulk Store

4810CP-1XX

6.5 Liquid cooler. Not applicable.

6.6 Use of this specification. This specification is a detail specification which uses MIL-T-81734(AS) as a general specification. When the term "not applicable" is used in this specification it means that the corresponding paragraph requirements of MIL-T-81734(AS) are not required to be met by this specification (see 6.6 of MIL-T-81734(AS)).

6.7 Abbreviations and acronyms.

ACM	Air Combat Mode
AFQAR	Air Force Quality Assurance Representative
AP	Autopilot
AZ	Azimuth
C	Celsius (centigrade)
CAO	Contract Administrative Officer
CGI	Cognizant Government Inspector
EL	Elevation
EMI	Electromagnetic Interference
EMV	Electromagnetic Vulnerability
F	Fahrenheit
GSE	Ground Support Equipment
HAC	Hughes Aircraft Company
Hz	Hertz
IC	Initial Condition
ID	Identification
IDTA	Identification Test Access Assembly
IPRA	In-place Repairable Assembly
ISM	Igniter Safety Mechanism
LTE	Launch-to-eject
MATS	Missile Auxiliaries Test Set
MTS	Missile Interface Test Set
MOAT	Missile on Aircraft Test
MTBF	Mean Time Between Failures
MTTR	Mean Time to Repair
NAFI	Naval Avionics Facility, Indianapolis
NTR	Naval Technical Representative
OOT	Out-of-tolerance
p-p	Peak-to-peak
QA	Quality Assurance
QRA	Quick Replaceable Assembly
REMCAM	Repairable Multilayer Circuit Assembly Method
RIG	Rate Integrating Gyro
RLM	Ready, Launch, MOAT

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S/A Semi-active
SHP Seekerhead Positioning
SRA Shop Replaceable Assembly
STT Single Target Track
TDRF Target Doppler, Radio Frequency
Test Set Airborne Weapon Control System Test Set
 AN/AWM-23(V)
TO Transmitter Oscillator
TM Telemetry
TSA Test Set Assembly
UP Umbilical Pin
Vac Volts Alternating Current
VCLO Voltage-controlled Local Oscillator
Vdc Volts Direct Current
VRMS Volts Root-mean-square
WCS Weapon Control System
WRA Weapon Replaceable Assembly

6.8 Convenience outlet power. Not applicable.

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