MIL-C-27259A(USAF)
9 May 1962

Superseding
MIL-P-27259(USAF)
10 September 1959

MILITARY SPECIFICATION

CHARACTERISTICS CHARTS (ORANGE BOOK) USAF GUIDE NR. 4 FOR USAF TRAINING EQUIPMENT

1. SCOPE

1.1 This specification covers requirements for the preparation of USAF training equipment characteristics charts (orange book) USAF Guide Nr 4.

2. APPLICABLE DOCUMENTS

2.1 There are no documents applicable to this specification.

3. REQUIREMENTS

3.1 Physical Characteristics.- Each characteristics chart shall be prepared as a reproducible copy suitable for reproduction purposes using the photolithographic process. The charts shall be prepared using the style, size of print, and general arrangement shown on figures 1, 2, 3, and 4. The charts shall consist of 2 sheets 8 1/2 by 11 inches in size with 4 pages of information. Binders for these charts shall not be furnished.

3.1.1 A characteristics chart shall be prepared for each separate trainer and submitted to the procuring activity for approval, within 30 days after approval of the Mock-up or not later than 90 days after receipt of contract. Every 2-month period after delivery of the initial chart until completion of the applicable contract, a similar reproducible chart shall be submitted to the procuring activity. This periodic chart shall incorporate any changes, deletions, or additions to the trainer which occurred during the reporting period. In the event no changes are necessary, the contractor shall so advise the procuring activity in writing.

3.2 Preparation.- In the preparation of the charts, including tables, and illustrations, all lines, letters, and numbers shall be made with the aid

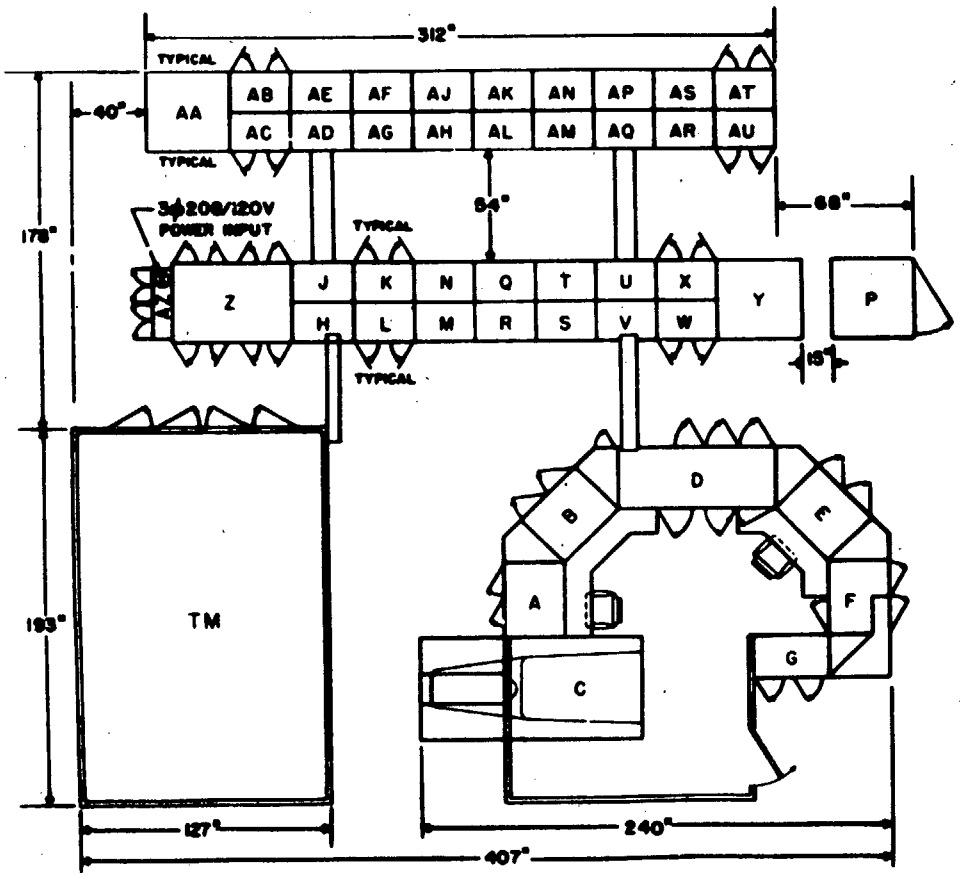
AF Hoover-Dayton Co., 10 June 1962 1700

USAF Training Equipment Characteristics

TRAINER, FLIGHT SIMULATOR,

F-105D ADVERSE WEATHER AIRCRAFT, TYPE MB-7

F L O O R P L A N



CABINET IDENTIFICATION KEY

A	Instructor Console
B	Instructor Console
C	Pilot's Compartment
D	Plotting Board
E	Operator Console
F	Operator Console
G	Radio Aids Station
H	Radio Aids Cabinet
J	Radio Aids Cabinet
K	Radio Aids Cabinet
L	Radar Equipment Cabinet
M	Radar Equipment Cabinet
N	Mass, Altitude and C.G. Computer Cabinet
P	Air Conditioner
Q	Engine Computer Cabinet
R	Radar Equipment Cabinet
S	Radio Aids Cabinet
T	Engine Computer Cabinet
U	Engine Computer Cabinet
V	Radio Aids Cabinet
W	Automatic Checkout System
X	Engine Computer Cabinet
Y	Cabinet Blower
Z	Central Power Supply
AA	Cabinet Blower
AB	Engine System Computer Cabinet
AC	Engine System Computer Cabinet
AD	Flight Controls Computer Cabinet
AE	X and Y Coordinates Computer Cabinet
AF	Mass, Altitude, C.G. and Engine System Computer Cabinet
AG	Flight Controls Computer Cabinet
AH	Moments, Rates and Euler Computer Cabinet
AJ	Moments, Rates and Euler Computer Cabinet
AK	Auxiliary Aerodynamics Computer Cabinet
AL	Moments, Rates and Euler Computer Cabinet
AM	Aerodynamics Computer Cabinet
AN	Aerodynamics Computer Cabinet
AP	Aerodynamics and Plotting Board Computer Cabinet
AQ	Aerodynamics Computer Cabinet
AR	Target Computer Cabinet
AS	Thunderstick Computer Cabinet
AT	Thunderstick Computer Cabinet
AU	Thunderstick Computer Cabinet
AZ	Power Input and Distribution Panel
TM	Land Mass Generator

Figure 2

AIR CONTROL

The room in which the simulator is located should be maintained at 65° to 80° F dry bulb.

The air conditioning unit is a single complete package, furnishing conditioned air for the cockpit area and the instructor and operator area. The output capacity is 5 tons.

Water supply requirements: 5 gpm at 70° F.

Pressure must be greater than 35 psig. If more than 60 psig is encountered, a pressure reducing valve must be installed. Three-3/4 inch plumbing fittings are provided for intake, exhaust, and condensate lines.

(Cont'd on page 4)

AUX. POWER

None provided.

MAINT. EQUIP.

The trainer has an Automatic Test and Checkout system. Within this system, the aerodynamic systems can be checked completely and automatically for five static flight conditions. The Checkout system also can be used to check the power (engine) system. Answers are digitally read-out and simultaneously printed on paper tape. The following items are furnished with the trainer:

(Cont'd on page 4)

MISSION & DESCRIPTION

The principal mission of the F-105D, Type MB-7 Flight Simulator Trainer is to provide the facility to train pilots in procedures required to fly the F-105D aircraft in fulfillment of its mission to navigate, to seek out and destroy enemy air or ground targets under adverse weather conditions.

Through use of the simulator, knowledge can be gained of the handling characteristics of the aircraft, communications and navigational equipment, and integrated operation of the radar system and flight systems.

Complete reproduction of map terrain is made available for radar presentation for the first time, through the use of high accuracy scale maps and closed loop television optical systems. The signals are translated to radar video signals and presented as radar scope presentations in the cockpit.

The complex interrelation of flight controls, fire control, navigation, and automatic pilot have been accurately reproduced.

LIMITATIONS: The interaction of the ILS and automatic pilot have not been reproduced. In the absence of gravitational stimulus on the pilot, all cockpit instrumentation reflect the effects of computed gravity at all times.

ELECTRICAL REQUIREMENTS

Power	42 kva at 0.85 power-factor
Voltage	208/120 volts ± 10 percent
Frequency	60 cps ± 5 percent
Phase	3 phase, wye connected, four wire
Current	Approximately 125 amperes (300 amperes max) per phase wire.
Wire size	No. 0000AWG
Power receptacle	Service entrance is in the main power panel, cabinet A2. (See figure 2.)
Interunit cabling	Laced cables installed in metal ducts and wireways.
Batteries required	None
Air conditioners	Internally connected
Electrical outlets	Present in every major unit
Lighting arrangement	Console area and terrain map room

SIZE & WEIGHT

Number of sections	9
Dimensions and weight of largest unit	895 lb
Size: 155 x 74 x 12 inches	
Dimensions and weight of heaviest unit	3000 lb
Size: approx 103 x 84 x 92 inches	
Total weight of trainer	approx 32,000 lb

(Cont'd on page 4)

TECHNICAL PUB.

43D3-4-9-1 Technical Manual, Operation
43D3-4-9-2 Technical Manual, Maintenance
43D3-4-9-4 Non-illustrated Parts Breakdown
43D3-4-9-6 Technical Manual, Inspection Requirements
Instructor's Guide

AUX. EQUIPMENT

UHF/ADF Command Trainer and Transmitter	AN/ARC-70
ILS Receiver	AN/ARN-81
Radio Set (TACAN)	AN/ARN-62
Automatic Direction Finder	AN/ARA-48
Intercommunications	AN/AIC-30
Doppler Navigator	AN/APN-105
Radar Warning	AN/APS-54A
IFF	AN/APX-37
Toss Bomb Computer	E-30 (Mod.)
ECM	AN/ALT-6, -7, -8
Chaff Dispenser	AN/ALE-2

Complete provisions to present any two of six preprogrammed radio stations simultaneously.

Complete video-radar provisions to generate targets even under unfavorable operational conditions for radar instruction.

GFE ITEMS

60-6310	Indicator, Remote Attitude Director, Type ARU-2A, WCLC1-1-40
60-6303	Indicator, Horiz. Situation, Type AF/A24J-1, WCLC1-1-49B
60-6302	Indicator, Air Speed Mach, Safe Speed, Type AVU-1/A, WCLC1-1-43

(Cont'd on page 4)

SPECIAL DATA

Three 40-foot packed vans are required for transporting the disassembled trainer. Except for interconnecting cables, electronic tubes not clamped, or covers, it is not necessary to crate or box the shipping units.

Preliminary utilities installation must provide for air conditioning water and trainer electrical power.

Blower exhaust and intake ducts (4 required) 10 inches by 30 inches (if desired).

(Cont'd on page 4)

AIR CONTROL - Cont'd from page 3

Exhaust and intake air ducts are constructed on the site for installation at that particular site.

The computer cabinets are cooled by means of two motor driven blowers (one intake, one exhaust) in each of two cabinets. Each blower, rated at 2,000 cfm, is driven by a 1/3 hp, single phase, 120 volt motor. Control levers on each blower cabinet can be set to draw air from inside or outside the building and deliver the exhaust air either inside or outside.

Maximum heat radiated into the room is approximately 16,000 BTU per hour for outside air intake and exhaust.

To these figures add approximately 550 BTU per person within the enclosure.

GFE ITEMS - Cont'd from page 3

60-6307 Indicator, Attitude & Vertical Speed, Type AAU-1/A, WCLC1-1-44A
60-6315 Amplifier, Horizontal Situation Indicator
60-6321 Amplifier, Airspeed-Mach-Safe Speed Indicator
60-6322 Amplifier, Altitude Vertical Speed Indicator
60-6309 Computer, Flight Dir. Type CPU-4/A P/N1781493 FSN6610-708-3228 (Sperry)

SIZE AND WEIGHTS - Cont'd from page 3

Recommended room size and ceiling height - 41 x 42 x 14 feet
Recommended door size - 12 ft. wide x 10 ft. high
Maximum concentrated floor load - approx 900 lb (est.)
Maximum distributed floor loading - approx 30 psf (est.)
Actual size
Length 420 inches
Width 371 inches
Height 144 inches

MAINTENANCE EQUIPMENT - Cont'd from page 3

NOMENCLATURE	CODE LETTERS	PART NO.	MFGR:
Voltage Ratio Test Panel	ER6625	AW7085	ACF Electronics
Test Input Cable	ER	AW7786	ACF Electronics
Voltage Output Cable	ER	AW7788	ACF Electronics
± 50 Volt Reference Cable	ER	AW7789	ACF Electronics
Oscilloscope Input Cable	ER	AW7787	ACF Electronics
Sync Signal Cable	ER	AW7784	ACF Electronics
Ammeter Null Indicator	MEL7CAC	HS-3-1/2 MA1	Marion Electrical Instrument Company
Bridge, High Gain Comparison	ER7CAC1387-59	G4504	ACF Electronics
Test Plug	ER6930	G4527	ACF Electronics
Test Synchro	ER7CAC801319-7318	G4503	ACF Electronics
Receiver Synchro	ER7900874585-5	Type 1F	ACF Electronics
Variable Phase Source	ER7CAC363815-65	G4502	ACF Electronics
Variable Resistor	ER5905502-4827	RV4ATSD103A JAN-R-94	ACF Electronics
Neon Glow Lamp	ER6240233-9100	NESI	ACF Electronics
Indicator Lamp	ER6210	91406-932	ACF Electronics

SPECIAL DATA - Cont'd from page 3

A suitable hoist, or preferably two fork lifts, are required for loading or unloading the trainer.

On installation, each unit can be leveled individually using permanently installed jacks.

The following are trainer vs aircraft serial numbers.

Trainer	Aircraft
AF58-1 and AF58-2	58-1154 (9th production unit)
AF59-1 and AF59-2	60-428 (116th production unit)

Revision Basis: Initial issue

Figure 4

of a mechanical device or shall be typeset characters. Text and, insofar as practicable, tabular data shall have right-hand margins justified.

3.2.1 Type.- Principle text entered into the chart shall be equivalent to 12-point Bookman or similar book-face type. Typeset, IBM Electromatic Proportional Spacing Machine, or Varitype copy may be used. Other letters, numbers, or characters shall be similar to those in the charts available from the procuring activity when required. (See 6.3.) These sample charts may be used as a guide in the preparation of the characteristics charts.

3.2.2 Color.- Unless otherwise specified, color shall be restricted to black throughout the charts with the exception of half-tones used for illustrations All half-tone illustrations and all line illustrations not assembled into the text shall be mounted on a suitable mounting board and protected by an inner tissue a an outer heavy paper cover affixed to the mount along the top edge. Art work shall be clean. All oil, wax, grease, etc., shall be carefully removed. Care shall be taken to avoid damage in handling.

3.2.3 Copy.- The text, compilation, arrangement, and accuracy of the copy shall be of high quality, comparable to that of high-grade commercial handbooks. Copy which has filled letters or is blurred will not be accepted. Al material shall be submitted with all mechanical indications for accurate photo-lithographic reproduction. The exact location and final size of all square-finish halftones shall be indicated on the reproduction proof. The indication shall cons of hairline typeset lines or fine lines in black ink locating top and bottom limits the halftone. Art work shall be indicated for cropping by the use of crop mar placed in the marginal area of the illustration of its mounting to indicate the proportion of the figure to be included in the final production. The proportion shall agree with the proportion indicated on the reproduction proofs.

3.3 Contents and Arrangement

3.3.1 Page 1.- Page 1 shall include a photograph, or perspective drawing of the trainer and its associated equipment. Other items, as applicable to be included on this page are as follows:

a. The title "USAF Training Equipment Characteristics" directly belo the picture.

b. The assigned nomenclature and type number of the trainer in the ma title block along with the aircraft or missile model designation, if applicable.

c. Name of the trainer manufacturer in the right side of main title bloc

d. Trainer type number and aircraft model designation, if applicable, in lower right corner of page.

e. Date of publication in the lower left corner of page.

3.3.2 Page 2.- Page 2 shall be a top view floor plan of the trainer and its associated equipment with all dimensions necessary to describe the size of the assembled trainer and the relative locations of its various assemblies. The floor plan shall include, but not be limited to, the following items, as applicable:

a. Student's area.

b. Instructor's and operator's area and identification of all equipment, including nature, location, and swing of all doors and access panels.

c. Identification of individual computer cabinets. This may be accomplished by means of a centralized tabular listing. Also indicate location and swing of all cabinet doors, openings, and access panels.

d. Attachments where applicable or proposed.

e. Location of air-conditioning equipment and access panels, if any.

f. Ducting and ventilation layout (air and water).

g. Entrance location of main power source.

h. Location and entrance of water lines and drains.

i. Trainer type number, aircraft or missile designation, if applicable, and page number shall be located in the lower left corner of the page.

3.3.3 Page 3.- Page 3 shall include engineering and technical data, as applicable, in accordance with the following headings:

a. Mission and Description - The training capabilities, extent of simulation, and limitations of each trainer shall be listed. Any provisions made for attachments of other training equipment shall be described.

b. Electrical Requirements - Complete planning information on the electrical requirements of each trainer and its associated equipment shall be included. This section of page 3 shall include, but not be limited to, the following items:

(1) Power requirements and power factor

(2) Voltages and voltage tolerances, including nature of electrical connection

(3) Frequency and frequency tolerances

(4) Phase and type of power circuitry; e.g., Delta or Wye connections

(5) Current and fuzing

(6) Wire sizes

(7) Location of main power receptacle

(8) Type and location of interunit cabling

(9) Batteries required

(10) Nature of electrical outlets and general lighting arrangement.

c. Auxiliary Power - Listing of electrical generator sets covered by MIL specifications suitable to power the trainer in the absence of utility power. Information shall include, but not be limited to, the following items:

(1) KW rating

(2) Voltage range and voltage tolerances

(3) Frequency and phase characteristics, including tolerances

(4) Type of power circuitry; e.g., Delta or Wye connection

(5) USAF stock number and MIL specification.

d. Technical publications - Numerical listing and title of all USAF technical publications pertaining to the trainer and modifications thereto.

e. Maintenance Equipment - Listing of standard and special test equipment and tools necessary for the proper installation, operation, and maintenance of the trainer. Include USAF stock number for each item, when applicable. Give the manufacturer's stock number for all items not covered by USAF stock number. Give brief description of any automatic checking equipment included as a part of the trainer.

f. Auxiliary Equipment - Listing of auxiliary equipment utilized for training in procedures and techniques necessary for complete training of personnel. A notation shall be included in this section to indicate the absence of listing of classified systems or equipment, when applicable.

g. Sizes and Weights - Information shall include, but not be limited to, the following:

(1) Number of sections

(2) Dimensions and weight of largest unit (uncrated)

(3) Dimensions and weight of heaviest unit (uncrated)

(4) Total weight of trainer (crated and uncrated)

(5) Recommended room size and ceiling height

(6) Minimum and recommended door openings

(7) Maximum concentrated floor load (pounds)

(8) Maximum distributed floor loading (psf)

h. Air Control - Planning data for air-conditioning or heat dissipation requirements of the trainer building and specific data relating to the utility requirements of any air-conditioning or heat dissipation system supplied as a part of the trainer. Information shall include, but not be limited to, the following:

(1) Recommended range of dry bulb room temperature

(2) Capacity (tons) of air-conditioning units and their location

(3) Water supply and water temperature required for air-conditioning units (gallons per minute at ( )°F)

(4) Diameter of inlet, outlet, and gravity condensate drain pipes

(5) Horsepower rating of ventilating and exhaust fans employed to circulate or exhaust air in the trainer and their eapacity (cubic feet per minute)

(6) Approximate maximum heat radiated into training room under most severe temperature conditions (BTU/hr)

i. Special Data - Any special housing, facilities, or handling data applicable to the trainer. Information shall include, but not be limited to, the following:

(1) Include type and number of transportation units used to transport the trainer

(2) Preliminary utilities installation required prior to installation of the trainer

(3) Type and size of special ventilating ducts to the outside of the building

(4) Hoisting and dock facilities required at installation site

(5) Table of trainer serial numbers versus applicable aircraft serial numbers

(6) Other pertinent facts concerning the trainer which do not fall under other major headings as specified in 3.3.3.

j. GFE Items - List of all items furnished by the Government in the fabrication of the trainer.

k. Trainer type number, aircraft or missile designation, if applicable, and page number shall be located in lower right corner of this page.

3.3.4 Page 4 - Page 4 shall include overrun information from any or all sections of pages 1 through 3, when sufficient space is not available. Trainer type number, aircraft or missile designation, if applicable, and page number shall be located in lower left corner of this page.

3.4 SECURITY CLASSIFICATION - Information contained in the training equipment characteristics charts shall be of an unclassified nature.

4. QUALITY ASSURANCE PROVISIONS

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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 Inspection and Acceptance - The characteristics charts shall be subject to final inspection and approval of the procuring activity. All data contained in the charts shall be subject to review and analysis by the responsible AFSC engineering organization and shall be closely coordinated with the project officer concerned.

5. PREPARATION FOR DELIVERY

5.1 Packing - Each reproducible of the characteristics chart shall be packed separately and in such a manner that it will not be damaged during shipment. Charts shall not be folded. All shipping containers shall contain a letter of transmittal.

5.1.1 Marking and Labeling - All shipping containers shall be addressed to:

ASD (ASNXHC)
Wright-Patterson AFB, Ohio

5.1.2 The following information shall appear on all shipping containers for reproducible copy:

"Reproducible Copy"
"Government Order Nr (or Contract Nr)"

6. NOTES

6.1 Intended Use - The USAF training equipment characteristics charts are intended to provide an official staff document summarizing the military capabilities and logistics of USAF special training equipment on a readily comparable basis.

6.2 Ordering Data - Procurement documents should specify the following:

a. Title, number, and date of this specification

b. The format to be submitted not later than 90 days after award of contract.

6.3 For copies of sample charts address requests to:

ASD (ASNXHC)
Wright-Patterson AFB, Ohio

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (Of submitter)	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEM PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE PLATE NO. 15419

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