

DATA ITEM DESCRIPTION

Title: Human Engineering Design Approach Document-Operator

Number: DI-HFAC-80746B

AMSC Number: A7320

Approval Date: 19980708

DTIC Applicable:

Limitation:

Office of Primary Responsibility: A/AMCOM **GIDEP Applicable:**

Applicable Forms:

Use/Relationship: The Human Engineering Design Approach Document - Operator (HEDAD-O) describes equipment which interfaces with operators. This document provides a source of data to evaluate the extent to which equipment having an interface with operators meets human performance requirements and human engineering criteria.

a. This data item description (DID) contains the format and content preparation instructions for HEDAD-O resulting from applicable tasks delineated in the SOW.

b. This DID supersedes DI-HFAC-80746A.

Requirements :

1. Reference documents . The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments, notices, and revisions shall be as cited in the current issue of the DODISS at the time of the solicitation.

2. General . The HEDAD-O shall describe the layout, detail design, and arrangement of crew station equipment having an operator interface; it shall also describe operator tasks (see below) associated with equipment. The HEDAD-O shall describe the extent to which human performance requirements and applicable human engineering design criteria (e.g., MIL-STD-1472) have been incorporated into the layout, design, and arrangement of equipment having an operator interface. Findings from analysis of operator tasks shall be presented as part of the rationale supporting the layout, design, and integration of crew station equipment.

3. Format . The HEDAD-O format shall be contractor selected. Unless effective presentation would be degraded, the initially used format arrangement shall be used for all subsequent submissions.

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4. Content . The HEDAD-O shall contain the following crew station and operator-related information:

a. Equipment List . A list of each item of equipment having an operator interface and a brief statement of the purpose of each item of equipment. Separate lists shall be provided for each operator's station.

b. Specification and drawing list . A list of specifications and drawings, approved by human engineering at the time of HEDAD-O preparation. When contractually required to prepare and submit the HEDAD-O early in the development process, the list shall also address documents where human engineering approval is planned.

c. Crew station description . Description(s) of the crew station(s), emphasizing human engineering design features. The following aspects of each crew station shall be described:

(1) Layout and arrangement . One sketch, drawing, or photograph of each crew station. These sketches, drawings, or photographs shall contain operator and equipment related reference points (e.g., operator eye position, seat reference point) and scale. One sketch, drawing, or photograph of each item of crew station equipment shall also be provided; the point of reference shall be normal to the item of equipment and scale shall be indicated.

(2) Controls and displays . The layout and detail design of each control/display panel (or control/display areas independent of panels) shall be described (e.g., phosphor type, brightness, resolution, contrast, color or other coding, control/display ratio, control force, and range characteristics). Display symbology, display formats, and control/display operation logic shall be described with regard to intended use by the operator(s).

(3) Operator vision . Operator vision to crew station items of equipment shall be described using the operator's normal eye position(s) as the point of reference. When applicable, operator external vision shall also be described using the operator's normal eye position(s) as the point of reference; extent of external vision shall be related to system mission requirements.

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(4) Environmental factors . Operator life support systems, protective clothing and equipment, noise, vibration, radiation, temperature, ambient illumination, climatic effects, and other relevant environmental parameters.

(5) Ingress/egress . Normal and emergency ingress and egress provisions and procedures.

(6) Crew station lighting . Crew station lighting characteristics and lighting control systems.

(7) Crew station signals . Crew station signals including warning, caution, and advisory signals shall be described with regard to signal characteristics, signal meaning, signal consequences, operator procedures, cause of signal activation, and crew control over signal characteristics.

(8) Operator posture control . Operator posture control including seating, restraint systems, and other postural control techniques.

(9) Communication systems . Communication systems and communication systems control.

(10) Special design . Special design, layout, or arrangement features if required by mission or system environment.

(11) Multiple operator stations . Multiple operator station design, shall be described where applicable. Rationale for number of operators, arrangement of operators, and allocation of functions to the operators shall also be described.

d. Crew station geometry . Crew station geometry shall be described using the seat reference point or operator's eye position(s) as a reference point. The position of each control, display, panel, etc., shall be described in terms of three-dimensional space (X,Y,Z coordinates); operator eye position shall be described in terms of system design coordinates or as zero (X), zero (Y), and zero (Z). The center of each panel, display, control, etc., shall be used as the equipment point of reference. True angle to vision to each item of equipment shall also be shown.

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e. Human engineering design rationale . Rationale for human engineering design, layout, and arrangement of each item of crew station equipment having an operator interface shall be described. The specific considerations of system mission (or system function); equipment operation; operator selection, training, and skill requirements; operator task performance requirements; and limitations imposed on designs by the procuring activity or state-of-the-art shall be described. The basis for reaching specific design, layout, and arrangement decisions shall be presented (e.g., MIL-STD-1472 criteria, human engineering requirements or guidelines specified in the contract, system engineering analyses, systems analyses, human engineering studies, trade-off analyses, mock-up results, simulation results, and human engineering results).

f. Analysis of operator tasks . Results from analysis of operator tasks (see critical tasks in MIL-HDBK-1908) shall be presented as part of the rationale for crew station design, integration, and layout. The following shall also be described: methodology used to generate task analysis results (e.g., paper and pencil, computer-based simulation, dynamic simulation); system-mission(s), function(s), or other exogenous information used to "drive" the task analysis; human performance data (e.g., time and error) against which task analysis results are compared; and operator assumptions (e.g., level of skill, training). Critical tasks (see MIL-HDBK-1908) shall be clearly identified. If the program has progressed to the point where the required data is available through other reporting media, such as a task inventory or task analysis, they shall not be duplicated, but shall be referenced or appended to the HEDAD-M along with appropriate supplementary information fulfilling the intent of this provision.

g. Alternatives to baseline design . Sketch, drawing, or photograph of each item of equipment being considered as alternatives or changes to the selected (baseline) crew station design.

h. Design changes . Design, arrangement, or layout changes made since the last HEDAD-O preparation.

5. End of DI-HFAC-80746B.