NOT MEASUREMENT SENSITIVE

MIL-STD-1478
13 May 1991

MILITARY STANDARD

TASK PERFORMANCE ANALYSIS

AMSC A6121 AREA HFAC

Distribution Statement A. Approved for public release; distribution is unlimited.

FOREWORD

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U. S. Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

3. This standard is the result of more than a decade of work by personnel in all three services and industry. Impetus for the work was provided originally by the Commanding General, U. S. Army Operational Test and Evaluation Agency. However, the increasing cost and complexity of military materiel attracted other participants to the effort, since task performance analysis is a fundamental tool of a variety of engineering specialties.

4. As more and more military materiel contains sophisticated electronics, and as descriptions of human behavior with regard to that materiel involve less gross muscle-movement and more cognitive tasks (whose performance is more difficult to describe), there has been a need to provide flexibility for innovation and further development in the art of task performance analysis. While this standard allows for that flexibility (by permitting users to select virtually any means of conducting a task performance analysis from stubby pencil to sophisticated software), the format and content of a task performance analysis product are described with specificity.

5. This standard also accommodates recent specialty programs in all services concerned with manpower, personnel, and training (including embedded training) [MANPRINT in the Army, HARDMAN in the Navy, and IMPACTS in the Air Force], and is consistent with DoD policy on Manpower, Personnel, Training and Safety in the defense system acquisition process.

CONTENTS

1. SCOPE

1.1 Purpose. This standard defines the requirements for performing a task performance analysis where such analysis is required in the development or acquisition of military systems, equipment, and facilities.

1.2 Applicability. This standard prescribes the requirements and deliverable products of task performance analysis in all engineering and support functions including training, human engineering, manpower, personnel, system safety, workload analysis, logistic support analysis, and testing and evaluation.

1.3 Application guidance. In determining the applicability of the tasks herein and tailoring them to a program, MIL-H-46855 should be used to determine if a task analysis is to be required. If a task analysis is required, this standard should be tailored to accommodate equipment design, training, test and evaluation, manning, and workload functions, as appropriate. For additional information on application, refer to paragraph 6.4 and the appendix on tailoring and application guidance.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplemented thereto cited in the solicitation.

Standards

Military

MIL-STD-1388-1	Logistic Support Analysis
MIL-STD-1388-2	DOD Requirements for a Logistic Support Analysis Record

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Critical task. A task is critical if failure to accomplish it in accordance with system requirements would result in adverse effects on system reliability, efficiency, effectiveness, safety, or cost. A task is also to be designated as critical whenever system design characteristics approach human limitations, and thereby, significantly increase the likelihood of degraded, delayed, or otherwise impaired mission performance.

3.2 Task definition. The process of preparing a task inventory.

3.3 Task inventory. A comprehensive listing (prepared in accordance with MIL-STD-1388-1 and documented in accordance with MIL-STD-1388-2) of all tasks performed upon system hardware by operations, maintenance, and support personnel.

3.4 Task performance analysis. A process performed on tasks, subtasks and task elements selected from a task inventory by the procuring activity. The component steps of a task performance analysis are left to the selection of the procuring activity (based on the nature of the acquisition, the complexity of the human performance requirements, and the stage of design maturity).

4. GENERAL REQUIREMENTS

A task performance analysis shall be performed and reported during development and acquisition of military systems, equipment, and facilities to ensure effective man/machine and man/man interface design, to facilitate effective training program development, and test and evaluation, and to provide information for manning and workload studies. These activities shall begin in the early stages of the design phase of system development and be continued throughout system development and acquisition. Report(s) of task performance analysis efforts shall provide to the procuring activity such information as is required by the relevant Data Item Description(s).

4.1 Task inventory. A copy of the task inventory prepared in accordance with MIL-STD-1388-1 and documented in accordance with MIL-STD-1388-2 shall be obtained.

4.2 Task performance analysis. Tasks judged to be critical according to the criteria in paragraph 3.1 shall be subjected to a task performance analysis. In addition, other tasks shall be analyzed as specified by the procuring activity. A set of data relevant to each task (critical and otherwise designated) shall be collected and analyzed. For each of these tasks, the minimum data collected and analyzed should be equipment acted upon, consequence of the action, and feedback information resulting from the action. Analysis results should identify at least the following:

a. Task performance standards

b. An estimate of probability of error as a function of aptitutde and training

c. An estimate of the time to successful performance as a function of aptitude and training.

d. A time and error rate associated with each critical task and how it relates to the time and error rate and performance time for the overall system.

Additional task data and analyses to be collected and performed by the contractor shall be specified in the required Data Item

Description. These data parameters shall be selected by the procuring activity.

4.3 Level of detail. The level of detail in any task performance analysis report shall be no greater than is necessary to meet the requirements of the users of that report. The level of detail shall normally be stated by the procuring activity by reference to the level of task taxonomy to be used by the preparer.

4.4 Method of performing task performance analysis. Unless a particular method for conducting a task performance analysis is required by the statement of work of the contract, the preparer shall select and employ the most cost-effective method which meets the needs of the users identified in the statement of work.

5. DETAILED REQUIREMENTS

5.1 General. The detailed requirements of this standard are the second of two sequential, related efforts. The first is the preparation of a task inventory in accordance with the requirements of MIL-STD-1388-1 and reported in accordance with the format requirements of MIL-STD-1388-2. The second, a task performance analysis, cannot be performed without the results of the first.

5.2 Conduct of task performance analysis.

5.2.1 Purpose. The purpose of analyzing performance of selected tasks, subtasks, and task elements contained in the task inventory by addressing the lowest taxonomic level specified by the procuring activity is to describe task performance in terms of human performance time and accuracy. The product of the analytic effort is intended for use in the system acquisition process in support of equipment design, testing and evaluation, training requirements identification, manning and workload assessment, development of training and maintenance manuals, and other documentation and reporting.

5.2.2 Task performance analysis. A detailed analysis of performance of each operations, maintenance and support task designated from the task inventory shall be accomplished. The analysis shall describe performance in terms of time and accuracy, under conditions selected by the procuring activity from the list of parameters given in DI-HFAC-81197.

5.2.3 Preparation of the task performance analysis report. The report of task performance analysis shall be in the format shown in DI-HFAC-81197 and shall include those structural and analytic elements selected by the procuring activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This standard is intended to be used in establishing and defining the requirements for performing a task performance analysis as part of the development and acquisition of military systems, equipment and facilities.

6.2 Tailoring. Where this standard is applied in a procurement document, the procuring activity shall tailor the requirements of paragraphs 4 and 5 to the specific acquisition program, considering the previous development of the system (if any) and the specific tailoring guidance in the Appendix.

6.3 Data requirements. The following Data Item Descriptions (DIDs) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this standard is applied on a contract, in order to obtain the data, except where the DoD FAR Supplement 227.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
4.2, 5.2.2, and 5.2.3	DI-HFAC-81197	Task Performance Analysis Report	

The above DIDs were those cleared as of the date of this standard. The current issue of DoD 5010.12L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the DD Form 1423.

6.4 Subject term (key word) listing.

a. Analysis, task performance

b. Analysis, task performance, critical

c. Engineering, human

d. Inventory, task

APPENDIX

TAILORING GUIDE

NOTE: This Appendix provides guidance information only and is in no way intended to be invoked as a contractual document other than by possible use of Table I as a reference.

10.0 Scope. This appendix provides guidance and criteria for selection by the procuring activity of the specification of the parameters to be included in the task performance analysis.

20.0 Applicable documents. The following documents, of the issue in effect on the date of invitation for bids or requests for proposals, form a part of this appendix to the extent specified herein.

Specifications

Military

MIL-H-46855	Human Engineering Requirements for Military Systems, Equipment and Facilities

30.0 Tailoring guide.

30.1 General. The procuring activity shall first use MIL-H-46855 to determine if a task analysis is to be a required part of the contract. The Tailoring Guide provides the procuring activity an opportunity to specify task performance analysis content requirements. Thus, those interested in equipment design, training, test and evaluation, manning or workload will use the Tailoring Guide to specify to the contractor what the task performance analysis are to include. Table I is the Tailoring Guide for use in specifying the task performance analysis parameters.

30.2 Description and use. The Tailoring Guide of Table I is a matrix composed of a list of task inventory and task performance analysis parameters (on the left side), and a set of categories of system development and task performance analysis applications (across the top). The Guide is used by the procuring activity to check off those parameters the representatives of the procuring

TABLE I. Tailoring guide

TASK PERFORMANCE ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT															
	CONCEPT					DEMONSTRATION/VALIDATION					FULL SCALE DEVELOPMENT					
	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	TOTAL
A. Performance concerns 1. Task criticality 2. Performance of task a. Source of data (1) SME opinion (2) Comparability analysis (3) Objective measurement b. Task performance measures c. Workload measures d. Identification of human errors B. Health considerations 1. Temperature and humidity 2. Ambient noise 3. Shock, vibration, motion recoil 4. Windblast 5. Pressure fluctuations 6. Surface heat or cold 7. Electromagnetic radiation 8. Toxins 9. Psychological stress a. Confined spaces b. Isolation c. Sensory or cognitive overload d. Body disorientation e. Sustained or continuous operations f. Human waste elimination constraints																

TABLE I. Tailoring guide - Continued.

TASK PERFORMANCE ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT															
	CONCEPT					DEMONSTRATION/VALIDATION					FULL SCALE DEVELOPMENT					
	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	TOTAL
C. Human engineering considerations																
1. Input parameters																
a. Information required																
b. Information available																
c. Initiating cues																
d. Data display format																
2. Response parameters																
a. Action taken																
b. Body movements required																
c. Workspace envelope required																
d. Workspace envelope available																
3. Feedback parameters																
a. Feedback required																
b. Feedback available																
c. Cues indicating task completion																
d. Relative rate of feedback update																
e. Form of feedback																
4. Ambient lighting																
5. Ventilation																
D. Logistics considerations																
1. Skills required																
a. Skill level code																
b. Skill specialty code																
c. Skill specialty evaluation code																
2. Tools required																
3. Job aids and manuals required																
4. Support and test equipment identification																

TABLE I. Tailoring guide - Continued.

TASK PERFORMANCE ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT															
	CONCEPT					DEMONSTRATION/VALIDATION					FULL SCALE DEVELOPMENT					
	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	TOTAL
a. Support item sequence code																
b. Item category code																
5. Electric power requirements																
6. Spares and expendables required																
7. Number of persons per skill specialty code																
8. Number of manhours per skill specialty code																
9. LSA control number																
E. Manpower and personnel considerations																
1. PULHES codes																
2. ASVAB scores																
3. Planned MOS of performers																
4. Range of criterion ASVAB scores for lower 20% of personnel currently assigned to MOS identified in subparagraph (1) above																
5. Safety considerations																
6. Special protective equipment required																
7. Hazards encountered																
a. Frequency																
b. Cause																
c. Consequence																
8. Weights to be lifted or transported																
F. Training considerations																
1. Type of training given																
2. Length of training (in hours)																

TABLE I. Tailoring guide - Continued.

TASK PERFORMANCE ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT															
	CONCEPT					DEMONSTRATION/VALIDATION					FULL SCALE DEVELOPMENT					
	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	TOTAL
3. Estimated cost/trainee/hour																
4. End of training comprehension and performance test score for each trainee																
G. Discussion																
1. Identification of problem areas by concern																
a. Human Engineering																
b. Manpower																
c. Personnel																
d. Training																
e. System Safety																
f. Health Hazards																
g. Workload																
h. Logistics																
2. Proposals for solving problems in the areas identified above																
3. Estimated impact upon manned system performance requirements of the time and accuracy measures of task performance																
H. Conclusions																

activity require the contractor to include in the task performance analysis.

30.2.1 Task inventory and task performance analysis parameters. The list of parameters is comprehensive but not exhaustive and other parameters may be required by the procuring activity. These additional parameters will be specified in the Request for Proposal (RFP).

30.2.2 System development and task performance analysis applications. The categories listed across the top of the matrix represent phases of system development, and beneath those categories are various application areas of task performance analyses. The rationale is that a task inventory and task performance analysis can be required during any or all phases of system development by those concerned with equipment design, training, test and evaluation, manning, and workload. Thus, for any phase of system development, procuring activity representatives interested in these applications can specify, for each application, the task performance analysis parameters they want the contractor to provide in response to the required Data Item Description.

30.2.3 Tailoring guide use. The Tailoring Guide is used in the following way. Those individuals at the procuring activity identify each parameter that the contractor is to provide in the task performance analysis by placing the letter "E" in the appropriate column next to parameters on which information is regarded as "essential", and the letter "R" in the appropriate column next to parameters on which information is regarded as "recommended." The columns used depend upon the phase of system development and the task performance analysis application. The phases of system development are noted on the guide, because what is required of the contractor should be somewhat different for each phase. This is because the amount of data and information available for a task performance analysis can be different. For example, in the Conceptual phase, there may not be enough information about the system to be able to determine many of the task performance analysis parameters; whereas in the Development phase there will probably be enough information to determine all parameters. Thus, it is very important that the users of the Tailoring Guide take into consideration what data and information will probably exist (including an Early Comparability Analysis) over the contract duration when selecting the task performance analysis parameters so that the contractor is not given requirements which cannot be met. Since each task performance analysis application can require different (although overlapping) parameters, each application is given a separate column for selection. A notional example of the use of Table I is provided

in Table II in the form of a copy of Table I that has been filled out with requirements for a hypothetical system. Once all selections have been made, the procuring activity can tailor the required parameters in the appropriate Data Item Description. Those individuals selected by the procuring activity to select the parameters shall be experts in the activities of human engineering design, test and evaluation, training, manning, and workload; and in the use of task performance analysis results as applied to these activities.

30.3 Contractual applicability.

30.3.1 Further tailoring. Procuring activities may further tailor the contents of the task performance analysis by including additional parameters in the RFP and contractual package.

30.3.2 Contractor use. Unless otherwise specified by the procuring activity, contractors shall utilize the completed Tailoring Guide or its results as a baseline in the preparation of RFP responses and task performance analysis program planning. This does not preclude the contractor from proposing further tailoring.

30.3.3 Evolutionary development. For evolutionary development of older or existing systems, equipment, software and facilities, the Tailoring Guide will generally apply only to new or revised design and procedure features. Old systems undergoing improvement through evolutionary means will generally not have the Tailoring Guide applied to components retained and unaffected by such evolutionary development techniques. It is important to understand that there may be exceptions to this general rule; therefore, evaluation by the human engineering staff of the procuring activity is considered extremely advisable.

30.3.4 Product improvement. Recognizing that product improvement actions may occur during more than one acquisition phase and that product improvements can involve Conceptual, Validation, or Full-Scale Engineering tasks, or a combination of these, the procuring activity should use the Tailoring Guide to reflect the specific performance objectives of the product improvement program.

30.3.5 Production and deployment phase. Design changes affecting human performance during the Production and Deployment phase, can, like product improvement actions, involve Conceptual, Validation, or Full-Scale Development tasks, therefore, the procuring activity should use the Tailoring Guide to reflect the specific performance objectives of the design changes.

TABLE II. Example of completed tailoring guide

TASK PERFORMANCE ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT															
	CONCEPT					DEMONSTRATION/VALIDATION					FULL SCALE DEVELOPMENT					
	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	DESIGN	T&E	TRAIN	MANN	WKLD	TOTAL
A. Performance concerns																
1. Task criticality	R		E		R	R		E		R	E	R	E	R	E	
2. Performance of task	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
a. Source of data																
(1) SME opinion	R		R			R		R			R		R			
(2) Comparability analysis	R	R	E	R	R	R	R	E	R	R	R	R	E	R	R	
(3) Objective measurement	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
b. Task performance measures	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
c. Workload measures	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
d. Identification of human errors	E	E	E	R	R	E	E	E	R	R	E	E	E	R	R	
B. Health considerations																
1. Temperature and humidity	E	E	R	R	E	E	E	R	R	E	E	E	E	E	E	
2. Ambient noise	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
3. Shock, vibration, motion recoil	E	R	R	R	E	E	R	R	R	E	E	R	R	R	E	
4. Windblast	R	R	R	R	E	R	R	R	R	E	R	R	R	R	E	
5. Pressure fluctuations	R	R			R	R	R			R	R	R			R	
6. Surface heat or cold	E	E	R	R	R	E	E	R	R	R	E	E	R	R	R	
7. Electromagnetic radiation	E	R	R	E	R	E	R	R	E	R	E	R	R	E	R	
8. Toxins	E	R	R	E	R	E	R	R	E	R	E	R	R	E	R	
9. Psychological stress																
a. Confined spaces	E	E	R	E	E	E	E	R	E	E	E	E	R	E	E	
b. Isolation	R	R	E	E	E	R	R	E	E	E	R	R	E	E	E	
c. Sensory or cognitive overload	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
d. Body disorientation	E	E	E	R	E	E	E	E	R	E	E	E	E	R	E	
e. Sustained or continuous operations	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
f. Human waste elimination constraints	E	R	E	R	R	E	R	E	R	R	E	R	E	R	R	

30.4 Human engineering review. Procuring activities are responsible for assuring that the Tailoring Guide as applied to specific contracts has been subjected to human engineering review to ensure consistency of the completed guide with human factors requirements, pursuant to the nature of the objectives of the contracts. Specifically, the parameters selected shall be reviewed to assure compliance with human engineering, training, testing and evaluation, manning and workload requirements. Further, there shall be a human engineering review of the tasks selected, from the task inventory, to be subjected to a task performance analysis to insure necessity and cost-effectiveness.

CONCLUDING MATERIAL

Custodians:
Army - MI
Navy - AS
Air Force- 11

Preparing activity
Army - MI
(Project HFAC-0044)

Review activities:
Army - AL, AR, AT, AV, CR, ER, GL, MD, MG, MR, TM, TE
Navy - MS, OS, PE, SH, TD, YD
Air Force - 14,19,26

Civilian agency coordinating activities:
NASA - MSF
DOT - FAA

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-STD-1478	910513

3. DOCUMENT TITLE
Task Performance Analysis

4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER	
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)
	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY	
a. NAME U.S. Army Missile Command	b. TELEPHONE (Include Area Code) (1) Commercial: (205) 876-6980 (2) AUTOVON: 746-6980
c. ADDRESS (Include Zip Code) Commander, U.S. Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

DD FORM 1426