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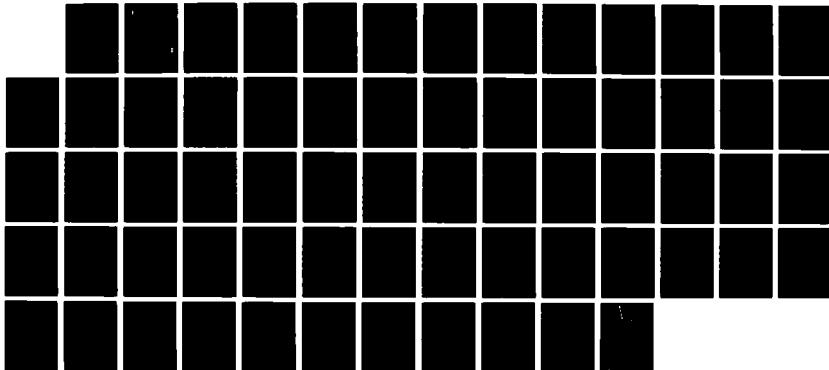
HUMAN FACTORS ENGINEERING DATA MANAGEMENT HANDBOOK(U)
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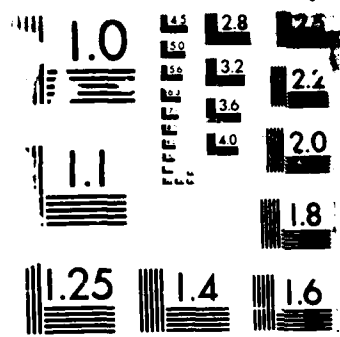
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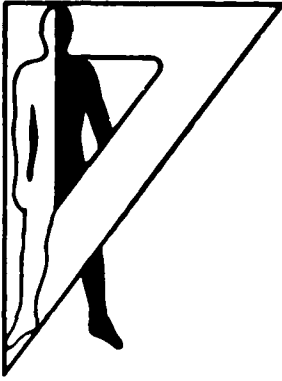
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Technical Memorandum 6-87

HUMAN FACTORS ENGINEERING DATA MANAGEMENT HANDBOOK

R. Bruce McCannons

March 1987
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U. S. ARMY HUMAN ENGINEERING LABORATORY

Aberdeen Proving Ground, Maryland

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<p>This document is intended for use by persons having HFE Program Management responsibility in support of materiel acquisitions. It provides a basic understanding of data management as a discipline and a strawman approach to determining required data items and specifying and scheduling their timely delivery. Also included are instructions for preparing the Contract Data Requirements List (CDRL), DD Form 1423.</p>			
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HUMAN FACTORS ENGINEERING DATA MANAGEMENT HANDBOOK

R. Bruce McCammons

March 1987

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- A -

PREFACE

For some time, serious concerns have existed regarding how the Government acquires data. The questions most frequently asked include, how much data should we buy, when should we ask for it, how should we use it, and how do we acquire it so as to be both timely and useful?

This document was written with the above concerns and questions in mind. It is intended for use by HEL and other personnel who are engaged in HFE program management activities in support of materiel acquisitions. The document is presented as guidance for determining data requirements and specifying and scheduling their timely delivery.

Accordingly, the objectives of this document are to provide a basic understanding of data management and a conceptual approach to facilitating data acquisition as part of the materiel development process. As such, it should be considered a living document and, after evaluation and/or implementation by users, one which will be updated or modified, as required, to reflect field experience and changes in relevant policy.

Last, while written from an HFE perspective, the author recognizes that HFE is most properly considered not as a discipline in and unto itself, but as a predominant element of the much larger initiative called MANPRINT (Manpower and Personnel Integration). However, since the underlying principles and concepts governing data management are generic, the information and guidance contained herein should also be useful in acquiring other MANPRINT data, i.e., in the domains of Manpower, Personnel, Training, Safety, and Health Hazards Assessment.

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HUMAN FACTORS ENGINEERING DATA MANAGEMENT HANDBOOK

INTRODUCTION

An integral part of an effective HFE (or MANPRINT) Program is the acquisition of the data required to feed, drive, and validate the various work activities needed to achieve a system's design and performance objectives. However, it must be understood that data are expensive, and acquiring too much is neither cost-effective nor productive. Conversely, acquiring too little data can also have serious program ramifications. Imagine, for example, trying to design a complex system absent task analysis data or trying to produce a Human Factors Engineering Analysis (HFEA) without sufficient HFE test data.

The trick, then, is how to establish an optimal balance between program work and data requirements. The solution evolves from proper data management.

While other documents (e.g., AR 700-51 and DOD-STD-963) exist which speak to the subject of data management, the author has found them to be rather terse and somewhat incomplete from a user perspective. Therefore, this handbook was written to provide information, insight, and rationale not found in other documents. It attempts to answer the following questions:

1. What is meant by "data"?
2. What is data management, and why is it important?
3. How does one determine what data are needed?
4. How does one identify data to be delivered?
5. How does one specify and schedule data for delivery?
6. What happens after data is delivered: review and evaluation?

DATA MANAGEMENT

Data Defined and Explained

Data is defined in AR 700-51 as, "...all recorded information, regardless of form or characteristic, prepared either in-house or by a contractor for delivery to the Government, including data maintained by a contractor for the

Government." Per this definition, data can be documents, graphs, drawings, pictures, computer printouts, or even the contents of a computer's memory.

While the HFE practitioner will typically be involved with only the latter two, there are three types of data normally acquired from a contractor during a materiel acquisition. These are:

1. Financial. Data such as dollar expenditures, forecasts, status, and other cost information.
2. Administrative/management. Data used to administer, manage, and enforce contractual requirements, to include program status, tracking, and planning information.
3. Technical. Data of a scientific or technical nature such as the documentation of research or development work, the definition of a design, or the reporting of test results.

The reason for providing the above definitions herein is to make two main points: First, data are "paper" products and do not constitute work. Work is the effort required to generate the paper and is acquired via the Statement of Work (SOW). Second, for all practical purposes, data can be thought of as plans and reports, e.g., an HFE Program or Test Plan or an HFE Progress or Test Report.

Data Management Defined and Explained

While it may sound trite, data management is simply the management of data, i.e., how much is needed, what kind, when is it needed, and will its generation serve a meaningful purpose? Procedures and policy regarding data management are found in and mandated by Department of Defense Instruction (DODI) 5010.12, the DOD Data Management Program.

Basically, the purpose of the data management program is to identify and justify the minimum data required for each item of materiel, and then to control procurement, preparation, acceptance, delivery, storage, retrieval, review, updating, interchange, and distribution of all data throughout the life-cycle of the item. This program applies to all data acquisitions regardless of the dollar value of the item or system being procured.

The objectives of the data management program are to assure optimum effectiveness and economy in the support of systems and equipments within the Defense establishment. To meet these goals, it is intended that the accurate determination of requirements and the orderly acquisition and timely utilization of adequate technical data be accomplished by:

1. Planning data requirements concurrently with planning for systems, materiel, and services to insure a coordinated effort.

2. Procuring data on the basis of need for a specific, intended use, and only when requirements can be justified.

3. Selecting contract data requirements from an approved list to minimize proliferation of requirements.

4. Specifying data requirements on a single, standardized form in all contracts to provide for visibility and control.

5. Providing for the review and challenge of proposed data requirements by other than the originator to insure objective evaluation of need.

6. Insuring that effective quality assurance programs and procedures are established to insure that the data requirements specified are met.

7. Insuring that data are not treated as end items in themselves, but rather as a by-product of a work task in the SOW.

8. Insuring that Requests for Proposals (RFPs) include data requirements.

While attaining the above goals may sound complicated, the mechanics of the operation are really quite simple. First, there will be a "Data Call" which you may receive in the form of a letter or a phone call from a Program Manager's Office (PMO) or other activity. The purpose of the data call is to put you on notice that a given procurement is being planned and that this is your opportunity to specify what data are needed to support your specialty area (HFE) requirements. Second, based on program metrics to be discussed below, you will identify the data needed and forward this information to the activity originating the data call. Third, after all responses to the data call have been received, the originating activity will convene a Data Requirements Review Board (DRRB), sometimes referred to as a "murder" board. It then becomes the responsibility of this board to review and validate all the data requirements proposed and make a final determination of those which will be included in the solicitation (RFP).

As the requestor of HFE data, you may or may not be invited to participate on the DRRB. If you are, there is no problem since you will be able to personally defend your data requirements. If not, your inputs must be able to stand alone. Regardless, the best posture to assume is that you won't be at the DRRB. In this case, the following guidelines are suggested to maximize the probability of your requirements surviving the review process:

1. Be very selective in determining what data are required. Keep data items to the minimum required to satisfy program objectives.

2. Provide written rationale for each data item proposed. Again, you may not get the opportunity to defend your requirements in person.

3. If possible, find out what data are being requested by others to avoid duplication.

4. Related to 3 above, provide alternatives. For example, you want to be kept aware of the contractor's progress regarding HFE, so you might consider asking for formal HFE Progress Reports. However, if you know or think that someone else, say Product Assurance, will be asking for monthly or quarterly Technical Progress Reports, you should consider piggybacking HFE status information onto their data item. Go ahead and ask for your data separately, but offer the piggyback alternative. If accepted, everyone is happy -- you get your data, and the DRRB can proudly point to a data item that got killed. This approach can also be used for obtaining HFE test data.

5. Make sure your data items are keyed to a tasking in the SOW or to a specification requirement in the RFP.

6. Don't depend on a phone call to make your data requirements known. They should be forwarded in writing on the appropriate form, i.e., DD Form 1423. If not, expect your requirements to either get lost or modified to the point that you won't be able to recognize them later.

Determination of Needed Data

The correct determination of minimum essential HFE data is dependent on four factors: (1) knowledge of the materiel being procured; (2) acquisition strategy; (3) program history; and (4) program phase, i.e., Concept, Demonstration and Validation, Full-Scale Development, or Production and Deployment. (NOTE: Under the Army Streamlined Acquisition Program [ASAP] these would be Proof of Principle, Full-Scale Development, and Production and Deployment.)

There are two basic things you need to know about the item or system itself: how complex are the human-equipment interfaces, and to what extent is system effectiveness dependent on human performance? For example, if the item to be procured is a "set-and-forget," black box with one toggle switch and a power light, you certainly wouldn't need or ask for a full-blown HE program complete with testing and progress reporting. However, if the system operation/maintenance is expected to require a significant amount of human-equipment interaction or

intervention, e.g., information display, input, processing, fault detection and isolation, etc., then you would want as much data as is reasonable to define, validate, and fine-tune the HFE design.

Information regarding program phasing, acquisition strategy, and history has to be considered simultaneously since it all leads to the same bottom line. For example, the basic question regarding program phase is whether the system is entering advanced or engineering development (AD or ED). If the answer is AD and the system is complex, it is pretty safe to assume that virgin territory is about to be explored, and a complete and comprehensive HFE data package is in order. However, if you know that the acquisition strategy is to follow the normal progression of events, i.e., AD followed by ED followed by production, then you may decide to ask for some of your data in AD and some in ED. Conversely, if the acquisition strategy contains provisions for skipping ED if all goes well in AD, you would not want to make the same decision.

If the answer to your original question regarding phasing is ED, then the first thing you need to know is what kind of data was generated in AD. If none, a complete package is again in order. If some, you'll need to fill in the blanks.

There are too many combinations of program phases, acquisition strategies, and historical perspectives to address all the "what ifs" herein. Suffice it to say that a determination of data requirements should be made intelligently, i.e., using all information available. It is just not possible to develop a standard set of data requirements for imposition on all contracts without being guilty of overkill on some and underkill on the others. Regardless, the author has found that, even for complex systems' acquisitions, the following data items have sufficed: HE Program Plan (DI-H-7051); HE Test Plan (DI-H-7053); HE Test Report (DI-H-7058); and HE Progress Reports (either as DI-H-7059, or as part of another, related data item). These data items, then, could be thought of as "core" requirements.

Identification of Needed Data

Once you have decided what generic HFE data are required to facilitate your program management efforts, the next step is to specifically identify data items for inclusion to the RFP. In so doing, regulations prescribe that you make your selections from an approved list.

DOD Directive 5000.10, "Policies for the Management and Control of Information Requirements," mandates the publication of the Acquisition Management Systems and Data Requirements

Control List (AMSDL) as DOD 5000.19-L, Volume II, and requires that the AMSDL be used in selecting data requirements placed on contracts. The AMSDL, then, is the list alluded to previously.

For all practical purposes, you can think of the AMSDL as the index to a "mail-order" catalog of data items which you can legally impose on a contract with no questions asked. Continuing the analogy, the catalog itself is composed of thousands of Data Item Descriptions (DIDs) which define and describe the particular types and kinds of data to be delivered.

The AMSDL lists and categorizes data several ways: alphabetically, numerically, by keyword, and by function. Complete instructions for using the AMSDL are contained in DOD 5000.19-L, Volume II, and the reader should become familiar with them since DIDs are constantly being updated, revised, added, and canceled. However, to make your task a little easier, the following information is provided.

DIDs approved and listed in the AMSDL prior to 1 July 1985 are identified as follows: "DI" or "UDI," followed by a single alpha character, followed by a 4- or 5-digit number, e.g., DI-X-9999. The prefix "DI" or "UDI" stands for Data Item or Unique Data Item, respectively. For now, you can use either, but all UDIs are presently being reviewed for the purposes of standardization and/or consolidation and will eventually be removed from the AMSDL.

The single alpha character following the "DI" or "UDI" represents the data functional category, and following the alpha character is a 4- or 5-digit number which really doesn't have any intrinsic meaning. The functional categories are:

- A--Administrative/Management
- E--Engineering and Configuration Documentation
- F--Financial
- H--Human Factors
- L--Logistics Support
- M--Technical Publications
- P--Procurement/Production
- R--Related Design Requirements
- S--System/Subsystem Analysis
- T--Test
- V--Provisioning

The most often used HFE data will be found under category "H" which includes DIs associated with human engineering, training, and safety; subsystem personnel products and processes; and qualitative and quantitative personnel requirements for planning, manning, and training purposes. However, you should also familiarize yourself with the types of data available under the other categories -- especially "T," if you plan to piggyback some of your reporting requirements onto someone else's data item.

Last, while there are still some in the 1300 series, the most often used HFE DIs will be found under the 7000 series. (A partial listing is included as Appendix A.)

NOTE: Since 1 July 1985, policy has mandated that new DIDs will be identified as follows: "DI," followed by a four-letter designator, followed by a 5-digit number, e.g., DI-XXXX-99999. Also, one-time DIDs (e.g., UDIs) will not be listed in the AMSDL. For new HFE data items, the four-letter designation is "HFAC." Presently, there are no HFE data items bearing the HFAC designator. Eventually, however, existing HFE data items will be converted to the new nomenclaturing scheme.

Specifying and Scheduling Data

Having determined the generic data you need, and having identified the particular data items which will fulfill those needs, the next step is to specify and schedule the delivery of these data in an acceptable contractual format. These requirements are accomplished using the DD Form 1423, "Contract Data Requirements List (CDRL)."

The CDRL is pretty much what its name implies, i.e., it is a listing of all data requirements which the contractor will be obligated to deliver under the contract. The list itself is composed of multiple DD Forms 1423 (See Appendix B).

The following is information and instructions for completing the Form 1423.

1. The 1 January 1975 edition of DD Form 1423 is the only one authorized for contractual application. All other editions are obsolete.

2. Header Data: Under "CATEGORY," enter an "H," and leave the rest blank. The other information will be provided by the procuring agency contract specialist.

3. Data elements numbered 1, 2, 3, 4, 6, 7, 8, 10, 12, 13, and 15 must be completed by DOD components. Completion of other data elements is optional.

4. Your responsibility will be to data elements 2, 4, 6, 8, 10, 11, 12, 13, 14, and 16. While it is noted that, of these, 11, 14, 16 are optional, you will use all three and will probably discover that 16 (REMARKS) will be your best friend.

5. BLOCK 1 (SEQUENCE NUMBER): This is a non-significant, alphanumeric (e.g., A001) identifier used to reference the data product being ordered. This identifier will be assigned by the originator of the RFP. You don't have to worry about it.

6. BLOCK 2 (TITLE OR DESCRIPTION OF DATA): Enter here the exact title of the DID (DD Form 1664), e.g., "Human Engineering Program Plan."

7. BLOCK 3 (SUBTITLE OF DATA): An entry is required here only if there are multiple data items having the same DID number, and a subtitle is needed to differentiate them. You will probably never use this block.

8. BLOCK 4 (AUTHORITY [Data Item Number]): Enter here the DID numbers, e.g., DI-H-7051, to include the latest revision, supplements, or addenda. If the DID has been tailored, note this parenthetically, e.g., DI-H-7051 (Tailored). For specific guidance on tailoring, see Appendix C.

9. BLOCK 5 (CONTRACT REFERENCE): An entry here denotes the specific paragraph number of the contract, RFP, system specification, etc., which drives the data requirement. Leave this entry blank because you will not know the specific reference(s), and it is not your responsibility. An entry will be made by the responsible contracting specialist prior to contract solicitation.

10. BLOCK 6 (TECHNICAL OFFICE): Entered here is the symbol of the office having primary responsibility for assuring the adequacy of the data item. Logically, this should be your office symbol, but since the PMO has the ultimate responsibility for approving data, it will probably end up being theirs. When filling out the 1423, go ahead and put your office symbol in this block; the PM shop will change it if they want to.

11. BLOCK 7 (DD 250 REQ): This entry designates the location (Contractor's facility, or Destination) for performance of Government inspection and acceptance. Such designation is accomplished by entering the applicable code from the list shown below.

<u>CODE</u>	<u>INSPECTION</u>	<u>ACCEPTANCE</u>
SS	*Source (DD Form 250)	*Source (DD Form 250)
DD	Destination (DD Form 250)	Destination (DD Form 50)
SD	*Source (DD Form 250)	Destination (DD Form 250)
DS	Destination (DD Form 250)	Source (DD Form 250)
**LT	Letter of Transmittal Only	
**NO	No inspection or acceptance required	
XX	Inspection and acceptance requirements specified elsewhere in contract	

*Source indicates contractor's facility.

**Use of these symbols is not authorized for engineering data such as drawings and specifications.

Since you will probably be reviewing (inspecting) and determining the adequacy of (accepting/rejecting) HFE data in your home office, it would seem that DD is the correct entry. It is not.

Any combination of "Ds" and "Ss" in block 7 triggers a volume of paperwork (DD Forms 250) which is just not necessary for the receipt, review, and disposition of HFE data. For this reason, enter "LT." Such entry says to the contractor: "Just send me the required data with a formal cover letter, and I will respond in kind." This approach will reduce paperwork, save the Government time and money, and guarantee a proper audit trail -- the latter being all that is really needed anyway. If the PM wants to change your entry to something else, he will.

12. BLOCK 8 (APPROVAL CODE): If you are willing to accept the data item "as is," leave this field blank. If you want approval rights before allowing the contractor to proceed, enter an "A." A good rule to follow is: if the purpose of the data item is for a contractor to propose how he intends to do something (e.g., an HE Program or Test Plan), put an "A" in block 8. Conversely, if the intent is to document something that has already been done and/or the results thereof (e.g., HFE Progress Reports), then leave block 8 blank. Last, in making this determination, it should be noted that data items requiring approval normally are submitted in draft before publication of a final document.

13. BLOCK 9 (INPUT TO IAC): This block is used only when an Integrating Associate Contractor (IAC) is involved. Leave blank.

14. BLOCK 10 (FREQUENCY): Entry of one of the codes shown below establishes the frequency with which data are submitted.

DAILY	Daily
WEEKLY	Weekly
BI-WE	Each 2 weeks
MTHLY	Monthly
BI-MO	Each 2 months
QTRLY	Quarterly
BI-AN	Each 2 years
2 TIME	Two separate submittals
ONE/P	1-time preliminary draft
DFDEL	Deferred delivery
ANPLY	Annually
SEMIA	Each 6 months
OTIME	One time
ONE/R	One time and revisions
R/ASR	Revisions as required
ASREQ	As required (See notes A and B below)

Note A: Use Block 13 for further explanation.

Note B: If data is of recurring type, it will be submitted at the end of the reporting period established in this field unless otherwise indicated in the DID instructions or in Blocks 12 or 13 of the 1423.

Except in the case of progress reports which you might want submitted monthly, bi-monthly, or quarterly, the codes you will probably use most often are "OTIME" and "ONE/R." OTIME means one time only and is appropriate for data items not requiring approval, e.g., an HE System or Task Analysis Report and, for systems having a relatively uncomplicated soldier-machine interface, HE Test Reports. ONE/R means one time with revisions and is appropriate for plans, design approach documents, and, for systems having a complex soldier-machine interface, HE Test Reports, i.e., data items which require approval and/or are normally submitted in draft.

15. BLOCK 11 (AS OF DATE): An entry is required only when data is subject to predetermined cutoff dates. About the only time you would use this field would be for progress reports. If used, enter the as of date (AOD) as days prior to the end of the reporting period, e.g., "15" would place the AOD at 15 days before the end of each month or quarter depending on the frequency specified in Block 10; a "0" would place the AOD at the end of the month or quarter. (NOTE: If you have piggy-backed your progress reports onto another data item, you will have to be satisfied with the AOD on that data item.)

16. BLOCK 12 (DATE OF FIRST SUBMISSION): If you know exactly when you want the data, enter this date as "Year/Month/Day." However, since you probably won't know the contract start date, it makes more sense to specify a data submission date in terms of a number of days after date of the contract award. For example, if you want a particular data item 60 days after contract (DAC) award, enter "60 DAC." (NOTE: Another commonly used acronym is ADAD [After Date of Award Document], so you could also use "60 ADAD.")

You can also tie a data submission date to a specific contract event whose date is unknown, e.g., the Preliminary or Critical Design Review (PDR/CDR) or Prototype Qualification Test (PQT). For example, you don't really care when your HE Test Plan is submitted, but you want to be sure there is an approved plan before PQT. To handle this situation, enter "See Block 16" in Block 12. Then, in Block 16, specify delivery of the Plan for some reasonable number (e.g., 90) of days prior to PQT.

Last, if you are ordering data which will be submitted in draft and requires approval, the recommended approach is to enter "See Block 16" and specify the schedule of delivery and review cycle in Block 16.

17. BLOCK 13 (DATE OF SUBSEQUENT SUBMISSION/EVENT IDENTIFICATION): It is intended that, if data are to be submitted more than once, the date(s) of subsequent submission(s) be entered herein. Again, since you won't know the contract award date, it is best to enter "See Block 16" and specify the delivery schedule in Block 16.

A special case is HE progress reports. For example, you want quarterly progress reports with the first one to be delivered 90 DAC. On the 1423 for the progress report, you would enter a "0" in Block 11, "90 DAC" in Block 12, and "QTRLY" in Block 10. You have said it all; no entry is required in Block 13.

18. BLOCK 14 (DISTRIBUTION AND ADDRESSES): Here are entered your address (office symbol) and the number of regular/reproducible copies. Reproducible copies means "camera-ready" and you won't need any. Assuming you will need only one regular copy, the correct entry is 1/0.

19. BLOCK 15 (TOTAL): This entry is the total of the regular and reproducible copies. Since other activities may also be requesting copies of your data, you won't know what these numbers will be. Leave blank.

20. BLOCK 16 (REMARKS): Enter here any remark required by entries in Blocks 1-15 and any other remark that is considered essential to clearly identify the data item or delivery requirements. Assuming you have entered "See Block 16" in Blocks 12 and/or 13, and "OTIME" or "ONE/R" in Block 10 as

recommended, the remarks section is the place to explain what you really want. For example, you want a draft HE Program Plan 60 days after contract award, approval rights, and a final plan responsive to Government comments generated during the review process. When ordering this data then, an appropriate entry in Block 16 would read as follows: "Draft plan to be delivered 60 DAC. Government requires 30 days for review. Final plan to be submitted 30 days after receipt of Government comments."

21. BLOCKS 17-26: Tear off this detachable section and throw away.

22. PREPARED BY/DATE: Sign and date. The "Approved By" section is for the PMO.

The above constitutes general guidance for the preparation of the DD Form 1423. While the words and embellishments are not the same as those found in the official regulations, nothing has been said that is in violation or disagreement with those regulations.

Since it is difficult to cover all eventualities in a narrative, samples of completed DD Forms 1423 for the HE Program Plan, Test Plan, Test Report, and Progress Report (DI-H-7051, 7053, 7058, and 7059, respectively) are shown in Appendix D. While presented as examples, the formats illustrated have been used many times and work.

Last, whenever data items are discussed, the question of scheduling invariably arises. Thus, while there are no pat answers, the following is presented as general guidance.

For obvious reasons, it is desirable to have the HE Program Plan in effect shortly after contract award. Also, because of the effort already expended by the contractor in preparing his proposal and the general nature of the HE Plan itself, it is not unreasonable to specify an early delivery. Taking into account the time which must be allocated for Government review and contractor resubmittal, scheduling the initial submission at 30-45 DAC is considered realistic.

Scheduling of the HE Test Plan and Report is a more complicated task. First, due to the specificity of the preparation instructions, critical sections of the Test Plan cannot be definitized until other supporting tasks, e.g., task analyses, are completed. Obviously, such work will not be finished early in the contract. Second, the HFE practitioner must decide the nature of the HE testing program itself, i.e., is it perceived for use as an iterative design tool which turns interim results into design solutions, or as a final verification methodology? If the former, then the majority of the test results should be in by CDR at the latest, and both the HE Test Plan and Report have to be scheduled accordingly. (NOTE: To assure that an HE Test Report is available at any

given point in time requires that the initial submission of the HE Test Plan precede the Report by a minimum of 90 days plus the duration of the actual testing plus that portion of the time required for data reduction and analysis which cannot be done concurrent with the testing.) If the data to be collected are primarily for verification purposes, then the major concern is having an approved Test Plan approximately 15-30 days prior to the start of formal testing.

Considering the above, three points should be clear. First, scheduling the HE Test Plan and Report requires that the HFE practitioner do a fair amount of homework. Second, it makes no sense to schedule the Test Plan too early. Last, the initial submission of the Test Plan should be keyed to an appropriate system milestone or event.

In regards to the scheduling of the HE Progress Reports, the answer is easy. Schedule the first one to appear right after the contractor has had time to do some meaningful work (e.g., 60-90 DAC), with subsequent submissions monthly, bi-monthly, or quarterly thereafter, as appropriate.

Data Review and Evaluation

Assuming your data requirements have survived the review process described above, they will be made part of the contract. All you can do then is sit back and wait for your data items to arrive.

Once the contracted data have been received, it becomes your responsibility to determine its adequacy. As mentioned previously, in the case of reports, what you see is pretty much what you get. In general, the review is relatively straightforward, and the typical deficiencies to look for are less than full disclosure and/or noncompliance with an approved, associated plan. However, in the case of plans, the review process is more critical because, once approved, that plan becomes a minicontract. As such, it defines what the contractor will and (by omission) won't do for the agreed upon price of the work effort described by the plan. It also becomes the metric by which the contractor's work performance will be judged.

The review process itself is a simple matter of comparing the contractor's proposed or accomplished effort against that described in Section 10 (Preparation Instructions) of the DID (DD Form 1664). If the two match, you accept; if they don't, you reject. A decision to accept can generally be transmitted to the Project Office by a phone call. However, should you decide to recommend to the PMO that the data item be rejected, such recommendation should be accomplished by formal correspondence containing full supporting rationale. Be specific and precise since your letter will be the foundation

of the formal rejection notice which will be sent to the contractor. If what you write needs translation or major revision, then instead of saving the PM work, you have created more.

On the other hand, the most common trap to beware of is that of feeling you have to write the contractor's data item for him. To avoid this pitfall, limit yourself to pointing out the disconnects between the data item and the DID, any omissions you might find, and proposals that you feel won't work.

Last, if you have decided to recommend rejection of a data submittal, the following procedure is recommended to minimize processing and turnaround time on the part of the PMO. First, prepare a short cover letter to the PMO stating that the subject document was reviewed, was found to be unacceptable, and that a complete evaluation and supporting rationale are attached as an enclosure. Second, remembering to be completely objective and unemotional, prepare the promised evaluation and attach it to the cover letter.

If the above procedure is used, upon receipt of your formal response, the PMO can simply detach your evaluation from the cover letter and attach it as an enclosure to the official rejection notice which will be sent to the contractor. This procedure also maximizes the probability that your exact words will be transmitted to the contractor.

As a final and closing note, there will be times when a data submittal is so bad that a line item evaluation would require as much work on your part as would writing the data item itself. (This situation typically occurs when a data item submission, e.g., HE Test Plan, has been scheduled too early.) In such cases, the author has used the following expedient. First, include in a cover letter a statement of the situation as described above. Second, make a xerox of the DID and, using a yellow or other bold color marker, highlight the areas of noncompliance. Third, attach the highlighted DID as an enclosure to the cover letter, and mail it to the PMO.

REFERENCES

- | | |
|------------------------|--|
| AR 700-51 | Army Data Management Program |
| DOD-STD-963 | Military Standard, Data Item Description (DID), Preparation of |
| DODI 5010.12 | The DOD Data Management Program |
| DODD 5000.10 | Policies for the Management and Control of Information Requirements |
| DOD 5000.19-L, Vol. II | Acquisition Management Systems and Data Requirements Control List (AMSDL) |
| AR 700-70 | Application of Specifications, Standards, and Related Documents in the Acquisition Process |

APPENDIX A
HFE DATA ITEMS

HFE DATA ITEMS

DI-H-7051	HUMAN ENGINEERING PROGRAM PLAN
DI-H-7052	HUMAN ENGINEERING DYNAMIC SIMULATION PLAN
DI-H-7053	HUMAN ENGINEERING TEST PLAN
DI-H-7054	HUMAN ENGINEERING SYSTEM ANALYSIS REPORT
DI-H-7055	CRITICAL TASK ANALYSIS REPORT
DI-H-7056	HUMAN ENGINEERING DESIGN APPROACH DOCUMENT- OPERATOR
DI-H-7057	HUMAN ENGINEERING DESIGN APPROACH DOCUMENT- MAINTAINER
DI-H-7058	HUMAN ENGINEERING TEST REPORT
DI-H-7059	HUMAN ENGINEERING PROGRESS REPORT
DI-H-1336	NOISE MEASUREMENT REPORT

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
	AGENCY	NUMBER
1. TITLE Human Engineering Program Plan	DOD	DI-H-7051
3. DESCRIPTION/PURPOSE The Human Engineering Program Plan is the single document which describes the contractor's entire human engineering program, identifies its elements and explains how the elements will be managed. This document is used by the procuring activity as the principal basis for approval of the contractor's program and as one basis for review of the contractor's progress.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DOC REQUIRED	
7. APPLICATION/INTERRELATIONSHIP The Human Engineering Program Plan (HFPP) is related to DI-H-7053, Human Engineering Test Plan and DI-H-7052, Human Engineering Dynamic Simulation Plan. This DID replaces DI-H-1312A, DI-H-2104, DI-H-3259, UDI-AH-5014, UDI-R-20182, UDI-M-22272B and UDI-H-25568. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.1.2 of MIL-H-46855B.	8. APPROVAL LIMITATION	
	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B MIL-STD-1472	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS 10.1 <u>General</u> . The HEPP shall describe an integrated effort within the total project and shall contain specific information to show how and when the contractor shall satisfy all human engineering performance, design and program requirements specified in the contract. 10.2 <u>Format and Content Requirements</u> . The HEPP shall consist of the following sections: (1) <u>Table of Contents, List of Illustrations and Introduction</u> . (2) <u>Tailoring</u> . This section shall propose tailoring of MIL-H-46855B as specifically applicable to this contract, additional to any tailoring already accomplished by the procuring activity or where exceptions or other tailoring changes are warranted. This proposed tailoring of MIL-H-46855B shall identify specific provisions by paragraph, rationale for tailoring and effects of tailoring on the human engineering program. If no tailoring of MIL-H-46855B is proposed beyond that specified by the procuring activity, this shall be stated. (3) <u>Organization</u> . This section shall identify and describe the contractor's primary organizational element responsible for complying with human engineering requirements. The functions and internal structure of this element shall be defined.		

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10. PREPARATION INSTRUCTIONS (continued)

Structural definition shall include the number of proposed personnel on an annual basis and summary job descriptions for each person. In addition, the relationships of this element to other organizational elements responsible for areas impacted by human engineering, such as those charged with equipment and software design, safety, training, test and evaluation, integrated logistic support and other engineering specialty programs (such as reliability, maintainability, survivability/vulnerability, and transportability) shall be fully explained. The authority delegated to each of the elements shall be stated in explaining the relationships. This section shall also describe the methods by which the contractor shall ensure that compatibility is continuously maintained between the design of system hardware and software (including support and training equipment), human performance requirements, personnel requirements and training requirements.

(4) Human Engineering in Subcontractor Efforts. If any work related to system components or software having human interface is to be performed under subcontract, the subcontractor's organizational element responsible for human engineering shall be described to the same extent as the prime contractor's human engineering organization is covered. A copy of the human engineering requirements proposed for inclusion in each of these subcontracts shall be provided. The method(s) by which the prime contractor monitors subcontractor compliance shall be fully described.

(5) Human Engineering in System Analysis. This section shall identify those human engineering efforts in system analysis (or, where contractually required, in system engineering), as described in MIL-H-46855B, which are contractually applicable and the organizational element(s) responsible for their performance. Human engineering participation in system mission analysis, determination of system functional requirements and capabilities, allocation of system functional requirements to human/hardware/software, development of system functional flows and performance of system effectiveness studies shall be fully described. Any data required from the procuring activity shall be described.

(6) Human Engineering in Equipment Detail Design. This section shall describe the human engineering effort in equipment detail design to ensure compliance with the applicable provisions of MIL-STD-1472 and other human engineering requirements specified by the contract. Human engineering participation in studies, tests, mock-up evaluations, dynamic simulation, detail drawing reviews, systems design reviews and system/equipment/component design and performance specification preparation and reviews shall be fully described. When DI-H-7052, Human Engineering Dynamic Simulation Plan is required by the contract, the description of human engineering participation in dynamic simulation may be brief. Finally, this section shall propose tailoring of MIL-STD-1472

10. PREPARATION INSTRUCTIONS (continued)

as specifically applicable to the contract, additional to any tailoring already accomplished by the procuring activity or where exceptions and other tailoring changes (additional to the self-tailoring nature of MIL-STD-1472) are warranted. This proposed tailoring of MIL-STD-1472 shall identify specific provisions, by paragraph, as applicable. If no tailoring of MIL-STD-1472 is proposed beyond that specified by the procuring activity, this shall be stated.

(7) Human Engineering in Equipment Procedure Development. This section shall describe the human engineering effort in equipment procedure development to ensure compliance with paragraph 3.2.2.5 of MIL-H-46855B. The methods shall be stated by which the contractor shall ensure that:

a) operator and maintainer functions and tasks are allocated, organized and sequenced for efficiency, safety and reliability; and,

b) the results of this effort are reflected in operational, technical and training publications and in training system design.

(8) Derivation of Personnel and Training Requirements. This section shall describe the methods by which the contractor shall ensure that operator and maintainer personnel and training requirements are based upon human performance requirements developed from system analysis data.

(9) Human Engineering in Test and Evaluation. This section shall describe human engineering test and evaluation as an integrated effort within the contractor's total test and evaluation program and shall contain specific information to show how and when the contractor shall satisfy human engineering test and evaluation requirements of MIL-H-46855B. Design milestones shall be identified at which human engineering tests are to be performed to assess compatibility among human performance requirements, personnel aptitude and skill requirements, training requirements and equipment design aspects of personnel-equipment/software interfaces. Major test and demonstration objectives shall be identified and proposed test methods shall be described. This section shall also identify the human engineering personnel involved in test and evaluation, and a summary of the human engineering test schedule. The summary test schedule shall depict major human engineering tests, evaluations and demonstrations in relationship to major project milestones such as 90 percent design release, project level design reviews, first article demonstration tests and commencement of procuring activity testing. When DI-H-7053, Human Engineering Test Plan is required by the contract, this section may briefly summarize proposed T&E efforts.

DI-H-7051

10. PREPARATION INSTRUCTIONS (continued)

(10) Human Engineering Deliverable Data Products. This section shall identify and briefly describe each human engineering deliverable data product specified in the contract.

(11) Time-Phase Schedule and Level of Effort. This section consists of a milestone chart which identifies each separate human engineering effort to be accomplished and shall state the level of effort (in man-months) for each task.

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DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
	AGENCY	NUMBER
1. TITLE Human Engineering Dynamic Simulation Plan	DOD	DI-H-7052
3. DESCRIPTION/PURPOSE This plan describes the contractor's intended use of dynamic simulation techniques in support of human engineering analysis, design support and test and evaluation.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID is related to DI-H-7059, Human Engineering Progress Report. This DID replaces UDI-H-21388. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.2.1.2 of MIL-H-4685B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-4685B	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS		
<p>10.1 <u>Content Requirements.</u> The plan shall consist of the following information:</p> <p>1) Rationale and General Description. The need for a dynamic simulation program shall be described. The overall simulation concept shall be described. Benefits to be derived from dynamic simulation shall be stated. The interrelationships between dynamic simulation and other human engineering analysis, design support and test and evaluation techniques shall be described.</p> <p>2) Techniques. Each dynamic simulation technique and procedure proposed by the contractor shall be fully described. Rationale for the selection of techniques shall be given. The specific contributions of each technique to human engineering analysis, design support and test and evaluation shall be stated. Previous efforts conducted by the contractor or others to validate each proposed technique shall be described, including a discussion of results.</p> <p>3) Activities. The intended use of each dynamic simulation technique shall be described with regard to each of the following:</p> <p>a) human performance and workload analysis, test and demonstration.</p> <p>b) system design development, test and demonstration.</p>		

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DI-H-7052

10. PREPARATION INSTRUCTIONS (continued)

- c) system effectiveness studies, tactics development and verification
- d) development and verification of operator skill, knowledge and other training data.
- e) operator procedures development and verification, including degraded mode and emergency procedures.
- f) training equipment design and verification studies
- g) development and verification of technical publications

4) Organization and Personnel. The plan shall identify and describe the contractor organizational elements responsible for executing the Human Engineering Dynamic Simulation Plan. Structural definition shall include the number of proposed personnel, level of effort (in man-months) and the functions of key personnel. The relationships between responsible organizational elements shall be described. The authority delegated to each element shall be stated in explaining the relationship.

5) Schedule. A detailed schedule shall be prepared. Compatibility between the simulation schedule and the release of program analyses, design and test products for each area of utilization described in paragraph 3) above shall be described. Facility and special requirements (per paragraph (7) below) shall be indicated on the schedule.

6) Data. Data acquisition procedures and techniques, types of qualitative and quantitative data to be obtained and data analysis techniques shall be fully described. The plan shall state that simulation results shall be described in Human Engineering Progress Reports (DI-H-7059).

7) Facilities and Special Requirements. Dynamic simulation facilities shall be described. Any requirements to utilize government facilities, models, data or other government property shall be identified. If the contractor requires participation by government personnel (e.g., as subjects in simulation studies), appropriate information shall be provided - such as number and qualifications of personnel, desired level of participation and schedule of participation.

8) Scenarios and Mission Descriptions. The scenarios and missions to be simulated shall be described. Information on mission objectives, geography, threats, weather conditions, or any other data relevant to system simulation shall be presented.

10.2 Format Requirements. The Human Engineering Dynamic Simulation Plan shall be prepared in contractor format.

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DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
1. TITLE	AGENCY	NUMBER
Human Engineering Test Plan 3. DESCRIPTION/PURPOSE This plan details the proposed testing to demonstrate that the personnel-equipment/software combination can accomplish the intended operation and maintenance functions in accordance with system specifications. This plan serves as the principal means of planning for validating human performance requirements, accuracy of personnel selection criteria, adequacy of training, and acceptability of design of the personnel-equipment/software interface.	4. APPROVAL DATE 1 June 1979	DI-H-7053
7. APPLICATION/INTERRELATIONSHIP This DID is related to DI-H-7051, Human Engineering Program Plan, DI-H-7055, Critical Task Analysis Report and DI-H-7058, Human Engineering Test Report. This DID replaces DI-H-1313 and DI-H-2105. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.3 of MIL-H-46855B.	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
10. PREPARATION INSTRUCTIONS 10.1 <u>General</u> . The Human Engineering Test Plan (HETP) shall document in detail the contractor's plan for gathering and analyzing data to show that the system, when fielded, will satisfy four criteria: 1) All human performance requirements for operations and maintenance can be performed to an acceptable level or standard under conditions of expected use; 2) the human performance requirements for operations and maintenance can be performed reliably by personnel reasonably representative of the military personnel who will ultimately perform them; 3) both the cost (in terms of all resources required) and some measure (based on human performance time and error data) of prospective effectiveness of the contractor's training program for operations and maintenance are known; and 4) the design of system hardware and software facilitates efficient, safe and accurate human performance. 10.2 <u>Content Requirements</u> . 1) Introductory information	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B MIL-STD-1472	
	MCSL NUMBER(S)	

10. PREPARATION INSTRUCTIONS (continued)

- a) Title descriptive of each test to be conducted.
- b) Identification of equipment (or concept) being tested.
- c) Statement of the task groups (or portions thereof) being reported. (A list, in sequential order, of all of the discrete performance tasks--with critical tasks identified--which will be required of each person in the system.)
- d) Purpose of tests.
- d) Objective(s) of tests (if different from subparagraph d) above).

2) Test Design. Identification of test conditions, performance measures, sample sizes, and sequence of test events.

3) Test Methods and Controls. Description of procedures to be followed in conducting each test. Explanation of how environmental variables and other factors which could affect the performance measures will be controlled or described, including where relevant:

- a) noise
- b) illumination level
- c) shock and vibration
- d) air temperature and humidity
- e) ventilation
- f) exposure to toxic or hazardous substances.

4) Test Participants. General description of the personnel population from which test participants will be selected. Identification and justification of test participant selection criteria. Identification of methods by which data describing actual test participants will be gathered, including, where relevant:

- a) age
- b) weight
- c) sex
- d) body dimensions relevant to performance tasks (paragraphs 3.1 and 5.6 of MIL-STD-1472)
- e) visual acuity

10. PREPARATION INSTRUCTIONS (continued)

- f) hearing level
- g) existence of physical disabilities
- h) educational and work experience
- i) prior experience relevant to performance tasks

5) Training of Test Participants.

- a) Description of type and amount (in hours) of system-specific pre-test training planned for test participants.
- b) Description of any end-of-training comprehension test administered to test participants before test data-gathering begins.

6) Equipment Involved.

- a) Description of mockup or equipment on which tests will be conducted (including material to be used and type of fabrication; dimensions; and cross-reference to blueprints, drawings or sketches).
- b) Identification of other, non-system equipment involved in tests (including all equipment to be worn, carried or otherwise borne on the body of test participants such as weapon, communications equipment, headgear, survival equipment, protective mask and night vision equipment).

7) Data collection. Detailed description of the instrumentation or other means which will be used to obtain raw data on each of the performance measures. Identification of forms, if any, which will be used for recording data. Description of the frequency and means by which data on environmental variables and other extraneous factors will be collected.

8) Data Reduction. Detailed descriptions of techniques to be used for transformation and combination of raw data; statistical techniques to be employed and assumptions pertaining to the use of each (e.g., normally distributed); and confidence levels selected.

9) Data Analysis. Explanation of how the data collected will be used in:

- a) human performance error analysis (e.g., "calculating operator error rate for mission-critical tasks")
- b) identifying incompatibilities among human performance and equipment

10. PREPARATION INSTRUCTIONS (continued)

- c) system safety analysis
- d) logistics and maintainability assessment(s).
- e) calculating system reliability, availability and effectiveness.

10) Test Reporting. Identification of tests for which a Human Engineering Test Report (DI-H-7058) will be prepared and tentative date(s) of initial submission.

10.3 Completeness.

This plan, if submitted incrementally to facilitate use of previous test results in planning additional tests which may be necessary, shall not be considered complete until all task groups and mission segments and their interactions have been accounted for.

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
1. TITLE	AGENCY	NUMBER
Human Engineering System Analysis Report	DOD	DI-H-7054
3. DESCRIPTION/PURPOSE This report describes the human engineering efforts conducted as part of system analysis and presents results. The data are used by the procuring activity to evaluate the appropriateness and feasibility of system functions and roles allocated to operators and maintainers.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID replaces UDI-H-21386 and UDI-H-21387. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.1 through 3.2.1.2 of MIL-H-46855B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS 10.1 <u>General</u> . The Human Engineering System Analysis Report (HESAR) shall be prepared which describes human engineering analyses of system functions, system information flow and processing requirements and operator/maintainer capabilities which are conducted to determine plausible human roles. 10.2 <u>Content Requirements</u> . The HESAR shall consist of the following information: 1) <u>System Objective(s)</u> . In accordance with information provided by the procuring activity and/or contractor studies, the system objective(s) shall be described. If the objective(s) are to be met by the system operating in conjunction with other systems not within the scope of the contract, the following shall also be described: a) The overall (or higher level) objective(s) to be met through combined operation of systems b) The sub-objective(s) to be met by the system being developed under the contract c) interactions required between systems to meet the overall objective(s). 2) <u>System Mission(s)</u> . In accordance with information provided by the pro-		

DI-H-7054

10. PREPARATION INSTRUCTIONS (continued)

curing activity and/or based upon contractor studies, the system mission(s) shall be described. The mission description(s) shall describe the context(s) within which the system will meet its objective(s); e.g., geography, mission time constraints, weather, day/night, humidity, sea state, terrain roughness, vegetation density, enemy force concentration, enemy weapons/countermeasures capabilities, enemy order of battle, presence/absence of other cooperating systems, etc.

3) System Functions. In accordance with information provided by the procuring activity and/or based on contractor studies, the system functions (which must be performed to meet the system objective(s) within the mission context(s)) shall be described.

4) Allocation of System Functions. Analyses conducted in accordance with paragraph 3.2.1.1 of MIL-H-46855B shall be described. Specifically, the following analyses and the results of these analyses shall be presented:

a) Information Flow and Processing (paragraph 3.2.1.1.1 of MIL-H-46855B)

b) Estimates of Potential Operator/Maintainer Processing Capabilities (paragraph 3.2.1.1.2 of MIL-H-46855B)

c) Allocation of Functions (paragraph 3.2.1.1.3 of MIL-H-46855B)

5) Equipment Identification. In accordance with information provided by the procuring activity and based upon contractor studies conducted in accordance with paragraph 3.2.1.2 of MIL-H-46855B, the selected design configuration shall be described.

10.3 Format Requirements. The HESAR shall be prepared in contractor format.

U.S. GOVERNMENT PRINTING OFFICE: 1979-603 022/9041

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S)	
	AGENCY	NUMBER
1. TITLE Critical Task Analysis Report	DOD	DI-H-7055
3. DESCRIPTION/PURPOSE This report describes the results of critical task analyses performed by the contractor to provide a basis for evaluation of the design of the system, equipment or facilities. The evaluation will verify that human engineering technical risks have been minimized and that solutions are in hand.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID replaces DI-H-2109 and DI-H-7012. This DID is primarily applicable to a portion of the work tasks delineated in paragraph(s) 3.2.1.3.1 and 3.2.1.3.2 of MIL-H-46855B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B	
	MCSL NUMBER(S)	
1. PREPARATION INSTRUCTIONS 10.1 This report shall describe and analyze each critical task, including: <ol style="list-style-type: none"> 1) Information required by/available to personnel which is relevant to the critical task assigned to them. 2) Actions which each performer must complete to accomplish the critical task, including responses to specific information, responses to combinations of information, and self-initiated responses. 3) The functional consequences of each operator or maintainer critical task with respect to the effects upon both the immediate subsystem functions and the overall system mission. 10.2 The report shall also include, for each critical task, the factors described by paragraph 3.2.1.3.2 (1) through (20) of MIL-H-46855B. 10.3 The task analysis information shall be presented in one or more of the following formats, as appropriate. However, the same information shall not be presented twice, regardless of form. 1) <u>Flow Diagrams</u> . Used primarily to describe the sequential, parallel or interactive relationships of human tasks and equipment actions showing the relevant		

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DI-H-7055

10. PREPARATION INSTRUCTIONS (continued)

antecedents and the consequences of each operator action.

2) Tabular Presentation. Used to describe discrete units of a given task measured along a time-base or other quantitative performance criteria. This mode of presentation may be used to show a level of detail that cannot be encompassed in the flow diagrams.

3) Narrative Description. Used to describe tasks which can be satisfactorily accomplished by any of a number of optional procedures which may be chosen by the operator. Such description shall specify the concepts and objectives of the task to be performed rather than the concrete procedures to be employed.

★U.S. GOVERNMENT PRINTING OFFICE: 1979-603-922/9042

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
	AGENCY	NUMBER
1. TITLE Human Engineering Design Approach Document-Operator	DOD	DI-H-7056
3. DESCRIPTION/PURPOSE 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.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DOC REQUIRED	
7. APPLICATION/INTERRELATIONSHIP This DID replaces DI-H-2107, DI-H-3261A, DI-H-4605, UDI-H-21272 and UDI-H-21385. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.1.2, 3.2.1.3, 3.2.1.4, and 3.2.2 of MIL-H-46855B.	8. APPROVAL LIMITATION	
	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B MIL-STD-1472	
		MCSL NUMBER(S)
10. PREPARATION INSTRUCTIONS		
<p>10.1 <u>General</u>. The Human Engineering Design Approach Document - Operator (HEDAD-0) shall be prepared which describes the layout, detail design and arrangement of crew station equipment having an operator interface; it shall also describe operator tasks associated with the equipment. The HEDAD-0 shall describe the extent to which the human performance requirements, MIL-STD-1472 and other applicable human engineering documents specified in the contract have been incorporated into the layout, design and arrangement of equipment having an operator interface. Operator task analysis results shall be presented as part of the rationale supporting the layout, design and integration of crew station equipment.</p> <p>10.2 <u>Content Requirements</u>. HEDAD-0 shall consist of the following crew station and operator-related information:</p> <p>1) 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.</p> <p>2) List of specifications and drawings approved by human engineering at the time of HEDAD-0 preparation. When contractually required to prepare and submit the HEDAD-0 early in the development process, the list shall also address documents where human engineering approval is planned.</p>		

10. PREPARATION INSTRUCTIONS (continued)

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

a) Layout and Arrangement. One sketch, drawing or photograph of the (each) crew station shall be provided. 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 be provided; the point of reference shall be normal to the item of equipment and scale shall be indicated.

b) 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).

c) 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.

d) Environmental Factors. Operator life support systems, protective clothing and equipment, noise, vibration, radiation, temperature, ambient illumination, climatic effects and other relevant environmental parameters shall be described.

e) Ingress/Egress. Normal and emergency ingress and egress provisions/procedures shall be described.

f) Crew Station Lighting. Lighting characteristics and lighting control systems shall be described.

g) Crew Station Signals. 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.

h) Operator Posture Control. Seating, restraint systems and other postural control techniques shall be described.

i) Communications Systems and Communications Systems Control.

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

10. PREPARATION INSTRUCTIONS (continued)

k) Multiple operator stations design, if applicable. Rationale for number of operators, arrangement of operators and allocation of functions to the operators shall be described.

4) Geometric layout of the crew station(s). 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.

5) Rationale for human engineering design, layout and arrangement of each item of crew station equipment having an operator interface. 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, other human engineering requirements specified in the contract, system engineering analyses, systems analyses, human engineering studies, trade-off analyses, mock-up results, simulation results and human engineering test results).

6) Operator task analysis (see paragraph 6.2.5 of MIL-H-46855B) results 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 (i.e., time and error) against which task analysis results are compared; and operator assumptions (e.g., level of skill, training). Critical tasks (see paragraph 6.2.1 of MIL-H-46855B) shall be clearly identified.

7) Narrative which provides rationale for any need to deviate from, or take exception to, MIL-STD-1472 or other contractual human engineering documents.

8) Sketches, drawings or photographs of each item of equipment being considered as alternatives or changes to the selected (baseline) crew station design.

9) Design, arrangement or layout changes made since the last HEDAD-0 preparation shall be described.

10.3 Format Requirements. Contractor format shall be utilized.

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
	AGENCY	NUMBER
1. TITLE Human Engineering Design Approach Document-Maintainer	DOD	DI-H-7057
3. DESCRIPTION/PURPOSE This document provides a source of data to evaluate the extent to which equipment having an interface with maintainers meets human performance requirements and human engineering design criteria.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DOC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID replaces DI-H-2108 and UDI-H-21385. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.1.2, 3.2.1.3, 3.2.1.4, and 3.2.2 of MIL-H-46855B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B MIL-STD-1472	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS		
<p>10.1 <u>General</u>. The Human Engineering Design Approach Document - Maintainer (HEDAD-M) shall be prepared which describes the characteristics, layout, and installation of all equipment having a maintainer interface (excluding depot level maintenance actions); it shall also describe maintainer tasks associated with the equipment. The HEDAD-M shall describe the extent to which the requirements of MIL-STD-1472 and other applicable human engineering documents specified in the contract have been incorporated into the design, layout, and installation of equipment having a maintainer interface. Maintainer task analysis results shall be presented as part of the rationale supporting the layout, design and installation of the equipment. The requirement for this information is predicated on the assumption that, as analytic and study information, it is developed sufficiently early to influence the formulation of other system data such as maintenance allocation charts, special repair parts/tool lists, LSAR data. If the program has progressed to the point where the required data is available through other reporting media, such as those noted above, 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.</p> <p>10.2 <u>Content Requirements</u>. The HEDAD-M shall consist of the following information:</p> <p>1) List of each item of equipment having a maintainer interface at the Organizational and Field/Intermediate Maintenance Activity (IMA) level, a brief statement</p>		

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10. PREPARATION INSTRUCTIONS (continued)

of the purpose of each item of equipment and the types of maintenance required on each item of equipment (e.g., troubleshoot, remove, inspect, test, repair).

2) List of specifications and drawings approved by human engineering at the time of HEDAD-M preparation. The list shall also address documents where human engineering approval is planned.

3) Description of system equipment, emphasizing human engineering design features. The following aspects of equipment shall be described:

a) Layout of System Equipment. (1) The location and layout of all system equipment requiring maintenance shall be described with emphasis on human engineering features which facilitate maintenance. Equipment located in areas assessed through common doors, panels, openings, etc., shall be indicated. (2) The location of each item of equipment shall also be noted in terms of three-dimensional space (i.e., X, Y, and Z coordinates); the reference point for each item of equipment shall be its center as viewed by the maintainer while gaining access to the equipment.

b) Design of Equipment. The design of each item of equipment shall be described with emphasis on human engineering features which facilitate maintenance such as handles, self-test capability, labeling, connector spacing and keying.

c) Installation of Equipment. The installation of each item of equipment shall be described with emphasis on human engineering features which facilitate maintenance such as fasteners, clearances, relationship between accessibility and failure rate (or scheduled maintenance frequency) of each item of equipment and visual access afforded.

4) Rationale. The specific considerations of equipment maintenance requirements (e.g., frequency, criticality, equipment failure rate), maintainer requirements (e.g., personnel selection, training and skills), maintainer task requirements, environmental considerations, safety and limitations imposed by the procuring activity or state-of-the-art shall be described. The bases for reaching specific design, layout and installation decisions shall be presented (e.g., MIL-STD-1472 criteria, other human engineering requirements specified in the contract, human engineering studies, trade-off analyses, mock-up results and human engineering test results).

5) List of special tools, support equipment, job aids/devices required for maintenance of each item of equipment.

6) Maintainer task analysis results presented as part of the rationale supporting layout, design, and installation of item of equipment. Maintainer task analyses shall consist of the following:

10. PREPARATION INSTRUCTIONS (continued)

task number, task title, task frequency (for scheduled maintenance actions) or estimated task frequency (based on equipment mean-time-between-failure for unscheduled maintenance actions), data source used (e.g., drawing number, sketch number, development hardware, actual production equipment), detailed task sequence (see paragraph 6.2.5 of MIL-H-46855B), support equipment required, tools required, job aids required, estimated task time, estimated personnel requirements (e.g., number of personnel required, skills and knowledge required) and human engineering considerations which reflect specific human engineering requirements incorporated into the design (e.g., maintainer fatigue, potential hazards, safety or protective clothing/equipment required or recommended, access problems, maintainer communication requirements, special task sequence requirements, labeling). As applicable, the following types of maintainer tasks shall be addressed by task analyses: remove/replace, trouble-shoot (fault location), repair, adjust, inspect, service and test. Critical tasks (see paragraph 6.2.1 of MIL-H-46855B) shall be clearly identified.

7) Narrative which provides rationale for any need to deviate from, or take exception to, MIL-STD-1472 or other contractual item human engineering requirements.

8) Two sketches, drawings or photograph of each of equipment having a maintainer interface. Each item of equipment shall be depicted, a) by itself from top, front and side (three-view trimetric or exploded trimetric view) and b) installed as the maintainer would normally view it during maintenance.

9) Sketches, drawings or photograph of each item of equipment being considered as alternatives to the selected, or baseline design. Sketches, drawings or photographs of alternative equipment installations or layouts which exist at the time of HEDAD-M preparation.

10) Description of design, installation or layout changes which have been made since the last HEDAD-M submission.

10.3 Format and Data Organization Requirements. The HEDAD-M be prepared in contractor format except that information shall be presented in two major parts:

1) Information pertaining to maintenance actions performed at the Organizational Level.

2) Information pertaining to maintenance actions performed at the Field/IMA level.

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
	AGENCY	NUMBER
1. TITLE Human Engineering Test Report	DOD	DI-H-7058
3. DESCRIPTION/PURPOSE This report provides evidence that the personnel-equipment/software interface requirements for the operation, maintenance and support of the system have been met. This report serves as the principal means of assessing the compatibility of the human performance requirements, personnel selection criteria, training program and design of the personnel-equipment/software interfaces.	4. APPROVAL DATE 1 June 1979	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID is related to DI-H-7051, Human Engineering Program Plan, DI-H-7053, Human Engineering Test Plan, and DI-H-7055, Critical Task Analysis Report. This DID replaces DI-H-1334A and DI-H-2111. This DID is primarily applicable to work tasks delineated in paragraph(s) 3.2.2.4 and 3.2.3 of MIL-H-46855B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B MIL-STD-1472	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS 10.1 <u>General</u> . A Human Engineering Test Report (HETR) shall be prepared by the contractor for each personnel position in the system being developed. All of the operations and maintenance tasks required of the individual assigned to a personnel position are referred to as the "task group" of that position. 10.2 <u>Content Requirements</u> . 1) Introductory Information a) Specific title of test b) Identification of equipment or concept being tested c) Specific purpose of this test d) Objectives of this test (if appropriate, stated in terms of hypotheses to be tested) e) Date(s), location(s), and name(s) of individual(s) present and supervising the conduct of the test.		

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BLOCK 3, DESCRIPTION/PURPOSE (Continued)

This report will be used to determine whether and to what level or standard(s) each trained individual can perform in the specified sequence all assigned systems tasks; to determine whether and to what extent each individual's performance is affected by equipment configuration, the performance of other system personnel, or both; and to assess the impact of the measured human performance on the attainment of task, task group, and mission requirements.

BLOCK 10, PREPARATION INSTRUCTIONS (Continued)

f) for each task group or portion thereof reported, a list of all the discrete tasks and a brief description of the operational environment in which they are to be performed when the system is deployed.

2) Description of Test Methods and Controls

a) Statement of (or reference to) any human performance standards (e.g., "0.9 probability of operator launching missile within 10 seconds after detecting target") or assumed contribution to error (e.g., "aiming error less than 3 mils") contained in system development documents. If none, so state.

b) Description of environment at each distinct location of human performance. (Include noise and illumination levels, shock and vibration, air temperature and humidity, and ventilation. Also, state the concentration of and test participant exposure time to any toxic or hazardous substances; and state whether that exposure was or was not within the applicable safety limits for each substance.)

c) Description of test participants. For each participant, where relevant, state age, weight, body dimensions applicable to performance tasks (see paragraphs 3.1 and 5.6, MIL-STD-1472), visual acuity and hearing levels, any known physical disabilities, and educational and work experience.

d) Description of individual clothing and equipment (including all clothing and equipment worn, carried or otherwise borne on the body, such as weapon, communications equipment, headgear and protective mask).

e) Type and amount (in hours) of system-specific pre-test training (differentiating "hands on" practice from other training) given to test participants; and type, content and results of training assessment used. Also, state time intervals between end of training, training assessment and start of tests being reported.

10. PREPARATION INSTRUCTIONS (continued)

f) Description of mockup or equipment on which test is conducted (including material used and type of fabrication; dimensions; and cross-reference to blueprints, drawings or sketches).

g) Identification of deviation(s) during the test from conditions of expected use (subparagraph 1b(1)(f) above); narrative explanation of reason(s) for deviation(s), and presumed effect(s) of such deviation(s) on the validity of generalizations from test data.

3) Data Collection Techniques

a) Identification of the quantitative and qualitative measures of both human and system performance.

b) Description of methods, procedures and instrumentation used in data collection.

c) Description of techniques used for data reduction, statistical techniques employed, and confidence levels selected.

4) Results

a) Summaries of quantitative human and system performance data.

b) Summaries of qualitative data (including questionnaires, interviews, checklists, etc.).

5) Description of Human Performance Errors

a) Narrative description, with photograph(s) if appropriate, of each error. Include frequency of occurrence of each error during test.

b) Consequence (brief statement of the immediate effect of the error on system operation).

c) Causes (isolation of the immediate cause of each actual performance error and identification of the events, conditions, operator workload, environmental factors and equipment configurations which may have contributed to it).

d) Explanation by participants making errors of the reasons for the errors.

e) Recommended solutions (stated in terms of equipment redesign, alteration of tasks, personnel selection and/or training). Provide rationale.

10. PREPARATION INSTRUCTIONS (continued)

6) Description of Incompatibilities Among Human Performance and Equipment.

a) Identification

1. During the test what tasks of one task group interfered with the performance of which tasks of another task group? If none, so state.

2. During the test what human performance was adversely affected by what equipment configurations or characteristics? (Identify controls and/or displays needed but not present). If none, so state.

b) Recommended solutions (stated in terms of equipment redesign, alteration of tasks, personnel selection and/or training). Provide rationale.

7) Description of Observed Safety Hazards.

a) Narrative description, with photograph(s) if appropriate, of each safety hazard identified during the test. If none, so state.

b) Frequency each hazard was encountered by test participants.

c) Severity and consequence of each hazard.

d) Recommended action to eliminate or minimize hazard (stated in terms of equipment redesign, alteration of tasks, personnel selection and/or training). Provide rationale.

8) Analysis of Impact of Human Performance on Attainment of System Performance Goals.

a) Statement of (or reference to) system performance goals.

b) Narrative explanation of reasons why any human performance tasks required by present equipment design are not feasible; or why any standards presently set for specific human performance tasks are unattainable. (If all human performance requirements are feasible and any standards set appear to have been met, so state).

c) Narrative explanation of how measured human performance times and errors in operations and maintenance can affect system reliability and availability.

d) Narrative explanation of how measured human performance times and error frequencies and magnitudes can affect system effectiveness.

10. PREPARATION INSTRUCTIONS (continued)

e) Narrative explanation of how system performance goals would be affected by implementing the solutions recommended in subparagraphs (5), (6) and (7) above.

9) Conclusions

a) Summary of major findings from test.

b) Implications of major findings (including anticipated effects on system reliability, availability and effectiveness).

10) List of recommended changes to equipment configuration, human performance tasks, personnel selection and/or training (in order of decreasing importance) with indication of government or contractor organizations responsible for implementing recommended actions.

DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S).	
1. TITLE	AGENCY	NUMBER
Human Engineering Progress Report	DOD	DI-H-7059
3. DESCRIPTION/PURPOSE This report describes status of the contractor's human engineering program. Each report is used to transmit human engineering progress, problems, and plans for each succeeding reporting period. These reports provide evidence that human engineering considerations are reflected in system design and development and indicate compliance with contractual requirements for human engineering.	4. APPROVAL DATE 1 June 1975	
	5. OFFICE OF PRIMARY RESPONSIBILITY ARMY/MIRADCOM	
	6. DDC REQUIRED	
	8. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP This DID replaces DI-H-1314 and DI-H-2110. This DID is primarily applicable to work tasks delineated in paragraph(s) 1.1, 3.1.2, and 3.3 of MIL-H-46855B.	9. REFERENCES (MANDATORY AS CITED IN BLOCK 10) MIL-H-46855B	
	MCSL NUMBER(S)	
10. PREPARATION INSTRUCTIONS 10.1 <u>General</u> . The Human Engineering Progress Report shall describe progress and activity in sufficient detail to demonstrate that human engineering considerations are reflected in systems analyses (or systems engineering analyses where required), system design and development, and system test and evaluation. Progress reports shall be concise and shall not unnecessarily repeat previously reported material. Changes may be indicated by reference to past reports rather than by duplication of an entire set of data, information or plans. Where detailed data are furnished by other reporting media, they shall be referenced by, rather than included in, the progress report; however, general summary information, reflecting results of efforts germane to reported progress, shall be included. 10.2 <u>Content Requirements</u> . The following information shall be presented: <ol style="list-style-type: none"> 1) Summary and current status of all human engineering activity. 2) Summary and status of all human engineering design recommendations and action items. 3) Summary of human engineering participation in design reviews and program reviews. 		

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10. PREPARATION INSTRUCTIONS (continued)

4) Summary results of human engineering analyses, studies, experiments, mock-up evaluations, simulation activities, tests and demonstrations.

5) Results of projects which involved human engineering participation (e.g., trade-off studies). Other documentation reflecting changes to system design which affect man-machine interface shall be appended to the report as needed.

6) Deviations from the Human Engineering Program Plan (DI-H-7051) currently being requested.

10.3 Format Requirements. Human Engineering Progress Reports shall be prepared in contractor format except that separate sections shall address each of the following areas:

1) Work accomplished this reporting period. This section shall address tasks begun, completed or in progress; significant results of completed tasks; end item products completed and available for review; unusual conclusions that may portend modification to future activities.

2) Work planned for next reporting period. This section shall address tasks that will be commenced or completed.

3) Problems. This section shall identify specific problems which occurred during the reporting period or are anticipated to occur during the next reporting period. Effects of problems on other tasks, schedules, costs or program scope shall be indicated. Proposed solutions shall be presented.

4) Actions required of the procuring activity. This section shall identify special requirements or problems wherein procuring activity assistance is or may be required.

5) Appendix. This section shall present reports, project notes, drawings or other documentation required to ensure completeness of the progress report.

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DATA ITEM DESCRIPTION	2. IDENTIFICATION NO(S)	
	AGENCY	NUMBER
1. TITLE Noise Measurement Report	Army	DI-H-1336
3. DESCRIPTION/PURPOSE 3.1 The Noise Measurement Report provides data on the following noise measurements conducted on materiel: a. Steady State Noise, Personnel-Occupied Areas (Ref para 10.2). b. Aural Non-Detectability (Ref para 10.3). c. External Noise (Acceleration, Drive-by, Stationary) (Ref para 10.4). d. Impulse Noise, Personnel-Occupied Areas (Ref para 10.5).	4. APPROVAL DATE 80 JUL 29	
	5. OFFICE OF PRIMARY RESPONSIBILITY DARCOM/MICOM	
	6. ODC REQUIRED	
	5. APPROVAL LIMITATION	
7. APPLICATION/INTERRELATIONSHIP 7.1 The Noise Measurement Report is applicable when MIL-STD-1474B "Noise Limits for Army Materiel" is contractually imposed. 7.2 In order to provide the data required by this Data Item Description, the procuring activity may be required to provide the contractor with specific information on equipment/vehicle operating conditions. (e.g., Ref paras 10.2.1.1, 10.2.3.1 and 10.3.2).	9. REFERENCES (Mandatory as cited in block 10) MIL-STD-1474B	
	MCBI NUMBER(S) OMB EXEMPT AMSC No. A3115	
10. PREPARATION INSTRUCTIONS 10.1 <u>Format</u> . The Noise Measurement Report shall be in the contractor's format unless otherwise specified in the contract. 10.1.1 <u>General</u> . The Noise Measurement Report shall provide all the applicable data required by para 5.5 of MIL-STD-1474B and shall provide the following noise measurement data: 10.2 <u>Steady-State Noise, Personnel-Occupied Areas</u> . 10.2.1 <u>Measurement</u> . Data from measurements from on-site unweighted octave band analysis, A and C weighted levels and when appropriate, PSIL-4. The measurement location at each operator or crew position, representative passenger positions and occasionally occupied positions. 10.2.1.1 <u>Duty Cycle Testing</u> . Noise level (Leq*) as described in para 3.5 of MIL-STD-1474B, and the description of the test site, when the procuring activity specifies typical duty cycle testing. 10.2.1.2 <u>Noise Contours</u> . Distances and directions from the noise source at which the noise level is 85dB(A) is required when the noise level of the source has been determined to be 85dB(A) of greater. 10.2.2 <u>Operating Conditions for System Testing</u> . The operating conditions for tests including the identification of subsystems and auxiliary equipment operating concurrently.		

10. PREPARATION INSTRUCTIONS (continued)

10.2.3 Mobile Equipment Testing

10.2.3.1 Vehicles. Noise data measured at two-thirds rated engine speed or two-thirds posted vehicle speed (in the highest gear), as specified by the procuring activity and noise data for all gears at the specified operating condition. Noise levels for load-carrying equipment and Army tactical trucks for conditions of two-thirds maximum load and two-thirds off-highway payload, respectively and the identification of auxiliary equipment operating concurrently.

10.2.3.2 Off-Road Construction and Materials-Handling Equipment. Noise levels, equipment speed, load and test site surface.

10.2.3.3 Watercraft. Noise levels, craft speed and water surface conditions.

10.2.4 Stationary Equipment Testing. Noise data, operating speed, operating load and list of auxiliary equipment operating during the test.

10.2.5 Test Environment and Instrumentation

10.2.5.1 Test Environment. Description of test site, identifying the locations of potential reflecting surfaces, the background noise level at time of test, location of test personnel and the use of windscreens, as applicable. For vehicle tests, road surface conditions and grade. Ambient weather conditions: Temperature, humidity and barometric pressure.

10.2.5.2 Instrumentation. A list of instrumentation per para 5.5 of MIL-STD-1474B and the calibration values before and after each test sequence.

10.2.6 Contingency Reporting. Where measurement has shown that system noise is greater than the limits of Category D, Table 2 of MIL-STD-1474B, evidence that reduction of the levels to meet Category D is clearly beyond the state of the art shall be reported. The sequence of events specified in para 5.1.1.2 of MIL-STD-1474B shall be followed and subsequent analyses relative to the applications of Category C or Category A shall be reported as applicable.

10.3 Aural Non-Detectability

10.3.1 Measurement. Data from measurements from on-site unweighted octave band analysis including the measurement location relative to the ground and the noise source.

10.3.2 Operating Conditions for Equipment Testing. The operating conditions of the equipment, which shall be specified by the procuring activity.

10.3.3 Test Environment and Instrumentation

10.3.3.1 Test Environment. The description of the test site, identifying the locations of potential reflection surfaces, the background noise level at time of test and the location of test personnel. Ambient weather conditions: Temperature, humidity, barometric pressure and wind velocity and direction.

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10. PREPARATION INSTRUCTIONS (continued)

10.3.3.2 Instrumentation. A list of instrumentation per para 5.5 of MIL-STD-1474B and the calibration values before and after each test sequence.

10.4 Exterior Noise (Acceleration, Drive-by, Stationary)

10.4.1 Measurements. Noise level data from measurements specified in Table 4, Sound Level Limits and Test Procedures for Exterior Noise, of MIL-STD-1474B and the measurement locations, as specified in the applicable SAE Standard from Table 4.

10.4.2 Operating Conditions for Equipment Testing. The operating conditions of the equipment being tested, as specified by applicable SAE Standard from Table 4 of MIL-STD-1474B.

10.4.3 Test Environment and Instrumentation

10.4.3.1 Test Environment. The description of the test site, indentifying the location of potential reflecting surfaces, the condition of the ground surface around the test area, the path of vehicle travel, the background ambient noise level and the location of test personnel. Ambient weather conditions: Temperature, humidity and barometric pressure.

10.4.3.2 Instrumentation. A list of instrumentation per the applicable SAE Standard from Table 4 of MIL-STD-1474B and the field calibration values before and after each test sequence.

10.5 Impulse Noise, Personnel-Occupied Areas

10.5.1 Measurement. Data from measurements of peak pressure levels and B-durations and shall include pressure versus time histories of individual noise exposures. The measurement location and transducer orientation at each operator or crew position or measurement position designated by the procuring activity.

10.5.1.1 Recording. Either direct oscilloscope photography of pressure time histories or oscillograph or digital plotter pressure-time histories from an FM tape recording of the noise exposure.

10.5.1.2 Noise Contours. The distances and directions from the noise source at which the noise level is equal to 140 dB is required when the impulse noise level of the source has been determined to exceed 140 dB. The distance and directions from the noise source at which the noise level is equal to the specified impulse noise limit category (X, Y or Z), Figure 5 of MIL-STD-1474B as well as the method of determination.

10.5.1.3 Repetitive Systems. The effective B-duration, as determined per para 5.4.4.3 of MIL-STD-1474B of a repetitive system used to establish the maximum allowable peak pressure level of the system.

10. PREPARATION INSTRUCTIONS (continued)

10.5.1.4 Multi-Charge Systems. The peak pressure levels of all the charges associated with a given multi-charge system.

10.5.1.5 Ammunition Temperature. The peak pressures and B-durations from system tests at temperature extremes for rounds producing impulse noise from rapid burning propellant.

10.5.2 Test Environment and Instrumentation

10.5.2.1 Test Environment. The description of the test site, identifying the location of potential reflecting surfaces, the background noise level at time of test, the location of test personnel and operations, if present and the use of a microphone windscreen, an applicable. Ambient weather conditions: Temperature, humidity and barometric pressure.

10.5.2.2 Instrumentation. A list of instrumentation per para 5.5 of MIL-STD-1474B including specifications of pressure transducers used identifying overshoot characteristics and rise time. The transducer calibration procedures and the results of pre and post test calibration shall be provided.

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APPENDIX B
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17. SYSTEM ITEM NUMBER	20. 10. 11.	21. CONTRACTOR FILE / DOCUMENT NUMBER
18. 908 APPROVAL FORM NUMBER	20. 10. 11.	22. ESTIMATED NUMBER OF PAGES
19. RESERVED FOR ADP	20. 10. 11.	23. PRICE GROUP
22. 9 ON ADP	20. 10. 11.	24. ESTIMATED TOTAL PRICE
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19.	20.	21.
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CONTRACT VALUE		

CONTRACT DATA REQUIREMENTS LIST

1. SEQUENCE NUMBER	2. TITLE OR DESCRIPTION OF DATA	3. SUBTITLE	4. CONTRACT REFERENCE	5. TECHNICAL OFFICE			6. PREQUENCY	7. DATE OF SUBMISSION	8. DISTRIBUTION AND ADDRESSES (Indicate - Regular Copies/Specs Copies)
				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
1.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
16. REMARKS									
1.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
2.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			13. TOTAL
16. REMARKS									
1.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
2.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			13. TOTAL
16. REMARKS									
1.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
2.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			13. TOTAL
16. REMARKS									
1.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			
2.				7. 1. 2. 3.	7. 4. 5. 6.	7. 7. 8. 9. 10. 11.			13. TOTAL
16. REMARKS									
								APPROVED BY _____	
								DATE _____	

INSTRUCTIONS FOR COMPLETING DD FORM 1423

FOR GOVERNMENT PERSONNEL

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FOR THE CONTRACTOR

1. The estimated prices filled-in in Item 26 will not be separately used in evaluation of offers.

2. Each offeror may complete Items 23 and 24 in accordance with the following instructions:

Item 23. Contractor File/Documents Number - Enter bidder's or offeror's internal filing or document number, if applicable.

Item 24. Estimated Number of Pages - Enter the estimated number of pages, drawings, etc., for single preparation.

3. Each offeror shall complete Items 25 and 26 in accordance with the following instructions (this does not apply to advertised contracts or to negotiated contracts under \$100,000).

Item 25. Price Group - Contractors shall specify one of the four following groups of effort in developing estimated prices for each item of data listed on the DD Form 1423

a. Group I. Definition - Data which is not otherwise essential to the contractor's performance of the primary contracted effort (production, development, testing, and administration) but which is required by DD Form 1423.

Estimated Price - Costs to be considered under Group I are those applicable to preparing and assembling the data item in conformance with Government requirements, and the administrative and other expenses related to reproducing and delivering such data items to the Government.

Example for Group I - A technical manual prepared for military use only. The estimated price of the manual would be noted on the DD Form 1423 exclusive of cost for any of the manual material that had been generated for other purposes (e.g., drawings used both for production and as illustrations in the manual).

b. Group II. Definition - Data which is essential to the performance of the primary contracted effort but the contractor is required to perform additional work to conform to Government requirements with regard to depth of content, format, frequency of submittal, preparation, control or quality of the data item.

Estimated Price - Costs to be considered under Group II are those incurred over and above the cost of the essential data item without conforming to Government requirements, and the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group II - In the case of MIL-D-1000 Form I drawings (drawings to military standards), the estimated price of the data item begins only after the engineering and manufacturing information has been developed and the final form original drawings have been initiated. The estimated price shall not include the cost of configuration control, but shall include any additional quality assurance and control of the drawings but not related to engineering configuration control. Not to be considered is "design effort" expended on layout drawings and other data which serve principally as a medium for developing design and are not used in manufacture, production or test of the end item.

c. Group III. Definition - Data which the contractor must develop for his internal use in performance of the primary contracted effort and does not require any substantial change to conform to Government requirements with regard to depth of content, format frequency or submittal, preparation, control and quality of data.

Estimated Price - Costs to be considered under Group III are the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group III - A drawing prepared to Form 2 or 3 of MIL-D-1000 (drawings to company standards) which had been used in the manufacturer's normal plant activities.

d. Group IV. Definition - Data which is developed by the contractor as part of his normal operating procedures and his effort in supplying these data to the Government is minimal.

Estimated Price - Group IV items should normally be shown on the DD Form 1423 at no cost.

Example for Group IV - A brochure or short manual used in a company's normal commercial business, that is acquired by the Government in such small quantities that cost of determining a charge would not be practical.

Item 26. Estimated Total Price.

a. For each item of data listed, the bidder or offeror shall enter an amount equal to that portion of the total price which is estimated to be attributable to the production or development for the Government of that item of data. These estimated data prices shall be developed only from those costs which will be incurred as a direct result of the requirement to supply the data, over and above those costs which would otherwise be incurred in performance of the contract if no data were required.

b. The estimated data prices shall not include any amount for rights in data. The Government's right to use the data shall be governed by the pertinent provisions of the contract.

APPENDIX C
TAILORING POLICY AND GUIDANCE

TAILORING POLICY AND GUIDANCE

Per AR 700-70 (Application of Specifications, Standards, and Related Documents in the Acquisition Process), dated 15 May 1983, specifications, standards, and related documents must be selectively applied and tailored to impose the optimum set of essential requirements. As amplification of this policy, application and tailoring are defined as follows:

Application - The process of selecting, tailoring, and reviewing specifications, standards, and related documents applicable to a particular acquisition and contractually evoking them, completely or tailored, at the most advantageous time in the acquisition.

Tailoring - The process by which individual requirements (sections, paragraphs, sentences, words) of the selected specifications, standards, and related documents are evaluated to determine the extent to which they are applicable for a specific acquisition....

For all documents except DIDs, there are two accepted methods of contractually evoking tailored requirements. The first is to specify individual requirements by direct citation, e.g., MIL-STD-1472, Sections 1, 3, 4, 5.1, 5.2, etc. The second is to specify whole documents excluding certain parts, e.g., MIL-STD-1472 except Sections 2, 5.10, 5.12, etc. While direct citation is considered to be the most effective method, tailoring by exclusion is appropriate when only a small percentage of the source document has been determined to be not applicable.

For data, tailoring of requirements shall consist only of the exclusion of those sections, paragraphs, sentences, or words in Section 10, Preparation Instructions, of the DID which have been determined to be not applicable. Such tailoring is physically accomplished by lining out those parts of the DID which are not to be contractually evoked. Further, when a DID has been tailored, this fact must be noted in Block 4 of the affected DD Form 1423, and a copy of the tailored DD Form 1664 must be appended to the CDRL.

As a final amplifying note, it is totally improper to add to or modify requirements of a DID. While you may have personal knowledge of this practice having been used in the past, and maybe even successfully, it is extremely important to know that the contractor has no legal obligation to respond to added or modified DID requirements and is completely aware of that fact.

If you have a legitimate need for data that cannot be obtained using existing DIDs, procedures exist for effecting new ones. However, preparing and staffing a new DID involves a lot of work and takes a relatively long time. A better, quicker, and equally effective approach is to simply specify the requirement(s) in the SOW section of the contract solicitation.

APPENDIX D
SAMPLE DD FORMS 1423

ATCH NR TO EXHIBIT		CONTRACT DATA REQUIREMENTS LIST										SYSTEM/ITEM	
TO CONTRACT/PR		CATEGORY H										CONTRACTOR	
1. SEQUENCE NUMBER	2. TITLE OR DESCRIPTION OF DATA	3. SUBTITLE	4. CONTRACT REFERENCE	5. AUTHORITY (Date from Number)	6. TECHNICAL OFFICE	7. DDD FORM NO. (A) (B)	8. DDD CODE (A) (B)	9. LT A	10. FREQUENCY	11. AS OF DATE	12. DATE OF 1ST SUBMISSION	13. DATE OF SUBSEQUENT SUBM/EVENT ID	14. DISTRIBUTION AND ADDRESSES (Address - Regular Copies/Info Copies)
1.	2. Human Engineering Program Plan				SLCCE-XX				ONE/R		See Block 16		14. SLCCE-XX 1/0
2.	DI-H-7051				LT A				See Block 16				
16. REMARKS Draft to be submitted ___ DAC. Government requires ___ days for review. Final to be submitted ___ days after receipt of Government comments.													
1.	2. Human Engineering Test Plan				SLCCE-XX				ONE/R		See Block 16		14. SLCCE-XX 1/0
2.	DI-H-7053				LT A				See Block 16				
16. REMARKS Draft to be submitted ___ days prior to ___ Government requires ___ days for review. Final to be submitted ___ days after receipt of Government comments.													
1.	2. Human Engineering Test Report				SLCCE-XX				ONE/R		See Block 16		14. SLCCE-XX 1/0
2.	DI-H-7058				LT A				See Block 16				
16. REMARKS Draft to be submitted ___ days after completion of HFE testing. Government requires ___ days for review. Final to be submitted ___ days after receipt of Government comments.													
1.	2. Human Engineering Progress Report ("Stand Alone" option)				SLCCE-XX				TBD		90 DAC		14. SLCCE-XX 1/0
2.	DI-H-7059				LT				0				
16. REMARKS													
PREPARED BY												DATE	APPROVED BY
												15. TOTAL	DATE

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FOR THE CONTRACTOR

1. The estimated prices filled-in in Item 26 will not be separately used in evaluation of offers.
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Item 23. Contractor File/Document Number - Enter bidder's or offeror's internal filing or document number, if applicable.

Item 24. Estimated Number of Pages - Enter the estimated number of pages, drawings, etc., for single preparation.

3. Each offeror shall complete Items 25 and 26 in accordance with the following instructions (*this does not apply to advertised contracts or to negotiated contracts under \$100,000*)

Item 25. Price Group - Contractors shall specify one of the four following groups of effort in developing estimated prices for each item of data listed on the DD Form 1423.

a. Group I. Definition - Data which is not otherwise essential to the contractor's performance of the primary contracted effort (*production, development, testing, and administration*) but which is required by DD Form 1423.

Estimated Price - Costs to be considered under Group I are those applicable to preparing and assembling the data item in conformance with Government requirements, and the administrative and other expenses related to reproducing and delivering such data items to the Government.

Example for Group I - A technical manual prepared for military use only. The estimated price of the manual would be noted on the DD Form 1423 exclusive of cost for any of the manual material that had been generated for other purposes (*e.g., drawings used both for production and as illustrations in the manual*).

b. Group II. Definition - Data which is essential to the performance of the primary contracted effort but the contractor is required to perform additional work to conform to Government requirements with regard to depth of content, format, frequency of submittal, preparation, control or quality of the data item.

Estimated Price - Costs to be considered under Group II are those incurred over and above the cost of the essential data item without conforming to Government requirements, and the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group II - In the case of MIL-D-1000 Form I drawings (*drawings to military standards*), the estimated price of the data item begins only after the engineering and manufacturing information has been developed and the final form original drawings have been initiated. The estimated price shall not include the cost of configuration control, but shall include any additional quality assurance and control of the drawings but not related to engineering configuration control. Not to be considered is "design effort" expended on layout drawings and other data which serve principally as a medium for developing design and are not used in manufacture, production or test of the end item.

c. Group III. Definition - Data which the contractor must develop for his internal use in performance of the primary contracted effort and does not require any substantial change to conform to Government requirements with regard to depth of content, format frequency or submittal, preparation, control and quality of data.

Estimated Price - Costs to be considered under Group III are the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group III - A drawing prepared to Form 2 or 3 of MIL-D-1000 (*drawings to company standards*) which had been used in the manufacturer's normal plant activities.

d. Group IV. Definition - Data which is developed by the contractor as part of his normal operating procedures and his effort in supplying these data to the Government is minimal.

Estimated Price - Group IV items should normally be shown on the DD Form 1423 at no cost.

Example for Group IV - A brochure or short manual used in a company's normal commercial business, that is acquired by the Government in such small quantities that cost of determining a charge would not be practical.

Item 26. Estimated Total Price.

a. For each item of data listed, the bidder or offeror shall enter an amount equal to that portion of the total price which is estimated to be attributable to the production or development for the Government of that item of data. These estimated data prices shall be developed only from those costs which will be incurred as a direct result of the requirement to supply the data, over and above those costs which would otherwise be incurred in performance of the contract if no data were required.

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Estimated Price - Costs to be considered under Group II are those incurred over and above the cost of the essential data item without conforming to Government requirements, and the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group II - In the case of MIL-D-1000 Form I drawings (drawings to military standards), the estimated price of the data item begins only after the engineering and manufacturing information has been developed and the final form original drawings have been initiated. The estimated price shall not include the cost of configuration control, but shall include any additional quality assurance and control of the drawings but not related to engineering configuration control. Not to be considered is "design effort" expended on layout drawings and other data which serve principally as a medium for developing design and are not used in manufacture, production or test of the end item.

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Estimated Price - Costs to be considered under Group III are the administrative and other expenses related to reproducing and delivering such data item to the Government.

Example for Group III - A drawing prepared to Form 2 or 3 of MIL-D-1000 (drawings to company standards) which had been used in the manufacturer's normal plant activities.

d. Group IV. Definition - Data which is developed by the contractor as part of his normal operating procedures and his effort in supplying these data to the Government is minimal.

Estimated Price - Group IV items should normally be shown on the DD Form 1423 at no cost.

Example for Group IV - A brochure or short manual used in a company's normal commercial business, that is acquired by the Government in such small quantities that cost of determining a charge would not be practical.

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