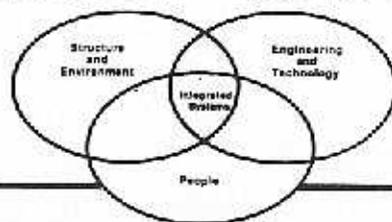




MANPRINT BULLETIN



SES Appointed to Head MANPRINT Initiative

Dr. Harold R. Booher became the Special Assistant to the ODCSPER (MANPRINT) on 7 July 1986. Dr. Booher brings over 25 years of government, industry, and academic experience to the position. His academic credentials include a BA in math and physics from DePauw University, a BS in electrical engineering from Rose-Hulman Polytechnic Institute, an MA in experimental psychology from George Washington University, and a PhD in human factors from Catholic University.

Prior to joining ODCSPER, Dr. Booher was Chief, Maintenance and Training Branch, Nuclear Regulatory Commission. In this position, he was responsible for directing programs for research, technology development, and policy analysis on personnel, training, human factors, and nuclear safety maintenance issues. Dr. Booher also has extensive human factors experience in industry and has been an engineering psychologist, a human factors officer, and a personnel research psychologist with the Department of the Navy, as well as an education research specialist with the National Highway Traffic Safety Administration.

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TRADOC Agency Develops Early Comparability Analysis (ECA) Procedural Guide

The U.S. Army Soldier Support Center, National Capital Region, has recently completed the Early Comparability Analysis (ECA) Procedural Guide, dated July 1986. The guide contains major changes from previous draft guidance and includes an ECA Resource (Time) Model which is helpful in estimating resources required to conduct an ECA.

ECA is a "lessons learned" approach to identify MANPRINT issues early in the materiel acquisition process. The Early

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DCSPER To Address Human Factors Society

The Annual Meeting of the Human Factors Society will be held at the Dayton Convention Center, Dayton, Ohio, from 29 September to 3 October 1986. LTC Robert M. Elton, Deputy Chief of Staff for Personnel, Department of the Army, will make a presentation on MANPRINT on 2 October. Highlights of his talk will be included in the October Bulletin. For more information on the meeting and registration contact: Human Factors Society, P.O. Box 1369, Santa Monica, CA 90406, Telephone: (213) 394-1811.

Dr. Booher's position was established as part of a recent reorganization of ODCSPER. Personnel formerly assigned to the MANPRINT Policy, Research, and Planning Division are now assigned to the Office of the Special Assistant to the ODCSPER (MANPRINT).

In this newly established position, Dr. Booher is responsible for representing the ODCSPER at Army System Acquisition Review Council (ASARC) meetings. In addition, he will work closely with the Army staff, major commands, and industry in implementing and institutionalizing the MANPRINT Program.

In a recent interview, Dr. Booher stated that although he has been in the job only a few weeks, he is impressed by the degree of importance being given to the needs of the soldier. When asked about his early view of his role he said, "I see my office as a developer, catalyst, and auditor of MANPRINT policy and guidance. TRADOC, AMC, OTEA, and others are the implementors. Also, we have a definite role in focusing human performance research. And we need to be a stimulus in systems integration. There is a lot of work to be done on how to integrate people systems and machine systems in this age of specialization and advanced technology."

In discussing the ASARC, Dr. Booher said that he would play an active role. He said, "The road to the ASARC provides for the identification and resolution of issues early in the process, and, that's how it should work. When it doesn't, I plan to raise the issue at ASARC." ●

Comparability Analysis methodology is based on an analysis of the operator, maintainer, and repairer tasks associated with predecessor and/or reference systems. The objectives of the ECA are to establish soldier tasks as a common language for systems design, to identify predecessor system tasks and potential new system tasks that are costly in MPT resources (i.e., "high drivers"), and to limit such high drivers in contracted design by addressing manpower, personnel, and training (MPT) in planning, requirements, and contractual documents.

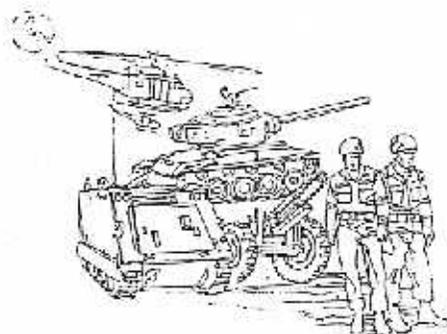
Specifically, an ECA determines which tasks associated with predecessor and/or reference systems are MPT resource-intensive. Several situations occur that can cause a task to be a high driver. Mastering a task may require an inordinate amount of training. Actual performance of the task in the field may require the services of more personnel than the unit can support. Task performance may require special skills or knowledge that are not prerequisites for entry into the particular MOS. Finally, a task may be so difficult to perform that its accomplishment is unusually prone to error.

The ECA identifies these high driver tasks so that they can be limited in or eliminated from the design of new or improved weapon systems. Information obtained from an ECA can also be used in an acquisition audit trail to support system design requirements. Finally, the ECA is

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MANPRINT: A Historical Perspective

By: John D. Weisz
Director, US Army
Human Engineering
Laboratory



As an old timer in the Human Factors Engineering R&D effort (most likely the oldest in the Department of Defense) I would like first to congratulate and commend the MANPRINT Policy Office for initiating the publication of the MANPRINT Bulletin. All of us in the trenches associated in any way with MANPRINT implementation should wholeheartedly support this excellent publication and use it as a prime communication vehicle up and down the chain of command and among ourselves. I have directed all personnel assigned to the Human Engineering Laboratory (HEL) to support this publication and submit articles for future editions. "Preaching, teaching, reaching" has always been my motto if you want to sell and have got something worthwhile to sell. The Bulletin will surely serve this purpose.

The HEL has been in the Human Factors Engineering business for 35 years. During that time (1967, 1968, 1969, and 1980) we published various documents in support of efforts to initiate a program like MANPRINT. However, the need for such a program was slow to be recognized.

The first version of Army Regulation 602-1, "Human Factors Engineering Program," dated 4 March 1968, defined human factors engineering as "a

comprehensive technical effort to integrate all manpower characteristics (personnel skills, training implications, behavioral reactions, human performance, anthropometric data, and biomedical factors) into all Army systems." The reader can readily see that this definition (written by Mr. Jacob Barber, formerly of the ODCSPER Research and Studies Office, and myself) broadened the scope of human factors engineering in effect at that time into an effort similar to MANPRINT.

Though we certainly tried, we could not fully implement AR 602-1 in 1968 nor later on because of organization and policy problems. There was no mechanism to integrate the various aspects of the above definition across the responsible commands and agencies, nor sufficient policy and guidance to enforce such integration. Thus, it was not until 1980 when we briefed Generals Kerwin and Blanchard that things began to happen. As a result of our discussion and their recommendations, we updated HEL Guide 1-69, Manpower Resources Integration Guide for Army Material Development, dated 30 January 1969, into a document titled Human Factors Engineering in Research, Development and Acquisition, dated 31 October 1980.

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(Weisz continued from page 3)

The above "soldier-in-the-loop" initiatives have been carried forward and expanded over the past two years by Generals Thurman, Thompson, and Elton, who became directly involved in the implementation of MANPRINT. Moreover, Mr. Spurlock, Assistant Secretary of the Army for Manpower and Reserve Affairs, has been a strong advocate and has profusely quoted my earlier publications (1967 and 1968) to the House Armed Services Committee in seeking support for such an effort within the Army.

So, that is some of the history. I am sure that I did not include all of it, but regardless, now we do have a MANPRINT initiative supported by Army leadership. Now it's time for us to get on with the show.

Obviously, we will still have a long way to go--industry must be convinced and shown that the Army is serious about MANPRINT, inhouse specialists well-trained in MANPRINT procedures must be developed and assigned to key positions on the Army staff and within appropriate commands and agencies, and requirements documents and materiel development contracts must include MANPRINT design requirements. Furthermore, inhouse contract monitors must be closely involved throughout the development phases to ensure contractor compliance with MANPRINT requirements and testers, and evaluators must include MANPRINT issues in all tests. In addition, MANPRINT players must provide input to the Human Factors Engineering Analysis (HFEA) at each Army System Acquisition Review Council/In-Process Review

(ASARC/IPR) milestone, and the ASARC/IPR process must oversee and enforce MANPRINT concerns delineated in the HFEAs.

In closing, I again want to recognize the MANPRINT Bulletin as an important vehicle for disseminating MANPRINT information and issues, and even addressing controversy among ourselves (the healthy, professional type, I hope), as we seek to find our way along uncharted paths toward ultimate implementation of MANPRINT and acceptance of its objectives throughout the Army. Again, "on with the show."●

(ECA continued from page 2)

valuable because it identifies preliminary MPT constraints and develops the preliminary target audience description.

While ECA has its greatest impact prior to program initiation, it is equally effective when applied to product improvements and nondevelopment item acquisitions. Thus, it can be used throughout the materiel acquisition process. Furthermore, after component/system fielding, ECA can help identify soldier tasks that are resource intensive. Such problem tasks may be resolved in the near term with an MPT "quick fix." In the long term, problem resolution may require a product improvement. Finally, the results of an ECA can influence design and ensure system supportability. However, if an ECA is done too late in the materiel acquisition process, design influence may be limited and only supportability will be enhanced.

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ECA (continued from page 4)

ECA is designed to be simple, to require no special skills to conduct, and to use data that is readily available. The process involves twelve steps:

1. Initiate analysis
2. Identify relevant MOS
3. Collect task lists
4. Collect data on task criteria
5. Assign values to data
6. Calculate task scores
7. Identify high drivers
8. Conduct task analysis
9. Conduct learning analysis
10. Identify deficiencies
11. Determine solutions
12. Prepare report

Early Comparability Analysis provides a great deal of useable data, but it is not a MANPRINT cure-all. The methodology has the following characteristics/limitations:

- It addresses individual but not collective tasks.
- It does not address supervisory and managerial tasks.
- It addresses MPT issues and to a lesser extent human factors, but not safety or health hazard issues.
- It provides a basis of comparison for comparable tasks.
- It helps avoid a repeat of old "mistakes," but it does not prevent all new "mistakes."

ECA has been tested on a wide variety of small, medium, and large systems, including Stinger, TACFIRE, 107mm Mortar, and Bradley Fighting Vehicle. ECAs are currently being



conducted for M1A1 Tank Block II Modification, Unmanned Aerial Vehicle, and Advanced Field Artillery System.

The ECA Procedural Guide can be ordered from the Defense Technical Information Center under document number AD-A169021. Send request to: DTIC, Cameron Station, Alexandria, VA 22304-6145. Telephone: (202) 274-7633; Autovon: 284-7633.

Questions and comments concerning either ECA methodology or the Procedural Guide should be addressed to: Deputy Commander, USASSC-NCR, ATTN: ATNC-NMF-C, 200 Stovall St., Alexandria, VA 22332-0400. Telephone: (703) 325-0395 or Autovon: 221-0395. •

Readers Survey A Success

A special word of thanks and appreciation to all of you who took the time to fill out and return the questionnaire included with the first issue. You gave us lots of ideas. Many of your suggestions have been incorporated into this issue; others will follow. In addition, some of you had questions of a technical nature that have been sent to the appropriate agency for an answer. Keep those comments and suggestions coming! Also, if you have ideas, information, or "lessons learned" that would be of interest to other readers, please send them in. We'll give you credit or leave the source anonymous -- your call.

**Do You Have Questions,
But No Answers?
Try MATRIS**

The Manpower and Training Research Information System (MATRIS) is an automated decision support system to serve the technical information needs of the manpower, personnel, and training R&D community.

MATRIS is jointly sponsored by the Office of the Under Secretary of Defense for Research and Engineering and the Office of the Assistant Secretary of Defense for Force Management and Personnel. The system is administered by the Defense Technical Information Center.

MATRIS can provide information about planned, ongoing, and recently completed DoD research within the technology areas of human factors, manpower and personnel, education and training, and simulation and training devices.

For additional information, contact: DTIC, MATRIS Office, San Diego, CA 92152. Telephone: (619) 225-2056; Autovon: 933-2056.

**Training Systems Conference
To Focus On
Manpower And Personnel**

The 8th Interservice/Industry Training Systems Conference will be held in Salt Lake City, Utah, on November 18-20, 1986. The theme, "Training Systems: The Next Step," highlights the service's expanding emphasis from training equipment alone to the total training system. The focus will be on the requirement for training systems to be

planned and developed concurrently with weapon system development from the manpower, personnel, and training viewpoint. BG James B. Allen, Jr., Director of Training, ODCSOPS, Department of the Army, is one of the featured speakers. For additional information on conference program and registration, contact: National Security Industrial Association, Suite 901, 1015 15th St., N.W., Washington, D.C. 20005, Telephone: (202) 393-3620.

**MANPRINT Questions?
Call Toll-Free**



The MANPRINT Information Hotline will go into service on 1 September on a 120-day trial basis. The hotline will be operational from 0900 to 1600 hours Eastern Standard Time, Monday through Friday. The phone numbers are: outside Virginia, 800-262-1626; inside Virginia, 800-327-1626. The hotline is operated by Automation Research Systems (ARS), Ltd., under contract to the Office of the Deputy Chief of Staff for Personnel. Depending on the nature of your question, ARS will either provide an immediate answer, research the answer, and call you back, or refer you to the appropriate agency or person for a response.

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Armed Services and NASA Support Development of Human Performance References

The Integrated Perceptual Information and Designers (IPID) Program, administered through the Armstrong Aerospace Medical Research Laboratory, was initiated to support the development by source of comprehensive human engineering data. The objective of IPID is the consolidation and communication of perceptual and human performance data for the design of human and machine systems. With Army, Navy, Air Force, and NASA support, it has evolved into a comprehensive program to enhance the useability of human factors data and the design community, and to provide access to a wide variety of data on design problems.



NASA



The IPID Program is developing two products: The Handbook of Perception and Human Performance, published in 1986 (John Wiley & Sons, New York) and The Engineering Data Compendium to be published in 1987. The handbook is a two-volume scientific reference work with 45 chapters covering sensation and perception, information processing, and human performance. The four-volume compendium treats these topics, as well as more applied issues, but is specifically designed for those directly involved in the design of equipment and systems.

For more information on these publications or the IPID program, contact: Dr. Kenneth R. Boff, ATTN: AAMRL/HEA, Wright-Patterson AFB, OH 45433, Telephone: (513) 255-7596 or Autovon: 785-7596.