MANPRINT BULLETIN

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Tools, Models, and Methodologies

Have a Safe and Happy Holiday...see you in 1990!

Human Factors Engineering Smart Contract Preparation Expediter (SCOPE)

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U.S. Army Human Engineering Laboratory
and
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LICA Systems, Inc.

As MANPRINT intensifies the Army's focus on the soldier-system interface, the Human Engineering Laboratory (HEL) is responding with the development of an expert system, called the Smart Contract Preparation Expediter (SCOPE). This system will aid human factors engineers in developing materiel acquisition documents that fully and accurately reflect human factors considerations. Such considerations include designing Army materiel to conform to the capabilities and limitations of the soldiers who will operate, maintain, supply, and transport the materiel in its operational environment.

Human factors engineers at HEL's detachments are using their technical background and experience to identify issues that must be addressed by the contractor during system design and development. These areas of concern are communicated to the contractor as human factors engineering (HFE) taskings and emphasis areas in the Request for Proposal (RFP). The human factors engineer must ensure that the correct issues are identified early and that the HFE taskings address these issues in a clear, specific, and cost-effective manner. Incomplete, overly-general, or inconsistent HFE requirements in the RFP can lead to less than optimally designed systems which may then require costly engineering changes or revisions before the system can meet the operational performance standards specified in the Operational and Organizational (O&O) Plan and Required Operational Capability (ROC) document.

The development of a knowledge-based, automated tool to aid human factors engineers in the above activities was envisioned by HEL as a means of improving productivity, stabilizing available expertise, and enhancing consistency and product quality.

A feasibility protoype of SCOPE, developed in-

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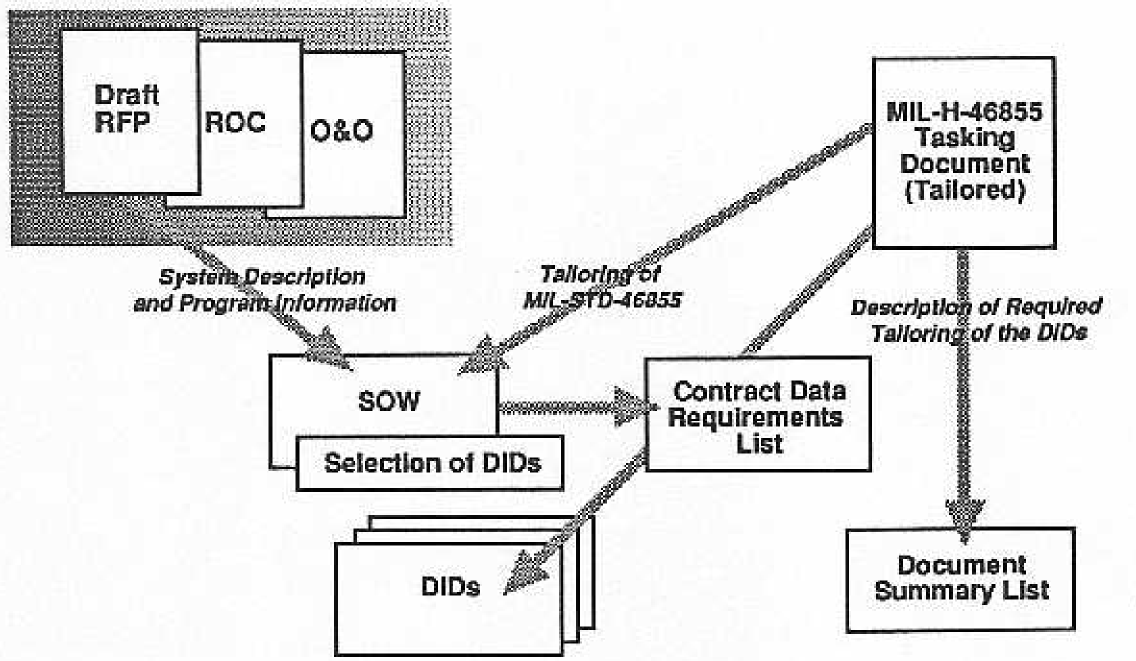

SMART CONTRACT PREPARATION EXPEDITER (SCOPE)

house by HEL, consists of an intelligent, interactive document editor and a program with knowledge of HFE and Army materiel design. Using SCOPE, the human factors engineer can quickly and accurately generate the HFE taskings, along with a tailored Statement of Work (SOW) and Contract Data Requirements List (CDRL).

The intelligent editor portion of SCOPE allows the human factors engineer to tailor MIL-H-46855B, Human Factors Engineering Requirements for Military Systems Equipment and Facilities. Text that is part of the original document can be "lined out" to reflect deletions, with inserted text marked. After edits are complete, the program interprets the tailored additions and deletions and generates the correct, legally-binding text which will task the contractor with the appropriate HFE work.

Based on the human factors engineer's description of the acquisitioned item, SCOPE uses its embedded HFE-expertise to find particular areas, workplaces, or subsystems which require concentrated HFE-attention. Knowledge about the structure and content of the RFP and its subsections (SOW, CDRL, etc.) has been modeled so that optional or alternate clauses and phrases are conditionally generated, depending on the materiel description, acquisition strategy, contract type, design technology, and similar concerns. The resulting document is automatically formatted.

HEL has a development contract with LICA Systems, Inc., awarded in February 1989, for phased development of SCOPE. By late 1989, the HEL Detachment at the Missile Command will begin evaluating the initial version.

LICA is modeling the commodity-specific design and performance knowledge to develop a hierarchical network of relationships between materiel characteristics and human factors requirements. These models will be developed into a knowledge base using an object-oriented expert system building tool. This hierarchy will provide the capability to infer system requirements in human factors terms to ensure that the design considers human performance limitations. The models will be incrementally refined and extended to include commodity-specific knowledge from other HEL Detachment activities.

Procedures for maintaining consistency of tailoring within and across the generated documents are also being explored. As the MIL-H-46855 tasking document is interactively tailored by the human factors engineer, consistent tailoring of the requested Data Item Descriptions (DIDs) will be automatically performed. For example, DIDs that are cited in the

SOW will be appropriate to the materiel and to the acquisition phase, and they will be correctly called out on the CDRL and tailored in a consistent manner on the Document Summary List.

Future plans call for modeling the report-structure knowledge in a more flexible manner, and developing text generation and formatting functions that are more generic and better integrated into the knowledge representations. As an adjunct to SCOPE, LICA plans to develop an expert-computer interface to provide easy and effective tailoring of SCOPE for each commodity area handled by HEL Detachments. This capability will ease updating and renewal of SCOPE's knowledge bases as new Army systems are developed, new regulations are promulgated, and new successful RFP input text is written.

When fully developed, SCOPE will be able to store and organize knowledge about past and present HFE contracts, program plans, reviews, design recommendations, progress reports, deviation reports, standards, regulations, handbooks, data, and other documentation necessary to justify HFE actions and recommendations. SCOPE will provide a more consistent and timely response to requests from Project Managers, thus increasing the productivity and effectiveness of HEL's field office resources.

For more information, contact Joan E. Forester, USALABCOM, HEL, ATTN: SLCHE-CS, Aberdeen Proving Ground, MD 21005-5001. AV 298-5898 or COM (301) 278-5898.

Manpower and Logistics Trade-off Analysis (MALTA) Model

Sal Culosi and Paul F. Hogan
Systems Research and Applications (SRA) Corporation

SRA is developing a prototype manpower and logistics trade-off analysis model. Called MALTA, this model uses probability theory to generate a Markov chain system of equations that describe the interactions between base maintenance and logistics support capability. The model is designed to help the analyst determine the manpower requirements and spare parts inventory necessary to achieve a specific level of weapon system availability.

Because weapon system components fail randomly, sizing maintenance manpower and spare parts inventories based on the average failures over a given period would likely result in large numbers of "not mission capable" (NMC) weapon systems when failures are higher than average. Clearly, there is a lower limit on the maintenance manpower side of the equation; if we cannot repair items at least as fast as the average failures during a repair period, then the backlog of unserviceable components will grow very rapidly, as will the requirements for spare parts.

Beyond this minimum maintenance manpower level exists an optimum mix of maintenance-manpower and spare parts necessary to achieve a given capability. Given the cost of manpower and spare parts, the MALTA model can help the analyst determine the least-cost combination of spares and manpower to achieve a specified level of weapon system availability.

The MALTA model can consider simultaneously more than one type of spare part and skill level needed to make the repairs. In addition, the model has the ability to consider the benefits of using maintenance personnel who can perform more than one maintenance function. That is, the model can calculate the cost of achieving a given level of weapon system availability for two cases: (1) personnel in a given skill category can repair only one type, or one group, of spares; and (2) personnel in a skill category are cross-trained to repair two or more types of spares.

Because of the conjectural nature of failure rates, economies in overall manpower requirements are achieved generally when members are cross-trained. Cross-training is costly, however, and may result in reduced proficiency in repairing any single item. The model considers these interactions in

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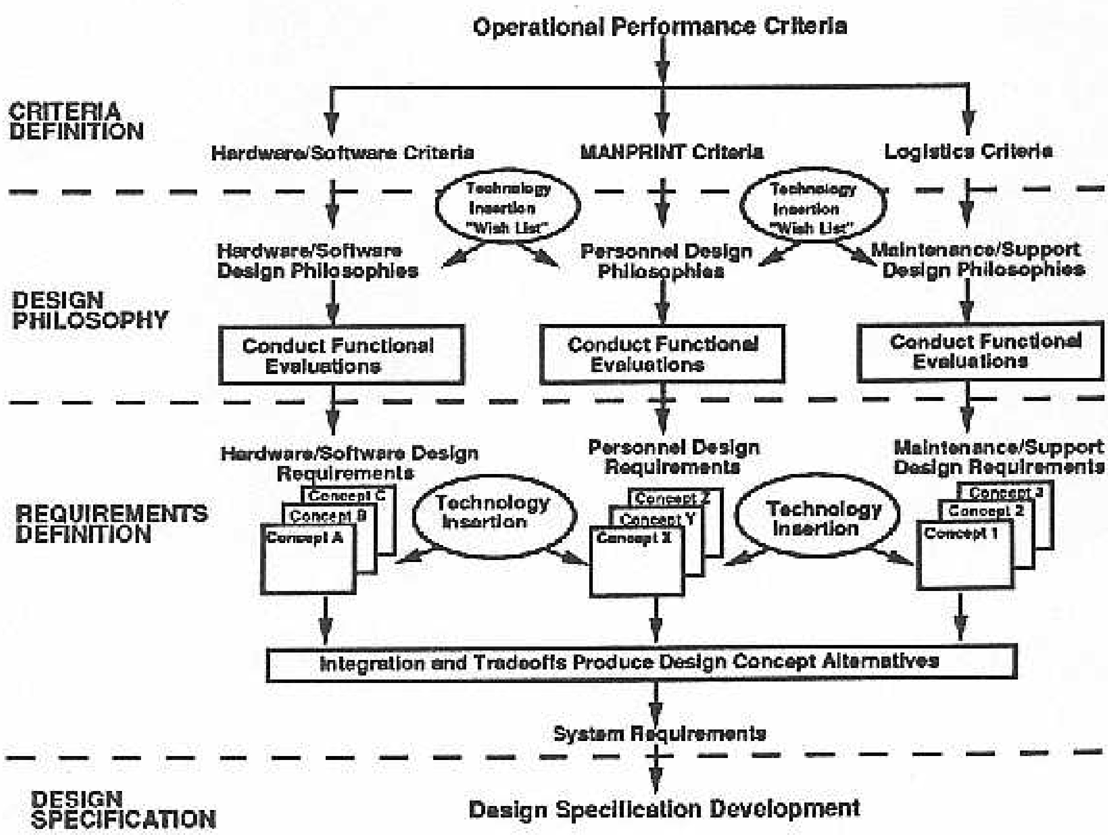
MANPRINT
As Part of Technology Insertion

Toni Hodges
ARINC Research Corporation

Since MANPRINT's inception, both Government and Industry have made great strides in recognizing how the human element impacts on total system performance. Human factors professionals, training analysts, logisticians, and other scientists and engineers have responded to this awareness by designing and applying tools and methodologies that assess factors affecting human performance. These tools allow engineers to reduce or eliminate those factors that interfere with human performance—and thus total system performance—in previous designs.

The hunger for new technology, however, threatens the determination to include human requirements in system design. The temptation to use new technology indiscriminately is not limited to hardware and software developers Even within the human factors and training arenas, we are designing advanced automated programs to predict and modify human behavior. The threat is that emerging technologies are so exciting in and of themselves that they may advance without apparent full justification. Several recent studies indicate that some of today's sophisticated system and equipment designs fail to consider the limitations or the strengths of the operators, maintainers, and support personnel required for the system's mission execution. A recent study of glass cockpits (Wiener, 1989) found that more than half of the advanced aircraft pilots questioned believe that automation actually increases workpload, even after as much as a year of experience with the new technology The MANPRINT community has succeeded in identifying "past" design errors and determining how to correct them. We must now avoid similar errors when using new technology for which we have no historical data.



The focus for new system designs should not be on what *can* be, but rather on what *should* be. We must first determine exactly where we want to go with a new program and what exactly constitutes "success." The figure on page 4 depicts, on a global level, the type of up-front work that should be performed before any design requirements or specifications are written.

In the Criteria Definition Phase, design planners must evaluate the criteria to which they are designing and determine what will make the design "successful." The criteria should be defined early in the program by the engineers and logisticians, in parallel. Each should use their expertise to define the criteria unique to their concerns and determine how to select or design the most desirable solutions.

In the Design Philosophy Phase, analysts should examine what is available in today's emerging technology that might meet those criteria. If we allow ourselves the opportunity to develop "wish lists," we can begin to explore the many options for each design concept without unneccessary constraints. Analyses can be conducted within each specialized area and prototypes and mockups produced to determine the feasibility of these options. At this point, we have real information to work with.

The Requirements Definition Phase begins by establishing alternative concepts to meet prescribed criteria. By bringing technology to bear in well-defined areas of performance, we can guide rather than chase technology. Only after this work is completed should we begin to conduct the trade-off studies necessary to develop the design concept alternatives that will determine system requirements and define system specifications. Even though hardware and software engineers may have interacted with MANPRINT analysts and logisticians before these early trade-offs studies begin, formal interaction and integrated concepts are imperative at this point for the specification formulation process.

By careful mission definition and evaluation of design philosophies conducted in parallel with the experts in each program area, the trade-offs necessary to produce design alternatives will produce realistic design concepts. This will provide a greater chance of success in producing systems that perform as intended. We must not hinder the explosion of technology. Rather, we must be wise in its use, and use it wisely. Total system performance is not a function of technology alone, nor is it a function of man alone. Their development must evolve together.

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MALTA (Continued from page 3)

determining the total manpower and logistics costs of achieving a given level of weapon system availability with and without cross-training. Thus, the model can provide insight into the following issues:

- **Optimal Resource Mix.** Calculate the least cost of manpower, training, and spare parts inventory necessary to achieve a given level of effectiveness.

- **Adjustment to Staffing Cuts.** Quantify how additional spares and/or cross-training can be used to offset the effects of manpower reductions on weapon system availability rates.

- **Implications of Cross Training.** Quantify how cross training can affect manpower and spares requirements, readiness, and costs.

- **Effects of Budget Changes on Weapon System Availability.** Quantify how changes in overall budget will affect weapon system availability, assuming that resources are allocated optimally across spares, manpower, and cross-training.

A number of simulation models can be used to address the above problems. These models, however, are detailed, long-running, and require an enormous amount of data preparation. In contrast, the MALTA model, which operates on any IBM compatible PC with 640k of memory, is a fast-running, expected-value model designed to capture the essence of manpower/logistics interactions. The MALTA model represents a first-cut effort at addressing manpower, training, logistics, budget, and readiness issues in a coherent, systematic fashion—with highlights on interrelationship and trade-offs.

For more information, contact Sal Colusi or Paul F. Hogan, SRA Corp., 2000 15th Street North, Arlington, VA 22201, (703) 558-4700.

T800 Remembers the Soldier

A MANPRINT Success Story

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Assistant Program Manager, LHX Program

Paul Thagard
Light Helicopter Turbine Engine Company (LHTEC)

Editor's Note: The following is an edited version of an article that first appeared in the July/August 1989 issue of the Army RDA Bulletin.

In the past, the Army and Industry developed sophisticated systems and then attempted to adapt the soldier to the resulting system. A significant data base of inefficient weapons and equipment proved that approach did not work. The Army began to realize that, in order to develop an effective system, the soldier and his capabilities must be considered from the very outset of the acquisition program. Thus, in December 1984, the MANPRINT concept was launched as a coordinated effort to influence system design to ensure safe system operability, maintainability, and supportability available resources.

The T800 full-scale development program was one of the first Army acquisition programs to which MANPRINT was applied. Because of the T800's streamlined acquisition and performance-oriented approach, the Request for Proposal (RFP) did not specify how MANPRINT was to be applied to the program. This allowed each contractor to design and tailor MANPRINT principles to best support his approach to the T800 competition.

The winning T800 contractor team, the Light Helicopter Turbine Engine Co. (LHTEC), a partnership of the Allied Gas Turbine Division of General Motors and the Garrett Engine Division of the Allied Signal Aerospace Company, established a dedicated MANPRINT team soon after contract award. The LHTEC MANPRINT team was composed of highly-qualified and experienced technicians, maintenance officers, and pilots, as well as individuals qualified in both the turbine engine maintenance and manpower/personnel or training areas. A cadre of personnel possessing both technical and managerial qualifications is critical; MANPRINT analysts must have "in-the-trenches" experience and be able to recognize design inadequacies.

To facilitate the integration of MANPRINT into the engine design, LHTEC formed a MANPRINT Joint Working Group early in full-scale development. This group, consisting of personnel from Integrated Logistics Support Analysis, Technical Publications, and Systems Engineering, worked closely with Design Engineering and Air Vehicle Support personnel. This close working relationship fostered communication and coordination, and provided a strong synergistic approach to problem solving.

Manpower is a critical resource to the Army. New system acquisitions must require no increase in manpower over the predecessor. Early analysis of the T800 engine design indicated a significant reduction in the manpower requirement when compared to currently fielded engines. As the T800 design matured, the efforts of the designers and the MANPRINT team yielded even lower manpower requirements. Meticulous review of drawings and mock-ups resulted in supportability design recommendations to relocate components, consolidate the functions of two or more components into one, add maintainability features, and implement other improvements to enhance the design.

LHTEC created specific analytical methodologies to ensure that required T800 engine maintenance tasks would fall within the capabilities of the soldiers the Army could expect to recruit and retain. In addition, LHTEC performed several surveys to evaluate the T800 design in the hands of the projected maintainers.

T800 MANPRINT Analytical Tools

LHTEC MANPRINT personnel created a Cognitive Requirements Model to assess the mental demand placed on the maintainer when performing T800 user-level tasks. The results of individual task analyses are addressed in aggregate to determine the minimum aptitude area score required for successful task performance.

The Functional Allocation Analysis was used to align the engine design with the soldier's capabilities. This analysis determines which T800 resource—hardware, software, or soldier—should perform a particular task segment. Functional allocation is particularly relevant to the fault isolation process, where sensors and/or software may be used to replace or reinforce the decision-making process. Proper use of each resource is imperative. Overuse of the human decision-making capability could predispose the system to failure; underuse could result in excessive hardware and software costs.

A document titled "LHTEC MANPRINT Specification of the Soldier" facilitated the function allocation analysis by describing the mental capabilities of Army personnel with a particular aptitude area score. Performance was then defined within these constraints to ensure successful task accomplishment. Staying within these constraints will result in the proper allocation of fault isolation task segments among the soldier, software, and hardware.

Another useful analytical tool used in the MANPRINT analysis was a computer program (based on the Flesch Reading Ease Method) that evaluates written material to determine its scholastic reading grade level (RGL). Programmed for use on LHTEC personal computers, RGL analysis was performed on all written material used by the maintainer, including maintenance task narratives, technical manuals, and training materials, including Computer-Based Training (CBT) and Engine Monitoring System (EMS) screen displays. RGL analysis ensures the maintainer will be able to comprehend the material, thus alleviate comprehension errors.

Another analysis tool that impacted on the T800 design was the Human Engineering Design Approach Document-Maintainer (HEDAD-M). The HEDAD-M effort used computerized task analysis worksheets, which allowed analysts to review task scenarios as design modifications were evaluated. Human factors engineers used the worksheets to conduct tests to validate removal and installation task elements for external components and other user-level tasks. These tests generated additional design influence and provided rationale for design decisions.

Practical Verification of MANPRINT Influence

In early 1987, LHTEC MANPRINT personnel surveyed students at Dobson High School in Mesa, Arizona as a "maintainer of the future" survey. The

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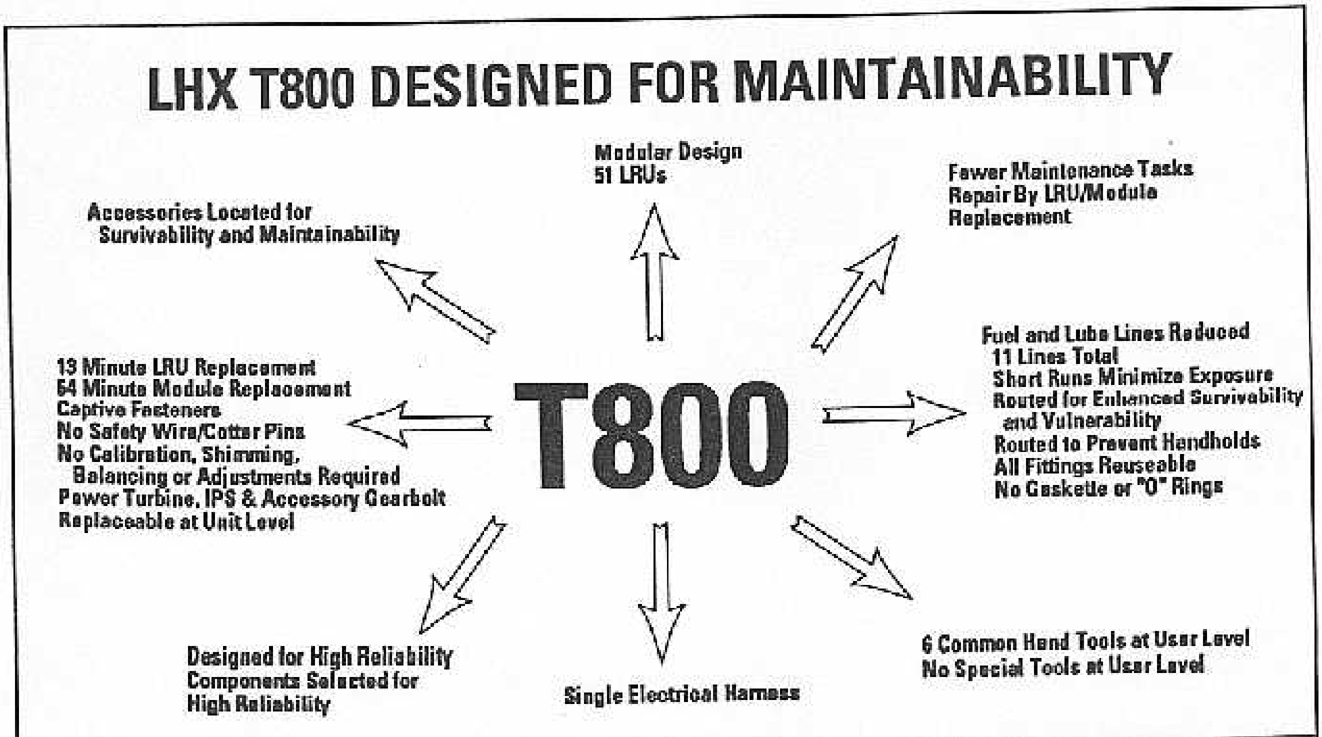


T800 (continued from page 7)

survey aimed to determine if the LHTEC T800 engine could be maintained by individuals available for future Army service.

Survey participants included nineteen juniors and seniors from industrial arts classes. Seventeen males and two females represented the spectrum of aptitudes (CAT I-IV) available to the Army. The scores of those students who had taken the Armed Forces Qualification Test (AFQT) were used in the analysis. The scores of those who had taken the Scholastic Aptitude Test (SAT) were converted to the AFQT equivalent.

The students were given a short training course on general turbine engine theory, then trained to perform T800 user-level component removal/installation tasks. Guided by simulated EMS screen displays, each student then performed a removal/ installation task on a component. Fellow students used an LHTEC checklist to evaluate each "maintainer's" performance and critique the T800 design. All of the participants performed T800 user-level tasks satisfactorily. Several improvements proposed by the Dobson High students were incorporated into the design.

During January and February 1988, LHTEC MANPRINT personnel conducted a T800 MANPRINT field survey at five Army installations and one Coast Guard facility. The survey was designed to evaluate the T800 user-level maintenance task performance of maintainers who were trained and guided by state-of-the-art computerized training and technical manual delivery systems. Participants were trained on three T800 line-replaceable unit removal/replacement tasks by the CBT system. This system allows maximum student participation during the training session through the use of an interactive video disc, as well as superior graphic displays and audio.

After completing the CBT course, each participant performed the task on which he was trained. An EMS computer, functioning as a paperless technical manual, provided technical guidance on the tasks, which were performed a metal T800 mock-up. Each participant then completed a survey form which contained both objective and subjective questions pertaining to the CBT, EMS, and LHTEC T800 design. Asked to compare the CBT and EMS to conventional training methods and technical manuals, all participants responded with positive replies.

Additional questions concerning T800 maintainability rated it easier to maintain than current engines.

System safety and health hazard assessment considerations in design were achieved through several analyses and reports. Safety engineers reviewed drawings to ensure safety design requirements were incorporated. Identified hazards were either eliminated or associated risks reduced to an acceptable level. Analyses were performed at all levels: preliminary hazard, system/subsystem hazard, and operating and support hazard. These resulted in a positive safety assessment report. Additionally, the failure mode effects and criticality analysis, developed as part of the reliability program to evaluate each significant component and the modes in which it can fail or malfunction, was used to assist the safety effort.

Summary

The efforts of the LHTEC MANPRINT Working Group significantly influenced the engine design to reduce manpower and personnel requirements, lower the training burden, lessen the number of maintenance tools required, and reduce the potential for human error during maintenance activities.

The manpower analyses gave the Army visibility for force structure planning and identified the LHTEC T800 as a powerplant with extremely low maintenance man-hours per flying hour. The use of the cognitive requirements model produced accurate predictions of task mental demand. Analytical tools ensured maintenance tasks were within the capability of the projected maintainer. Human factors engineering and safety evaluations and analyses resulted in an effective soldier-machine interface and a system which is safe to operate and maintain.

These MANPRINT efforts contributed significantly to the design of an engine which is indeed operable and maintainable within the manpower and personnel constraints of the Army. The overwhelming success of the T800 MANPRINTprogram clearly demonstrates that designing a system to the soldier increases the system's effectiveness and ensures operational availability.

For more information, contact Paul Thagard, Light Helicopter Turbine Engine Company, 548 N. 97th St., Mesa, AZ 85027. (602) 231-3861.

AMCOS: A New Tool for Estimating Manpower Costs

Donald E. Rose, Jr.
Systems Research and Applications (SRA) Corporation

Editor's Note: A previous article on AMCOS appeared in the November/December 1987 issue of the MANPRINT Bulletin.

The Army Manpower Cost System (AMCOS) is a system of life-cycle cost models developed by SRA Corporation and their sub, SAG Corporation, under contract to the Army Research Institute. The models are designed to improve the Army's ability to estimate active, reserve, and civilian manpower costs. The U.S. Army Cost and Economic Analysis Center is using AMCOS to estimate manpower costs for all independent cost estimates. AMCOS is now available to all Army users for estimating MANPRINT-related manpower costs.

The fully interactive, PC-based AMCOS models feature an on-line function key reference guide and extensive menus for easy use. The models compute both single and aggregate answers to complex cost questions and their supporting details by MOS and congressional appropriation. Output is provided for user-specified unit configuration, over time.

The AMCOS models calculate manpower costs based on user-specified scenarios and stored cost data. The stored cost data is generated by computerized cost modules that emulate personnel compensation policies, reflect continuation rates, and estimate average and marginal costs.

The user interfaces with the model in three ways:

- **Manpower Requirements Input.** The user manually or electronically inputs the manpower requirements, by MOS and grade, for each unit being costed. The user also specifies a time-phased scenario that tracks the phase-in and phase-out of the weapon system or force structure being costed.

- **Cost Review.** The user may review, by skill, the detailed default costs used by the model. This allows verification of the cost elements being applied in a particular exercise.

- **Cost Modification.** The user may specify certain cost policies by adjusting the default costs; selecting specific special-pays; selecting high-versus-low quality personnel and/or selecting marginal-versus-average costs. In addition, the user may select the discount rate and set variable inflation rates, by appropriation cateory, for the first five years of the cost projection.

The output from the life-cycle model is oriented towards user needs,offering the following options:

- **Force Structure Level of Detail.** The models provide cost estimates for any combination of single position, unit, or aggregation of units.

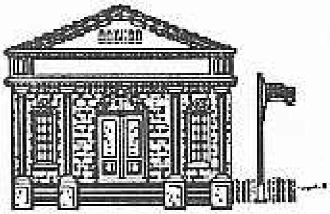
- **Cost Level of Detail.** Costs are available by MOS; grade; major cost element (basic pay and allowances, recruiting, training, reenlistment, PCS, etc.); appropriation category; and total costs.

- **Output Options.** The user may receive output through the computer monitor in tabular or graphical form, or print hardcopy results in tabular form. In addition,a special feature allows the user to compare the results of alternative calculations.

Hardware requirementsfor AMCOS include any IBM-compatible PC using MS-DOS 2.0 or higher with one floppy disk drive and a 10-megabyte hard disk. The software comes with a comprehensive user's manual and information on the methodologies used in the models. The software is easily loaded and, with the use of screen prompts and the user's manual, is easily mastered.

The AMCOS life-cycle cost models support the MANPRINT community by providing a practical tool for estimating costs in support of manpower, personnel, and training decisions. In addition, they are useful in estimating the cost of the manpower link between a system's design and Army personnel and training programs.

For more information, contact Donald E. Rose,Jr., SRA Corp., 2000 15th Street North, Arlington, VA 22201, (703) 558-4700.



Schedule of Upcoming MANPRINT Courses

MANPRINT Senior Training Course

12-16 February 90 (Ft. Leonard Wood, MO)
19-23 Mar 90 (Picatinny Arsenal, NJ)
16-20 Apr 90 (Ft. Huachuca, AZ)
14-18 May 90 (Ft. Monmouth, NJ)

MANPRINT Staff Officers Course*

27 Nov-15 Dec 89	05-23 Mar 90
22 Jan-09 Feb 90	02-20 Apr 90

*All courses will be held at Ft. Belvoir, VA.

MANPRINT INFORMATION

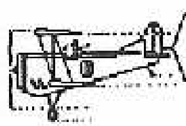
POLICY - MANPRINT Directorate, HQDA (DAPE-MR). Washington, DC 20310-0300. AV 225-9213, COM (202) 695-9213.

MANPRINT TRAINING - Soldier Support Center-National Capital Region, ATTN: ATNC-NM, 200 Stovall St., Alexandria, VA 22332-0400. AV 221-3706, COM (703) 325-3706.

PROCUREMENT & ACQUISITION - US Army Materiel Command, ATTN: AMCDE-PQ, 5001 Eisenhower Ave., Alexandria, VA 22333-0001. AV 284-5696, COM (202) 274-5696.

HUMAN FACTORS ENGINEERING STANDARDS AND APPLICATIONS - Human Engineering Laboratory - MICOM Detachment, ATTN: SLCHE-MI, Redstone Arsenal, AL 35898-7290. AV 746-2048, COM (205) 876-2048

MANPOWER, PERSONNEL AND TRAINING RESEARCH - Army Research Institute, ATTN: PERI-SM, Alexandria, VA 22333-5600. AV 284-9420, COM (202) 274-9420.



MEETINGS OF INTEREST

13-16 November 1989

Interservice/Industry Training Systems Conference: "Training Through Teamwork - Meeting the User's Needs." Ft. Worth, TX. Sponsored by the American Defense Preparedness Association. Contact: Capt. Jackson or Ms. Amy Enwright, ADPA, TMAS, Rosslyn Center, 1700 N. Moore St., Arlington, VA 22209.

23-25 January 1990

Annual Reliability and Maintainability Symposium and Exhibits Program. Los Angeles, CA. Contact: RAMS, 412 Dunton Drive, Blacksburg, VA 24060, or call Dr. J. Nichlas at (703) 231-5357.

1-3 May 1990

"People, Machines, and Organizations: A MANPRINT Approach to System Integration." Hampton, VA. Sponsored by the National Security Industrial Association. Contact: COL (R) Bruce Green,1025 Connecticut Ave.,Suite 300, Washington, DC. (202) 775-1440 or FAX 775-1309.

GENERAL INFORMATION

Proposed articles, comments, and suggestions are welcomed, and should be mailed to: MANPRINT Bulletin, ATTN: HQDA (DAPE-MR), Washington, DC 20310-0300. Telephone: AV 225-9213, COM (202) 695-9213.

LTG Allen K. Ono, Deputy Chief of Staff for Personnel

MG Stephen R. Woods, Jr., Commander, Soldier Support Center (Proponent for Army MANPRINT Training)

Mr. Harry Chipman, ODCSPER Coordinator

Ms. Nan B. Irick, Editor, ARS

Harold R. Booher
Director for MANPRINT

The MANPRINT Bulletin is an official bulletin of the Office of the Deputy Chief of Staff for Personnel (ODCSPER), Department of the Army. The Manpower and Personnel Integration (MANPRINT) program (AR 602-2) is a comprehensive management and technical initiative to enhance human performance and reliability during weapons system and equipment design, development, and production. MANPRINT encompasses the six domains of manpower, personnel, training, human factors engineering, system safety, and health hazard assessment. The focus of MANPRINT is to integrate technology, people, and force structure to meet mission objectives under all environmental conditions at the lowest possible life-cycle cost. Information contained in this bulletin covers policies, procedures, and other items of interest concerning the MANPRINT Program. Statements and opinions expressed are not necessarily those of the Department of the Army. This bulletin is published bimonthly under contract by Automation Research Systems, Ltd., 4480 King Street, Alexandria, Virginia 22302, for the MANPRINT Directorate, Office of the Deputy Chief of Staff for Personnel under the provisions of AR 310-2 as a functional bulletin.