



MANPRINT Quarterly

Winter 1999



Director's Corner

To the MANPRINT Practitioners in the U.S. Army:

Permit me to start this message by expressing my thanks to each of you who are working to ensure that the systems our Army is developing will be capable of being operated and maintained by the soldiers, leaders and units that will ultimately be issued these systems. Whether you are involved in Integrated Concept Teams, or Integrated Product Teams, your efforts to question whether manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability are being appropriately addressed, constitutes a most essential component of the acquisition process. As MANPRINT practitioners each of you often toil in the shadows, receiving little in the way of praise or thanks from the ICT Leaders or Program Managers whose systems you are trying to improve. What I want each and every one of you to recognize is that your labors and efforts are not going unnoticed.

The Deputy Chief of Staff for Personnel, LTG Ohle; the Military Deputy to the Assistant Secretary of the Army for Research, Development and Aquisition, LTG Kern; the Deputy Under Secretary of the Army for Operations Research, Mr. Hollis; to name but a few of the Army's key policy makers, are aware and appreciative of your efforts. The Army's MANPRINT program has been recognized as one of the essential components of our materiel and acquisition program. I recently attended a briefing of the Air Force Chief of Acquisition where the issue of Human Systems Integration (MANPRINT) was presented. The Air Force is planning on re-establishing this program and is looking at the way the Army has developed and implemented its efforts. Each of you should be proud that the work you have done, and continue to do, is regarded by our sister service as a model worthy of emulation.

You should be aware that we are presently engaged in serious, and at times strenuous, budgetary negotiations for the FY01-05 mini-POM. Expanded funding for the MANPRINT program is receiving significant attention by the Army's Senior Leadership. I cannot promise you that all of our requirements will be met but I can assure you that we are presenting our needs for additional support with both strength and conviction. The General Officer Steering Committee for MANPRINT has now matured into a Board of Directors (BOD) for MANPRINT. This BOD is co-chaired by the Assistant Secretary of the Army for Manpower and Reserve Affairs, Assistant Secretary of the Army for Research, Development and Aquisition, and the Deputy Under Secretary of the Army for Operations Research. I fully expect that this Board, working in concert with the Deputy Chief of Staff for Personnel, will secure the resources needed to build and maintain a MANPRINT program par excellence. Your dedication to and involvement in MANPRINT is what will make this program grow and prosper.

I want to take this opportunity to personally thank each and every MANPRINT practitioner for your efforts. I promise you that I will work tirelessly to ensure you receive both the resources and recognition you so richly deserve. My door is always open should you care to visit and my e-mail (holzrf@hqda.army.mil) is at your disposal.

Contents...

- The Director's Corner.....1
- Article: *The Enhanced Role of MANPRINT in OPTEC's Integrated Test and Evaluation Process*, Author: Donald B. Headley, ARL-HRED and Uldi Shvern, OPTEC.....2
- MANPRINT Training.....6
- FY 99 MANPRINT Training Schedule.....9
- MANPRINT Information.....10
- Reader's Response.....11

Bob Holz

Acting Director for Personnel Technologies

The Enhanced Role of MANPRINT in OPTEC's Integrated Test and Evaluation Process

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On September 29, 1998 an important memorandum affecting the MANPRINT community was signed by MG Larry Lehowicz, then the commander of the U.S. Army Operational Test and Evaluation Command (OPTEC). The memo (a) reaffirms the importance of including MANPRINT as a viable component of the procedures used to evaluate a system's effectiveness, suitability, and survivability, and (b) initiates a partnership agreement with the Human Research and Engineering Directorate (HRED) of the U.S. Army Research Laboratory to be a prime resource for MANPRINT support. The following sections provide more detail on these main items of the memorandum.

The OPTEC System Team

Every system which undergoes evaluation has an OPTEC System Team (OST) to coordinate the effort. OST membership is meant to be multi-disciplinary and usually includes a MANPRINT analyst who serves as a member or consultant. The analyst is typically an HRED Field Element employee or a contractor. MANPRINT activities include

- identifying and adding soldier issues to the System Evaluation Plan;
- developing objective measures of operator and maintainer performance;
- developing questionnaires;

- assisting in data collection and acting as subject matter expert observers;
- interviewing test participants;
- interpreting test data and writing applicable sections of the System Evaluation Report;
- representing soldier issues at Joint Working Group, Integrated Concept Team (ICT), and Integrated Product Team (IPT) meetings;
- conducting modeling efforts. Two recent examples are a workload model applied to the NBC Reconnaissance Vehicle (Fox; see the Summer/Fall, 1998 issue of the *MANPRINT Quarterly*), and a task and workload model of the Command and Control Vehicle. These efforts support the T&E process in terms of efficiency and effectiveness in that the models (a) can be used to show where to focus resources on critical areas and thereby save dollars by reducing the test, (b) allow the analyst to play "what if" scenarios, and (c) provide a test rehearsal tool;
- providing special support when requested, for example, assessing MANPRINT issues of Warfighting Rapid Acquisition Program systems involved in the Division Advanced Warfighting Experiment conducted at Fort Hood, Texas, November, 1997.

Continued on page 3

A Key T&E Document: The System Evaluation Plan

Although general MANPRINT statements appear in Part IV of the Test and Evaluation Master Plan (TEMP), specific MANPRINT issues to be tested are written into the System Evaluation Plan (SEP). The SEP explains how test and evaluation will be accomplished. It describes the various events (such as tests, demonstrations, simulations, and analyses) necessary to permit an independent evaluation of the system. Issues to be tested are listed under three key headings, Effectiveness, Survivability, and Suitability. MANPRINT items more frequently appear under (*Operational*) Suitability, which is defined as

“the degree to which a system can be placed satisfactorily in field use, with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistic supportability, and training requirements” (DA Pamphlet 73-5, Operational Test and Evaluation Guidelines, 30 September, 1997, pg. 109).

Soldier-related items are typically inserted in the suitability section as “Additional Issues” and are written by members of the OST (another set of issues appearing in the SEP, called Critical Operational Issues, are written by the combat developer [materiel systems] or the functional proponent [automated information systems] and are cross-walked from the TEMP). The MANPRINT point of contact on the OST often uses the System MANPRINT Management Plan as a source for the issues. Specifics concerning each issue appear as measures of performance. As an example, an issue might be “Does the ABC system allow soldier interactions with it to be efficient and sustainable during operation, maintenance, and training?” Accompanying measures of performance could be stated as

- “Proportion of individual operator, maintainer, and system supervisor tasks performed to the prescribed standard,” and
- “Number and severity of health hazard or system safety incidents.”

Examples of Supported Systems

Examples of OSTs that are receiving direct MANPRINT analyst support by HRED personnel include

- Command and Control Vehicle
- Army Battle Command System
- Total Army Distance Learning Program
- Global Broadcast Service
- Theater High Altitude Air Defense
- Body Armor Set, Individual Countermine
- Crusader
- Lightweight Water Purifier
- Modular Artillery Charge System
- AN/TYQ-69 Communications Control System
- All Source Analysis System (ASAS)
- SHF TRI-Band Advance Range Extension Terminal (START-T)
- Multifunctional Information Distribution Systems
- Modular Body Armor
- Modular General Purpose Tent System
- Improved Cargo Helicopter
- Land Warrior
- Cockpit Airbag System
- Mounted Warrior
- Suite of Integrated IR Countermeasures

Continued on page 4

Continued from page 3

- Suite of Integrated RF countermeasures
- M1A2 Abrams System Enhancement Program

This representative sampling shows a variety of system types and Army Category funding levels. The application of MANPRINT principles ensures that soldier issues will be included in the SEP.

Recent Examples of MANPRINT Influence in T&E

The following two examples are presented to illustrate the influence of soldier issues in the T&E process:

- M93A1 NBC Reconnaissance Vehicle (Fox)
 - The M93A1 was designed for a three-person crew
 - It was assessed as “unsuitable” and “ineffective” after the Initial Operational Test and Evaluation (primarily because of MANPRINT issues)
 - HRED recommended redesigning the crew-station layout and running a task analysis model to estimate the redesign’s effects on operational mission performance and assisting the Test Integration Working Group with follow-on test planning.
 - Results: The redesigned system was assessed as “suitable” and “effective” after an OPTEC-sponsored Operational MANPRINT Validation test, and Limited User Testing. The M93A1 was subsequently type classified and is currently being fielded.
 - Value-added: HRED’s efforts saved \$1 to 2 million in program management costs, helped to focus OPTEC evaluations, and are estimated to have saved 25% of life cycle manpower, personnel and training costs.
- M1 Breacher (Grizzly)

- Designed for two man crew
- Major MANPRINT issues identified during the Early User Test & Evaluation:
 - Required hand-eye coordination skills sometimes exceeded the abilities of the operator
 - Two man crew inadequate for vehicle maintenance
 - Inadequate workspace design
 - Heat buildup in the crew cabin
 - Lack of ability to see outside vehicle
 - Restricted vision at night
 - Frequent failure of joystick during breaching operations
- These Issues are currently being addressed by the Program Manager and the Training and Doctrine Command (TRADOC) System Manager

Domain MANPRINT & OPTEC MANPRINT – What’s the Difference?

In the ideal case, a Program Manager’s Office calls the MANPRINT domain agencies into its program early in the acquisition process (these agencies are HRED, ARL’s Survivability/Lethality Analysis Directorate, U.S. Total Army Personnel Command, U.S. Army Safety Center, and the U.S. Army Center for Health Promotion and Preventive Medicine). The domain experts (a) review such key documents as the Statement of Work, the Mission Need Statement, and the Operational Requirements Document (ORD); (b) sit on ICTs and IPTs; (c) assist in writing a MANPRINT management plan; and (d) conduct domain assessments. The domain influence helps to ensure that through early identification of soldier issues, system design can be modified when necessary. The system is therefore better prepared for Army Systems Acquisition Review Council meetings.

Given that MANPRINT is a process which identifies risk areas, its use by OPTEC System

Continue on page 5

Teams functions to guide them in composing a more viable SEP, that is, one that includes soldier issues (items such as the MANPRINT management plan or early assessments can serve as input to this process). The evaluation of such issues is part of judging a system's suitability. Note that MANPRINT continues to be an integral part of the test and evaluation process even though some of the related Military Standards and policy documents have been deleted or downgraded as a consequence of the acquisition streamlining initiative. Indeed, with the new mandate for soldier requirements to be a part of the ORD (paragraphs 4 or 5), Mr. Walter W. Hollis, the Deputy Under Secretary of the Army-Operations Research, remarked that "OPTEC will be the conscience for MANPRINT" (29 Sep, 1997, MANPRINT General Officer Steering Committee meeting minutes). Issues in the ORD will be integrated into the TEMP and thus, into the SEP. In a recursive fashion, results of testing are used by the domain community as input for its assessments for the next milestone decision review.

Merging of A Core Value and Vision

OPTEC's Core Value, as stated by MG Lehowicz, is that "OPTEC's ultimate customer is the soldier – my son or daughter, your son or daughter – who will judge our efforts with their lives and mission accomplishment. This is a sacred trust which will not be compromised". MANPRINT as an integral component of OPTEC's T&E procedural package, which also emphasizes realistic environments, realistic test scenarios, and representative samples of the target audience, will help ensure that systems are fielded only when ready.

Dr. Robin L. Keesee, the Director of HRED, saw a fit between the MANPRINT skill base which HRED has augmented and the need for soldier-system information for OPTEC to perform its evaluations. HRED has field elements strategically placed at many of the TRADOC sites and Army Research, Development and Engineering Centers, and by virtue of work performed at the request of Program Managers, the staff has expertise in many systems which OPTEC is preparing to evaluate. Rather than work in parallel on common issues, the partnership agreement ensures that HRED's knowledge can be used as background and input to testing documents.



OPTEC

HRED

With the MANPRINT community providing early and continuous domain support and thereby influencing system design and test design, the probability that fielded systems will be usable and maintainable is enhanced.

MANPRINT Training

MANPRINT Training was revised in Oct 1998 to address Acquisition Streamlining and guidance of the MANPRINT GOSC. The course now consists of four modules:

1. Program Overview
2. MANPRINT and Integrated Concept Teams (ICTs)
3. MANPRINT and Integrated Product Teams (IPTs)
4. MANPRINT and Testing and Evaluation (T&E)

Folks who attended MANPRINT Training prior to Oct 98 are strongly encouraged to attend this updated training as it provides critical information about MANPRINT under Acquisition Streamlining and MANPRINT General Officer Steering Committee guidance.

Tuition and Fees:

No tuition is charged for DoD personnel. For non-DoD personnel the tuition charge is \$66/person/day and is due the first day of class.

MANPRINT Courses

MANPRINT Action Officer Course (MAOC):

This eight-day course is for the MANPRINT Practitioner who needs an understanding of how MANPRINT can influence all aspects of system acquisition. This course consists of all four modules outlined above.

Tailored MANPRINT Training:

These 2-4 day courses can be tailored to the needs of your particular organization.

Examples of Tailored Training:

Personnel in a DCD of a Center and School could receive:
Program Overview and MANPRINT and ICTs. (see POI below)

Personnel in a PM's office could receive:
Program Overview and MANPRINT and IPTs. (see POI below)

Continued on page 7

The instructors at ALMC can help you decide which blocks of instruction would be best for your organization.

More details about the training (such as upcoming class schedules), can be found at www.manprint.army.mil. Follow the "MANPRINT" or "MANPRINT Training" links from the PERTEC Homepage to the MANPRINT Training section.

The POI for the course is outlined below:

MANPRINT Program of Instruction

Module 1: Overview

1. WELCOME/ORIENTATION (REQUIRED FOR ALL CLASSES)

TLO: Introduce faculty, special guests, and students

- Describe course purpose, scope and prerequisites
- Review course schedule
- Provide administrative information

2. MANPRINT OVERVIEW

TLO: Define MANPRINT

- Describe the purpose and objectives of the MANPRINT program
- Discuss MANPRINT and its role in Total System Performance

3. LIFE CYCLE SYSTEM MANAGEMENT MODEL (LCSSM)

4. MANPRINT PROCESS REVIEW

TLO: Describe the MANPRINT process in terms of LCSMM

- Describe key MANPRINT documents and exit criteria in conjunction with LCSMM

5. MANPRINT ORGANIZATIONS AND DOMAINS

TLO: Identify MANPRINT organizations, the U.S. Army MANPRINT Team

- Define and describe the MANPRINT domains of MANPOWER, PERSONNEL CAPABILITIES, TRAINING, HUMAN FACTORS ENGINEERING, HEALTH HAZARDS, SAFETY, AND SOLDIER SURVIVABILITY

- Explain MANPRINT Domain Interaction
- Demonstrate the ability to identify MANPRINT domain issues for systems acquisition

6. Target Audience Description (TAD)

Module 2: MANPRINT IN INTEGRATED CONCEPT TEAMS (ICT)

TLO: Overview: Warfighting ICT to Requirements Documentation ICT

- Duties and responsibilities of the Team in ICTs
 - MANPRINT in MNSs
 - MANPRINT in ORDs
 - ICT Reports and Common Data Elements (CDE)
-

Module 3: MANPRINT IN INTEGRATED PRODUCT TEAMS (IPT)

- Duties and responsibilities of the Team in IPTs.
 - MANPRINT in contracting
 - MANPRINT in RFPs
 - MANPRINT in Source Selection
 - MANPRINT in System Engineering
 - MANPRINT Assessments
 - Demonstrate knowledge of MANPRINT in Contracting, MANPRINT in Systems Engineering and MANPRINT assessments
-

Module 4: MANPRINT IN TESTING AND EVALUATION (T&E)

TLO: Overview

- Duties and responsibilities of the Team in T&E.
- MANPRINT in TEMPs

FY 99 MANPRINT Training Schedule



MANPRINT ACTION OFFICER COURSE (MAOC)



<u>CLASS</u>	<u>START DATE</u>	<u>END DATE</u>	<u>LOCATION</u>
99-703	04 May 99	13 May 99	Ft Huachuca, AZ
99-704	13 Jul 99	22 Jul 99	Ft Leonard Wood, MO
99-002	09 Aug 99	19 Aug 99	Ft Lee, VA
99-706	24 Aug 99	02 Sep 99	Huntsville (AMCOM), AL
99-705	21 Sep 99	30 Sep 99	Ft Gordon, GA



MANPRINT TAILORED TRAINING (APPLICATIONS COURSE)



<u>CLASS</u>	<u>START DATE</u>	<u>END DATE</u>	<u>LOCATION</u>
99-706	09 Mar 99	12 Mar 99	Ft Eustis, VA
99-707	23 Mar 99	25 Mar 99	Huntsville (AMCOM), AL
99-702	20 Apr 99	22 Apr 99	Ft Belvoir, VA
99-704	25 May 99	28 May 99	Ft Gordon, GA
99-708	08 Jun 99	11 Jun 99	Natick, MA
99-705	22 Jun 99	25 Jun 99	Rock Island, IL
99-709	03 Aug 99	06 Aug 99	Warren, MI

(POC: Mr. Len Girling, COM (804) 765-4361, DSN 539-4361)

MANPRINT INFORMATION

Articles, comments, and suggestions are welcomed. Submit to: MANPRINT Quarterly, HQDA (DAPE-MR), 300 Army Pentagon, Washington, DC 20310-0300; DSN 225-7035, COM (703) 695-7035, FAX (703) 697-1283, E-mail: simmoms@hqda.army.mil

POLICY: Department of the Army, ODCSPER, ATTN: DAPE-MR, 300 Army Pentagon, Washington, DC 20310-0300, DSN 225-7035, COM (703) 695-7035.

DIRECTORY OF DESIGN SUPPORT METHODS: Defense Technical Information Center–MATRIS Office, DTIC-AM, 53355 Cole Road, San Diego, CA 92152-7213, DSN 553-7006, COM (619) 553-7006, E-mail: ddsm@dticam.dtic.mil, and World Wide Web: <http://dticam.dtic.mil/hsi/>

MANPRINT DOMAIN POCs:

MANPOWER, PERSONNEL & TRAINING:

Mr. Steve Dwyer, U.S. Army Training and Doctrine Command, ATTN: ATCD-RP, Fort Monroe, VA 23651-5000, DSN 680-3477, COM (804) 727-3477, FAX: xxx-2483, E-mail: dwyers@monroe.army.mil. Mr. Arthur L. Pridemore, U.S. Total Army Personnel Command, ATTN: TAPC-PLC-M, 200 Stovall Street, Alexandria, VA 22332-0406, DSN 221-2024, COM (703) 325-2024, FAX: xxx-0657, E-mail: pridemoa@hoffman-emh1.army.mil

HUMAN FACTORS ENGINEERING: Dr. Edwin R. Smootz, Chief, Human Factors Integration Division, HRED, Army Research Laboratory, ATTN: AMSRL-HR-M, Aberdeen Proving Ground, MD 21005-5425, DSN 298-5817, COM (410) 278-5817, FAX: xxx-8823, E-mail: esmootz@arl.army.mil

SYSTEM SAFETY: Mr. Dwight Lindsey, U.S. Army Safety Center, ATTN: CSSC-ISE, Fort Rucker, AL 36362-5363, DSN 558-2046, COM (334) 255-2046, FAX: xxx-9528, E-mail: lindseyd@rucker-safety.army.mil

HEALTH HAZARDS: Mr. Mike McDevitt or Mr. Bob Gross, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), ATTN: MCHB-DC-OHH, Aberdeen Proving Ground, MD 21010-5422, DSN 584-2925, COM (410) 671-2925, FAX: xxx-1016, E-mail: robert.gross@apg.amedd.army.mil and World Wide Web: <http://chppm-www.apgea.army.mil/hha>

SOLDIER SURVIVABILITY: Mr. Richard Zigler, U.S. Army Research Laboratory, ATTN: AMSRL-SL-I, Aberdeen Proving Ground, MD 21005-5068, DSN 298-8625, COM (410) 278-8625, FAX: xxx-7254, E-mail: rzigler@arl.army.mil



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Acting Director for Personnel Technologies

The MANPRINT Quarterly 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 seven domains of personnel capabilities, manpower, training, human factors engineering, system safety, health hazards and soldier survivability. 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 prepared quarterly under contract for the Personnel Technologies Directorate, Office of the Deputy Chief of Staff for Personnel under the provisions of AR 25-30 as a functional bulletin.

READER'S RESPONSE

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