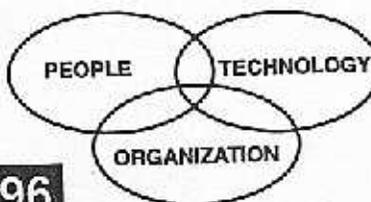




MANPRINT Quarterly

Vol. IV, No. 3 Summer 1996



The Director's Corner

MANPRINT was given a solid foundation in the new DoD 5000.2-R, as described in the lead article by LTC Howell and in the MANPRINT "Tear Out." Retention of the requirement for Human Systems Integration (HSI) in the new 5000.2-R is the product of positive support and policy guidance from the Assistant Secretary of the Army for Manpower and Reserve Affairs, the Honorable Sara E. Lister, and her Principal Deputy, Mr. Archie D. Barrett; the Assistant Secretary of the Army for Research, Development and Acquisition, the Honorable Gilbert F. Decker; the Deputy Undersecretary of the Army for Operations Research, Mr. Walter W. Hollis; and the Deputy Chief of Staff for Personnel, LTG Theodore G. Stroup, Jr. Much of the credit for the clarity of the 5000.2-R sections on HSI goes to Ms. Nina Richman-Loo and Ms. Pam Bartlett of the Office of the Under Secretary of Defense for Personnel and Readiness. Several Air Force and Navy officers and civilian personnel also made substantial contributions.

Jack H. Hiller
Director for MANPRINT

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MANPRINT AND THE DOD 5000 SERIES DOCUMENTS

by LTC Mitchell A. Howell

Good news practitioners!! Human Systems Integration (HSI), as a program, is here to stay...and for those of you who may have been less than sure of the status, just check out DoD 5000.2-R, Part Four, paragraph 4.3.8. Of course you know that MANPRINT is the Army's execution of the HSI program, and as such, must comply with the intent of the new guidance in the revised DoD documents. To this end, the MANPRINT Directorate is currently revising the guidance provided in AR

602-2, "MANPRINT in the System Acquisition Process."

The basic thrust of the 5000 series revision is to reduce the bureaucratic hurdles to be negotiated by Program Managers (PMs) during program planning and execution. In other words, the PM is allowed to "custom tailor" his program in accordance with his assessment of value added and best commercial practices to meet his cost, schedule, and performance goals. Gone are the days when

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Manpower and Personnel Integration (MANPRINT) and the Bradley Fighting Vehicle

by Master Sergeant Carl Goins
and

John E. Hodges

MANPRINT Division, Deputy Chief of Staff for Plans, Force Integration and Analysis
U.S. Total Army Personnel Command
(DCSPLANS, PERSCOM)

Can MANPRINT be implemented in a system after fielding? **The answer is yes!** The M2 and M3 (Bradley) were developed and fielded prior to MANPRINT's initiation. However, as improvements were developed for the Bradley, a significant MANPRINT effort was implemented by Combat Developers (CD), Program Managers (PM), TRADOC System Managers (TSM), and Contractors. Their dedication resulted in "soldier focused" improvements for the Bradley A1 and A2 versions, the A2 Operation Desert Storm (ODS) configuration, and the A3.

The upgrades for the A2 included: an improved power train with a 600 horsepower engine and upgraded suspension for increased speed and maneuverability; mounting provisions for armor tiles, 30mm armor protection, and spall liners in the squad compartment (for enhanced system and *soldier survivability*); ammunition restowage; and a SINCGARS radio for communication with the M1A2 Abrams tank.

Taking advantage of Lessons Learned is a valuable MANPRINT technique. After Operation Desert Storm, soldiers recommended additional improvements for the Bradley A2 "ODS." Some of these were: revised gunner and commander hand stations, with additional controls for operating the laser rangefinder; the Battlefield Combat Identification System (BCIS) for interrogating other vehicles; and the Driver's Viewer Enhanced (DVE), for mobility in all weather, degraded visibility conditions, and total darkness.

The A3 prepares for the "Digitized Battlefield." It integrates many A2 ODS features and includes additional MANPRINT enhancements. Among them are: installation of an electronic architecture structured

around a 1553 databus; an improved land navigation capability (with GPS, inertial navigation, and EPLRS); a 10-man Gas Particulate Filter Unit (GPFU); a second generation Improved Forward Looking Infrared sight (I-FLIR); the Commander's Independent Viewer (CIV); and the Improved Bradley Acquisition Subsystem (IBAS), for increased lethality.

The CIV allows independent day and night searches by the commander and gunner. It automates the "hand-off" to the gunner and gives a true "Hunter-Killer" capability to the A3. The Commander's Tactical Display (CTD) enhances "situation awareness" by providing tactical situation information, communications, system diagnostics, and other mission critical data. It interfaces with the command and control communications system and enables direct digital communication with other A3 Bradleys and M1 Abrams on the battlefield. A second display in the squad area allows the squad and squad leader to selectively view the CTD and IBAS, CIV, or DVE imagery.

The MANPRINT effort on the A3 has been exemplary. The prime contractor, United Defense Limited Partnership (UDLP), has implemented an effective MANPRINT program. MANPRINT domain representatives participate in weekly meetings. They track, review, discuss, and resolve issues. An energized Human Factors Engineering (HFE) effort is also part of the MANPRINT Program. They have used an Anthropometric 3D Man-Modeling Tool to solve design issues and provide alternative sites for placement of components.

Another important feature of their program is **rapid prototyping** of the "soldier-machine" interface

of the Commander's Tactical Display (CTD) command and control software, by using the Authorware® Professional™ authoring tool. Rapid prototyping provided a way for MANPRINT personnel and software engineers to analyze the proposed design and provide improvements early and at modest expense. The prototype has been updated several times for user demonstrations and "fine-tuning." This effort continues.

An additional high payoff effort by UDLP is the "Combat Simulation and Integration Laboratory" (CSIL). The CSIL serves many purposes, including: development of software, integration of software and hardware, Proof-of-Principle testing, validation by User Juries, demonstrations, etc.

User Juries are a vital element of a successful MANPRINT effort. Their use can eliminate many problems prior to formal testing. With the leadership of the TSM and PM, operators and maintainers have been

brought to the CSIL. There they review and make recommendations on operation and effectiveness of system interfaces and components. They participate each step of the way from "mock ups" and simulations, to "brass-board" prototypes, to final component.

The Program Manager is personally committed to MANPRINT, and his staff is thoroughly focused on the soldier. The Program Manager's Office (PMO) hosted the most recent MANPRINT Joint Working Group (MJWG) meeting, held in San Jose, CA. The MJWG reviewed the A3 MANPRINT Program and initiated review of all outstanding issues.

The Bradley is constantly being improved with "state of the art" technology and each version offers improved system performance. The integration of MANPRINT into Bradley development clearly demonstrates how to enhance Total System Performance.

Meetings of Interest



Strategies Leading to Expert System Success: Lessons Learned, Pitfalls and Overcoming Obstacles



26 - 29 August 1996

U.S. Army Logistics Management College
Fort Lee, VA 23801-1705

POC: Mr. Dennis Fuller

Commercial: 804-765-4226

DSN: 539-4226



Association of the United States Army (AUSA) Annual Meeting

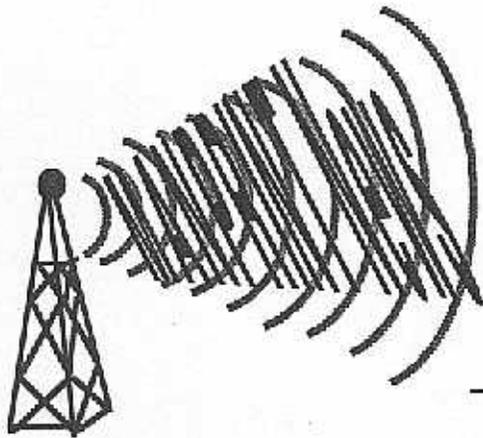
14 - 16 October 1996

Sheraton Washington Hotel
2660 Woodley Road, at Connecticut Avenue, N.W.
Washington, D.C. 20008

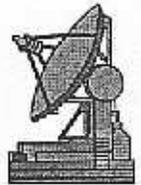
Omni Shoreham Hotel
2500 Calvert Street, N.W.
Washington, D.C. 20008

Metro Rail Red Line: Woodley Park/Zoo Station

Non-members of the AUSA may register at the Sheraton Washington.



Getting the Word Out



- Due to the latest revisions of the DoD 5000 series, DCSPER is in the process of updating AR 602-2. Draft AR 602-2 was sent out for review and comment on 12 June 1996. The revised regulation stresses the importance of cooperation among everyone involved in acquisition, and urges heavy participation by the User's Representative throughout the entire systems life cycle.
- DCSPLANS, PERSCOM, in coordination with the Army Logistics Management College (ALMC), is heading up an assessment of current MANPRINT training. A training survey was developed and sent to over 350 randomly selected MANPRINT practitioners. The response rate was over 50% (thanks, folks!). Analysis of the results is ongoing. We will keep you posted.
- Also concerning training, the MANPRINT Training Steering Committee will meet at PERSCOM on 24 July 1996. The committee consists of representatives from each of the seven MANPRINT domains. They meet semi-annually to review the current training program and exchange ideas concerning training needs and future enhancements.
- A great deal of interest has been expressed in the status of the "How-To" Guide. "MANPRINT in AIS - A 'How-To' Guide for the MANPRINT Action Officer" was made available in March of 1995. This was expanded to include materiel systems, with completion in December 1995. Distribution of the expanded guide, unfortunately, was precluded by the revisions to the DoD 5000 series, and we have been

working to revise the guide to reflect the new acquisition streamlining initiatives. We think the guide will be very useful. It contains an overview of MANPRINT; describes the acquisition life cycle; and discusses the SMMP, the MJWG, and the MANPRINT Assessment process. It details important MANPRINT activities by life cycle phase and provides recommendations on how to accomplish them. There is also an appendix providing POC (complete with names, addresses, and phone numbers) for those agencies that should be represented on the MJWG. Information on how to get a copy of the Guide will be made available in the next issue of the MANPRINT Quarterly.

- Speaking of POC—we are in the process of updating the annual MANPRINT Directory. The 1996 edition should be on its way to the printers by the time you read this. Copies should be requested by fax to DSN 227-1283, COM 703-697-1283.
- MANPRINT SYMPOSIUM. Due to the unavailability of suitable facilities and for planning purposes, we have decided to postpone our Fall 96 symposium until Spring 97. Look for more news in the upcoming editions of the MANPRINT Quarterly.
- Last, but not least, we'd like to encourage any of you out there who have interesting stories or insights about MANPRINT to write or call and let us know about them. You out there practicing in the field have a lot to share with your fellow MANPRINT practitioners. We look forward to hearing from you. The next issue of the MANPRINT Quarterly will be published in the September/October timeframe.

Transitions

Farewell:

LTC Mitch Howell, previously charged with marketing, training, and assessment duties for the MANPRINT Directorate. Mitch is now assigned, effective July 1996, Chief of Acquisition, Joint Logistics Advanced Concept Technology Demonstration, Logistics Anchor Desk, U.S. Army Materiel Command. We would like to take this opportunity to thank him for his outstanding contributions to the MANPRINT program and wish him well in his new assignment.

Welcome:

LTC Larry Thurman, Acquisition Corps (IN)...Larry joined the MANPRINT Directorate as Chief, OIPT Team, on 17 June. He previously served as Senior Test Evaluation Officer, Test and Experimentation Command (TEXCOM), U.S. Army Operational Test and Evaluation Command (OPTEC).



MANPRINT Training Schedule



MANPRINT Action Officer Courses

FY 96		
Class	Date	Location
96-706	30 Jul - 8 Aug 96	Fort Monmouth, NJ
96-002	9-19 Sep 96	USALMC, Fort Lee, VA

FY 97		
Class	Date	Location
97-701	22-31 Oct 96	Fort Bliss, TX
97-702	3-12 Dec 96	Fort Hood, TX
97-001	27 Jan - 6 Feb 97	Fort Lee, VA
97-703	11-20 Mar 97	Fort Huachuca, AZ
97-704	15-24 Apr 97	Fort Eustis, VA
97-002	12-22 May 97	Fort Lee, VA
97-705	11-21 Aug 97	Redstone Arsenal, AL
97-003	15-25 Sep 97	Fort Lee, VA

MAISRC Workshops

Class	Date	Location
96-714	10-12 Sep 96	Fort Belvoir, VA
96-715	24-27 Sep 96	Fort Huachuca, AZ

MANPRINT Workshops

FY 96		
Class	Date	Location
96-713	20-22 Aug 96	Redstone Arsenal, AL

FY 97		
Class	Date	Location
97-701	8-11 Oct 96	Rock Island Arsenal, IL
97-702	23-24 Oct 96	Fort Knox, KY
97-703	5-8 Nov 96	Fort Sill, OK
97-704	19-22 Nov 96	Fort Huachuca, AZ
97-705	14-17 Jan 97	Fort Rucker, AL
97-706	25-28 Feb 97	Fort Bragg, NC
97-707	25-28 Mar 97	Washington, DC (PERSCOM)
97-708	29 Apr - 2 May 97	Fort Bliss, TX
97-709	6-9 May 97	Redstone Arsenal, AL
97-710	10-13 Jun 97	TACOM, Warren, MI
97-711	17-20 Jun 97	TACOM, Warren, MI
97-712	24-27 Jun 97	Fort Gordon, GA
97-713	29 Jul - 1 Aug 97	Picatinny Arsenal, NJ
97-714	5-8 Aug 97	Fort Leonard Wood, MO
97-715	9-12 Sep 97	Fort Hood, TX
97-716	30 Sep - 3 Oct 97	Rock Island Arsenal, IL

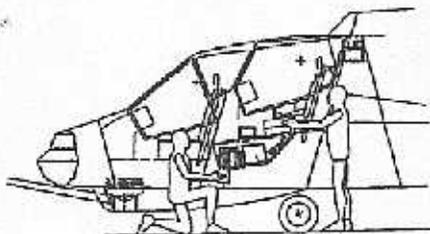
MANPRINT Training POC: CPT Mark Carmody or SFC Irvin Raveneau, (703) 325-1560/8422, DSN 221-1560/8422.

(Continued from page 1)

you could beat the PM about the head and shoulders with a regulation saying, "You must do this whether or not it makes sense." Gone are the days when you could wait until the end of a program or just prior to a Milestone Decision Review (MDR) and say "gotcha." Oh no, *now, you must be a team player; i.e., participate up front and early* in the process so that *all known issues, problems, and concerns can be placed on the table during program execution...* Oh by the way, when you bring up problems, issues, and concerns, *you must also put solutions on the table.* You are, by regulation (and by virtue of your responsibilities to the soldier), empowered and required to do so.

Well I don't know about you, but I think that this is great news! We now have the opportunity to show just how valuable MANPRINT is to the PM, the Army, and the entire DoD. Let's take a moment to examine the implications of these changes.

MANPRINT is the essence of value added, because **everything, every doggone thing** that we research, develop, or acquire **requires** some kind of human interface. Nothing is exempt. Software must be programmed and installed. Hardware must be moved. The system or equipment must be maintained. The bottom line is that, somewhere in the



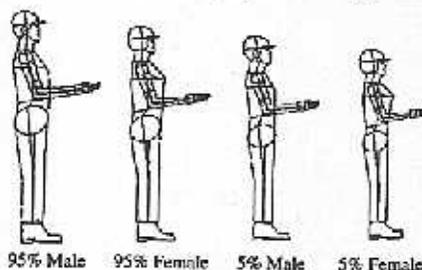
total life cycle of a system, man must interface or provide input. Our challenge is to cast off the existing constraints (pre-5000.2R mindsets) and implement innovative methods to show how and where value is added. Let me give you a few techniques that I use as examples.

The first thing I try to do each morning is to remember who my basic customer is and why I

have this job. No matter how you cut, rationalize, or package it, your answer should be the same as mine: the soldier.

The second thing I do is to evaluate my thought process from that soldier's perspective. This generates positive statements for me like the following:

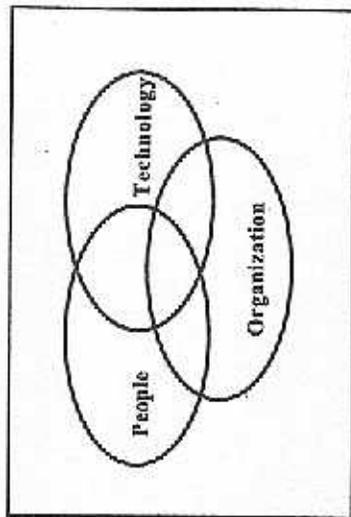
- a. Soldier performance affects system performance;
- b. Skill is a function of aptitude and training;
- c. Soldier performance can be measured by time and accuracy;
- d. Equipment design determines soldier tasks; and
- e. Make the designer responsible for the soldier's performance, i.e., design a system to meet the specified requirement that can be operated both efficiently and effectively by the target user.



The third thing I try to do is to determine how MANPRINT can help the soldier cope with the dwindling resource problem. In effect, there are four basic resources that constantly impact the soldier from a MANPRINT perspective: time, money, materiel, and personnel. What does this mean? Well, there is never enough time to build a system correctly (do it right) or to train to a 100% standard—but after a soldier is injured or killed, there is somehow always time and money to fix it. There are not enough systems (materiel) or personnel to allow us the luxury to field large units, proliferate military occupational specialties (MOS) or additional skill identifiers (ASI), or to replace casualties at will. There is never enough money to buy

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THE MANPRINT GOAL:
TOTAL SYSTEM PERFORMANCE



WHAT IS MANPRINT? The comprehensive management and technical effort to ensure total system effectiveness by integration of work from the seven MANPRINT domains: Manpower (M), Personnel Capabilities (P), Training (T), Human Factors Engineering (HFE), Health Hazards (HH), System Safety (SS), and Soldier Survivability (SSv). MANPRINT originated as an Army initiative under the direction of General Maxwell Thuman and was later adopted by the DoD under the name Human Systems Integration (HSI).

The 1996 revision of the DoD 5000 series documents greatly streamlined previous bureaucratic requirements to enable Program and Product Managers (PM) to custom tailor

Personnel Capabilities

The cognitive and physical capabilities required to be able to train for, operate, maintain, and sustain materiel and information systems.

Manpower

The number of military and civilian personnel required and potentially available to operate, maintain, sustain, and provide training for systems, in accordance with Title 10, U.S. Code Armed Forces, Sec. 2434.

System Safety

The design features and operating characteristics of a system that serve to minimize the potential for human or machine errors or failures that cause injurious accidents.

Training

The instruction or education, and on-the-job or unit training required to provide personnel and units with their essential job skills, knowledge, values and attitudes.

Human Factors Engineering

The integration of human characteristics into system definition, design, development, and evaluation to optimize human-machine performance under operational conditions.

Health Hazards

The design features and operating characteristics of a system that create significant risks of bodily injury or death; prominent sources of health hazards include: loud noise, chemical and biological substances, extreme temperatures, and radiation energy.

Soldier Survivability

The characteristics of a system that can reduce fratricide, detectability, and probability of being attacked, as well as minimize system damage, soldier injury, and cognitive and physical fatigue.

required for major acquisitions.

Appendix II, Operational Requirements Document, para 5c: HSI Mandatory Procedures and Format. HSI domains must be addressed.

Appendix III, Test and Evaluation Master Plan, Mandatory Procedures and Formal, page 4, part IV, para a2: Human-in-the-loop testing is required with typical users.

ARMY IMPLEMENTATION OF HSI

The upcoming revised Army Regulation (AR) 602-2, MANPRINT, the Army's Human Systems Integration Process for Systems Acquisition, provides implementing guidance for the 5000 series for the seven independent MANPRINT domains and the Army organizations that conduct MANPRINT functions, **WITHOUT CREATING ANY ADDITIONAL WORK REQUIREMENTS FOR PMs OR ACQUISITION OFFICIALS.** The MANPRINT Directorate in the ODCSPER ensures integration of MANPRINT domain work for the HQDA staff across all stages of the systems life cycle.

For more information about MANPRINT/HSI, contact:

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or

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