Army Regulation 602–2

19 April 1990

Soldier-Materiel Systems

Manpower and Personnel Integration (MANPRINT) in Materiel Acquisition Process

Headquarters
Department of the Army
Washington, DC
Issue Number 1
17 April 1987

SUMMARY of CHANGE

AR 602-2
Soldier-Materiel Systems
Manpower and Personnel
Integration (MANPRINT) in the
Materiel Acquisition Process

This is a new regulation. It describes policies and procedures and assigns responsibilities for the MANPRINT program in the Department of the Army.

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Effective 18 May 1987

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Manpower and Personnel Integration (MANPRINT) in the Materiel Acquisition Process

This UPDATE printing publishes a new Army regulation that is effective 18 May 1987.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Summary. This regulation prescribes policies and procedures and assigns responsibilities for the Manpower and Personnel Integration (MANPRINT) Program in the Department of the Army. It establishes a requirement for the MANPRINT Management Plan. MANPRINT is an umbrella concept encompassing human factors engineering, manpower, personnel, training, health hazard assessment, and system safety. The focus of MANPRINT during the life-cycle system management of Army materiel is on influencing materiel systems design and associated support requirements so that developmental, nondevelopmental, and product-improved systems can be operated and maintained in the most cost effective and safest manner consistent with manpower structure, personnel aptitude and skill, and training resource constraints of the Army.

Applicability. This regulation applies to the Active Army, the Army National Guard, and the U.S. Army Reserve.

Impact on New Manning System. This regulation does not contain information that affects the New Manning System.

Internal control systems. This regulation is subject to the requirements of AR 11–2. It contains internal control provisions, but does not contain checklists for conducting internal control reviews. These checklists are being developed and will be published at a later date.

Supplementation. Supplementation and establishment of forms other than DA forms are prohibited without prior approval from HQDA (DAPE–ZAM), WASH DC 20310–0300.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

Suggested improvements. The proponent agency of this regulation is the Office of the Deputy Chief of Staff for Personnel. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA (DAPE–ZAM), WASH DC 20310–0300.

Distribution. Distribution of this publication is made in accordance with DA Form 12–9A–R requirements for 602-series publications. The number of copies distributed to a given subscriber is the number of copies requested in Block 279 of the subscriber's DA Form 12–9A–R. AR 602–2 distribution is D for the Active Army, ARNG, and USAR. Existing account quantities will be adjusted and new account quantities will be established upon receipt of a signed DA Form 12–9U–R (Subscription for Army UPDATE Publications Requirements) from the publications account holder.

Contents (Listed by paragraph number)

Chapter 1
Introduction

1–1. Purpose

This regulation—

a. Establishes policies, procedures, documentation requirements, and responsibilities for establishing and supporting Manpower and Personnel Integration (MANPRINT).

b. Emphasizes front-end planning of soldier-materiel system design for optimum total system performance as part of the Army materiel systems acquisition process. (See AR 1000–1.)

1–2. References

Required and related publications listed in appendix A.

1–3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

1–4. Policies

a. MANPRINT will be used to integrate combat, training, and materiel development with personnel resources, capabilities, and constraints during all phases of the life-cycle of materiel systems (to include developmental, non-developmental, and product improvements) as well as nonstandard commercial equipment procurement by major Army commands (MACOMs). MANPRINT will be applied to the principal item of equipment, associated support items of equipment, other support equipment, and training devices. MANPRINT will be accorded equal priority with all other system characteristics to ensure effective man-materiel interface.

b. The format of the System MANPRINT Management Plan (SMMP) at appendix B will be the standard for all combat, training, and materiel developers.

c. MANPRINT assessment will be a separate major area in source selection and evaluations.

d. Human factors engineering, biomedical, system safety, or behavioral research will be conducted in a timely manner to address gaps that exist in human performance data. (See AR 602–1.)

e. The combat developer and the materiel developer will develop detailed plans and procedures for establishing, supporting, and evaluating the six domains of MANPRINT. Prior to program initiation the combat developer, assisted by the training developer, is responsible to perform or coordinate formal studies, analyses, evaluations, and modeling on the proposed materiel system to determine initial MANPRINT requirements. At program initiation, or upon appointment of a program manager (PM) the materiel developer has overall responsibility for the MANPRINT efforts in accord with AR 70–17. Integrated logistics support will be an integral part of the evaluation and analytical efforts. (See AR 700–127.)

f. Human factors engineering analysis (HFEA) will be prepared in accordance with AR 602–1 on all Army major, designated acquisition, and in-process review (IPR) programs. Waiver of the HFEA requires approval of the Deputy Chief of Staff for Personnel (DAPE–ZAM) for Department of Defense (DOD) major programs and designated acquisition programs (DAPs); waiver of HFEA for IPR systems requires materiel developer and combat developer joint approval.

g. The user representative will prepare a target audience description.

1–5. The MANPRINT Program

a. MANPRINT refers to the comprehensive management and technical effort to assure total system effectiveness by continuous integration into materiel development and acquisition of all relevant information concerning the following:

(1) Human factors engineering.
(2) Manpower.
(3) Personnel.
(4) Training.
(5) System safety.
(6) Health hazards.

b. The philosophy of the MANPRINT Program is to have the Army and industry take necessary actions to answer the question: Can this soldier with this training perform these tasks to these standards under these conditions?

c. MANPRINT includes but is not limited to the following:

(1) Integration of all actions in the materiel acquisition process affecting human performance and reliability. This includes human factors engineering, manpower levels, personnel requirements, training requirements and methods (including training devices), system safety, and health hazards.

(2) Developing equipment that will permit effective soldier-materiel interaction within the established performance limits, training time, soldier aptitudes and skills, physical capabilities, and physiological tolerance limits.

(3) Determining and evaluating requirements for overall system performance requirements based upon capabilities and limitations of soldier performance.

(4) Developing and applying methodologies to analyze human factors engineering, manpower levels, personnel, training, system safety, and health hazard issues in an integrated manner.

(5) Developing, maintaining, and using data bases containing human factors, human performance, manpower, personnel, training, system safety, and health hazard information.

(6) Selecting, defining, and developing soldier-materiel interface characteristics; work space layout, work environment, and effective transfer of operator-maintainer skills for similar tasks on similar equipment. The process of developing and defining a work environment includes detailed analyses of the proposed environment on the health and safety of operator and support personnel. Analyses of the work environment also includes consideration of the physical and cognitive demands on personnel based on the operating tempo of the unit in both a training and combat environment.

(7) Determining human performance requirements for new systems and product improved systems and matching available human aptitudes with training concepts (including training devices and publications) to produce required skills.

(8) Providing basic soldier-materiel system task sequence data to describe, develop, and assess the human performance required in a soldier-materiel system.

(9) Determining the numbers and types of soldiers and civilians needed for manning a system to provide for subsequent personnel planning and training; providing data needed for establishing new military occupational specialty (MOS), additional skill identifier (ASI) or special qualification identifier (SQI) for new or improved materiel systems, doctrine, and force or unit structure.

(10) Assessing the manpower, personnel, and training burden that materiel design or development concepts may impose on the Army.

(11) Confirming the effectiveness of MANPRINT by evaluating the soldier-materiel systems and unit performance.

(12) Applying, as appropriate, MANPRINT methodologies to development items, nondevelopment items, and product improved Army materiel systems throughout each phase of the acquisition cycle.

(13) Integration of personnel assignment policies to ensure that specifically trained soldiers are assigned to units and positions for which trained.

d. The objectives of the MANPRINT program are to—

(1) Influence soldier-materiel system design for optimum total system performance by considering human performance and reliability issues related to human factors engineering, manpower, personnel, training, system safety, and health hazards before making a functional allocation of tasks among people, hardware, and software.

(2) Ensure that Army materiel systems and concepts for their employment conform to the capabilities and limitations of the fully equipped soldier to operate, maintain, supply, and transport the materiel in its operational environment consistent with tactical requirements and logistic capabilities.

(3) Assist the Army trainer in determining, designing, developing, and conducting sufficient, necessary, and integrated Army and joint service training.

(4) Improve control of total life-cycle costs of soldier-materiel systems by ensuring consideration of the costs of personnel resources and training for alternative systems during the conceptual stages and for the selected system during subsequent stages of acquisition.

(5) Ensure through studies and analyses and basic and applied research (human factors engineering; soldier-materiel system analysis; and experimental, physiological, and psycho-physical psychology) that

equipment designs and operational concepts are compatible with the limits of operators and maintainers defined in the target audience description.

(6) Develop a unified, integrated MANPRINT data base to define ranges of human performance. Compare these ranges against system performance and provide for the timely development of trained personnel.

(7) Provide MANPRINT data for the development of technical manuals, training manuals, field manuals, and other training media and technical publications. Ensure that the use of these publications does not require aptitudes, education, or training beyond the requirements set to perform the tasks they describe.

(8) Apply MANPRINT concepts and current educational technology to analysis, design, and development of training devices.

(9) Influence the manpower, personnel, and training (MPT) related objectives of the integrated logistics support (ILS) process.

(10) Integrate combat development and technology base information systems with personnel long-range planning.

(11) Ensure that personnel trained for specific force modernization systems (by MOS and ASI) are assigned to units and positions for which trained and that they are assigned in sufficient quantity to support fielding and sustainment.

1-6. Filing and records keeping

A MANPRINT case file will be established by all organizations involved in MANPRINT activities by system. (See AR 340-18.)

Chapter 2
Responsibilities

2-1. Deputy Chief of Staff for Personnel (DCSPER)

The DCSPER will—

a. Exercise primary DA staff responsibility for the MANPRINT Program.

b. Develop, coordinate, and disseminate MANPRINT Program policy and guidance to all Army commands and agencies.

c. Review and monitor materiel objectives, requirements documents, systems MANPRINT management plans, acquisition plans, and other activities in materiel development or improvement to assure that MANPRINT is addressed early and continuously in the development of total system performance requirements.

d. Provide behavioral sciences and human factors engineering research support to ensure the scientific basis for MANPRINT including the processing of research, development, test, and evaluation (RDTE) funding requirements. The DCSPER research program is executed through the following agencies:

(1) The U.S. Army Research Institute (ARI) for the Behavioral and Social Sciences, a field operating agency of DCSPER. (See AR 70-8.)

(2) The Human Engineering Laboratory (HEL), the Army's lead laboratory for human factors engineering, and agency of the U.S. Army Laboratory Command (LABCOM). (See AR 602-1.)

e. Provide for professional coordination and collaboration among human factors engineering, system safety, biomedical, manpower, personnel, and training specialists.

f. Develop instruction in coordination with the Deputy Chief of Staff for Operations and Plans who will ensure expeditious revision of authorization documents to reflect new or changed MOS, ASI, or SQI required by the systems being developed or improved.

g. Approve and verify data contained in qualitative and quantitative personnel requirements information (QQPRI) submissions. (See AR 71-2.)

h. Provide an overall systems safety policy for developing or improving systems. (See AR 385-16.)

i. Review, through the U.S. Army Safety Center (USASC), materiel assessment inputs to the HFEA.

j. Prepare through the USASC, safety lessons learned for MANPRINT analysis and provide input as required to the automated MANPRINT data base.

k. Approve and distribute methodologies to be used by the Army in forecasting manpower and personnel requirements.

l. Appoint the DA personnel systems staff officer (PERSSO) for DOD major programs, DAPs, and selected IPR programs.

m. Ensure that MANPRINT is integrated into materiel system requirements, development, acquisition, and product improvement.

n. Serve as a regular member of the Army System Acquisition Review Council (ASARC) in accordance with AR 15-14 and conduct pre-ASARC MANPRINT reviews.

o. Ensure that personnel assignment policies are established that provide for assignment of specially trained personnel to units and positions for which trained in time to support fielding and sustainment.

2-2. Deputy Chief of Staff for Logistics (DCSLOG)

The DCSLOG will—

a. Ensure interface of MANPRINT in the Army ILS program for all developmental, nondevelopmental, and product-improved systems and for logistics research and development.

b. Establish Army policy and guidance to integrate MANPRINT with the ILS process. (See AR 700-127.)

c. Monitor the MANPRINT efforts, in coordination with other Army staff agencies, to ensure effective policy implementation.

2-3. Deputy Chief of Staff for Research, Development, and Acquisition (DCSRDA)

The DCSRDA will—

a. Include RDTE funds for MANPRINT in the annual submission for the Program 6 budget.

b. Establish Army policy and guidance for integrating MANPRINT within the research and development community.

c. Ensure the adequacy of MANPRINT before production of materiel in coordination with Headquarters, Department of the Army (HQDA), Office of the DCSPER (ODCSPER).

d. Ensure application of MANPRINT in system modification or product improvement actions in coordination with HQDA, ODCSPER.

e. Ensure the inclusion of MANPRINT issues in the technical test (TT) program and other tests and evaluations.

f. Ensure that MANPRINT status and issues are briefed by the TRADOC Systems Manager (TSM) and/or PM during each review of a new system, specifically to include the two star preliminary review and the ASARC itself. (See AR 15-14.)

2-4. Deputy Chief of Staff for Operations and Plans (DCSOPS)

The DCSOPS will—

a. Ensure application of MANPRINT methodologies in combat developments during the preparation of initial and subsequent requirements documents and in the review of acquisition objectives for total system feasibility.

b. Identify and resolve training issues.

c. Ensure the inclusion of relevant MANPRINT data in establishing requirements for training devices for new equipment; institutional, unit, and joint service training; and in developing table of organization and equipment and table of distribution and allowances.

d. Ensure the inclusion of MANPRINT issues in user testing (UT) and evaluations.

e. Ensure MANPRINT is addressed by all Special Task Forces (STF) in accordance with AR 71-9.

f. Develop and disseminate training guidance and constraints for materiel acquisition to include training devices, hardware, and software.

g. Establish Army policy and guidance for integrating MANPRINT in the Army training program.

h. Ensure that MANPRINT is considered in basis of issue plan (BOIP)/QQPRI policy. (See AR 71-2.)

i. Collect and report through U.S. Army Development and Employment Agency (ADEA) appropriate MANPRINT data for the areas specified in paragraph 1-5*a* for systems tested by ADEA.

2-5. Assistant Chief of Staff for Information Management (ACSIM)

The ACSIM will—

a. Establish policy and guidance to integrate MANPRINT considerations into the preparation of requirements documents and the development and acquisition of information management systems.

b. Identify and incorporate criteria in the spectrum management process to guard against the effects of electromagnetic radiation hazards, as identified by The Surgeon General, for Army personnel operating radio and radar systems.

c. Ensure application of MANPRINT methodologies to hardware and software development, modification, and acquisition programs that come under the responsibility of the information management agency.

2–6. Assistant Chief of Staff for Intelligence (ACSI)

The ACSI will—

a. Establish threat policy in support of combat, training, and materiel development activities. (See AR 381–11.)

b. Establish policy and guidance to integrate MANPRINT considerations into the development and acquisition of intelligence and security materiel systems.

2–7. The Surgeon General (TSG)

TSG will—

a. Provide consultation and advice to the Army staff and developing agencies on medical aspects of MANPRINT, including health hazard assessments, psychological-biological considerations, lessons learned, constraints, and guidelines. (See AR 40–10.)

b. Establish and issue all medical policies, health standards, exposure limits, or other policies that relate exposure of personnel to actual or potential health hazards throughout the materiel development and acquisition cycle.

c. Develop the medical and health standards data bases needed to support HFEA in Army systems.

d. Perform the appropriate medical RDTE tasks for non-medical development and acquisition programs.

e. Coordinate with appropriate Army Medical Department (AMEDD) agencies and commands to accomplish health hazard assessments in response to requests for medical support. Serve as the approval authority for all health hazard assessment reports, which will be forwarded through command channels for inclusion in HFEAs.

2–8. Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC)

The CG, TRADOC will—

a. Ensure MANPRINT is considered and reported in mission area analysis (MAA) and doctrinal, combat, and training developments.

b. Develop target audience descriptions for use by combat, training, and materiel developers and contractors for developmental, nondevelopmental, and product-improved materiel systems. Target audience descriptions will provide as a minimum the following information on each MOS that will operate, maintain, or support a new or improved item of equipment:

(1) Projected force structure authorizations by grade and operating strength percentage and the standards of grade authorizations.

(2) MOS/civilian designation and description.

(3) Anthropometric data.

(4) Physical qualifications.

(5) Aptitude institution for Armed Forces Qualification Test (AFQT), quality distribution, and area aptitude scores.

(6) Biographical information or civilian education, percentage with English as a second language, and gender mix.

(7) Skills and knowledge trained during advanced individual training and noncommissioned officer (NCO) training.

(8) Task performance information (by skill level if available).

c. Develop a SMMP in conjunction with AMC for each development, non-development, or product-improved materiel system.

d. Coordinate and provide MANPRINT information to the materiel developer for execution in all materiel programs. This includes documenting the requirements for materiel developers' MANPRINT related efforts such as HFEA, health hazard assessments, and logistic support analysis in the SMMP.

e. Ensure that requirements documents produced under AR 71–9 include adequate specification of MANPRINT requirements (including minimum standards of soldier performance for critical operation, maintenance, and training tasks as well as the maximum tolerable training burden).

f. Prepare the Individual and Collective Training Plan (ICTP), which integrates the MANPRINT goals, constraints, and requirements as stated in the SMMP and defines the total system training strategy (see glossary), to include training devices and training aids.

g. Provide MANPRINT data on materiel systems to Director, U.S. Army Human Engineering Laboratory, ATTN: SLCHE–FS, Aberdeen Proving Ground, MD 21005–5001, for inclusion in the HFEA.

h. Recommend to ODCSPER (DAPE–ZB), when appropriate, research and development projects in the field of education and training as a result of MANPRINT issues involving unusual skills or learning processes.

i. Provide manpower, personnel, and training lessons learned to Commander, Materiel Readiness Support Activity (MRSA), ATTN: AMXMD–EI, Lexington, KY 40511–5101, for inclusion in the MANPRINT lessons learned data base.

j. Provide assessments of manpower, personnel, and training implications through the use of ODCSPER-approved methodologies for inclusion in the concept formulation package (CFP). The CFP must state explicit MANPRINT risks and estimated requirements for each alternative.

k. Conduct MANPRINT training for Army Staff agencies and MACOMs.

l. Ensure MANPRINT issues and criteria are provided to testers and evaluators, that test results are collected and disseminated, and that post-fielding analysis is performed. (See AR 71–3.)

m. Ensure representation of individuals qualified by education, training, and experience in the six MANPRINT disciplines on all Special Study Groups (SSGs).

n. Provide resources to proponent centers and schools to perform MANPRINT tasks within TRADOC.

o. Provide support to AMC in developing and maintaining the automated MANPRINT data base.

p. Ensure MANPRINT data are collected during user testing for which TRADOC is responsible and is available for use by other activities for continuous evaluation.

q. Ensure that employment and doctrinal decisions that influence engineering design are analyzed for resource and human performance implications.

r. Include MANPRINT responsibilities in TSM charters.

2–9. Commanding General, U.S. Army Materiel Command (CG, AMC)

The CG, AMC will—

a. Integrate MANPRINT (including inputs from human factors engineering, personnel, training, safety, testing, and medical activities) into the materiel research, development, product improvement, and acquisition.

b. Establish and maintain the MANPRINT data base in coordination with DCSPER, ACSIM, TSG, and CG, TRADOC.

c. Support TRADOC in developing the SMMP and use it as guidance for the formulation of HFEA, health hazard assessment, Test and Evaluation Master Plan (TEMP) and the ILS Plan.

d. Develop, coordinate, and implement human factors engineering, system safety, and training device design, and standards and procedures.

e. Coordinate with TRADOC to ensure that MANPRINT training for Army contractor management and technical personnel involved in the materiel acquisition process is provided.

f. Ensure that system PMs have had MANPRINT training.

g. Perform appropriate basic and applied human factors engineering and system safety RDTE.

h. Ensure the inclusion of MANPRINT in the TT, first article testing (FAT), initial production testing (IPT), and production acceptance test and evaluation (PAT&E).

i. Ensure human factors engineering and system safety specialists are assigned to materiel development programs.

j. Ensure PMs and major subordinate commands incorporate MANPRINT provisions into materiel system contracts. Monitor materiel system prime- and subcontractors in the accomplishment of MANPRINT objectives and requirements as specified in the statement of work, development, or system specifications and applicable military standards.

k. Ensure coordination with Commanding General, TRADOC and Commanding General, U.S. Army Operational Test and Evaluation Agency to integrate all MANPRINT test and evaluation requirements, objectives, issues, and criteria into the TEMP.

l. Prepare, through HEL, in coordination with other commands, an HFEA on all DOD major, designated acquisition and IPR programs unless waived. Waiver approval authority for DOD major and designated acquisition programs is HQDA (DAPE–ZAM). Waiver authority for IPR Programs requires joint approval by HQ AMC and HQ TRADOC.

m. Prepare, through PM for training devices (TRADE), a concept formulation package for all training devices and incorporate training assessments into the HFEA.

n. Fund contracted MANPRINT studies and methodologies and ensure that ODCSPER approved MANPRINT methodologies have been applied to appropriate systems.

o. Include MANPRINT as a separate major area in the course selection evaluation plan. Request MANPRINT trained representatives to participate as members of the Source Selection and Evaluation Board (SSEB).

p. Provide representation to all special task forces (STFs) special study groups (SSGs) to ensure that MANPRINT is considered early and throughout the materiel acquisition process. (See AR 71–9.)

q. Provide the MANPRINT manager for all AMC developed materiel systems.

r. Provide systems safety assessment and management input to HFEAs throughout the life cycle of materiel system development and acquisition as well as ensure HFEA input is integrated into system safety analysis in accordance with AR 385–16.

s. Request a review of health hazard assessment by TSG during the concept exploration phase as well as subsequent phases where potential hazards are identified.

t. Submit to TSG a written proposal for studies involving the use of volunteers in accordance with AR 70–25 (TSG has final approval authority for all studies using volunteers except research with nuclear or chemical warfare agents, which are approved by the Under Secretary of Defense for Research and Engineering).

u. Ensure technical trade-off analyses include human performance and reliability.

v. Include MANPRINT responsibilities in PM charters.

2–10. Commanding General, U.S. Army Health Services (CG, HSC)

The CG, HSC will—

a. Prepare system health hazard assessment reports through the U.S. Army Environmental Hygiene Agency (HSHB–MD–A) Aberdeen Proving Ground, Maryland 21010–5422 and forward to OTSG for approval.

b. Perform reviews of all requirements documents during concept exploration and subsequent phases to identify potential hazards.

c. Plan and execute as a combat developer, a MANPRINT program for medical (Class VIII) materiel development and acquisition.

d. Provide health hazard issues and data input as required to the automated MANPRINT data base.

2–11. Heads of other Army agencies and Army commands assigned responsibilities for development of materiel items

The CG, U.S. Army Information Systems Command; CG, U.S. Army Intelligence and Security Command; CG, U.S. Army Medical Research and Development Command; CG, U.S. Army Strategic Defense Command; and Chief of Engineers will—

a. Establish MANPRINT programs that incorporate the provisions of this regulation in their combat and training developments, materiel acquisition, and testing responsibilities.

b. Obtain the review of health hazard assessor during the concept exploration phase as well as subsequent phases where potential hazards are identified.

c. Submit to TSG a written proposal for studies involving the use of volunteers in accordance with AR 70–25 (TSG has final approval authority for all studies using volunteers except research with nuclear or chemical warfare agents, which are approved by the Under Secretary of Defense for Research and Engineering).

d. Provide safety assessments of their materiel acquisition systems for inclusion in the HFEAs for their respective programs.

e. Obtain MPT assessment data from the combat developer for integration into the HFEA and the ILS program for the system under development.

f. Ensure that research findings relating to or affecting human performance and reliability are reported to DAPE–ZAM.

2–12. Commanding General, U.S. Army Operational Test and Evaluation Agency (CG, OTEA)

The CG, OTEA will—

a. Collect and evaluate soldier performance data (time and accuracy) for all critical operations and maintenance tasks in major and designated acquisition program testing and evaluation for which OTEA is responsible. (See AR 70–10 and AR 71–3.)

b. Include soldier performance data on critical operations and maintenance tasks in any calculations of system effectiveness and availability presented to ASARC reviews.

c. Assess effectiveness of proposed training for critical operations and maintenance tasks.

d. Verify that soldiers used in testing are representative of the user population as defined in the target audience description.

Chapter 3
MANPRINT in Life Cycle System Management of Army Materiel

3–1. Introduction

a. MANPRINT is focused on influencing the design of materiel systems and associated support requirements so that developmental, nondevelopmental, and product-improved systems can be operated and maintained efficiently and safely within the manpower structure, personnel aptitudes, and training resource constraints of the Army.

b. The engineering design philosophy of MANPRINT is focused on optimum system performance on the battlefield, which includes consideration of both soldier and equipment capability. MANPRINT is an option oriented process as opposed to an objective-oriented process. The MANPRINT process will provide decisionmakers information upon which to make tradeoffs in areas such as quality and numbers of people, training, technology, conditions, standards, costs, and personnel assignment policy.

3–2. MANPRINT in the Army streamlined acquisition process (ASAP)

MANPRINT will be integrated throughout the ASAP in the same manner as the current Life Cycle System Management Model (LCSMM). The phases of the ASAP are included in parenthesis after LCSMM phases in paragraphs 3–3 through 3–6. (See AR 70–1.)

3–3. MANPRINT in the preconcept exploration phase (requirements and technical base activities phase)

a. MANPRINT will be considered and integrated during all phases of the life cycle (AR 70–1) for all materiel systems. The MANPRINT effort for a specific system is initiated when the decision is made to meet a battlefield or training deficiency by improving or developing equipment. MANPRINT will be integrated into the Operational and Organizational (O&O) Plan, Training Device Needs Statement (TDNS), and the Justification for Major System-New Start (JMSNS).

b. MANPRINT in this phase will consider the human element in terms of manpower, capabilities, skills available or achievable, and forecasted training capabilities and training burden. The system definition is critical and must be identified in order to do a preliminary comparative analysis. Human performance data on the predecessor system should be identified and plans made for conducting a human factors engineering analysis.

c. Exploration of available technologies and methodologies begins during this phase. Research required to support the training requirement will be conducted to resolve critical training issues. The need for this research will be documented as a separate research and development requirement under AR 70–8. Research to identify what human

attributes correlate to successful performance on a given function or task may be undertaken.

d. The combat and training developers should work closely to ensure the training strategy (see glossary) is adequate and attainable. When a system requires a training device, the combat developer has lead responsibility for MANPRINT, with the training developer assuming a support role. When a nonsystem training device is required, the training developer assumes responsibility and will manage all MANPRINT activities required rather than the combat developer.

e. The combat or training developer, in conjunction with the materiel developer, will initiate a SMMP in this phase. (See chap 4.) The combat developer or training developer for a training device will maintain the SMMP throughout the life-cycle of the system.

f. The target audience description will be prepared.

g. The plan for trade studies and analyses must be carefully prepared. Missions and mission environments must be analyzed to determine design drivers. Trade studies must focus on human performance and reliability associated with each technology.

h. The total organizational and equipment system into which the new item of equipment will be integrated must be carefully and thoroughly identified.

3–4. MANPRINT in the concept exploration phase (requirements/ technology base activity/proof of principle phase).

a. MANPRINT analyses must be accomplished in sufficient detail prior to initiation of concept exploration to provide a baseline to which technical approach alternatives and their resulting MANPRINT implications can be compared. MANPRINT requirements and constraints must be established for inclusion in requirements documents and solicitation documents.

b. The combat and training developers in conjunction with the materiel developer will integrate MANPRINT into appropriate technical and management plans. MANPRINT data will be developed to—

(1) Determine probable and projected MANPRINT requirements.

(2) Develop planning for personnel support and training programs in accordance with AR 350–35 and identify critical issues for further study or testing.

(3) Support operational and organizational concepts and provide requisite MANPRINT input to the Program Management Documents (PMDs), especially the integrated logistics support plan (ILSP) and the TEMP.

c. Estimates of manpower and personnel costs, including training costs and projections of the cost of recruiting and retraining soldiers with the required aptitudes, will be explicitly considered in cost effectiveness analyses and in selection of the best technical approach. Cost effectiveness of training devices will be specifically addressed to determine savings resulting from decreased annual man-day requirements, annual instructor requirements, and training annual costs. (See AR 71–9.) The assumptions and methods used to measure the cost effectiveness of training devices will be reported in sufficient detail to permit other analysts to replicate the computations. Cost data will be updated during subsequent phases.

d. For materiel with a prominent human interface, it is critical to collect and evaluate human performance reliability data to determine whether the proposed system concept will deliver the expected performance using personnel with no greater aptitudes and no more training than planned. Where the conceptual system is a drastic departure from current materiel, and thus predecessor data may not be applicable, actions must be taken to assure MANPRINT issues are highlighted and given emphasis in subsequent phases. Consideration will be given towards identifying human performance issues as critical test issues for resolution. (See AR 70–10.)

e. Application of various training methodologies and exploration of available training technologies continue during this phase.

f. An HFEA will be conducted.

g. The combat developer will update the SMMP, if required, and provide a copy to the materiel developer for update of the HFEA, the health hazards assessment (HHA), and the ILSP.

h. Joint (combat, training, and materiel developers) tailoring of military specifications, standards, and contract data requirements list will be accomplished. Particular attention must be given to having industry identify trade-off points and human tasks associated with the system.

3–5. MANPRINT in the demonstration and validation phase (proof of principle phase)

a. MANPRINT standards, measures, testing issues, and criteria will be provided to the test and evaluation community through coordination of the TEMP.

b. MANPRINT data to support the BOIP and QQPRI will be developed during this phase. (See AR 71–2.)

c. The requirement to conduct a continuing training requirements analysis (TRA) as a part of the demonstration and validation phase will be documented in the requirements document. The following will be completed by the end of this phase—

(1) Development of an initial training strategy (documented in a new equipment training plan (NETP) in accordance with AR 350–35) for the user, based on tentative identification, allocation, and sequencing of tasks, and the user's role in operating, maintaining, or controlling the materiel.

(2) Identification of training devices and aids and special training requirements. (See AR 350–38.)

d. An HFEA will be conducted or updated, as appropriate.

e. MANPRINT issues will be evaluated in TT and UT.

f. The SMMP will be updated by the combat developer as required and a copy provided to the materiel developer for update of HFEA, the HHA, and the ILSP.

g. Special human factors engineering characteristics, male and female soldier characteristics, and manpower, personnel, and training considerations peculiar to the system will be addressed as specified in the requirements documents. (See AR 71–9.) The MANPRINT portion of the requirements documents will provide soldier performance specifications and consider maximum and minimum personnel aptitudes and skills that can be required.

h. User representative participation in preliminary design reviews and critical design reviews is mandatory.

3–6. MANPRINT in the full-scale development phase (development and production prove out)

a. MANPRINT issues will be evaluated in TT and UT, particularly those approved as critical in the independent evaluation plan (IEP).

b. An HFEA will be conducted or updated as appropriate.

c. MANPRINT data will be development as required during this phase and may support an amended BOIP and/or QQPRI.

d. The SMMP will be updated by the combat developer as required and a copy provided to the materiel developer for update of the HFEA, HHA, and the ILSMP.

e. Engineering change proposals will be reviewed for MANPRINT implications.

3–7. MANPRINT in the production and deployment phase

a. During this phase, care must be taken to assure that MANPRINT actions have been completed and the materiel is ready for fielding. New equipment training and institutional training must be ready to prepare soldiers to operate, maintain, and support the emerging materiel. Manpower spaces must be documented with sufficient lead time to ensure that soldiers with the requisite skills and abilities are available to fill these spaces. Personnel assignment policies must be established to support initial fielding and sustainment. Critical and major MANPRINT problems not resolved during materiel development must be addressed, solved, or reconciled.

b. The support package, to include test equipment, tool kits, lesson plans, technical manuals, and other supportability aspects must be ready before the first unit is equipped.

c. Proponents, users, and providers will continually assess the fielded system for potential improvements that could enhance MANPRINT aspects of the system or the potential follow-on systems.

3–8. MANPRINT in nondevelopmental items

a. MANPRINT considerations must influence selection of the basic nondevelopmental item (NDI) or components to be assembled, the design of any modification, and the integration hardware and software.

b. Potential human factors engineering, manpower, personnel, training, safety, and health hazard problems must be identified and evaluated during the market investigation. MANPRINT must be addressed fully in requirements documents, solicitation documents, and in the user criteria for the market investigation.

c. MANPRINT issues will be included in testing and will also receive equal weighting when considered and compared with other criteria in the ranking of alternatives.

d. Data pertaining to each NDI alternative, whether or not selected for procurement, will be incorporated into the automated MANPRINT data base for use in future procurements.

3–9. MANPRINT in product improvements

a. MANPRINT is critical to product improvements, including preplanned product improvements. The system will normally have been fielded long enough for empirical MANPRINT data to be available. Regardless of the specific product improvement proposal, MANPRINT lessons-learned data must be captured by incorporation into the automated MANPRINT data base and MANPRINT guidelines and constraints must be developed.

b. While great care will be taken to assure that defective hardware components are replaced and improved, equal care must be taken to assure soldier problem components are also replaced or improved. This requires that MANPRINT field data be collected during the sample data collection (SDC) effort in accordance with AR 750–37.

c. All data acquired through analysis or test will be incorporated into the automated MANPRINT database.

d. Industry identification of trade-off points and human tasks is critical. These must be called for and reviewed by all concerned.

3–10. MANPRINT in the integrated logistic support process

a. ILS documentation will consider MANPRINT as specified in AR 700–127. Logistic support analysis tasks may use hardware versus manpower (HARDMAN) and early comparability analysis (ECA) as inputs to the BOIP/QQPRI process.

b. MANPRINT reviews may be conducted as part of the ILS reviews and will assess the status and adequacy of MANPRINT planning for a materiel system.

Chapter 4
System MANPRINT Management Plan

4–1. Purpose

a. The SMMP is a planning and management guide. The SMMP will be used by all activities involved in materiel development and acquisition to ensure MANPRINT issues are addressed throughout the system's life-cycle. The SMMP documents the data that is available or must be generated, how and when the data will be generated, and how it will be employed to address MANPRINT issues and concerns. It provides the proponent with documentation that all available data have been examined and a plan or program established to address MANPRINT concerns throughout the materiel acquisition plan (MAP).

b. The SMMP provides an audit trail. The SMMP will document the data sources, analyses, trade-offs, and decisions made throughout the acquisition process. The plan serves as documentation of what was considered and why it was or was not employed. The SMMP provides a source for continuity to lessen the impact of personnel changes on the MANPRINT effort. New personnel can review the SMMP and determine why and what tasks, actions, and analyses have or have not been scheduled and performed, what action must be coordinated and scheduled, and who is involved in the effort.

4–2. Policy

a. The SMMP will contain the information in the format shown at appendix B.

b. An SMMP will be prepared for each development, non-developmental, and product-improved system.

c. The combat developer is the approving authority for the SMMP. The SMMP will be coordinated with the appropriate organizations and agencies involved in the MANPRINT effort. A copy of the SMMP will be provided to HQDA, ODCSPER (DAPE–MBI) WASH D.C. 20310–0300 for staffing and comment.

4–3. Procedures

The SMMP is initiated prior to program initiation by the combat or training developer when a deficiency requiring a materiel or training solution is identified. At this point in the acquisition process, the SMMP will be vague and, in some areas, blank; as the acquisition process progresses, the plan will become more specific and definitive. Initiation of the SMMP follows a logical progression.

a. Identify all potential date sources and analyses.

b. Determine current guidance that is available.

c. Determine whether a predecessor system (or reference components) exists.

d. Examine the list of date sources and determine those which are appropriate for the effort being initiated, those readily available, and those which must be generated. Also determine the availability of resources to generate this data. As the program progresses, data sources may be added or eliminated depending on requirements and resources.

e. Review the acquisition strategy (which may be extremely vague at this time) and set priorities for when data must be available and when coordination to have the data available must be scheduled.

Appendix A
References

Section I
Required Publications

AR 15–14
Systems Acquisition Review Council Procedures. (Cited in para 2–1*n*.)

AR 40–10
Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process. (Cited in para 2–7*a*.)

AR 70–1
Systems Acquisition Policy and Procedures. (Cited in paras 3–2 and 3–3*a*.)

AR 70–8
Personnel Performance and Training Program (PPTP). (Cited in paras 2–1*d* and 3–3c.)

AR 70–10
Test and Evaluation During Development and Acquisition of Materiel. (Cited in paras 2–12*a* and 3–4d.)

AR 70–17
System/Program/Project/Product Management. (Cited in para 1–4*e*.)

AR 70–25
Use of Volunteers as Subjects of Research. (Cited in paras 2–9*t* and 2–11*c*.)

AR 71–2
Basis of Issue Plans (BOIP), Qualitative and Quantitative Personnel Requirements Information (QQPRI). (Cited in paras 2–1*g*, 2–4*h*, and 3–5*b*.)

AR 71–3
User Testing. (Cited in paras 2–8*l* and 2–12*a*.)

AR 71–9
Materiel Objectives and Requirements. (Cited in paras 2–4*e*, 2–8*e*, and 2–9*p*.)

AR 340–18
The Army Functional Files System. (Cited in para 1–6.)

AR 350–35
Army Modernization Training. (Cited in paras 3–4*b*(2) and 3–5c(1).)

AR 350–38
Training Device Policies and Procedures. (Cited in para 3–5c(2).)

AR 381–11
Threat Support to U.S. Army Force, Combat and Materiel Development. (Cited in para 2–6*a*.)

AR 385–16
System Safety Engineering and Management. (Cited in para 2–1*h*.)

AR 602–1
Human Factors Engineering Program. (Cited in paras 1–4*f* and 2–1*d*.)

AR 700–127
Integrated Logistics Support. (Cited in paras 1–4*e* and 2–2*b*.)

AR 750–37
Sample Data Collection: The Army Maintenance Management System (Cited in para 3–9*b*.)

AR 1000–1
Basic Policies for Systems Acquisition. (Cited in para 1–1*b*.)

Section II
Related Publications

A related publication is merely a source of additional information. The user does not have to read it to understand this publication.

AR 70–15
Product Improvement of Materiel

AR 350–6
Army-Wide Small Arms Competitive Workmanship

AR 570–1
Commissioned Officer Aviation Position Criteria

AR 570–2
Organization and Equipment Authorization Tables Personnel

AR 570–5
Manpower Staffing Standards System

AR 700–129
Integrated Logistics Support Management of Multi-Service Communications-Electronics Systems and Equipment (AFR 400–46; OPNAVINST 4105.2)

AR 702–3
Army Materiel Systems Reliability, Availability, and Maintainability (RAM)

AR 702–9
Production Testing of Army Materiel

AR 715–6
Proposal Evaluation and Source Selection

AR 750–1
Army Materiel Maintenance Concepts and Policies

DOD–HDBK–743
Anthropometery of U.S. Military Personnel (Metric)

MIL–HDBK–759A
Human Factors Engineering Design for Army Materiel

MIL–STD–143B
Standards and Specifications, Order of Preference for the Selection of

MIL–STD–882B
System Safety Program Requirements

MIL–STD–1388–1A
DOD Requirements for a Logistic Support Analysis

MIL–STD–1388–2A
Logistic Support Analysis Record

MIL–STD–1472C
Human Engineering Design Criteria for Military Systems, Equipment and Facilities

MIL–STD–1474B
Noise Limits for Army Materiel

MIL–H–46855
Human Engineering Requirements for Military Systems (Metric)

DOD–HDBK–761
Human Engineering Guidelines for Management Information Systems

DOD–STD–1477
Symbols for Army Air Defense Systems Displays Military Standards and handbooks are available from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

Appendix B
Format for the System MANPRINT Management Plan

B–1. Summary
Provide an overview of the MANPRINT strategy to be employed and the highlights of the SMMP.

B–2. Description
a. Description of the proposed materiel system. Provide an overview including, but not limited to, the materiel deficiency being addressed, missions, operational environments, design versions or alternatives, and essential total system (soldier-in-the-loop) performance characteristics.

b. Acquisition Strategy. Briefly discuss the LCSMM strategy to be employed.

c. Agencies. List the lead agency and all agencies expected to be involved in supporting the system acquisition.

d. Guidance.

(1) *Decisions.* List all decisions that will have a direct impact on the design and/or MANPRINT issues.

(2) *General DA and MACOM guidance.* List all available guidance provided for MANPRINT issues.

B–3. MANPRINT strategy
a. Objectives. List the MANPRINT goals to be achieved during the acquisition process.

b. Data sources and availability.

(1) *Predecessor system.* Determine the predecessor or reference systems and components, if any. Consider predecessors for each component of the materiel system, training devices, and repair and support equipment.

(2) *Early availability of data/risk analysis.* Discuss the types and importance of data and when it is to be available for inclusion in analyses. Determine its impact on the MANPRINT strategy to be employed and the associated level of risk incurred. Provide the rationale and background employed in deciding how to address MANPRINT issues throughout the acquisition life-cycle.

(3) *Planned level of MANPRINT analysis effort.* Identify what and when analyses are to be conducted based on the availability of data and resources. Include how they will affect the risk incurred by the MANPRINT strategy employed.

B–4. Concerns
Discuss any issues or areas of concern that have been identified. These are issues to watch during the system's development and should cause the SMMP to be updated as answers are obtained.

B–5. Tabs
a. TAB A—Data Sources. List all potential data sources, the MANPRINT areas (manpower, personnel, training, human factors engineering, system safety, and health hazards) addressed and the data item's relative importance to the system's development. This will form the cornerstone for all analyses and planning.

b. TAB B—MANPRINT Milestone Schedule. Using a Gantt Chart format, display all significant MANPRINT tasks to be accomplished from research and exploratory development through first unit equipped.

c. TAB C—Task Description. For each task to be performed, list the following information (necessary for Tab B preparation):

(1) Task description (narrative).
(2) Rationale (why it is necessary).
(3) Resources (personnel and dollars).
(4) Time to complete (optimistic, normal, pessimistic).
(5) Responsible agency (lead agency).
(6) Support agencies.
(7) Dependencies (tasks that must be completed prior to starting this one).
(8) Feeds (tasks that cannot start until this one has been completed).

d. TAB D—Questions to be Resolved. List any questions whose answers will influence the MANPRINT decisions and tradeoffs to be made. These should be detailed and be specific in nature as opposed to the broad areas of concern contained in the basic document.

e. TAB E—Coordination. List all commands, agencies, and activities with whom the SMMP must be coordinated.

Glossary

Section I
Abbreviations

ACSI
Assistant Chief of Staff for Intelligence

ACSIM
Assistant Chief of Staff for Information Management

ADEA
U.S. Army Development Employment Agency

AFQT
Armed Forces Qualification Test

AMC
U.S. Army Materiel Command

AMEDD
Army Medical Department

ARI
U.S. Army Research Institute for the Behavioral and Social Sciences

ASAP
Army streamlined acquisition process

ASARC
Army Systems Acquisition Review Council

ASI
additional skill identifier

BOIP
basis of issue plan

CFP
concept formulation package

CG
commanding general

CTP
coordinated test program

DA
Department of the Army

DAP
designated acquisition program

DCSLOG
Deputy Chief of Staff for Logistics

DCSOPS
Deputy Chief of Staff for Operations and Plans

DCSPER
Deputy Chief of Staff for Personnel

DCSRDA
Deputy Chief of Staff for Research, Development, and Acquisition

DOD
Department of Defense

DT
development testing

DTP
detailed test plans

ECA
early comparability analysis

FAT
first article testing

HARDMAN
hardware vs. manpower

HEL
U.S. Army Human Engineering Laboratory

HFE
human factors engineering

HFEA
human factors engineering analysis

HHA
health hazards assessment

HQ
headquarters

HQDA
Headquarters, Department of the Army

HSC
U.S. Army Health Services Command

ICTP
Individual and Collective Training Plan

IEP
independent evaluation plan

ILS
integrated logistics support

ILSP
integrated logistics support plan

INSCOM
U.S. Army Intelligence and Security Command

IPR
in-process review

IPT
initial production testing

JMSNS
justification for major system new starts

LABCOM
U.S. Army Laboratory Command

LCSMM
Life Cycle System Management Model

LSA
logistic support analysis

MAA
mission area analysis

MACOM
major Army command

MANPRINT
manpower and personnel integration

MAP
materiel acquisition plan

MIL STD
military standard

MOS
military occupational specialty

MPT
manpower, personnel, and training

MRSA
Materiel Readiness Support Activity

NCO
noncommissioned officer

NDI
nondevelopment item

NETP
new equipment training plan

NET
new equipment training

ODCSPER
Office of the DCSPER

O&O
operational and organizational

OT
operational testing

OTEA
U.S. Army Operational Test and Evaluation Agency

PAT&E
production acceptance test and evaluation

PERSSO
personnel systems staff officer

PM
program manager

PMD
program management document

QQPRI
qualitative and quantitative personnel requirements information

RDTE
research, development, test, and evaluation


0001070312

RFP
request for proposal

RFQ
request for quotation

ROC
required operational capability

SDC
sample data collection

SDC
U.S. Army Strategic Defense Command

SMMP
System MANPRINT Management Plan

SQI
special qualification identifier

SSA
system safety analysis

SSEB
Source Selection and Evaluation Board

SSI
specialty skill identifier

SSG
special study group

STF
special task force

TDNS
Training Device Needs Statement

TDP
test design plan

TEMP
Test and Evaluation Master Plan

TRA
training requirements analysis

TRADE
training devices

TRADOC
U.S. Army Training and Doctrine Command

TSG
The Surgeon General

TSM
TRADOC systems manager

TT
technical test

USAISC
U.S. Army Information Systems Command

USASC
U.S. Army Safety Center

UT
user testing

Section II
Terms

Early comparability analysis
A "lessons learned" approach to identify manpower, personnel, and training resource intensive tasks (high drivers) on current materiel that must be resolved in new or product improved systems. By-products of the methodology are initial MPT constraints and input to target audience description.

HARDMAN vs. Manpower (HARDMAN)
The Army HARDMAN comparability methodology is a structured approach to the determination of the manpower, personnel, and training resource requirements for a conceptualized materiel system. Additionally, HARDMAN estimates the impact of these MPT requirements on system effectiveness and life-cycle costs. The objective of using HARDMAN is to provide Army decisionmakers with information on competing design proposals in order to intelligently assess the supportability of each from a MPT standpoint. Although the methodology can be applied at later phases of the materiel acquisition process, it is most effective prior to milestone 1.

Manpower and personnel integration (MANPRINT)
The process of integrating the full range of human factors engineering, manpower, personnel, training health hazard assessment, and system safety to improve soldier performance and total system performance throughout the entire materiel development and acquisition process.

System MANPRINT Management Plan
The SMMP serves as a planning and management guide and an audit trail to identify tasks, analyses, trade-offs, and decisions that must be made to address MANPRINT issues during the materiel development and acquisition process. The SMMP is initiated by the combat or training developer when the MAA identifies battlefield deficiency requiring development of new or improved materiel. The SMMP will be updated as needed throughout the MAP.

Training strategy
Training strategy is a term which includes—

a. Who is to be trained (active component, reserve, civilian).

b. What is to be trained (system specific tasks and combat critical tasks).

c. When is the training to take place (basic training, advanced individual training, and NCO training).

d. Where is the training to take place (institution or unit). The examples are not all inclusive. Training strategy is distinguished from training concept, which should answer the question as to "how" the training should be conducted; for example, on the actual equipment, embedded training, training devices, or simulators. Sustainment training to maintain readiness levels must be considered and requires data on anticipated skill decay rates and resource constraints (including time) at the unit level.

*U.S. G.P.O. 1987-181-029:60095