



# MANPRINT BULLETIN

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March/April 1992

## Concurrent Engineering

by Major M. Colleen Gorman  
Armstrong Laboratory

**Editor's Note:** This article, which is abridged from the November/December 1991 issue of the Air Force IMPACTS Bulletin, offers an informative look at Concurrent Engineering's alternative approaches to development.

Concurrent engineering (CE) has been defined as "as a systematic approach to the integrated, concurrent design of products and their related processes, including manufacture and support. This approach is intended to cause the developers, from the outset, to consider all elements of the product life cycle from conception through disposal, including quality, cost, schedule, and user requirements" (IDA Report R-338).

Numerous companies report that using concurrent engineering, as opposed to standard engineering approaches, has led to better products with lower life-cycle costs and shorter development times. These results are achieved through integrated product development. Designers, manufacturers, suppliers, and customers, all participate throughout the process development.

Above all, concurrent engineering is a way of looking at a product other than the traditional "American way." Improvement of the product and the associated manufacturing and support processes is viewed as an ongoing effort that is the responsibility of everyone involved. Concurrent engineering focuses on meeting the customer's requirements and

holds that quality must be built in, not added on or inspected in.

In traditional linear engineering, information essentially flows in one direction, and each activity must be sequenced before the next activity begins.

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**"Remember the Soldier."**

In contrast, concurrent engineering has feed-forward and feedback information loops, allowing decisions to be based on information from all affected areas (as illustrated in Figure 1).

In addition, the traditional design team is expanded to include marketing, manufacturing, key suppliers, the customer, and other specialists. Team members work as equals in a climate of trust and ownership to enhance the design by helping to identify and solve problems earlier in the design process.

The use of concurrent engineering delays the final configuration of the product until relatively late in the development process. However, it also reduces changes during manufacture, and results in fewer modification requests from customers. The delay in settling final design parameters also affects distribution of life-cycle cost (LCC). In standard design practice, future LCC is fixed early because product design decisions are made early in the development process. In concurrent engineering, by contrast, the deferral of a final product design means that the bulk of LCC is not committed until full-scale production. Total LCC is also lower, despite higher initial cost in early design phases.

Many of concurrent engineering's ideas and techniques are not new; however, their implementation has become much easier in recent years due to vast improvement in relatively inexpensive computer power and the development of computer-based design tools (CAD/CAM/CAE).

Concurrent engineering is also bolstered by increased use of analytical techniques (such as statistical process control methods and fault tree analysis) which help define optimum design and production parameters and support system tradeoff decisions.

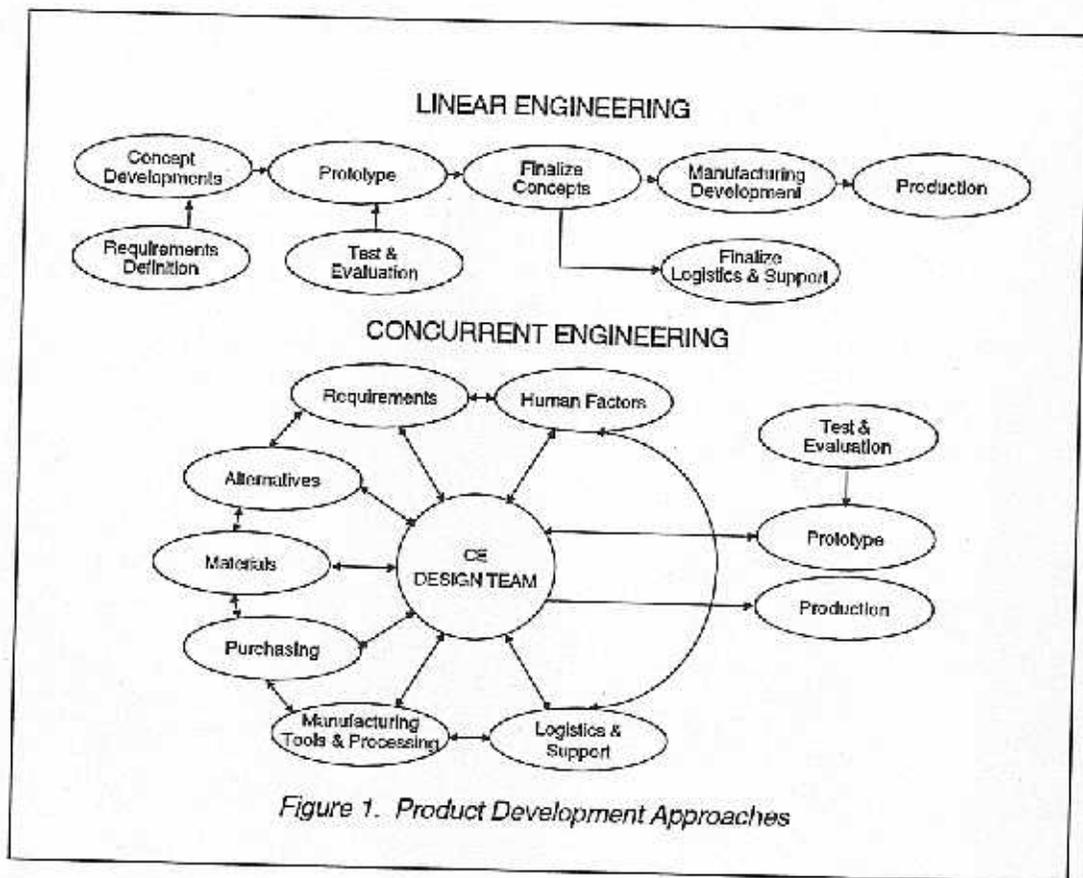


Figure 1. Product Development Approaches

Concurrent engineering does not happen merely by management fiat. It requires changes in organizational structure, skillful technical management, and a long-term profit outlook. To succeed, these fundamental, far-reaching changes must be supported and led from the very top and supplemented by altered engineering practices.

In typical design practice, rapid selection of a design concept is normal; in concurrent engineering, however, the decision should be delayed to allow for a complete evaluation of alternatives and their implications. How to best accomplish this may require more research on the psychological and sociological aspects of design teams.

When the next Desert Storm happens, the personnel support detail will number about half of today's and operators will be using even more sophisticated systems. The challenge is to ensure these people will be able to accomplish their mission with equally spectacular results.

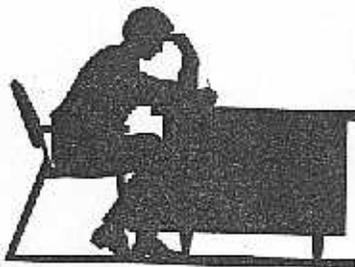
For more information, contact Maj Colleen Gorman, Logistics Research Division, Human Resources Directorate, Armstrong Laboratory, WPAFB, OH 45433; DSN: 785-3611.

## MANPRINT BULLETIN

*The MANPRINT Bulletin is always looking for input from the community. You may have the answers to those questions your fellow readers are pondering; or those bits of information that can keep the Bulletin interesting and current. The Bulletin is here to entertain as much as to deliver important information to you. Here are the guidelines authors should follow for submissions:*

- ✓ **ABOUT THE BULLETIN:** The Army MANPRINT Bulletin is a bimonthly professional development bulletin published by the Directorate for MANPRINT, ODCSPER. The Bulletin's editorial office can be reached at: HQDA, Attn. DAPE-MR, The Pentagon, Washington, DC 20310-0300, Attn Mr. Harry Chipman. Phone numbers are Commercial (703)695-9213 or DSN 225-9213. Datafax (703)695-3195.
- ✓ **PURPOSE:** To serve as communication channel for the MANPRINT community, and to allow the MANPRINT Directorate to put out guidance and policy without the delay of changing a formal document.
- ✓ **SUBJECT MATTER:** May include but not necessarily limited to process, procedures, techniques programs accomplishment, program advances and failures (nobody's project, lets learn from our mistakes), ideas, personnel shifts, trail balloons. Acronyms should be kept to a minimum and when used, must be written out and explained. Also of interest are books reviews related to Army, DoD, or pertinent industry MANPRINT efforts.
- ✓ **LENGTH OF ARTICLES:** Articles should be approximately 750 to 1,000 words in length. This equates to 2-3 double-spaced typed pages, using a 20-line page.
- ✓ **PHOTOS:** Include any photographs or illustrations which complement the article. Black and white or color are acceptable. We cannot promise to use all photos or illustrations and they are normally not returned unless requested.
- ✓ **BIOGRAPHICAL SKETCH:** Include a short biographical sketch of the author. This should include the author's educational background and current position.
- ✓ **CLEARANCE:** Be sure you can get it if we ask for it.

Authors should include their address, office phone number (DSN/autovan and commercial), and commercial fax number when articles are submitted.



### MANPRINT BULLETIN

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## MEETINGS OF INTEREST

● 9 - 12 March 1992

**Test & Evaluation.** Ft. Walton Beach, FL. Contact: ADPA, (703) 522-1820, Fax (703) 522-1885.

● 7 - 9 April 1992

**Logistics Symposium & Expo.** Williamsburg, VA. Contact: ADPA, (703) 522-1820, Fax (703) 522-1885.

● 5 - 7 May 1992

**PM TRADE/AMEC APBI.** Orlando, FL. Contact: ADPA, (703) 522-1820, Fax (703) 522-1885.

● 11 - 13 May 1992

**Vehicle Technology.** Detroit, MI. Contact: ADPA, (703) 522-1820, Fax (703) 522-1885.

● 4 - 5 June 1992

**Industry/Army International.** Arlington, VA. Contact: ADPA, (703) 522-1820, Fax (703) 522-1885.

● 16 - 17 June 1992

**MANPRINT Practioners Seminar.** Old Town Ramada, Alexandria, VA. Contact: Gretchen Eberhard, Fu Associates, 2300 Clarendon Blvd., Suite 1400, Arlington, VA 22201; (703) 243-2992, Fax (703) 243-6229.

● 23 - 25 June 1992

**60th Military Operation Research Society Symposium.** Monterey, CA. Contact: MORs, 101 S. Whiting St. #202, Alexandria, VA 22304; (703) 751-7290.

● 12 - 16 October 1992

**Human Factors Society 36th Annual Meeting.** Atlanta, GA. Contact: HFS P.O. Box 1369, Santa Monica, CA 90406; (301) 394-9793.

## MOVERS & SHAKERS

### PEOPLE IN THE NEWS

• Major Lauris T. Jones III, a.k.a., Taylor, joined the MANPRINT Directorate some time ago. Then he went TDY to the Program Management Course at Defense Systems Management College. Currently, Taylor is working in the Acquisition Division.

• Major Lou Cocker is spending 6 months with MANPRINT Directorate on his way to CGSC. Lou just completed a master's degree in Engineering Management. He also has a MBA. Lou is starting a project to put MANPRINT into civilian engineering education.

• Ms. Roma "Suzie" Swafford, TRADOC'S spokesperson for MANPRINT since its inception, retired on 27 December 1991. Suzie retired with over 33 years federal service and plans to travel the states splitting her time between her grandchildren in Syracuse, NY and San Diego, CA. TRADOC MANPRINT policy is now being handled by Major Jerry Lawrence and Steve Dwyer, DSN 680-2102.

• LTC Nelson Laughton's duties are shifting from the MANPRINT Directorate's Acquisition Division to acting Deputy Director.

• DCSPER MG William Reno retired on 31 January 1992. MG Thomas P. Carney from DA's Program Analysis & Evaluation Directorate will be the new DCSPIER.

• Arthur Pridemore, DCSPi, PERSCOMM was recently promoted to GM-14. He was selected to be the Chief, Combat Systems Branch, DCSPi, PERSCOMM. Other recent promotions within DCSPi include John Hodges, GM-13, Chief, Combat Support/Service Support Section, Combat Systems Branch and Diana Lueker, GM-13, Chief, Logistics Systems Section, Information Systems Branch.

• DCSPi lost a very special colleague and friend 10 October 1991 with the passing of Mr. Fred Rote. Fred was one of the founding members of the SSC-NCR/USAPIC/DCSPi MANPRINT element. His Materiel Division provided MANPRINT Subject Matter Experts to lend "hands on" expertise throughout TRADOC to get MANPRINT programs off the ground. Fred's warmth, humor, and professionalism are greatly missed by all who knew him.

# HARDMAN III Update

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The HARDMAN III suite of software modules was developed by the Army Research Institute's MANPRINT Division (formerly, the Systems Research Laboratory) as a MANPRINT tool to be used in system acquisition -- both early and throughout the life cycles requirements change. Currently HARDMAN III is in its first round of applications. The proposed Patriot Navigation Emplacement System enhancement, the Advanced Field Artillery System (AFAS), and concepts for the Forward Arming and Refueling Point (FARP) are some of the applications so far.

The six basic modules being used now are:

- ▶ SPARC (*System Performance and RAM Criteria Aid*)
- ▶ M-CON (*Manpower Constraints Aid*)
- ▶ P-CON (*Personnel Constraints Aid*)
- ▶ T-CON (*Training Constraints Aid*)
- ▶ MAN-SEVAL (*Manpower-based System Evaluation Aid*)
- ▶ PER-SEVAL (*Personnel-based System Evaluation Aid*)

SPARC, M-CON, P-CON, and T-CON are used early, prior to system design. The output of these modules provides the analytical basis for much of the MANPRINT input to requirements documents. Ultimately, through the Request for Proposal, information is communicated to system designers on:

- ▶ realistic performance criteria
- ▶ the numbers and kinds (i.e., personnel characteristics) of operators and maintainers expected to be available in the fielding years
- ▶ the amount and type of training expected to be available

Once a system design has been formulated, the manpower and personnel requirements of that design are tied to mission performance in MAN-SEVAL and PER-SEVAL. In MAN-SEVAL, operator and crew workload and task allocation are evaluated against mission success and maintainer workload is evaluated against system availability measures. In

PER-SEVAL, performance under varying environmental conditions and with varying personnel characteristics is evaluated.

**New software release.** In response to user-feedback and initial software verification and validation, the HARDMAN III software has been revised and improved. Version 2 of the HARDMAN III software is planned for distribution through the Defense Technical Information Center (DTIC) in Spring '92. Prior to the DTIC release, software can be requested directly from ARI, with priority going to Army users. Improved features of Version 2 will include:

- ▶ Up-to-date library of Military Occupational Specialties
- ▶ Higher fidelity manpower and personnel projections
- ▶ Enhanced maintenance modeling
- ▶ Easier data transfer between modules
- ▶ Faster processing speed

**Training for '92.** Last year, four HARDMAN III training seminars were held around the country. The three-day seminar covers all six modules and provides basic knowledge on how to use the software. This year's schedule is just now being drawn up, with at least one session planned for the Washington, D.C. vicinity. The seminar will be expanded in scope. It will include a presentation of two new software modules: Manpower Capabilities II (MANCAP II) and FORCE. MANCAP takes MAN-SEVAL estimates as input for a unit-level estimation of operator, maintainer, and support requirements. FORCE takes the MAN-SEVAL estimates Army-wide.

*For more information, contact Dr. Laurel Allender, DSN 284-9046.*

# MANPRINT Training



The deputy Chief of Staff for Personnel Integration, U.S. Total Army Personnel Command, is the proponent for MANPRINT training. MANPRINT training is conducted by the U.S. Army Logistics Management College, Ft. Lee, VA. We offer MANPRINT Managers and an Action Officers Course. Senior Leader Seminars will be conducted in 1992.

The purpose of the **MANPRINT ACTION OFFICERS COURSE (MAOC)** is to train officers, warrant officers, noncommissioned officers and civilian personnel to perform duties as action officers responsible for integrating MANPRINT considerations into the system development and acquisition process. The course is nine days in length. An officer skill 6S is awarded to MAJs, CPTs and LTCs upon successful completion of the course.

The following **MANPRINT ACTION OFFICERS** classes are still available for FY 92.

<u>CLASS</u>	<u>DATES</u>	<u>LOCATION</u>
92-012	16 Mar - 26 Mar 92	Signal School, Ft. Gordon, GA
92-006	13 Apr - 23 Apr 92	TROSCOM, St. Louis, MO
92-007	4 May - 14 May 92	RESIDENT, Ft. Lee, VA
92-008	26 May - 5 Jun 92	BRD&E Ctr, Ft. Belvoir, VA
92-009	15 Jun - 15 Jun 92	ADA School, Ft. Bliss, TX
XXXXXX	20 Jul - 7 Aug 92	Fort Monmouth, New Jersey
92-010	17 Aug - 27 Aug 92	AMCCOM, Rock Island, IL
92-011	14 Sep - 24 Sep 92	HEL, Aberdeen Proving Ground, MD

The **MANPRINT FOR MANAGERS COURSE (MFM)** is designed to provide training to mid-level managers in Army organizations with MANPRINT missions and functions in order to facilitate the accomplishment of MANPRINT programs goals. The course provides highly interactive instruction on MANPRINT and its background, philosophy, purpose and domains in two days.

The following **MANPRINT FOR MANAGERS** classes are still available for FY 92.

<u>CLASS</u>	<u>DATES</u>	<u>LOCATION</u>
92-011	26 Mar - 27 Mar 92	Signal Center, Ft. Gordon, GA
92-006	1 Apr - 2 Apr 92	BRD&E Ctr, Ft. Belvoir, VA
92-007	20 May - 21 May 92	HEL Aberdeen Proving Ground, MD
92-008	25 Jun - 26 Jun 92	ADA School, Ft. Bliss, TX
XXXXXX	10 Aug - 11 Aug 92	Fort Monmouth, New Jersey
92-009	12 Aug - 13 Aug 92	ARDEC, Picatinny Arsenal, NJ
92-010	2 Sep - 3 Sep 92	TACOM, Warren, MI

**MANPRINT FOR SENIOR LEADERS SEMINAR** is a four hour seminar designed to give General Officers and Senior Executive Service personnel an overview of MANPRINT. The Senior Leaders Seminar, currently being developed and scheduled, will be conducted approximately three times each year.

For more information about these courses or to enroll in one contact the following:

Enrollment procedures: DSN 687-2156 or (804) 734-2156.

Information and other assistance: DSN 221-3706 or (703) 325-3706.

Proponent for MANPRINT Training:

Deputy Chief of Staff for Personnel Integration  
TAPC-PI-MPT (Mr. Dykhuis, SFC Carr)  
Alexandria, VA 22332-1345

# MATRIS and Human Systems Integration

T. Fuller Dean & Barry R. Smith, Jr.  
Defense Technical Information Center (MATRIS Office)

MATRIS is a DoD automated information system which:

- advances the coordination of Manpower, Personnel, Training, Simulation, Human Factors, and Safety technology Research and Development (R&D),
- provides detailed information on related Programs Element, Projects, Work Units, and Studies & Analysis records,
- produces standard and tailored *ad hoc* reports for program documentation, and
- offers both online and assisted user access to the database.

In tracking human-related R&D within the DoD, MATRIS has been particularly responsive to the growing information needs of the Human Systems Integration (HSI) community within all Services. This includes programs in the Army (MANPRINT), Navy (HARDMAN), and Air Force (IMPACTS), which address the interrelated design/development/acquisition/implementation requirements of DoD man-machine systems. To alleviate the problems of information dissemination and duplication of effort across the Services, MATRIS prepared a special HSI report in early 1991 in an attempt to facilitate information flow within the Manpower, Personnel, and Training (MPT)/HSI R&D community, and to share knowledge by gathering in one place useful data related to these common efforts.

In addition, the Designing for the User Subgroup of the DoD Human Factors Engineering Technical Group has produced the *Directory of Design Support Methods (DDSM)*, which contains records now available in MATRIS as a separate, searchable record type. This annotated directory of human factors design support tools and techniques, developed by DoD, NASA, and industry members of the Technical Group, contains references to human factors databases, handbooks and other publications, military standards, prototype and interface design tools,

analytic techniques, and computer simulation software. The DDSM describes the methods to be used along with their purpose, products and availability.

MATRIS recently gave a poster presentation on the DDSM at the 35th annual meeting of the Human Factors Society. The presentation was highly successful; many government and non-government organizations found the DDSM interesting and informative. Many were interested in contributing new information to the DDSM.

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Directory of Design Support Methods Submission Form

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1. OVERALL CATEGORY:  
2. AVAILABILITY:

3. NAME OF DESIGN SUPPORT METHOD (TITLE):

4. SPONSOR:

5. POINT OF CONTACT:

6. PHONE:

7. DESCRIPTION:

A. General Overview of Method:

B. Appropriate Uses:

C. Equipment Required for Use:

D. Inputs Required for Use:

(over)

Figure 1. Page 1 of DDSM Submission Form

To help people contribute new information, MATRIS created a DDSM Submission Form to allow the contributor to submit his/her Design Support Method on a simple 2-page form. (See Figures 1 and 2.) Contributors may also submit their entry on a computer disk. Instructions accompanying the form explains this in greater detail.

Because these methods are unclassified and unlimited, anybody with material pertaining to the DDSM may contribute. MATRIS welcomes all who have an interest in the HSI field.

For more information or to obtain a DDSM and/or a form, contact Ms. Byars Vicino, MATRIS Office, DTIC AM, San Diego, CA 92152-6800; (619)553-7000/(DSN)553-7000

E. Processing Techniques for Input:

F. Output Consists of:

G. Use of Output:

8. REFERENCES:

9. ALTERNATIVE/COMPARABLE APPROACHES:

10. STAGE OF DEVELOPMENT:

11. HOW TO OBTAIN THE METHOD:

12. COMMENTS:

Figure 2. Page 2 of DDSM Submission Form

## MANPRINT and Industry in the U.K.

**Editor's Note:** This article is an excerpt from the January, 1992 issue of **FOCUS**, The House Journal of the Ministry of Defense.

Over 40 senior executives from the defense industry attended a presentation last month on "MANPRINT and Industry," host by DCDS (Systems), Lt. Gen. Sir Anthony Mullens.

The United States' MANPRINT (Manpower and Personnel Integration) program, covering all aspects of the interface between man and machine, has been adapted by the Army--which is now urging industry to implement the changes necessary to make human factors integration a reality.

"Providing military capability is not just about hardware," said DCDS(S). "Our future equipment will comprise some of the most complex manned systems yet devise, whose potential will only be

fully realized if human factors are given proper emphasis during design and procurement."

The Army's MANPRINT initiative and the similar Naval Human Factors Integration Program allow formal trade-offs to be made between cost and performance, training and skills, manpower and technology. "We have started the standardization of procedures as far as practicable across the Services," said DCDS(S).

MANPRINT's international context was addressed by CDP Dr. Malcolm McIntosh, who mentioned that Britain's NATO partners had formed a MANPRINT research study group to identify the tools and technologies needed.

"The increasing proportion of our equipment bought "off the shelf" has emphasized the need to harmonize procedures with our allies," he said.

"the task would be eased if a uniform approach to human factors integration--such as that offered by MANPRINT--were adopted internationally. The benefit to you, as defense contractors, is that it broadens the potential market for your products."

To date, he continued, manpower has been treated as a fixed resource, not subject to trade-offs. "Yet when you take the cost of one man over the in-service life of an equipment, some 20 years or more, how much more cost effective it would be to invest a little more in--for example--reliability and simplicity, in order to reduce the instructors required or to improve maintainability."

MOD will be specifying MANPRINT in its invitations to tender, concluded CDP, and will be exploring the possibility of establishing a central human factors strategy which would encompass all three Services plus command information systems.

The pitfalls that lie in wait should human factors be ignored were mentioned by Rear Admiral Richard Cobbold, ACDS(OR)(Sea Systems): "There are technological opportunities to employ people more cost effectively by transferring tasks to machines, but unscrutinized automation can too easily replace a man by a machine and the produce a need for a more expensive, more highly skilled machine minder."

Major General Sam Cowan, Admiral Cobbold's counterpart on the Land Systems side, touched on the US Army experience with four high technology military systems: a shoulder launched anti-aircraft missile, the Built-in Test Equipment (BITE) for a main battle tank, a military helicopter and a tracked artillery piece.

These repeatedly failed to achieve their full potential when operated and supported by soldiers--and among the several development faults which were subsequently identified was the failure to address human factors issues systematically and early enough.

Such experiences have produced what General Cowan defined as the "MANPRINT Question." "Can these soldiers with this training and

equipment perform their tasks to the required level of performance under these conditions?"

Some reassurance for the defense contractor was provided by Master General of the Ordnance, Lt. General Jeremy Blacker: "MANPRINT is not viewed as a means of ridding ourselves of a set of particularly thorny problems by dropping them into industry's lap.

"The introduction of a general Human Factors Defense Standard which is now called up routinely in specifications is a major step forward, and the MANPRINT Office is sponsoring a standard to describe human factors requirements specific to vehicles. We hope this will be the first of several such documents."

Norman Wallwork, Engineering and Quality Director of British Aerospace Dynamics Ltd.,

explained why his company has adopted MANPRINT: it believed that this would increase first-time sales and repeat orders; many of its customers now accorded MANPRINT a high priority; and it was a good engineering practice to recognize, ideally at the concept stage, that systems' operational success rate could be influenced by human beings.

The difficulties of proving compliance with human factors requirements, and the question of MANPRINT tools, were topics aired in the question and answer session. In the long term, said the panel, it was hoped to produce objective specifications for human factors; in the short term, subjective judgments would be made during individual trials.

UK industry is being asked to tell MOD which tools, of the several thousand commercially available here, they regard as most suitable for us on any particular project. (US tools, now being evaluated, are not immediately translatable to the UK concept.) MOD is exploring whether, in the longer term, it will be possible to lay down standards for tools.

"Cooperation is the key to success," said DCDS(S). "We are in the early stages--but we are on target."



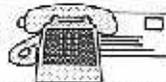
# DID YOU KNOW?

■ On 1 October 1991, the U.S. Army Personnel Integration Command (USAPIC) was deactivated as a command and the mission and personnel were integrated into the U.S. Total Army Personnel Command (PERSCOMM). COL John R. Miller, USAPIC's commander, assumed the new title of the Deputy Chief of Staff for the Personnel Integration (DCSPI).

■ Dr. Harold Booher, Director of the MANPRINT Directorate for the DCSPER, attended the annual PEO/PM conference in Orlando, FL. In addition to giving a presentation which stressed the value added by MANPRINT, he participated in several work groups. The overriding thought at the conference was to reduce those requirements which do not add value to a project. Task forces will be formed to continue the efforts of some of the thirteen conference work groups. The MANPRINT office is monitoring the development of these task forces and will be a member of those with MANPRINT interest.

■ The OSD HSI Office has been working with DSMC, Program Management Division faculty members to incorporate coverage of HSI in DSMC acquisition curriculum. Discussions so far have focused on HSI policy, relationships between HSI and Logistics Support Analysis, treatment in military standardization, and suggested points of inclusion in the Program Manager course curriculum. The HSI Office is also expected to observe selected classes to review specific HSI coverage, and to recommend revisions as necessary. (Nina Richman-Loo, OASD (FM&P), HSI, 697-9380)

## ARTICLES & COMMENTS



Articles, comments, and suggestions are welcomed. Mail to: MANPRINT Bulletin, HQDA (DAPE-MR), Attn: Mr. Harry Chipman, Washington, DC 20310-0300; AV 225-9213, COM (703)695-9213.

## MANPRINT INFORMATION

**POLICY:** MANPRINT Directorate, HQDA (DAPE-MR), Washington, DC 20310-0300. AV 225-9213, COM (703)695-9213.

**MANPRINT TRAINING:** US Total Army Personnel Command, ATTN: TAPC-PI-MP, 200 Stovall St., Alexandria, VA 22332-0400. AV 221-3708, COM (703)325-3706.

**PROCUREMENT & ACQUISITION:** US Army Materiel Command, ATTN: AMCDE-AQ, 5001 Eisenhower Ave., Alexandria, VA 22333-0001. AV 284-5696, COM (703)274-5696.

**HUMAN FACTORS ENGINEERING STANDARDS & APPLICATIONS:** Human Engineering Laboratory - MICOM Detachment, ATTN: SLCHE-MI, Redstone Arsenal, AL 35898-7200. AV 746-2048, COM (205)878-2048.

**MANPOWER, PERSONNEL AND TRAINING RESEARCH:** US Army Research Institute, ATTN: PERI-SM, Alexandria, VA 22333-5600. AV 284-9420, COM (703)274-9420.

**TEST & EVALUATION:** Operational Test & Evaluation Command, 4501 Ford Ave., Alexandria, VA 22302-1458; (703)756-2487.

LTG William H. Reese, Deputy Chief of Staff for Personnel

Thomas Carney

COL John R. Miller, DCS Personnel Integration, U.S. Total Army Personnel Command (Proponent for Army MANPRINT Training)

Mr. Harry Chipman, ODCSPER Coordinator

Harold R. Booher  
Director for MANPRINT

Ms. Susan L. Culkin, Editor

The MANPRINT Bulletin is an official bulletin of the Office of the Deputy Chief of Staff for Personnel (ODCSPER), Department of the Army. The Manpower and Personnel Integration (MANPRINT) program (AR 602-2) is a comprehensive management and technical initiative to enhance human performance and reliability during weapons system and equipment design, development, and production. MANPRINT encompasses the six domains of manpower, personnel, training, human factors engineering, systems safety, and health hazard assessment. The focus of MANPRINT is to integrate technology, people, and force structure to meet mission objectives under all environmental conditions at the lowest possible life-cycle cost. Information contained in this bulletin covers policies, procedures, and other items of interest concerning the MANPRINT Program. Statements and opinions expressed are not necessarily those of the Department of the Army. This bulletin is prepared bimonthly under contract for the MANPRINT Directorate, Office of the Deputy Chief of Staff for Personnel under the provisions of AR 25-30 as a functional bulletin.