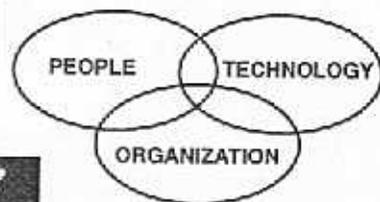




MANPRINT Quarterly

Vol. V, No. 2 Spring 1997



The Director's Corner

On April the 14th, it was my pleasure to host the MANPRINT Practitioner of the Year Awards for 1996. LTG F. E. Vollrath, the Deputy Chief of Staff for Personnel, presided over the ceremony here in the Pentagon, and recognized four outstanding individuals as MANPRINT Practitioner of the Year in their respective categories. Two other individuals were also recognized by the DCSPER as Runners-Up. Information regarding the nomination procedure and deadlines for 1997 will be published in subsequent issues of this quarterly.

Each year the quality and quantity of nominations continue to grow; however there are many individuals working MANPRINT programs and MANPRINT initiatives in the field who should be nominated for this award for 1997. I encourage PMs, TSMs, Combat Developers, and Functional Proponents to nominate their worthy individuals for this Department of the Army level recognition. Many aspects of individuals' work go unrecognized day after day. This award is an excellent opportunity to recognize your employees' efforts. Even when nominees are not selected for the award, the very act of nomination itself can speak volumes for what a supervisor thinks about an employee's work.

This year the DCSPER and the Personnel Technologies Directorate recognized six highly qualified individuals as described in this edition of the Quarterly. We all look forward to carrying on this tradition of recognizing excellence.

Jack H. Hiller
Director for Personnel Technologies

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Meeting of Interest



AUSA Annual Meeting 13-15 October 1997

Sheraton Washington Hotel
2660 Woodley Road, at
Connecticut Avenue, NW
Washington, DC 20008

Omni Shoreham Hotel
2500 Calvert Street, NW
Washington, DC 20008

Metro Rail Red Line: Woodley Park/Zoo Station
Non-members of the AUSA may register at the
Sheraton Washington.

MANPRINT Training Steering Committee Meeting
(Continued from page 3)

The new course module on the System MANPRINT Management Plan (SMMP) being developed will provide a one-day in-depth offering available as an option in the MANPRINT Applications Course. This module will expand the current course SMMP block of instruction and provide students with more computer-based tools designed to reinforce both SMMP principles and execution.

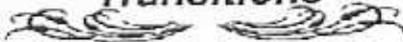
Domain representatives briefed the committee on the latest developments within their specific areas of MANPRINT. Organizational changes continue to be a reality for most organizations, and as these new responsibilities are assumed, there are changing MANPRINT roles. These domain briefings help the program manager, course director and instructors ensure that current course materials are up to date. The committee also reviewed the Program(s) of Instruction for both the MANPRINT Action Officers Course (MAOC) and MANPRINT Applications [Workshop] Course, and

changes, additions and deletions were recommended. Suspense to conclude the recommended changes, additions, and deletions is 1 July 1997.

The MANPRINT Training Steering Committee remains committed to ensuring the Army has timely and quality manpower and personnel integration training. These semi-annual meetings provide an excellent opportunity for committee members to outline changes in their domains which impact this training and provide alternatives to the existing program which will ensure our courses meet the needs of the Army today.

If you have questions concerning MANPRINT training or are interested in attending an upcoming course, please contact: Ms. Diana Lueker, PERSCOM at 703-325-3241 or DSN 221-3241 - Email: luekerd@hoffman.emh1.army.mil; or Mr. Len Girling, ALMC at (804) 765-4361 or DSN 539-4361 - Email: girlingl@lee-dns1.army.mil.

Transitions



FAREWELL:

On 31 March 1997, Ms. Roscille W. Nelson retired as the Deputy Director for Personnel Technologies. Ms. Nelson joined the ODCSPER staff, MANPRINT Directorate, in February 1992. She brought to this demanding assignment a broad range of knowledge gained from her previous assignments. As the Deputy Director for MANPRINT, she was instrumental in ensuring that MANPRINT was approved as the Army's implementation of the HSI program. She worked tirelessly to establish a wide range of programs to develop and support an effective MANPRINT program.

We want to take this opportunity to thank her for her dedicated efforts on behalf of the MANPRINT program and to wish her well in all her future endeavors.

Ms. Betsy Tierney, MANPRINT Staff Action Control Officer, left ODCSPER after twelve years of service to accept another assignment. She will be working for the Deputy Under Secretary of the Army (Operations Research) effective 14 April 1997. Our best wishes to Ms. Tierney as she leaves us after many outstanding years of dedicated professional service.

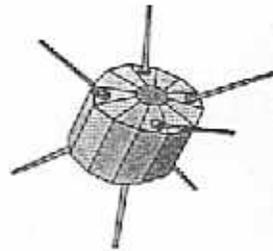
WELCOME:

Dr. Robert Holz has been placed on a lateral temporary assignment from the United States Army Research Institute (ARI) to serve for 90 days as the Acting Deputy Director for Personnel Technologies beginning 7 April 1997.

Getting The Word Out

As you know, the Department of Defense (DoD) approved a significantly revised set of the DoD 5000 series documents, implementing sweeping changes in system acquisition. The main purpose was to streamline the process: get more effective, affordable systems to the field on a more timely basis.

To reflect this new way of doing business, the Personnel Technologies Directorate, Office of the Deputy Chief of Staff for Personnel, has been in the process of revising AR 602-2, "Manpower and Per-



sonnel Integration (MANPRINT), the Army's Human Systems Integration Process for Systems Acquisition" and the MANPRINT "How-To" Guide. We are including discussions on Integrated Concept Teams, Integrated Product Teams, and how MANPRINT fits into this new management structure.

AR 602-2 is currently at the Army Publishing Agency, and a draft version of the "How-To" Guide is being reviewed. We will publish more information in the next MANPRINT Quarterly.



MANPRINT Training Schedule

MANPRINT Workshop FY 97 Schedule

<u>CLASS #</u>	<u>DATE</u>	<u>LOCATION</u>
705	24 - 27 Jun 97	Fort Gordon, GA
707	5 - 8 Aug 97	Fort Leonard Wood, MO
706	9 - 12 Sep 97	Fort Hood, TX
703	30 Sep - 3 Oct 97	IOC, Rock Island, IL

MANPRINT Action Officer Course FY 97 Schedule

<u>CLASS #</u>	<u>DATE</u>	<u>LOCATION</u>
702	12 - 21 Aug 97	MICOM, Huntsville, AL

Tracing Failure to a Down Payment

LTC Taylor Jones

Product Manager for Strategic Targets

U.S. Army Space & Strategic Defense Command

(The author has compiled this article from a number of separate efforts, which he either assessed or managed over the previous ten years.)

The MANPRINT Practitioner is continuously challenged by the requirement to integrate seven complex domains with the materiel system as they apply to an emerging total system (i.e., hardware/software, leader, soldiers and unit, operators and maintainers and support personnel). To an entry level practitioner, the focus gravitates to learning the domains and crosswalking them from his own domain to other domains and to the objective materiel system. Seldom is this novice a master of more than two of the domains, so the learning process occupies most of the practitioner's time. Given that there seldom is more than one specialist per project, the actual human system integration process yields to the learning "curve" before substantial work can be accomplished.

Generally, the novice quickly recognizes the need for the other domain experts in the program. Given available training, that practitioner will know where to go for domain expertise. The entry of seasoned human factors engineers and other experts brings the actual total system emphasis to the program. In a perfect world, this happens before system Requests For Proposal hit the street. In our somewhat less than perfect environment, the acquisition of an effective MANPRINT team is delayed.

Probably the most significant stumbling block to the MANPRINT mission is resourcing the effort, early enough to efficiently guide the total system concept and design work. It is with greater frequency that the project office (versus requirements community) makes a belated thrust at the MANPRINT process. Unfortunately, as the cost of doing business for the new project is estimated, human systems integration (HSI) has no line on the funding requests. And the logistics line, a default contributor to HSI, is typically low.

And so the dedicated, yet unfunded MANPRINT team may find some domain participation by government employees, but not the entire suite of essential expertise required for fully effective HSI contributions.

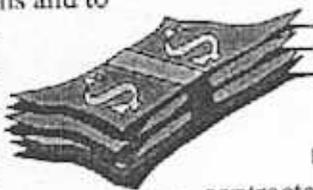
When a project has been underway the threat of a milestone review typically appears as if unexpected.

Program documentation is scrutinized and yields the inevitable answer: Incomplete HSI—and no plan to get there!

Scarce funding may now be allocated—too little and too late. Technical Assistance contractors are brought in on short notice. Program triage begins. Domain experts are hired and raced to the scene. Working groups are scheduled, and after the frustration of the first meeting, a more deliberate process begins. This work-in-progress requires time. Documentation is past due, and boilerplate HSI jargon is hastily patched into the gaps by the PM's staff. The PM is now apt to see the MANPRINT plans looming as obstacles to the original project milestones instead of timely assistance.

Then, just as the members of the MANPRINT team seem knowledgeable enough to assess and address the situation, the Request for Proposal is released. Perhaps a contract is awarded, but without HSI in the contract Statement of Work or deliverables, MANPRINT emerges here as an option and not as a fundamental project requirement. The first shot at ensuring operational suitability is thus lost. Application of lessons learned to requirement is too late. Designing to the intended target audience now begins to look like an expensive retrofit action. MANPRINT becomes a high risk issue on the PM's IPR chart. Still, it's the leaders, soldiers, maintainers and support personnel who lose the most from the PM's dilemma.

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The Integration of the Human Element and Design

*Mr. John C. Roddick
McDonnell Douglas Aerospace*

The budgetary restriction currently confronting our industry is influencing them to plan for multiple usage of hardware and for obtaining maximum performance from the supporting work force. To assist in this plan, the development of new weapon systems must integrate the total supporting work force (direct and overhead) with the hardware design. A close design harmony of staffing and equipment is essential for achieving maximum total system performance at minimum cost.

The Department of Defense (DoD), with programs such as MANPRINT and tools such as HARDMAN, has emphasized the importance of human systems integration with the materiel components of new weapon system development. Contractor compliance with these acquisition concepts has never been more essential. This paper is a study in the philosophy of system maintenance and service staffing within this new budgetary environment for the new weapon systems to be produced under current austere budgets. Although our concern at McDonnell Douglas is with tactical aircraft, our approach may be applied to any DoD acquisition project.

Cost Reduction From System Commonalities and Innovations

The costing of the human component of the total system design, calculated for a new weapon system design, includes trade-off analysis for designed-in reliability enhancements and planned usage rates and demands (e.g., time between major inspections and maintenance). The human cost becomes compounded when multiple customers bid for use and support of the same hardware in base support operations.

A case in point is the Joint Strike Fighter (JSF) program whereby one aircraft design is being developed to support the operational requirements of three U.S. customers (Navy, Air Force, and Marine Corps). This aircraft design offers the customers commonality of parts,

support equipment, training, and human skills. These commonalities will reduce the Operational and Support Cost (O&S Cost) of the projected design in comparison with current weapon systems.

However, the "same" weapon system design will rarely produce similar support staffing estimates for all the customers because of differences in their operational procedures. The transition into a new design based on application of new technologies will produce conditions requiring fewer maintainers but more servicing workers. Accordingly, the measurement of these staffing requirements, by the application of the distinctive customer's maintenance concept, operational usage, and job-specialty responsibilities, modifies the rate of potential savings for weapon systems support. To be costed accurately, these differences must be understood and dealt with in the initial cost analysis for the customer.

In measuring the staff requirements for these customers, two accounting systems apply, both interacting with design. First calculated are the direct staffing numbers that represent the support requirements for an emerging design. The direct staffing is derived by modeling that applies the customers' operational usage, maintenance plan and specialties to the hardware design. Second, the indirect staffing models the customers' organizational structure and lines of authority. The indirect staffing, a responsibility of the customers, combines with the direct staffing to form the total unit manning authorization. The customer may alter the indirect staffing position requirements by taking advantage of the new reliability features and designed-in maintenance technology aids.

The indirect staffing may be greatly influenced by the weapon system contractor's design when it includes built-in capabilities that replace work tasks otherwise

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The Integration of the Human Element and Design

(Continued from page 7)

accomplished by staff members. These tasks typically fall within the responsibilities of the operational unit's overhead staff. An illustration of this is the performance data now provided from the built-in engine monitoring systems that replaced the requirement for manual calculations for scheduled engine inspections. A reduction or change in the authorized levels of maintenance (organizational, intermediate, or depot) would delete direct staffing responsibilities and alter the overhead lines of authority. This would reduce the operational units' organizational structure and cost. Both the direct and indirect staffing estimates are equally important, with one directly supporting hardware maintenance and the other (indirect) supporting hardware usage.

The weapon system contractor is fundamentally concerned with the numbers of technicians and technical skills required to service and maintain the newly designed system hardware. The calculations for these direct staffing requirements early in a new program are relevant to precise questions asked by the customer in the Request for Information document. The questions relate to staffing requirements that apply to specific operational scenarios, such as deployments and wartime sorties. The costs for the amount of direct and supporting indirect staffing for these scenarios need to be projected over the life of the weapon system to plan for the necessary operational support funds. The expenditure of funds for people and people-related requirements supporting current weapon systems in operational units might be as high as 60 percent of their O&S operating budget. To calculate this requirement, the engineering design data for the new weapon system needs to be translated into manpower spaces and then cost factors.

In the early stages of the competition driven cost analysis, the total unit staffing authorization numbers will not be explicitly requested by the customer. They are, however, required, and are estimated by internal analysis of O&S costing for presentation to the customer as cost factors. The request for total direct unit manning authorizations by the customer is part of the Engineering and Manufacturing Development Phase, (EMD). This is a Milestone II tasking as defined by

DoD 5000.2-R, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs.

During the Milestone II, EMD stage, the total work force for the operational units, the intermediate level maintenance function, and the overhead functions will be estimated and priced. The final evaluation for unit staffing requirements would include spaces for deployments, wartime surges, and peacetime scenarios, expressed to the customer as manning authorizations. Additionally, suggestions relating to the customers' organizational structure, maintenance concept and technical specialties are offered. These suggested changes take advantage of the emerging design to reduce the total support staff.

Improved system reliability is shifting the workloads from maintenance to servicing tasks. Over the years, Product Improvement Programs have capitalized on technology for the enhancement of military weapon system performance and reliability. Improvement in system reliability has advanced significantly, resulting in major reductions in maintenance technical support requirements. The workload reductions resulting from improved system reliability have substantially reduced manning requirements, and have given the customers the ability to consolidate supporting job-specialties. These efforts are now approaching the maximum limits of direct manpower savings. Still attainable for the customer are some selective consolidations of maintenance specialties. The realignment of maintenance tasks into new consolidated specialties must not, however, result in tasks beyond the aptitudes of the available technicians. Expanding these technical responsibilities typically increases the required knowledge of multiple, complex subsystems. An evaluation of the task requirements and human capabilities is necessary for each new job specialty or existing specialty that will provide the initial work force.

Training programs must also be changed to accommodate new reliability features and job-specialty consolidations. The amount of training for supporting tech-



nicians will decrease for maintenance and increase for servicing functions. The cross-over of these responsibilities is driven by smarter weapon system designs with diagnostic self-test capabilities installed to assist the technicians with troubleshooting tasks. From an individual's perspective, the retention of system knowledge and repair skills will diminish over time for systems that seldom fail.

It appears that the next challenge in human interface design shall relate to the weapon system's inspection tasks. A weapon system design that achieves total system reliability would still need to initially retain approximately 50 percent of its assigned staffing positions. This is due to the inspection and servicing tasks required to retain the weapon system in a mission-ready status. The accomplishment of daily pre-flight, post flight, and phase inspections; the loading and downloading of weapons; and configuration changes will still consume a large amount of manpower support. An engineering endeavor to reduce these support tasks would simplify field support of the weapon system. The cost of this endeavor could be offset by the reduction of future manning authorizations.

The reductions of direct manpower support by the consolidation of specialties and the transformation of the servicing tasks could have a profound impact on the customers' organizational structures. This will influence the requirements for all command and supervision positions and staffing at the intermediate levels of support. These changes in staffing projections would facilitate the formation of an autonomous operational unit by reducing its logistics footprint. These organizational changes will be felt in unit deployment costs and in the quantity of necessary transporting airlift.

The goal

The goal for human integration is to produce a total system design that maximizes performance effectiveness at minimum life cycle costs for the combined materiel and human components.

All elements of the manpower analyses, such as staffing, organizational structures, productivity, and career tracks, must be in harmony with the projections of force reductions. To ensure the operational and support success of new weapon systems in the planning stages, a close interaction between the customer and the contractor's design engineers, life cycle cost analysts, and manpower/personnel experts is essential.

Tracing Failure to a Down Payment (Continued from page 6)

This failed attempt at HSI can't be attributed to Pentagon "rice bowls," nor should industry take the hit. The critical resources and timely planning for the total system design was simply omitted from the early planning process.

No other element of a program would have been allowed to proceed without resourcing. Yet seemingly critical HSI programs launch with empty pockets, and then may also quickly

sink. Soldier suitability is not free and does not happen well by accident.



The PM's "starting team" must estimate the cost of HSI, and the PM must champion the allocation of HSI funds. As programs establish a mature approach to investing in operational suitability, the alleged high costs of carefully executed MANPRINT efforts will recede. And the MANPRINT may again become a cost effective solution for the total system design.