



US Army

FY09 Human Systems Integration Plan

(Annex to the OSD HSI Management Plan)

Version 1.0

US ARMY MANPRINT

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**HQ Department of the Army, G-1
FY09 Human Systems Integration Plan**

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1.0 INTRODUCTION

The Army will remain central to successfully achieving U.S. national security objectives, particularly in an era in which operations will be waged increasingly in urban and complex environments. As the decisive ground component of the Joint and interagency teams, the Army operates across the full spectrum of conflict to protect our national interests and affirm our Nation's commitment to friends, allies, and partners worldwide. Our goal is a more agile, responsive, campaign-quality and expeditionary Army with modern networks, surveillance sensors, precision weapons, and platforms that are lighter, less logistics dependent, and less manpower intensive.¹

To accomplish the Army's goal, it must build the readiness necessary. Among the important readiness initiatives underway, two of these are: 1) provide Soldiers the best equipment through the Rapid Fielding Initiative, the Rapid Equipping Force, and Army modernization programs, including Future Combat Systems, aviation, Patriot PAC-3, LandWarNet, intelligence, logistics automation, and other advanced technologies; and 2) adapt institutions and the processes, policies, and procedures, including business practices, to more effectively and efficiently support an expeditionary Army at war.

The Army's MANPRINT (Manpower PeRsonnel Integration) program is a critical part of these two initiatives to build and maintain Army readiness. MANPRINT is the Army's designation for Human-Systems Integration (HSI). The MANPRINT was officially established within the Army in 1986 – its purpose is to ensure that human capabilities and limits within materiel systems are explicitly addressed by analytical consideration of the separate and integrated impact of seven human domains: manpower, personnel, training, human factors engineering, health hazards, soldier safety, and soldier survivability.

1.1 Purpose

The objective of this document is to present the Army Strategy, Management, and Execution Plan for MANPRINT. This plan supports the development of an overarching OSD Management Plan for HSI in response to tasking in the 2008 NDAA (Public Law 110-181) for the House Armed Services Committee.

1.2 Scope

The scope of this Management Plan includes policy, guidance, oversight and direction for MANPRINT. It presents the various organizations, roles and responsibilities, business and technical analytic processes that make up the MANPRINT enterprise. It also provides an estimate of resource requirements for a comprehensive MANPRINT program. It further addresses accountability, assessment measures, human capital development, and planned

¹ The Army Posture Statement, APS2008, February 2008

activities for the coming year.

1.3 Document Revision History

Version	Date	Description	Status
1.0	February 2009	United States Army Human Systems Integration Plan	Current

1.4 References

Title	Doc. No.	Version	Date
Operation of the Joint Capabilities Integration and Development System	CJCSM 3170.01C	Version C	1 May 2007
Joint Capabilities Integration and Development System	CJCSI 3170.01F	Version F	1 May 2007
The Defense Acquisition System	DoDD 5000.1	N/A	12 May 2003
Operation of the Defense Acquisition System	DoDI 5000.02	N/A	2 Dec 2008
The Army Posture Statement	APS2008		February 2008
Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process	AR 602-2	N/A	8 Dec 2008 (DRAFT In staffing)
Army Acquisition Policy	AR 70-1	N/A	30 Jan 2004
Army Acquisition Procedures	DA PAM 70-3	N/A	28 Jan 2008
AFARS	5115	Rev #21,	22 May 2007
Health Hazard Assessment Program in Support of the Army Acquisition Process	AR 40-10	N/A	27 Jul 2007
The Army Safety Program	AR 385-10	N/A	27 Aug 2007
Army Test and Evaluation Policy	AR 73-1	N/A	01 Aug 2006
Test and Evaluation in Support of Systems Acquisition	DA PAM 73-1	N/A	30 May 2003
MANPRINT Workforce Campaign Plan	Internal	Version 4.0	March 2005
MANPRINT Awareness Plan	Internal	N/A	FY 08

2.0 ARMY HSI ORGANIZATION AND RESPONSIBILITIES

2.1 MANPRINT Directorate

MANPRINT is a directorate within the HQ Department of the Army, Deputy Chief of Staff, G-1. The Army G-1 is a three-star level office. MANPRINT consists of an SES Level Director, a GS-15 Deputy, three MANPRINT Program Analysts, and an administrative assistant (contract support). Figure 2-1 is a diagram of these elements and relationships.

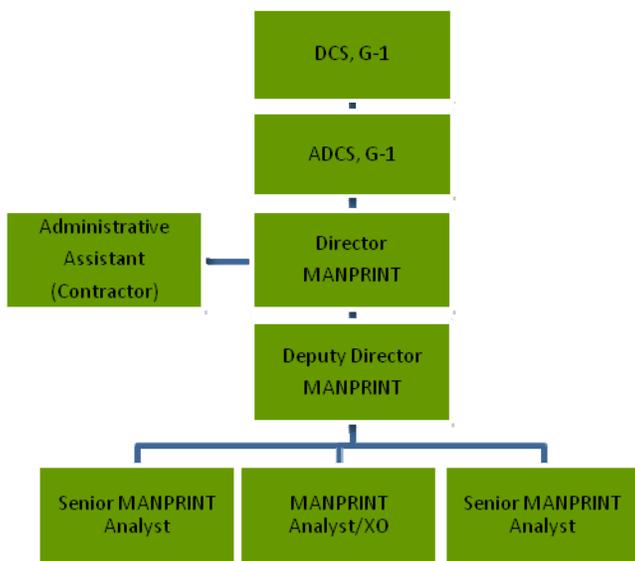


Figure 2-1 MANPRINT within the Army

2.1.1 Directorate Functions

The MANPRINT Directorate mission is to exercise primary Department of the Army (DA) staff responsibility for the MANPRINT Program in accordance with Army Regulation 602-2. This includes the following functions:

- Establish, coordinate, and disseminate DA MANPRINT Program policy, guidance, and procedures to all Army commands and agencies.
- Finalize and approve all MANPRINT Assessments (MA) from MANPRINT practitioners in the field. The MA shall identify any critical MANPRINT issues with the system that must be resolved

before the Army G-1 will officially support any recommendation that the system proceed to the next acquisition milestone. Sixty days prior to the convening of a key Milestone Decision Review (MDR), issue approved system MAs to the Milestone Decision Authority (MDA), with copies to the system Program Executive Officer/Program Manager (PEO/PM). The MA is the primary mechanism to hold system developers accountable to address MANPRINT requirements.

- Represent the Army G-1 MANPRINT position at system MDRs, to include Army Systems Acquisition Review Councils (ASARCs), Overarching Integrated Product Teams (OIPs), and other official acquisition decision venues. Serve as advocate for resolution of any critical MANPRINT issues and provide recommendations for risk mitigation to the MDA, as applicable.
- Serve as the Army's focal point for MANPRINT Program interfaces with other DOD services, government agencies, and international programs regarding policy, standards, and research and development.
- Serve as the proponent for the Army MANPRINT Training Program. Oversee MANPRINT training in all courses of instruction (Army, DOD, and other).
- Sponsor a MANPRINT Practitioners' Workshop approximately every eighteen months to further professional coordination and collaboration among specialists in the seven MANPRINT domains of manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability, from government, industry, and the academic community both in the U.S. and allied nations.
- Establish and maintain a state-of-the-art knowledge-based monitoring, assessment, and evaluation system to account for all MANPRINT activity and its return on investment to support soldier readiness and the materiel acquisition process.
- Establish and maintain a MANPRINT website as part of the overall HQDA G-1 website. Maintain it as a primary source of information on MANPRINT policy, guidance, procedures, training, and events.
- Serve as the proponent for the MANPRINT Technical Base Research and Development Program to identify and prioritize research needs as specified in the Soldier Oriented Research and Development Program under AR 70-8.
- In coordination with Office of the Deputy Chief of Staff, G-4, establish policy on how MANPRINT and Integrated Logistics Support (ILS) programs will complement each other and interface.
- In coordination with the Army Test and Evaluation Office (TEO), establish policy on how MANPRINT and test and evaluation programs will complement each other and interface.
- Review the application of MANPRINT in Army models, simulations, and analyses.
- Review all applicable system acquisition life-cycle requirements and compliance documents, to include Materiel Capability Documents (MCD), Manpower Estimate Reports (MER), Acquisition Strategies, System Engineering Plans (SEP), System Evaluation Plans, Supportability Strategy (SS), among others, to ensure that MANPRINT domain requirements have been properly addressed. Coordinate with PEOs and PMs to ensure those requirements have been adequately

cross-walked and embedded into Requests for Proposal (RFPs) and Test and Evaluation Master Plans (TEMPs).

- Encourage and facilitate an integrated, cooperative working relationship among all of the MANPRINT domain agencies.

These 14 core functions represent the comprehensive and persistent implementation of the AR 602-2 MANPRINT mission and mandates.

2.1.2 Directorate Resources

The MANPRINT Directorate is headquartered in the Pentagon within the Army G-1 staff, and is resourced by the DA G-1 to perform the management and oversight functions listed in the preceding section. Five TDA personnel positions are approved and filled with additional authority to contract for administrative and technical support. The FY09 budget outline for the Directorate is shown in the Table below. Estimates are rounded and based on previous year’s trend averages to account for inflation. Civilian Pay is based on an average PSY of \$120K. The sum total operating budget is approximately \$1.2M/FY.

Table 2-1 MANPRINT HQ Resources

MANPRINT	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
Travel	\$15,000	\$15,000	\$15,000	\$15,000	\$60,000
Training	\$4,500	\$4,500	\$4,500	\$4,500	\$18,000
Contracts	\$0	\$500,000	\$0	\$0	\$500,000
CIV PAY	\$150,000	\$150,000	\$150,000	\$150,000	\$600,000
Sub Total By Qtr	\$169,500	\$669,500	\$169,500	\$169,500	\$1,178,000

2.2 MANPRINT Practitioners

2.2.1 Practitioner Workforce

MANPRINT practitioners are located at numerous field sites who apply MANPRINT analysis to systems. They are the front-line team who provide the on-going technical expertise and analytic support to program managers throughout the system acquisition life-cycle. This workforce consists of several hundred scientists and engineers who come from three Army field operating agencies: the Army Research Laboratory (ARL) Human Research and Engineering Directorate (HRED) and Survivability/Lethality Analysis Directorate (SLAD); the Army Center for Health Prevention and Preventive Medicine (CHPPM); and the Army Combat Readiness and Safety Center (CRC). ARL is responsible for the manpower, personnel, training, human factors engineering, and survivability domain assessments; CHPPM is responsible for health hazard domain assessments, and CRC conduct safety domain assessments. Figure 3.2 depicts ARL, CHPPM, and CRC sites.

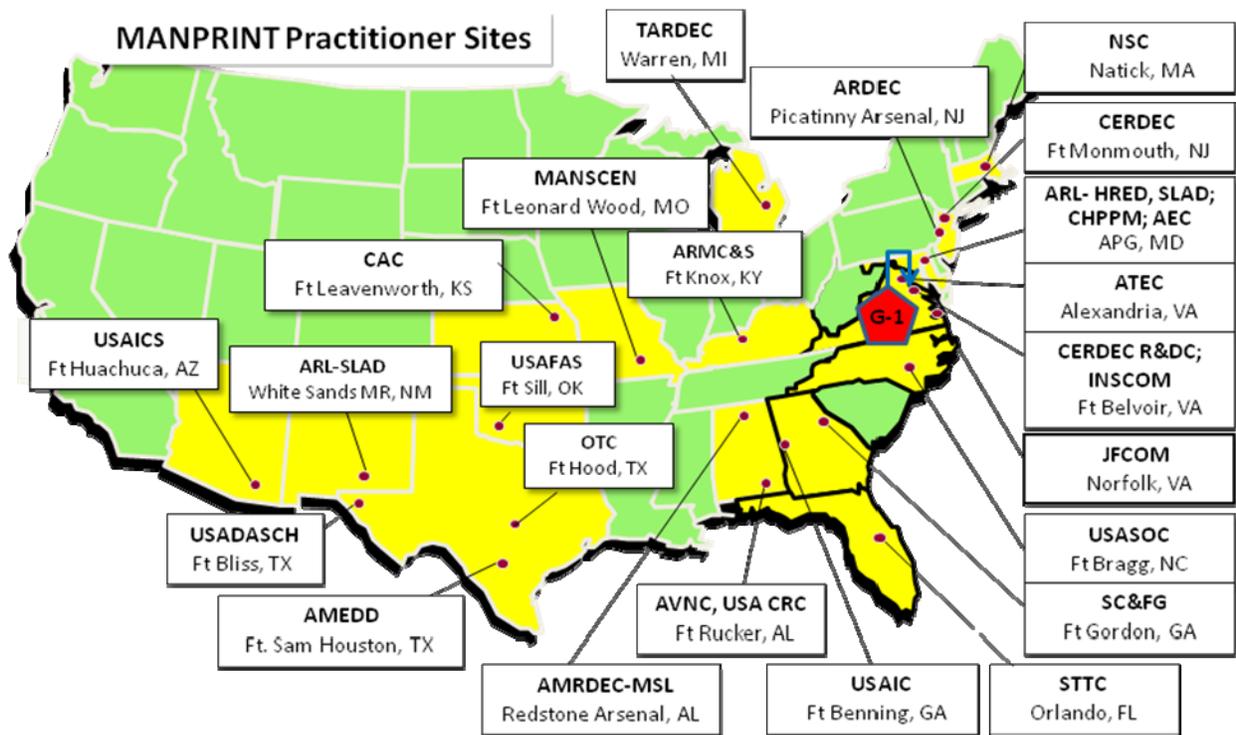


Figure 2-2 MANPRINT Practitioner Sites

2.2.2 Practioner Functions

The primary MANPRINT practitioner function is to perform technical analytic support to system developers. This function consists of a four-stage analytic cycle that iterates throughout the system life cycle. The four elements of this cycle are:

- Identify MANPRINT issues
- Analyze issues and rate their risk to system operational performance
- Develop risk mitigation options
- Conduct trade-offs among risk mitigation options to recommend those that are cost-effective and operationally sound (e.g., training change, manning change, design change, etc.).

Creating MANPRINT Assessments is a pervasive technical-analytic process within the analytic cycle. Assessments are conducted by applying behavioral, physiological, and environmental science and engineering methods within each of the seven MANPRINT domains, and then integrating these results to conduct domain tradeoffs. The end result is a set of risks and their severity characterized as critical, major, or minor. These risks are used to calculate the impact of MANPRINT on total system ownership/life cycle costs, Soldier safety and survivability, and

operational system performance.

A second important practitioner function is MANPRINT analytic support to independent system tests and evaluations.

In addition to hands-on analyses in direct support of system acquisition, practitioners also conduct research to refine and develop MANPRINT models, simulations, and other analytic tools.

2.2.3 MANPRINT Practitioner Resources

MANPRINT work is conducted by government or contract personnel within the practitioner agencies. These individuals are primarily funded by system PEO/PMs, Test and Evaluation Agencies, some in-house funds for limited cases, and with some special project funding. In a few cases, most notably the Army's Future Combat System (FCS), the build contractors have their own MANPRINT staff, and the MANPRINT government personnel provide oversight.

With over 600 Army programs in some phase of development (including Acquisition Category (ACAT) I-III programs (ACAT I are the most resource intensive), non-program of record systems, rapid fielding initiatives, and emerging technology) at any given time, the MANPRINT workforce is assigned to Army priority programs as their personnel inventory resources permit. ACAT I and II systems and rapid initiative requests are given the highest priority, followed by specific and special interest program manager/commander requests, and ACAT III programs. On average, about 70% of systems in development are covered.

3.0 ARMY HSI PROCESS CYCLE

3.1 Overview

MANPRINT is conducted concurrently at the oversight and policy level, (MANPRINT Directorate, Army G-1) and at the practitioner and analysis level (Analysis agencies). The MANPRINT Directorate has a set of business processes that facilitate the execution of their 14 core functions (Section 2.1.1), and MANPRINT practitioners follow a four stage technical analysis cycle (Section 2.2.2) that includes a wide range of analytic activities at varying levels of complexity and rigor.

3.2 Acquisition Programs of Record

In the best case, MANPRINT analysis is targeted at every point in the Army (and DoD) systems acquisition life cycle. For a given system, MANPRINT analysis may or may not have been requested or applied to the entirety of a system development. The guiding principle for all efforts is risk identification and mitigation throughout the entire period of analysis.

3.3 Rapid Fielding Initiatives and Pre-Acquisition Capabilities

Increased demand for rapid fielding equipment and emerging technology has compressed the system concept to deployment time. MANPRINT support is provided to agencies such as Joint Improvised Explosive Device Defeat Organization (JIEDDO), Defense Advanced Research Programs Agency (DARPA), as well as Combatant and Support Commands (e.g., Intelligence and Security Command (INSCOM). These requests have grown exponentially in the last five years and now comprise over 30% of MANPRINT work.

3.4 Support to Test and Evaluation Agencies

Collaboration with the Army's test and evaluation agencies has been instituted or substantially increased. In early 2006, the Army Research Laboratory, Human Research and Engineering Directorate (ARL-HRED), signed a major collaboration agreement with the Army Test and Evaluation Command (ATEC). This has enabled MANPRINT to be included in early test planning and execution processes for programs of record as well as Rapid Equipping Force (REF) and Quick Reaction Capability (QRC) deployment initiatives.

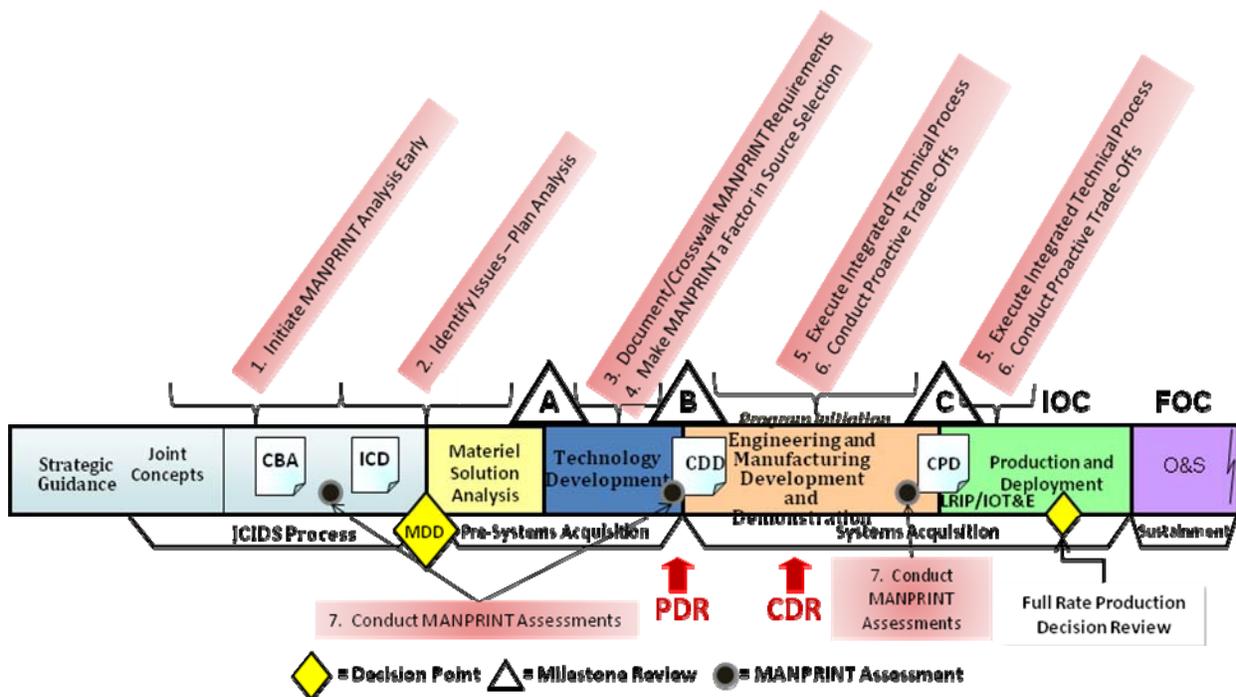
4.0 ARMY HSI SYSTEM ACQUISITION PROCESS INTEGRATION

4.1 Mapping of MANPRINT Process to System Acquisition Life Cycle

MANPRINT practitioners ensure that their analytic work incorporates these seven elements:

1. Initiate MANPRINT systems engineering early, preferably during concept phase
2. Plan an analysis strategy to identify MANPRINT issues
3. Document/Crosswalk MANPRINT requirements to system architecture and design
4. Make MANPRINT a factor in Source Selection
5. Execute integrated technical analysis plan
6. Conduct proactive trade-offs among MANPRINT domain elements
7. Conduct MANPRINT Assessments

Each element corresponds to point and area locations within the Army/DoD Acquisition Life-Cycle as in Figure 4-1. Probably the most critical of the seven elements is number seven - to conduct a minimum of one and preferably three MANPRINT Assessments in the life-cycle: early, Pre-Milestone B and Pre-Milestone C. [Refer to Appendix A for more detail on the analytic activities associated with the acquisition life-cycle].



Defense Acquisition Management System Life Cycle and MANPRINT Analysis/Technical Tasks Overlay

Figure 4-1 Mapping MANPRINT Tenets to the System Life Cycle

4.2 Range of Analytic Activity

Currently the range of MANPRINT support to system development and acquisition ranges from qualitative and intermittent, to highly quantitative and fully engaged through the total system life cycle. This degree of support is monitored using a relative scale of analytic rigor to describe the level of effort and some quantitative metrics if included in the technical work. MANPRINT managers assign the scale values which range from one (advisory, minimal) to five (most rigorous, quantitative):

Table 4-1 MANPRINT Analytic Rigor Scale

MANPRINT TASK	SCALE VALUE (5=rigorous, 1=advisory)
Human-Figure and Task Network Modeling and Simulation/HIL (Human in the Loop) Experiment	5
MANPRINT Assessment for LRIP/MS Decision Reviews	5
Co-Chair MANPRINT IPTs	5
Hands-on Participation in Design Process	4
ATEC System Team/TEMP MOE Development-Collection-Analysis	4
Source Selection Panel MANPRINT Rep	3
Write MANPRINT Requirements for Army Systems/Ensure Manprint Language in Acquisition Documents	3
Fielding Support/Quick Look At Rapid Equipment Fielding/COTS	2
Technical Advice in Teleconference/Single Meeting	1

Following the assignment of analytic rigor, the MANPRINT effort is adjusted to account for system life-cycle point of entry (earlier is better; later is not as beneficial), and whether MANPRINT support has occurred across the entire life-cycle or at a discrete point only (across the system development process has greater payoff).

5.0 ARMY HSI HUMAN CAPITAL DEVELOPMENT

5.1 Workforce Development and Sustainment

A MANPRINT Workforce Campaign Plan was written in March, 2005 as a study project within the MANPRINT Directorate to get an initial sense of issues and resource requirements for a comprehensive and professional workforce. This plan is reproduced in Appendix C.

The FY05 workforce plan raised a number of important issues, the most salient and pertinent: A MANPRINT career field does not exist. Current MANPRINT managers and practitioners come from a number of scientific and engineering backgrounds including Human Factors Engineering, Experimental, Applied, Cognitive, and Behavioral Psychology, Industrial/Organizational Psychology, Industrial, Electrical, Chemical Engineering, Physiology, Occupational Health, Safety, among others. In addition there is no cross-cutting certification for MANPRINT within the Army for either civilian or military personnel. The typical qualification for a MANPRINT position is targeted at a Master's level individual, with option to complete a PhD as part of an Army obligation. Some hires are accepted at the Bachelor's level with appropriate experience.

Beginning in FY 09, the MANPRINT enterprise workforce will be fully examined and transformed in the next three years, with a target to submit support requirements in the FY 12 POM. The goal is to have a career path for MANPRINT analysts to progress from entry, mid, and senior levels with growth into management or senior mentorship positions. Part of this development process will include leveraging current military and academic education and training opportunities from the other services and DoD, as well in universities.

Other findings and recommendations from the FY 2005 plan will be leveraged in the development of the MANPRINT Career Field initiative.

5.2 Training and Education

The Army continues to experience high demand for their MANPRINT training courses for new practitioners, acquisition personnel, and related disciplines. These operate on a rotating schedule and on-demand, and include a 5-day action-officer/practitioner course, a 2-4 day executive/custom tailored course, and several hour instruction modules within the Army Leadership Management College (ALMC) and the Defense Acquisition University (DAU). A senior analyst within the MANPRINT HQ Directorate is dedicated 1/3 PSY to maintaining and upgrading these courses, as well as expanding their reach and scope.

The Army believes that the future of MANPRINT education is to align with the other services to create joint and adaptive HSI course modules that can be professionally produced and managed. This will be addressed in the Joint HSI Working Group (JHSIWG) for consideration and resourcing in FY10.

6.0 ARMY HSI FY09 KEY TASKS

6.1 Stay the Course with MANPRINT Core Functions and Analytic Practice

The 14 core MANPRINT functions represent the enduring framework from which MANPRINT is managed and executed. Some of these are more fully covered than others. The FY09 goal is to increase coverage on these functions by 20% by assessing their underlying processes and making changes to make them more efficient, and automated if appropriate. This will be a multi-year effort.

6.2 Activity Tracking and Assessment–Knowledge Management

In FY07, the MANPRINT HQ office initiated a spreadsheet tracking system to develop full situation awareness of analyst coverage of Army systems and the resulting payoff to program developers and soldiers. This effort will continue and become the central element of monitoring, tracking, networking, information sharing, trend analysis, and computation of return on investment. A Beta-version of a web-based portal for this system (MANPRINT Enterprise Tracker/Analyzer – META) has been prototyped. In the coming year managers and analysts will use the system and provide input to refine the interface and functionality. A working and supported web version will be deployed in FY10.

6.3 Chair JHSIWG

The Army is the Joint HSI Working Group Chair for 2009. During this tenure, the JHSIWG business processes will be coded into a framework and a log of issues and actions will be deployed. The four standing subcommittees of JHSIWG will be clearly named and defined to accommodate the services, DoD, and other Federal and Coalition agencies as appropriate. Full instantiation of web services for the JHSIWG will be instituted so that work can be on-going throughout the year, and meetings are straightforward and efficient. A Joint Service HSI promotion booth will be stood up at the Pentagon during late April to broaden HSI understanding and demonstrate unity of effort to senior leaders.

6.4 Begin MANPRINT Career Field Development

Currently MANPRINT practitioners and managers come from a variety of professional job series. These include Human Factors Engineer, Research Psychologist, Safety Specialist, Physiologists, among others. To encourage and stabilize the application, a more dedicated work force is required. The Army MANPRINT office will work with G-1 human resources specialists to determine whether a distinct job code or job qualifiers will be the best path to initiate recruiting, sustaining, educating, and promoting this human capital.

6.5 Build POM request for MANPRINT Application Funding MDEP/PE

Funding for MANPRINT is currently a combination of RDT&E dollars from core agency budgets, acquisition program managers, and Army studies and analysis support. Army MANPRINT is currently reviewing the planning, programming, and budgeting for MANPRINT efforts, and will propose an improved approach within the Army as well as in the Joint HSI Working Group and Senior Leader Council.

7.0 ARMY HSI RESOURCE REQUIREMENTS

7.1 MANPRINT Directorate

The 14 enterprise MANPRINT core functions were presented in section 2.1.1. Some functions are more fully covered than others. Two additional program analysts personnel would enable more comprehensive and efficient coverage and operations. Table 7-1 shows the 14 functions and their current coverage status.

Table 7-1 MANPRINT Enterprise Functions Coverage Status

Function	Coverage Status	Comments
1. Establish, coordinate, and disseminate DA MANPRINT Program policy, guidance, and procedures to all Army commands and agencies.	Good	Coverage sufficient
2. Finalize and approve all MANPRINT Assessments (MA) from MANPRINT practitioners in the field. The MA shall identify any critical MANPRINT issues with the system that must be resolved before the Army G-1 will officially support any recommendation that the system proceed to the next acquisition milestone. Sixty days prior to the convening of a key Milestone Decision Review (MDR), issue approved system MAs to the Milestone Decision Authority (MDA), with copies to the system Program Executive Officer/Program Manager (PEO/PM). The MA is the primary mechanism to hold system developers accountable to address MANPRINT requirements	Partial	Number of systems in acquisition exceeds MANPRINT practitioner availability; not all MANPRINT Assessments required can be performed.
3. Represent the Army G-1 MANPRINT position at system MDRs, to include Army Systems Acquisition Review Councils (ASARCs), Overarching Integrated Product Teams (OIPTs), and other official acquisition decision venues. Serve as advocate for resolution of any critical MANPRINT issues and provide recommendations for risk mitigation to the MDA, as applicable.	Good	Coverage sufficient
4. Serve as the Army's focal point for MANPRINT Program interfaces with other DOD services, government agencies, and international programs regarding policy, standards, and research and development.	Partial	Increased HSI interest within the services and DoD has increased workload. NATO partners are requesting US HSI engagement for coalition system policy/guidance
5. Serve as the proponent for the Army MANPRINT Training Program. Oversee MANPRINT training in all venues (Army, DOD, and other).	Partial	Demand for MANPRINT training is growing exponentially each FY

6. Sponsor a MANPRINT Practitioners' Workshop ~ every 18 months to further professional coordination and collaboration among specialists in the seven MANPRINT domains (manpower, personnel, training, human factors engineering, system safety, health hazards, soldier survivability), from government, industry, and the academic community both in the U.S. and allied nations.	Good	Coverage sufficient
7. Establish and maintain a state-of-the-art knowledge-based monitoring, assessment, and evaluation system to account for all MANPRINT activity and its return on investment to support soldier readiness and the materiel acquisition process.	Limited	Current spreadsheet based tracking and metrics are not suitable for situation awareness and rapid computation of return on investment
8. Establish and maintain a MANPRINT website as part of the overall HQDA G-1 website. Maintain it as a primary source of information on MANPRINT policy, guidance, procedures, training, and events.	Good	Coverage sufficient
9. Serve as the proponent for the MANPRINT Technical Base Research and Development Program to identify and prioritize research needs as specified in the Soldier Oriented Research and Development Program under AR 70-8.	Good	Coverage sufficient
10. Coordinate with the Deputy Chief of Staff, G-4 to establish policy on how MANPRINT and Integrated Logistics Support (ILS) programs will complement each other and interface.	Good	Coverage sufficient
11. Coordinate with the Army Test and Evaluation Office (TEO) to establish policy on how MANPRINT and test and evaluation programs will complement each other and interface.	Partial	TEO recently stood up and requesting more formal coordination and engagement
12. Review the application of MANPRINT in Army models, simulations, and analyses.	Good	Coverage sufficient
13. Review all applicable system acquisition life-cycle requirements and compliance documents, to include Materiel Capability Documents (MCD), Manpower Estimate Reports (MER), Acquisition Strategies, System Engineering Plans (SEP), System Evaluation Plans, Supportability Strategy (SS), among others, to ensure that MANPRINT domain requirements have been properly addressed. Coordinate with PEOs and PMs to ensure those requirements have been adequately cross-walked and embedded into Requests for Proposal (RFPs) and Test and Evaluation Master Plans (TEMPs).	Partial	Coordination with key personnel and attendance at critical IPTs exceeds availability of MANPRINT personnel, due to increased OPTEMPO, added system increments, more total systems
14. Encourage and facilitate an integrated, cooperative working relationship among all of the MANPRINT domain agencies.	Good	Coverage sufficient

7.2 MANPRINT Practitioner Agencies and Workforce

Although a solid workforce is in place and operating, system coverage and analytic rigor is a challenge. ACAT I and II systems and a number of non-programs of record and ACAT III systems are being addressed. However with pending workforce retirements and increasing numbers of system, a fully functioning workforce would require an increase of 50% by new hires or reassignment.

A \$2.1M increase in FY11 funding would provide a 45% increase in the number of programs impacted. FY12-15 Requirements for practitioners is shown in Table 7.1

Table 7-2 MANPRINT Practitioner Funding POM Recommendation

Dollars (in \$M)	FY12	FY13	FY14	FY15
Current (PE 65326.33B)	\$1.7	\$1.7	\$1.8	\$1.8
UFR	\$2.1	\$2.1	\$2.0	\$2.0
Total	\$3.8	\$3.8	\$3.8	\$3.8

MANPRINT Support to Test and Evaluation (T&E) activities could be fully realized with POM funding to practitioners. Currently, MANPRINT is funded by PM reimbursable funds through the Army Test and Evaluation Command (ATEC) Systems Teams (AST). However, these funds are primarily for use during tests late in the system life cycle. Applying resources at the beginning of the life cycle to T&E planning and initial tests has been estimated to save up to 25% in downstream costs. Recommended funding for T&E is shown in Table 7-2

Table 7-3 MANPRINT Practitioner Funding for T&E POM Recommendation

(\$M)	FY09	FY10	FY11	FY12	FY13	FY14	FY15
ARL HRED	1.6	3.2	3.2	3.3	3.4	3.5	3.6

7.3 MANPRINT Technology

Existing tools and models are mostly stand-alone instruments. Each model is operated by itself, and when the models must work together, it is laborious to translate one model's output to be another model's input. Models need to be placed under a common architecture if they are to support timely and intensive analysis.

New analytic tools and models are needed that better reflect the realities of the information age. Military success, today, is more dependent on having an accurate situational awareness. Current tools are more focused on physical actions rather than cognitive behaviors, and are not entirely satisfactory in assessing situational awareness.

The Army's S&T (Science & Technology) funding portfolio for MANPRINT technology is currently \$1M/FY. These funds are used to develop tools, obtain software licenses, maintain help desks, conduct validation and verification evaluations, among other tasks. A typical life-cycle cost for tool development averages \$100-200K. This does not cover the maintaining and sustain costs. A more robust budget of \$5M/FY for methods and tools, would leverage and incorporate next generation technologies (common architectures, expanded computational algorithms, cognitive behavioral models, etc.) and build-in the needed support costs. Table 7-4 shows the current and enhanced funding for MANPRINT technology

TABLE 7-4

MANPRINT ANALYSIS MODELS AND TOOLS - CURRENT VS ENHANCED FUNDING					
CURRENT	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
R&D Bench Scientists*	\$99,999	\$99,999	\$99,999	\$99,999	\$399,996
Hardware/Software	\$60,000	\$60,000	\$60,000	\$60,000	\$240,000
CONTRACTS **	\$90,000	\$90,000	\$90,000	\$90,000	\$360,000
Sub Total By Qtr	\$249,999	\$249,999	\$249,999	\$249,999	\$999,996
ENHANCED	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
R&D Bench Scientists*	\$679,998	\$679,998	\$679,998	\$679,998	\$2,719,992
Hardware/Software	\$270,000	\$270,000	\$270,000	\$270,000	\$1,080,000
CONTRACTS **	\$300,000	\$300,000	\$300,000	\$300,000	\$1,200,000
Sub Total By Qtr	\$1,249,998	\$1,249,998	\$1,249,998	\$1,249,998	\$4,999,992

* Government civilian salary for HumanPerformance Science & Engineering = \$100K/FY

** Contract Information

PURPOSE/ DESCRIPTION	\$ Type RDTE	PERIOD OF PERFORM	AMOUNT	
Software licenses, maintenance, help-desk	6.3	12 mon	\$240,000	CURRENT
			\$1,080,000	FUTURE

Enhanced funding, as in the second half of Table 7-4, would provide a significant step forward for the Army MANPRINT Directorate, which has the proponency for AR 70-8, SORD (Soldier Oriented Research & Development). The Directorate is responsible for ensuring that Army agencies include MANPRINT requirements in their S&T 6.1-6.3 portfolios. [The AR was last revised in 1990, and will be rewritten in the next three years to contain more substantive and measureable management and accounting processes. The new version will require senior Army level advocacy to approve and enforce.]

8.0 ARMY HSI MATURITY METRICS

8.1 Metrics Framework

MANPRINT has three categories of measures: MANPRINT Payoff, Risk, and Resources. This framework is defined as:

MANPRINT Payoff = f (Risk + Resources)

MANPRINT payoff is one or more of three return-on-investment (ROI) measures: cost savings/avoidance, soldier survivability/injury avoidance, and enhanced soldier-system performance.

MANPRINT risk measures are derived from the number, severity, and probability of human performance issues identified through observation, analysis, modeling and simulation, and experimentation for a given system or system of systems. Each MANPRINT domain conducts separate risk assessments, using methods and measures specific to their domain, which are aggregated to report a single index of risk. The domain reports are integrated so that a single combined rating of critical, major, or minimal is reported in a given system MANPRINT Assessment. These are submitted to the Army leadership as the basis for a MANPRINT recommendation of Go, Go with qualification, or No-Go for a System Milestone Decision.

MANPRINT resource measures are the numbers of qualified personnel, training and education opportunities, and analysis methods and tools that can be used to provide MANPRINT support to assess systems. Each of these elements has an associated funding component which is directly related to overall MANPRINT capability.

8.2 Metrics Assessment and Evaluation

MANPRINT has been in operation for over 20 years and has continually improved and quantified its analyses and payoff to the Army. A method to track and account for this work has only recently been shifting from anecdotal evidence to a central knowledge management and evaluation system. This challenge is being addressed with a solid enterprise approach to upgrade measures, recordkeeping, analytic rigor, human capital investment, and 21st century trend analysis and predictive tools.

9.0 ARMY HSI ASSESSMENT PROCESS

9.1 Enterprise Tracking and Analysis

The MANPRINT Enterprise Tracker/Analyzer (META) is a knowledge management software system that will provide a graphical, distributed collaboration tool that will allow for the effective management and conduct of MANPRINT activities. Currently a BETA version of META is operating with a limited data set. Ultimately META will contain a comprehensive database of Army and Joint systems, their life-cycle status and primary attributes, a listing of key MANPRINT and stakeholder personnel, and a record of all MANPRINT analysis and enterprise support activities- archived, current, and projected. Using a password-protected log-in portal, MANPRINT managers, practitioners, and senior executives will access a graphical workspace to post and update their activity, determine specific or aggregate system status, and develop single measure and trend analysis reports. Figure 9-1 shows the high level architecture for META.

META Architecture

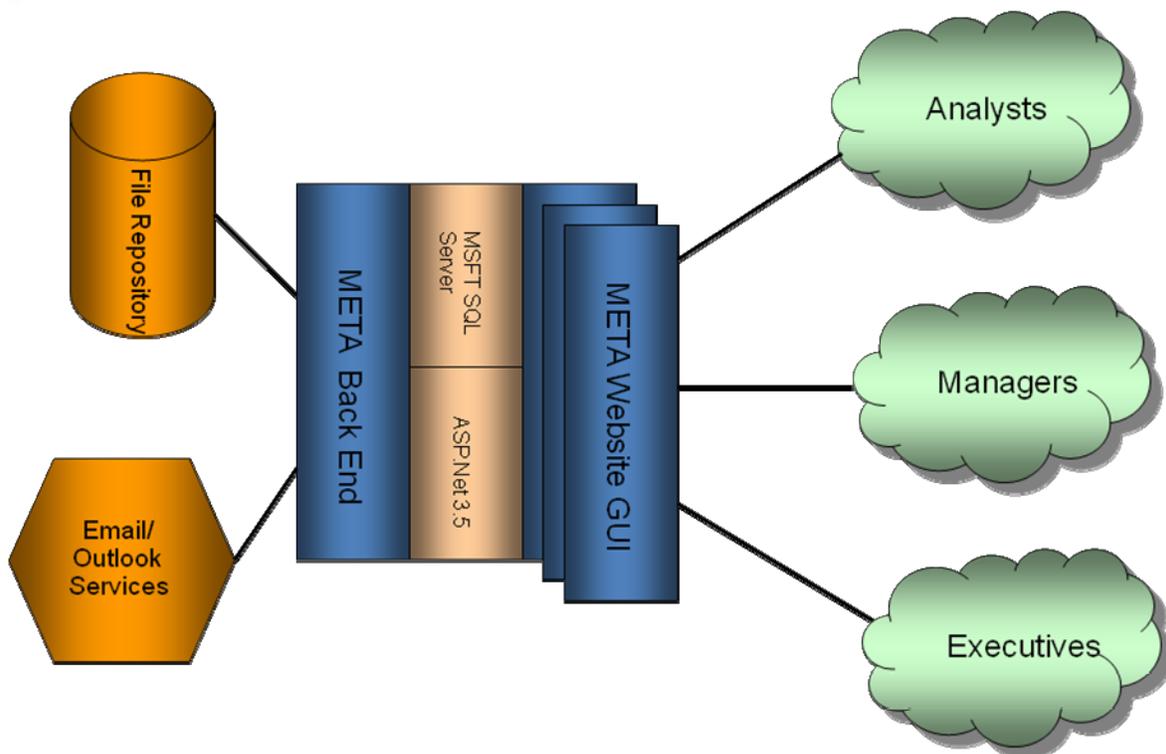


Figure 9-1 META Tool Architecture

META is a multi-year effort designed to replace current mostly manual or spreadsheet-based tracking and analysis of MANPRINT efforts. Today, disparate documents and records of MANPRINT work for a given system must be collected and assessed to build a portfolio of

accomplishments and challenges. In the next three years, META will supersede the current methods and enable near real time computation and viewing of MANPRINT's payoff to Army systems. Appendix B contains a recent slide deck with screen-shots from the META application.

9.2 Operational and System Program Executive Feedback

Lessons learned and program success stories from system development and deployment over time are currently collected by exception rather with a proactive, comprehensive plan. The Army already has established portals and knowledge management systems where findings from materiel equipment use in training and operational theaters is obtained. MANPRINT plans to ingest these types of data into META for analysis specific to MANPRINT payoffs and missed opportunities. In FY 09, a draft framework and outline plan will be developed to determine the best approach to import system developer, tester, and operator event activity useful for analysis in META. This step will dramatically expand the scope of assessment for the entire MANPRINT enterprise. An initial capability for MANPRINT use is targeted for FY 10-11.

10.0 ARMY SUPPORTING DETAILED PLANS

10.1 MANPRINT Guidebook – DA PAM

The MANPRINT Directorate will transform its MANPRINT Handbook, produced in CY 2005, into an official Department of the Army Pamphlet. The Handbook was designed to introduce MANPRINT to practitioners, managers, and system concept and capability developers, and then provide hands-on techniques, methods, and SOP for conducting MANPRINT. By following the Army standard publication process to develop a DA PAM, the current handbook will be updated, refined, and fully staffed within the Army community to develop a professional product for use by trainers, planners, and action officers. A draft version of the MANPRINT PAM has been written and is scheduled for publication in FY10.

10.2 MANPRINT Training for the Acquisition Community

MANPRINT is working in cooperation with the Joint HSI Working group to share and develop an overall systems approach to MANPRINT training and education. A senior analyst within the MANPRINT Directorate is permanently assigned to oversee this effort, and consists of one-third PSY level of effort, and will ensure that the Joint HSI training and education plan is suitable for Army use.

10.3 MANPRINT Campaign Plan FY 05

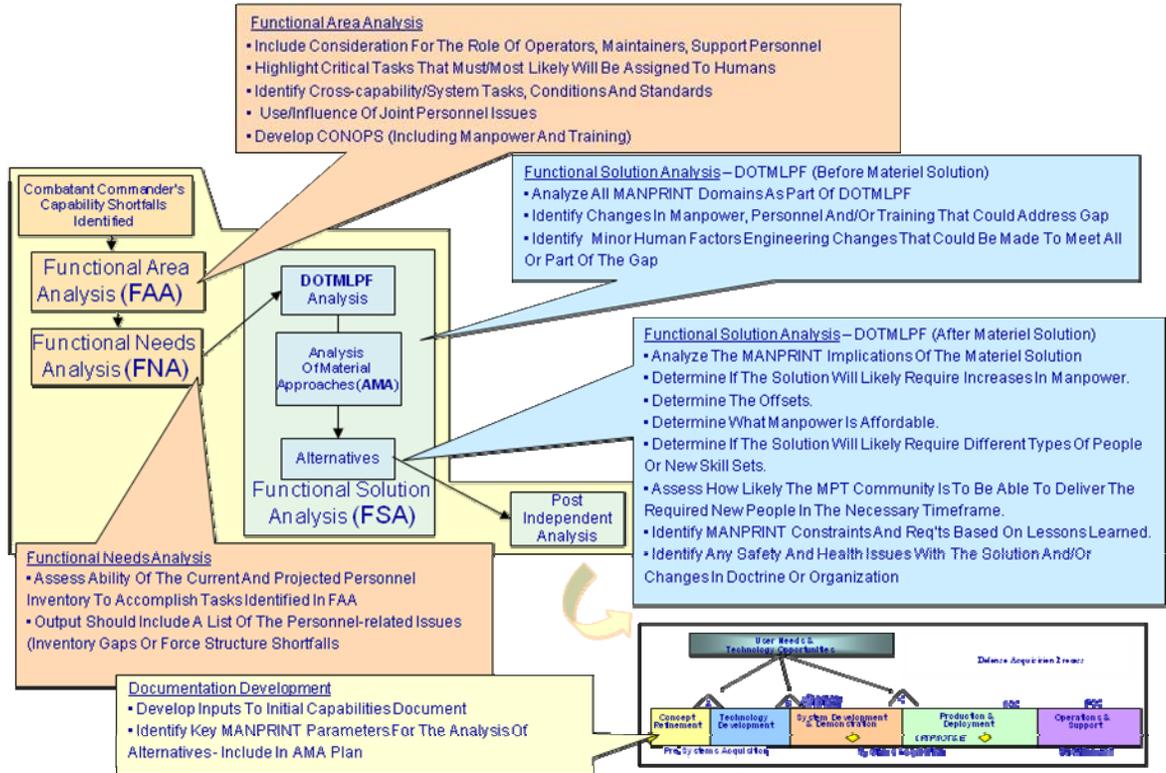
A MANPRINT Campaign Plan was first developed in 2005, and many of the ideas presented in this plan are incorporated in this Army HSI plan. In the coming year, the MANPRINT directorate will continue to leverage the relevant sections of the Campaign Plan and more fully inform the current HSI plan. The FY 05 plan is reproduced in Appendix C.

10.4 MANPRINT Awareness Plan FY 05

A MANPRINT Awareness Plan was written in 2005 to provide an initial estimate of the types of strategic communications and outreach activities required to better integrate MANPRINT in the acquisition and total Army community. Cost estimates were included in this plan. The MANPRINT Directorate believes that this should be a JHSIWG initiative and a Joint HSI awareness plan should be developed and followed, with yearly updates. The FY 05 plan is reproduced in Appendix D and will be used as feeder data to JHSIWG personnel to assist in development of a Joint plan.

APPENDIX A. MANPRINT ANALYTIC FUNCTIONS WITHIN THE ACQUISITION LIFE CYCLE

1. Initiate MANPRINT Systems Engineering Early



2. Plan Analysis – Identify Issues

Program-Specific, Issue-Oriented

Issue Identification And Tracking

Identification Code
Title
Criticality
Issue Summary
Operational Impact If Not Resolved
Recommended Solution/Mitigation
Lead/Assist Responsibility
Current Status

- * **Provides Audit Trail For MANPRINT Assessment**

Analysis Planning

MANPRINT Analyses Should Address The Specific MANPRINT Issues Of An Individual Capability Development Effort.

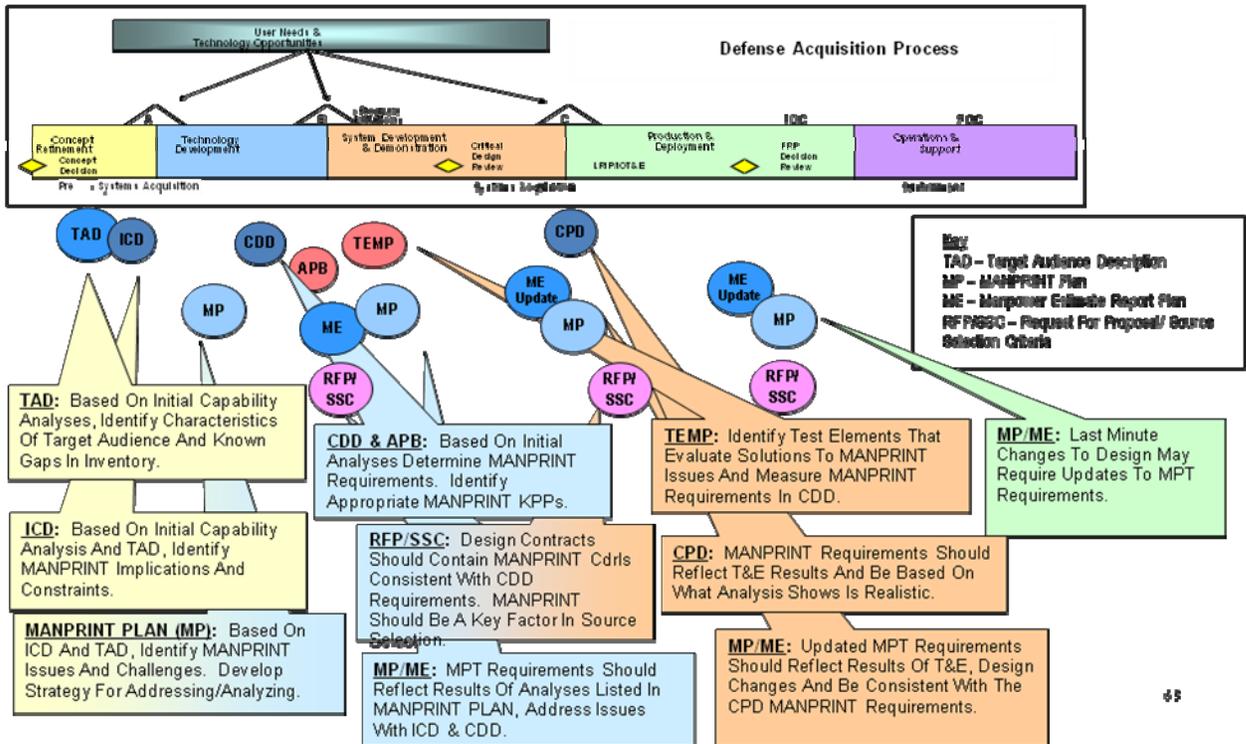
- * **MANPRINT Plan May Include Both Issues And Analysis Planning.**



42

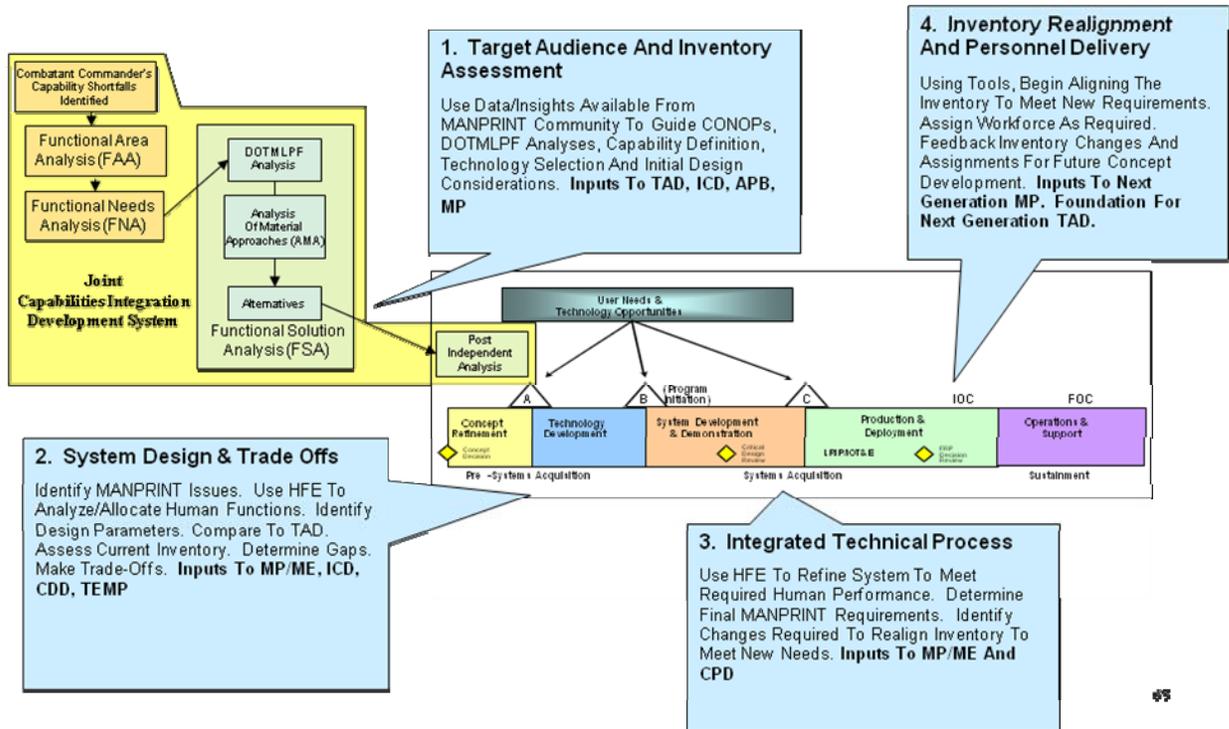
3. Document/Crosswalk MANPRINT Requirements

4. Make MANPRINT a Factor in Source Selection



5. Execute Integrated Technical Process

6. Conduct Proactive Trade-Offs



7. Conduct MANPRINT Assessments

Purpose

**Determine Status And Adequacy Of MANPRINT Effort
Present Issues and Risks To Decision Makers**

When

Prior To All Milestone Or Major Design Reviews

Scope

User Concerns

Program Risks

Manpower Affordability

Training (Issues & Devices)

Human-System Interfaces

Documented Resolutions

Time Lines

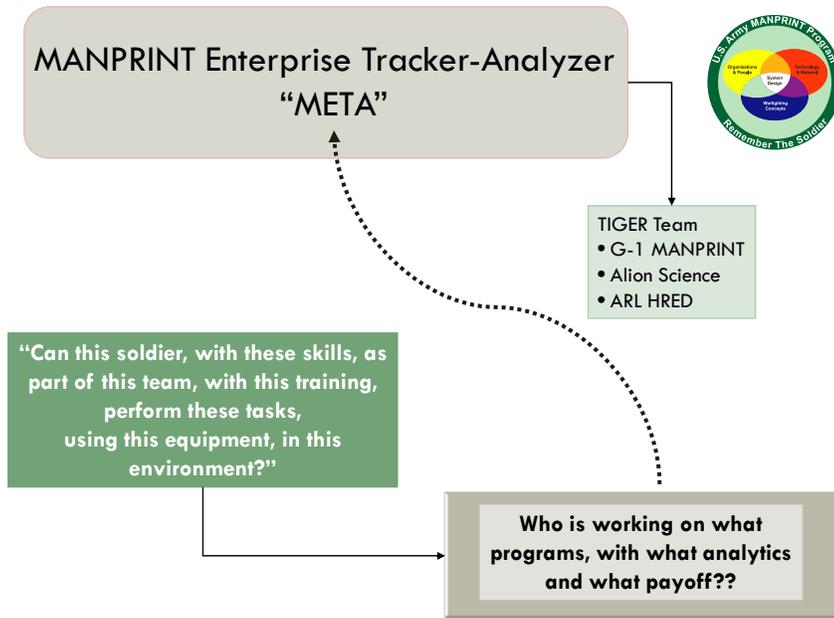
Test Results

MANPRINT Rqts In Documentation

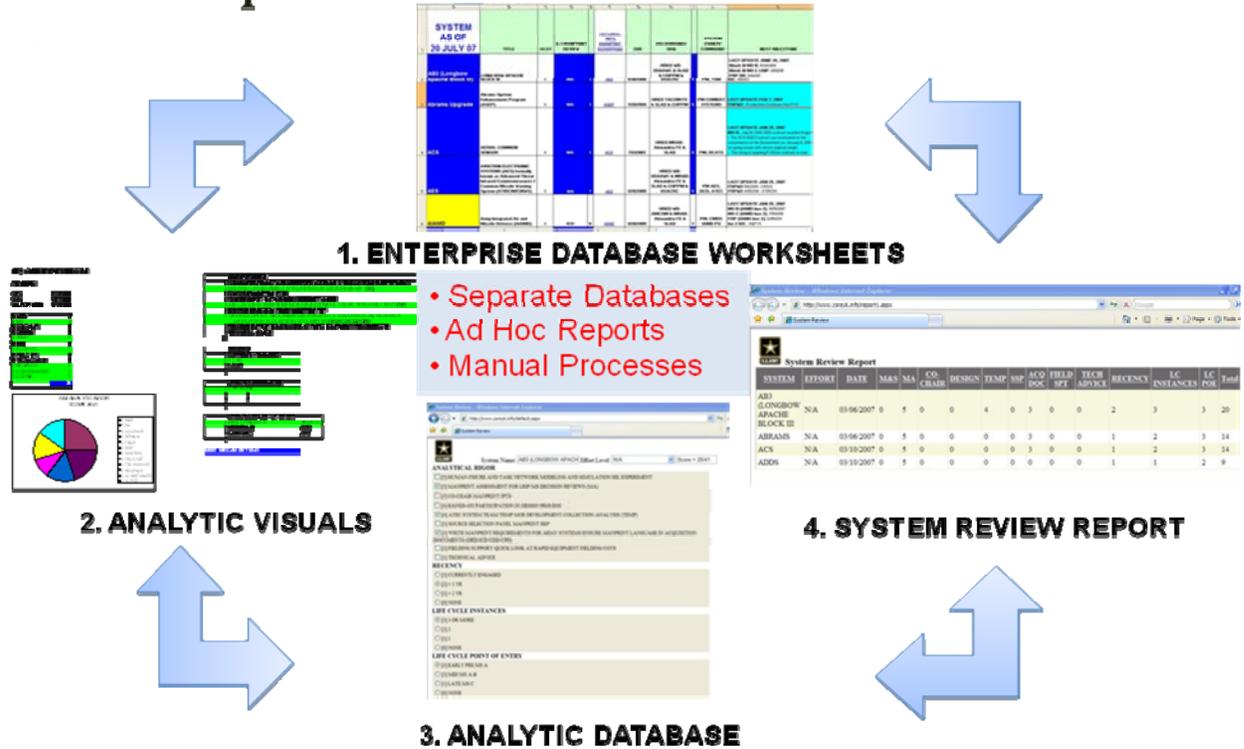
Completeness

26

APPENDIX B. MANPRINT ENTERPRISE TRACKER-ANALYZER (META) SLIDE DECK WITH SCREEN SHOTS



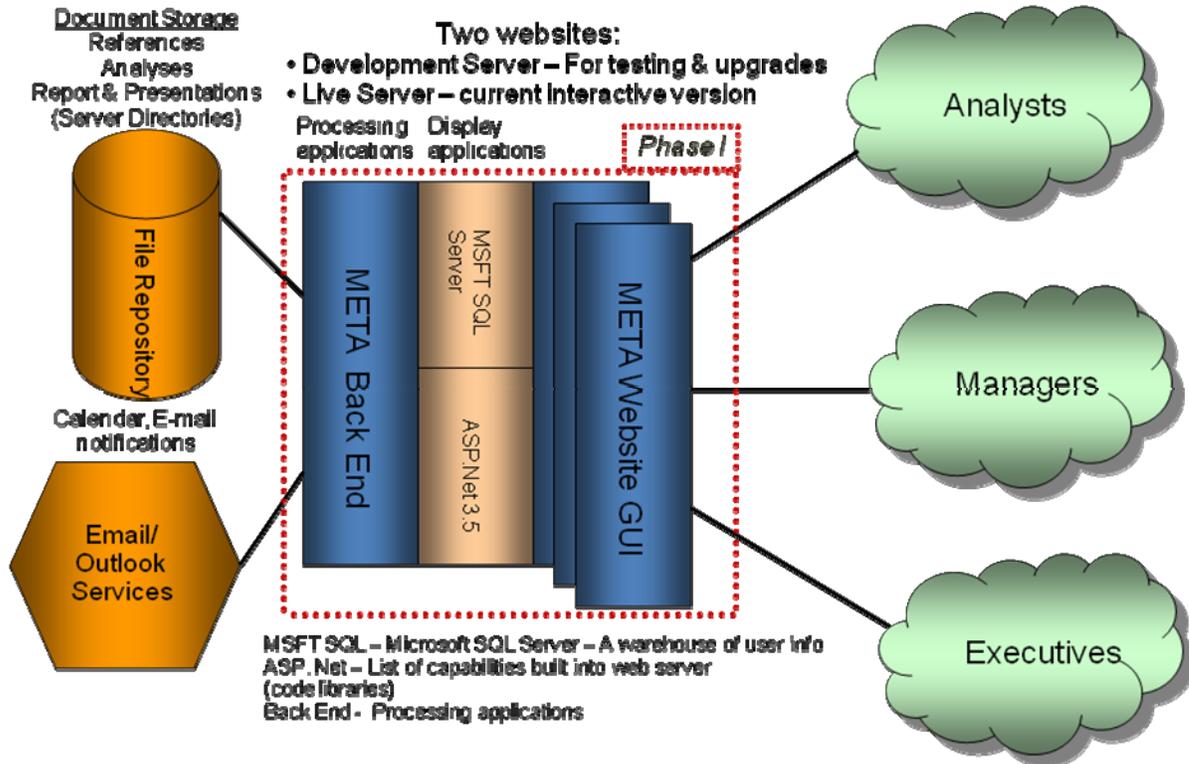
MANPRINT Enterprise Analysis: Spreadsheet Functional Flow



What We Need: META - A Dynamic Tool MANPRINT ENTERPRISE TRACKER- ANALYZER

- META Must Have A User-Dashboard and Under the Hood Analysis Tools
- - ▣ Determine **Trends** And Produce Reports
 - ▣ Call up **Tools** Which Can Answer MACRO to MICRO questions
- Enable Determination Of
 - ▣ Resource Gaps
 - ▣ High **payoff areas** and success stories
- Communicate the MANPRINT Story, to Anyone, at Any Time
 - ▣ Inform Decision Makers about MANPRINT success & risk
 - ▣ Raise awareness of the MANPRINT **impact** on SOLDIER readiness
 - ▣ Provide guidance on where to place RESOURCE emphasis

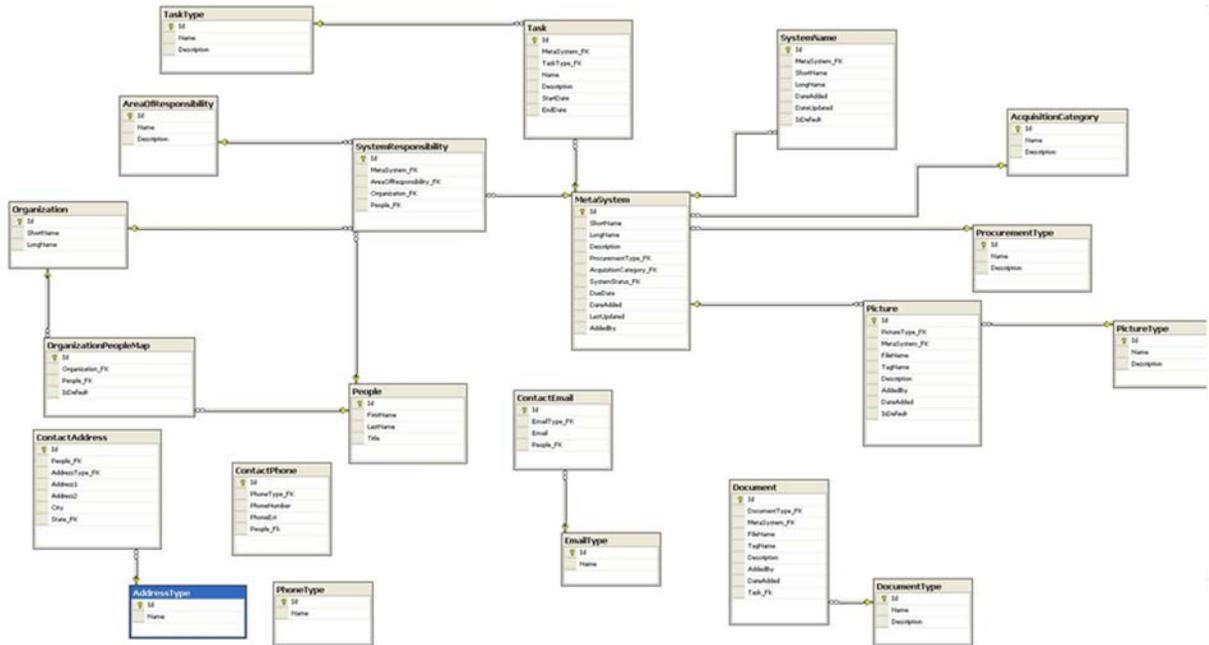
META Architecture



META Development Approach

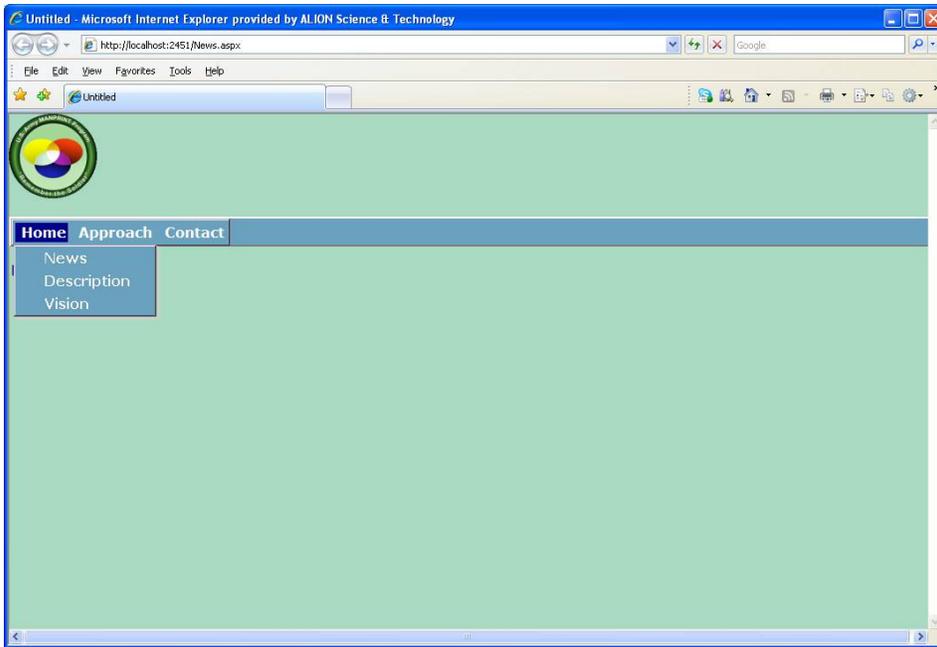
- Spiral approach to add new and modify existing features
- A “data driven” architecture that will allow for fast, replaceable and interchangeable GUIs as GUI evolves
- First step - replace current system with META website
 - ▣ Hosted externally to G1
 - ▣ Replace spreadsheet approach with web GUI
 - ▣ Provide current reporting along with META Demo capabilities
- Conduct user review with limited number of users
 - ▣ Build capabilities per user requirements
 - ▣ Exercise use cases

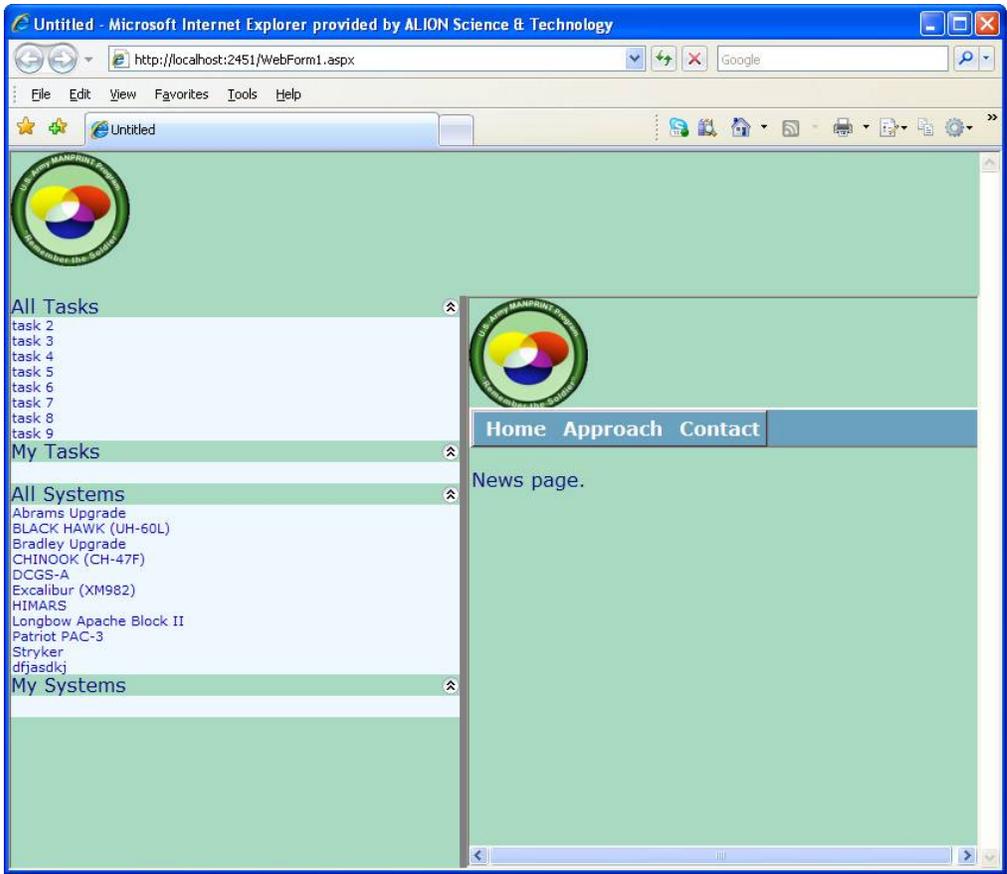
MANPRINT Activity Tracking Database



META Home Page

Username:	<input type="text"/>	META News & Announcements
Password:	<input type="text"/>	
META Splash Screen Picture		





Untitled - Microsoft Internet Explorer provided by ALION Science & Technology

http://localhost:2451/NewFolder1/TaskEdit.aspx

File Edit View Favorites Tools Help

Untitled

Id	2
Name	
Description	task 2
StartDate	10/14/2008
EndDate	10/14/2008 11:53:05 PM
DateComplete	
AnalysisResults	
LifeCycle	Concept Refinement
ManprintDomain	<ul style="list-style-type: none"> Concept Refinement Technology Development System Development & Demonstration Production & Deployment
Funder	
Requester	
Owner	McDevipt
System	Abrams Upgrade
TaskStatus	Complete
TaskType	Human-Figure and task network modeling and simulation/HIL experiment

[Update](#) [Cancel](#)

Analyst - Status - Mozilla Firefox

http://localhost:2473/Analyst/Status.aspx

meta - analyst - status

System	Owner	ACAT	Manpower	Personnel	Training	Human Factors	System Safety	Health Hazards	Soldier Survivability
ACS	Bev	I		🔍				🔍	
ARH	Taylor	I		🔍				🔍	🔍
BIOMETRICS	John	I					🔍		
BLACK HAWK (UH-60L)	Taylor	I		🔍	🔍		🔍		🔍
BLACK HAWK (UH-60M)	Taylor	I		🔍				🔍	
Bradley Upgrade	Teresa	I	🔍			🔍	🔍	🔍	
CCU/SPO	John	I		🔍					
Chem Demil-CMA	John	I					🔍		🔍
Chem Demil-CMA Newport	John	I					🔍	🔍	
DCGS-A	Bev	I	🔍	🔍		🔍	🔍	🔍	
FBCB2	Bev	I						🔍	
FBS	John	I	🔍	🔍	🔍	🔍	🔍		🔍
FCS	John	I			🔍	🔍	🔍		

executive

- Status
- Schedule
- Briefing Templates
- PowerPoint Wizard

manager

- Status
- Schedule
- Success Stories

analyst

- Status
- Task Priorities
- Tools

Done

Analyst - Update System - Mozilla Firefox
 http://localhost:2473/Analyst/EditSystem.aspx?system=84

meta - analyst - update system

ACS










Last Modified: 1/6/2008 9:15:00 AM

Upload additional documentation:

Analytical Rigor (8)

- Human-Figure and task network modeling and simulation/HIL experiment
- MANPRINT assessment for LRIP/MS decision reviews (MA)
- Co-chair MANPRINT IPTS
- Hands-on participation in design process
- ATEC system team/temp MOE Development-Collection-Analysis (Temp)
- Source selection panel MANPRINT REP
- MANPRINT requirements for Army systems/Ensure MANPRINT language in acquisition documents (ORD/ICD/CDD/CPD)
- Fielding support/quick look at rapid equipment fielding/COTS
- Technical advice

Recency (1)

Life Cycle Instances (2)

Life Cycle Point of Entry (3)

Add Additional Comment:

executive

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- [Briefing Templates](#)
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manager

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- [Schedule](#)
- [Success Stories](#)

analyst

- [Status](#)
- [Task Priorities](#)
- [Tools](#)

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Done 100%

APPENDIX C. MANPRINT WORKFORCE CAMPAIGN PLAN 2005

**U.S. ARMY
MANPRINT WORKFORCE CAMPAIGN
PLAN**

**Manpower And Personnel Integration (MANPRINT)
Program Support**



**for
Deputy Under Secretary of the Army
(Acquisition, Technology and Logistics)**

Deputy Under Secretary of the Army (Operations Research)

Deputy Chief of Staff, G1

**MANPRINT Directorate
March 2005**

The MANPRINT Acquisition Workforce Campaign Plan is a living document that will be updated regularly to align with the changing environment, the Warfighter's requirements, and comments from the field. In the future it will be posted on Army MANPRINT Homepage <http://www.manprint.army.mil/manprint>.

APPENDIX D. MANPRINT AWARENESS PLAN

**MANPRINT AWARENESS PLAN
(MAP)**

Manpower and Personnel Integration (MANPRINT)



**for
Deputy Chief of Staff, G1**

**Prepared for
MANPRINT Directorate**

Contract Number: W74V8H-04-C-0014