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Human-Systems Integration Technologies, Tools, and Techniques (HSIT^3): Survey Results

Interim Report 1

Prepared for: Edwin R. Smootz, Ph.D.
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13. ABSTRACT ***(Maximum 200 Words)***
The Human Systems Integration Technologies, Tools, and Technicques (HSIT3) Survey was implemented to solicit input from HSI subject-matter experts (SMEs) and MANPRINT practitioners to identrify the user's requirements for an updated HSI practitioner's guidebook. The survey was divided into three major sections: (1) Demographics; (2) MANPRINT Implementation; and (3) MANPRINT SOAR Recomendations. The survey was sent electronically to 70 MANPRINT practitioners and SMEs representing the Army, Air Force, Navy, FAA, industry, academia, the UK and Canada. The survey responses that were returned varied in the level of detail. It appears that individuals concentrated their efforts on areas with which they were most familiar.

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February 1, 2000

Table of Contents

Interim Report #1
Human Systems Integration (HSI)
Technologies, Tools, and Techniques Survey

1. Background

Over the past decade the U.S. Army has developed a wide range of tools, techniques, and technologies for integrating human factors into material acquisition. Many of these methodologies have been critical to the Army's MANpower and PeRsonnel INTegration (MANPRINT) program, providing a number of cost and performance benefits. The Department of Defense (DoD), U.S. Government agencies, and foreign countries have begun to implement their own programs modeled after the MANPRINT program. These programs are frequently identified as Human-Systems Integration (HSI) or Human-Factors Integration (HFI) programs. However, a major problem has developed with both the Army MANPRINT program and those programs modeling MANPRINT in their attempts to achieve cost and performance benefits similar to those achieved in the past. This is due to the lack of guidelines and case study material describing the methodologies.

Since MANPRINT was introduced 14 years ago, HSI has become more prevalent in system designs. While many accomplishments were made, there is still a tremendous potential for the application of HSI to future systems. To capture the theoretical advances and lessons learned in the development and application of HSI technologies, tools, and techniques, it was determined that a complete state-of-the-art study was needed as the first major step to update, standardize, document, and train for the current HSI concepts and processes. The first item to accomplish in this task was a survey of the user community to obtain input on user requirements and needs for an updated HSI practitioner's guidebook.

2. Purpose and Objectives

The Human-Systems Integration Technologies, Tools, and Techniques ($HSIT^3$) Survey was implemented to solicit input from HSI subject-matter experts (SMEs) and MANPRINT practitioners to identify the user's requirements for an updated HSI practitioner's guidebook. Structured to follow the format of the proposed updated HSI state-of-the-art report (SOAR), the survey (Attachment 1) queried the SMEs and practitioners for recommendations on issues, themes, and information they believed should be covered in each section, as well as potential authors and contributors. The overall goal of the survey was to develop a guidebook that would be responsive to the needs of the user community.

The survey was divided into three major sections: (1) Demographics; (2) MANPRINT Implementation; and (3) MANPRINT SOAR Recommendations. The Demographics section was included to obtain background information so that a user profile could be established. The purpose of the second section, MANPRINT Implementation, was to determine the voids in MANPRINT methodology, the success rate with, or obstacles to, implementing MANPRINT, and whether the program receives the support from top-level management that it needs. Finally, the third section, MANPRINT SOAR Development,

was divided into the five proposed sections for the SOAR. Within each section, the survey respondents were provided with a one-paragraph description of the proposed section and were requested to provide what their recommendadtions for an organizing principle or theme, potential chapter titles, and potential authors or contributors for each chapter.

3. Methodology

The survey was sent electronically to 70 MANPRINT practitioners and SMEs representing the Army, Air Force, Navy, FAA, industry, academia, the UK and Canada. These individuals were selected on the recommendations of a panel of senior analysts working on the project. Of the 70 recipients, 15 submitted responses (21%), and an additional 6 individuals (9%) replied that they did not feel they had enough knowledge on this topic to submit a reasonable response.

4. Results

4.1 Demographics

Of the 15 respondents, 8 were government employees and 7 worked in the industrial sector, with an average of 11 years experience using MANPRINT. In addition to MANPRINT, other commonly used tools were Hardman, Imprint, Survivability Assessments, and Personnel Subsystems.

4.2 MANPRINT Implementation

Question 1 asked what the respondents believed were the most significant voids in the MANPRINT methodology. The most common void reported was the **lack of authoritative requirement for the mandatory implementation a MANPRINT program**. Additional responses included lack of quantitative MANPRINT methods, scarcity of HSI professionals who understand the acquisition process, lack of methods, procedures, and techniques for integrating MANPRINT issues early in the design process, and the difficulty of determining a "return on investments" for MANPRINT interventions.

With regard to question 2, respondents stated MANPRINT was **often** successful when implemented as a routine activity in design and operations.

Question 3 asked what the respondents believed was the biggest obstacle to the implementation of MANPRINT in the design phase of system development. Overall, the response was **the inability to make MANPRINT a routine step in the early concept definition phase of development** and the **lack of funding resources**. Other responses included the lack of reliable data, lack of understanding of MANPRINT implications, and the lack of leadership understanding as to what HSI involves.

Finally, on Question 4, respondents believed that on the whole, MANPRINT **sometimes** (as opposed to always or never) has the support needed from top level management for successful implementation in system design.

4.3 MANPRINT SOAR Recommendations

This section of the questionnaire comprised open ended/text questions only. For this reason, analysis was difficult, particularly with the low number of responses and the high degree of variability among the answers. However, it was possible to extract overall themes for each section which were summarized and distributed to a list of potential Workshop attendees. These results served as the underlying basis for discussion at the HSI Pre-Seminar and SOAR Workshop that was held 19-20 January, 2000 in Arlington, Virginia.

The survey responses that were returned varied in the level of detail. It appears that individuals concentrated their efforts on areas with which they were most familiar. In addition, recommended chapter titles and authors were not always provided. This section reports the resulting comments in a general format. For a detailed account of all themes, chapter titles, suggested authors, and comments, please see the *HSI Survey Summary Results* (Attachment 2).

4.3.1 Part I – Introduction

Three general themes were suggested by the respondents for Part I of the new HSI guidebook:

THEME 1

Organize around the overall need for MANPRINT by first providing a historical perspective, moving to the technologies, tools, and techniques, and ending with future goals and methods of achieving these goals.

- **Issue 1** – Define the domains and discuss why integration is needed for success.
- **Issue 2** – Discuss why MANPRINT was needed and how the policy came about.

THEME 2

Introduce a summary of the acquisition process with the understanding that more detail will be included in the following sections of the SOAR.

- **Issue 1** – Requirements Definition: need to get quantifiable MANPRINT requirements early and identify DoD and Department-level documents that specify HSI requirements.
- **Issue 2** – User Involvement: get users who have operational experience assigned directly to the program.
- **Issue 3** – Source Selection: imbed MANPRINT throughout the Request for Proposal (RFP).
- **Issue 4** – Design Integration: have knowledgeable MANPRINT experts working within the design and development of systems. Emphasize cost savings of integration.
- **Issue 5** – Test and Evaluation: ensure that T&E starts as an iterative effort early in the design stage. Test REAL subjects that are trained, skillful, and have the equipment representative of soldiers.
- **Issue 6** – Plan, program, and budget for MANPRINT.

THEME 3

Good HFE principals are always needed.

- **Issue 1** – Sell Management on HFE: top 10 mistakes made by systems engineering management and how to avoid them.
- **Issue 2** – Tailor to your project: discuss guidelines and task analysis and testing. Determine how much, when and how to tailor to your program budget, scope, and size.
- **Issue 3** – Pitfalls in using SMEs to design systems – how to work with SMEs and PMs. Must ensure that users and PMs are thinking along the same line.

4.3.2 Part II – HSI Tools, Techniques, and Technologies

Four general themes were proposed by the respondents for Part II:

THEME 1

Discuss the current state of MANPRINT/HSI and provide a separate chapter for each domain, including a discussion of intended users and address technology gaps.

- **Issue 1** – What should a good HSI domain tool do?
- **Issue 2** – Identify and explain the various domain (MPT, HFE, HH, etc). problems?

THEME 2

Focus on the selection process for tools and the use of appropriate tools or techniques at the appropriate stage of the process.

- **Issue 1** – Select the best tool for the application and the methods for applying the tool.
- **Issue 2** – Address special issues with new tools or the adaptation of existing tools.
- **Issue 3** – Keep the tool useful over iterative applications as the design matures.
- **Issue 4** – Avoid data collection that is not useful.

THEME 3

Discuss the problems of insufficient metrics to make decisions and the methods of HSI design without MIL-STDs.

THEME 4

Discuss emerging tools, such as NASA's MIDAS and ONR's HCDE, and virtual environments for HCD. These are still in the early stages, but are becoming more powerful. Integration is lacking and needed.

4.3.3 Part III – HSI Applications in Acquisition Process

Seven general themes were proposed for Part III:

THEME 1

Focus on trade-off decisions rather than specific methods.

- **Issue 1** – The Systems Acquisition Process: introduce readers to the process, including a streamlined version of it.
- **Issue 2** – Inform the reader on actions that can be taken at each stage of the process to ensure MANPRINT issues are considered.

THEME 2

Emphasize choosing the right tool for each stage in the acquisition process.

THEME 3

MPT must be viewed as an integral part of the system performance. Convey that MPT influences the ability of the weapon system to accomplish the mission.

- **Issue 1** – Training needs to develop skills specific to evaluating a particular system need to be in place for applicable testing.
- **Issue 2** – Mission Focus (part-task vs. mission simulation): discuss how to gather early part-task human performance information and relate it to mission accomplishments.
- **Issue 3** – Set MPT Objectives and Meet Them: set meaningful MPT objectives and have them drive systems design.
- **Issue 4** – Get user buy-in to push for designs that will reduce total ownership cost and get MPT financiers input in the design process.
- **Issue 5** – Maintain full system MPT performance objectives and ensure that they are tested.

THEME 4

Emphasize the role of the practitioner in each stage of the design process and as an integral member of the concepts and requirements team, system engineering team, and test and evaluation team.

THEME 5

Describe MANPRINT in ORD, SRD, RFP, Source Selection and Contract. Describe the Assessment Guidelines for Program Managers and Industry.

THEME 6

Don't disregard the basics. Transition of task requirements must include human requirements as well as system or mission requirements. Design is more of an art than science, particularly when no guidelines exist on previous systems.

- **Issue 1** – Requirements to Design: how to navigate the tricky path. Tools help you but don't THINK for you.

THEME 7

Discuss a need for MANPRINT databases to support tools, techniques, and technologies.

4.3.4 Part IV – Management and Organization Factors

Four general themes were proposed for Part IV:

THEME 1

Approach from the standpoint of leveraging the discipline's impact for the good of the person in the system, not a competing approach.

THEME 2

Discuss how the placement of MANPRINT elements within an organization structure has historically influenced this approach.

THEME 3

Consider staffing for MANPRINT success. For instance, training developer, material developer, contractor, and government staff.

THEME 4

Consider how this part (Part IV, Management and Organizational Factors) complements with the *Handbook of System Engineering and Management.*

4.3.5 Part V – Case Examples

Three general themes were proposed for Part V:

THEME 1
Emphasize the payoff from investing in HSI. Illustrate how the various principles, methods, and process have been successfully (and unsuccessfully) applied in real systems.

THEME 2
Use the work already done on the MANPRINT/HSI success storied and those published by the DoD HFE TAG.

THEME 3
Emphasize the acquisition process – state what is good and bad at each phase in the process.

5. Conclusions

This survey was implemented as the first of many steps in creating a high-quality HSI SOAR that would serve as a practical guidebook to the HSI practitioner. Rather than trying to anticipate what the users would like to see, the practitioners and users were approached directly for opinions and input. The responses were then summarized and presented to the HSI Workshop attendees to serve as a basis for discussion in the various panel sessions that were conducted and to stimulate additional ideas.

The most comprehensive recommendations gathered were on the themes for the SOAR. Nearly all of the themes that were suggested were useful, and attempts will be made to include most of them in the SOAR. In some cases, a recommended theme was very close to a planned chapter or one of the five Parts, but perhaps more often, a recommended theme appeared to be most useful if followed throughout a number of chapters.

Several chapter titles were suggested, however all but two titles were already under consideration. These titles were added to the proposed list of chapter titles (Attachment 3) since they suggested important areas of content that were missing. The titles, *Emerging Technologies* and *Data Design and Management* are presented in bold in Attachment 3. In addition, a number of candidate authors were suggested. However, since it was previously determined that the workshop would be held prior to assigning specific chapters to specific authors, most of those individuals suggested by the survey were invited to the workshop. Some candidates were also invited to submit chapter outlines, both of which are presently under consideration by the HSI Advisory Group.

A typical response rate for surveys is approximately 20% of all surveys administered. While we achieved this rate on actual responses (with an additional 9% that replied indicating they did not feel qualified to respond), it was hoped that we would receive a higher number of returns. However, the responses that were received were well thought out and provided valuable information. The survey and the summarized results that were

distributed to the workshop attendees prior to the workshop provided an effective means of preparing the participants for the issues that were addressed and the discussions held during the two-day event.

Attachment 1
Human Systems Integration (HSI)
Technologies, Tools, and Techniques Survey

NOTE: Before you begin, please save this document as your last name only. When you have completed the survey, return the document as an attachment in your e-mail. This will allow us to track the responses in a more efficient manner. Thank you!

---

1. Demographics

1. Name: _____

2. Primary work domain:
   a: _____ Government. Which branch? _____
   b: _____ Contractor
   c: _____ Academia
   d: _____ Other. Please specify _____

3. Number of years experience using MANPRINT: _____

4. Other HSI tools and techniques used: _____

---

2. MANPRINT Implementation

1. What do you believe to be significant voids in the MANPRINT methodology? (For example: No formal descriptions of methods for the HSI domain; No common basis for HSI applications across systems).

2. How frequently has the MANPRINT implementation, as a routine step in design and operations, been successful?

   _____ Always
   _____ Often
   _____ Sometimes
   _____ Rarely
   _____ Never

3. What do you believe are the biggest obstacles to the implementation of MANPRINT in the design phase of system development?

4. How frequently does MANPRINT have the support from top level management that it needs for successful implementation in system design?

   _____ Always
   _____ Often
   _____ Sometimes
   _____ Rarely
   _____ Never

3. MANPRINT SOAR Recommendations

This section contains the five proposed sections for the MANPRINT SOAR. Please read the section descriptions and recommend any issues, topics, and information that you believe should be covered in each section. In addition, please provide your recommendations for chapter headings (as many as you consider appropriate) and two potential authors, per chapter, that you consider to be subject matter experts and potential contributors.

Part I. Introduction

The Introduction will draw heavily from the MANPRINT experience, showing how the systems acquisition culture operates and where opportunities for human factors disciplines exist in this culture. MANPRINT principles for large organizations to use in applying HSI will be discussed as will various HSI concepts. Historical examples of good and poor MANPRINT applications will be included.

If you were designing this section in the MANPRINT SOAR, what would you choose as your organizing principal or theme?

What chapters would you include in this section and what issues and/or problems would you address? In addition, please nominate two potential authors that you consider to be the best contributor for each chapter.

Chapter Heading	**Issues and/or Problems**	
1.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
2.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
3.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
5.		
	Author 1	Author 2
Name Phone or email		

Part II. HSI Tools, Techniques, and Technologies

HSI Tools, Techniques, and Technologies provides the current state-of-the-art for the seven domains of MANPRINT. Although Manpower, Personnel and Training (MPT) are each a domain, one chapter may be sufficient to show the current HSI methods for these domains. Human Factors Engineering is the most fully developed of the HSI disciplines having a large number of specific design tools and technologies, so this chapter may be longer than the others, covering not only well validated tools but more advanced concepts as well. Each of the other three domains (Health Hazards, Systems Safety, and Personnel Survivability) have specialized methods for application to the HSI process which would best be described in separate chapters. A special HSI domains integration chapter for tools like IMPRINT would be the wrap-up chapter in this part.

If you were designing this section in the MANPRINT SOAR, what would you choose as your organizing principal or theme?

What chapters would you include in this section and what issues and/or problems would you address? In addition, please include two potential authors that you consider to be the best contributor for each chapter.

Chapter Heading	**Issues and/or Problems**	
1.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
2.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
3.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
5.		
	Author 1	Author 2
Name Phone or email		

Part III. HSI Applications in Acquisition Process

HSI Applications in the Acquisition Process provides information on the major stages in acquiring a system. The process will be described in terms of requirements determination (which has major MPT tradeoffs), system specification (with extensive need for HSI considerations in the Request for Proposal (RFP) and source selection guidelines), and system design, development, and test and evaluation of system performance. This section will also address the specific methods which help in tradeoff decisions between MPT and system performance. In addition, the role of HSI in the new simulation-based test and evaluation culture, which relies more heavily on system level measures of effectiveness and measures of performance in early concept stages, will be covered.

If you were designing this section in the MANPRINT SOAR, what would you choose as your organizing principal or theme?

What chapters would you include in this section and what issues and/or problems would you address? In addition, please include two potential authors that you consider to be the best contributor for each chapter.

Chapter Heading	**Issues and/or Problems**	
1.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
2.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
3.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
5.		
	Author 1	Author 2
Name Phone or email		

Part IV. Management and Organization Factors

The section on Management and Organization (M&O) Factors will survey the state-of-the-art for the latest M&O environments that procure and produce systems and equipment. It is important that the reader gain a clear understanding of other competing and complementary disciplines like Integrated Logistics Support (ILS) and systems engineering which could be covered in chapters on ILS and systems engineering interfaces. Finally the need for HSI practitioners to understand the various economic factors which drive decisions in the acquisition process should be addressed.

If you were designing this section in the MANPRINT SOAR, what would you choose as your organizing principal or theme?

What chapters would you include in this section and what issues and/or problems would you address? In addition, please include two potential authors that you consider to be the best contributor for each chapter.

Chapter Heading	**Issues and/or Problems**	
1.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
2.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
3.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		

Part V. Case Examples

Case Examples are needed to fully understand how HSI has and can be applied on real systems. Major system procurements are considerably different from small systems, but HSI can play an extremely important role is both types of acquisitions. This part should provide illustrations that integrate the earlier parts by describing how the various methods and principles have been successfully applied in past systems. A particular emphasis should be placed on proven demonstrations of major cost and performance benefits that have been achieved because of HSI. One chapter could focus on how HSI has worked successfully in major system procurements like the Comanche and another chapter might describe how HSI can and has been applied successfully in small system acquisitions (like the Fox Nuclear, Biological, and Chemical (NBC) Reconnaissance System vehicle).

If you were designing this section in the MANPRINT SOAR, what would you choose as your organizing principal or theme?

What chapters would you include in this section and what issues and/or problems would you address? In addition, please include two potential authors that you consider to be the best contributor for each chapter.

Chapter Heading	**Issues and/or Problems**	
1.		
	Author 1	Author 2
Name Phone or email		
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2.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
3.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
4.		
	Author 1	Author 2
Name Phone or email		
Chapter Heading	**Issues and/or Problems**	
5.		
	Author 1	Author 2
Name Phone or email		

Attachment 2
HSI Survey Summary Results

Note: I have confirmation from 3 additional individuals who plan to submit results. Three individuals replied stating they either didn't know of MANPRINT or didn't feel they had enough experience with it.

Number of Responses: 15

Work Domain: 8 government; 7 contractors.

Years Experience: Average of 11 years

Other HSI Tools used: Hardman, Imprint, Survivability Assessments, Personnel Subsystems.

Question 1:
What do you believe to be significant voids in the MANPRINT methodology? (For example: No formal descriptions of methods for the HSI domain; No common basis for HSI applications across systems).

- Lack of quantitative methods.
- Lack of HSI Professionals that understand the acquisition process.
- Lack of methods, procedures, and techniques for integrating MANPRINT issues early in the design process.
- Difficult to determine "return on investment" for MANPRINT fixes.
- No common forum for sharing lessons learned and challenges.
- Lack of formal relationship between requirements (OPNAV) and process (ASN).
- **authoritative requirement for mandatory implementation.**

Question 2:
How frequently has the MANPRINT implementation, as a routine step in design and operations, been successful?

- Always/Often

Question 3:
What do you believe are the biggest obstacles to the implementation of MANPRINT in the design phase of system development?

- Lack of reliable test data.
- Lack of unambiguous performance criteria.
- Funding resources.
- Lack of adequate HFE tools.
- Inability to make MANPRINT a routine step in the early concept definition phase.
- Lack of full understanding of MANPRINT implications.
- Lack of well-defined requirement (DoD 5000.2 isn't explicit enough in reform environment).
- Lack of leadership understanding as to what HSI is.
- **Archaic systems.**

Question 4:
How frequently does MANPRINT have the support from top level management that it needs for successful implementation in system design?

- Sometimes

MANPRINT SOAR *Recommendations*

Part I - Introduction

Theme A: (Sue Archer)

• Organize around the overall need for MANPRINT. First provide a historical perspective of MANPRINT projects, move to technologies, tools, and techniques, and end with future goals and how to get there.

Suggested chapters associated with Theme A:

Chapter Heading	**Issues and/or Problems**	
5. "What is MANPRINT" or "Why MANPRINT"	Define the domains and discuss why integration is key to success of MANPRINT.	
	Author 1	Author 2
Name	**Hal Booher**	
Chapter Heading	**Issues and/or Problems**	
6. The History of MANPRINT	Discuss reasons MANPRINT was needed and how the MANPRINT policy came about.	
	Author 1	Author 2
Name	no author provided	

Theme B: (Tom Metzler)

• Tie this section to the Acquisition process.

Suggested chapters associated with Theme B:

Chapter Heading	**Issues and/or Problems**	
1. Requirements Definition	• Getting quantifiable MANPRINT requirements in early. • Identify the DoD and Department level documents that specify HSI requirements.	
	Author 1	Author 2
Name	**Col. Mac Willie**	
Chapter Heading	**Issues and/or Problems**	
2. User Involvement	Getting users who have operational experience assigned directly to the program.	
	Author 1	Author 2
Name	**Mark Ammon**	
Chapter Heading	**Issues and/or Problems**	
3. Source Selection	Imbed MANPRINT throughout the RFP.	
	Author 1	Author 2
Name	**Dr. Bruce Hamilton**	
Chapter Heading	**Issues and/or Problems**	
4. Design Integration	• Having knowledgeable MANPRINT experts working within the design and development of systems. • Highlight cost savings of an integrated effort.	
	Author 1	Author 2
Name	**Jerry Seeman**	**Matt Hannan**
Chapter Heading	**Issues and/or Problems**	
5. Test and Evaluation	Insuring that T&E starts as an iterative effort early in the design stage. Have REAL subjects that have the training, skill and equipment representative of soldiers.	
	Author 1	Author 2
Name	**Dino Piccione**	

Theme C: (Taylor Jones)

• (No principle/theme)

Suggested chapters associated with Theme C:

Chapter Heading	**Issues and/or Problems**	
1. Why do we integrate domains?		
	Author 1	Author 2
Name	**Marjorie Zelko**	
Chapter Heading	**Issues and/or Problems**	
2. Planning, programming and budgeting for MANPRINT		
	Author 1	Author 2
Name	**Taylor Jones**	

Theme D: (Glenn Osga)

• Good HFE principles are always needed. The developer must know the task, customer, user environment, user skills/training requirements, cost, safety issues, and be able to sell and educate management as well as work closely with system engineers and use iterative design with usability testing.

Suggested chapters associated with Theme D:

Chapter Heading	**Issues and/or Problems**	
1. Selling Management on HFE	Top 10 mistakes made by system engineering management and how to avoid them.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
2. Tailoring to your project	Guidelines and task analysis and testing how much, when, and how to tailor to your program budget, scope, and size.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. Pitfalls in using SMEs to design systems – how to work with SMEs and program managers	User's often cannot describe requirements and think only in terms of the end design. However, PMs think in terms of requirements. The key is to separate clearly the requirements from the design and not cloud discussions between the two.	
	Author 1	Author 2
Name		

Part II – HSI Tools, Techniques, and Technologies

Theme A: (Sue Archer)

- Use this section to discuss the current state of MANPRINT. Provide a separate chapter for each domain (HFE Tools, Manpower Tools, Personnel Tools, etc.). Include a discussion of intended users and address technology gaps.

Suggested chapters associated with Theme A:

Chapter Heading	**Issues and/or Problems**	
1. HFE Tools (also, have chapters for tools each other domain)	Have it be an introduction – What should a good HFE tool do?, What sorts of problems are HFE problems?, etc. (address same issues for each tool).	
	Author 1	Author 2
Name	no author provided	

Theme B: (Mike Strub)

- Discuss a need for MANPRINT databases to support tools, techniques, and technologies.

Suggested chapters associated with Theme B:

Chapter Heading	**Issues and/or Problems**	
1. MANPRINT Data Base Design and Development		
	Author 1	Author 2
Name	**Ron Laughery**	

Theme C: (Tom Metzler)

- Focus on the selection process for tools and the use of appropriate tools or techniques at the appropriate stage of the process. (Frank Malkin mentioned this also)

Suggested chapters associated with Theme C:

Chapter Heading	**Issues and/or Problems**	
1. Tools Selection	Selection of best tool for the application.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
2. Tools Use	How to apply the tool. Consider strengths and weaknesses.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. Tools Maintenance	How to keep the tool useful over iterative applications as the design matures.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
4. Tools Generation or Adaptation	How to treat special issues with new or adaptations of existing tools.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
5. Data or Information	How not to get caught in gathering a lot of data that isn't useful.	
	Author 1	Author 2
Name	no author provided	

Theme D: (Taylor Jones)

• No theme

Suggested chapters associated with Theme D:

Chapter Heading	**Issues and/or Problems**	
1. Where have all the metrics gone?		
	Author 1	Author 2
Name	**ARL-HRED**	
Chapter Heading	**Issues and/or Problems**	
2. Substitutes for MIL STDs		
	Author 1	Author 2
Name	**Al Sciaretta**	

Theme E: (Glenn Osga)

• Tools are emerging – they are still in the infancy stage but are becoming more powerful. Integration is lacking and needed. Industry need to pull together to link their tools to share information.

Suggested chapters associated with Theme E:

Chapter Heading	**Issues and/or Problems**	
1. MIDAS	Looks like a promising toolset	
	Author 1	Author 2
Name	**NASA Ames (see website)**	
Chapter Heading	**Issues and/or Problems**	
2. HCDE	Human Centered Design Environment. Funded by ONR – 4th year of a 5 year development plan.	
	Author 1	Author 2
Name	**John Winters**	

Part III – HSI Applications in Acquisition Process

Theme A: (Sue Archer)

• Focus on tradeoff decisions rather than specific methods.

Suggested chapters associated with Theme A:

Chapter Heading	**Issues and/or Problems**	
1. The System Acquisition Process	Introduce readers to the process, including a streamlined version of it.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
2. (the remaining chapters should be each stage in the acquisition process).	Inform the reader on the types of things they can do at each stage of the process to ensure MANPRINT issues are considered.	
	Author 1	Author 2
Name	no author provided	

Theme B: (Mike Strub)

• Emphasize choosing the right tool for each state in the acquisition process.

Suggested chapters associated with Theme B:

Chapter Heading	**Issues and/or Problems**	
1. MANPRINT Early in System Design		
	Author 1	Author 2
Name	**Bill Rouse**	

Theme C: (Tom Metzler)

• MPT must be viewed as an integral part of the system performance and it should be conveyed that MPT influences the ability of the weapon system to accomplish the mission.

Suggested chapters associated with Theme C:

Chapter Heading	**Issues and/or Problems**	
1. Chicken or the Egg	If the training that is needed to develop skills specific to evaluating a particular system are not in place, how can the system be tested?	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
2. Mission Focus (part task vs. mission simulation)	How to gather early part task human performance information and relate it to mission accomplishments.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. Setting MPT Objecting and Meeting Them	How to set meaningful MPT objectives and have them drive systems design.	
	Author 1	Author 2
Name	no author provided	

Chapter Heading	Issues and/or Problems	
4. Getting user buy-in to push for designs that will reduce total ownership cost.	Need to get MPT financiers into the design process for their input.	
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
5. Maintaining full system MPT performance objectives and ensuring that they are tested.	Determining the means and constraints of realistically testing for MPT throughout the acquisition process.	
	Author 1	Author 2
Name	no author provided	

Theme D: (Frank Malkin)

- Role of the practitioner in each stage of the design process and his/her value as an integral member of the concepts and requirements team, System Engineering team, and the Test and Evaluation team.

no chapters or authors suggested.

Theme E: (Taylor Jones)

- no theme

Suggested chapters associated with Theme E:

Chapter Heading	Issues and/or Problems	
1. MANPRINT, ORD, SRD, RFP, and Contract		
	Author 1	Author 2
Name	**Taylor Jones**	
Chapter Heading	**Issues and/or Problems**	
2. Assessment Guidelines for PMs and Industry		
	Author 1	Author 2
Name	**All independent assessors**	

Theme F: (Glenn Osga)

- Don't disregard the basics. Task analysis is the key. Transition of task requirements must include human requirements as well as system or mission requirements. Transition into design is the key. Design is more of an art than science, particularly when no guidelines exist on previous systems. You must prototype and test rather than rely on models.

Suggested chapters associated with Theme F:

Chapter Heading	Issues and/or Problems	
1. Tools help you but don't THINK for you.	Requirements to Design – how to navigate the tricky path.	
	Author 1	Author 2
Name		

Part IV – Management and Organization Factors

Theme A: (Tom Metzler)

- Approach this section from the standpoint of leveraging the discipline's impact for the good of man in the system, not a competing approach.

Suggested chapters associated with Theme A:

Chapter Heading	**Issues and/or Problems**	
1. ILS		
	Author 1	Author 2
Name	**Hal Booher**	
Chapter Heading	**Issues and/or Problems**	
2. Training		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. Life Cycle Cost		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
4. Systems Engineering		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
5. MPT Implanted Requirements (in the above listed discipline requirements).		
	Author 1	Author 2
Name	no author provided	

Theme B: (Sue Archer)

- Discuss how the placement of MANPRINT elements within an organization structure has historically influenced the approach.

No chapters or authors suggested for this theme.

Theme C: (Taylor Jones)

- No theme

Suggested chapters associated with Theme C:

Chapter Heading	**Issues and/or Problems**	
1. ILS and why we need HSI		
	Author 1	Author 2
Name	**Mitch Howell**	
Chapter Heading	**Issues and/or Problems**	
2. Staffing for MANPRINT success. Training Developer, Material Developer, Contractor and Government Staff		
	Author 1	Author 2
Name	no author provided	

Part V – Case Examples

Theme A: (Mike Strub)

- The payoff from investing in MANPRINT

Suggested chapters associated with Theme A:

Chapter Heading	Issues and/or Problems	
1. CRUSADER-MANPRINT		
	Author 1	Author 2
Name	**Linda Pierce**	

Theme B: (Nancy Dolan)

- Navy case examples

Suggested chapters associated with Theme B:

Chapter Heading	Issues and/or Problems	
1. DD-21		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
2. JSF		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. AAV		
	Author 1	Author 2
Name	no author provided	

Theme C: (Sue Archer)

- Use the work already done on the MANPRINT/HSI success stories and those published by the DoD HFE TAG. (One chapter per case study).

No chapters or authors suggested for this theme.

Theme D: (Tom Metlzer)

- Emphasize the Acquisition Process – state what is good and bad at each phase in the process (Chapter should go back to the Acquisition Process – MS 0, MS I, MS II, etc.) Also, set up a web site for the exchange of lessons learned so that users can exchange and contribute information.

No chapters or authors suggested for this theme.

Theme E: (Taylor Jones)

- No theme

Suggested chapters associated with Theme E:

Chapter Heading	Issues and/or Problems	
1. An Armored gun system		
	Author 1	Author 2
Name	no author provided	

Chapter Heading	Issues and/or Problems	
2. An ATCCS System (ASAS)		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
3. DDG-51 (the first Aegis Destroyer)		
	Author 1	Author 2
Name	no author provided	
Chapter Heading	**Issues and/or Problems**	
4. Tactical Communications like SINCGARS		
	Author 1	Author 2
Name	no author provided	

Theme F: (Glenn Osga)

- Task Centered Design – what is it, how to employ it, what do you get, how is it different than other design approaches? Design the system around the tasks to be performed in a clear and simple way rather than forcing the user to build the content, goals and information for tasks on the fly while at work.

Suggested chapters associated with Theme F:

Chapter Heading	Issues and/or Problems	
1. Task Centered Design – US Navy Multimodal Watchstation	Moving from a legacy task environment to a task centered design in future naval command and control systems.	
	Author 1	Author 2
Name	**Glenn Osga**	**Karl Van Orden**

Attachment 3
Proposed SOAR Chapter Titles

PART I:	Introduction
Chapter 1:	Human System Integration (HSI) Concept
Chapter 2:	Systems Acquisition Culture
PART II:	HSI Tools, Techniques, and Technologies
Chapter 3:	Manpower, Personnel and Training (MPT)
Chapter 4:	Human Factors Engineering (HFE) Technology
Chapter 5:	Health Hazards Tools and Techniques
Chapter 6:	Systems Safety
Chapter 7:	Personnel Survivability
Chapter 8:	Special Integration Tools (e.g., IMPRINT)
Chapter 9:	**Emerging Technologies**
PART III:	HSI Applications in Acquisition Process
Chapter 10:	Requirements Stages
Chapter 11:	Solicitation/Procurement Stages
Chapter 12:	System Design (Performance Tradeoffs)
Chapter 13:	Human Systems Integration Test and Evaluation
Chapter 14:	**Data Base Design and Management**
PART IV:	Management and Organization Integration
Chapter 15:	Management and Organization Environments
Chapter 16:	ILS Interfaces
Chapter 17:	Systems Engineering Interfaces
Chapter 18:	Economic Factors
PART V:	Case Examples
Chapter 19:	Systems Acquisition - Major (e.g., Comanche)
Chapter 20:	Systems Acquisition - Small (e.g., Fox)