



Communicating ISR Bridging Capabilities

A White Paper for the Distributed Common Ground System – Army V3

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Table of Contents

Introduction.....	1
Personal Role and Experience	2
Project Description.....	3
Target Audiences	3
Project Medium.....	4
Background.....	5
Literature Review & Theory.....	6
Methodology.....	9
White Paper Outline.....	11
Timeline	12
Lessons Learned.....	13
Conclusion	14
Works Cited	15
Appendix A – Questionnaire Design	17
Appendix B – Qualitative Research Results.....	23
Appendix C – DCGS-A V3 White Paper	26

Introduction

This report details the authoring of a comprehensive white paper of the Distributed Common Ground System – Army (DCGS-A) V3, for the Intelligence and Information Warfare Directorate (I2WD) at Fort Monmouth, NJ. Briefly defined, DCGS-A is a newly developed architecture designed to bridge independent military intelligence systems used by soldiers in Iraq today. When published, the white paper will fill a critical gap between the DCGS-A development community and key decision-makers in the Armed Forces intelligence community. The paper was primarily guided by grounded theory research, which identified themes that are perceived as deficient among target readers of current DCGS-A literature.

The purpose of the project was to provide an introductory document on the DCGS-A V3 program to professionals who wish to learn about the system. The requirements of the document were to both market the purpose and benefits of the system to decision-makers, as well as provide a secondary level of information on the technical aspects of the system to engineers. In this respect, the document serves the dual functions of education and marketing.

The white paper (see Appendix C) first discusses the current motivations within the Armed Forces to develop new ISR capabilities. Following that, a list of current challenges in the ISR community are detailed. This then leads to an overview of how the DCGS-A program is addressing those problems. A history of how DCGS-A has come about has been provided, as well as an extensive exploration of DCGS-A's architecture and functionalities. The paper then examines the benefits of creating a new convergent

architecture, as well as what future steps are planned to improve on tools that connect and consolidate functions into a Distributed Common Ground System.

The grounded theory research subjects were professionals with various levels of experience with DCGS-A V3. They represented the perspectives of managers, contractors, engineers, technical writers, and military intelligence (MI) officers in the U.S. Army. The independent variables were comprehension of DCGS-A aspects (purpose/architecture/systems/documentation), and level of experience with DCGS-A. The dependent variable was overall knowledge of DCGS-A V3. That is to say, how well do participants in the program understand why and how the *whole* system works, based on what they've learned from current documentation and their own experiences?

Approximately 20 subjects were asked to complete a survey that questions their amount of experience with DCGS-A, as well as their understanding of the program's components, which matched the independent variables listed above. The questions were presented in a coded multiple-choice format, as well as a directed essay format. The results were analyzed, and major sub-themes were organized under the independent variable categories; the coded level of experience for each participant assisted in the prioritization of the themes. The top five themes were then directly correlated to sections of discussion within the white paper.

Personal Role and Experience

I am a part-time student in the Professional and Technical Communications Master's Degree Program at the New Jersey Institute of Technology. I initially earned a B.S. in Computer Engineering from the NJIT Albert Dorman Honors College, and was hired as an engineer at I2WD shortly thereafter. As a result, I have been a resident of

Monmouth County for the past five years. During the two most recent years of my employment, I have attended to numerous responsibilities as a member the growing DCGS-A program team. These duties have included systems engineering, software & hardware development and testing, technical documentation, and systems demonstrations & presentations. Consequently, my understanding of the DCGS-A system has expanded both as an engineer, and as a technical communicator. The combination of these skills has prepared me for the task of developing the means to educate non-engineers on the purpose, functions, and framework of the system.

Project Description

The purpose of this project was to identify which aspects of the DCGS-A program are the least understood by professionals associated with it, and to incorporate those aspects into a comprehensive white paper that can be freely distributed to the public. The deficiencies identified were based on the professionals' own experiences with the system, as well as their experience with existing documentation on the DCGS-A.

Target Audiences

The audiences of this report are faculty members at NJIT (for the purpose of evaluating the content and validity of the Master's project), and Mr. Shaun Cronen, one of the government team leads on the DCGS-A program. Mr. Cronen maintains a superior understanding of all aspects of the program, and acted as an external reviewer of the white paper on behalf of the U.S. Army.

There are two audiences for the white paper. The primary target audience consists of political officials, military commanders, and IT directors from organizations external to PM DCGS-A. These audience members maintain a low level of technical

expertise, but require a detailed understanding of why and how the DCGS-A program benefits soldiers and other intelligence systems. The secondary audience consists of novice engineers, technical writers, and operators who will begin interacting with the DCGS-A program for the first time. These audience members maintain a higher level of technical expertise, and not only require the same overview as the primary audience, but additional technical information on the system in order to assist them in their responsibilities.

Project Medium

The medium of the white paper was chosen above all others for two key reasons. Firstly, the format for the information that needs to be shared among the primary and secondary audiences must meet the security clearance requirements of the U.S. Army. These standards are very high, and each piece of information that is shared with the general public must undergo a detailed investigation, spanning upwards of several weeks. Although an overview of DCGS-A could be shared through many mediums, such as web sites and marketing videos, documents were the least likely to cause difficulties during the screening process; they were the most easily annotated by reviewers, and were therefore quicker to return for potential revisions. Because the deliverables for this project were required to also meet the deadline requirements of the MSPTC department, the choice of writing a document was the most logical one. Secondly, white papers are more easily distributed to many military departments via soft and hard copies, and can be more easily edited later on as both DCGS-A and its interested parties change over the course of the next several years. The possibility that the paper will require adaptations

and revisions in the future (by individuals other than myself) is very high, since DCGS-A is still in a relatively early stage of development.

Background

This project was prompted by two separate factors. The first factor was a requirement outlined by the administrators of the Professional and Technical Communications program at NJIT, towards which I am working to earn an M.S. The program requires the completion of a project that not only produces a professional deliverable to a client, but also represents the majority of the student's skills learned during his participation in the program.

The second factor was the result of observations made by myself as an engineer on the DCGS-A V3 program. Over the course of two years, the responsibilities I held quickly extended beyond the operation and testing of the DCGS-A system, and led to the tasks of assisting in the creation of technical documentation for the system, as well as presenting demonstrations of the system's current capabilities to a wide variety of VIPs. These responsibilities were imparted to me partially because of the experience I had gained as an MSPTC student, which my team leads found useful in completing mission requirements. After conducting many such demonstrations, and answering numerous questions about DCGS-A, I observed a distinct lack of high-level documentation on V3. Basic questions such as "What does DCGS-A do?" and "How does DCGS-A help out the soldier today?" were often asked, and the only answers existed within dry, technical Microsoft PowerPoint presentations, or lengthy engineering publications that were seldom released to the public, largely because of security classification issues.

This researcher promptly came to the conclusion that a document needed to be written which answered as many of these high-level questions as possible. It needed to both “sell” the system to visiting guests and VIPs, and also explain the overall system to engineers who were new to the project, and required a certain amount of perspective on how it all fit together. It also needed to meet the exacting security requirements of the U.S. Army’s public-release policy, in order for everyone to benefit from its contents.

The questions that arose from this background information then became: Who exactly would benefit the most from this kind of document? What parts of DCGS-A do people need to understand the most? The answers to these questions directly impact the content and success of any white paper written, and were therefore the most relevant guides in the research required to complete the project.

Literature Review & Theory

Throughout a majority of modern Army doctrine, Network Centric Warfare (NCW) has been a predominant philosophy; the preeminent authors on NCW literature have been David S. Alberts and John J. Garstka. While they have not claimed to be the final authorities on NCW, they have laid down a fundamental groundwork that numerous MI systems (including DCGS-A) have built upon in their development stages. As a result, this project used some of Alberts and Garstka’s ideas as a means of outline organization. In their book Network Centric Warfare: Developing and Leveraging Information Superiority, the authors loosely define NCW as “a new way of thinking -- network-centric thinking – and applying it to military operations” (88). They provide several examples of how a military battlespace can benefit from the sharing of resources within an enterprise environment, opposed to the isolated platform-centric way that many

sensors and systems operate today. In Understanding Information Age Warfare, they go on to develop three domains that a mature NCW system will operate in: the *physical domain* where “elements of the force are robustly networked achieving secure and seamless connectivity and interoperability” (57), the *information domain* where “the force has the capability to share, access, and protect information to [guarantee] information advantage over an adversary” (57), and the *cognitive domain* where “the force has the capability to develop high quality [synchronized] awareness and share this awareness” (58).

Dr. Paul W. Phister and John D. Kerry expand on the concepts behind NCW with the idea of knowledge centric operations (KCO) in their article “Knowledge Centric Operations: Implications to Future Command and Control.” KCO is suggested as a transition “from the predominantly physical (Network-centric) to one of more mental (knowledge-centric) level warfare” (9). In other words, the theory changes the emphasis from identifying means of network ISR assets to building user-level understanding of the information that is made available thanks to proper NCW practices. The authors compare NCW provisions with their potential KCO counterparts, and cite numerous real-world examples of how network-centric systems can be further assessed for improvement in knowledge-centric configurations.

The qualitative research that was used to conduct the needs analysis for this project was based on H. Russell Bernard’s writings on *grounded theory* in his book Social Research Methods: Qualitative and Quantitative Approaches. According to Bernard, grounded theory is “a set of techniques for (1) identifying categories and concepts that emerge from text, and (2) linking the concepts into substantive and formal

theories” (443). Bernard cites numerous practical examples of the grounded theory approach in action, as well as defines the major steps for implementing the approach, such as finding & coding themes, building conceptual models, and building hierarchies that link major themes to independent variables. These concepts and examples were applied to the text that was collected from the assessment surveys; the resultant variables were directly related to topics that were included in the white paper.

The format of the white paper, as well as the underlying theories behind the crafting these kinds of papers, was guided by professionals such as Michael Stelzner. In Writing White Papers: How to Capture Readers and Keep Them Engaged, Stelzner uses his experiences as an author of over 100 white papers, in conjunction with the writings of others in his field, to outline the definition of the white paper, as well as the many different types of papers in use today. He postulates that white papers are documents that act as both an informational document *and* marketing propaganda, using only facts and technical evidence to offer a persuasive solution to a particular problem. According to Stelzner, although there are many textbook definitions for a white paper, it can be distilled down to “a persuasive document that usually describes problems and how to solve them” (2). Furthermore, it can be categorized as a technical document, a business document, or a hybrid of the two. Gordon and Gordon also contribute to the purpose of a white paper as “a piece of marketing collateral whose form and content lies somewhere between a glossy brochure and a technical manual” (2). These definitions of the modern white paper, specifically the hybrid white paper, are what led to the decision to adapt its format to serve the requirements of the project. Furthermore, Stelzner suggests a detailed approach to creating white papers, starting with the implementation of a needs

assessment, and continuing with the execution of a comprehensive outline that follows a format that synchronizes with the primary audience. The information in Stelzner's book assisted in the development of an outline for this project's paper, as well the development of some of the questions that were applied to the grounded theory research.

Additional insight into the shape of the content within the white paper was provided by Philip R. Cateora and John L. Graham in International Marketing. This book delves deeply into the theories and practices that guide modern marketing across the globe. Their explanations of environments that marketers must face in all phases of design and implementation were particularly relevant to the white paper. The relevance lies in the reality that the white paper must potentially satisfy a very wide variety of audiences. For example, the paper must first be approved by departmental peers (both engineers and managers), as well as security review personnel. Afterwards, it must appeal to members of the academic community, and then to external technical staff and decision-makers from around the globe that wish to learn about DCGS-A. Consequently, the arguments made in the paper must be widely persuasive in nature, and therefore behave as an effective marketing tool on behalf of the DCGS-A program.

Methodology

The goal of the needs assessment for this project was to identify the DCGS-A topics that primary and secondary audiences would benefit the most from, were they to be discussed in a white paper. This required evidence that there was indeed a definite list of topics that were at the forefront of audience interests. In order to prove this theory, a qualitative study was implemented, in the form of a semi structured questionnaire. The questionnaire consisted of approximately 12 questions, and inquired into the experiences

users had with the DCGS-A program using both Likert-styled questions and essay questions. The questionnaires were given to approximately 20 volunteers using a Purposive Sampling methodology. The sampling frame included commissioned and non-commissioned Army officers, contract engineers, and federal employees who all worked with the program to varying degrees and capacities for at least three months. The participants were given approximately one week to complete the questionnaire, allowing them a leisurely pace to reflect on the answers to the essay questions.

Following collection of the questionnaires, a grounded theory approach was used to study the results; the dependent variable in this case was DCGS-A topic relevancy. The questionnaires were imported into NVivo, a qualitative analysis program, and the answers to the essay questions were coded according to loosely defined themes. As the study progressed, the themes were refined into a set number of sub-themes that related to aspects of the DCGS-A program; these items became independent variables eligible for translation into white paper topics. In addition to the coded themes, the Likert-style answers were scored to identify which participants most closely resemble the primary and secondary audiences. The scores were used to prioritize which participants' coded themes were more likely applied to the white paper. Topics were also be prioritized by how frequently they appeared in the coding process. At the end of the coding and prioritization, the top five topics that emerged were directly applied to the white paper as topics of discussion. Appendix A contains the questionnaire used in the study, and Appendix B shows the summarized results of the analysis.

Dependent Variable	First-Tier Theme	Second-Tier Subtheme	Independent Variables
DCGS-A Topic Relevancy	Audience Background	Professional experience	DCGS-A Experience Level
		DCGS-A familiarity	
		DCGS-A participation	
	Audience Knowledge	Knowledge of purpose	Comprehension of: <ul style="list-style-type: none"> • System purpose • Architecture • Analyst workflow
		Knowledge of architecture	
		Knowledge of components	
	Audience Training	Training background	DCGS-A Documentation Quality & Availability
		Documentation exposure	
		Opinions on documentation	

Table 1. Example of extracted themes and variables.

White Paper Outline

The following was the outline that the white paper followed:

Introduction: A high-level list of problems, and a high-level solution within a few paragraphs.

Drivers Impacting ISR Transformation: A discussion of the political and technological factors that are driving the trends for Army transformation, and those transformation factors that relate to the formation of DCGS-A.

Current Shortcomings of Existing Systems: The top three to five problems that relate to the paper’s topic.

The Distributed Common Ground System - Army:

- **Overview:** An overall explanation of the solution that DCGS-A provides. Includes information on where it will be used, and who will benefit from it.
- **History:** An explanation of the historical motives and actions that led to the establishment of DCGS-A.
- **How it Works:** This is the meat of the paper, the technical section that talks about how DCGS-A works. It details:
 - Core technologies behind the system

- Data interfaces & Data flow
- Hardware architecture
- Software architecture
- **Benefits:** An explanation of how DCGS-A overcomes the shortcomings listed previously, as well as other problems that may not have been mentioned.

The Future: A short discussion of how DCGS-A may evolve beyond V3.

Appendices: Extra information such as an acronym glossary and a list of references.

Total Length: 25 pages (50 MLA-formatted pages)

Timeline

Milestones	Approximate Date
Attain project approval from reviewers	January 2007
Distribute & collect research surveys	January 2007
Deliver proposal: draft	February 2007
Complete survey analysis	February 2007
Deliver proposal: revised	March 2007
Begin white paper: draft	Early March 2007
Deliver white paper: draft (to external reviewer)	Mid April 2007
Deliver final report: draft	Mid April 2007
Deliver white paper final (to security review board)	Late April 2007
Deliver final report: revised	Late April 2007
Deliver presentation materials	Early May 2007
Deliver complete project: final	Early May 2007
Conduct project briefing	Mid May 2007
Graduate with MS PTC from NJIT	May 2007

Table 2. Timeline of project milestones.

Lessons Learned

This project presented a bounty of opportunities to exercise the many lessons learned from the NJIT MSPTC program, as well as new challenges to study. The task of creating the white paper entwined multiple areas of technical communications, and was an ideal means of demonstrating the experiences gained from the program. To begin, the white paper was at heart a technical document that demanded a rigorously professional presentation of facts and theorems, which could be accepted by academic and military communities as accurate and reliable. Additionally, it was at heart a marketing document that needed to appeal to similar audiences in a persuasive manner. This required the tactful application of rhetoric, laced with ideas that spoke easily to casual readers, yet backed by undeniable facts and punctuated with aesthetically pertinent diagrams. Consequently, the white paper, which is a relatively new and prospering form of technical publication, resulted in a tricky balancing act of multiple PTC disciplines. Furthermore, as a document written on behalf of the U.S. Army, I was forced to learn to work within the difficult boundaries that national security protocols place around all official documents that are to be shared with the world.

Before drafting the white paper, however, I needed to learn more about the individuals for whom I was writing. The needs assessment connected me with a variety of professionals, civilian and officer alike. I learned that engineers have very different priorities than soldiers and managers, and that each group has their own unique set of questions when it comes to DCGS-A. Although the results of the qualitative study yielded a useful list of topics to include in the paper, I determined that there was still much work to be done in the future. First, the sampling group in future studies would

need to be significantly larger in scope, in order to properly collect a large enough response from *all* potential audiences. Second, once a document is published, time must be dedicated to testing the effectiveness of the paper on the primary and secondary audiences in a separate study; this was a task that I was unable to accomplish myself because of time constraints as a graduate student. Based on the results of such a user assessment, an iterative process could then carry on that permits the paper to evolve in scope and accuracy until a final white paper is distributed that definitively addresses the inquisitive needs of the readers.

Conclusion

Based on the observations made from current program literature, and the common-sense need to communicate the program's capabilities to multiple organizations worldwide, the call for action was clear in this researcher's opinion. A white paper on DCGS-A V3 perfectly serves the hybrid roles of both a marketing document of the architecture's capabilities as they relate to current problems in the ISR battlefield, and a technical document for the architecture's internal components and interoperability. Furthermore, the grounded theory approach was an ideal way to "test the waters" with current developmental and testing personnel to determine what topics on DCGS-A required the most elaboration for the masses. Although the paper required a high-level exploration of DCGS-A due to security constraints, it will hopefully serve as a milestone document towards the development of more comprehensive documentation as the architecture evolves both in the lab and in the field beyond V3.

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Appendix A – Questionnaire Design

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: DCGS-A Program Comprehension from Documentation

This consent form is part of an informed consent process for a research study and it will give information that will help you to decide whether you wish to volunteer for this research study. It will help you to understand what the study is about and what will happen in the course of the study.

If you have questions at any time during the research study, you should feel free to ask them and should expect to be given answers that you completely understand.

After all of my questions have been answered, if you still wish to take part in the study, you will be asked to sign this informed consent form.

The lead researcher (the principal investigator) or another member of the study team (an investigator) will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.

In participating in this study, you understand that you are not giving up any of your legal rights by volunteering for this research study or by signing this consent form.

The lead researcher is interested in finding out if you can fully understand the information you are given. You need to fully understand the information before you can give your informed consent to enter into this research study.

You have the right to say Yes or No to taking part in and part of this research study.

Why is this study being done?

This study is attempting to discover what aspects of the DCGS-A program require the most explanation for managers, engineers, and average users. The topics that this study will discover will be used as a guiding factor behind the creation of a comprehensive White Paper for the DCGS-A program.

Why have I been asked to take part in this study?

You are an important representative of the types of people that will read the DCGS-A White Paper. Your status as a professional who has worked with the DCGS-A program, regardless of your level of involvement, makes you an ideal voice for the creation of future documentation. You are just the type of person whose feedback is important to this study, and can potentially affect the design of many presentations and literature for the DCGS-A program in the future.

Who may take part in this study? And who may not?

This study is designed initially for a select set of individuals who have interacted with the DCGS-A program on professional levels, be it managerial, technical, or otherwise participatory.

How long will the study take and how many subjects will participate?

This study will take no longer than 60 minutes to complete, dependent on the amount of time dedicated to answering the survey questions. Approximately 20 participants will be allotted one week's time to complete and return the survey.

What will I be asked to do if I take part in this research study?

You will be asked to complete a short form about yourself, including information such as your age, professional status, and the frequency you work with the DCGS-A program. Next, you will be asked to fill out several essay-style questions discussing various aspects of your understanding of the DCGS-A program and its current supportive documentation.

Who will be allowed to look at my research records from this study?

Personal information collected in this study will be viewed only by the lead researcher.

Your personal identity, that is your name, address, and other identifiers, will be kept confidential.

Your data may be used in scientific publications. If the findings from the study are published, you will not be identified by name. Your identity will be kept confidential. The exception to this rule will be when there is a court order or when a law exists requiring the lead researcher to report information. In this case, you will be informed of the intent to disclose this information to the state or federal agency.

If you do not sign this approval form, you will not be able to take part in this research study.

You can change your mind and revoke this approval for the use of your data at any time. If you change your mind, you must revoke your approval in writing by contacting Joseph Walerko.

I, the participant, agree to take part in this study. I have read and understand the above information in this consent form, and freely accept my role as a participant.

Subject Name: _____

Subject Signature: _____ Date: _____

Signature of Investigator or Responsible Individual:

To the best of my ability, I, the researcher, have explained and discussed the full contents of the study including all of the information contained in this consent form. All questions of the research subject have been accurately answered.

Investigator/Person Obtaining Consent: _____

Signature: _____ Date: _____

DCGS-A Program Comprehension from Documentation

This survey is being conducted by Joseph Walerko, a graduate student at NJIT, as part of a study investigating professional comprehension of the Distributed Common Ground System – Army (DCGS-A) Program. No information gathered from this survey will be released to outside parties. For email respondents, please forward your survey to joseph.walerko@us.army.mil no later than January 11, 2007. All responses received after the deadline will be ignored.

Please supply your name, address, and/or email address if you would like to receive a copy of the results of the survey. Thank you for your participation.

<i>Name:</i>	
<i>Address:</i>	
<i>Email address:</i>	

Instructions

On the following pages you will be asked a series of survey questions. These questions focus on your level of participation within the DCGS-A program, as well as your comprehension of the program and current documentation that supports it.

Please answer these questions as thoroughly as possible. You will be given one week to consider the questions posed to you, in order to allow you more time to answer the questions as you consider them.

As a reminder, all answers are strictly confidential, and will not be disclosed to anyone other than the investigator.

The study should take about an hour to complete, although more time may be dedicated to answering the survey questions if desired. When you are finished, save this document and email it to Joseph Walerko at the following address:

joseph.walerko@us.army.mil

You may also fax your results to 732-532-1672. However, if you fax your results, please contact Joseph Walerko either via email or telephone.

Thank you for your cooperation.

Proceed to the next page to begin.

Part I: Personal Information

1. Name (*Last, First, Middle*):
2. Age (*18-24, 25-34, 35 or older*):
3. Organization:
4. Military Rank (*if applicable*):
5. Profession (*if applicable*):
6. Years of experience in your profession:

Part II: DCGS-A Experience

Please answer the following questions by double-clicking the box next to the answer you believe to be the most appropriate, and changing the “Default value” to “Checked” .

1. How long have you been familiar with the DCGS-A Program?
 - 3 years or more
 - 1 – 2 years
 - Less than a year
2. Have you received training on the DCGS-A System?
 - Yes
 - No
3. How would you classify your level of participation with the DCGS-A Program?
 - I work on the program regularly
 - I work with the program occasionally
 - I do not participate much with the program
4. How would you classify your understanding of the *purpose* of the DCGS-A Program?
 - Strong
 - Average
 - Weak

5. How would you classify your understanding of the *overall architecture* behind the DCGS-A program?

- Strong
- Average
- Weak

6. How would you classify your understanding of the *systems* (such as JIOC-I and ABCS) that DCGS-A brings together within its architecture?

- Strong
- Average
- Weak

7. How much documentation on the DCGS-A Program have you read?

- I have read many documents on the DCGS-A Program
- I have read some documents on the DCGS-A Program
- I have *not* read many documents on the DCGS-A Program

Please answer the following essay questions as thoroughly as possible, using multiple sentences and paragraphs to construct your responses.

8. To your understanding, what problems does DCGS-A attempt to solve?

Response:

9. What aspects of DCGS-A do you think you understand well?

Response:

10. What aspects of DCGS-A do you *not* think you understand well?

Response:

11. If you have read documentation on DCGS-A, what parts of the program do you think were covered well? What parts of the documentation do you *not* think were covered well? *In answering this question, you may also include your experiences with Microsoft PowerPoint presentations.*

Response:

12. Overall, what do you think you would like to learn more about from the DCGS-A program?

Response:

Appendix B – Qualitative Research Results

Table 3 shows the summarized results of the collected surveys; Table 4 shows the overall frequency of topics mentioned. When determining the initial scores from the Likert-style questions, each question was graded so that participants with the *least amount of DCGS-A experience* received a higher score. For example, Question #1 was scored accordingly:

1. How long have you been familiar with the DCGS-A Program?

- 3 years or more → 1 Point
- 1 – 2 years → 2 Points
- Less than a year → 3 Points

Using this convention, the users who were less experienced with the DCGS-A program, but with more years of professional experience, received a higher priority on their topics of interest, since they more closely reflected the primary and secondary audiences who will read the final white paper. Table 5 shows the top six participants who yielded the top five scores (participants 010 and 016 both scored 15 points), as well as the topics they referred to in their essay responses. The topics those participants focused on were correlated against the most frequently extracted topics among all the participants. The results ranked the five most frequent variables that were addressed by the highest scoring participants:

- Interoperability
- System Architecture
- Hardware Architecture
- Software Architecture
- Operations, tools, and usability

Participant Code	Total Score	Comprehension Variables									
		NET	POL	SWA	HWA	SYA	DATA	OVER	FUT	IOP	WORK
001	11			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
002	13					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
003	14					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
004	12			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
005	12					<input checked="" type="checkbox"/>					
006	9					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
007	19					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
008	11		<input checked="" type="checkbox"/>								
009	10				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
010	15										<input checked="" type="checkbox"/>
011	10							<input checked="" type="checkbox"/>			
012	9					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
013	13							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
014	16	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	
015	12					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
016	15				<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	
017	13		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
018	16			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	

Table 3. Survey scores and matrix of extracted themes

Theme Code	Theme Description	Frequency
NET	Network & Communications	1
POL	Political & Financial	2
SWA	Software Architecture	3
DATA	Data Flow	2
OVER	Overall "Big Picture"	2
HWA	Hardware Architecture	4
FUT	Future Implementations	4
SYA	System Architecture	10
WORK	Operations, Tools, and Usability	6
IOP	Systems Interoperability	8

Table 4. Frequency & description of themes

Participant Code	Variables Addressed
007	SYA, WORK
014	NET, IOP
018	SWA, HWA, SYA, IOP
003	SYA, OVER, IOP
010	WORK
016	HWA, IOP

Table 5. Themes chosen by top scoring participants

The results of the analysis presented five topics that were a) frequently mentioned by most of the survey participants, *and* b) addressed by the participants who most closely matched the primary readership audience. Consequently, these five topics were included with as much detail and explanation as possible in the white paper. Nevertheless, many of the other topics were also addressed with some clarity in the paper because they were deemed “common sense” issues that the author anticipated would be required for the white paper.

It should be noted here that the results of this analysis are not perfect. The limited sampling size for the study, coupled with the security requirements to refrain from presenting heavy amounts of detail, allowed only a puerile attempt at presenting a document that would answer the unspoken questions of the audience. However, it is anticipated that in the future more extensive studies on documentation requirements will be conducted when the DCGS-A environment has a greater permanence in the MI community.

Appendix C – DCGS-A V3 White Paper

The contents of this appendix are currently undergoing a U.S. Army security evaluation for release within the academic community. It is anticipated that the material will be released in early May 2007. What follows are the first three pages of the white paper, which consist of the title page, abstract, and table of contents.

April 2007
Intelligence & Information Warfare Directorate
White Paper

The Distributed Common Ground System – Army: The Benefits of
Building ISR Bridges
by
Joseph Walerko

NOTICE

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This document has not been officially certified by PM DCGS-A as of this publication date; the views and statements made by the author do not necessarily reflect those of PM DCGS-A or any other U.S. government agency.

Date for general release 02 May 2007

Approved for public release; distribution is limited to academic use only.

Abstract

This document presents a comprehensive description of Distributed Common Ground System-Army (DCGS-A). It begins with a look at the factors that are driving the current transformation in the U.S. Army, specifically those affecting intelligence, surveillance, and reconnaissance systems. This is followed by a discussion of current problems that exist with currently fielded military intelligence systems, as well as potential solutions. One solution, DCGS-A V3, is summarily explored. Aspects of the system that are described include core technologies, hardware architecture, and software architecture. The benefits of such a system are outlined, as they pertain to the overall goals of the U.S. Army. The document presents the conclusion that DCGS-A V3 solves many of the major obstacles that modern military intelligence systems face, while future iterations of the system will continue to improve on the ways soldiers will observe and understand the changing nature of the War on Terror.

Contents

Abstract.....	2
Summary	Error! Bookmark not defined.
Drivers Impacting ISR Transformation	Error! Bookmark not defined.
Current Shortcomings of Existing Systems	Error! Bookmark not defined.
The Distributed Common Ground System - Army: An Overview .	Error! Bookmark not defined.
defined.	
A History of DCGS-A V3 Development	Error! Bookmark not defined.
System Architecture.....	Error! Bookmark not defined.
JIOC-I Overview.....	Error! Bookmark not defined.
ABCS Overview	Error! Bookmark not defined.
DIB Overview	Error! Bookmark not defined.
Multi-Function Workstation Overview.....	Error! Bookmark not defined.
External Tools & Thin Client Applications	Error! Bookmark not defined.
Data Interfaces & Data Flow	Error! Bookmark not defined.
Hardware Architecture.....	Error! Bookmark not defined.
Software Architecture	Error! Bookmark not defined.
Conclusions.....	Error! Bookmark not defined.
Benefits	Error! Bookmark not defined.
The Future of DCGS-A.....	Error! Bookmark not defined.