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Analysis indicated that changes are possible and necessary to ensure rapid, timely delivery of SIGINT from national systems to Army commanders at division and corps on or before the decisive moment on the battlefield. This study advocates that DOD and NSA must develop, implement and enforce a comprehensive set of standards for SIGINT data dissemination. They must focus on narrowing the number of paths for dissemination to far fewer intelligence broadcasts that deliver the original SIGINT source information with other associated intelligence. The Army needs to train more soldiers on the capabilities of the national systems and on how to more accurately state their commanders' requirements so they can be satisfied by national systems.

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MOVING SIGNALS INTELLIGENCE FROM NATIONAL SYSTEMS TO ARMY WARFIGHTERS AT CORPS AND DIVISION

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

WILLIAM P. CLAPPIN, MAJ, USA
B.A., East Tennessee State University, Johnson City, Tennessee, 1990

Fort Leavenworth, Kansas
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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

MOVING SIGNALS INTELLIGENCE FROM NATIONAL SYSTEMS TO ARMY WARFIGHTERS AT CORPS AND DIVISION by MAJ William P. Clappin, USA, 75 pages.

This unclassified study evaluates the Signals Intelligence (SIGINT) support the Army receives from national systems. It reviews SIGINT support provided during Operation Joint Endeavor (1995) and during Operation Desert Capture II (1994) using the principles of intelligence defined in Joint Publication 2-0 as criteria. The existing systems for dissemination from the national level are insufficient to ensure consistent, rapid delivery of this information for timely prosecution of potential targets below the strategic or operational level of war. This study also reviews the systems and organizations that the Army has which can directly access current SIGINT disseminated from national systems.

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ABBREVIATIONS

1AD	First Armored Division
24ID	Twenty-Fourth Infantry Division
ACE	Analysis and Control Element (of a division G2 intelligence staff)
AEPDS	Advanced Electronic Processing and Dissemination System
AOR	Area of Responsibility
ASAS	All-Source Analysis System
ASPO	Army Space Program Office
ATR	Aided Target Recognition
AUTODIN	Automated Digital Information Netwrok
AWE	Advanced Warfighting Experiment
CINC	Commander in Chief
CINCEUR	CINC Europe
CJCS	Chairman, Joint Chiefs of Staff
COMIFOR	Commander, Implementation Forces
COMINT	Communications Intelligence
CSP	Communications Systems Processor
DAMO-FDI	Department of the Army, Military Operations, Force Development, Intelligence systems
DIA	Defense Intelligence Agency
DISE	Deployed Intelligence Support Element (from corps)
DOD	Department of Defense
DPA	Dayton Peace Accords
EAC	Echelons Above Corps
EAD	Echelons Above Division
EGSM	Enhanced Ground Station Module
ELINT	ELectronic Intelligence
EPDS	Electronic Processing and Dissemination System

ETUT	Enhanced Tactical Users' Terminal
EUCOM	European Command
FAST	Forward Area Support Terminal
FISINT	Foreign Instumentation Signals Intelligence
FM	Field Manual (Army)
G2	Assistant Chief of Staff, G2 (Intelligence)(division and corps)
GFAP	General Framework Agreement for Peace
GSD	Graphic Situation Display
HMMWV	High-Mobility Multipurpose Wheeled Vehicle
HPSCI	House Permanent Select Committee on Intelligence
I&W	Indications & Warning
IBS	Integrated Broadcast Service
IFOR	Implemetation Force
IMINT	Imagery Intelligence
INTELINK	Intelligence Link (Intelligence internet)
IO	Information Operations
J2	Assistant Chief of Staff, J2 (Intelligence)(joint)
JCS	Joint Chiefs of Staff
JDISS	Joint Deployable Intelligence Support System
LOC	Lines of Communications
MITT	Mobile Integrated Tactical Terminal
MSE	Mobile Subscriber Equipement
NATO	North Atlantic Treaty Organization
NCA	National Command Authority
NIST	National Intelligence Support Team
NRTI	Near-Real-Time Intelligence master server
NSA	National Security Agency
NTC	National Training Center (Fort Irwin, California)

ODC-II	Opeartion Desert Capture II
OJE	Operation Joint Endeavor
OOTW	Operations Other Than War
OSO	Operations Support Office (National Reconnaissance Office)
RFI	Request for Information
SATCOM	Satellite Communications
SFOR	Stabilization Force
SHED	Special Handling and Evaluation Detachment
SIGINT	Signals Intelligence
SPIRIT	Special Purpose Integrated Remote Intelligence Terminal
SSCI	Senate Select Committe on Intelligence
TADIXS-B	Tactical Data Information Exchange System Broadcast
TDDS	TRAP Data Dissemination System
TENCAP	Tactical Exploitation of National Capabilities
TES	Tactical Exploitation System
TIBS	Tactical Information Broadcast System
TRADOC	Training and Doctrine Command
TRAP	TRE and Related Applications
TRE	Tactical Receive Equipment
TRIXS	Tactical Reconnaissance Intelligence Exchange System
USAREUR	United States Army Europe

CHAPTER 1

INTRODUCTION

Introduction to the Problem

> And to control many is the same as to control few.
> This is a matter of formations and signals.[1]
>
> Sun Tzu, *The Art of War*

The existing dissemination methods of the U.S. Signals Intelligence (SIGINT) system at the national level are insufficient to ensure consistently rapid delivery of this important information for timely and informed prosecution of potential high value targets below the strategic or operational level of war.

The global information environment and that specific subset which concerns military operations, the military information environment, are among the most recently identified areas of significance to warfighter success on the battlefield. The Department of Defense (DOD) and the U.S. Army have recognized for some time the importance of information to battlefield success, be it as the vehicle of command and control or as intelligence. Information as intelligence is a key factor in the warfighter's ability to achieve dominant battle space awareness. It gives them the ability to "see" the battlefield in depth and make rapid decisions concerning critical points in time and space. A further subset of intelligence on which the DOD and the U.S. Army have focused and developed is the production of signals intelligence. SIGINT derives meaningful information from the threat's use of the electromagnetic spectrum. The means to produce SIGINT have developed from very simple systems to extremely complex ones. These systems now range

from basic monitoring of battlefield radio communications and radar transmitters by tactical elements to the complex systems used at national level to monitor strategic use of the electromagnetic spectrum in the global information environment.

These SIGINT systems, both at national and at tactical levels, evolved within separate organizations. Tactical and operational systems deploy as organic capabilities for Army elements and were developed to support the tactical commander's needs. The systems above corps, including the national systems, were developed to support national and strategic decision makers. A consequence of these separate development paths has been the growth of production and reporting systems at each of the levels for processing and disseminating SIGINT which are not common to, or shared between them. In many cases these two sets of systems are not compatible.

Intelligence information is accessible and available at the national level which is of great value to tactical and operational commanders. Recognizing this fact, the Army has been striving for more than two decades to develop means to identify, access, disseminate, and then use this intelligence. The Army has a special program for tactical exploitation of national capabilities (TENCAP), specifically targeting national level SIGINT and imagery intelligence (IMINT). This program has predominantly addressed ways of exploiting national capabilities from within the existing structure. The Army has developed systems and organizations that can directly access current SIGINT disseminated from national systems which has been made available through existing broadcast means; however, a problem exists with this approach. If the SIGINT was not already available in an intelligence broadcast or if the information could not easily be added to such a distribution

means, then access to and distribution of the intelligence in a timely manner to Army division and corps commanders has not been possible.

The available human and technical resources used to access and analyze SIGINT are becoming more limited while the targeted communications are rapidly becoming more technologically advanced. In this environment it is imperative that all potential sources of such information are capable of distributing these essential elements of SIGINT to the user whom it will best support. This research will review the existing means used by the Army to disseminate the essential elements of SIGINT from national systems to warfighters and to determine whether a better, or more unified way exists to accomplish this task.

Importance of the Subject

This research is aimed at identifying practical weaknesses in the current signals intelligence reporting and dissemination methods from national systems to Army divisions and corps. Battle space awareness and information operations are necessary elements for success on the battlefield, according to Army doctrine. The current methodology of reporting and disseminating the essential elements of national level SIGINT necessary for this success is still constrained within an older intelligence architecture. The current national structure for dissemination was developed to support a simpler system having slower production rate and more deliberate use of the information, and in which information was reserved for national and strategic consumers. After Operation DESERT STORM it became obvious that change was needed to ensure greater responsiveness from national systems to Commanders in Chief (CINCs). During hearings before the U.S.

Senate Select Committee on Intelligence in 1991, Senator Boren outlined congressional intentions on the reorganization of the intelligence community following the conclusion on Operation DESERT STORM:

> Our own interest in reorganization was born out of concern that, despite sizable growth in development in intelligence during the 1980's, military commanders were not receiving timely and relevant intelligence regarding the threats and contingencies which they perceived as the most threatening. The members of this committee became concerned that the national and tactical intelligence bureaucracies were isolated from each other resulting in duplication, waste and poor performance. The tactical and national intelligence communities appear to be excessively isolated from one another, leaving each free to pursue self-sufficiency through organic systems and organizations on the argument that national systems or civilian systems cannot be relied upon for support, The national community, likewise, emphasizes its peacetime missions and pays scant attention to the commander's needs. Finally, we undertake this review in light of the economic realities that will confront us in the 1990's. If budget deficits are to be brought down, government spending must be reduced, and intelligence will be forced to share in these reductions. We must look for ways then to do more with less. If we can streamline, if we can avoid unnecessary duplication, if we can find more efficient ways of accomplishing the intelligence mission, then by all means we should adopt them.
>
> As we begin this important review of the intelligence community, I think that it is worthwhile to consider an analogous, and very recent, reorganization effort. Back in 1986, if there was one thing that united the military services, other than the Soviet threat, it was their fierce antipathy toward the Goldwater-Nichols Reorganization Act, at least initially. And yet few today would deny that our victory in the Persian Gulf was in large part attributable to General Schwarzkopf's streamlined management structure, a structure that was at least in part established under the Goldwater-Nichols bill which was hammered out in part in this very room. Our ultimate goal is the same: better intelligence and a better product in the national interest of the United States.[2]

In a national environment of shrinking budgets and dwindling resources, it is important that the existing capability to produce SIGINT be available to any consumer with a valid need for the information. This research will attempt to identify and recommend

improvements to the reporting and dissemination systems and specify the changes necessary to achieve these improvements.

Background

Warfighters must achieve information dominance at critical points on the battlefield to ensure the success of their force in accomplishing their assigned mission. To achieve dominance, warfighters must plan and integrate information operations into their overall military operations. As a consequence of this need, the planning and integration of information operations are becoming increasingly critical to successful military operations. Battle space awareness and information operations (IO) at division and corps are becoming progressively more dependent on information and intelligence derived from systems not organic to these organizations. The operations focus and organization of the existing signals intelligence system at the national level are sufficient to effectively support strategic targeting. However, this system is not capable of delivering this information to intelligence elements at division and corps consistently in a timely fashion. The Army has defined what elements of information operations are to be conducted at the division and corps level. Any additional SIGINT from any source would unquestionably contribute to these operations and enhance battle space awareness. To improve this situation, the Army must identify the essential elements of SIGINT available at the national level which would be needed at division and corps. To ensure rapid, timely delivery to warfighters on or before the decisive moment on the battlefield, constraints on reporting and dissemination

of these essential elements of SIGINT between national systems and the division and corps must be identified and eliminated.

Once this information is processed at the national level, the means to deliver it in a timely, usable form to the commanders at division and corps is stovepiped (limited to specific, point-to point delivery systems), disjointed and cumbersome. The variety of demands for national-systems intelligence has caused a proliferation of processing and dissemination systems and has allowed over 273 of these stovepiped systems to develop.[3] The dissemination of this intelligence is frequently limited to channels that make fusion of the information with other existing intelligence difficult. SIGINT accessible via national level systems has great potential value. This situation of imperfect and hence limited dissemination of any such valuable information about the battle space restricts the division and corps commanders' awareness and their prosecution of information operations. The Army all-source intelligence system (all-sources analysis system-ASAS, and the analysis control element-ACE) has begun to address parts of this problem at the division and corps through flexible input protocols and message handling software. However, there still remains much which could be done to the process at the national level that would enhance the capabilities of these Army systems to deliver a more accurate battle space awareness.

Relationship of this Thesis to the Problem

This thesis will isolate and define the existing obstacles to identifying and delivering SIGINT from national systems to division and corps. Several assumptions about the topic form the basis on which to proceed. First, the essential elements of SIGINT

required from national systems for the division and corps are definable. Next, these essential elements of SIGINT required from national systems remain fairly constant. It was also necessary to assume that the existing systems could be altered and/or personnel could be trained to improve the process of reporting and disseminating them. Last, based on personal experience, it was assumed that national-systems SIGINT is an important source of information for battlefield awareness for division and corps operations.

The Research Question

The intent of this research is to improve the battle space awareness of division and corps commanders and enhance the use of related SIGINT above and below corps. It is proposed to answer the question: What changes are necessary to ensure rapid delivery of the essential elements of signals intelligence from national level systems to Army commanders at division and corps?

Definition of Operational Terms

The following are some operational terms that will be used in the discussion of this problem and in resolving my primary research question and supporting my proposed thesis. These terms are in common use in this field of study and enable a more direct discussion of the topic.

Battle Space Awareness. This term describes the extent of the commander's understanding of the current state on the battlefield. It is accomplished by developing a firm grasp of the relationship of the enemy and the environment to those physical

components determined by the maximum capabilities of friendly and enemy forces to acquire and dominate each other by fire, maneuver and in the electromagnetic spectrum.[4]

Information Dominance. The degree of information superiority that allows the possessor to use information systems and capabilities to achieve an operational advantage in a conflict or to control the situation in operations short of war, while denying those capabilities to the adversary.[5]

Information Operations (IO). Continuous military operations within the military information environment that enable, enhance, and protect the friendly force's ability to collect, process, and act on information to achieve an advantage across the full range of military operations. Information operations include interacting with the global information environment and exploiting or denying an adversary's information and decision capabilities.[6]

National Systems. A term used generically to refer to any asset used by the intelligence collection organizations of the United States, especially space-based systems.[7]

Signals Intelligence (SIGINT). Intelligence derived from collecting, locating, processing, analyzing, and reporting external parameters and internal content of intercepted communications and noncommunications emitters. It is subdivided into: communications intelligence (COMINT); electronic intelligence (ELINT); and foreign instrumentation signals intelligence (FISINT).[8]

Warfighter. A military commander engaged in the operational or tactical art of war. He plans, conducts, and supports major operations and battles to attain tactical or

operational objectives in support of the operational objectives of theater strategy or strategic objectives of Army forces.[9]

Related Questions

In developing the primary research question, several related questions became apparent. This research will have to address these in order to be able to answer the proposed question and support the thesis in this document. These questions are:

1. What elements of signals intelligence are essential to division and corps warfighters for battle space awareness and the conduct of tactical information operations?

2. What systems already exist to report these essential elements of SIGINT from national systems to division and corps?

3. What communication means exist to carry and deliver these reports to the intelligence elements at division and corps?

4. How does the Army intelligence system currently process, handle, and fuse with other sources the information conveyed in these essential elements of SIGINT?

5. At what point in time and in what way does the information finally get delivered to the commanders at division and corps?

Limitations

A potentially very restrictive boundary on this research is that much of the documentation on national SIGINT systems and the details of SIGINT dissemination are highly classified, some also being compartmented within their classification. This constraint may reduce the scope of discussion to the subject titles of the essential elements

of national system produced SIGINT releasable at division and corps. It will also limit the discussion to the means of dissemination, not the formats and protocols or internal processes of these systems.

Delimitations

To define the area this research is intended to cover and avoid crossing into areas that might restrict distribution of the results, the specific formats or protocols for the dissemination of the essential elements of SIGINT will not be discussed. The sources, capabilities, or output levels of national level SIGINT systems also will not be discussed.

Research Method

In developing this research, the method used is intended to collect information on this topic as it pertains to the proposed question and thesis. This research will accomplish this by reviewing any classified and unclassified works and military manuals which contain information related to the reporting, analysis, dissemination and use of national-systems SIGINT at division and corps. As information is identified which covers any of these areas, it will be divided into the categories of: necessary SIGINT elements; existing reporting means; existing dissemination means; potential new means of dissemination; and potential means for merging existing systems. The critical tests that will be applied to this information are whether it is recent enough (i.e., current with technology and capabilities), whether it represents a possible source for change, and whether it is feasible as a near-term solution.

[1] Department of the Army, FM 100-6, *Information Operations.* Washington DC:U.S. Government Printing Office, August 1996, 5-0.

[2] Congress, Senate Select Committee on Intelligence, *Hearings on Review of Intelligence Organization*, 102nd Cong., 1st sess., 21 March 1991, 3.

[3] U.S. Department of Defense, *Communications Handbook for Intelligence Planners(U)* (Washington DC: Defense Intelligence Agency, 24 January 1995), 4-9.

[4] FM 100-6, *Information Operations*, 6-9.

[5] FM 100-6, *Information Operations*, 2-3.

[6] FM 100-6, *Information Operations*, 1-9.

[7] U.S. Army Command and General Staff College, *U.S. Army Space Reference Text.* Ft. Leavenworth KS: U.S. Government Printing Office, January 1995, F-7.

[8] Department of the Army, FM 34-1, *Intelligence and Electronic Warfare Operations.* Washington DC: Department of the Army, September 1994, 2-5.

[9] Armed Forces Staff College, AFSC Pub 2, *Service Warfighting Philosophy and Synchronization of Joint Forces,* Armed Forces Staff College: National Defense University, August 1992, 1-16.

CHAPTER 2

LITERATURE REVIEW

Background in Tactical Exploitation of National Capabilities (TENCAP)

The nature of the problem of accessing and delivering nationally produced SIGINT for Army divisions and corps to use, and the technology environment in which it exists dictate that much of the relevant research in this field will be fairly current. Any research of the topic must account for the ongoing revolutionary advances in communications technology and data processing systems. These changes are occurring in twelve to eighteen month cycles and directly impact long-term attempts to improve direct, rapid support to warfighters from national systems. Therefore, much of what has been identified here as relevant prior research is no more than three to four years old.

While SIGINT has always been produced at the national level which would potentially be of value to tactical consumers, the effort to access and deliver this SIGINT has only recently become a real issue. The Army Space Program Office (ASPO) has been existence since 1973 with the expressed intent of providing the tactical commander from echelons-above-corps (EAC), corps, division, and the separate brigades access to national and theater collection capabilities. Between 1977 and 1981 the other services followed the Army's model and created their own TENCAP offices. Finally, the National Security Agency (NSA) and the Defense Intelligence Agency (DIA) joined in the effort to make use of national-systems intelligence to support tactical commanders. Some successes have resulted from this steadily increasing focus on TENCAP, such as the Tactical information

Broadcast System (TIBS) and the Tactical Receive Equipment and Related Applications (TRAP) Data Dissemination System (TDDS) broadcasts. Yet, despite all the apparent progress, a fairly large problem still exists with the development of the current systems available to access national-systems SIGINT. In a 1995 article in the U.S. Army's intelligence periodical, Military Intelligence, Lieutenant Colonel William A. Ross (USAF), provided a good basis for defining the technical problems associated with this issue across the DOD. He gave a broad description of the tactical application for many of the national systems already in existence and drew the still relevant conclusion that "the intelligence community has yet to develop a clear direction, policy, and doctrine regarding space application, systems requirements, and training."[1] This opinion is not an isolated position from an Air Force officer familiar only with a national-level view of the tactical exploitation of national capabilities. This perspective is strongly supported by other elements within DOD. In another article that same year, Amy McAuliffe discussed the overarching "need for a unified blueprint for reconnaissance and intelligence capabilities"[2] across programs and agencies.

This view that the national systems have not yet developed a coherent means for timely delivery of SIGINT is also supported from the tactical users' perspective as well. Evaluating the national intelligence support received by the Army during operation JUST CAUSE and operations DESERT SHIELD/DESERT STORM, a study produced in 1994 at the Army Command and General Staff College concluded that the existing "battlefield requirements for timely data was greatly exceeded by demand."[3] Since 1994, the Army has

continued to be forced into a greater reliance on national systems to support its warfighting intelligence needs by an ever decreasing budget and diminishing force size.

Literature that Supports the Problem Statement

Outside the realm of official government publications, much has been written that addresses these shortcomings of the national systems' ability to meet tactical customers' needs. These shortcomings have been highlighted at the very highest level in DOD, as in an interview May 1996, the Chairman of the Joint Chiefs of Staff (CJCS) General Shalikashvili recognized and acknowledged the national-systems intelligence dissemination problem. His conclusion was that, "we must improve more timely support to the warfighter from overhead and theater systems," and that the "dissemination of intelligence below the JTF level requires high-capacity, interoperable intelligence dissemination systems."[4] Since then, the Department of Defense has continued to field new systems to support dissemination to warfighters at theater and joint task force levels. However, a problem still exists in ensuring timely dissemination of support from national systems. The dissemination by these future high-capacity, interoperable intelligence systems will deliver such high volumes of information that they may end up inundating consumers, unless the consumers understand how to select and limit the flow to only that information which is necessary to their situation. This need for the consumer to better understand how the system operates highlights the need for more and better training of commanders and their staffs in how to identify and control the relevant information being made available to them. Some of these intelligence dissemination systems already exist, but they are stovepiped.

The term stovepiped refers to systems that are specifically designed for use by the national system providing the SIGINT and the tactical consumer they serve.

The communications architecture supporting dissemination is also an area of some concern because of the impact it may have on the development of intelligence dissemination. Current Army efforts to bring together and integrate the various existing intelligence broadcasts in a common format was addressed in an article in the Army Communicator during 1996. While the author did not project a near-term solution to the problem of diverse communications formats, it did state that "a joint intelligence broadcast steering group has been formed... addressing intelligence broadcast policy and direction... intended to resolve the often uncoordinated proliferation of stovepiped intelligence broadcasts."[5]

Because the Army has led DOD over the past twenty-five years in developing access to national-systems SIGINT, the current state of Army TENCAP systems is also very important to the discussion of changes needed to further improve this access. The processing and communications systems which have been fielded by the ASPO to support the tactical customer are the core of what will likely become the solution to a more unified means of delivery for this national-systems SIGINT. Chief warrant Officer (CW2) Steve Montgomery, while part of the Directorate of Combat Systems at the Army Intelligence sCenter, Ft. Huachuca, wrote an article in 1996 describing newer systems already being developed. There are two specific systems which he addressed that show promise for improving timeliness and accessibility. One, known as near-real-time intelligence (NRTI), actually is a server which hosts intelligence data posted there by analysts in the national

systems. The data is available to be pulled down by analysts at corps and division over the JDISS. The other system, BINOCULAR, is a candidate for filling the near-term need of providing rapid, timely information from national systems to divisions and corps by pushing the data out to them over an intelligence broadcast. BINOCULAR merges the TIBS and TDDS broadcast data into a single broadcast system containing the data in the broadcasts plus a new data stream which provides the correlated and merged elements of both of the source broadcasts. The new intelligence broadcast has the advantage of its data having also been compared to the national databases for the accuracy and completeness, all in a matter of seconds. The article also described an Army initiative called the Tactical Exploitation System (TES) which will integrate the functions of all the Army's current TENCAP systems and make them uniformly inter-operable with the Army's all-source analysis system (ASAS). With this as the Army target for future integrated SIGINT dissemination from national systems, the problem of timely delivery of national-systems SIGINT to tactical consumers becomes more clearly a problem of access at the producing end rather than delivery to the division or tactical customer.

In pursuing answers to the primary research question, many potential or projected improvements were encountered which may provide solutions to the problem of timeliness and utility of information from national systems. ASPO, the Army TENCAP office, is responsible for developing such solutions which will deliver available national-systems SIGINT. As stated earlier, this office has developed some useful systems which can access what is currently available, but the ASPO does not really address the larger problem of standardizing the format and elements of SIGINT to be made available from these national

systems. The Army's ASAS and the most recent changes in its fielding configuration resulted apparently from the field testing ongoing in the European theater. Use of the system pointed to a greater need for access to joint or combined intelligence networks such as the Joint Deployable Intelligence Support System (JDISS). Most authoritative works on this topic are in official publications. The Army's FM 100-18 (July 1995) Space Support to Army Operations, and the U.S. Army Space Reference Text (January 1995) are fairly good histories of the Army's interest and access to national systems. Current information was also drawn from the ASPO internet web site and the Warfighter's Guide to Intelligence Communications Architectures, prepared by the 743d Military Intelligence Battalion in 1995. No unclassified literature, publications or books were found other than the official ones already mentioned, which had specific information bearing directly on the topic of intelligence dissemination systems used by the Army. Other sources used in conducting this research focused mostly around current articles in professional journals. After-action reviews in Army and DOD databases also contain relevant information useful in this analysis. The most recent doctrinal documents, FM 100-18, JCS Publication 2-0 and 2-01, and FM 100-7, were compared with other information concerning this topic as listed in the bibliography. These sources have overwhelmingly supported the fact that there is a problem in moving intelligence information in a uniform, timely fashion from national systems to corps and division customers. While some of the various programs and work aimed at resolving the problem have been described here, no details were found regarding the development or use of a common standard to drive the improvements.

Much of the approach in this thesis to assessing this problem and searching for means to resolve it is driven by my own background in SIGINT. I have served in Army Military Intelligence as a SIGINT specialist for the past eighteen years. My first four years of service from 1981 and 1985 were as a voice intercept operator, 98G-Russian. During this time I served as a team chief and eventually the senior squad leader on a TRAILBLAZER (AN/TSQ 124) VHF and HF COMINT collection and direction finding master control station. I was in the 533d Military intelligence Battalion of 3d Armored Division, V Corps in Frankfurt, Germany, and faced with many of the common problems of collecting communications intelligence with assets organic to a heavy division. I earned my commission in 1985 and from 1986 to 1989 I served as a Platoon Leader and Current Operations Officer with the 204th Military Intelligence Battalion. This battalion was part of the 66th Military Intelligence Brigade, a mobile, echelon above corps (EAC) SIGINT battalion supporting the U.S. Army in Europe (USAREUR). Between 1991 and 1995, I served in the 704th Military Intelligence Brigade at Fort Meade, Maryland, with duties at the National Security Agency (NSA). I received three years of special cryptologic training (earning the additional skill indicator 3W) while assigned there and worked for most of the four-plus years in national systems SIGINT programs. During this time I also commanded a company in the 743d Military Intelligence Battalion, supporting five of these national systems. I then served as the battalion's Operations Officer (S3), coordinating operations, plans, and training for all the Army soldiers involved in support of national-systems SIGINT collection and processing. From 1995 to 1997 I served at a national-systems site in the United Kingdom as the station's Senior Watch Officer. I also served as their

Support to Military Operations (SMO) Officer and Military Operations Integration Officer, coordinating support from our national systems site for military customers in European Command (EUCOM), Central Command (CENTCOM) and Atlantic Command (ACOM). I have hands-on experience in operating systems used either in identifying or prosecuting a very wide variety of SIGINT targets. My training includes electronic warfare operations, tactical intelligence analysis, strategic intelligence analysis, national cryptologic operations, and international satellite systems capabilities and operations. As demonstrated by my duty assignments, for the past seven years I have focused on leveraging national-systems capabilities for the Army to integrate and use at echelons above and below corps. From this experience base I expect to be able to analyze and draw conclusions which are based in the facts of ongoing developments.

Questions Which Arise Suggesting Further Research

In answering the primary research question several new questions became apparent. However, these questions were not specific to this research. They involve the means used to portray or display the information which the Army has been attempting to move quickly from sensor to shooter. Currently the information is processed into a local database, filtered, analyzed and then displayed as an icon on a graphic situation display. Usually these icons are symbols that do not themselves convey much meaning other than their relative location on the display to other icons and to a point of reference on a map. The data that supports the icon is usually only available to an operator by clicking on the icon. The information conveyed with these icons must be correlated and merged with

other information by a system such as ASAS and further analyzed by an intelligence operator. It is then transferred to a situation display for use by the commander and his intelligence and operations staffs in planning and decision making. It would be much more efficient if the processor receiving, breaking down and hosting the data also analyzed, compared, correlated and merged it with other related reports or intelligence. It could then be automatically added to the situation display. An intelligence analyst would then have to perform quality control, selectively accessing and confirming the symbols on the situation display. The resulting question then is: what improvements are possible in simplifying the processing and displaying of intelligence information being delivered to division and corps operations elements for use by commanders?

Summary

The root of this dissemination problem has its origin in the proliferation of processing and dissemination systems in the absence of defined Department of Defense guidelines or a coherent policy for their development, standardization and integration. Any treatment of the topic must encompass the ongoing revolutionary advances in communications technology and data processing systems. These changes occur in twelve to eighteen month cycles. They affect long-term attempts to improve direct, rapid support to warfighters from national systems. Rapid changes in technology dictate rapid changes in the systems themselves. Therefore much of the relevant research in this field is fairly current. Much of what has been identified as relevant prior research is no more than three to four years old, and even then may not be as current as is needed.

[1] William A. Ross, "Space support to the warfighter," *Military Intelligence* 21, no. 1 (Jan-Mar 1995): 23.

[2] Amy McAuliffe, "Building the eyes and ears of the battlefield," *Military & Aerospace Electronics* 6, no. 6 (June 1995): 10.

[3] Brian J. Cummins, "National reconnaissance support to the Army," (Master of Military Art and Science Thesis, Ft. Leavenworth: Army Command and General Staff College, 1994), 119.

[4] Stacey Evers, "Shalikashvili points out ISR problems," *Aerospace Daily* 178, no. 25 (3 May 1996): 207.

[5] Scott Long, "Migrating to a single broadcast format with the Integrated Broadcast Service," *Army Communicator* 21, no. 3 (Summer 1996): 30.

CHAPTER 3

RESEARCH METHODOLOGY

Research Approach.

This research method assesses the national systems' success or failure in ensuring rapid delivery of the essential elements of signals intelligence from national systems to Army commanders at division and corps. The approach was to collect information sources on this topic as they pertained to this research question and thesis. These assembled classified and unclassified works and military manuals were then reviewed in detail to extract the information related to the reporting, analysis, dissemination and use of SIGINT at division and corps produced by national systems. Two operations were specifically reviewed. Operation JOINT ENDEAVOR in 1996 was analyzed for the support provided by the national systems to V Corps and the 1st Armored Division in their initial deployment of forces into Bosnia. For a more recent case study, Operation DESERT CAPTURE II was chosen because it was part of an Army Warfighting Experiment in 1994. As resources were identified which discussed national systems providing SIGINT to tactical users, the relevant system was assessed for its ability to satisfy principles describing the qualities of intelligence outlined in JCS Publication 2-0. These qualities are: timeliness, objectivity, usability, completeness, accuracy, relevance. Indication that the SIGINT produced by national systems did not satisfy these principles was defined as an intelligence system deficiency and it was included in the analysis and discussion. If the national systems did not satisfy these principles, the information was then

divided into categories of: relevant SIGINT elements; existing reporting means; existing dissemination means. If the system satisfied the JCS Publication 2-0 principles, it was grouped in the following categories: potential new means of dissemination; potential means for merging existing systems. Finally, a set of critical tests were applied to the information which had been retained in all categories before including it in the discussion. These tests were: was it recent enough (i.e., current with technology and capabilities); did it represents a possible source for change; was it feasible as a solution for the near term.

In developing this methodology, several assumptions had to be made about the information and the field that this thesis examines. The first of these assumptions was that the essential elements of SIGINT required from national systems for the division and corps were definable. It was also assumed that these essential elements of SIGINT required from national systems remained constant and that the existing systems could be altered to improve the process of reporting and disseminating them. Lastly, it was assumed that national-systems SIGINT is a relevant and important source of information for battlefield awareness for division and corps operations.

Criteria for Evaluating Evidence

The principles of intelligence defined in JCS Publication 2-0 were selected as initial criteria in evaluating the evidence. They were chosen because they offered qualitative measures to assess the success or failure of the national systems in providing SIGINT to Army commanders at division and corps. The joint level of doctrine and intelligence

balances the strategic concerns of the national level with the narrowly focused needs at the tactical level. This required balance produced a test that could be applied at both levels.

Below are descriptions of each of the principles of intelligence quality as they are found in JCS Publication 2-0, which were applied to national-systems SIGINT.

Timeliness. All intelligence must reach the commander or his staff in time for them to use it effectively. Timely intelligence is critical in preventing surprise, efficient application of forces to take objectives, conducting an effective defense, and in seizing the initiative. Timely intelligence from national systems is essential for the division and corps commander's directing and cueing of his organic collection resources and sensor systems to track threats. This principle often conflicts with the principle of accurate intelligence. The more timely intelligence is, the more probable it is that the intelligence has not had time to be analyzed for its significance and accuracy. The commander's need for information at a specified moment in the decision-making process is a factor of being timely. A system's capability to deliver timely intelligence is determined by the capability and understanding of that commander's intelligence officer. He must express the appropriate amount of lead time necessary for the intelligence to reach the commander in time.

Objectivity. Objective intelligence is free of political, personal or situational bias. Commanders' battle space awareness must be as thorough as possible. Intelligence must depict the current situation that is as factual as possible at all times. Accurate situation portrayal is directly dependent on objective intelligence.

Usability. The form in which intelligence is delivered to a user must be tailored to their capability to display or access it. It should not require further analysis or manipulation in order for it to be used or applied. Packaging for reporting and dissemination must be done at the producing end in a form that meets the needs of intended users and which minimizes the need for handling prior to application.

Completeness. This measure describes the intelligence in relation to the supported commander's mission, responsibilities and objectives. Intelligence approaches completeness as it enables a commander to gain a direct advantage over the enemy he is facing. Initiative, flexibility, and surprise are all dependent on intelligence that is as complete as possible and certainly more complete than the enemy's intelligence.

Accuracy. To be of any value, intelligence must be factually correct. Inaccurate intelligence leads to an estimate of the situation that is not true and which will produce predictive analyses that are seriously flawed. However, intelligence which is only factually correct is not enough. It must also answer the specific requirements it is being gathered to resolve. Further, if the intelligence is tainted by a bias in collection, analysis, reporting, or dissemination it can produce incomplete or inaccurate battle space awareness, leading to wrong decisions by the force commander.

Relevance. Intelligence must contribute to a commander's battle space awareness and his understanding of the enemy's intentions. Intelligence must enable predictive analyses to support a commander in conceiving, planning, executing and evaluating operations. To be relevant, intelligence must be objective, complete, accurate, timely, and usable.

Security Measures for Handling Sensitive Topics

No material that was either classified or derived from classified sources was included in this thesis. Much of the documentation on national SIGINT sources and the details of content, format, protocols and communications means of SIGINT dissemination are classified. These classified materials were used only as leads to open sources which would be relevant to this topic so that this problem could be better discussed in greater detail. The approach of writing this thesis as an unclassified document and not producing a classified annex may have restricted the scope of the discussion. This thesis has been able to cover the essential aspects of national-systems SIGINT releasable at division and corps. It has been able to cover the means of dissemination in enough detail to indicate the scope of the problem and the potential solutions. This approach necessarily excluded the sources, methods, formats and protocols of these systems. For this reason the specific content, formats or protocols for the dissemination of the essential elements of SIGINT have not been discussed. The sources, capabilities or output levels of the national level SIGINT systems also have not been discussed.

CHAPTER 4

CASE STUDIES AND PROBLEM ANALYSIS

> Communications dominate war;
> they are the most important single element in strategy.[1]
>
> Mann (1907)

This chapter will examine the role national signals intelligence assets played in supporting operations described in two case studies. The operations which will be examined include JOINT ENDEAVOR (OJE), DESERT CAPTURE II (ODC-II), and more recent iterations of the Army's Advanced Warfighting Experiment (AWE). These are situations where the need for these national resources was well described, and the assessment of the value that they provided was reasonably well documented. After examining historical events and the intelligence force structure available at the time, this chapter will assess signals intelligence successes or shortfalls using the research method outlined in chapter 3. The criteria for success in the research methodology are derived from JCS Publication 2-0. This publication is the fundamental intelligence support guide for unified commands, but it also can be applied to the subordinate combat commands and the national intelligence organizations that support them during joint or combined operations[2].

Operation JOINT ENDEAVOR

The IFOR in Operation JOINT ENDEAVOR, from December 1995 to December 1996, represented a new test of U.S. leadership in joint and combined military operations

involving NATO and the Western European Union.[3] IFOR was the first military operation other than war (OOTW) for the U.S. on the European continent since the Cold War.[4] U.S. involvement came with limits on the number of forces we could deploy into the theater of operations.[5] U.S. deployment required a unique new balance of the capabilities afforded by organic, theater, and national SIGINT resources.[6] Once again the impact of the 1986 Goldwater-Nichols Department of Defense (DOD) Reorganization Act on military operations was tested. The U.S. European Command's (EUCOM) organization and combatant command authority had been affected by this law since the fall of the "Soviet threat." The intent of the law had been to strengthen the authority of the unified commanders in chief (CINC), such as in EUCOM, while better defining the lines of communication from the national command authority (NCA) through the Chairman, Joint Chiefs of Staff (CJCS) to these warfighting CINCs. The purpose of the law was to avoid the duplication of chains of command that had occurred during the Vietnam War. The Act also outlined succinct guidance to the DOD field agencies. The Defense Intelligence Agency (DIA) and the National Security Agency (NSA) were designated as combat support agencies with responsibility to perform intelligence support activities for the warfighting commands. The overall concept was to make DOD agencies more responsive to the intelligence needs of military combatant commanders during peace and war.

The impact of the Goldwater-Nichols DOD Reorganization Act, and a renewed pressure from Congress, had resulted in a new model for streamlining the efforts of the intelligence community. This congressional pressure is illustrated by such assessments as Senator John Warner's opening statement, post-DESERT STORM, to the Senate Select

Committee on Intelligence (SSCI). He addressed the effect of the Goldwater-Nichols Act on the defense intelligence apparatus. Senator Warner stated:

> Mr. Chairman [Boren] if we learn the lessons of Desert Shield and Desert Storm well and we apply the principles [of] Goldwater-Nichols, I am certain that we will structure a defense intelligence apparatus to support our troops and insure our security which is second to none throughout the world.[7]

The established joint procedures and doctrine provided the basis for the integration of combat forces and national intelligence support into CINC EUCOM's (CINCEUR) area of responsibility (AOR), but the deployment into Bosnia was different. The first Armored Division, as EUCOM's force contribution and part of a multinational element, created the need for parallel but separate intelligence support organizations, one for the U.S. forces and one for NATO and coalition allies. Each U.S. military service in EUCOM had the responsibility to provide appropriate forces to the multinational force through the Commander IFOR (COMIFOR). However, because of restrictions placed on the release and dissemination of sensitive U.S. produced intelligence, EUCOM and their subordinate Army command, USAREUR, decided how best to organize the intelligence support to 1AD during the initial movement and occupation phases of Operation JOINT ENDEAVOR. Some of the U.S. command arrangements had not been very well addressed, "the command relationships between NATO authorities, USCINCEUR and USAREUR were not well defined and this led to inefficiencies and confusion."[8] These inefficiencies and confusion extended in some cases to the intelligence support required by 1AD. Tasked with support of the multinational effort as well as the U.S. forces in the IFOR, the combat support agencies had unclear lines of command authority and

responsibility over theater intelligence support and subordinate intelligence elements in Bosnia.[9] DIA, having been criticized over the incompleteness of its intelligence databases prior to and during the Gulf War, was prepared to organize and deploy national intelligence support teams (NISTs) very early in this operation with direct access to the now improved intelligence databases.[10] But the dual chains of command meant they would have to supply NISTs for the U.S.-only headquarters as well as the NATO/IFOR headquarters.

In Bosnia the national intelligence community had the complex task of providing a much larger measure of tailored intelligence data and analysis. In the past the theater would have provided this support to itself with organic resources. The problems this caused related not only to the chain of command and operational authority, but also to the content and control of that intelligence.[11] Beyond any doubt, operations in Bosnia have had profound impact on future Army intelligence operations and their support or augmentation by national systems. This impact is due largely to the fact that U.S. participation in Bosnia represents a model for intelligence support of a medium sized force deployed in a theater where the number of U.S. soldiers on the ground has been limited.[12] To maximize combat force in the area of operation other force elements were restricted in size, thereby dictating that intelligence support would have to be augmented by national systems. The impact of relying so heavily on national intelligence can lead to shortfalls and even intelligence gaps. National systems have a finite capability to collect and, when priorities in other areas of the world are weighed, these assets may become less available than the organic resources they are supposed to augment or replace.[13] Also, the

intelligence analysis and reporting timelines for information collected by national systems is historically established with the perspective of the strategic policy maker in mind, rather than oriented on the tactical or operational commander's concerns. Individual military service intelligence organizations have always been responsible for that service's unique needs in the past. However, the individual service intelligence organizations do not have very much influence on tasking of or reporting by national collection systems. Their main influence on these systems is in leveraging their capability when national collection interests and tactical collection needs coincide to some degree.[14] As with many parts of the world not considered a direct threat to U.S. national interests, Bosnia was only an area of incidental concern for national intelligence collection before U.S. intervention to secure the general framework agreement for peace (GFAP).[15] Much of the DIA's and NSA's pre-IFOR intelligence estimates of the former Republic of Yugoslavia/Bosnian region were aimed at the political and economic stability of the area. Only during the events leading up to the IFOR deployment had any real focus been shown in building a database on the military forces and potential terrorist activity there.[16]

EUCOM's Role in National Systems Collection

In virtually every military operation, national intelligence is key in developing the background and databases from which the theater CINC and component services draw their information to support and plan for impending deployment. National signals intelligence played an important role in supporting the United States' 1st Armored Division (1AD) as part of the Dayton Peace Accords implementation force (IFOR) and in

supporting V Corps forward (supporting 1AD from Hungary). In the central European region, collection by the theater and national intelligence architecture is well defined and layered to produce complementary coverage of important targets. Theater intelligence assets provide a relatively large amount of the information which the theater military forces analyze and disseminate.[17] That information is processed at both the theater and the national levels by each of the respective services in line with their unique intelligence needs. In this environment, national collection systems overlap and augment the efforts of the theater systems by providing a greater depth of coverage and a wider range of other special capabilities. Like the information collected by theater resources, information collected by the national systems is shared so that each of the respective levels (component service, theater, and national) can analyze the data and produce reporting required at their particular level.[18] Theater collection also provides part of the essential strategic indications and warning (I&W) of hostile activity. Under normal conditions the deployed commander's organic systems provide him with an immediate I&W capability that also supports the national intelligence I&W requirements. In the case of Bosnia, EUCOM is a mature, forward-deployed command with all of these key elements of the greater intelligence community structure in place.[19]

The situation in Bosnia posed a special intelligence problem. The U.S. forces deployed as part of a multinational division, and they performed their mission in a high-threat, limited-force-authorized environment. Because of this constraint U.S. forces required intelligence on all movement by potential hostile elements in the U.S. sector and on potential terrorism and civil disorder activities.[20] Low-level targets, such as potential

civil disorder and terrorism, demand a significant amount of detailed intelligence so that individuals and entities can be tracked. This situation also dictated a need for greater scope and detail in the intelligence effort in order to define the stability of Bosnian Federation parties, produce predictive intelligence on the Bosnian elections, monitor political issues concerning the former warring factions, and monitor for the possibility of tampering with mass grave sites identified by the International Crime Tribunal for the Former Yugoslavia.[21] Force size limitations had reduced the amount of organic intelligence resources that we were able to deploy with the division. These combined factors of detailed intelligence needs and limited in-country assets led to the conclusion that there was an immediate need to rely on national intelligence systems to provide as much of the required collection as possible to compensate for the absent organic capability. Part of the solution was to deploy a large part of the V Corps intelligence support structure forward in Hungary. This forward element was able to supplement and help orchestrate collection on behalf of the division in Bosnia, even though V Corps was not part of the IFOR deployment.[22] Despite this focused need for national-systems support, EUCOM and V Corps still had no more influence on the collection requirements driving these systems than they had before the deployment. This problem would become apparent more than once before the IFOR operation made the transition to the stabilization force (SFOR) mission. 1AD had to rely on this difficult marriage of limited organic systems and the use of available augmenting national-systems in the region throughout Operation JOINT ENDEAVOR.

Intelligence Support to 1AD

In the months immediately prior to the deployment of IFOR, U.S. national-systems SIGINT had focused on identifying and tracking the command and control nets, the air defense networks, and the logistics structure supporting the Serbian-backed Bosnian Serbs, the Croatians, and the Bosnian Muslims as they struggled for control of Bosnia. Much of the national-systems access to the communications and air defense structures was lost when these structures were destroyed or intimidated into silence during NATO sanctioned air strikes conducted in May and August of 1995.[23] These strikes were conducted to enforce the cease-fire and encourage real participation in the negotiations which led to the Dayton Peace Accords.[24] The loss of access to many of these intelligence sources created a difficult problem for continued monitoring of compliance by the former belligerent parties in the Dayton Peace Accords. It was still more difficult to establish reliable access and build a database for the terrorist elements and civil police forces. These were non-military elements who could exert a far wider impact on the local stability which IFOR was supposed to establish. These local influences, at a lower level of intensity than the belligerent military forces, could quickly precipitate hostile action along friendly lines of communication (LOCs) or at control points or check points. Therefore they posed a prominent threat to the IFOR and U.S. forces in Bosnia. The principal focus of intelligence collection and analysis during Operation JOINT ENDEAVOR was to provide the COMIFOR and the 1AD commander with an accurate picture of Serb, Croat and Muslim intentions and capabilities. It was also focused to monitor their compliance with the Dayton Peace Accords.[25] To do this monitoring, the theater-level intelligence structure

had to rely extensively on national-systems intelligence. The 1AD commander had determined that it would be important to have his limited organic intelligence resources in country early. Once 1AD's low-level, organic, division intelligence assets were arrived, no additional military intelligence personnel would be deployed in-country to collect and process intelligence, since the commander was limited to a specific overall force size.[26] While the theater intelligence resources, deployed forward with V Corps in Hungary, provided some augmenting coverage, there were still gaps in their ability to meet the overall collection strategy necessary to support 1AD. To overcome this limitation, theater and national systems were devised that permitted remote access to threat communications. These communications were then collected and sent to monitoring sites in southern Germany and the continental U.S.[27] In addition to this, national system coverage was optimized to provide best access of the Bosnian area of responsibility (AOR). To provide the most timely possible access to the national systems intelligence, DIA established national intelligence support teams (NISTs) supporting the COMIFOR and the Commander of the Allied Command Europe's Rapid Reaction Corps (ARRC) in Sarajevo, and at the 1AD headquarters in Tuzla. A NIST is an ad hoc organization composed of representatives from national agencies and departments to provide direct support intelligence collection planning and to coordinate requests for information (RFI) between the theater and DIA.[28] The NIST has self-contained satellite communication equipment (a stovepipe). This self-contained communications feature was developed to ensure national system connectivity even if the theater communications become saturated with operational and other non-intelligence traffic. This link has proved critical in the past,

often providing the only dedicated communication link among intelligence staff components and the national intelligence community. NSA increased its operational support to the deployed military forces as well as stepping up its support to national decision makers. NSA participated at the NISTs and established a number of special handling and evaluation detachments (SHEDs) to assist in collection management and coordination of SIGINT support for the military organizations in theater.

An Assessment of National Systems Support to 1AD Using JCS Publication 2-0 Criteria

How well did the national systems supported the theater and 1AD intelligence requirements? The following results were determined using the principles of intelligence quality found in JCS Publication 2-0 to assess the quality of national systems SIGINT support to the U.S. forces in the IFOR.

Timeliness. With the deployment of organic division all-source analysis (ASAS) equipment, and a NIST to directly support the U.S. forces in Tuzla, some national-systems SIGINT reached the commander or his staff as quickly as was possible. It was usually in time for them to use it effectively. The timeliness of the information was frequently three to five minutes in getting from a national site to the division analysis control element (ACE). This timeliness was unique to information that was either very organized such as air defense related ELINT and formatted tracking data or fairly fixed such as high capacity communications systems transmitter locations and net structure. Most of it was reported over the existing broadcast dissemination systems (Tactical Information Broadcast System TIBS, TRAP Data Dissemination System TDDS). This timely intelligence was critical in

preventing many surprises along the friendly LOCs. It was instrumental in rapid response by the command to changing conditions at the weapons storage sites.[29] It was also unique in providing the tactical commander ample lead time to counter plans by radical factions to create civil disorder. In this situation, national-systems intelligence was essential for the division and corps commanders to permit them to focus their resources. It aided the national systems planners in directing and cueing of collection resources and sensor systems to better track threats. While in some cases there had not been enough time for the information to be analyzed for its significance and accuracy by human analysts, it was released into the broadcast systems anyway. The process to allow rapid release of combat information from the national systems was derived from our experience in DESERT STORM.[30] The national-systems capability to deliver timely intelligence in Bosnia was also determined by the enhanced capability and understanding of the 1AD commander's intelligence officer, augmented by the national intelligence support team. With the NIST immediately available, the intelligence and operations staffs were able to express the specific need and the appropriate amount of lead time necessary for the desired intelligence to reach the commander in time.[31]

However, in critical situations the system generally failed to deliver timely communications intelligence derived from the internal content of communications. This failure resulted from the analysis and reporting organization at the national-systems sites being structured to produce intelligence for national decision makers. The necessary reporting process to ensure more timely delivery of the information to a tactical commander was simply added to or applied over the existing process. Initially there was

no way for the national systems intelligence producer to effectively highlight the more important or critical data or ensure its rapid delivery.[32]

Objectivity. Remembering that objective intelligence is free of political, personal or situational bias, the national-systems SIGINT was always wholly objective. However, since IFOR was a NATO structure and the IFOR had sixteen nations participating, intelligence products occasionally took on a political spin.[33] A commander's battle space awareness must be as thorough as possible. Intelligence must depict the current situation as accurately and as thoroughly as possible at all times. Accurate situation portrayal is directly dependent on objective intelligence.

Usability. Only some of the intelligence produced by the national systems was easily usable by the tactical commander. The form in which intelligence is delivered to a user needs to be tailored to their capability to display or access it. Information that was formatted and passed over the existing intelligence broadcasts could be said to have been usable. It did not require further analysis or manipulation in order for it to be used or applied by the systems available at the division level. This was almost exclusively non-communications intelligence that was passed over the broadcast networks. Communications intelligence from the national systems needed to be better packaged before reporting and dissemination so that it could have met the immediate needs of the intended user and minimized the need for special handling prior to application.[34]

Completeness. With the exception of some of the information later produced under compromise situations, the intelligence provided by the national systems was complete. When national systems are used to fill gaps in a commander's ability to collect

with organic capability, there must be a premium placed on his access to those systems. As the situation in Bosnia wore on it became apparent that U.S. forces would continue to need access to the wide variety of national-systems resources that had been focused on Bosnia. The demand on the national systems by other agencies began to create compromises in access. To permit this sharing, or compromised use, the system's capability to fill the tactical command's intelligence gaps was also compromised. National-systems intelligence was able to fill a unique niche in relation to the supported commander's mission, responsibilities and objectives. It enabled him to gain a direct advantage over the enemy he was facing. Because of the absolute volume and breadth of information being provided to the 1AD commander, his initiative and flexibility in dealing with the belligerent forces were certainly more complete than the threat's.[35]

Accuracy. Substantially all of the intelligence delivered from national systems was accurate, no information was found to the contrary. Though there is some evidence that some unspecified national intelligence agencies had released some uncorroborated data which ended up having to be retracted, this was not the case with the national-systems SIGINT.[36]

Relevance. National-systems intelligence certainly contributed a unique element to the 1AD commander's battle space awareness and his understanding of the threat's intentions. Though it did not always meet all the desired criteria, it did enable predictive analysis to support 1AD in conceiving, planning, executing and evaluating their operations. The greatest downfall or weakness in the national systems produced signals

intelligence was in the lack of timeliness in providing communications related intelligence.[37]

Some of the more memorable intelligence coups of this period were derived from national systems SIGINT. However, they were attributable more to the development of relevant information over an extended period of time rather than from timely, rapid reporting of intelligence for immediate use by the tactical commander. Timely reporting of national-systems communications intelligence was then, and remains now, unreliable and slow.

Operation DESERT CAPTURE

Conducted in March and April of 1994, eighteen months before U.S. troops deployed in Operation JOINT ENDEAVOR, Operation DESERT CAPTURE II was an exercise specifically designed to demonstrate that state-of-the-art automated intelligence systems could support tactical warfighters and have a dramatic effect on the battlefield.[38] The need for this exercise grew from the fact that during DESERT STORM much of the intelligence system that supported U.S. forces had been provided by means other than what was available in the fielded Army inventory or covered in doctrine at the time. The Tofflers, in their book *War and Anti-War*, captured the impact of these nondoctrinal intelligence operations during this desert war in quoting a statement by retired Colonel Alan Campen:

> The computer-driven network that fed all-source intelligence to U.S. troops about to plunge across the Saudi Arabian border on February 21, 1991, did not even exist on that day, barely six months earlier, when Iraq invaded Kuwait. It was improvised... by a group of innovators who discovered how to bend the rules,

end-run the bureaucracy, and exploit off-the-shelf hardware and software to get the job done, promptly.

At the tactical level ODC-II involved the 3d brigade of the 24th Infantry Division (24 ID) at the National Training Center (NTC). Supporting this fight was the 24 ID's division intelligence operations (an ACE minus) at the Battle Command Battle Lab at Ft. Huachuca, Arizona, backed by the XVIII Airborne Corps Deployable Intelligence Support Element (DISE). As a third element, the Army Training and Doctrine Command (TRADOC) battle labs observed systems architecture performance. ODC-II included joint operations with national, Air Force, Navy, and Army intelligence sensor and processor systems and communications networks. Through this architecture the fighting brigade received top-down intelligence from multiple national and theater sensors using a combination of broadcast data and database pulls. The exercise tested the theory that the entire intelligence systems architecture, operating in a split-based mode, could be driven, focused, and used by and for the commander.[39]

ODC-II supported Operation DESERT HAMMER which was an advanced warfighting experiment (AWE) to exercise battlefield synchronization. The emphasis of ODC-II was to evaluate the ability of division and above to support warfighters at the brigade and battalion task force levels. The idea was to synchronize real-time data from friendly force equipment with merged all-source intelligence data from the division and tactical reports from the fighting brigade's organic assets. The friendly situation was then integrated into the common picture of threat and friendly force disposition and fed to the brigade and battalion task forces. The main object was for the brigade commander to be

able to pull intelligence and situation on demand from higher echelons, while on the move.[40]

Intelligence to Support the Deployed Brigade Commander

The 24th ID ACE operated out of Ft. Huachuca using ASAS equipment provided by the Battle Command Battle Labs in a joint government-industry cooperative effort. They had the Enhanced Ground Station Module (EGSM) to capture and pre-process broadcast intelligence, six ASAS terminals to perform analysis and fusion of received intelligence, and a TROJAN special purpose integrated remote terminal (SPIRIT) system to provide robust, reliable communications. The ACE received intelligence from division-level collectors and from collectors at echelons above division (EAD). Most of the EAD assets were down-linked to the XVIII Corps DISE. These systems included the U-2, GUARDRAIL, the P-3 Orion and other national systems. The ACE also received broadcast intelligence from RIVET JOINT and other national non-communications electronic intelligence (ELINT) collection systems through the EGSM.[41]

The division ACE's most important objective was to focus theater and national intelligence resources in support of the brigade tactical warfighter. They found that the weak link from their perspective was the system developed by the Army specifically to do that, ASAS. The automation of the top-down feed from the available sensors worked as well as was expected. However, due to security protocols and other similar problems, most databases were not able to transfer from the ASAS Warrior workstations handling the inputs to the ASAS collateral enclave workstations which were to make the data

available to the warfighters.[42] The ACE managers also found that reliable communications are critical when working with top-down intelligence automation. The outages that are normally associated with the mobile subscriber equipment (MSE) communications significantly disrupt the flow of this bulk digital intelligence data. The ACE, the corps DISE, and the Intelligence Center Synchronization Cell were able to successfully focus the sensors and assets at echelons above division (EAD), but synchronization proved to be a real challenge. The brigade planning cycle was frequently shorter that the tasking lead time required for these sensors. This highlighted the need for division-level planning by the ACE, or ACE involvement in brigade-level planning if in a force projection scenario or joint task force scenario. The exercise proved the importance of identifying clear, specific priority intelligence requirements early in the planning cycle.[43]

Supporting the ACE, XVIII Corps activated the division G2 intelligence portion of the corps assault command post with an attached DISE and deployed them to the NTC at Ft. Irwin. The corps MI brigade deployed equipment that permitted them to link to various national systems through a local area network established via their TROJAN SPIRIT communications system. The equipment and communications available to the DISE allowed them to pull data from virtually all the national level agencies, fuse this data into a product for the 24th ID commander and his ACE, and then pass it on through ASAS.[44]

The perceived value of the ACE and ASAS within the tactical force is quite substantial. In the Spring of 1994, a month or two prior to 24th ID's participation in ODC-II, the 82d Airborne Division commander, Major General Steele, expressed his

sentiments about the future and value of ASAS and the ACE in providing an unprecedented level of intelligence support for his decision-making needs:

> I have witnessed a revolution in intelligence support since the transition to ACE and ASAS....After four months, it is apparent that ACE is long overdue and is the key to tactical fusion and a truly seamless intelligence architecture. The concept is a reality in the 82d and we are not looking back, only ahead to realizing ACE's full potential.... Congratulations to the intelligence community's quiet but powerful revolution--ACE and ASAS.[45]

An Assessment of National Systems Support to ODC-II Using JCS Publication 2-0 Criteria

How well did the national systems supported the brigade's tactical intelligence requirements? Again, using the principles of intelligence quality found In JCS Publication 2-0, resulted in the following:

Timeliness. The intelligence available to the brigade was critical in preventing surprise, enabling efficient application of forces to take objectives, conducting an effective defense, and in seizing the initiative. Timely intelligence from national systems, while it might have been essential for the brigade and division commander's directing and cueing of their organic collection resources and sensor systems to track threats, was difficult to make accessible to the brigade.[46] In this case the security principle of separate enclaves for different security requirements directly conflicts with the principle of timely accurate intelligence. To ensure intelligence from national systems is timely, it normally has not had time to be analyzed for its significance and accuracy by human analysts. In this case it was available, but was not distributable due to security protocols. The commander's need for information at a specified moment in the decision-making process must drive the

capabilities of the systems that support him. The corps DISE and the ACE were able to express an appropriate amount of lead time necessary for the intelligence to reach the commander in time. The manner in which the intelligence was delivered, coupled with security constraints of the ASAS, caused the distribution to miss the commander's need for timeliness.[47]

Objectivity. There were no indications of the intelligence being skewed by political, personal or situational bias. Still, the commanders' battle space awareness must be as thorough as possible. The intelligence which could have depicted a much more timely and up-to-date current situation was available at the division ACE, but was undeliverable due to security constraints.

Usability. In this area, the national systems and even the other EAD systems were weak. The form in which intelligence is delivered to a user needs to be tailored to their capability to display, access or distribute it. The intelligence from these systems was delivered to the DISE and ACE requiring further analysis or manipulation in order for it to be used or applied.[48] Then, due to security constraints, it had to be purged of information which was too sensitive for release below the division ACE enclave, downloaded to a disk, and then uploaded in another terminal to allow it to be disseminated.[49] In this case, sanitization and packaging for reporting and dissemination should be done at the producing end so that it meets the needs of intended users and minimizes the need for special handling prior to application.

Completeness. The ACE and DISE chiefs described the intelligence as having supported the brigade commander's mission, responsibilities and objectives.[50] His

initiative, flexibility, and surprise were all as complete as possible and were more complete than the opposing force's (OPFOR).

Accuracy. The brigade described the intelligence they received as factual, answering the specific requirements it had been gathered to resolve.

Relevance. Based on the dynamic involvement of the DISE and ACE, the intelligence gathered from national systems effectively contributed to the brigade commander's battle space awareness and his understanding of the OPFOR's intentions.[51] Despite the problems associated with security protocols, the derived intelligence did enable predictive analysis that supported the commander in conceiving, planning, executing and evaluating operations.

While ODC-II was considered a success, it also indicated several actions needed to continue the improvement of access to theater and national intelligence. It demonstrated that the MI Corps was able to support the tactical warfighter at division with timely, tailored intelligence from national systems, but that there were still problems with disseminating it further.[52] The Battle Labs found that we need to continue to develop a pull-down capability for intelligence, thereby linking national and theater intelligence systems to brigade and battalion warfighters.[53] Major General John Stewart pointed out that:

> The first major insight gained from ODC-II was that we must train the commander on the whole of the intelligence system if we expect him to drive the intelligence effort. We cannot wait until a conflict arises, then tell the infantry brigade commander, "OK, now direct the use of all available intelligence systems from tactical to national." Unless we have trained the commander on the entirety of the system, he will be unable to drive the system.[54]

This dilemma indicates that a change is needed in the way the Army trains commanders and also indicates that more training of his whole staff is also necessary if they are to support him in using the whole intelligence system, not just his own organic assets.

Analysis of Recent Signals Intelligence Systems Developments

The national-systems SIGINT dissemination systems referred to thus far provide broadcast or direct access to national-systems intelligence. The means to access these systems were developed by the Army Space Program Office (ASPO) and the TENCAP program. In the past, tactical commanders without a TENCAP asset had to have national-systems intelligence "pushed" down to them. With an attached or organic TENCAP asset these commanders can now "pull" the data they require, when needed, from either the existing intelligence broadcasts or from a national database over a number of different communications links.[55] All of these Army TENCAP systems are capable of fairly robust communications via the TROJAN SPIRIT, Army mobile subscriber equipment (MSE), satellite communications (SATCOM), and the automated digital information network (AUTODIN). The TENCAP systems act as pre-processors for the ASAS and use the TENCAP Communications System Processor (CSP) to link with the ASAS. The planned future of these systems is for them to migrate into one Tactical Exploitation System (TES) for preprocessing and interoperability with ASAS. This future system is expected to offer the ability to push and pull databases, files, and intelligence products between ASAS and the national intelligence producers. Pushing data means that the producer actually provides his intelligence to the consumer with little effort on the consumer's part, such as in a

broadcast. Pulling data means that the consumer must actively reach out and access the data from a central database and set up periodic queries to update his own databases. This capability is already available, in part, through such systems as the Joint Deployable Intelligence Support System (JDISS) and the intelligence community's internet, INTELINK. The intent of TES is to greatly reduce the time required to acquire, process, and analyze information, then fuse it with other intelligence and be able to present it to the commander as a common picture of the battle space.[56]

Among the current SIGINT related TENCAP systems are the electronic processing and dissemination system (EPDS) and the enhanced tactical user's terminal (ETUT). The EPDS provides the commander with access to data from several national, theater and corps SIGINT sensors. It can produce tailored automatic intelligence reports, electronic order of battle (EOB) updates and dynamic database processing and reporting. The ETUT processes IMINT, SIGINT data and intelligence received from other TENCAP systems. It provides security sanitization of the data it receives and provides tailored reporting to the command it is supporting. It can produce intelligence reports, annotated imagery, and targeting data. The ETUT has been augmented by or is being replaced by the HMMV mounted mobile integrated tactical terminal (MITT) and the man transportable forward area support terminal (FAST). The key to these TENCAP systems is that they access data that is either available in a broadcast or has been made available via a direct down-link from the producing national-system sensor. The majority of the intelligence available from these TENCAP systems is either ELINT or non-

communications SIGINT. These types of SIGINT lend themselves more easily to limited automated analysis and to data formatting before transmission.[57]

The ASPO and the TENCAP program plan several future initiatives to improve national-systems intelligence access. These include the TES, mentioned earlier, the Graphic Situation Display (GSD) software, automatic and assisted target recognition (ATR) processors, and the Advanced EPDS (AEPDS). TES will combine the capabilities of the AEPDS and the TENCAP imagery processors into a modular, scaleable and tailorable package that is rapidly deployable. The TES is intended to operate well behind the initial entry force in an operation. It will support split-based operations, provide continuous updates while the force is moving, conduct detailed analysis of intelligence collected, maintain its own master database, and gather and host intelligence on other contingency areas. The GSD is intended to standardize graphic information displays. The purpose of standardizing the displays is to improve the speed with which an analyst can interpret data and produce a report. It will also make the information "readable" by other intelligence systems and layer the details associated with the displayed icons, embedding them in the display. The ATR processors are planned to enhance an analyst's ability in performing initial target detection, allowing the analyst to confirm, deny or modify the processor's assessment. The AEPDS combines the functions of the EPDS and the ETUT in a single down-sized system.

As explained before, the Army TENCAP program has produced a wide variety of means to access the existing intelligence dissemination systems at the national level. Despite these ongoing efforts, in their own information brochure and briefing they indicate

that they have not been focused on pursuing standardization of the reporting formats or broadcast systems to which they have provided access. One reason for this is that there is already a national-level organization chartered to orchestrate tailored national-systems support within DOD, the Operational Support Office (OSO). Another reason why ASPO and the TENCAP program have not pursued standardization is that there are significant roadblocks to solving this problem. The two most prominent impediments are security and prioritization. Most prospective tactical users do not have the required security permissions and controls to be given direct access to national-systems intelligence. This situation also creates problems in educating these important consumers in how and when they can apply these capabilities to their operations. Military intelligence professionals in DOD have not yet fully agreed on TENCAP doctrine and direction. When they do, DOD will have to give national-systems training and familiarization on a much broader scope and to much lower levels than it has been taken in the past.[58]

Another area projected for improvement is the area of broadcast technology. The system being developed to supersede existing systems is called the Intelligence Broadcast Service (IBS). In response to guidance from the House Permanent Select Committee on Intelligence (HPSCI), the DOD has developed a plan that integrates the various intelligence broadcasts and networks. The DOD plan is to migrate the system to a single data-broadcast message format, develop an integrated intelligence broadcast and dissemination architecture, and migrate users to a single related receiver family. It will merge such intelligence broadcast systems as the TDDS, TIBS, TRIX and TADIXS-B. Each of these currently uses a narrow-band, ultra-high-frequency broadcast to disseminate

national and theater intelligence across the battlefield.[59] The JCS J2 has staff proponency for this program and the executive agency was assigned to the Navy. Army staff proponency rests with the force development office of the deputy chief of staff for operations and plans, DAMO-FDI. A significant step in resolving the issue of so many broadcast systems was taken when a joint intelligence broadcast steering group was formed, replacing the individual steering groups for each of the current broadcast programs.

Summary of Findings in Terms of JCS Publication 2-0 Criteria

In order to synthesize what was found in reviewing the previous two operations and the associated current literature, the findings are summarized here in terms of the criteria used.

Timeliness, which has improved since the Operation Desert Storm era systems, still bears a lot of uncertainty. SIGINT with fixed parameters (ELINT and other non-communications SIGINT) is frequently able to reach the division or corps commander or his staff in time for them to use it effectively. This form of timely intelligence from national systems has been instrumental in the division and corps commander's directing and cueing of his organic collection resources and sensor systems to track threats. This type of information does not normally need time to be analyzed for its significance and accuracy and is therefore more easily broadcast soon after recognition. The national-systems capability to deliver timely SIGINT is directly affected by the capability and understanding of the division or corps commander's intelligence officer. The requesting officer must have

had sufficient training to permit him to express the appropriate amount of lead time necessary for the desired intelligence to reach his commander in time.

Communications-related intelligence remains a problem for national systems to generate and deliver in a timely manner for division and corps commanders due to structural "bottlenecks" in the reporting system. The effort demanded of national systems intelligence analysts to ensure only objective intelligence is released is part of the difficulty in delivering timely intelligence. The national systems have developed extensive routines for confirming the information they report. They have only been able to overcome those routines in specific situations where authority to downgrade or release certain types of reports has been given to the local producer of the intelligence.

Usability remains a very relevant issue, even in the context of current developments. The form in which most of the national-systems SIGINT is delivered to users is still constrained by the software and systems which is installed at the national systems sites. Work is underway to standardize the format of the data so that it conforms to the needs of the users to display or access it, but this work is far from complete. Systems such as the Army's ASAS have made great strides in processing the incoming data and standardizing it at the user end. But this data should not require further analysis or manipulation when received at the division or corps in order for it to be used or applied. The national systems need to ensure that the packaging for reporting and dissemination is done at the producing end in a form that meets the needs of intended users and which minimizes the need for handling prior to application.

The intelligence produced by the national systems has proved important in ensuring completeness. National-systems intelligence in both of the operations studied demonstrated value in relation to the supported commander's mission, responsibilities and objectives. It had a noticeable impact in enabling the supported commander to gain a direct advantage over the enemy he was facing.

Because of the volume and redundancy of the national-systems intelligence provided, the accuracy of this information was generally very high. For this reason, the intelligence was very highly regarded and valued when it was timely. The greatest downfall in national-systems intelligence was that it was unlikely to completely answer the specific questions it was being gathered to resolve because the requirements were too broadly written. Further, if the intelligence is tainted by a bias in collection, analysis, reporting, or dissemination, it can produce incomplete or inaccurate battle space awareness, leading to wrong decisions by the force commander. This type of bias was created during OJE when the decision was taken to compromise the use of the national systems between national and theater requirements. This compromise resulted in diminished access to targets of interest to the deployed commander and hence a decreased probability that the information he required would be collected or reported.

In most situations and environments national-systems intelligence is more than relevant. It provides access to the area of interest long before other systems are available. It is available to contribute to the tasked commander's battle space awareness and his understanding of the enemy's intentions before he has been mobilized and continues to contribute long after he has arrived in the area of operations. National-systems intelligence

has its greatest value in enabling predictive analysis to support a commander in conceiving, planning, executing and evaluating operations.

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CHAPTER 5

CONCLUSION

To ensure timely, rapid delivery of SIGINT from national systems to corps and division commanders the existing processing, handling, and dissemination systems must be simplified and standardized. To improve access to and dissemination of national-systems SIGINT for division and corps commanders three things must be done. First, the DOD and NSA must develop, implement and enforce a comprehensive set of standards for SIGINT data dissemination and then issue guidelines on how they are to implemented. Next, DOD and NSA must narrow the number of processes and communication paths for SIGINT dissemination to far fewer, more complete intelligence broadcasts. These broadcasts must deliver the original SIGINT source information and related intelligence information from multiple sources that has been merged into a single product. Finally, DOD and the Army must train more commanders and soldiers on the capabilities of the national systems and on how to state their information requirements in a manner that can be satisfied by those national systems.

As the Army continues to be reduced in strength, it becomes imperative that they make the greatest possible use of all the resources that remain available within the Department of Defense. This imperative extends to national intelligence systems as well as to battlefield operating systems. Risk on the battlefield is measured in what we do not know and what we are unable to accomplish. The risk involved in employing ground forces can be reduced by ensuring that our leaders and commanders know as much as is

technologically and humanly possible before making decisions or acting. The commanders tasked with leading U.S. forces in executing missions that implement our national security strategy must have the greatest possible situational awareness. The national-systems deficiencies met with during the analysis in this thesis fall into three main areas. There is a lack of guidance and standards from DOD on the format and means for dissemination of national-systems SIGINT. There are too many different systems for disseminating national-systems SIGINT. Intelligence personnel at division and corps are not well enough trained in what national-systems capabilities exist or in how to access them.

In researching and arriving at these conclusions, several related questions have had to be addressed. In defining whether national-systems SIGINT met the Joint Publication 2.0 criteria, it was necessary to first identify those elements of signals intelligence which are essential to division and corps warfighters for battle space awareness and for the conduct of tactical information operations. These elements were never simply listed in any of the resources that were reviewed, but they did become obvious through discussion of whether appropriate information was being delivered to division and corps commanders. These essential elements include the time at which the signal was intercepted, the type of system that generated the signal, the location from which the signal emanated and any order of battle information that could be associated with this particular source. In chapter four the systems that already exist to report these essential elements of SIGINT from national systems to division and corps were described and discussed. The communication means which exist to carry and deliver these national-systems intelligence reports to the intelligence elements at division and corps turned out to be an integral part of the

discussion and analysis of the systems used to process and report national-systems SIGINT. Chapter four also detailed how the Army intelligence system currently processes, handles, and fuses or merges with other intelligence sources the information conveyed in these essential elements of SIGINT. The last subordinate question actually turned out to have two parts. In identifying at what point in time and in what way the information finally gets delivered to the commanders at division and corps the discussion in chapter four uncovered several existing or planned systems that answered the question. An area for further study was suggested by the research on this topic also and it is briefly described at the end of this chapter.

For the national systems to contribute to a division or corps commander's situational awareness these systems must be able to deliver the intelligence that they produce quickly, accurately and in a form that the commanders can readily use. Historically the national systems have not been able to accomplish this on a consistent basis. The problems that prevented timely dissemination are rooted in the separate development paths taken by SIGINT dissemination from tactical and national systems. In the absence of a well-defined Department of Defense policy or coherent standards for development and integration, the past proliferation of processing and dissemination systems has lead to over 273 stovepiped systems.[1] Rapid changes in technology have caused the need for rapid changes in these dissemination systems. Customer demand for access to the SIGINT being produced by the national systems over time has caused specialized means for dissemination to be developed. This trend, if unchecked by DOD guidance, will continue to result in the creation of new, unique means to deliver this

intelligence. There are proprietary and political barriers to this problem being easily resolved. Each of the stovepiped systems represents a significant commercial contract that exists to produce and maintain the respective system. Also, these systems represent political capital for the agency, collection site or military service for whom the system was developed to serve because these systems provide logical access to a wider range of the DOD budgeted funds. In a politically driven environment such as budgets, where it is prudent to provide support to military operations, these stovepipe systems demonstrate the good intentions of the national-systems information provider to directly support U.S. military forces as they move into harms way. Until DOD establishes specific criteria for the development and standardization of these systems, the national-systems program offices will continue to create new and diverse means to rapidly meet customer demands.

Several broadcast systems have been developed which deliver some of the types of SIGINT produced by the national systems. The development and use of these systems have improved the timeliness of national-systems SIGINT dissemination. The most successful and useful of these systems were developed as a means to disseminate ELINT and the external parameters of COMINT. The fixed parameters of ELINT and other non-communications SIGINT make it possible to rapidly process and then disseminate the information quickly enough to reach the division or corps commander in time for them to use it effectively. These types of SIGINT are more easily processed for transmission through automated analysis and formatting of the data.[2] This form of national-systems intelligence is used by the division and corps commanders in maintaining an electronic order of battle and in directing and cueing their organic collection resources and sensor

systems to track threats. Such formatted SIGINT is also more easily added to the intelligence produced by the corps and division organic systems in order to further enhance the overall graphic situation display and the commander's situational awareness.

In the interest of improving and simplifying dissemination, the Army is developing a system to give much more ready national-systems access to the division and corps intelligence staffs. The Tactical Exploitation System is expected to offer the ability to push and pull databases, files, and intelligence products between national intelligence producers and the ASAS at division and corps. This improved access is already partially available through such systems as the JDISS and Intelink. These two wide-area intelligence networks have greatly reduced the time it takes to acquire, process, and analyze information from national systems. After some manipulation of the data, the analysts can then merge it with other intelligence and be able to present it to the commander as a common picture of the battle space.[3] The TES is designed to complement the concept of split-based intelligence operations pioneered in support of such operations as Joint Endeavor.[4] TES is intended to operate from a location well behind the initial entry force in a sanctuary location. It will provide continuous updates while the force is moving and is expected to conduct detailed analysis of all the intelligence collected, maintain its own master database, and to gather and host intelligence on other contingency areas.

Other current SIGINT related TENCAP systems, discussed in chapter four, already provide the commander with access to data from a variety of national, theater and corps SIGINT sensors. They produce tailored automatic intelligence reports, order of battle (OB) updates and dynamic database processing and reporting. Some even provide

security sanitization of the data they receive and provide tailored reporting to the command they support. The key to the capability and value of these TENCAP systems is that they access data already available in an intelligence broadcast or through a direct down-link from the producing national-systems sensor.[5] The ASPO, manager of the Army's TENCAP Program has several ongoing initiatives to improve national-systems intelligence access. These were also discussed in chapter four and, in addition to TES, included Graphic Situation Display (GSD) software, assisted/aided target recognition (ATR) processors, and the Advanced EPDS (AEPDS).

Until such systems as the TES are fielded, data usability remains a very relevant problem. Most of the intelligence produced by national systems is delivered to users in a format constrained by the software and hardware systems currently in use at the national-systems sites. Often, the SIGINT data format used at these national sites is unique to the systems, software and development contracts at each of the locations. These formats must be standardized so that they conform to the display and access needs of the users. Systems such as the Army's ASAS are able to receive and process much of the existing data and then reformat and standardize it at the user end.[6] This requires personnel and equipment that would be better used in other ways. The national-systems SIGINT data should not require further analysis or manipulation when received at the division or corps in order for it to be used or applied. Requiring such processing unnecessarily increases the burden on the user. The DOD must set format standards for the national systems to ensure uniform packaging for reporting and dissemination is done at the producing end that meets the needs of intended users and which decreases the need for handling prior to application.

The volume and redundancy of intelligence that the national systems are able to provide can produce accurate and reliable information that is of significant value to corps and division commanders. In most situations, national systems provide intelligence access to the commander's area of interest long before other systems are available. They contribute to the commander's battle space awareness and his understanding of the enemy's intentions before the commander's force has been mobilized. The national systems continue to contribute to the commander's situational awareness long after he has arrived in the area of operations and they provide him with continuous coverage even as he draws down his force presence and exits. One of the greatest values of national-systems intelligence is in enabling predictive analyses to support a commander in conceiving, planning, executing and evaluating operations. SIGINT will help get the commander inside the decision process of any threat to his forces. Reduced access to national-systems intelligence from corps or division intelligence elements as a result of too many diverse formats or too many reformatting steps before use is an unacceptable situation. For this reason DOD must decrease the variety of broadcasts and stovepiped systems. They must establish an acceptable set of rules and standards that make the SIGINT produced by national systems more accessible across all programs. DOD must then implement those standards on an aggressive schedule to ensure that current and near-future systems are all compatible.

Communications intelligence, derived from the internal content of threat transmissions, remains a problem for national systems to generate and deliver in a timely manner to division and corps commanders. The important raw communications

information must first be recognized by a collector or analyst as they search for a myriad of other requirements. The collector or analyst must then generate a report, have it reviewed for accuracy, and finally get it released for transmission and dissemination. The national-systems capability to deliver timely intelligence in this manner is also directly influenced by the level of skill and understanding of the division or corps commander's intelligence officer and staff. Former Assistant Secretary of Defense Mr. Donald Latham, in Congressional testimony during hearings on intelligence restructuring in 1991, stated:

> I believe a very important need for intelligence is closeness to the user... I am sure the feeling is even more acute for a military commander in combat, and it seems to me that the biggest need in terms of intelligence analytical capability for many, many tasks is for commanders in the field to be able to have people with them who can conduct dialogue with national offices that have expertise, so that analysis can be done quickly and catered to the commander's needs.[7]

The intelligence officer and staff who directly support the commander must understand all of the national-system resources and how to access their unique capabilities through requests for information. Currently, national-systems intelligence is unlikely to completely answer the division or corps commander's specific requirements it was being gathered to resolve. This is because the requirements are normally too broadly written by the time they have gone through the division and corps intelligence staffs. The level of training given to the division and corps intelligence staff officers does not normally include enough background in national-systems SIGINT. The requesting officer must have had sufficient training to permit him to define the information requirement in the correct detail and also to express the appropriate amount of lead time necessary for the desired intelligence to reach his commander in time. Without an increase in the quality of the training these

division and corps intelligence personnel receive, the volume and quality of the information the national systems can deliver cannot be fully realized.

To correct this serious deficiency in the training of commanders and their intelligence officers and staff, the Army must include more national-systems training in the curriculum at each level of formal schooling. This subject is treated as a very limited topic in military intelligence training. As an example of how little training is given on this topic, it constituted only four hours of the curriculum for the military intelligence officer advanced course (MIOAC) between 1989 and 1995. The core curriculum of the intelligence schools for military occupational specialty training, advanced individual training, basic and advanced non-commissioned officer courses, officer basic and advanced training courses must all include more training on the capabilities of these national systems. The curriculum at these schools must also better teach intelligence personnel how to articulate requirements for a commander so that they can be met by these same systems. For better training of commanders, the Army needs to add this vital subject to the common core curriculum at the Combined Arms Support Staff School (CAS3), the Command and General Staff College (CGSC) and the Army War College. The topic is only offered as an elective at CGSC, and within the time allotted instructors can only teach about fifty officers a limited range of information on the subject. The subject must also be better integrated into simulations and training scenarios used by both the schools and by Army units. National-systems intelligence is currently given extremely limited simulation in the exercises at CGSC and even less at the MIOAC. If the Army expects commanders to understand and use all the resources available to them, then the Army must better integrate

this subject into the common core schools where these commanders receive their training, before the assume command.[8]

In summary, to ensure timely, rapid delivery of SIGINT from national systems to corps and division commanders the existing processing, handling, and dissemination systems must be simplified and standardized. To improve access to national-systems SIGINT for division and corps commanders three things must be done. First, the DOD and NSA must develop, implement and enforce a comprehensive set of standards for SIGINT data dissemination and then issue guidelines on how they are to implemented. Next, DOD and NSA must narrow the number of processes and communication paths for SIGINT dissemination to far fewer, more complete intelligence broadcasts that deliver the original SIGINT source information and also intelligence information from multiple sources that has been merged into a single product. Finally, DOD and the Army must train more commanders and soldiers on the capabilities of the national systems and on how to state their information requirements in a manner that can be satisfied by those national systems.

Recommendations for further study

The following recommendations pertain to the intelligence problems identified in this thesis and merit further examination. They represent issues outside the scope of the thesis but are pertinent to the issue of national-systems support to the Army.

1. Forward deploying personnel experienced in managing and accessing the national systems as part of a NIST in direct support of corps and division commanders

provides a marked improvement in the support that commander receives. Since more of our operations are similar to Operation JOINT ENDEAVOR, serious consideration should be given to creating institutional elements at least at corps level with national-systems trained personnel permanently assigned. This would provide corps commanders with an immediate staff with experience in accessing and working with national-systems intelligence.

2. During times of crisis, national systems SIGINT collection and analysis capability with access to the affected CINC's area of interest should be at the disposal of the supported CINC. Most complaints of diminished value-added by these systems is due to a perceived or real lack of responsiveness of these systems to the deployed force's needs. The SIGINT architecture in the affected theater should respond directly to the needs of the deployed force through the responsible CINC. It should allow them to make their own intelligence "calls" without "second guessing" and without unadvertised compromises by the national intelligence community.

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[3] U.S. Department of Defense, *Communications Handbook for Intelligence Planners (U)*, 7-3.

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