Civil Information Management in Support of Counterinsurgency Operations: A Case for the Use of Geospatial Information Systems in Colombia

A Monograph

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14. ABSTRACT

Civil Information Management Systems (CIMS) allow commanders to build a Common Operational Picture (COP) upon which to base operational planning and execution. Geospatial Information Systems (GIS) are a type of CIMS. The military has underutilized GIS by traditionally using them as cartographic and imagery systems for military intelligence and maneuver support purposes.

This monograph provides a framework for evaluating GIS as a tool in counterinsurgency (COIN). Geography plays a crucial role in the Colombian internal conflict; this presents a unique opportunity to evaluate the capabilities that GIS offer in COIN. The nature of the current conflict or "Long War" requires effective engagement, coordination, and collaboration with interagency and international partners. The counterinsurgency effort in Colombia is an example of this environment, and this study concludes that the relevance of GIS in that context suggests their potential application in other counterinsurgency settings.

Based upon the above, two proposals are made; (1) further development and analysis of existing GIS data for Colombia, and (2) development and integration of a robust Civil Information based GIS capability within the U.S. Joint Forces supporting counterinsurgency efforts in Colombia and elsewhere.

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Abstract

CIVIL INFORMATION MANAGEMENT IN SUPPORT OF COUNTERINSURGENCY OPERATIONS: A CASE FOR THE USE OF GEOSPATIAL INFORMATION SYSTEMS IN COLOMBIA by MAJ José M. Madera, USAR, 81 pages.

Civil Information Management Systems (CIMS) are emerging as a resource which allows commanders to build a Common Operational Picture (COP) upon which to base their operational planning and execution. Geospatial Information Systems (GIS) are a type of CIMS. GIS have been underutilized by the military which traditionally uses geographic data as cartographic and imagery support for military intelligence and maneuver purposes.

This monograph provides a framework for determining the value of using GIS as a tool in counterinsurgency (COIN). Given the crucial role that geography plays in the Colombian internal conflict, this case presents a unique opportunity to evaluate the capabilities that GIS offer. Recent experience shows that, despite achieving a significant measure of success on the battlefield, the Armed Forces of the United States of America face continuing challenges in adapting to the requirements of a long term global struggle. The nature of the current conflict or "Long War" requires effective engagement, coordination, and collaboration with interagency and international partners. Counterinsurgency efforts in Colombia are an example of this environment, and this study concludes that the applicability of GIS in that context posits the desirability of applying these capabilities in other counterinsurgency settings.

Based upon the above, two proposals are made; (1) further developing and analyzing existing GIS data sets for Colombia by applying a Civil Information collection methodology and (2) developing and integrating a robust Civil Information based GIS capability within the U.S. Joint Forces supporting counterinsurgency efforts in Colombia and elsewhere.

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INTRODUCTION

Research Question

This monograph seeks to determine the potential value of using Geospatial Information Systems (GIS) to assist the Government of Colombia's counterinsurgency (COIN) efforts and thus provide a framework for determining the value of using GIS as a tool in other counterinsurgency settings.

Rationale and Relevance

This work is a continuation of an endeavor to develop further understanding of the potential of applying Civil Information Management Systems (CIMS) and GIS in support of military operations. It is motivated by the author's experiences as a civil military operations planner and knowledge management team leader assigned to the 350th Civil Affairs Command during Operation Iraqi Freedom 2 (OIF2). As part of that assignment, the author was involved in the development and implementation of the Civil Affairs Knowledge Management System (CAKMS). CAKMS is an advanced prototype civil information management and decision support system integrating GIS capability, developed to assist commanders in planning, execution, and assessment of civil military operations.

This effort began during the winter of 2003. In October of that year, prior to deployment in support of OIF2, BG Charles H. (Sandy) Davidson IV, then Commander of the 350th, became concerned with the pressing need to develop a civil military operations common operational picture in support of Coalition efforts in the Iraqi Theater of Operations. This concern resulted in his development of a conceptual framework for a civil affairs knowledge management system. CPT Michael Sullivan, a Civil Affairs officer and experienced computer programmer, developed the initial functional design. The design matured with the assistance of CPT (now MAJ) Gregory

Vialle, an Engineer officer whose experience during Operation Enduring Freedom (OEF) in Afghanistan informed the development effort.

The pre-deployment effort was informed by discussions with LTC (now COL) Michael Warmack, Commander of the 96th Civil Affairs Battalion, and members of his unit's GIS Team. U.S. Central Command (USCENTCOM) resources facilitated development and deployment efforts related to the system. Continued refinement of the CAKMS concept is ongoing, and includes recent work in Colombia and Pakistan to refine its conceptual design.[1] The challenges of attempting to develop and deploy the system in the Iraqi Theater of Operations, and subsequent review of its potential application in support of stability and reconstruction operations resulted in recognition that current U.S. Joint and Army doctrine, organizations, planning and operations could benefit from improvements to the existing approach towards managing civil information and applying the full potential of CIMS and GIS.

Without changes in the current approach, U.S. and Coalitions forces will continue to be hampered by less than optimal flow of civil information, limited integration and de-confliction of project data, and a critical lack of automated collection and database management of critical spatially-related information that could be leveraged for intelligence and civil military operations purposes. This is especially relevant given ongoing counterinsurgency efforts in support of OIF and OEF in the USCENTCOM Theater, and other locations in support of the Global War on Terror (GWOT). For these reason, a discussion of the potential for use of GIS in counterinsurgency is relevant.

[1] Space precludes an acknowledgement of the list of a multitude of military and civilian personnel who assisted this effort. Among the many that supported a groundbreaking effort to develop, deploy and implement a CIMS system while the Knowledge Management (KM) team responsible was already deployed forward; the following stand out: LTC Peggy Murray of USCENTCOM's J8, Mr. Matt Durkin of NAVAIR (Project Manager), the coding and management team in DPRA. Members of the 350th who played a role in the project include, but are not limited to MAJ J.C. Mitchell, LTC Rogers, CPT Charles Anthony, COL John S. Domenech, LTC (now COL) Mark McQueen, who supervised the CAKMS Team, and MAJ (now LTC) Robert Conforto.

Background

Current U.S. joint doctrine emphasizes the value of achieving information superiority, that is, "the operational advantage gained by the ability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same".[2] Closely associated to the notion of information superiority is a requirement for developing a common operational picture (COP) which affords commanders and their staff shared awareness and understanding. Although these concepts are closely associated with theoretical constructs such as Network Centric Warfare, the requirements they identify are not dependent on them. [3] The critical need for situational understanding was already clearly identified in Sun-Tzu's classic text *(Sūn Zǐ bīng-fǎ* [孫子兵法]) thousands of years ago:

> He who knows the enemy and himself
> Will never in a hundred battles be at risk;
> He who does not know the enemy but knows himself
> Will sometimes win and sometimes lose;
> He who knows neither the enemy nor himself
> Will be at risk in every battle.[4]

Geospatial Information Systems (GIS) are a type of Civil Information Management Systems (CIMS). The importance of CIMS in conflict and complex humanitarian emergencies is drawing increasing attention from the military and interagency community. Lessons learned from Afghanistan, Iraq, and recent disasters in Indonesia, Pakistan, and the United States point to the need to improve collaboration, integration and synchronization of civilian and military activities in response to conflict and natural disasters. As result of these experiences, and emerging

[2] Joint Publication 3-13, *Information Operations*. (Washington: Joint Chiefs of Staff, 13 February 2006), I-5, online at http://www.dtic.mil/doctrine/jel/new_pubs/jp3_13.pdf.

[3] See U.S. Department of Defense, *The Implementation of Network Centric Warfare* (Washington, D.C.: Office of Force Transformation, January 5, 2005), 24.

[4] Sun Tzu, *The Art of Warfare*. Roger T. James, trans. (New York: Ballantine Books. 1993), 113.

doctrinal emphasis on information dominance, Civil Information Management Systems are emerging doctrinally and practically as a required resource for commanders who need to effectively plan and execute operations by developing and referring to a Common Operational Picture.

GIS have been used effectively for decades in a variety of civilian settings such as law enforcement, natural resource management, corporate marketing, and public utility management. Historically, GIS have been underutilized by the military. The use of geographic data has been traditionally envisioned merely in terms of cartographic or imagery support for military intelligence and maneuver purposes.

Despite a widespread recognition of the critical role that geographic and human factors play in counterinsurgency, the current U.S. approach to counterinsurgency does not fully exploit existing technologies that allow for systematic collection, visualization and analysis of data related to these factors and their interrelationship. In light of this situation, it is worthwhile to examine how these technologies, known as Geospatial Information Systems (GIS), can be a valuable tool in dealing with insurgency. The application of these systems will require a rethinking of the existing doctrine and methodology regarding to the use of intelligence and civil military information in that context. Based upon this rethinking, a new approach for the collection, dissemination, and analysis of GIS data is proposed.

Despite achieving a significant measure of success on the battlefield, United States forces face continuing challenges in adapting to the requirements of counterinsurgency. The nature of the current conflict or “Long War” requires effective engagement, coordination, and collaboration with interagency and international partners. Counterinsurgency efforts in Colombia are an example of this environment, and this study concludes that the applicability of GIS in that context posits the desirability of applying these capabilities in other counterinsurgency settings.

Based upon the above, two proposals are made; (1) further developing and analyzing existing GIS data sets for Colombia by applying a civil information methodology and (2)

developing and integrating a robust GIS capability within the U.S. Joint Forces supporting counterinsurgency efforts there and elsewhere.

Methodology

The approach used in this work is the single case study methodology. The research line is supported by research of primary sources such as U.S. Department of Defense doctrinal publications, technical manuals, reference material, GIS industry reference texts, and Government of Colombia (GOC) and Illegal Armed Group (IAG) official documents. This line is strongly reinforced by preliminary analysis of a comprehensive unclassified database held by the Geospatial Information Systems Team of the Foreign Military Studies Office, Combined Arms Center, Ft. Leavenworth, Kansas.[5] The Colombia Violence Study database, prepared in collaboration with a number of government, non-governmental, private and public entities in Colombia, is a comprehensive geospatial information store that reflects over 15 years of geo-referenced data on: Illegal Armed Group (IAG) related incidents of violence, Improvised Explosive Device (IED) and landmine-related incidents, order of battle information for the GOC and IAG's in Colombia, among many other data points. In addition, the analysis effort is supported by a number of secondary sources such as scholarly writings on counterinsurgency and violence in Colombia

The research line proceeds by providing a general understanding of the nature of counterinsurgency, analyzing the nature of the internal conflict in Colombia, and exploring the role of certain human and psychosocial factors involved on the conflict. This discussion allows an objective assessment of the feasibility and utility of using GIS in the context of Colombia's counterinsurgency setting in a way that diverges from the traditional U.S. military's approach to

[5] Foreign Military Studies Office, *Colombia Violence Study*, Version 3.0 (Ft Leavenworth: FMSO GIS Team,25 February 2006). Grateful acknowledgement for invaluable ongoing technical support is given to CPT Patrick Rainier and his team. For access to the data, insights into the situation in Colombia and the critical role of geography in counterinsurgency *muchas gracias* to Dr. Geoffrey Demarest.

GIS. As a result of this assessment, this study posits the desirability of applying GIS capabilities in other counterinsurgency settings.

Limitations and Delimitations

This study recognizes that insurgency is a complex and multifaceted phenomenon. However, given the focus of the research questions, it will not delve deeply into the larger geopolitical, macroeconomic, cultural and psychological issues involved in this type of struggle but instead focus on the role of terrain and the interplay between its human and physical dimensions. This focus should not be taken to be a reductionist attempt to identify this interplay as the critical factor of insurgency in general, or the Colombian situation in particular.

In addition, an in depth discussion of the full potential application of GIS in a counterinsurgency setting would likely extend into techniques, tactics and procedures sensitive to exploitation by actual and potential adversaries. Along this same line, this study will not undertake a full analysis of the GIS data mentioned in this study or a too detailed discussion of its possible application in the case of Colombia due to space limitations and, more importantly, possible exploitation. In line with the methodology, the intent is to state and support a case for the general application of GIS in the counterinsurgency setting and a more detailed analysis will be left for further study and more in depth research.

The primary concern of the research effort is an evaluation of the role that Civil Information Systems (CIMS), more specifically, the subclass of CIMS that GIS represents. Therefore this monograph does not discuss in detail the emerging concepts of Civil Information beyond a contrast and comparison with traditional notions of intelligence. The discussion on counterinsurgency is not meant to be a comprehensive analysis of the historical and conceptual development of its related concepts. It is focused on providing a framework that allows for an understanding of the key role that the interaction between the physical and human factors of the environment.

Finally, this work aims to provide a broad view of the conflict in Colombia without seeking to offer a comprehensive analysis of its social, geopolitical, and historical roots or project its future course. Instead, this monograph focuses on the period from 1950 to the present with a view to identifying those factors that are relevant to assessing the efficacy of counterinsurgency efforts by the Government of Colombia (GOC). Once those factors are identified, they are used as the basis for a discussion on how GIS can enhance situational understanding of those factors and inform counterinsurgency planning and operations.

Summary

This section presents the primary research question of this monograph as determining the potential value of using Geospatial Information Systems to assist the Government of Colombia's counterinsurgency efforts and thus provide a framework for determining the value of using GIS as a tool in other counterinsurgency settings. After a discussion of the doctrinal and conceptual background that informs the project, it discusses the methodology, limits, and delimitations of the project. The following chapter provides a conceptual framework for understanding counterinsurgency and the critical role terrain plays in it.

CHAPTER TWO

INSURGENCY, COUNTERINSURGENCY AND THE TWO TERRAINS

War is God's way of teaching Americans geography.

Ambrose Bierce

Insurgency and Counterinsurgency- *Sui Generis* Warfare?[6]

Across the military community the current operational environment is forcing acknowledgement, or in some cases a rediscovery, of the importance of human factors in insurgency.[7] The experience of dealing with insurgencies is not new to U.S. forces. The historical analyses of authors such as Max Boot, Ivan Musicant, and John Nagl show this; yet the situation faced by U.S. and Coalition forces in support of the governments of Iraq, Afghanistan, the Philippines, and Colombia, among others, has given a renewed urgency to the study and practice of this kind of war.[8] The counterinsurgency canon is unanimous in its recognition of the importance of human factors as one of the major points of contrast between conventional and unconventional warfare. David Galula, whose work serves as the *locus clasicus* of modern counterinsurgency theory, summarizes this view when he identifies the population as the "new

[6] An earlier version of this section was submitted to the 2006 Combined Arms Center Commanding General's Essay competition.

[7] As unconventional warfare intelligence expert and former operator Wade Y. Ishimoto, CPT (Ret.) USA, recently remarked; many of the lessons the U.S. Army is "discovering" about counterinsurgency are part of the institutional memory of Special Operations Forces (SOF) that were codified during the early days of the Special Warfare Center and School, and the SOF community. Source: Rylander Award 2006 acceptance speech by Mr. Ishimoto, National Defense Industrial Association SO/LIC Conference, Washington, DC (March 14, 2006).

[8] See Max Boot, The Savage Wars of Peace: Small Wars and the Rise of American Power (New York: Basic Books, 2000); Ivan Musicant, The Banana Wars: A History of United States Military Intervention in Latin America from the Spanish-American War to the Invasion of Panama (New York: MacMillan Publishing, 1990); Ivan Musicant, Empire by Default: The Spanish-American War and the Dawn of the American Century (New York: Henry Holt and Co., 1998); John A. Nagl, Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife (Westport: Praeger Publishers, 2002).

ground" that must be conquered by the insurgent.[9] The relevance of the human element as a key distinguishing factor of insurgency and counterinsurgency is undeniable. Joint doctrine defines an insurgency as "An organized movement aimed at the overthrow of a constituted government through use of subversion and armed conflict."[10] Echoing joint doctrine, the Army's latest document on counterinsurgency describes it as "those military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat insurgency."[11] Implicit in both of these is a recognition of human factors. The application of the SWEAT model by the First Cavalry Division in Baghdad, the use of civic action projects by Provincial Reconstruction Teams in Afghanistan, or the combined U.S./Partner Nation MEDRETES in Colombia are only some of the many examples of effective measures oriented to influencing this factor in insurgency situations. [12]

However, while Galula's insight is seminal and military thought cannot deny that the populace constitutes "key terrain" in counterinsurgency, there is a danger in moving too far in one conceptual direction. At times the emphasis on winning the minds and hearts has resulted in a lack of balance in an approach to understanding and fighting insurgencies.[13] This could be called the myth of counterinsurgency as *sui generis* warfare. This is a well entrenched and disseminated conception of insurgency in the professional military consciousness as kind of war so radically distinct from conventional warfare that it requires its own theory, a distinct set of principles of war, and a complete rethinking of conventional approaches which may include neglecting the

[9] David Galula, *Counterinsurgency Warfare: Theory and Practice* (New York: Frederick A. Praeger Publishers, 1964) 7.

[10] Joint Chiefs of Staff, Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms*. (Washington: Joint Chiefs of Staff, 31 August 2005) online at <http://www.dtic.mil/doctrine/jel/doddict/data/i/02683.html>.

[11] Headquarters, Department of the Army. Field Manual Interim 3-7.22, *Counterinsurgency Operations* (Ft. Leavenworth: Combined Arms Center, 1 October 2004), vi.

[12] MEDRETE stands for Medical Readiness Training Exercises. These engagements make extensive use of dental and medical teams in Humanitarian Civic Action.

[13] North American revolutionary leader John Adams first spoke of what we now refer to as "hearts and minds" when he wrote "The Revolution was in the minds and the hearts of the people."

traditional emphasis on territorial conquest and the related concept notion of seizing and holding key terrain.

Against any conception that gives primacy to either the human or physical terrain, it is more appropriate to recognize that effective counterinsurgent warfare requires a balanced recognition of the importance that both terrains—the physical and the human—have in this context. The complex nature of warfare in general and counterinsurgency in particular entails that a multitude of factors are involved in their emergence and development within a particular nation. These often include a range of external and internal geopolitical, economic, cultural, and psychological aspects that impact upon the rise, progress and eventual resolution of insurgencies. While an in depth analysis and evaluation of these is beyond the scope of this work; it is nevertheless critical to recognize that the influence of all these factors ultimately impinges upon a particular place and the particular people that inhabit that place. Despite the temptation to grant primacy of one over the other, there is no one element of terrain that is more important than the other. For the successful practice of counterinsurgency a choice between the human and physical domains is not possible. Instead, "terrain" must serve as shorthand for the interrelationship of both.

Human Factors and Linkage to Terrain

Human activity is inextricably tied to space. A sense of place is basic to understanding anything there is; witness Aristotle's inclusion of "place" in his *Categories*.[14] Place gives us a marker to remember, to understand and to describe human endeavors. Insurgency is no exception. Names such as Concord, Yán'ān, Bunker Hill, Điện Biên Phủ, Sierra Maestra, Saigon, Mindanao, Marquetalia, Tikrit, Kathmandu, and al Fallujah serve as shorthand for referring to and describing

[14] Aristotle, *Categories* 1b25.

past and ongoing insurgencies. Geography provides the backdrop against which the tragedy of insurgency and counterinsurgency runs its course, but it is human activity that constitutes the plot. Economic, social, cultural, historical and other interactions take place against the background of geography. For these and other practical reasons, it is critical to first *locate*; and then analyze, understand and synthesize the impact of human factors within the context of insurgency. All too often, the discussion of the impact of anthropological, historical, cultural and linguistic factors tends to ascribe an intangible and quasi-metaphysical aspect to them. In attempting to understand insurgencies, experts often speak of an "Arab Mind" or a "Latin American temperament" as if these are quintessential qualities somehow divorced from very objective realities of human beings living in a specific time and place. While this may be somewhat useful in a theoretical framework, it does not work well when practical understanding and action are concerned. Keeping this in mind, while it is necessary to acknowledge the utility of current use of terminology such as "human terrain" or "cultural terrain" in describing a vital factor in counterinsurgency; it is also necessary to stipulate that without a direct and explicit linkage to physical terrain this usage is empty of useful meaning.[15]

Physical Terrain and Linkage to Human Factors

To say that every military professional recognizes the need to obtain knowledge about terrain, and understand its impact upon military operations is almost banal. Practically, if not logically, the statement "terrain is important" amounts to a tactical tautology. This recognition is reflected in the earliest military theoretical texts. Sun Tzu, for example, observes:

[15] Ralph Peters is probably among the first to use the term "human terrain" in the context of a discussion of counterinsurgency. See Ralph Peters, "The Human Terrain of Urban Operations", *Parameters*. Vol. XXX, No. 1 (Carlisle: U.S. Army War College. Spring 2000), 1. The United States Marine Corps has adopted "cultural terrain" and affiliated terms comprising concepts similar to those captured by the "human terrain" expression. See for example the USMC Center for Advanced Operational Culture Learning Web site, online at <www.tecom.usmc.mil/caocl>.

When the commander receives his orders from the ruler, assembles his armies, and mobilizes the population for war, he should not make camp on difficult terrain, he should join with his allies on strategically vital intersections; he should not linger on cutoff terrain, he should have contingency plans on terrain vulnerable to ambush; and he should take the fight to the enemy on terrain from which there is no way out. There are roadways not to be traveled, armies not to be attacked, walled cities not to be assaulted, territory not to be contested…[16]

An astute commander will also recognize that the relevance of the human element is equal to that of the physical terrain. Nowhere is this more evident than in the context of insurgency. The intersection between the environment and the human dimension is a key element in the emergence and viability of insurgent activity. The relationship between physical, political, and psychological factors can be said to determine, to a large extent, the probability of an insurgency's success. From the perspective of the insurgent, the inescapable importance of this relationship is recognized by Ernesto "*Che*" Guevara, the patron saint of Latin American insurgencies, when he writes:

> When we analyze more fully the tactic of guerilla warfare, we will see that the guerrilla fighter needs to have a good knowledge of the surrounding countryside, the paths of entry and escape, the possibilities of speedy maneuver, good hiding places; naturally also, he must count on the support of the people.[17]

Guevara's statement is not simply a rewording of the tactical tautology that terrain matters, though it may include that concept. It is also an explicit theoretical identification of the necessary linkage between the physical environment and the populace's psycho-political terrain. For Guevara, this linkage is fundamental in determining the feasibility of revolutionary action.

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[16] Sun Tzu, *The Art of Warfare*, Roger T. James, trans. (New York: Ballantine Books. 1993), 135.

[17] Ernesto Guevara, *Guerrilla Warfare*, (Lincoln: University of Nebraska Press, 1998), 10-11. It is ironic that Che's failure was, at least partially, a result of his excessive reliance on geographical factors and costly misunderstanding of popular support conditions in Bolivia.

This same fact is equally recognized from the perspective of the counterinsurgent. Galula, for instance, notes that "The role of geography…may be overriding in a revolutionary war. If the insurgent, with his initial weakness, cannot get any help from geography, he may well be condemned to failure before he starts".[18] Among other factors, Galula recognizes the effect of geography and mentions location, size, configuration, borders, terrain, climate, population, and economics as determinant factors that influence and, in his view, may directly determine the success of an insurgency.[19] For his part, Bard O'Neill, Professor of National Security and Strategy and Director of Studies of Political Violence and Terrorism at the U.S. National War College, in developing his theoretical framework for analyzing insurgency writes "The first major criterion for evaluating an insurgency is the environment."[20] O'Neill's analysis then proceeds to differentiate between the physical and human environments as two dimensions of terrain whose understanding is critical for assessing the potential effectiveness an insurgency.[21] Thus, from both the perspective of the insurgent and the counterinsurgent, the role of terrain and its physical component is seen as critical, and their intersection is recognized as a fundamental aspect worthy of careful consideration.

Intersecting Terrains: The Ecology of Insurgency

It is O'Neill's use of the term "environment" which suggests an ecological approach. The logical synthesis of recognizing the intersection of both terrains is that effective counterinsurgency must equally weight the impact of the human and physical factors of the environment. To paraphrase Kant-- counterinsurgent warfare focusing on physical terrain without reference to human terrain is blind but counterinsurgent warfare focusing on human terrain without reference to physical terrain is mere empty intellectual play.

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[18] Galula, 35.

[19] O*p cit.* 35-38.

[20] Bard E. O'Neill, Insurgency & Terrorism: Inside Modern Revolutionary Warfare (Dulles: Brassey's Inc, 1990), 53.

[21] O'Neill, 53-67.

Ecology, as a branch the physical sciences, has as its subject matter the complex relationships between organisms and their environment. As a branch of the human sciences, specifically of sociology, it is concerned with understanding the relationship of humans to their physical environment. In ecology the practitioner seeks to achieve a holistic view and understanding of both physical and human phenomena. Using this concept in the context of warfare, what is needed to be successful in counterinsurgency is an ecological view that balances the impact of both the human and physical terrain upon the origin and development of conflict. Given this view, effective operational planning and execution in a counterinsurgency will require a means of apprehending the environment that explicitly recognizes the interconnectedness of both terrains. It will be based upon an approach that allows for facts about this linkage to be captured and conveyed in an informative, yet simple and elegant fashion. The use of Civil Information Systems and Geospatial Information Systems is proposed as a candidate for achieving this means of apprehension. These systems are explored in the following chapter.

CHAPTER THREE

CIVIL INFORMATION MANAGEMENT AND GEOSPATIAL INFORMATION SYSTEMS

Information Systems and Conflict

As military theorist Martin Van Creveld has observed, the historically increasing complexity of the operational environment has been matched by an increase in the sophistication of the various systems used by military commanders and their staffs to collect, analyze and synthesize information.[22] As the size of military formations, the scope and reach of command, and the complexity of operational design have increased, the organizational systems (such as staffs) and communications and related methods (couriers, telegraph, radio and now computers) involved have grown in complexity. This trend is evidenced in practice by the ubiquity of information technology currently applied to warfare, and in theory by the emerging construct of Network Centric Warfare (NCW), its attendant notion of information superiority and the related requirement for commanders and staffs to develop a Common Operational Picture (COP).[23]

The COP is defined in U.S. joint doctrine as "A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness."[24] The COP meets the requirements for information in support of the needs of commanders and planners in a variety of situations within the context of the entire spectrum of conflict. The COP supports doctrinal and practical requirements for situational understanding and battlespace visualization;

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[22] See Martin L. Van Creveld, *Command In War* (Cambridge: Harvard University Press, 1985).

[23] The use of the concept of the COP is not intended to imply an uncritical acceptance of NCW. Although an evaluation of this emerging theory of war is outside the scope of this work, it must be pointed out that there are a number of criticisms of its validity. See for example Douglas McGregor's critique of the concept of situational awareness in Douglas A. Macgregor, "Written Statement for the Record by Douglas A. Macgregor to The House Armed Services Committee" (Washington: DC, 15 July 2004 [D]), 1.

[24] DoD Dictionary, 1129. Online at <http://www.dtic.mil/doctrine/jel/doddict/data/c/01129.html>.

whether conducting major combat operations, small scale contingencies, or stability and reconstruction operations.

Current doctrine reflects classic military common sense when it clearly identifies the value of situational awareness and understanding in the operational context. This understanding underlies the Army's "Visualize, Describe, Direct" battle command construct, found in its primary doctrinal reference on military operations, and is the source of a requirement by commanders and their staffs to capture information related to civil matters:

Civil considerations relate to civilian populations, culture, organizations, and leaders within the AO. Commanders consider the natural environment, to include cultural sites, in all operations directly or indirectly affecting civilian populations. Commanders include civilian political, economic, and information matters as well as more immediate civilian activities and attitudes."[25]

Civil matters are an integral part of the COP that any commander must develop. These matters take on an added importance when their interrelationship with physical terrain is taken into account in the context of counterinsurgency.

Civil Information Management and Systems

Current Army doctrine recognizes the desirability of using automated systems "that achieve the purpose of cataloging and managing" information related to civil matters but is unclear regarding a distinction between data regarding civil matters, data disseminated in context of public affairs and command information programs, and information related to Civil Affairs and

[25] U.S. Army, Field Manual 3.0, *Operations* (Ft. Leavenworth: Combined Arms Center, July 2001), 5-5.

Civil Military Operations activities. [26] One proposed definition that more clearly defines *civil information*, states that it is:

> Raw data, gathered by or provided directly to military sensors in an organized system, with relations to persons, organizations, places, or things, within the civil component of the Commander's battlespace that can be fused or processed to increase DOD/ Interagency/ NGO/ IO/ IPI situational awareness, situational understanding or situational dominance.[27]

Directly related to the notion of civil information is the recognition of a requirement for managing it in order to leverage its utility. Again, emerging doctrine defines this process:

> Civil Information Management (CIM) is the process whereby civil information is collected, entered into a central database, and internally fused with the supported element, higher headquarters, other USG/DoD agencies, and international organizations and NGOs to ensure the timely availability of information for analysis and the widest possible dissemination of both the raw and analyzed civil information to military and non-military partners throughout the area of operations.[28]

As automation and information systems have increased in capability and availability, the means for obtaining, storing, and disseminating civil information have matured. While paper based staff journals, workbooks, card files and map overlays remain a viable (or sometimes the only) alternative in some environments; the availability of electronic means has increased and their use is evident even in austere tactical situations. Depending on available assets and

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[26] See U.S. Army, Field Manual 3-05.401, *Civil Affairs Tactics, Techniques, and Procedures* (Washington, DC: Headquarters Department of the Army, 23 September 2003), 5-28.

[27] Michael Warmack, *Civil Affairs Transformation Concept: INSCOM Brief (*Ft. Bragg: United States Army Civil Affairs and Psychological Operations Command (USACAPOC). 27 April 2005). 8. Note: this is DRAFT/PREDECISIONAL terminology. See the discussion below on emerging doctrine. Another proposed definition, which is more aligned with the Effects Based methodology and integrates the CASCOPE model (another emerging Civil Affairs/Civil Military Operations doctrinal concept) is: "Information developed from data with relation to civil Areas, Structures, Capabilities, Organizations, People, and Events within the civil components of the commander's battlespace that can be fused or processed to increase DoD/Interagency/IO/NGO/IPI situational awareness, situational understanding, or situational dominance." See LTC Marrs, "Fundamentals of Civil Information Management" (Fort Bragg: Civil Affairs/Civil Military Operations Directorate of Training and Doctrine, undated [D]), 29.

[28] U.S. Army, Field Manual 3-05.40, *Civil Affairs Operation,*. Author's Draft (Ft. Bragg: United States Army John F. Kennedy Special Warfare Center and School, March 2005), 5-26. Note: this is DRAFT/PREDECISIONAL terminology.

personnel skills, civil information is routinely captured and transmitted using word processing, presentation, spreadsheet and database management programs.

This variety of formats satisfies expediency and meets tactical level requirements. However it tends to become an obstacle for format standardization, data exchange, and analysis at higher levels. In addition, the reliance (or often requirement) for hardcopy production and archiving can become a major constraint on developing situational awareness about critical data concerning civil military operations. For instance, during OIF2, an attempt at the Multinational Forces level to develop a comprehensive overview of project management data, multi-source funding allocation, use, and administration in Iraq identified a minimum of 24 Coalition military, Non Governmental Organization, third-party nations, and provisional civil authority data sources. Among these disparate sources there was no standardized collection methodology, format, data sharing procedures, nor a common repository from which to develop this overview. In one instance, funding data occupied over 56 cabinets of hard copy data, at least 24 of which contained data on one single type of funding for projects.[29]

[29] Combined Joint Task Force 7 (CJTF-7) CJ9, "CMO Accountability Board: Mission Analysis" (UNCLASSIFED/DRAFT) (Baghdad: CJ9 Knowledge Management Team, 17 April 2004).

Another example of the lack of a standardized approach and supporting information system to capture, store, and disseminate civil information in the same Theater resulted in a similar situation:

> Civil Information was a problem for the Commander's Common Operating Picture (COP), for project finance decision-makers, for government support work, and in intelligence. In Baghdad, CA unites had inefficient tools and procedures in execution of government support and project management. A part of the problem is the inadequacy of software to facilitate common contact management processes…This information problem extended way beyond Civil Affairs. There was no [sic] Common Operating Picture (COP) of civil information across Civil Affairs, CPA Ministries, US Army Corps of Engineers, USAID, and Coalition Allies…The lack of COP is also felt at higher levels of the organization tasked with analysis and management of large-scale plans and programs. Oversight and management is nearly impossible without visibility and feed back on projects, events and actions at the lowest level.[30]

As a result of the potential complexity of information management for civil military operations, there is ongoing discussion in the Civil Affairs community regarding the need to design, develop, and implement automated management systems that will support the need for collection, fusion, analysis and dissemination of civil information. As emerging doctrine indicates, these Civil Information Management Systems (CIMS) provide commanders and staffs with the ability to capture, among other elements, information about the following: demographics, economics, social constructs, political processes, political leaders, civil-military relationships, infrastructure notes, non-state actors in the area of operations, civil defense, public safety and public health capabilities, the environment.[31] In short, CIMS capture the sort of information that paints a clear picture of the ecology of insurgency.

[30] After Action Report, 425th Civil Affairs Battalion, 21 December 2004. See Marrs, 16.
[31] Marrs, 11.

> ...the fundamental strategic and tactical problems are geographic.
> O'Sullivan & Miller[32]

Geospatial Information Systems

One clear requirement that has emerged from field experience, lessons learned from that experience, and reflection upon potential future requirements, is that these systems must integrate a Geospatial Information System (GIS) component. As a Civil Affairs transformation document drafted in 2004 describes, this is a common denominator in a number of:

> …ongoing CA Information Management initiatives taking place in Afghanistan, where the 364th CA BDE has constructed a GIS-based civil information management system; in Iraq, where the 350th CACOM is implementing its Civil Affairs Knowledge Management System (CAKMS); and in the U.S.A., where the 96th CA Battalion is constructing its Civil Affairs Geospatial Enterprise System (CAGES). All these efforts have in common a focus on constructing civil information databases, the use of GIS tools, and linking them with Geospatial referencing tools, such as GPS.[33]

GIS may be seen, not only as components of a CIMS, but as an instance of CIMS themselves. In order to understand this, a discussion of GIS and their capabilities is in order.

Geospatial information Systems (GIS) are not a new technology.[34] The concept of GIS is rooted in the geographic information systems that emerged during the early days of automation of information traditionally handled by the classic disciplines of cartography, geography, and, to some extent statistics.[35] In turn, the conceptual roots of spatial analysis were implicit in the very ideas that underlie mapping and cartography as disciplines oriented on the synthesis of complex

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[32] Patrick O'Sullivan and Jesse W. Miller Jr., *The Geography of Warfare* (New York: St Martin's Press, 1983), 7.

[33] COL Doug Nash, "Civil Affairs Information Management Strategy" (Washington, DC: Department of State Humanitarian Information Unit, 30 September 2004 [D]), 2.

[34] The use of "geospatial" is relatively recent. Traditionally in technical circles, these systems were know as "geographic information systems" For example see an early U.S. Government definition in Stephen Guptill, "A process for evaluating geographic information systems" (Denver: U.S. Geological Survey, 1988) Online <http://pubs.er.usgs.gov/pubs/ofr/ofr88105>.

[35] The term GIS can refer interchangeably to the *systems* used to capture store and convey geospatial information, the *science* that has as its object those systems, and the *study* of the milieu within which both are used. The first sense that is used in this paper; see Michael F. Goodchild, NCGIA Curriculum in Geographic Science Web site for a full discussion of this. Online <www.ngcia.uscv.edu/gisc/units/u2002>.

physical reality through visual representation. What distinguishes these systems from traditional cartographic and imagery is the element of embedded data. This in turn has roots in data maps, which as Edward Tufte, an influential theorist on the visual display of information remarks "…have a curious history. It was not until the seventeenth century that the combination of cartographic and statistical skills required to construct the data map came together, fully 5,000 years after the first geographic maps were drawn in clay tablets."[36]

Data maps allow for a quantum leap in what Tufte has called data density, a concept he defines as the ratio of the number of entries in a data matrix over the area of the data graphic. Data density is a measure of the amount of useful information that a visual representation presents to the user. Since maps intrinsically deliver a higher granularity of data than oral or written means, arguably they are the most powerful means of conveying complex information in an accessible way.[37] Ultimately, if the rationale behind CIMS is to provide a COP, they must not only have the ability to provide a centralized environment for data collection, storage and dissemination but also a means that will facilitate visual representation and analysis of this data, in order to ultimately support a synthesis of this data that yields situational understanding. GIS are a means to provide the sort of data maps that are, in many ways the most efficient means of conveying this understanding due to their power as a means of "efficient communication of complex quantitative ideas".[38]

Early application of the power implicit in data based mapping can be seen in the classic 1854 London Cholera epidemiological analysis of Doctor John Snow. An example of the power of combining visual and statistical information can be seen in a facsimile of Snow's map below.

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[36] Edward R.Tufte, *The Visual Display of Quantitative Information*, 2nd Edition (Cheshire, Connecticut: Graphic Press, 2001), 20.

[37] See Tufte, 162. According to him; "No other method for the display of statistical information is so powerful." *Op. cit.*, 26.

[38] *Ibid*, 15.

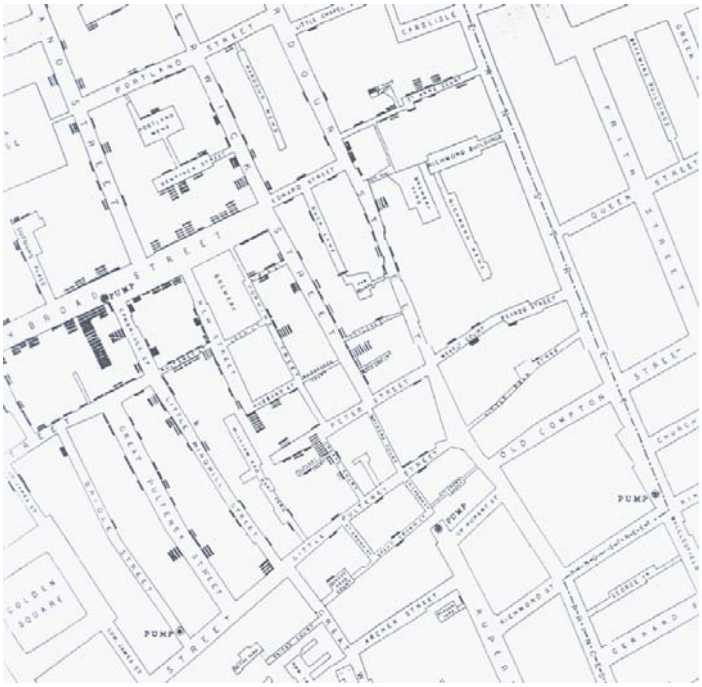

Figure 1- Dr. John Snow's Cholera Map[39]

Dr. Snow's graphic illustrated the location of buildings where cholera casualties occurred by means of parallel lines, and portrayed the density of casualties relative to the location of water pumps. Through the elegant use of graphics overlaid in a map, his work synthesized the relationship between disease vector sites (*e.g.* the infamous Broad street pump) and the spread of disease among the London population.[40] In addition to being the precursor of complex epidemiological studies and methodologies, Dr. Snow's effort can be seen as a forerunner of the sort of analysis and visual representation that is required for the development of a useful COP.

Another conceptual predecessor of the concepts behind contemporary GIS may be seen in Charles Booth's mapping of social and economic conditions in Victorian-era London.

[39] Scott Crosier, "John Snow: The London Cholera Epidemic of 1854" in Center for Spatially Integrated Social Science CSISS Classics Web site, online <http://www.csiss.org/classics/content/8>.

[40] See also Tufte, 24.

Figure 2 - Portion of George Booth's Map of Poverty in London

Booth's work in social cartography, which gave the English language the term "poverty line", used graphics to convey the complexity of human phenomena. [41] One element of GIS that is demonstrated by Booth's data map is the ability to provide a "snapshot" of multiple layers of data in one single graphical representation. The map shown in the figure above simultaneously illustrates information on political division, lines of communication, and socio-economic data for the population. The elegance of the means of presenting the information makes it accessible to the viewer, yet also conveys a sense for the density and complexity of the underlying data.[42]

In recent history, GIS evolved from early attempts to support automated graphic display of information, supported by file-based systems in the 1970's, through relational database management systems based systems in the 1980's, network-based products in the 1990's to the

[41] London School of Economics Library, "Charles Booth Online Archive: Booth Poverty Map & Modern map" Web site, online < http://booth.lse.ac.uk/cgi-bin/do.pl?sub=view_booth_and_barth&m.l=3&m.d.l=5&m.p.x=4282&m.p.y=7744&m.p.w=500&m.p.h=309&m.p.l=5&m.t.w=128&m.t.h=80&b.p.x=6381&b.p.y=10525&b.p.w=500&b.p.h=309&b.p.l=6&b.p.p.l=6&b.v.x=239&b.v.y=147>.

[42] The maps are supported by over three years of field research data. See London School of Economics site cited above.

current services-oriented products. Historically, GIS have been used in military settings along three general lines of application; military operations, intelligence, and installation management.[43]

Their application in these spheres has progressively advanced, yet it may be argued that the use of GIS in public and private sector settings on average outstripped military applications in terms of sophistication and pervasiveness.[44] For instance, the concept of GIS application in support of descriptive crime mapping and analysis dates back to 1967, it had become a reality by the 1990's and by the early 2000's was maturing into a rudimentary forecasting capability.[45]

While discussions and awareness of the strategic and public policy planning potential of leveraging GIS capabilities were prevalent in the academic community through the late 1980's and early 1990's; GIS literacy and awareness in the military has mostly been confined to the engineering, intelligence, aviation, and facilities management communities.[46] In the first three, especially, the focus has been on traditional perception and application oriented on the physical terrain, not the human terrain, or the intersection of the two. However, this is changing and there is a growing realization among decision makers and planners of the potential for their use in tactical through strategic contexts.

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[43] ESRI, "GIS for Defense and Intelligence" (New York: ESRI, 2005).

[44] This statement must be qualified by emphasizing that the focus of this work is on unclassified applications of GIS.

[45] See Arthur Gettis et al, "Geographic Information Science and Crime Analysis", URISA Journal, Col. 12, No. (Spring 2000), 14. For a popularized discussion of the state of the art and potential forecasting use see Wilpen Gorr, "Cloudy, With a Chance of Theft", *Wired*, Issue 11.09 (September 2003), online <www.wired,com/wired/archive/11/09/ciew.html>.

[46] For example, at the time, the educational experience at the School of Urban and Public Affairs (Now H. John Heinz III School of Public Policy & Management) included such topics for discussions as part of its Management Information Systems curriculum, including research opportunities at the graduate level in the development of these systems. In the aviation community, some GIS capabilities were available for aviation mission planning for high performance aircraft; but higher level technologies were not fielded evenly across the Services. Author's personal experience as a graduate student and military aviator during the mid 1980's trough mid 1990's.

> Intelligence is not merely cold hard data about numerical strength or armament or disposition of military forces. The most important element of intelligence has to be understanding the mindset and intention of the enemy.[47]
>
> Brigitte Gabriel, Middle East expert

Civil Information or Intelligence?

An excessive reliance on technology and a practical bias towards tangible knowledge of physical facts against interpretation of intangible factors may be said to be integral to current conceptions of the American Way of Way.[48] This explains, in part, the lack of emphasis in the U.S. defense intelligence establishment on gathering what can be described as 'soft' knowledge, an in-depth understanding of alien cultures, societies, religions and languages. This is the sort of knowledge that allows for the kind of understanding of an adversary's viewpoint that Gabriel identifies as so important.

Another possible source of this bias toward "hard" technical means and away from "soft" means may be a historical residue from the bipolar confrontation with the former Soviet Union. The closed nature of that society, physical and geographic conditions, and even political considerations created reliance on technical collection means to achieve an informational advantage. This created doctrinal, fiscal, and even conceptual patterns from which the intelligence community in particular and the national defense community at large are only recently beginning to deviate. These patterns informed a doctrinal framework that does not emphasize capture of the data that can develop into information about conditions that comprise the ecology of an insurgency.

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[47] Brigitte Gabriel, "Islam's March Against the West", remarks during speech delivered at the Intelligence Summit in Washington DC, Saturday February 18, 2006. Online <http://www.islamdaily.net/EN/Contents.aspx?AID=4087>.

[48] For an example of the negative implications of this bias, see a critique of current approaches such as Network Centric Warfare and their optimistic emphasis on technology in Antulio J. Echevarria II, U.S. Army, *Toward an American Way of War* (Carlisle Barracks, Pennsylvania: Strategic Studies Institute, Amy War College, March 2004), online <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB374.pdf>.

Current Doctrine

As mentioned above, the state of current Joint and Service awareness regarding the potential application of GIS to adequately capture "soft intelligence" through civil information is lacking. The traditional doctrinal breakdown of intelligence disciplines still reflects a failure to integrate knowledge of the physical and human terrains. For instance, a review of the existing doctrinal intelligence disciplines shows that the notion of "human terrain" although implicitly recognized is far from fully analyzed and developed as a critical factor in counterinsurgency.[49] The existing Joint doctrinal division of intelligence recognizes the use of geospatial information, under the Imagery Intelligence (IMINT) rubric but it still does so from the perspective of physical geography and traditional terrain analysis. The emphasis remains on collecting and manipulation of data about physical facts. Current definitions and concepts, including references regarding GIS Tactics, Techniques and Procedures reflect limited use of GIS as in terms of representing and analyzing data physical terrain data only.[50] In the Joint definition of GIS as "Geospatial Information and Services", the term "culture" is used in the sense of data concerning political boundaries, not anthropological, cultural, economic, or socio-economic factors.[51]. Current Joint doctrine on Civil Military Operations is silent on GIS.[52] In that same vein, U.S. Army doctrine

[49] For example, the Army's doctrinal reference on Unconventional Warfare only mentions the term once when it states "Subversion is a form of effects-based targeting on human terrain." See Headquarters, Department of the Army. Field Manual 3-05.201 *Special Forces Unconventional Warfare*. (Ft. Bragg: John F. Kennedy Special Warfare Center. April 2003), 1-2.

[50] U.S. Department of Defense, Joint Publication 2-03, Joint Tactics, Techniques, and Procedures for Geospatial Information and Services Support to Joint Operations (Washington: Joint Chiefs of Staff: 31 March 1999).

[51] The current DOD definition for "geospatial information and services" states: "The concept for collection, information extraction, storage, dissemination, and exploitation of geodetic, geomagnetic, imagery (both commercial and national source), gravimetric, aeronautical, topographic, hydrographic, littoral, *cultural*, and toponymic data accurately referenced to a precise location on the earth's surface." (emphasis mine). See U.S. Department of Defense, Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms*. (Washington: Joint Chiefs of Staff, 31 August 2005)**.** Online <http://www.dtic.mil/doctrine/jel/doddict/data/g/02286.html>.

[52] U.S. Department of Defense, Joint Publication 3-57, *Joint Doctrine for Civil Military Operations*, (Washington: Joint Chiefs of Staff, 8 February 2001). This current doctrinal reference contains no mention of geospatial information systems and does not explicitly mention a requirement for integrating knowledge of physical and cultural or socio-economic factors.

recognizes the importance of geospatial information, but still conceptualizes its application on a view constrained to the physical terrain and does not address integration of information concerning physical and human terrain factors.[53] Finally , current Civil Affairs doctrine only mentions a requirement to capture Civil Information, and more specifically geographic and political information, in the context of preparing the Area Study or Assessment, which is typically a textual narrative product and not susceptible to storage in database format.[54]

Emerging Doctrine: GEOINT

As mentioned previously, as a result of experiences in the GWOT which have caused a new awareness and rethinking of the role of GIS and emerging Civil Affairs doctrine; the U.S. military recognizes now more than ever the importance of physical and human terrain data. In some cases, future organizational designs include a place for CIMS and GIS expertise.[55] However, there is still a need to resolve existing institutional and procedural barriers to their application in counterinsurgency.

The explicit recognition within the Department of Defense (DOD) that GIS can provide a richer, more accurate and useful picture comprised by infrastructure, demographic and even cultural information reflected in overlapping data layers is fairly recent. This shift is evidenced by changes in terminology, and signaled in part by the name change of the former National Intelligence Mapping Agency (NIMA) to National Geospatial Intelligence Agency (NGA) in

[53] U.S. Department of the Army. FM 3-34 Engineer Operations (Headquarters DA: January 2004), 1-19.

[54] U.S. Department of the Army. FM 41-10 Civil Affairs Operations (Headquarters DA: February 2000), G-1, *passim*.

[55] See LTC Kenneth Moore, LTC Mike Warmack, and MAJ John Collison, "Operational and Organizational Concept for Civil Affairs Force" (Ft. Bragg: United States Army Special Operations Command G8, 18 April 2005); "CMO in UEx Staff Organizational Design Paper FDU Jr." (Ft. Bragg: United States Army Special Operations Command G8, 1 April 2005); Civil Info; MAJ Brian Ebert, "Civil Affairs Geographic Information System – Implementation Team (GIS-IT) Information Paper" (Ft. Bragg: 96th Civil Affairs Battalion (Airborne), 28 August 2003); CPT Larry Dewey, "Civil Affairs Information Management Decision Brief" (Ft. Bragg: 96th Civil Affairs Battalion (Airborne) GIS-IT,13 April 2004).

2004.[56] Another key indication is the emergence of a relatively new discipline in the intelligence field: Geospatial Intelligence (or GEOINT). This is "the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the earth."[57] However, as promising as the notion of GEOINT may be, it falls short of providing the framework and methodology for the optimal use of GIS in support of counterinsurgency. Part of this has to do with problems with classification.

The Issue of Classification

Part of the challenge in addressing the situation is that the sphere of knowledge within which understanding of the physical and cultural terrains, earlier described as the ecology of counterinsurgency, lies at the outer limits of the intersection between the intelligence community and other communities of practice. The reality is that there often is a cultural and information sharing gap between these communities. Within the military, repositories of data sources and viewpoints that will create and inform full understanding are found, for example, in both the intelligence and civil military operations community.[58] Yet as a result of doctrinal and operational requirements, these communities operate at arms length from each other. For sound practical reasons, not the least of which is the preservation of legitimacy before the eyes of the population within a theater or area of operations, there is a continuous attempt to maintain a clear division between Intelligence and Civil Affairs personnel and capabilities. There is, in most

[56] National Geospatial-Intelligence Agency (NGA), "NGA History", Online < http://www.nga.mil/StaticFiles/OCR/nga_history.pdf>.

[57] John M. Doty, "Geospatial Intelligence: An Emerging Discipline in National Intelligence with an Important Security Assistance Role" (DISAM Journal of International Security Assistance Management, Spring 2005; 27, 3; Military Module), 5.

[58] This is not intended to be a comprehensive list of communities within which this understanding ought to be cultivated. Arguably, full understanding requires practitioners from most if not all military communities. Among those who, at a minimum, would be required to effective interpret analyses based upon GIS application are included signals and communications, engineering, language, and foreign area specialties.

situations, a “bright line” that separates data gathering activities and repository systems from both communities.

The clearest evidence of the “bright line” mentioned above is the issue of classification. In most cases, the degree to which capturing and disseminating civil information is useful is directly proportional to the number of civilian and non-governmental agencies that have access to this information. With obvious exceptions, this is true even in conflict situations where judicious application of discretion is required in the public distribution of information that, although not considered classified, may be exploited for intelligence purposes by an adversary. Arguably, an inverse of this relation describes the utility of intelligence information. Even information covered by the rubric of open source intelligence (OSINT) can be subject to this issue, since once it is initially developed, it comes under the purview of intelligence specialists, organizations, and processes. [59]

Beyond Intelligence

Although an understanding of the critical relationship between physical and human geography is not new within the U.S. military, a disconnect between this awareness and action persists. Recent DOD acknowledgement this situation is reflected statements such as this one from a Defense Science Board report:

The current conflict in Iraq suggests much about the challenges the American military will confront in the twenty-first century. It involves cultural, tribal, and religious divides within Iraqi society. It has placed demands on soldiers and Marines similar to the “three-block war” posited in the mid 1990s by General Chuck Krulak, Commandant of the Marine Corps at the time. Above all, such wars will require intelligence based on understanding of foreign societies,

[59] A fuller discussion of how OSINT (Open Source Intelligence) and GEOINT would fit into this picture is beyond the scope and classification of the current work. Further reflection and research are required to flesh out a full exploration of the relationship between civil information, OSINT and the systems and procedures used in their collection and management.

their cultures, their languages, and their histories. *At present American's intelligence agencies emphasize none of these attributes.* But knowledge of those human and cultural factors must also reside outside the intelligence community.[60] (emphasis mine)

In order to fully exploit the potential of GIS based information, a compromise much be achieved between the extremes of open dissemination and closed distribution. Because the potential opportunity presented by application of GIS lies along a seam between these different spheres of knowledge and communities of practice, it may be necessary to re-evaluate this distance. A careful and deliberate discussion between the joint and interagency intelligence and civil military operations communities could suggest creative ways to allow for the necessary interaction and integration of perspectives and spheres of knowledge. Information gathered through the traditional intelligence disciplines and residing in intelligence information systems can enhance and in turn be enhanced by reference to data resident in civil information management systems. The potential for enhanced precision and richness of both civil information and intelligence analysis when a GIS informed perspective is added is enormous and should be exploited. To enable this effectively will require thoughtful consideration and careful implementation.

One possible approach is to think of civil information as comprising a category of information that naturally lies beyond the traditional intelligence disciplines. In contrast with "hard intelligence", which due to a number of reasons (such as operational security or force protection) must be hidden from the adversary, civil information is a kind of "soft intelligence" which can be used to inform or supplement intelligence analysis yet be freely disseminated. As the Defense Science Board quote above suggests, in order to fully exploit the full potential of its sources, and maximize the use of the information, even within the context of insurgency it is

[60] U.S. Department of Defense, *Defense Science Board Summer Study on Transformation Panel on Force Capability Evolution* (Washington: Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, August 2005), 25.

necessary for civil information systems to deal with information beyond the traditional realm of intelligence. While the emerging concept of "cultural intelligence" appears as a strong candidate; civil information is probably the more likely category for this, since it is by definition outside of the categorical scope of existing and emerging intelligence disciplines.[61]

GIS: Application in Counterinsurgency

Recognition of the military value of capturing and understanding information about the terrain and the people likely predates Sun Tzu's admonitions. There are several historical instances of the use of population census information for military purposes such as William the Conqueror's preparation of the Domesday Book after the conquest of England. In the context of counterinsurgency the clearest example of this use is the Peninsular War in Spain. This conflict gave rise to the new understanding of the term *guerrilla* which to this day informs Western conceptions of irregular and unconventional warfare and also saw the first modern use of economic and demographic surveys as counterinsurgency instruments by the French and their boycott by Spanish insurgents as a counter countermeasure.[62]

Contemporary experience confirms the value of a clear understanding of the terrain, the people that occupy it, and the multiple factors that arise from their interrelationships. From the insurgent's perspective, Brazilian revolutionary Carlos Marighella's statement that "It is also important to have a knowledge of topographical information" echoes the importance that Guevara's *foco* theory assigned to finding suitable terrain from which to engage in revolutionary

[61] A final caution is in order: the collection, consolidation and use of civil information under separate unclassified CIMS does not entail that the data in them could not be leveraged in support of traditional intelligence disciplines. However, care must be exercised to ensure that personnel, systems, and processes involved in the use of CIMS are distinct from those involved in intelligence systems used in support of traditional intelligence activities.

[62] John Lawrence Tone, *The Fatal Knot: The Guerrilla War in Navarre and the Defeat of Napoleon in Spain*. (Chapel Hill, NC: The University of North Carolina Press, 1994), 110-111.

struggles.[63] In his classic *Modern Warfare,* the French practitioner and theoretician of counterinsurgency Roger Trinquier highlights the importance of population resource control measures oriented on geographical areas threatened by insurgent activity.[64]

Unfortunately, the U.S. military has suffered from what could be described as selective myopia regarding the importance of the intersection between human and physical terrain for counterinsurgency. At times, this awareness was clear. For instance, the Marine Corps 1940 edition of the *Small Wars Manual*, based upon historical experiences in the Philippines, Central America, and other areas, mentions that the insurgents "knowledge of the terrain and their mobility permits them to move quickly and safely to avoid combat and then to launch an attack against a defenseless village or some isolated post" and addresses the need to understand political, economic and demographic conditions prior to engaging in counter guerrilla operations[65]: At other times, this awareness has waned due to an understandable institutional emphasis on conventional warfare. Even during those times, there has been a latent recognition of the importance and impact of a gap in "soft intelligence" capabilities. For example, a 1995 Rand/Arroyo Institute report reviewing requirements for contingency intervention in low intensity conflict environments revealed a lack of area and language knowledge that would impact future potential operations.[66]

While a discussion of the reason for this selective myopia is outside the scope of this work, at present, the earlier part of this work demonstrate that there is widespread recognition of

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[63] Walter Laqueur, *The Guerilla Reader: A Historical Anthology.* (Philadelphia: Temple University Press, 1977). 224.

[64] See Roger Trinquier, Modern Warfare: A French View of Counterinsurgency, Daniel Lee, trans. (London: Pall Mall Press. Reprinted by Combat Studies Institute, Fort Leavenworth, KS: USACGSC, January, 1985), 67 passim.

[65] U.S. Department of Defense, *Small Wars Manual* (Washington: U.S. Marine Corps, 1940), 5 *passim*.

[66]James A. Winnefeld, et al., *Intervention in Intrastate Conflict: Implications for the Army in the Post-Cold War Era* (Santa Monica: Rand, 1995) 80.

this condition, and an earnest search for a remedy. [67] In this context, the use of GIS in a counterinsurgency setting can offer a set of tools that address this. GIS may be seen as a set of lenses that can help address this institutional myopia while at the same time sharpening the focus of the Common Operational Picture. In the same way that Dr. Snow's map allowed London's authorities to understand the magnitude of the cholera epidemic and the mechanism of its spread; GIS can facilitate an understanding of the various phenomena associated with insurgency, whether they are improvised explosive devices or internally displaced persons, by portraying and facilitating location-based analysis.

Relevance

Current approaches to counterinsurgency recognize the significance of human and physical factors, yet they lack a coherent methodology that provides useful insights into their correlation. Ecology, as a branch of biological science is unique in its interdisciplinary approach to understanding the relationship between organisms and their physical surroundings. An ecological approach, one that merges analysis supported by geospatial intelligence and civil information management systems based on GIS, can provide a synthesis of the relationship between human and physical terrain. This synthesis provides a holistic understanding of the relationship between human and physical factors in the environment of insurgency, and allows decision makers to exploit this understanding. Therefore, in order to be truly effective, an ecological approach is required in the planning and execution of counterinsurgency operations.

As noted above, the current application of GIS is focused on the traditional military analysis of physical terrain. While there is growing realization of the potential for use of GIS and geospatial analysis tools to enrich an understanding of human terrain and its relationship with the

[67] For a discussion of the institutional characteristics that may explain this myopia see John A. Nagl, *Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife* (Westport: Praeger Publishers, 2002). Clear signs that this condition is being addressed in the Joint community and especially within the U.S. Army may be found in the recent addition of an 18 hour Counterinsurgency block to the Command and General Staff College's Intermediate Leadership Education curriculum.

physical terrain; the current operational environment requires an urgent change in the current approach.[68] GIS systems can increase the effectiveness of decision makers involved in counterinsurgency operational planning and execution by addressing needs within the realms of both intelligence and civil information. In the context of counterinsurgency, the application of these systems can be a force multiplier by assisting decision makers in developing and exploiting the sort of "cultural intelligence" that is urgently needed. This application would improve integration of kinetic and non-kinetic efforts through planning and execution informed by an understanding of the ecology of insurgency within a particular nation or region.

Contemporary military professionals must embrace the use of GIS in the same way that their predecessors took up the use of mapping and imagery to facilitate decision making. In the context of counterinsurgency, the application of these systems and can be a force multiplier by supporting analysis that can inform civilian and military decision makers developing and exploiting geospatial intelligence and civil information in order to develop a common operational picture informed by "cultural intelligence". This approach would improve integration of kinetic and non-kinetic efforts through planning and execution informed by an understanding of the ecology of insurgency within a particular nation or region. Without such an approach, the search for an adequate Common Operational Picture for commanders and staffs dealing with insurgencies will never be complete. The time has come for the military profession to leverage the benefits of applying geospatial analysis to the ecology of counterinsurgency.

Mapping the ecology of insurgency must become a priority in the current struggle against the enemies of freedom. In order to illustrate this, a discussion of insurgency in the Colombian context is in order. Rather than presenting a detailed account of events and actors, this work aims

[68] While civilian applications are further along than military use of GIS, this trend is not unique to the military. See Ted K. Bradshaw and Brian Muller, "Shaping Policy Decisions with Spatial Analysis" in Michael F. Goodchild and Donald G. Janelle, eds., *Spatially Integrated Social Science* (New York: Oxford University Press, 2004), 300-322. Bradshaw and Muller, academics specializing in urban planning and community development issues, point out that: "the growing capacity of spatial analytical techniques continues in large part to be underutilized in policy decision making or planning."

to generally describe the character of the Illegal Armed Groups (IAG) involved, the overall trend of the conflict, and contemporary developments. The following section aims to accomplish this in order to provide a context for the applicability of GIS in a counterinsurgency setting.

CHAPTER FOUR

COLOMBIA'S INTERNAL VIOLENCE: GIS AS A COUNTERINSURGENCY TOOL

Like most of our country the area was very suitable for an uprising.

Fabio Vasquez Castaño[69]

Environmental and Political Context: Colombia as a Fragmented Nation

When Castaño, one of the founders of the ELN a left wing IAG, described the local conditions in the northern Department of Santander; he summarized in one sentence the environmental and human circumstances that make Colombia susceptible to insurgency. As one of the better English language accounts of that country astutely points out "Colombia's history has been shaped by spatial fragmentation which has found economic expression in economic atomization and cultural fragmentation".[70] Castaño's evaluation echoes the analysis of Alvaro Valencia Tovar, noted historian and at one time the highest ranking officer of the Colombian military, who writes that the country is geographically and topographically ideal for irregular warfare.[71] Throughout much of its history, Colombia's political geography has been fragmented as a near mirror image of the isolation imposed by physical geography. As Safford and Palacios point out the physical division created by the Andes "have divided the country economically, culturally, and politically."[72]

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[69] Richard Gott, *Guerrilla Movements in Latin America* (London, Nelson & Sons, Ltd., 1970), 195.

[70] Frank Safford and Marco Palacios, *Colombia: Fragmented Land, Divided Society* (New Cork: Oxford University Press. 2002), ix.

[71] Alvaro Valencia Tovar,. Inseguridad y Violencia en Colombia. (Santafé de Bogotá: Universidad Sergio Arboleda. 1997), 91.

[72] Safford & Palacios, 3.

Figure 3 – Orographic and Hydrographic view of Colombia
(Note divisions caused by Andean ridge and major)[73]

Actors and Themes

To speak of insurgency in Colombia is to use shorthand in order to describe and classify a complex and dynamic phenomenon that has expanded beyond the traditional conceptions of insurgency. The conflict in Colombia has pitted the government, and society at large against a variety of groups with widely different motivations, *modi operandi*, and goals. As in Iraq, there is not one insurgency in Colombia, there are several. Unlike Iraq, Colombia is not riven along major ethnic lines but is nevertheless fragmented as a result of both historical and geographical accident.

Three major organizations have emerged as the continuing adversaries of stability and peace in Colombia; on the left of the political and rhetorical spectrum are the Revolutionary Armed Forces of Colombia-Popular Army (Fuerzas Armadas Revolucionarias de Colombia-Ejército Popular- FARC-EP), the National Liberation Army (Ejército de Liberación Nacional-

[73] Foreign Military Studies Office GIS Team, "Colombia Violence Comparison Study", Version 4 data. (Ft. Leavenworth: FMSO GIS Team, 25 February 2006). All subsequent GIS example figure reference this material and are noted as FMSO GIS Team, Violence Study.

ELN), and on the right is the paramilitary organization known as the Unified Self Defense Forces of Colombia (Autodefensas Unidas de Colombia- AUC). Although there are a number of other organizations of some historical and political impact on the process, these IAGs are the main nuclei of insurgent activity in the country and will be the focus of the following discussion.

Historical Context

The history of insurgency in Colombia presents a multi-faceted paradox. It is a country whose geography appears ideally suited for applying the *foco* insurgency methodology; yet was ignored by *Che* Guevara when selecting, a country to clone the Cuban revolution in South America. It is a nation where competition for fertile lands generated "The Violence" (*La Violencia*) a period of internecine violence (1949-1953) whose inhumanity has few parallels in the hemisphere; but where land reform did not yield revolutionary struggles on a scale and historical scope equal to Mexico's. Colombia is a land whose jungle areas have hidden the FARC's leadership and served as a base for their struggle for four decades but where insurgent action has failed to yield the decisive results achieved the rurally based insurgencies of Vietnam or Kâmpŭchea.

An explanation of these paradoxes is beyond the scope of this work, but this situation serves as a marker for one of the unique characteristics of violence in Colombia. Much like the characters and actions of Colombian novelist Gabriel Garcia Marquez's classic *One Hundred Years of Solitude*, the violence in this South American nation has followed a serendipitous and idiosyncratic, and peculiarly Colombian cyclical path. From its earliest times, violence in Colombia has been generated as a direct result of the competition for resources. As an expert on the role of geography in conflict notes "The history of Colombian conflict is a record of competition for control of lands and movement routes related to export products or their

taxation."[74] Safford and Palacios document several instances of this phenomenon in Colombian history. In discussing the recurring internal strife of Colonial times between the population and their Spanish colonial masters they note, for instance, a "pattern of war-induced exactions followed by rebellion".[75]

Arguably, the genesis of contemporary insurgencies in Colombia has the same root as those early rebellions. Although often ascribed to the political polarization that finds its origins in post-Independence social and ideological alignment and resulted in the formation of the Liberal and Conservative parties, *La Violencia* of the early 1950's had more concrete causes.[76] As Rafael Pardo Rueda, onetime presidential candidate and historian of Colombia, points out during this time many of the bands that eventually became the nucleus of insurgent movements were motivated by economic rather than political interest, expressed through actions oriented towards the expropriation of their victim's land.[77]

From Guerrillas to Narco-Corporations: The "Graying" of Colombian Insurgents

The contemporary history of violence in Colombia could be broadly summarized as the closed cycle of development of groups whose initial economic motivation was briefly disguised under political and ideological plumage, and who have returned to that starting point. This is especially in the case of the FARC and the AUC. In the case of the FARC, a group which initially "spread its influence by offering small farmers and ranchers the protection from the takeover

[74] Geoffrey Demarest, "Mapping Colombia: The Correlation Between Land Data and Strategy" (Carlisle, Pennsylvania: Strategic Studies Institute, March 2003), 1.

[75] Safford & Palacios, 64.

[76] Some theorists attempt to explain Colombia's violent past and present through the lens of cultural or historical determinants such as the oppression of the natives at the hands of the European colonists. Others may point to psychological explanations based on an ethnic propensity towards violence. Evaluating the validity of these explanations, most of which are based on outdated or discredited theoretical frameworks is beyond the scope of this monograph.

[77] Rafael Pardo Rueda, *La Historia de las Guerras* (Barcelona: Ediciones B Colombia, S.A., 2004), 402.

attempts by larger cattle ranchers"[78], the cycle has turned it into a narco-terrorist organization of suspect ideological consistency. Depending on which sources one believes, the AUC, which is actually an aggregate of various movements, began as an attempt to protect rural land owners property and interests against leftist guerrillas, an attempt to apply extralegal counterinsurgency means with the tacit support of government forces (a now mostly discredited account), or as the offshoot of Cartel vigilante justice.[79] The ELN is probably least susceptible to this description. This IAG, whose Cuban sponsored attempts at a *foco* type revolution commingled with the heady theoretical brew of Liberation Theology probably has the clearer ideological pedigree from its inception in the mid 1960's. While it did engage in some kidnapping activities during its early days, after its near obliteration at Anorí in 1974, it turned to wholesale kidnapping and extortion as its primary means of support.[80] In most cases, there is credible evidence that, despite varying degrees of engagement with the government in peace negotiations pr demobilization attempts, significant elements of all three of these IAG's in what can be described as corporate enterprises oriented towards criminal activity focused on narco-traffic, extortion, and kidnapping.

Joseph D. Celeski, a recently retired Special Operations officer, has coined the expression "grey stew" to describe the dilution of the ideological component and the increased presence of "warlords, regional drug lords, and transnational criminals" in insurgent movements. Adopting this terminology, the contemporary insurgency in Colombia may be seen as a hybrid or "grey stew" threat.[81] If that is the case, crafting a strategy to counter and address an insurgency that was originally (putatively) ideologically motivated but has changed into a narco-terrorist corporate

[78] Elisabeth J. Bileyeu, "Guerrilla Groups in Colombia: Prospects for the Future" (Ft. Leavenworth: U.S. Army Command and General Staff College, 1995), 8.

[79] See Stafford and Palacios, 361. See also David Spencer, *Colombia's Paramilitaries: Criminals or Political Force?* (Carlisle Barracks, Pennsylvania: Strategic Studies Institute, Amy War College, March 2004).

[80] See Pardo, 435. Also see Corporación observatorio para la paz, *Las verdaderas intenciones del ELN*. (Bogotá: Intermedio Editores. 2001).

[81] Joseph D. Celeski, "Operationalizing COIN", JSOU Report 05-2 (Hulburt Field, FL: Joint Special Operations University, September 2005), 2.

complex of questionable ideological integrity becomes a challenge since classical approaches may not work.

Current Developments in Colombia

Reclaiming the National Territory

On the one hand the graying of Colombia's insurgent movements is a challenge since, as Celeski writes, classic counterinsurgency approaches do not work well against this threat.[82] On the other hand, however, this very characteristic makes it susceptible to the type of analysis that GIS provides. Due to a need to consolidate their control and protect economic and natural resources that finance their activities, these IAG's tend to be tied to particular locations, and susceptible to strategies that revolve around asserting control over those locations. This in fact, is the current Government of Colombia's (GOC) strategy. By orienting on the physical terrain, and implicitly its human component, this strategy is open to the application of GIS to support its planning and operational requirements. A brief discussion of the current GOC approach to counterinsurgency is required.

The violence in Colombia can be understood as a cycle of conflict arising from the interplay of presence and absence. At various points in its history, Colombia has suffered the consequences of the presence of IAG's in areas where the government was absent. In a recent piece about Iraq, John Simpson, a BBC World Affairs Editor writes "the absence of effective government is a real encouragement to the insurgency". [83] This observation, although made in the particular context of violence in Iraq, illustrates the undeniable importance of the actual physical presence of authority in the face of insurgencies anywhere. While Simpson alludes to the impact of the abstract absence of governance caused by the lack a stable governing coalition in Iraq, the

[82] Celeski,3.

[83] John Simpson, "No reason for optimism in Iraq" (BBC News Website: 2006/03/06 13:37:22 GMT), online at http://news.bbc.co.uk/2/hi/middle_east/4778380.stm.

sense of his statement can be expanded to capture the equally disruptive impact that the concrete lack of presence by government representatives has in the face of violent revolutionary or antiauthority activity. In Colombia, this absence has played a critical role in the historical emergence and development of insurgent movements. In order to understand the current GOC approach and how it may benefit from the application of GIS, it is helpful to review examples of past failures.

Las Delicias, El Billar and *El Despeje*: The Consequences of Absence

The high point of the FARC's military challenge to the GOC took place between 1996 and 1998 when it made a fleeting transition into what Maoist theory calls the *strategic offensive* phase.[84] This period began with a successful attack upon government forces at Las Delicias, in the Putumayo region, continued with the defeat of a counterguerilla Battalion in El Billar, and ended with the failed attack on Mitú. During this time, the FARC engaged almost all the military bases in the Colombian southeast. During this period, the FARC exhibited an excellent level of awareness of the physical and human terrain. For instance, during the attack on Las Delicias, FARC irregulars encouraged Colombian soldiers to defect, calling them by first and last names. After other actions, there was ample evidence of exhaustive battlefield preparation, and influence and infiltration of local populations[85]

[84] O'Neill, 36.

[85] These attacks in one instance resulted in the FARC's occupation of an army base with significant materiel, and propaganda gains; in the other they resulted in the highest casualties in its history up to that point. See Pardo 532 *passim*. Also see Corporación observatorio para la paz, *Las verdaderas intenciones del FARC*. (Bogotá: Intermedio Editores. 1999),135-144.

Figure 4 FARC "Clearance Zone" (*Despeje*)[86]

Later on, from 1999 to 2002, during the presidential administration of Andrés Pastrana, the FARC achieved the largest ever erosion of the GOC's political sovereignty and legitimacy over territorial integrity by negotiating the departure of Government presence from an area slightly larger that country of Switzerland. As seen in Figure 5 above, this "clearance zone" (*El Despeje*), covered an area that extended over 16,000 square miles.[87] During this time, the FARC exercised para-legal authority and exploited resources in the entire area, destroyed government installations, and it is likely that it carefully orchestrated transfers of property titles in those areas.[88] Eventually, this area was reclaimed yet efforts by the GOC to reassert sovereignty over that terrain are still ongoing.

In the cases described above insurgent forces and their leadership exploited or encouraged the absence of the legitimate government, and leveraged their knowledge of the

[86] FMSO GIS Team, Violence Study.
[87] Pardo, 542.
[88] See Demarest, 6 *passim*.

human and physical terrain for their advantage. As a result of these experiences, and with the assistance of the United States Government, the current administration of President Alvaro Uribe, the COG has adopted an aggressive strategy that seeks to reverse the effects of its long absence over significant parts of the national space. A senior Colombian official, during conversations regarding the progress status of the GOC's efforts to combat the influence of the insurgents, described them as an attempt to "recolonize" the national territory. This, in his view, was necessary to counter the insidious and sophisticated penetration of the FARC and other IAG's into the physical, social, and economic fabric of select areas of the country.[89]

By adopting adopted a strategy of territorial consolidation, under of its Democratic Security and Defense Policy, the GOC has recognized the fundamental linkage between the human and physical terrains. It has taken a decisive step to influence the ecology of insurgency. The following chart represents selected strategic objectives with specific benchmarks for the GOC's counterinsurgency strategy: [90]

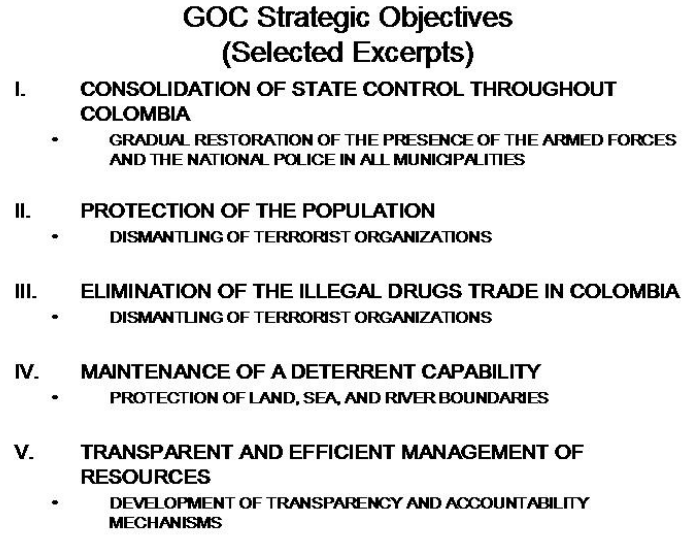

Figure 5- Example of GOC COIN Benchmarks

[89] Author's discussion with senior GOC official (non-disclosure) in May 2005.

[90] Presidency of the Republic of Colombia. *Democratic Security and Defense* Policy (Bogotá: Ministry of Defence. 2003), 31.

In order to achieve Strategic Objectives I and II and restore the presence of the Armed Forces and National Police while dismantling terrorist organizations it is logical to assume that the GOC would use a combination of kinetic and non kinetic counterinsurgency actions. In support of its strategy, the Colombian military is in fact implementing an approach it calls integrated action (*Acción Integral*). This approach complements kinetic operations by its conventional and non conventional forces with non-kinetic action such as medical, educational, and civic action efforts. In adopting these strategies, which focus on reoccupying (or recolonizing) the national space, the GOC has recognized the importance of the intersection of physical and human terrains. This effort can be greatly assisted by the application of GIS systems.

For example, the map below, plots violent act density (in red) showing violent incidents in the national territory of Colombia from 1988 to 2004. This graphic provides an example of the data that the GOC could use for planning its deployment of military and police units. Keeping in mind that the data shown is an aggregate over the six year period, there is clear potential for using yearly data in combination with statistical forecasting tools (available in most commercial GIS software packages) to attempt predictive analysis in order to plan a phased approach to recolonizing areas most affected by violence and deploying troops and police forces where the need for security is greatest.

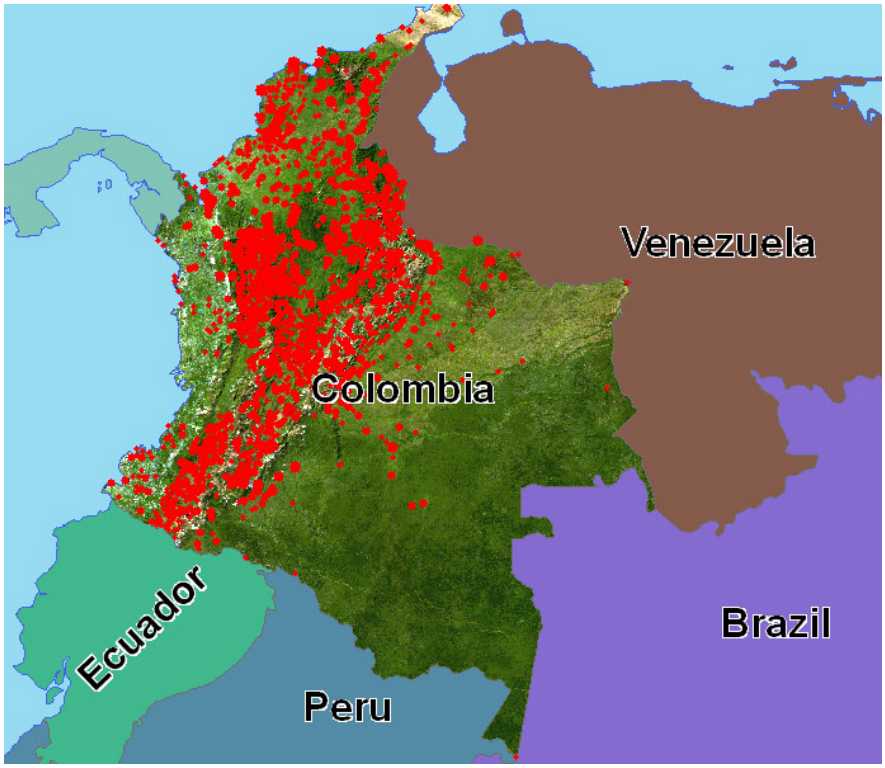

Figure 6- Violent Acts in Colombia 1988-2004[91]

Another example, supporting Strategic Objective III (see Figure 6 above) is more closely related to traditional uses of GIS data such as objective and target selection. However, the intent would be to move beyond that approach. In this instance, the GOC could use GIS to visualize and analyze the relationship between the location of narcotics sources and related resources, and the IAGs that profit from them. Although this analysis would obviously support planning and execution of military or law enforcement operations to eradicate sites, or interdict materials used in the production of narcotics, a civil information approach may include analyzing the direction, timing, and volume of the flow of internally displaced persons out of a known production area.

That information may indicate attempts by IAGs to consolidate their presence in that area in order to ensure control of those resources. The map below illustrates the location of poppy and coca leaf at the national level together with an overlay FARC and ELN order of battle general

[91] FMSO GIS Team, Violence Study. Aggregate includes AIG related kidnappings, assassinations, IED incidents, among others.

locations. The colored polygons reflect the general location of IAG aggregate units, traffic signal-like icons show approximate subunit locations, the green symbols represent poppy locations while the yellow represents coca leaf locations.

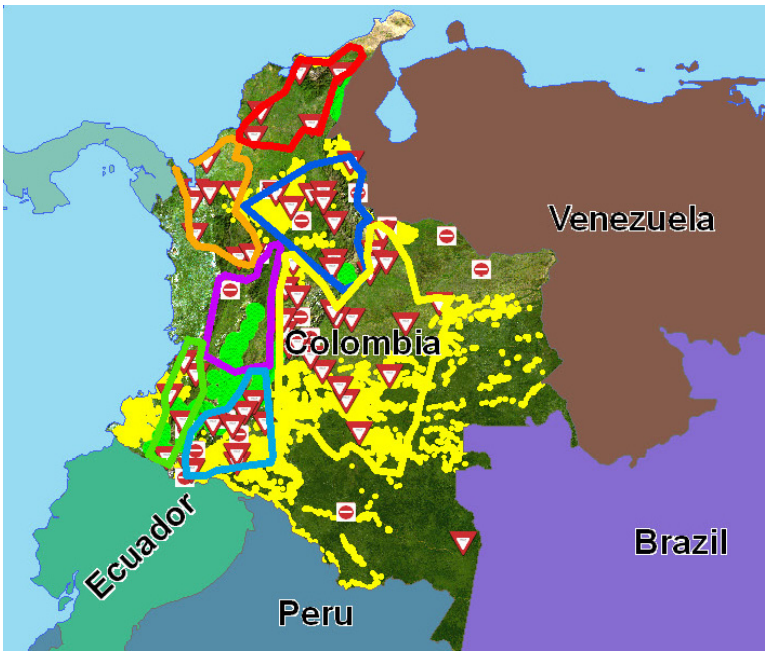

Figure 7- Poppy & Coca Location vs. FARC/ELN Order of Battle Locations (c. 1997)

Another instance of the use of GIS to achieve the above mentioned objectives would be tracking minefields in order to protect the population in a given area in support of the GOC's third strategic goal. [92] This also points to a more traditional military use of GIS. Mines are used by IAGs as countermobity measures to protect their lines of communications. As one Colombia expert has described, mines are "guerrilla droppings".[93] The pattern of these droppings when captured, plotted, visualized and analyzed with the help of GIS can paint an accurate picture for

[92] Outside the context of military use, Humanitarian Mine Action constitutes one of the more mature applications of GIS technology in use around the world today. For information on the Information Management System for Mine Action (IMSMA) see for example the Geneva International Centre for Humanitarian Demining site, online at <http://www.gichd.ch/998.0.html>.

[93] Author's conversation with Dr. Geoffrey Demarest, XX September 2005.

commanders and staffs interested in identifying and interdicting lines of communication (LOCs) for IAG combatants.

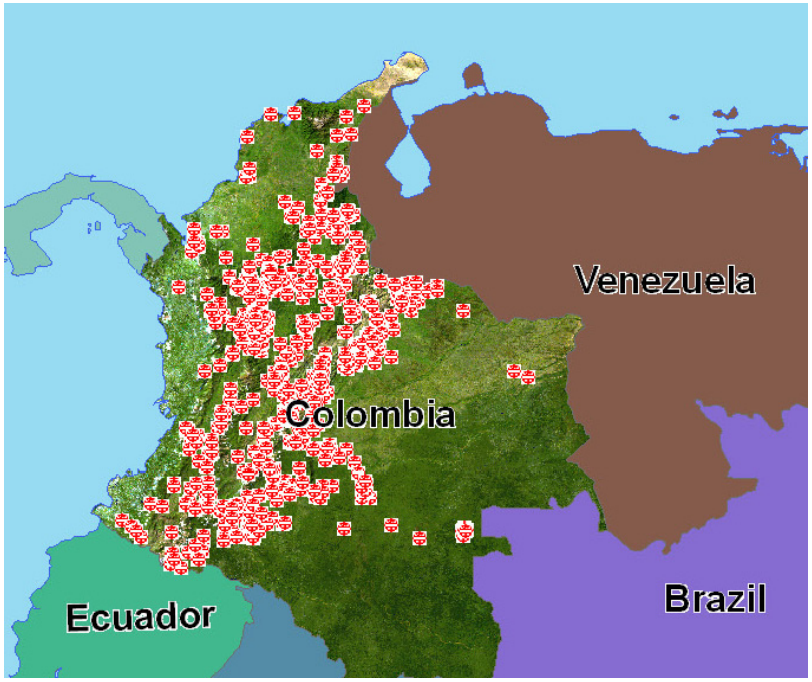

Figure 8 - Minefield Locations in Colombia

Another example, supporting Strategic Objective III (see Figure 6 above) is more closely related to traditional uses of GIS data such as objective and target selection. However, the intent would be to move beyond that approach. The GOC could use GIS to visualize and analyze the relationship between the location of narcotics sources, related resources, and the IAGs. Although this analysis would obviously support planning and execution of military or law enforcement operations to interdict or eradicate sites, a civil information approach may include analyzing the flow the timing, and volume of the flow of internally displaced persons out of a known production area. That information may indicate attempts by IAGs to consolidate their presence in that area in order to ensure control of those resources.

A final but critically relevant example of the use of GIS to support the counterinsurgency efforts of the GOC involves Strategic Objective V (see Figure 6 above). The GOC seeks to develop and strengthen the rule of law by ensuring transparency and accountability mechanisms

are restored in areas where they have been lacking. In short, it seeks to reassert governance after establishing presence. As mentioned previously, part of the IAG approach to the occupation of territory involves transfers of property ownership[94] Since the early days of the violence, Colombian IAGs have sought to transfer legitimate ownership of property abandoned by displaced persons who are not sympathetic to their cause or whose land holdings have tactical or economic value for their cause, and have actively promoted that displacement.[95] By tracking patterns of ownership, ownership transfers, and most importantly, by ensuring accurate tracking of cadastral data, GIS can play a key role in guaranteeing the legitimacy of land ownership transactions, records and ensuring the restoration and continuity of transparency and accountability mechanism. In short GIS can become enablers for the restoration of the rule of law.

The Case of Colombia: Why GIS?

Due to the factors previously discussed, Colombia presents itself as an optimal test case for the application of an ecological approach to insurgency. Given its Government's strategic emphasis on the consolidation of state control over the national territory, recognition of the need to deny IAGs resources that provide them with material support, and a requirement to restore the rule of law by, among other efforts, developing transparency and accountability mechanisms, The GOC's counterinsurgency efforts can benefit from the use of GIS. Applied in this context, GIS can:

- increase potential understanding of the linkage between human and physical terrain, which is critical to the defeat of the insurgency through a combination f kinetic and non-kinetic operations

[94] Geoffrey Demarest, *Mapping Colombia: The Correlation Between Land Data and Strategy* (Carlisle, Pennsylvania: Strategic Studies Institute, US Army War College, March 2003) and *Feasibility of Creating a Comprehensive Real Property Database for Colombia* (Fort Leavenworth, Kansas: Foreign Military Studies Office Special Report August 2002). Online at <http://fmso.leavenworth.army.mil/documents/milpolre.htm> Accessed 15 July 2005.

[95] Estimates of the internally displaced population by the United Nations High Commissioner for Refugees exceeded 2 million persons in 2004. See UNHCR website online at <http://www.unhcr.org>.

- enhance the effectiveness of assessments of its since georeferenced data have increased accuracy and are susceptible to more sophisticated analysis
- provide an efficient means of ensuring transparency and accountability of critical legal and procedural mechanisms such as property ownership records
- Proposed use of GIS by the Colombian government's interagency community would enhance GOC efforts by facilitating a number of key activities: such as:
- development of civil information and intelligence products supporting counterinsurgency planning and execution of both kinetic and non-kinetic activities[96]
- tracking of Measures of Effectiveness/Measures of Performance for counterinsurgency efforts along both kinetic and non-kinetic lines of operation
- coordination of national and international interagency activity in support of its efforts by deconflicting civic action, and infrastructure development projects
- tracking land usage and property/cadastral records in order to guarantee the virtual presence of governance by guaranteeing legitimate models of ownership and commerce

[96] One caution regarding the need of integrating the use of these systems is that sooner or later, insurgents will seek to exploit GIS or related technologies due to their relative low cost and availability. The U.S. cannot wait until its adversaries exploit freely available GIS applications such as GoogleEarth. Determining the viability of such a threat is beyond the scope of this work, but can serve as an interesting exercise to the reader.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

Background

Historical evidence, military theory and current doctrine all point to the need for a Common Operational Picture to assists leaders, planners, and executors across the operational spectrum. The use of Civil Information Management Systems (CIMS) can play a critical role in the development and improvement of this picture to a level far beyond traditional methods of developing and maintaining situational awareness. Within the realm of CIMS, Geospatial Information Systems exponentially increase the potential for a richer and more dynamic COP and implicitly better understanding to guide operational planning and decision making.

After a discussion of the capabilities offered by CIMS and GIS, framed by an understanding of the information requirement of effective counterinsurgency in Colombia; this study provides a framework for determining the value of using GIS as a tool for counterinsurgency in that nation. As a result of this assessment, this study points to the desirability of applying further applying GIS capabilities in Colombia and exploring its use in other counterinsurgency settings. This is further supported when the current struggle in Colombia is seen within the strategic context of a larger struggle against insurgent movements across the world. The following section seeks to provide this context in order to underline the need to explore the expanded use of GIS by U.S. Forces engaged in counterinsurgency situations given that the U.S. and its allies are embarked upon a Long War which prominently includes a counterinsurgency component.

The Operational Context[97]

> The Long War is 90% intellectual, communications, political, economic, diplomacy, and intelligence focused. It is at most 10% military. We have not yet developed the doctrine or structure capable of thinking through and implementing a Long War (30 to 70 years if we are lucky) on a societal scale. This challenge is compounded because it is fundamentally different from waging the Cold War against the Soviet Union.
>
> Newt Gingrich[98]

Recent experience shows that, despite achieving a significant measure of success on the battlefield, the Armed Forces of the United States of America face continuing challenges in adapting to the requirements of the long term global struggle against uncompromising adversaries. Our nation and its leadership expect our forces to be successful in missions as different and distinct from each other as the locations where they take place; combating Islamic extremists in Iraq and Afghanistan while supporting the establishment of democratic governments, helping Colombia in defeating narco-terrorist illegal armed groups, supporting domestic emergency response and long-term reconstruction in the wake of Katrina, or assisting international partners such as Indonesia and Pakistan in their post-disaster mitigation and rehabilitation effort. Our forces are expected to accomplish this while at the same time developing and maintaining the capabilities for dealing with potential future conflicts with peer and near peer competitors.

Despite initial successes, our forces continue to be engaged in Afghanistan and Iraq fighting what Gingrich describes as the Long War.[99] Even after eventual success and withdrawal from those countries, an increasing number of other places around the world will see manifestations of this struggle. Furthermore, given international concerns over conditions in

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[97] A version of this monograph's conclusion was submitted to the 2006 JSOU/NDIA Essay Competition earlier this year.

[98] Newt Gingrich, "Statement of Former Speaker of the House Newt Gingrich Before the House Permanent Select Committee on Intelligence Subcommittee on Oversight" (Washington: US House of Representatives, Wednesday, October 19, 2005), 5, online at <http://intelligence.house.gov/Media/PDFS/GingrichTestimony101905.pdf>

[99] Gingrich, 4.

places such as Darfur, and the statistical likelihood of major natural disasters, the need for our forces to address complex humanitarian contingencies in the near future is almost inevitable.

In a number of cases, the efficacy of our forces during this conflict has been less than optimal. Critics such as Brigadier Aylwin-Foster, who served in Iraq as Deputy Commander of the Office of Security Transition, ascribe problems with the post-liberation performance of the United States in Iraq to of a number of factors including historical focus on kinetic operations, a rigid organizational culture, and institutional bias.[100] Others, such as Tom Ricks and Sean Naylor, journalists who have reported on the performance of U.S. Forces in Iraq and Afghanistan, challenge the adequacy of our planning or the increased diversity and complexity of organizations involved in major operations.[101] Many of these criticisms are based upon an incomplete understanding of the complexity of the environment in which our forces operate. Too often, they overlook the significant impact of a complex mixture of factors that go well beyond the military context. As Gingrich points out, the challenges of the Long War demand looking beyond military solutions. Along these lines, most critics only partially acknowledge the fact that many of the problems for which they hold the military responsible are rooted in the intrinsic inadequacy of our Armed Forces to comprehensively address issues that are at once political, economic, and diplomatic in nature.

Adding to this difficulty is the fact that the majority of the most critical activities involved in the non-military sphere take place at the operational level. Joint doctrine defines this as the level at which:

> …campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or other operational areas. Activities at this level link

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[100] Nigel Aylwin-Foster, "Changing the Army for Counterinsurgency Operations", Military Review (Fort Leavenworth: Combined Arms Center, November-December 2005), 2-15.

[101] Thomas E. Ricks, "Army Historian Cites Lack of Postwar Plan" (Washington Post, December 24, 2004), online at < http://www.washingtonpost.com/wp-dyn/articles/A24891-2004Dec24.html >; Sean Naylor, *Not a good day to die: The Untold Story of Operation Anaconda* (New York: Berkley, 2005). In his book, Mr. Naylor makes the argument that the number and diversity of conventional, unconventional, and interagency actors involved in Operation Anaconda greatly impacted the efficacy of US Forces.

> tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events.[102]

This level, which "…links the tactical employment of forces to strategic objectives", is seldom, if ever, a sterile military-only domain, uncontaminated by external factors and considerations. [103]

For instance, despite inaccurate claims to the contrary, there *was* a detailed military plan to address Phase IV of OIF; yet no amount of proactive planning can cancel out the impact of what Christopher Schnaubelt, who served as Chief of Policy in the C-5 Directorate of CJTF-7 in 2004, has described as "the lack of effective interagency collaboration at the operational level." [104]

Our Armed Forces can only be partially successful if they lack a framework that allows for the adequate linkage of strategic objectives to actions at the tactical level while at the same time taking into account the effect of non-military factors upon those actions. Furthermore, the strategic objectives of our government will not be attained without a framework that provides for the linkage of non-military to military actions across these levels. The contemporary and future operational environment will require our forces to address crises that Gene Zajac, a former Foreign Service Officer currently working at the Joint Forces Command, points out;

> …are likely to be more complex calling for a comprehensive response, a multidimensional strategy involving multiple governmental agencies, partnership with other nations and multilateral organizations.[105]

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[102] U.S. Joint Chiefs of Staff, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, D.C.: U.S. JCS, 12 April 2001), [As Amended Through 31 August 2005] ,391.

[103] U.S. Joint Chiefs of Staff, Joint Doctrine Encyclopedia (Washington, D.C.: U.S. JCS, 16 July 1997), 561.

[104] Kevin C.M. Benson," 'Phase IV' CFLCC Stability Operations Planning" in *Turning Victory Into Success: Military Operations After the Campaign*, Brian M. De Toy, ed. (Fort Leavenworth: Combat Studies Institute Press. 2004), 179-193; Christopher Schnaubelt, "After the Fight: Interagency Operations", *Parameters*, Vol. XXXV, no. 4. (Winter 2005-06), 48.

[105] Gene Zajac, *The Multi-National Interagency Group: A Concept Paper (Version 3)* (Norfolk: Joint Forces Command J9 Interagency Group, [5 August 2005] D), 2.

Therefore, it is precisely the operational level that requires urgent attention in order to ensure success in the Long War. Despite the overwhelming technological superiority, strength, and flexibility of our Armed Forces, traditionally they have lacked adequate doctrinal, organizational, and conceptual mechanisms to allow them to address the challenges of operating in an environment defined by a need to synchronize and integrate the actions of diverse multilateral elements at the operational and tactical level in order to attain national strategic objectives

In a recent article, Richard Downie, Director of the Center for Hemispheric Defense Studies, promotes the use of the term *integrated operations* to describe what our current doctrinal terminology covers by several terms such as joint, interagency, intergovernmental, or multinational operations.[106] Adopting that terminology allows us to say that determining the best way to organize, plan and execute for *integrated operations* presents the most critical and urgent challenge facing us in the Long War. The problem is greater and more urgent since, as Dr. John T. Fishel, an expert in Latin America, peacekeeping, and civil military operations, has pointed out, "DoD is the only organization within the government that has an operational echelon."[107] The military is often tasked with addressing non-military problem sets at the operational level because its potential partners are unable to respond adequately in terms of resources, presence, authority or expertise. As Schnaubelt points out "Contemporary threats…require interagency decisionmaking and collaboration at the operational level. Yet there is no effective system in place to cause this teamwork to happen."[108]

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[106] See Richard D. Downie, "Defining Integrated Operations", Joint Force Quarterly no. 38 (July 2005), 10-13.

[107] Remarks by Dr. Fishel, "Fishel and Benson Question and Answer Session" in *Turning Victory Into Success: Military Operations After the Campaign*, Brian M. De Toy, ed. (Fort Leavenworth: Combat Studies Institute Press. 2004), 206. See also John T. Fishel, "Planning for Post-Conflict Panama: What it Tells Us About Phase IV Operations", *ibid.* 169-178.

[108] Schnaubelt, 59.

An Operational Framework for Integrated Operations

The contemporary environment in which our Armed Forces operate is best understood as an amalgam of several complex, open systems.[109] The world is, at the same time, a globalized economic sphere, a shifting network of geopolitical alliances, the battleground for competing ideological and cultural visions, and an interconnected web of information exchanges weaving through overlapping social, tribal, and national entities. Our current language, organizations and approach to operational design hamper the efficacy of the joint forces in meeting the requirements of integrated operations because they fail to deal with the complexity of these systems.

Recent after action reports and lessons learned indicate that we need a comprehensive critique and rethinking of the language, organizations, and conceptual constructs currently in place. This critique must recognize that there are a number of problems with our current approach to integrated operations. This approach does not facilitate the exchange of information; it tends to allocate resources along static and hierarchical models, and suffers from a lack of imagination and adaptability by applying a linear bias to operational design. The nature of the conflict we are engaged in makes engaging interagency and international partners in coordination and collaboration a requirement, not an option. Therefore, a new approach is required; we must re-envision how interagency and multinational participants communicate, how our resources are organized and linked, and how operations are planned.

Language

One basic problem affecting participants in integrated operations is the lack of a common vocabulary. There is a marked absence of shared terminology among military, governmental, and non-governmental interlocutors. This problem exists not only across nations, but often within the borders one country, across government agencies, and even within organizations within those

[109] See L. Von Bertalanffy, *General System Theory* (New York: Penguin Press, 1975).

government agencies. By virtue of the nature of their profession, members of some communities, such as engineers and physicians, often share common professional terminology that transcends social, cultural, and historical differences. This is not the case across the very wide spectrum of professions, organizations and disciplines that may be required to collaborate during post-conflict reconstruction or complex humanitarian contingencies.

An example of this gap, and the impact it has on the effectiveness of operations, occurred last November during post-earthquake assistance efforts in Pakistan. In a number of meetings, US planners engaged in discussions with representatives from the Government of Pakistan (GOP), donor nations, and the United Nations (UN) to address planning for long term relief and reconstruction. In this situation, the use of terms such as "campaign planning" or "lines of operation" by US military planners in the context of humanitarian efforts hampered communication with strategic planners from the UN. Despite the fact that in the US military community the use of those terms is acceptable in stability and reconstruction settings, for the UN participants they conveyed negative connotations that initially hampered collaboration. Once the issue was identified, the US planners 'translated' their concepts into terminology used by their UN counterparts for subsequent discussions, ensuring shared understanding and objectives.[110]

A possible solution to this issue is to assume a pragmatic approach to communication with participants in integrated operations. One key element of operational language is doctrine. Rather than seeking to impose our vision and our own vocabulary--our doctrine--upon interagency and multinational partners, we must be willing to explore the use of neutral terminology or stipulate shared meanings. Following the above model, we must approach the evolution of doctrine by collaborating with interagency and multinational partners instead of attempting to force existing doctrinal constructs or develop emerging terminology in isolation from them.

[110] Author's personal experience during support to the Office of the Defense Representative in Pakistan (ODRP) (October-November 2005).

A complementary solution may be the creation of virtual shared communities of practice.[111] These are groups of people who may share common interests, goals, and concerns. Members may come together informally and are willing to establish an ongoing and dynamic relationship based on promoting mutual learning and discovery through the exchange of information and experiences concerning professional activities. Often these relationships will result in improved professional performance and assist in identifying and disseminating best practices. Virtual communities can be established by leveraging technology to support communication and collaboration in order to facilitate the creation and maintenance of the relationships described above. Tapping into these communities would allow for the development of new doctrinal concepts, testing the viability of shared terminology, and encouraging discussion of best practices before, during, and after integrated operations.[112]

Organizations

Analysis of the US government's post-Katrina response identified a major gap in planning capability and adequate planning structures within agencies responsible for implementing the National Response Plan.[113] In most cases only the Department of Defense has created organizations oriented at the operational level. Whether the task is domestic long term

[111] See Etienne Wenger, *Communities of Practice: Learning, Meaning and Identity* (New York: Cambridge University Press, 1998); Nancy M. Dixon, *Common Knowledge* (Boston: Harvard Business School Press, 2000); and Etienne Wenger, et al, *Cultivating Communities of Practice* (Boston: Harvard Business School Press, 2002). Arguably these communities already exist, since the operational tempo has increased the exposure of members of the military, interagency and multinational communities to each other. However, a virtual approach that leverages technology widens and enriches the opportunity for contact and is not limited by physical limitations.

[112] This approach could be mirror the Army's successful experiences with the mature virtual communities such as XO-Net and Companycommand.com. See Nancy M. Dixon, *et al, CompanyCommand: Unleashing the Power of the Army Profession* (New York: Center for the Advancement of Leader Development & Organizational Learning, 2005). Excellent examples of this type of emerging community are those managed by the State Department's Humanitarian Information Unit's USG ICT Support to S&R Operations eRoom, and the Army's Battle Command Knowledge Systems's SAMS-Net.

[113] SAMS Planning Group-Katrina, "Weathering Katrina: The Debate for an Operational Level Framework for Domestic Incident Management" (Ft. Leavenworth: School of Advanced Military Studies. November 7, 2005, D).

recovery and reconstruction, or post-conflict stability and reconstruction in Iraq, efficacy is hampered when there are no established organizational structures outside the military. These structures are needed to facilitate communication, coordination and collaboration across agency, governmental, and national lines. A number of recent proposals published in professional publications and academic outlets begin to address the problem of how to best organize to improve collaboration and coordination in integrated operations. These options include the following:

- appointment of a "supra-departmental presidential advisor" to address interagency coordination,
- creation of the Department of State's Office of the Coordinator for Reconstruction and Stabilization,
- subordination of existing Combatant Commanders and their Commands under senior civilian leadership,
- refinement of current Joint Interagency Task Forces arrangements,
- increases in the number of standing Joint Interagency Coordinating Groups,
- creation of Multi-National Inter-Agency Groups,
- enhancement of Joint Task Forces as the natural organizational focus at the operational level.[114]

While some of these proposals have been adopted, in the aggregate some of these may be inadequate because they are based on attempts to impose traditional, persistent, and hierarchical command and control schemes upon entities that ought to be non-linear, *ad hoc*, short-lived, and mutable. Furthermore, with few exceptions, they tend to assume that the military should assume an operational level leadership role for those organizations. Finally, the challenge of improving integration within existing organizations of the United States government, and the historical experiences of international bodies such as the United Nations both point to the equally daunting

[114] For examples see; among others, Thomas M. LaFleur, "Interagency Efficacy at the Operational Level" (Fort Leavenworth: School of Advanced Military Studies, 25 May 2005).; Clark A. Murdock and Richard W. Weitz, "Beyond Goldwater-Nichols: New Proposals for Defense Reform", *Joint Forces Quarterly*, no. 38 (April 2005); Neyla Arnas, *et al*, *Harnessing the Interagency for Complex Operations* (Washington: National Defense University, August 2005); Mitchell J. Thompson, "Breaking the Proconsulate: A New Design for National Power." *Parameters* Vol. XXXV No. 4. (Winter 2005-06), 62-75; James C. Royse, "Gold is the New Purple: Interagency Operations in Campaigns and Expeditions" (Fort Leavenworth: School of Advanced Military Studies, 23 May 2004).

issues that surround the creation of permanent structures for collaboration and integration among international, governmental, and non-governmental organizations.

Therefore, we must explore organizational constructs that eschew the hierarchical, linear, and persistent organizational approaches of the past. Rather than identify one single approach as a solution, one more creative alternative is to assume an attitude that encourages experimentation, exploration and discovery. The development and exploration of possible organizational models could be one of the tasks of the communities of practice mentioned before.

Design

US experiences across the full spectrum of operations point to a lack of adequate interagency operational planning capability, let alone a shared discipline for planning integrated operations. In a discussion of military support for long-term reconstruction planning by the Federal Emergency Management Agency (FEMA), a member of a planning team involved in assisting FEMA's efforts described one instance of this deficit:

> The difficulties we observed during the Katrina response were due to systemic failure. The lack of what we in the military refer to as "unity of effort" stemmed from the absence of operational level planning, thinking, and coordination. In short, there was an omission of the operational art. [115]

A factor complicating this deficit is that the logic applied by military organizations to problems arising in the contemporary operational environment is usually based upon linear and teleological models.[116] This logic tends to a linear and teleological approach, that is, a viewpoint oriented to achieving predetermined results based upon a simple and deterministic view of causality. These models, such as the Army's Military Decision Making Process, the Joint Operation Planning and Execution System, and even the emerging Effects Based Approach, are useful in military

[115] MAJ Robert Dixon, "Filling The Void: Introducing Operational Art to the National Response Plan", presentation during JTF-Katrina Lessons Learned Panel during Former Speaker Gingrich's visit to Fort Leavenworth, Combined Arms Center (December 5-6, 2005).

[116] I am indebted to Dr. Timothy Challans, of the faculty at the School of Advanced Military Studies, Ft. Leavenworth, for clarification of the possible metaphysical, epistemological, and logical pitfalls of the EBA/EBO approach.

contexts. However, these approaches may be grossly inadequate in the face of the complex open systems which comprise the contemporary operational environment, and the problems that take place within those systems. Open complex systems are dynamic, non-linear aggregates of entities whose interactions result in multifaceted interrelationships and which, because they may affect and be affected by other systems, exhibit behaviors that are difficult to understand, predict and control.

An emerging alternative to these military modes of thinking is Systemic Operational Design (SOD). SOD presents a radical departure from linear/teleological models and offers the possibility of discovering and creating solution spaces that transcend traditional military options. This approach, which is being studied and evaluated at the School of Advanced Military Studies and other entities across DoD, involves developing a contingent and partial understanding of complex systems, avoids assuming that these systems will respond in a predictable fashion or that a set of actions will necessarily result in the attainment of one determinable or particular end state. It recognizes that actions within a complex system will change initial conditions and that planning and execution must take this indeterminacy into account. As one student of the discipline puts it "SOD recognizes that the system will continually change and adapt, not just in response to our actions, but also in response to the rest of its environment."[117]

This mode of operational design is ideally suited to address the chaotic complexities of integrated operations in the contemporary operational environment. It is a mode that may allow us to plan effectively for effective responses in the context of the Long War, and one that should be studied and applied by those seeking to deal effectively with the challenges of integrated operations.[118] One solution to the current lack of a shared operational design discipline would be

[117] Discussion with MAJ Ketti Davison, USA, School of Advanced Military Studies.

[118] For the roots of this mode of operational design, see Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (Portland: Frank Cass Publishers, 1997). For a basic introduction to SOD see William T. Sorrells, *et al,* "Systemic Operational Design: An Introduction" (Fort Leavenworth: School of Advanced Military Studies, 2005).

to establish an institution modeled after the existing advanced operational studies programs where interagency and selected multinational participants would have an opportunity to study a number of disciplines, including Systemic Operational Design.[119]

GIS Informed Operational Design

Operational design cannot begin without the commander's vision. Doctrine speaks of the critical role that the Commander's envisioning and understanding of the battlespace plays.[120]

A major task for the U.S. in the Long War will be to work with other nations and assist their counterinsurgency efforts. This task will be better accomplished by applying GIS as a means to envision and understand the ecology of through the collection, analysis and dissemination of civil information. The latest National Security Strategy directly mentions a number of places where this understanding is both critical and urgent to the national interest.[121]

By leveraging the potential of GIS, the commander can supplement the traditional understanding of the physical terrain with a synthesis of the social, cultural, and economic factors that comprise the human terrain. Design based upon a Common Operational Picture that is enhanced by location-based information on demographic, economic and other human activity trends can support the requirements to develop a detailed appreciation of the terrain. SOD requires a more nuanced understanding of terrain than more traditional approaches, in some ways it reflects the imperative in Sun Tzu's dictum mentioned previously. GIS systems can provide the

[119] This proposal is in line with the ongoing trend of interagency representation at the Senior Service Schools, which arguably is "too little, too late" to allow for an effective impact upon the maximum number of potential practitioners at the operational level. These programs, such as the Marine Corps' School of Advanced Warfighting, the Air Force's School of Advanced Air and Space Studies, have, until recently, had significant attendance by allied officers but little participation by interagency representatives. Although there are joint interagency initiatives to address the education of integrated operations practitioners, such as the Joint, Interagency, and Multinational Planner's Course at the Joint Forces Staff College, the length of the educational experience they offer probably falls short that required to achieve a sufficient level of mastery over concepts such as Systemic Operational Design.

[120] See footnote #22 above.

[121] United States of America. The National Security Strategy of United States of America (Washington, DC: The White House, 16 March 2006), 13-15.

commander a fuller and richer COP by enabling sophisticated location-based analysis of the human dimension of terrain.

Conclusion

> Linear operational forms are now obsolete, and any attempt to revive them under changed historical circumstances will be a grave mistake.
>
> G.S. Isserson[122]

The challenge of the Long War demands that we change the way the US Armed Forces organize, plan for, and execute integrated operations. A major challenge to our success in the Long War is the lack of a shared language, effective organizations, and design approaches that satisfy the complex operational-level demands of integrated operations. Without means for communicating shared visions, adequate organizational structures, and processes that ensure effective and efficient collaboration and integration, our future efforts in the Long War will fall short of achieving national strategic goals. Failure to implement urgently needed changes in our operational design framework may mean the loss of national resources, international credibility and, most importantly, the lives of our service members. The probable cost is too great to ignore. Although this will be a protracted conflict and patience will be a key component in our approach for dealing with its challenges, it is urgent to leave behind outmoded conceptual, organizational, and procedural frameworks that impede the effective planning and execution of integrated operations. To be successful against a complex and adaptive adversary working in an equally complex environment we must implement the following approach:

- Engagement in a constructive dialogue with current and potential partners in integrated operations to construct a shared language that captures the nuances of functioning effectively within the contemporary operational environment. This includes establishment of communities of practitioners that will foster discussion and development of best practices.
- Development of new non-linear, adaptive, and dynamic organizational constructs. These constructs must not be bound by traditional approaches and be guided by the imperatives of pushing dialogue, design and decision making to the lowest possible organizational levels.
- Adoption of an intellectual and conceptual stance that abandons linear and teleological approaches to operational art and looks to a new logic of operational planning. One such logic is Systemic Operational Design.

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[122] Georgii Smoilovich Isserson, *The Evolution of Operational Art*, Theoretical Special Edition by Bruce W. Menning., trans. and ed. (Ft Leavenworth: School of Advanced Military Studies, 2005), 122.

- Integration of a sophisticated understanding of human terrain considerations into operational design. This understanding can be supported by the application of GIS capabilities in order to provide commanders with a synthesis of social, cultural, and economic factors as they relate to the physical terrain.

We must expand and redefine operational art to meet the requirements of integrated operations in the present and future Long War. The complex nature of the adversaries and challenges that we face require the application of innovative approaches. By adopting the operational design framework outlined above, we may gain a critical advantage for our Joint Forces and their interagency, intergovernmental, and multinational partners.

> Many innovations require a lengthy period of time, often of many years, from the time when they become available to the time when they are widely adopted. Therefore, a common problem for many individuals and organizations is how to speed up the rate of diffusion of an innovation.[123]
>
> Everett M. Rogers

Recommendations

The analysis in this monograph has attempted to provide a understanding of counterinsurgency based upon the intersection between human and physical terrains using the internal conflict in Colombia as a case study. Given the crucial role that geography plays in the Colombian internal conflict, analysis of this situation presents a unique opportunity for understanding the relationships between resource dependencies, social factor, and conflict, and evaluates the capabilities that GIS offer in support of counterinsurgency efforts.

The application of GIS analytical tools allows for an objective examination of the role that geographical location of resources plays in terrorism and insurgency. This monograph aims to increase understanding of that role and determine the viability of Geospatial Information Systems (GIS) analysis to assist the Government of Colombia's (GOC) counterinsurgency efforts. By analyzing the situation in Colombia, and reviewing the utility of applying GIS as a tool for counterinsurgency an argument for recognition of the need to improve DOD's use of CIMS in general, and GIS in particular, in the realms of counterinsurgency, counterterrorism, and Homeland Defense.

Based upon the above findings, two proposals for further research are worth considering, (1) developing a richer GIS data set for Colombia to enhance future analysis and efficacy of the Government of Colombia's (GOC) counterinsurgency efforts and (2) developing and integrating a robust GIS capability within the Joint Force community and especially within the U.S. Army's Civil Affairs forces.

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[123] Everett M. Rogers, *Diffusion of Innovations*, 5th Edition (New York: The Free Press) 1995, 1.

Way Ahead

This monograph may be seen as a propaedeutic to further in depth collection and analysis of available Colombian geospatial data which would improve the efficacy of future combined GOC and USG efforts to address the current counterinsurgency. A detailed analysis of existing GIS data would likely yield valuable insights into the relationship between physical and human terrain in Colombia by elucidating the relationship between instances of violence and conflict, presence of IAGs, location of existing resources, and demographic, social, economic trends; in short, a GIS based analysis of the ecology of insurgency in Colombia. This project should be undertaken in collaboration with the Colombian, government, international organizations, and non-governmental entities both as providers and users of the information collected. Appendix B provides a research proposal for such an effort.

This brief discussion of a linkage between application of GIS systems and GIS informed analysis to increased understanding concerning psychosocial, economic, and demographic factors may serve point to urgency of improving U.S. application of GIS in counterinsurgency elsewhere and complex humanitarian emergency settings in the current operational environment. Appendix C illustrates some of the requirements and possible direction of this application.

APPENDIX A- Acronyms and Abbreviations Used

AUC- *Autodefensas Unidas de Colombia* (United Self-Defense Forces of Colombia)

CA- Civil Affairs

CAKMS- Civil Affairs Knowledge Management System

CIMS- Civil Information Management Systems

CMO- Civil Military Operations

COIN- Counterinsurgency

CN- Counter Narcotics

CT- Counter Terrorist

COP- Common Operational Picture

DSS- Decision Support Systems

ELN- National Liberation Army of Colombia

FARC/EP- Revolutionary Armed Forces of Colombia/Popular Army

FID- Foreign Internal Defense

GIS- Geospatial Information Systems (formerly Geographic Information Systems)

GOC- Government of Colombia

IAG- Illegal Armed Group

IO- International Organizations *or* Information Operations (context dependent)

IPI- International Private Institutions

IMINT-Imagery Intelligence

KM- Knowledge Management

NCW-Network Centric Warfare

NGO- Non Governmental Organization

OIF2- Operation Iraqi Freedom 2

USG- Government of the United States of America

UW- Unconventional Warfare

SOD- Systemic Operational Design

APPENDIX B- Proposal for Further Research

MEMORANDUM FOR INSS 7 October 2005

FROM: MAJ José M. Madera, School of Advanced Military Studies (SAMS), ATTN: USA CGSC-SAMS-ATZL-SWV, 250 Gibbon Ave. Ft Leavenworth, KS 66027, email address: jose.madera@us.army.mil, Phone: (913) 758-3302, Fax: (913) 758-3252

SUBJECT: A Geospatial Information Systems Analysis of Human, Geographic, and Resource Factors in Colombia's Counterinsurgency

1. **Project Summary:** This effort explores how the intersection of geography, natural resources, and the human dimension plays a key role in the emergence of terrorist and insurgent activity in Colombia by performing Geospatial Information Systems (GIS) assisted analysis of illegal armed group (IAG) movement patterns, activity, and related incidents.

a. Abstract number: 4.31. Priority tier: 1.

b. Project's significance and specific policy relevance: This investigation will help to clarify the relationship between natural resource issues, geography and conflict through the application of Geospatial Information Systems (GIS). GIS are a type of Civil Information Management Systems (CIMS). These systems have historically been underutilized by the military. The importance of CIMS in conflict and complex humanitarian emergencies is drawing increasing attention from the military and interagency community. Given the crucial role that geography plays in the Colombian internal conflict, analysis of this situation presents a unique opportunity for understanding the relationships between resource dependencies, social factors, and conflict while at the same time evaluating the capabilities that GIS offer in support of counterinsurgency efforts.

c. Research objectives: The application of GIS analytical tools allows for an objective examination of the role that geographical location of resources plays in terrorism and insurgency.

The research aims to increase understanding of that role and determine the viability of Geospatial Information Systems (GIS) analysis to assess the Government of Colombia's (GOC) counterinsurgency efforts. By analyzing the situation in Colombia, the primary researcher also seeks to demonstrate the need to improve DOD's use of CIMS in general, and GIS in particular, in the domains of counterinsurgency, counterterrorism, and Homeland Defense.

d. Methodology: An in-depth literature review will inform insights gained through analysis of a geospatial database developed by Colombia-based researchers. This database, held by the Foreign Military Studies Office at Ft Leavenworth, Kansas, is the primary source of this project. Site visits will support collection of further geospatial data to add to the existing database, provide the opportunity to evaluate in-country GIS efforts, and assess the GOC's counterinsurgency efforts. The overall endeavor will be enhanced by on-site interviews with Colombian civilian, military, civil government, and non-governmental agency representatives regarding the political, socio-economic, and human factors of the insurgency and its geographic context.

e. Planned use of the results. Project results will be used to foster discussion regarding the need for understanding linkages between geography, resource dependency and conflict, and leveraging GIS in support of counterinsurgency efforts world wide. Primary researcher intends to submit an extract of the research report for publication consideration by professional journals.

2. **Researcher Qualifications and Status:** Principal Researcher is an Active Guard and Reserve (AGR) Civil Affairs officer attending SAMS. He has the following relevant qualifications:

- Masters of Science in Public Management and Policy, concentration in Information Systems (Carnegie Mellon University, Pittsburgh, PA)
- experience, as a programmer, developing Geographic Information Systems under a Department of Justice grant (Carnegie Mellon University, Pittsburgh, PA)
- experience, as a Humanitarian Mine Action program manager, in dealing with international organizations and host-nation ministerial level representatives in Latin America (US Southern Command, Miami, FL)

- experience, as a native Spanish-speaking Civil Affairs officer, supporting Colombian military and interagency counterinsurgency efforts (478th Civil Affairs Battalion, Perrine FL)
- experience, as Knowledge Management team leader, in development of Civil Information Management Systems (Combined Joint Task Force-7 and Multinational Forces-Iraq, Baghdad, Iraq)
- experience, as Knowledge Manager, in applying GIS in support of a Planning Group formed in support of FEMA during Hurricane Katrina (School of Advanced Military Studies, Ft Leavenworth, KS)

3. **Prior Results:** Principal Researcher has no prior research grant award history.

4. **Contribution to Military Education:** The project supports the completion of a monograph which constitutes a key requirement for graduation from the School of Advanced Military Studies. Results will be shared with SAMS students, faculty, and the professional community at large through presentations, a trip report, internal distribution of the monograph, and submission of monograph extract for publication (see paragraph *e* above).

5. **Budget:**

a. *Travel.* Primary researcher requests funding to cover expenses related to travel to Colombia. Tentative travel itinerary includes visits to Bogotá, the departments of Antioquia, Magdalena, and Arauca. Estimate based upon a maximum three-week stay and travel. See budget below*:

Lodging	2,159.00
Meals & Incidental Expenses	1,190.00
Taxes & Fees	287.74
	5,136.74

* Note: Principal researcher is requesting additional funding from the School of Advanced Military Studies and Joint Special Operations University to supplement INSS resources.

b. *Other*: Primary Researcher does not anticipate additional expenses requiring INSS funds.

APPENDIX C- DOTMLPF Concept for GIS Application in COIN

Introduction

This section details a suggested concept, using the Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities framework (DOTMLPF), for enabling integration of GIS in Counterinsurgency (COIN). The basic premise is that this integration will not take place until there is greater awareness in the military and interagency community of the potential use of Civil Information Management and Geospatial Information systems. With this in mind, the proposed concept would simultaneously seek to increase awareness while developing capabilities across the joint and interagency communities.

The proposal is closely modeled and inspired by review of documents and concepts during discussions by the author with Dr. Bryan L. Perdue, Geospatial Information Officer at the White Sands Missile Range in New Mexico while serving in the SAMS Planning Group in support of the Katrina contingency in the fall of 2005. Dr. Perdue's vision and work provide a clear roadmap for development and integration of GIS capabilities in installation management that can be modified to provide an institutional roadmap for the Army and the Joint community at large. This is by no means a comprehensive or mature proposal and is only intended to generate discussion and stimulate consideration of the positive impact of using GIS.

Vision

The effective application of GIS as an analytical and synthetic tool in counterinsurgency must be guided by a larger vision of how these systems should be applied for the benefit of the military community at large. Dr. Perdue's statement, which uses the term GI&S (Geospatial Information and Services) in the White Sands GIS Action Plan serves as a logical starting point, and could be modified to accommodate a Service of Joint scope; "Provide precise geospatial

information, at the proper place and time, regularly maintained from reliable sources, in a form that users can understand, easily access, and reliably use to accomplish their missions and tasks, more effectively and efficiently."[124]

Doctrine

1. Review and revise current Service and Joint doctrine on Counterinsurgency to include concepts related to the application of GIS in COIN. One example would be to include a section on Chapter 3 of the current Counterinsurgency Operations interim field manual (FMI 3-07.22) discussing civil information management, systems and application of GIS.

2. Establish a military working group to develop joint and interagency doctrine for the application of GIS in COIN settings in collaboration with interagency and multinational partners in the GWOT.

Organization

1. Stand up a Geospatial Information Systems and Civil Information Management "incubator" organization. The mission of this organization would be to develop a plan for integration of GIS use in Counterinsurgency (COIN). Members would include representatives from the traditional Maneuver community, and other branches such Special Operations, Civil Affairs, Intelligence, Foreign Area, Engineer, Strategy, among others.

2. Establish a Center of Excellence for CIMS/GIS with linkages to military, interagency, and academic institutions involved in COIN and Geospatial Information Science related activities.

3. Establish a GIS community of practice across the Joint and Interagency communities.

[124] Bryan L. Perdue, "Geospatial Information System Action Plan", Version 3.0, (White Sands Missile Range: Geospatial Information Services Office, December 2004), 8.

4. Promote collaboration and coordination among the interagency community including the widest range of interagency users and providers of civil information, geospatial, and imagery intelligence.

Training

1. Establish a minimum standard of “GIS literacy” and competency during initial personnel intake to the various services. Soldiers should be as comfortable using GIS as in the future as they are using maps today.

2. Provide opportunities for service member attendance to industry and academic courses on GIS.

3. Integrate the use of GIS into training and educational opportunities in all service training centers and institutional education venues.

Material

1. Establish and optimize funding sources and mechanisms that enable cost-sharing for data acquisition, licensing agreements, and enterprise-wide initiatives for leveraging Civil Information Management Systems (CIMS) and Geospatial Information Systems (GIS) capability across the entire Joint community.

2. Identify existing CIMS/GIS data resources, prioritize data needs and develop a plan to address current and emerging data requirements.

Leadership

1. Provide opportunities for senior leaders to receive orientation on emerging CIMS/GIS capabilities and potential.

2. Integrate course of instruction on GIS concepts as part of Professional Military Education across all services.

Personnel

1. Identify personnel with CIMS/GIS knowledge, skills and abilities.

2. Develop an education/assignment/utilization process to recruit, retain and employ GIS specialists across services and the Joint community.

Facilities

1. Integrate CIMS/GIS capability, including robust communications and information technology infrastructure into training and simulation centers.

2. Define standards for GIS support requirements across existing and projected training and simulation facilities.

BIBLIOGRAPHY

Violence in Colombia

Berajano Avila, Jesús Antonio, et al. Colombia: Inseguridad, violencia y desempeño económico en las áreas rurales. Bogotá: Universidad Externado de Colombia & Fondo Financiero de Proyectos de Desarrollo. 1997.

Bilyeu, Elisabeth J.. "Guerrilla Groups in Colombia: Prospects for the Future". Ft. Leavenworth, KS: U.S. Army Command and General Staff College. 1995.

Camacho Guizado, Alvaro. "Plan Colombia and the Andean Ridge Initiative: The Ups and Downs of a Policy." Paper presented at seminar: "Internal Armed Conflict, Peace Processes and Peace Negotiations – Is there a way forward in Colombia. Colombia Forum, Collegium for Development Studies. Uppsala University. December 2003.

Corporación observatorio para la paz. *Las verdaderas intenciones del ELN*. Bogotá: Intermedio Editores. 2001.

Corporación observatorio para la paz. *Las verdaderas intenciones de las FARC*. Bogotá: Intermedio Editores. 1999.

Esquivel, Ricardo. *Colombia Indefensa.* Bogotá: Editorial Planeta Colombiana. 2001.

Fonseca, Daniel, Omar Gutiérrez, and Anders Rudqvist. *Cultivos de uso ilícito en el sur de Bolívar: aproximación desde la economía política*. Bogotá: Gente Nueva Editores Ltda. 2005.

Foreign Ministry of Sweden. Estrategia de País: Colombia 1 de Enero de 2003 – de 31 Diciembre de 2007. Stockholm: XBS Grafisk service. 2003.

Guáqueta, Alexandra. "Change and Continuity in U.S.-Colombian Relations and the War Against Drugs". *Journal of Drug Issues*. Winter 2005: Vol. 35, Issue 1. 27-57.

Gutiérrez Lemus, Omar. "Análisis de la economía política de la coca en el departamento del Meta 1982-2004. Bogotá: Agencia Sueca de Cooperación Internacional para el Desarrollo, ASDI. January 2005.

La Rotta, M., Jesús E. Las Finanzas de la subersión Colombiana: Una forma de explotar la nación. Bogotá: Ediciones Los Ultimos Patriotas. 1996.

Gato, Gerardo. "Insurgencies, Terrorist Groups and Indigenous Movements: An Annotated Bibliography." (May-June 2001): XX-XX. Available from <http://fmso.leavenworth.army.mil/documents/milpolre.htm>. Accessed 15 July 2005.

Marcella, Gabriel and Donald E. Schulz. *Colombia's Three Wars: U.S. Strategy at the Crossroads*. US Army War College, PA: Strategic Studies Institute, 1999.

Medina Uribe, Henry. "Ideas for Constructing a New Framework of Hemispheric Security." In *Shaping the Regional Security Environment in Latin America: Perspectives from Argentina, Brazil, and Colombia*. Special Series. U.S. Army War College. Strategic Studies Institute. July 2003. 35-42.

Mendel, William W. "Colombia's Threats to Regional Security". Military Review. (May-June 2001): XX-XX. Online <http://fmso.leavenworth.army.mil/documents/mikpolre.htm> Accessed 15 July 2005.

Pardo Rueda, Rafael. *La Historia de las Guerras*. Barcelona: Ediciones B Colombia, S.A.. 2004.

Presidencia República de Colombia. *Plan Nacional de Desarrollo 2002-2006: Hacia un Estado Comunitario*. Bogotá: Departamento Nacional de Planeación. 2003.

_____. "Presentación de Centro de Coordinación de Acción Integral." Powerpoint Presentation. Bogotá, Centro de Coordinación de Acción Integral. 31 August 2004.

Presidency of the Republic of Colombia. *Democratic Security and Defense* Policy. Bogotá: Ministry of Defence. 2003.

Rabasa, Angel and Peter Chalk. Colombian Labyrinth: The Synergy of Drugs and Insurgency and Its Implications for Regional Stability. Santa Monica: RAND. 2001.

Safford, Frank, and Marco Palacios. *Colombia: Fragmented Land, Divided Society*. New Cork: Oxford University Press. 2002.

Sánchez Gomez, Gonzalo. "Violencias, contra-insurgencia y sociedad en la Colombia contemporánea." Thema Electronic Magazine (April 1998)

Spencer, David. *Colombia's Paramilitaries: Criminals or Political Force?* Carlisle Barracks, Pennsylvania: Strategic Studies Institute, Amy War College. March 2004.

Sweig, Julia E. "What Kind of War for Colombia?" *Foreign Affairs.* New York: Council on Foreign Relations. September/October 2002.

United Nations Secretariat. Committee on Human Rights. *Report of the High Commissioner for Human Rights on the situation of human rights in Colombia*. Advance Edited Version. 28 February 2005.

Valencia Tovar, Alvaro. *Inseguridad y Violencia en Colombia.* Santafé de Bogotá: Universidad Sergio Arboleda. 1997.

Insurgency and Counterinsurgency Theory and Practice

Galula, David. *Counterinsurgency Warfare: Theory and Practice.* New York: Frederick A. Praeger Publishers. 1964.

Guevara, Ernesto. *Guerrilla Warfare.* Lincoln: University of Nebraska Press. 1998.

Headquarters, Department of the Army. Field Manual 3-05.201 *Special Forces Unconventional Warfare*. Ft. Bragg: John F. Kennedy Special Warfare Center. April 2003.

Headquarters, Department of the Army. Field Manual Interim 3-7.22, *Counterinsurgency Operations*. Ft. Leavenworth: Combined Arms Center. 1 October 2004.

Nagl, John A. Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife. Westport: Praeger Publishers, 2002.

O'Neill, Bard E. Insurgency & Terrorism: Inside Modern Revolutionary Warfare. Dulles: Brassey's Inc.

Peters, Ralph. "The Human Terrain of Urban Operations". Parameters. Col. XXX, No. 1. Carlisle: U.S. Army War College. Spring 2000.

Tone, John Lawrence. The Fatal Knot: The Guerrilla War in Navarre and the Defeat of Napoleon in Spain. Chapel Hill, NC: The University of North Carolina Press, 1994.

Trinquier, Roger. Modern Warfare: A French View of Counterinsurgency. Original translation by Daniel Lee. London, UK. Pall Mall Press. Reprinted by Combat Studies Institute, Fort Leavenworth, KS: USACGSC, January, 1985.

Tse-tung, Mao. *On Guerrilla Warfare*. Samuel B. Griffith II, *trans.*. Chicago: University of Illinois Press. 2000.

Tzu, Sun. *The Art of Warfare*. Roger T. James, trans. New York: Ballantine Books. 1993.

Winnefeld, James A. et al.. Intervention in Intrastate Conflict: Implications for the Army in the Post-Cold War Era. Santa Monica: Rand. 1995.

Civil Information, Management Systems, and Intelligence

Armisted, Lehigh (Editor). Information Operations: Warfare and the Hard Reality of Soft Power. Dulles, VA: Brassey's Inc. 2004.

Ashby, W. Ross. *An Introduction to Cybernetics*. New York: John Wiley & Sons.

Ageron, Charles Robert. *Modern Algeria*: *A History from 1830 to the Present*. Michael Brett, trans.. New Jersey: Africa World Press, Inc. 1991.

Barr, Avron, Paul R. Cohen and Edward a. Feigenbaum. *The Handbook of Artificial Intelligence*. Volume IV. Addison-Wesley Publishing Company. 1989.

Civil Military Operations Directorate. *Civil Affairs Knowledge Management System (OIF2) Concept of Operations (CONOPS).* Version 1.0. Baghdad: Multinational Forces Iraq. 24 May 2004.

McGregor, Douglas A.. "Written Statement to The House Armed Services Committee". Washington: DC, 15 July 2004. [D]

Headquarters, Department of the Army. Field Manual 3.0. *Operations*. Ft. Leavenworth: U.S. Army Combined Arms Center. June 2001.

Turban, Efraim. 1990. *Decision support and expert systems: Management support systems*. New York: Mcmillan Publishing Company.

Phillips-Wren, Gloria E. and Lakhmi C. Jain. (eds.) *Intelligent Decision Support Systems in Agent-Mediated Environments.* Washington, DC: IOS Press. 2005.

United States Army. Combat Development Division, G-8. *Area Intelligence Special Target Operations Targeting Linked Environment (ARISTOTLE): Concept of the Operations (CONOPS)*. Fort Bragg: United States Army Special Operations Command (USASOC). Version 1.0, October 2004.

United States Army. Combat Development Division, G-8. *Civil Information Management (CIM) Way Ahead Concept Brief*. Fort Bragg: United States Army Civil Affairs and Psychological Operations Command (USACAPOC). 7 February 2005.

Warmack, Michael, *Civil Affairs Transformation Concept: INSCOM Brief*, Ft. Bragg: United States Army Civil Affairs and Psychological Operations Command (USACAPOC). 27 April 2005.

Geospatial Information Systems

Bradshaw, Ted K. and Brian Muller. “Shaping Policy Decisions with Spatial Analysis” in Michael F. Goodchild and Donald G. Janelle, eds.. *Spatially Integrated Social Science*. New York: Oxford University Press. 2004. 300-322

Center for Spatially Integrated Social Science (CSISS). *CSISS Web Page*. Online at < http://www.csiss.org/> 2005. Accessed 29 July 2005.

Demarest, Geoffrey. *Mapping Colombia: The Correlation Between Land Data and Strategy*. Carlisle, Pennsylvania: Strategic Studies Institute, US Army War College, March 2003.

_____. *Feasibility of Creating a Comprehensive Real Property Database for Colombia*. Fort Leavenworth, Kansas: Foreign Military Studies Office Special Report August 2002. Online at <http://fmso.leavenworth.army.mil/documents/milpolre.htm> Accessed 15 July 2005.

DiBiase, David. Managing editor. *The Geographic Information Science & Technology (GI S&T) Body of Knowledge 2006*. Draft 2006. University Consortium for Geographic Information Science. Online <http://www.ucgis.org/priorities/education/bok_discussionforum.asp > Accessed 19 February 2005.

ESRI. ArcGIS Web Site. Online at <http://www.esri.com>. 2005. Accessed 15 July 2005.

GIS Development Pvt. Ltd. The Gezspatial Resource Portal. Online at <http://www.gisdevelopment.net/application/> 2005. Accessed August 28, 2005.

Goodchild, Michael F., NCGIA Curriculum in Geographic Science Web. Online at <www.ngcia.uscv.edu/gisc/units/u2002>.

Keeley, James F. “Willie 14:5: Commercial Satellite Imagery and UN Peacekeeping”. *Journal of Conflict Studies*. New Brunswick, Canada: University of New Brunswick Fredericton. Vol. XXIII, No. 1, Spring 2003. Online at <http://www.lib.unb.ca/Texts/JCS/bin/get.cgi?directory=spring03/&filename=keeley.htm > Accessed 30 August 2005.

Kretov, V.S. et al. “Geographic Information Systems In Peacekeeping Operations.” *Military Thought.* Russian Federation Ministry of Defense. Minneapolis: East View Publications. Nov-Dec. 2001. Online at <http://www.findarticles.com/p/articles/mi_m0JAP/is_6_10/ai_82009978> Accessed 30 August 2005.

National Center for Geographic Information Analysis (NCGIA). NCGIA Core Curriculum Web Page. Online at <http://www.geog.ubc.ca/courses/klink/gis.notes/ncgia/toc.html#UNIT51 > 2005. Accessed 30 August 2005.

National Geospatial-Intelligence Agency (NGA). “NGA History”. Online < http://www.nga.mil/StaticFiles/OCR/nga_history.pdf>. Accessed 19 February 2006.

O’Sullivan, Patrick and Jesse W. Miller Jr.. *The Geography of Warfare*. New York: Saint Martin’s Press. 1983.

Perdue, Bryan L. “Geospatial Information Services Office Garrison Concept of Operations”. White Sands Missile Range: Geospatial Information Services Office. 30 May 2005.

_____. “Geospatial Information System Action Plan”. Version 3.0. White Sands Missile Range: Geospatial Information Services Office. December 2004.

Rogers, Everett M. , *Diffusion of Innovations*, 5th Edition. New York: The Free Press. 1995

Tufte, Edward R.. *The Visual Display of Quantitative Information*. 2nd Edition. Cheshire, Connecticut: Graphic Press. 2001.

Human/Psychosocial Dimensions of Conflict

Wiedenhaefer, Robert M. "Ethnopsychological Factors Associated with Terrorism". Ph.D. diss, H. Wayne Huizenga School of Business and Entrepreneurship, Nova Southeastern University. 2005.

Kelman, Herbert C. "Social-psychological Dimensions of International Conflict." In *Peacemaking in International Conflicts: Methods & Techniques*. I. William Zartman and J. Lewis Rasmussen, Editors. Washington: United States Institute of Peace Press. 1997.

O'Sullivan, Patrick and Jesse W. Miller. *The Geography of Warfare*. New York: St. Martins' Press. 1983.

Assessment

Chairman of the Joint Chiefs of Staff. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 2003. Washington, D.C.: U.S. Government Printing Office, 2003.

Fitzgibbon, RussellzJumke and Phillip Kelly (eds.) *Assessing Democracy in Latin America*. Boulder: Westview Press. 1998.

JWFC Doctrinal Pamphlet 4 *Doctrinal Implications of Operational Net Assessment.* Norfolk: JFCOM JWFC, 24 February 2004).

JWFC Doctrinal Pamphlet 7 *Operational Implications of Effects-based Operations (EBO).* Norfork: JFCOM JWFC, 17 November 2004.

Mann, Edward C. *et al*., *Thinking Effects: Effects Based Methodology for Joint Operations*. Maxwell AFB, AL: Air University Press. October 2002.

Miscellaneous

Turabian, Kate L. *A Manual for Writers of Term Papers, Theses, and Dissertations.* 6th ed. Chicago: University of Chicago Press, 1996.

Lunsford, Andrea A. Easy Writer: A Pocket Guide. New York: Bedford/St. Martin's. 2002.

Sorrells William T., *et al*, "Systemic Operational Design: An Introduction". Fort Leavenworth: School of Advanced Military Studies, 2005

Strunk, William, Jr. and E.B. White. The Elements of Style. Third Edition. New York: Macmillan Publishing Co., Inc. 1979.

Student Text 20-10. *Master of Military Art and Science (MMAS) Research and Thesis.* Fort Leavenworth, KS: U.S. Army Command and General Staff College. July 2004.