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## INTEGRATED BATTLEFIELD MANAGEMENT BEGINS IN SPACE

### INTRODUCTION

On July 3, 1863, "Lee's stubborn pugnacity still pushed the attack forward, until three divisions totaling about 15,000 men suffered wreckage beyond recovery in the failure of Pickett's Charge"<sup>1</sup> Sadly, Robert E. Lee stands out for miscalculating the impact of an ongoing revolution in military affairs. He was knowledgeable in the new weapon systems he faced, yet was unwilling to adapt his strategy and tactics to the new realities. At the close of the twentieth century, military leaders face a similar dilemma. Today, a highly volatile technological environment is reshaping the battlefield. Our challenge is to understand and adapt, for if we fail to shape the new technologies, they will shape us with potentially disastrous results.

The JCS, through Joint Publication 6-0, established a benchmark for future command, control, communications, and computer systems. We must build a future where an effective C4I structure is able to support virtually any type of joint operation. This future vision is captured in the concept of real-time battlespace information. The JCS described the system's objective as follows: "The warrior needs a fused, real-time, true picture of the battlespace and the ability to order, respond and coordinate vertically and horizontally to the degree necessary to prosecute the mission in the battlespace."<sup>2</sup>

To understand the issue of battlefield management, we need to address a series of key questions. First, is this concept part of a revolution in military affairs (RMA)? Second, what is a reasonable vision for an integrated battlespace goal? Third, what are the acquisition issues associated with the concept? Finally, what is the best vehicle to convert this concept into a

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<sup>1</sup> Weigley, Russell F., *The American Way of War* (Bloomington, Indiana University Press, 1977) 117

<sup>2</sup> Joint Chiefs of Staff, *Joint Pub 6-0 Doctrine for Command, Control, Communications, and Computer (C4) Systems Support for Joint Operations* (Dept of Defense, 30 May 1995) I-1

strategy to guide our efforts? These questions are central to the entire concept of battlefield dominance and our success in reaching this goal in the next century. This paper will briefly look at each question and outline a vision of a near-term adaptation to best overcome the challenges we face in making this concept a reality. We begin our discussion with the basic question of change in the military environment.

### **REVOLUTION IN MILITARY AFFAIRS**

It is an understatement to say current military observers feel we are moving through an age of change. The "Information Age" is commonly used nomenclature for what several writers have labeled a revolution in military affairs. It is axiomatic that any revolution in military affairs is new technology which also requires new strategic thinking. The Gulf War astounded many observers both in and outside the military with a dazzling array of high-tech weapon systems. Prominent among the "nifty gadgets" receiving great publicity were an array of space assets which had been operational for many years. These systems which "revolutionized" the battlefield were nuclear command control support systems applied to the tactical environment. At the same time, an explosion in Internet use has demonstrated the incredible power of modern computing systems when placed in a networked environment. While the advances in computing power are dramatic, the basic science and technologies have been available for some time. What is new is the evolution in technology application. Our evolving use of information technologies is driving a revolution in military affairs (RMA). The integrated battlefield is the next step in this evolving application of technology to warfare.

Absolutely key to this unfolding process is the need for a growing comfort-zone or "normalization" of space as an indispensable part of the battle management equation. One needs to keep things in perspective when considering space. If Sputnik had been a soldier instead of a satellite, it would have retired with 30 years of service ten years ago. Good old fashioned space operations is at the very heart and core of the RMA.

Admiral Owens has noted the problem with significant change, as in an RMA, "is not getting people to accept the new, but to surrender the old. Most will flirt with the future, but few want to

embrace it at the expense of a comfortable present "<sup>3</sup> During the Gulf War, Air Force Space Command was clearly in the lead, driving changes on how to use strategic systems for tactical purposes. Their success in applying technology to new realities on the battlefield preceded both established strategy and doctrine from both the Air Force and JCS. It is no exaggeration to say that the space warriors and thinkers at Peterson AFB wrote the context for what current futurists call the RMA.

### **INTEGRATING THE BATTLEFIELD: CONCEPT OUTLINE**

A fundamental question in the battlefield management debates is one of doability. Is it possible to actually design and field an integrated battlespace management scheme or system? Here the issue hinges on how one approaches information and computing technology integration. The technology exists today to process huge amounts of data very quickly. More importantly, the computer industry is extremely adept at solving user application scenario problems. The business world is replete with examples of large integrated management systems. The telecommunications industry is a huge electronically controlled series of networks. The electrical power industry is overlaid on a highly automated grid system. Even our aging railway systems (e.g. Union Pacific in Omaha, Nebraska) are highly automated networking systems which use information and electrical command impulses to move large physical assets through geographically separated spaces. Air Force Space Command has, for many years, operated a large, complex command control and information processing systems. Since the advent of Cheyenne Mountain, the space community has adeptly translated space and ground-based source information inputs into decision making processes for the national command authority. The question is why do we have trouble integrating existing technology to the tactical battlefield.

The answer is in our military way of thinking. To begin with, military organizations tend to focus on the "teeth" of weapon systems as they operate on the battlefield. The "tail" of logistics, computer support, command control, and intelligence assessment are kept back out of harm's

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<sup>3</sup> Owens, William A., "The American Revolution in Military Affairs" Joint Force Quarterly (Winter 1995-96) 37

way This thought process is flawed The Gulf War showed that space assets are on the battlefield with the tanks, soldiers, and fighter aircraft space assets were there, operating around the clock Once the space operators internalized that fact and began to think like operators, the revolution in military affairs was underway

A prevalent theme in RMA literature is the concept of a commander watching the combat unfold from afar Martin Libicki describes how, in the future, information will flow to an area CINC and JTF commander through an "information mesh" of considerable proportions<sup>4</sup> Futurists see this long distance warrior-leader making clear-headed decisions based on space, air breathing, and ground system updates In turn, decisions are instantly executed through a system of high-tech terrestrial and extra-terrestrial battle systems<sup>5</sup> Libicki captured this process conceptually in the notion of dominant battlespace knowledge near perfect knowledge Despite Libicki's assurances to the contrary, it is difficult to divorce modern combat from the Clausewitzian notion of fog and friction, even in high-tech combat Further, Libicki takes the battlefield awareness provided by space assets and interpolates a quantum leap in force application efficiency without clearly articulating how this improvement is achieved<sup>6</sup> His is a large operating system, away from the battlefield, processing both sensor and command control inputs However, this concept is at odds with present commercial computer system applications it is the IBM mainframe versus a personal computer analogy Additionally, this concept is suspect because distance from the battlefield will almost certainly distort understanding of sensor inputs and misunderstanding of commands issued Further, space-based sensors do not provide perfect knowledge They provide a snapshot in time which needs interpretation from a knowledgeable individual on the battlefield

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<sup>4</sup> Libicki, Martin C , *The Mesh and the Net Speculations on Armed Conflict in a Time of Free Silicon* 2nd Printing (Washington D C , NDU, Aug 1995) 48

<sup>5</sup> Mahnken, Thomas G . "War in the Information Age" *Joint Force Quarterly* (Winter 1995-96) 39

<sup>6</sup> Libicki, Martin C & Johnson, Stuart E , *Dominant Battlespace Knowledge* (Washington D C , NDU, 1995) 48

An alternative system architecture is an integration of space-based sensor inputs, communications, assessment capability, and command control right on the battlefield. Space-based sensor systems and numerous ground-based mobile computers networked together in a decentralized manner allowing field commanders to communicate and act at lower echelons to better manage their forces. Decision making would diffuse lower in the chain of command, not higher and more centralized. The computing capability anticipated by Libicki completely ignores the dominant commercial industry trend toward decentralization of processing and decision making. Today's commercial networks make data available to more users, enhancing their individual decision making ability. Militarily, it is a principle of good leadership to foster decentralized execution.

What is needed to meet future warfighter needs is an integrated, highly mobile C4I system using existing space capabilities in concert with greatly enhanced computing capability. Conceptually, this alternative system would allow a battlefield commander to follow unfolding events in total through space-based sensor inputs and make better tactical decisions. He could use this integrated system scheme to call for real-time air support or artillery fires with pinpoint accuracy. As the close air support pilot is receiving the data from the battlefield commander, tanker support teams are also using the information to reallocate tanker assets supporting the fighter's new mission profile with optimum tie-up times and locations. The JFACC staff takes the same data and makes real-time alterations to a living Air Tasking Order accounting for this emerging mission requirement. At the same time, Space Command teams on the battlefield would take the same data and verify satellite bomb damage assessment is completed soon after the support strike is completed and provides near real-time assessment on the need for additional strikes. A system integrated on the battlefield would allow the application of queuing theory to the battlefield - more strikes with fewer assets. Senior-level commanders, like the JFACC, would make asset allocation decisions more effectively and efficiently, while allowing subordinate commanders the leeway to execute missions as the battle unfolds at sea, on the ground, or in the

air all in an integrated multi-service environment made possible through space-based C4I systems

This alternative to Libicki's vision is a process vision more akin to the currently evolving Internet than a centralized command control scheme. It is a concept where space-based systems are truly integrated into the battlespace at all levels, but most especially at the tactical level. It is a system which is integrated into unit equipment design, tactics, and strategy (especially at the operational level of war) to make truly joint operations possible. This concept is not a major leap in technology, rather it is a maturing of the concept of jointness.

### **ACQUISITION CHALLENGES**

Given a vision of integrated sensor input management and decentralized decision making, a daunting hurdle to success is the acquisition process. The problem is simple and widely understood. Our falling Department of Defense budgets create inertia to continue battlespace management systems as they are today. Further, it is unlikely future budgets will grow to allow innovative system development. Sadly, the cost of developing an integrating system for the battlefield is likely to be low since it will rely heavily on existing technology. Similar commercial applications abound and although none is directly applicable to the military environment, the basic principles already exist.

Additionally, as budgets shrink, service parochialism will squeeze "joint" systems out in order to support weapons which are part of each service's core culture and environment. The best answer to this dilemma is to capture the entire process in the space arena. Air Force Space Command needs to take the lead and develop a system usable at the tactical level in a wide variety of environments. Further, it must have the ability to field it in the existing weapon system architectures for each of the services. This will require a constant effort to understand user requirements and environments. Airman are going to have to learn how to think like soldiers and sailors.

## NATIONAL SPACE STRATEGY

Given the Air Force is the best service to develop and field this joint system, a strong clear set of goals is needed from national leadership. The best vehicle to convert this concept into a strategy to guide our acquisition and integration efforts is the National Space Strategy. Current National Space Strategy focuses on the space support decision process at the national level.<sup>7</sup> While the policy, as written, outlines modernization to support U S military activities, it does not establish requirements for space-based systems or ground interfaces to integrate information management at battlefield level. In an era of shrinking budgets and inter-service fiscal competition, the National Space Strategy is the one place which brings together the various existing system elements and the power of the White House to overcome service parochialism.

The Air Force and space community are culturally and intellectually equipped to accept the challenge of making jointness a technical reality. Air Force Space Command has a corporate ethos which is comfortable with leading edge technology and the risks inherent in such endeavors. An updated National Space Strategy is the critical first step in a path leading to Congress, the budget process, consensus building, and on through development and deployment. Space is the medium which now, more than ever, permeates operations regardless of environment.

## CONCLUSION

Col Jerry Wiedewitsch, in McNair paper 21, noted that "Technological superiority does not equate to warfighting superiority unless new systems are fielded in a timely manner."<sup>8</sup> The Information Age is changing the way all of us relate to our environment. Space is a critical element in making the Information Age a commonplace part of military operations across all services. While we are genuinely amidst a revolution in military affairs, the truth is we are in the embryonic stage of that revolution. We have an opportunity to make use of evolving technology, not to rewrite how wars are won, but to make existing technologies and systems more efficient on

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<sup>7</sup> White House, *Fact Sheet National Space Policy* (Washington D C , National Science and Technology Council, 16 Sept 1996) 5

<sup>8</sup> Wiedewitsch, Jerry L , *Technology Timelines from a Soldier's Perspective*, McNair Paper 21 (Washington D C , National Defense University, Aug 1993) 43

the battlefield. The tools are all available and in use to some degree in either the military or civil sector. The job ahead is to integrate the battlefield with the space systems and the great potential they offer. Normalizing space into the battlefield is the goal. While the concepts are relatively straightforward, acquisition hurdles, service rivalries, and shrinking budgets will challenge the faint-hearted. It will take a national focus and an integrating document, the National Space Strategy, to overcome the challenges. Battlefield dominance is achievable in the foreseeable future and the space community is the place to make it happen. All that remains is to lay out the guidance and begin the march into the future.

One noted scholar placed technological advancement in perspective noting "we may be neglecting the warrior skills and relinquishing the kind of military culture that would be needed to pursue warfare at the gut level"<sup>9</sup>. When technology and space are integrated on the battlefield at the tactical level, dislocation between technology and the "gut level" of war is avoided. Martin Libicki eloquently outlined the dangers America faces in the decades to come. The capabilities he thoughtfully places in the hands of a foe are measured and reasonable.<sup>10</sup> His dominant battlespace knowledge theory is strong, yet based on a host of developments which are decades away at best. U.S. national security demands reasonably costed solutions, using achievable technologies, in a near-term horizon. Our National Space Strategy needs to support an integrated Information Age battlefield and let the larger Libicki revolution come in its own good time.

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<sup>9</sup> Tilford, Earl H., *The Revolution in Military Affairs: Prospects and Cautions* (Carlisle Barracks, Army War College, 23 Jun 1995) Part III page 2

<sup>10</sup> Libicki, Martin C., *The Mesh and the Net: Speculations on Armed Conflict in a Time of Free Silicon* 2nd Printing (Washington D.C., NDU, Aug 1995) 161-165

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