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COALITION COMMAND AND CONTROL IN THE NETWORKED ERA

Application of the Strategic Alignment Model and Information Technology Governance
Concepts to Support Network Centric Warfare

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Abstract

Information technology has transcended its traditional back office role of supporting the overall business and has assumed a more strategic role in business and mission planning. Effective use of IT has allowed organizations to transform their business processes thereby realizing new capabilities and electronic business strategies that were previously impractical, if not impossible. Network Centric Warfare is often viewed as the military equivalent of E-Business. NCW and E-Business are clearly similar in that they involve the development of business processes in response to advances in technology to achieve a strategic advantage over the competition. Successful businesses achieve this transformation with the adoption of a strategic alignment framework to ensure seamless integration of technology into the organization. This framework ensures that cultural, training, technology, and business process issues are managed coherently. Observations of military writings on NCW indicate that the military tends to focus on technology first, without fully understanding the doctrinal and organizational changes required to effectively implement the technology. Given the military's heavy dependence on technology, which is constantly evolving, a strategic alignment mindset should be fostered to better help planners, operators, and maintainers manage change currently and in the future.

1. Introduction

There is little debate in both the private and government/military sectors that information technology (IT) can enable more business operations than ever before. In fact, over the past 40 years, "most companies have used computing technology to improve operations. Now and in the future, technology will be used to innovate businesses, products, and services." [7] The problem most organizations face is how to harness the power and opportunity of IT in order to use it as a

source of strategic advantage over their competition. Few companies have found ways of capitalizing on IT since traditionally “IT was viewed as a “cost center” or viewed as an “expense” rather than an enabler or driver of business value.” [8]

Network Centric Warfare (NCW) is often touted as the military equivalent to E-Business. In his 2001 report to Congress, Assistant Secretary of Defense for Command, Control, Communications and Intelligence, Mr. Arthur Money, said the terms “network centric operations” and “network centric warfare” are used to describe various types of military operations in the same way the terms “E-Business” and “e-commerce” are used to describe a broad class of business activities that are enabled by the internet.” [10]

The purpose of this paper is to look at NCW and transformation efforts to determine if the Air Force (and the U.S. military in general) has embraced the same aspects of transforming operations as private organizations do while adopting E-Business strategies. The paper is organized as follows. Sections 2 and 3 provide discuss how successful businesses employ IT Governance and strategic alignment principles to ensure their IT investments remain in step with their overall business goals. Section 4 then provides observations on how the military seems to be neglecting some of these principles and appears to be focused on technology. Section 5 presents a modified strategic alignment framework to help remedy this situation, and we conclude the paper in Section 6.

2. IT Governance

Technology tends to change faster than most organizations, whether they are private, government, or military. The key to transforming an organization in the Information Age is to remain adaptable and flexible. This does not merely mean reinvesting in the IT infrastructure so

as to remain current. On the contrary, organizations wishing to remain viable often need to transform (sometimes radically) internal business processes.

This is not to minimize the impact of technology, because the availability of new technology may in fact enable the organization to do things that were previously impractical if not impossible. IT can be a two-edged sword, however, and in a business world where flexibility and adaptability are critical, failure to leverage IT effectively and efficiently may seriously hamper the organization's performance and viability, especially in today's global, information-intensive world. Therefore, the need to integrate business and IT strategies is paramount.

IT is no different from any other investment made by an organization—a sufficient return on investment must be achieved, or the organization will eventually fail. In an organization that relies on IT to achieve business objectives, each level of the management hierarchy has a different perspective on the value of IT. It is essential for senior management to provide a concise vision on how IT creates value at each level within the organization.

Successful organizations dedicated to transforming their business operations and adopting a more E-Business approach recognize the necessity to align their IT goals with their business goals, a process known as IT Governance. This is critical because IT is at the core of any E-Business strategy. IT Governance involves aligning business objectives with IT decisions, infrastructure and overall strategy. “Alignment grows in importance as companies strive to link technology in light of dynamic business strategies and continuously evolving technologies.” [8]

The importance of having a sound IT Governance process cannot be understated. Without formal IT Governance procedures in place, IT managers are left to resolve isolated issues as they arise, therefore decreasing both productivity and time for innovation within an organization. Senior managers cannot afford to delegate all IT decisions to technical personnel.

Managers and leaders need well-developed skills to deal confidently and competently with IT issues so that these complex choices can take account of strategic, technical, competitive, financial, and organizational issues. [14]

Effective IT Governance also requires a significant investment in time and energy, by people throughout the organization. Senior executives must define enterprise performance objectives and actively design governance to ensure outcomes are consistent with those objectives [15]. Because IT Governance requires a vast number of both IT and non-IT stakeholders to change processes, successful governance initiatives require extensive involvement by relevant participants in design, planning and implementation [12].

Once an IT Governance framework is introduced into an organization, some of the ambiguity associated with achieving value from IT will be alleviated, since the framework will involve “clarification of how the organization will operate, how its structure will support business operations and what Governance arrangements will elicit the desirable behaviors that structure cannot ensure.” [15] IT Governance also allows for organizations to be more flexible in terms of IT infrastructure, as decision makers will be more educated on the needs and strategy of the business operations and how IT will facilitate the organization’s objectives.

3. Strategic Alignment Framework

The ultimate goal of IT Governance is achieving strategic alignment between business and IT to make sure money spent in IT is delivering value for the organization [1]. In order to fully take advantage of an E-Business strategy, management must align IT initiatives with the overall business goals. As business operations evolve, IT goals must co-evolve with the business. With businesses adopting E-Business strategies, the business value “derived from IT investments only emerges through business changes and innovations, whether they are new

business models or process change, and organizations must be able to assimilate this change if value is to be ultimately realized.” [11] This can be accomplished through successful alignment of IT and business strategies. The strategic alignment initiatives adopted by an organization should be embraced at all levels and can be used as a source of competitive advantage.

Alignment can be defined as “applying IT in an appropriate and timely way and in harmony with business strategies.” [8] Ultimately, strategic IT-business alignment refers to the extent an organization’s IT mission is aligned with the business mission, plans and objectives. According to Sledgianowski and Luftman, “for an organization to successfully align its IT strategies with its business strategies, specific management practices and strategic IT choices should be considered that help facilitate integration.” [13] These factors should be considered and standardized throughout each level of the organization in order for mid-level managers to execute business objectives which are aligned with the overall business strategy. While this is not an easy task for any organization, executives realize the necessity of IT and have been willing to invest millions of dollars to achieving this goal.

In order to implement a strategic alignment model, an organization must have a need for a new technology. Before an organization can implement a new technology, the strengths and weaknesses must be delineated and understood. The implications of implementing the technology organization-wide must also be studied. Organizations should strive to develop an “alignment behavior” in which all levels of the organization understand the benefits derived from IT. This will facilitate the “potential for complete alignment and improve their ability to gain business value from investments in IT.” [8]

Several frameworks have been introduced for organizations to apply to their strategic alignment initiatives. Venkatraman and Henderson developed the Strategic Alignment Model

(SAM), which provides a clear depiction of the relationships and interdependencies between business strategies (Figure 1). The SAM is one of the more robust frameworks introduced to organizations seeking strategic alignment of their business processes and IT infrastructure. Fundamentally, the SAM suggests that business success depends on the harmony of business strategy, information technology strategy, organizational infrastructure and processes, and IT infrastructure and processes [9]. It also demonstrates the need to consider both the internal and external business domains when developing an IT strategy.

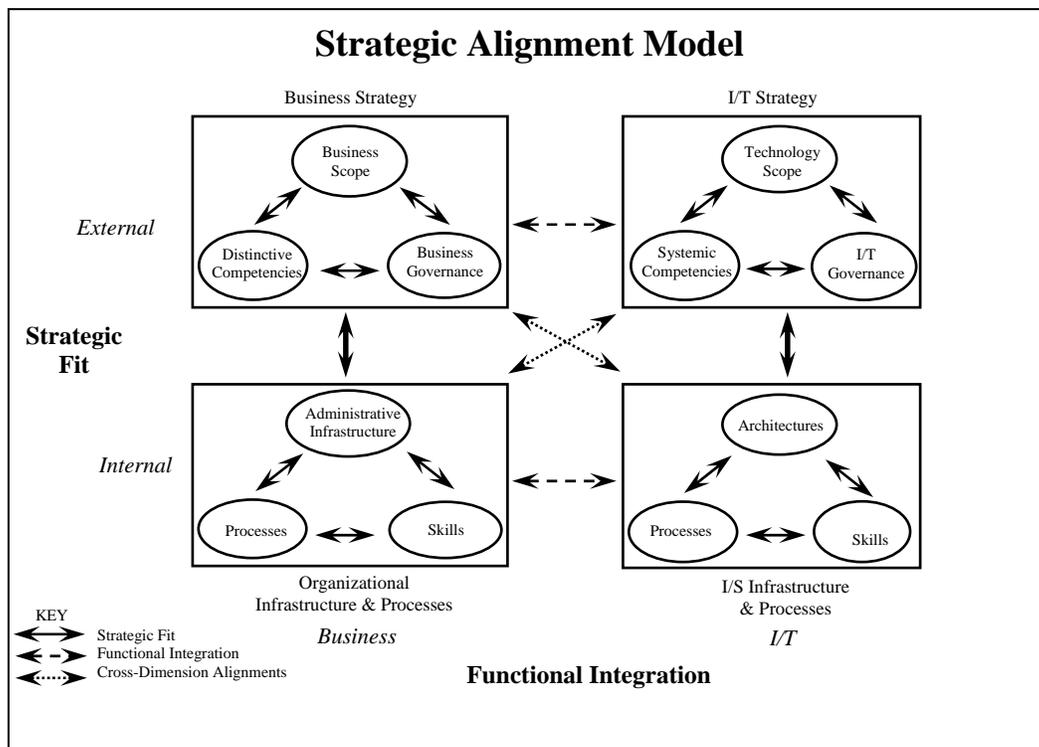


Figure 1: The Strategic Alignment Model [6]

The SAM does not provide specific objectives and processes for an organization to implement in order to achieve and sustain alignment. Alignment should instead be viewed as a highly dynamic process. For example, the SAM shows that alignment can only be achieved if the business processes and operations continue to evolve concurrently with the IT within an organization. Organizations should therefore strive for adapting technologies that can be

seamlessly integrated into the overall functions that are both internal and external to business operations, since it is possible for an organization to be operating at different perspectives simultaneously.

4. Observations

Both E-Business and NCW are predicated upon the use of technology to evolve an organization into the Information Age. There are some distinct differences between the terms E-Business and NCW, and it is difficult to totally compare the two concepts. E-Business strategies are a source of competitive advantage for many organizations, and many businesses are reluctant to divulge exactly how they implemented these strategies. Furthermore, the military and private sector use different languages to discuss their business operations, which can make comparing these two concepts difficult.

With that said, there are some parallels between E-business and NCW that can be drawn. The basic premise to both E-Business and NCW is similar: to adapt (or develop) business processes in response to advances in technology and to achieve (or preserve) a strategic advantage over the competition. The strategic advantage in E-Business and NCW does not come from the technology alone, but from the ability of an organization to exploit new capabilities enabled by the technology. This is accomplished through an evolution of business processes and procedures and adoption of a strategic alignment framework in order to seamlessly integrate technologies into the organization.

The military, not unlike the private sector, expects to accomplish a specific objective once a technology is implemented within the organization. A 2001 NCW Report to Congress, calls for co-evolution of technology, organization, and process. However, the literature studied by the authors does not support that these actions are occurring at all echelons of the military.

Further, there seems to be little recognition of the need for strategic alignment that is well understood at all echelons.

Air Force recognizes the need to create a strategy that is “dynamic, flexible, and adaptive to new requirements and opportunities”, but we continue to rely on technology to execute these objectives. The military cannot sustain information superiority by technology alone. The SAM suggests there must be interdependence between business and IT functions. The military must evolve its business (operational) processes in order to harness the true potential of new technologies because “applying IT to old, ineffective, inefficient business processes will not create value.” [9]

Many authors have written about how military policy and doctrine will need to evolve while implementing NCW at the strategic level. However, little or nothing is said about specific IT Governance procedures that can be disseminated and embraced throughout all of the echelons of the military. IT Governance procedures must be developed at the highest levels of command and disseminated throughout the forces.

Military organizations of all kinds (support, operations, maintenance, logistics, etc.) must then be held accountable to adhere to these policies, especially as the military as a whole evolves to a more net centric force. This is a fundamental difference between E-Business and NCW. With E-Business, IT Governance procedures are either developed before or concurrent with the implementation of technology and become the cornerstone for a successful E-Business strategy to be implemented within an organization. With NCW, however, we are seeing changes in policy and doctrine after the technologies are implemented, which may limit both the interoperability of the systems and the people who use them.

While the literature pertaining to NCW addresses the need for NCW to be the cornerstone for each of the service's transformation efforts and development of strategic plans, the military is lacking complete strategic alignment initiatives by its own admission. In a 2001 report to Congress, several significant impediments to the progress of NCW were addressed, which included: [2]

- Lack of strategic plan expressed in terms of network-centric hypothesis
- Lack of organizational focal points in OSD, the Services, Agencies and the Joint Community to promote and assist with the attainment of network-centric capabilities
- Lack of progress towards an info structure that achieves the levels of connectivity and interoperability needed to support Network Centric Operations

Without a clear strategic plan and alignment of both IT and mission initiatives, it will be difficult to completely execute NCW objectives. The report continues "with nothing but a general vision to guide them, each organization will develop its own sense of urgency and own set of priorities." [2]

The military needs to develop ways to quantifiably measure the success of implementing new technologies on the enterprise. In the civilian sector, profit is the driving force in implementing a new business model and spending large amounts of money on new technologies. Without a tangible return of investment, it will be difficult for the military to justify implementing new technologies on the enterprise to decision makers. Additionally, the Air Force continues to spend millions of dollars a year on IT, but the communications community stills has a difficult time determining the implication an outage might have to the mission. Assessing a value to new technologies as well as operationalizing network outages will help in efforts to align mission and IT objectives, since without assessing a value to a system, it will be difficult to convey to senior leadership the implications each system has to the mission.

The intent of this research is not to imply these E-Business initiatives presented in the SAM are not taking place, and there are some initiatives in place to implement strategic alignment within the military. One example is the Performance Reference Model (PRM), as depicted in the Department of Defense Architecture Framework (DoDAF). The PRM speaks to the need for alignment of IT along with performance measures. [3] The goal of the PRM is to provide a common and consistent framework for the DoD to use for IT performance measurements. To be compliant with Office of Management and Budget (OMB) requirements, as well as the Clinger-Cohen Act, an agency must identify performance information that pertains to any major IT investment. The problem with the PRM is it does not give any guidance on how changes to both technology and internal processes will be implemented in the organization. It also does not show how IT is related to the mission operations and the effects IT has on the overall objectives of the organization.

In another example, the Office of Force Transformation's Line of Development, commonly referred to as DOTMLPF (an acronym for doctrine, organization, training, materiel, leadership and education, personnel, and facilities), specifically speaks to the areas of training, culture, doctrine and materiel (technology). These areas are critical to success in transforming the force into the net-centric environment, and they are also interdependent. Unfortunately, little has been said about how changes to these areas affect the overall organization, or how each are aligned to support the overall mission of the military. In order to truly embrace the concept of NCW, the military must change its culture, focusing on and teaching the concepts of governance and strategic alignment to all career fields, at all levels.

5. A Modified Strategic Alignment Model

In order to truly embrace E-Business and transformation concepts, the military needs to eliminate the stovepipes associated with different business units which execute mission objectives. In the Air Force, efforts to achieve strategic alignment are concentrated at the HQ/AF levels. This is evident in the lack of interoperable systems which continue to be implemented within the GIG infrastructure at the operational and tactical level.

The focus of the military efforts can change if the military adopts a strategic alignment approach similar to the strategic alignment model. While traditionally conducted at the higher echelons of the military, strategic planning conducted at all levels will allow the importance of the change in culture to the Information Age to be conveyed to all military personnel. This will facilitate the dissemination of IT Governance policies, strategic alignment framework implementation and the integration of new technologies throughout the military enterprise. The overall goal of the SAM is to “reflect the view that business (mission) success depends on the harmony of business strategy, information technology strategy, organizational infrastructure and processes and IT infrastructure and processes.” [9]

Figure 2 shows how the SAM could be applied to the Air Force (and military in general) to achieve the desired strategic alignment. Table 1 depicts an explanation of each component of the SAM, as well as how each component relates to the Air Force. Fundamentally, the original and adapted strategic alignment models have the same components. The differences reside in the systemic competencies where the value of the IT is assessed for the organization.

For the military, the value of technology is measured through its: lethality, speed, survivability, timeliness, responsiveness, and richness/reach. These are often difficult for the military to quantifiably measure. In the private sector, IT is assessed a monetary value and the

organization's success often relies on the successful implementation of IT and how well the IT is aligned with the business processes of the organization. Management focuses on how a new way of conducting business will effect the daily operations of the business and assesses the need for a new business strategy based on its potential return on investment. The very economic survival of an E-Business organization rests on the efficacy of IT and the successful integration of internal and external business processes. E-Business equals business plus technology, plus economics, as it brings about a new facet of the economy. [5]

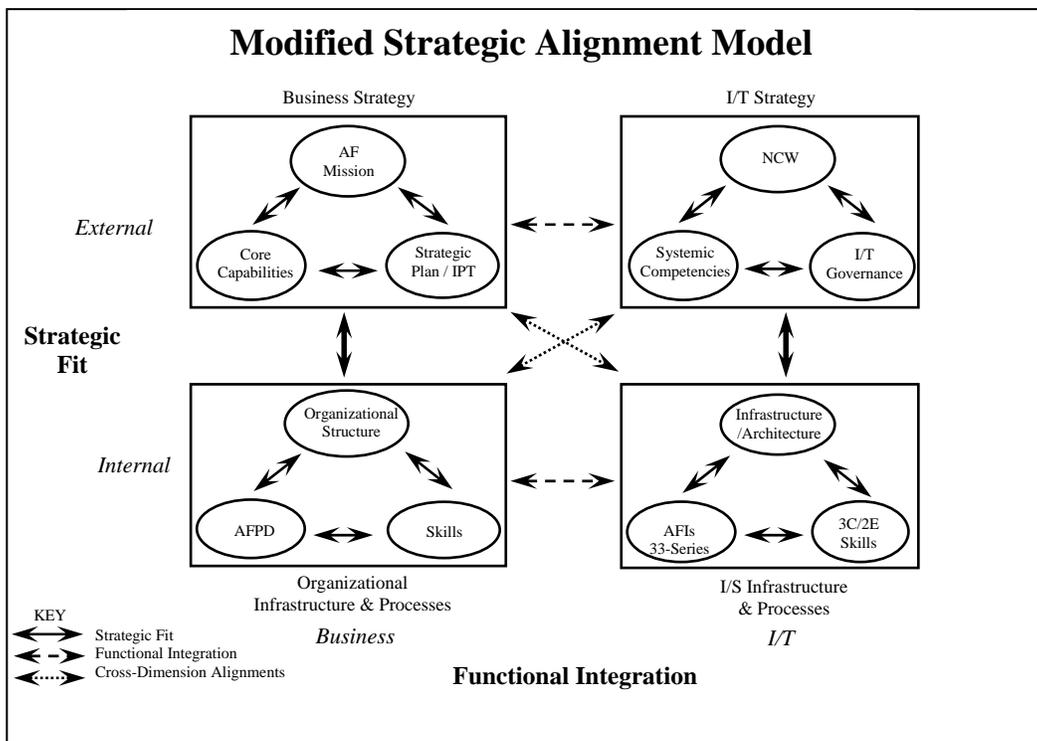


Figure 2: Adapted Strategic Alignment Model - Air Force

One component essential to both versions of the SAM is the need for IT Governance. Therefore, in order to establish strategic alignment within an organization, it can be suggested that management must first establish IT Governance practices. In order to achieve alignment of mission and IT objectives, it is essential for leadership to develop IT Governance procedures,

disseminate these throughout the Air Force and train all personnel on their relevance, since it is the business processes and changes to policy and doctrine that will exploit technology.

Table 1: Proposed Air Force Adaptation to SAM

Traditional SAM Components	Definition	Air Force Modification	Air Force Equivalent
Business Strategy Business Scope	How an organization distinguishes itself from the competition. [6] The overall goals of the organization.	AF Mission	The mission of the Air Force
Distinctive Competencies	The strategies used to deliver a product to the customers. What gives the organization an advantage and differentiates it from competition.	Core Capabilities	Air and Space Superiority Global Attack Precision Engagement Agile Combat Support Information Superiority
Business Governance	Business processes that are in place to execute a strategy.	Strategic Planning	IPTs, BMMP, OSMP
Organizational Infrastructure and Processes Operational Infrastructure	The internal hierarchy that is in place that supports the execution of a business strategy, policy writing and decision making.	Organizational Structure	HQ/USAF, DRUs, Agencies, Wings, Squadrons
Skills	Identifies the key skills of staff members who need to carry our business processes and business strategies	Skills	PME, IDE, SDE
Processes	The processes in place to support the execution of a business strategy. Those choices that define how key business processes will operate.	AFIs/SOPs/ AFPDs	Operations Series
IT Strategy Technology Scope	Addresses the available technology that can be used to support the business strategy and which IT systems are critical to the organization. [6] (i.e. LANs, expert systems)	NCW	LAN, GIG
Systemic Competencies	The specific attributes IT needs to have to support the business strategy. Those attributes of IT strategy that could contribute to the creation of new business strategies.[6] (i.e. value of IT)	Systemic Competencies	Lethality, Speed, Survivability, Timeliness, Responsiveness Richness, Reach
IT Governance	Strategies for creating and providing the overall IT strategy that supports IT. The ultimate goal of the IT infrastructure.	IT Governance	AF lacks IT Governance Procedures/Guidance
IT Infrastructure and Processes IT Infrastructure	The policies that define the overall software and hardware infrastructures. (Configuration management)	IT Infrastructure	CITS, AF Enterprise
Processes	Key Information security policies and procedures that govern the daily operations of the IT organization.	AFIs	33- series
Skills	The technical skills needed by personnel in the IT organization	Technical Training	2E/3C Skill sets

Adoption of a strategic alignment framework, such as the SAM, will assist both the communications and non-communications personnel alike manage the value of IT. It will help alleviate the misconception that an IT outage is primarily an IT problem, since with NCW, the success of mission depends on the integration of IT and the unit's mission. A framework such as SAM could potentially help the military assess a tangible value to an IT investment and link an IT outage with a mission impact, something that is lacking in the current IT infrastructure on today's military networks and GIG concept.

Conclusion

If the military continues to rely on technology to help fight wars, execute its missions and transform the force, it will need to develop structures, doctrine, and policies that are aligned to facilitate those initiatives. In order maximize the effectiveness of new technologies, personnel must embrace these new technologies and understand how each facilitate the mission objectives of the unit. Technology may make the forces faster and leaner, but it is only through IT Governance and strategic alignment that the military will maintain its success on the battlefield.

Alignment is an essential piece to achieving an E-Business strategy, and in order for the military to embrace the components of NCW, it needs to be the backbone of its efforts. In the few instances where alignment concepts are discussed in conjunction with network centric warfare, little is actually said other than that it needs to be done. This research proposes an adaptation of Henderson and Venkatraman's Strategic Alignment Model to illustrate how these concepts from the private sector can be applied to military operations.

While the military does focus on other essential elements required for implementing NCW, its measurement of success comes from the execution of technology on the battlefield. However, as our enemies learn to exploit those capabilities; our true competitive edge as it

relates to NCW will come from the development of IT Governance procedures and strategic alignment of our IT and mission objectives. Becoming a truly agile force is the only way to contend with a rapidly changing environment and to exploit our enemy's vulnerabilities through information superiority.

Furthermore, if the military is going to rely on technology to help fight wars, and execute its mission, it is going to need to develop doctrine and policies that are aligned and complement those technologies, and since eventually those technologies will become obsolete. An adoption of a strategic alignment framework will facilitate with short, medium and long term strategic IT and mission planning at all levels. Without developing these procedures, our technicians and leaders will continue to lack the mission perspective necessary to make strategically sound decisions.

In conclusion, the Global War on Terrorism has required the military to be a more agile force. The required flexibility associated with this change challenges many of the traditional paradigms the military holds on executing war and peace time operations. The DoD wants to leverage new technologies similar to the private sector. In order to harness the power from technology and to truly capitalize on the opportunities presented by these new technologies, the military needs to draw upon the lessons learned from the private sector. There is little doubt that these technologies will enable the military to transform its operations into the Information Age, but it will take more than just technology to move the military from a platform-based to a capabilities-based force, since "even technologically backward societies have a nasty habit of devising strategies to offset America's high-tech superiority." [4] NCW has the ability to provide commanders with unparalleled situational awareness of the battlefield. However, only

when the IT objectives are aligned with the mission objectives can the IT infrastructure lift some of the “fog of war” associated with battle.

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